



Naval Facilities Engineering Command Southwest
BRAC PMO West
San Diego, CA

DRAFT
FINAL STATUS SURVEY REPORT

For Select Areas within the Excavation Boundary
Non-Time Critical Removal Action for Solid Waste Disposal Areas
Westside Drive, Bayside Drive, and North Point Drive
Installation Restoration Site 12 (Phase III)

FORMER NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

December 2018

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Contract Number: N62473-12-D-2005; Task Order: 0004
DCN: APTM-2005-0004-0120



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Appendix F	Data Validation Reports
Appendix G	Field Work Variances

Acronyms and Abbreviations

²²⁶ Ra	radium-226
APTIM	Aptim Federal Services, LLC
bgs	below ground surface
CB&I	CB&I Federal Services LLC
COC	contaminant of concern
DCGL	derived concentration guideline level
DQO	data quality objective
FSS	final status survey
FSSR	final status survey report
GPS	global positioning system
GWS	gamma walkover survey
H ₀	null hypothesis
H _a	alternative hypothesis
IC	investigation criteria
IL	investigation level
LBGR	lower boundary of the gray region
LLRO	low-level radiological object
LLRW	low-level radioactive waste
MARSSIM	<i>Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)</i>
MDC	minimum detectable concentration
mrem/yr	millirem per year
NaI	sodium iodide
Navy	U.S. Department of the Navy
NRC	U.S. Nuclear Regulatory Commission
NSTI	former Naval Station Treasure Island
NTCRA	non-time critical removal action
PAL	project action limit
pCi/g	picocurie per gram
PCSR	<i>Post-Construction Summary Report, Non-Time Critical Removal Action for Solid Waste Disposal Areas Westside Drive, Bayside Drive, and North Point Drive, Radiological Characterization, Building Demolition, and Remediation, Installation Restoration Site 12 (Phase III) Former Naval Station Treasure Island, San Francisco, California</i>
Pr	random shift probability
ROC	radionuclide of concern
RSY	radiological screening yard
RURR	Radiological Unrestricted Release Recommendation
Shaw	Shaw Environmental, Inc.
Shaw E&I	Shaw Environmental & Infrastructure, Inc.
SU	survey unit
SWDA	solid waste disposal area
the Site	Installation Restoration Site 12
TI	Treasure Island

Acronyms and Abbreviations (continued) _____

Work Plan	<i>Final Work Plan for the Non-Time Critical Removal Action for Solid Waste Disposal Areas Westside, Bayside, and North Point at Installation Restoration Site 12 (Phase III) at Former Naval Station Treasure Island, San Francisco, California</i>
WRS	Wilcoxon Rank Sum
YBI	Yerba Buena Island

1.0 INTRODUCTION

Aptim Federal Services, LLC (APTIM) conducted a non-time critical removal action (NTCRA) at the following solid waste disposal areas (SWDAs) located within Installation Restoration Site 12 (the Site) at the former Naval Station Treasure Island (NSTI), San Francisco, California:

- SWDA Westside (Westside Drive; formerly known as SWDA A/B)
- SWDA Bayside (Bayside Drive; formerly known as SWDA 1207/1209)
- SWDA North Point (North Point Drive; formerly known as SWDA 1231/1233)

Figure 1 shows the generic site location on Treasure Island (TI) and Figure 2 shows the actual removal action excavation boundaries at SWDAs Bayside and North Point.

To pursue and support a Radiological Unrestricted Release Recommendation (RURR) for SWDA Bayside, SWDA North Point, and SWDA Westside, post-excavation radiological surveys were conducted in accordance with the *Final Work Plan for the Non-Time Critical Removal Action for Solid Waste Disposal Areas Westside, Bayside, and North Point at Installation Restoration Site 12 (Phase III) at Former Naval Station Treasure Island, San Francisco, California* (Work Plan; CB&I Federal Services LLC [CB&I], 2015a) and the *Sitewide Radiation Protection Plan, Naval Station Treasure Island, San Francisco, California* (CB&I, 2014). The Work Plan and this Final Status Survey Report (FSSR) were prepared for the U.S. Department of the Navy (Navy), Naval Facilities Engineering Command Southwest, under Contract No. N62473-12-D-2005, Contract Task Order 0004. The work was conducted between May 2015 and December 2017.

This FSSR describes the final status survey (FSS) activities performed in accordance with Phase III project operations, presents results and findings, and provides evidence to support a RURR for remediated and debris-free areas within excavation boundary (survey unit [SU] bottoms and sidewalls) at:

- SWDA Bayside
- SWDA North Point

Project data to support a RURR for SWDA Westside is not presented in this report. Additional radiological remediation activities are planned under future Navy contracts.

Additional radiological remediation activities are also planned under future Navy contracts for specific excavation sidewall sections at SWDAs Bayside and North Point; see Section 4.6.2 for more details.

1.1 Site Location

TI is a 403-acre man-made island located next to a natural rock island, Yerba Buena Island (YBI), in the San Francisco Bay (Figure 1). TI was constructed of materials dredged from the San Francisco Bay from 1936 to 1937 for the Golden Gate International Exposition of 1939 and 1940. In 1940, the Navy began leasing TI from the City and County of San Francisco and later, during World War II, gained full ownership of NSTI. YBI, a 147-acre natural island, has been under military control since 1867. The primary function of YBI was to provide training, administration, housing, and support services to the U.S. Pacific Fleet. In 1993, NSTI was designated for closure under the Base Realignment and Closure Act of 1990. NSTI was closed on September 30, 1997.

1.2 Project Location and Description

The Site is located on the northwest portion of TI on a relatively flat 93-acre area (Figure 1). The Site consists of multiplex housing units with private backyards and common area front yards, side yards, and surrounding greenbelts. SWDAs Bayside and North Point consist of an approximate 3.5-acre area on the north side of the Site abutting Perimeter Road (Figure 2), and were known to contain chemical contaminants (predominantly lead) which were co-located with radiological objects containing radium-226 (^{226}Ra) and localized ^{226}Ra contaminated soil.

Several different phases of removal action work have taken place at the Site. The work described in this FSSR constituted Phase III of the NTCRA executed to remove chemical contaminants of concern and radionuclides of concern (ROCs). During Phase I, the Site SWDA Westside was excavated to 4 feet below ground surface (bgs) with the exception of building footprints. SWDAs Bayside and North Point were also excavated as part of Phase I to approximately 4 feet bgs to remove chemical contaminants of concern; however, radiological surveys and sampling to support radiological release were not addressed at the time. Upon completion of the removal of chemically contaminated soil, Phase I excavation areas at SWDAs Bayside and North Point were backfilled with clean import fill. Several locations of contaminants of concern (lead) or ^{226}Ra remained beneath the building footprints including Buildings 1207, 1209, 1211, and 1213 at SWDA Bayside and Buildings 1231 and 1233 at SWDA North Point as described in the Work Plan (CB&I, 2015a). The Phase II included building demolition of two buildings (Buildings 1121 and 1323) at SWDA Westside (only). Under this NTCRA (Phase III), the buildings under which known contamination was present were demolished. This facilitated access to the contaminated soil beneath. The previously backfilled Phase I excavation areas were re-excavated and exposed to allow for radiological investigation. During this re-excavation action, the clean fill was set aside for reuse as backfill. The 1 foot of clean import fill that was closest to the original excavation boundary “buffer material” was separately removed and radiologically scanned, sampled, and cleared before reuse. Section 5.1.7 further describes the different categories of soil handled and processed during the NTCRA.

1.3 Current and Future Land Use

The current land use of TI is a combination of residential, open space, publicly-oriented, institutional, and community uses. In addition to residences, there are soccer and rugby fields, baseball diamonds, an elementary school, and a daycare center.

The approximate residential population is 3,500 as identified in the *Treasure Island Naval Station Historical Radiological Assessment, Former Naval Station Treasure Island, San Francisco, California* (Weston Solutions, Inc., 2006). According to the *Final Treasure Island/Yerba Buena Island Redevelopment Plan Adoption, Naval Station Treasure Island Reuse Plan—Public Review Draft* (Seifel Consulting, Inc., 2010) and the *Final Environmental Impact Report, Treasure Island/Yerba Buena Island Redevelopment Project* (City and County of San Francisco, 2011), TI is proposed for future reuse as residential, open space, and publicly-oriented uses.

1.4 Scope of Work and Objective

The scope of Phase III FSS project operations included the following:

- Preparation of plans and reports
- Implementation of Navy approved portions of the *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)* (MARSSIM; U.S. Nuclear Regulatory Commission [NRC] et. al., 2000) process for characterization, remediation, and FSSs in support of demonstrating suitability for Radiological Unrestricted Release
- Radiological survey and sampling of project areas following excavation and remediation activities including removal of SWDA waste/debris
- Scientific analysis of radiological survey and sampling data
- Dose modeling and FSSR preparation

The objective of these tasks was to provide evidence to support a RURR for remediated and debris-free areas within SWDA excavation boundaries (SU bottoms and sidewalls) following excavation and removal action activities.

The scope included examination of previous excavation boundaries and continuation of excavations vertically and laterally until solid waste was removed and the excavation boundary sidewalls and bottom were deemed free of solid waste/debris. In several instances, both at SWDAs Bayside and North Point, excavations extended beyond the originally planned depth of 4 feet bgs. Planned SU excavation bottoms presented in this FSSR were excavated until they reached a waste/debris-free depth of clean soil/dredge material and thereby constituted a representative debris-free/“clean” FSS surface area. Excavations were also extended laterally at both SWDAs. Section 6.0 Final Status Survey Gamma Survey Results and Figures 7 and 8 detail what sidewalls were excavated until debris-free. The same figures also detail what sidewalls were not debris-free and require further action. The debris-free excavation sidewall and

bottom surfaces were sampled to verify the excavation boundaries met the chemical clean up goals and were then also gamma scanned and radiologically sampled. It should be noted that completing the sidewall waste/debris removal in the specific locations, noted on Figures 7 and 8, was not possible due to contractual excavation volume limitations of the contract. However, the RURR is supported in all other remediated and debris-free excavation areas, as described in the following sections of the report.

1.5 Deviations from Planning Documents

Due to changed site conditions and increased scope, several deviations from the Work Plan (CB&I, 2015a) occurred during the course of fieldwork, and are described as follows:

- Radiological surveying and support operations performed during Phase III project operations at SWDA Westside are not considered FSS activities and are therefore not included in this report. Additional radiological remediation activities are planned under future Navy contracts.
- Extensive debris was identified beyond both the planned vertical excavation boundary of 4 feet bgs and the lateral boundaries for SWDAs Bayside and North Point. This resulted in the majority of the contracted excavation volumes being expended at SWDAs Bayside and North Point. By reallocating excavation capacity from SWDA Westside to SWDAs Bayside and North Point, excavations could be extended deeper and wider to support debris removal.
- Final radiological characterization of lateral excavation boundaries (sidewalls) at SWDAs Bayside and North Point was not possible in specific locations due to the presence of embedded debris identified in select sidewall surfaces. These specific debris laden sidewalls did not receive a radiological FSS. Debris-free sidewall surfaces above the excavation water line were radiologically surveyed in situ; sample results are provided in this FSSR to support the RURR for SWDAs Bayside and North Point. As per the *Post-Construction Summary Report, Non-Time Critical Removal Action for Solid Waste Disposal Areas Westside Drive, Bayside Drive, and North Point Drive, Radiological Characterization, Building Demolition, and Remediation, Installation Restoration Site 12 (Phase III) Former Naval Station Treasure Island, San Francisco, California* (PCSR; APTIM, 2018), debris-free sidewall surfaces below the waterline were excavated and transported to an RSY pad with the excavated FSS layer from the bottom for final ex situ survey and sampling; see Sections 4.6.2 and 5.2 for more details.
- The demolition of Building 1235 at SWDA North Point, excavation of impacted soil from within the building footprint, and radiological characterization of excavated material were added to the original scope of work as defined in the Work Plan (CB&I, 2015a). This project action area was designated SWDA North Point SU 7. FSS activities were performed in situ at the final surface depth of the excavation (APTIM, 2018).

1.6 Report Organization

This FSSR consists of nine sections and provides descriptions of the specific activities performed during the FSS radiological activities at the Site. The report is organized as follows:

- **Section 1.0, “Introduction”**—Section 1.0 provides an introduction, site location and description, current and future land use, the scope of work and objective, deviations from planning documents, and report organization.
- **Section 2.0, “Historical Site Assessment”**—Section 2.0 presents the Site history and ROCs and describes previous investigation and removal actions at the Site.
- **Section 3.0, “Final Status Survey Evaluation and Methodology”**—Section 3.0 presents the evaluation of radiological screening data with respect to the FSS objectives.
- **Section 4.0, “Radiological Survey Design”**—Section 4.0 describes the conceptual site model; reviews the data quality objectives (DQOs); and discusses the minimum detectable ²²⁶Ra concentration, the reference areas, screening level, and the SUs.
- **Section 5.0, “Field Activities”**—Section 5.0 describes the field activities conducted.
- **Section 6.0, “Final Status Survey Gamma Survey Results”**—Section 6.0 discusses the results from the FSS gamma-scanning surveys performed during this project.
- **Section 7.0, “Final Status Survey Soil Sample Results”**—Section 7.0 discusses the results from the radiological screening data evaluation and FSS soil samples.
- **Section 8.0, “Conclusions”**—Section 8.0 presents a summary of field activities and conclusions.
- **Section 9.0, “References”**—Section 9.0 includes a list of documents used to compile this FSS report.
- **Figures 1 through 8**
- **Tables 1 through 28**
- **Appendices A through G:**
 - Appendix A, “Instrument Calibration Data”
 - Appendix B, “Gamma-Scanning Data”
 - Appendix C, “Analytical Data”
 - Appendix D, “Statistical Testing and Histograms”
 - Appendix E, “RESRAD Dose and Risk Modeling”
 - Appendix F, “Data Validation Reports”
 - Appendix G, “Field Work Variances”

2.0 HISTORICAL SITE ASSESSMENT

The following subsections describe the general site history and previous investigation and removal work at the Site.

2.1 Installation Restoration Site 12 History

The Site was originally used as a parking lot during the Golden Gate International Exposition of 1939 and 1940. After Navy occupation of the island in 1940, the area was developed for bunker storage of munitions and other materials, vehicle and equipment storage, recreational playing fields, and disposal and burning of waste. Beginning in the 1960s, areas of the Site were incrementally developed into housing for Navy personnel and their dependents.

During a previous removal action conducted in 2007 (Phase I) at SWDAs Bayside and North Point, approximately 9,000 bank cubic yard of radiologically and chemically impacted soil mixed with debris were excavated from both disposal areas (Shaw Environmental & Infrastructure, Inc. [Shaw E&I], 2013a). Excavation removed the majority of the waste debris and associated chemical contaminants of concern (COCs) and some of the ^{226}Ra present; however, subsurface contamination and debris remained adjacent to the foundations of contiguous residential structures, Perimeter Road, and Bayside Drive. These areas could not be accessed during Phase I without compromising the structural integrity of the buildings and roads. Further, Phase I did not include radiological survey and sampling to support a RURR.

2.2 Previous Investigations and Removal Actions

There have been several previous investigations to delineate COCs within SWDAs Bayside and North Point. The following sections identify and summarize the investigations and removal actions relevant to the Site areas addressed in this report.

2.2.1 Investigations

In 1992 and 1995, Tetra Tech EM, Inc., conducted remedial investigations at the Site, which included aerial photograph interpretations and subsurface sampling and analysis to identify areas of suspected debris disposal. One of the suspected debris disposal areas, adjacent to Buildings 1207 and 1209, was characterized as having lead concentrations in soil above the project action limit (PAL).

In June 2000, the Navy collected 70 soil gas samples within the Site to measure volatile organic compounds sitewide. There were no detections of volatile organic compounds in the soil gas samples from SWDAs Bayside or North Point.

From September to October 2003, Shaw E&I conducted trenching and sampling throughout the Site for the Navy to evaluate potential risks to human health and to make decisions about further remedial efforts at the Site (Shaw Environmental, Inc. [Shaw], 2004). Investigated areas included: 581 exploration

trenches, 7 step-out trenches, and 7 step-out hand auger locations. The investigation specifically excluded areas that had been previously remediated or were scheduled for future remediation (i.e., the SWDAs as defined in 2003), as well as streets, sidewalks, and parking areas. The results of the trenching investigation were used to further define the SWDA boundaries. During the investigation, as each trench was excavated, a Shaw E&I geologist used a Ludlum Model 44-10 2-inch-by-2-inch sodium iodide scintillation detector to collect field readings of the trench sidewalls and the excavated soil. Results showed that excavated material did not exhibit the presence of radioactive contamination above background. This further characterization for worker protection based on the action levels prescribed in project procedures was not warranted (Shaw, 2005).

The following reports document additional investigations relevant to the Site SWDAs Bayside and North Point:

- *Revised Engineering Evaluation/Cost Analysis Solid Waste Disposal Areas, Installation Restoration Site 12 Old Bunker Area, Naval Station Treasure Island, San Francisco, California* (SulTech, 2006)
- *Screening-Level Ecological Risk Assessment for Sites 6, 12, 21, 24, 30, 31, 32, and 33, Treasure Island, California* (Tetra Tech EM, Inc., 2006)
- *Final Treasure Island Naval Station Historical Radiological Assessment, Former Naval Station Treasure Island, San Francisco, California* (Weston Solutions, Inc., 2006)
 - Summarized the Navy's documented storage and disposal activities at the Site and concluded that the potential ROC was ^{226}Ra , although it stated that the radiological contamination potential for the Site was unlikely
 - Recommended that radiation monitoring should be performed during soil excavation of the SWDAs
- *Action Memorandum/Interim Remedial Action Plan: Non-Time Critical Removal Action for Solid Waste Disposal Areas, Installation Restoration Site 12, Old Bunker Area, San Diego, California* (Navy, 2007)
- *Final Historical Radiological Assessment – Supplemental Technical Memorandum, Naval Station Treasure Island, San Francisco, California* (TriEco-Tt, a Joint Venture of TriEco LLC and Tetra Tech EM, Inc., 2014)

2.2.2 Removal Actions

In 1999, a soil removal action for lead was conducted in the vicinity of Buildings 1207 and 1209 in the northern portion of the Site adjacent to Bayside Drive (IT Corporation, 1999; Figure 2). Approximately 2,200 bank cubic yards of soil were excavated and replaced with clean fill. Confirmation soil sample data indicated the concentrations of lead and other chemical contaminants remaining in the excavation sidewalls were below the levels associated with an unacceptable risk to human health or the

environment (Tetra Tech EM, Inc., 1999). However, the removal action revealed that, in general, debris and chemical contamination associated with debris could be more widespread than indicated in the remedial investigations. Consequently, SWDAs Bayside and North Point were further investigated for debris and COCs, specifically, lead. In early August 2000, investigations in the vicinity of Buildings 1235, 1205, and 1211 led to the expansion of SWDA North Point to include Building 1235 and the backyard of Building 1237 Unit A, and SWDA Bayside to include Building 1211. There were no significant findings of lead in the backyard of Building 1205.

Additional excavation was performed within the SWDAs Bayside and North Point footprints to an approximate depth of 4 feet bgs during Phase I of the non-time critical removal action in 2007. Following excavation, chemical confirmation samples were collected from the excavation bottom and sidewalls, gamma-scanning measurements were collected where feasible, and radiological soil samples were collected for analysis at the on-site gamma spectroscopy laboratory. The excavations at SWDAs Bayside and North Point were backfilled following excavation and confirmation sampling. Site restoration was also performed.

At SWDA Bayside, chemical confirmation samples were collected from 54 excavation sidewall locations, and 16 excavation bottom locations. Chemical analyses included lead, polychlorinated biphenyl, polycyclic aromatic hydrocarbons, and dioxins/furans. Seven sidewall-sampling locations from SWDA Bayside had exhibited chemical results exceeding PALs; these locations remained in place to not compromise the structural integrity of adjacent buildings. Further, 18 sidewall samples collected for radiological characterization and counted by the on-site gamma spectroscopy laboratory had ^{226}Ra results exceeding the project-screening level of 1.69 picocuries per gram (pCi/g). These sample locations were located along building foundations or, in some cases, at the edge of the project specified excavation extent.

At SWDA North Point, chemical confirmation samples were collected from 38 excavation sidewall locations, and 16 excavation bottom locations. Chemical analyses included lead, polychlorinated biphenyl, polycyclic aromatic hydrocarbons, and dioxins/furans. Six sidewall-sampling locations from SWDA North Point exhibited chemical results exceeding PALs; these locations remained in place at the time to not compromise the structural integrity of adjacent buildings. In addition, six sidewall samples collected for radiological characterization and counted by the on-site gamma spectroscopy laboratory had ^{226}Ra results exceeding the project-screening level. These sample locations were located along building foundations or, in some cases, at the edge of the project specified excavation extent.

The residual material that exceeded the project-screening level at SWDAs Bayside and North Point were addressed during this Phase III work.

2.3 Radionuclide of Concern

The only radionuclide identified to date at the Site is ^{226}Ra , making it the sole ROC during the Phase III remedial activities. ^{226}Ra has a half-life of approximately 1,600 years. During Phase III operations,

673 low-level radiological objects (LLROs) composed of ^{226}Ra were discovered, most during intrusive work activities at SWDAs Bayside (337) and North Point (81). Many of the identified ^{226}Ra sources appeared to be legacy commodities/objects (devices such as dials and gauges) and disk sources, though many were unrecognizable and best described as rusted and corroded metal fragments, fragments likely from dials, gauges, and luminescent devices. Identified ^{226}Ra LLROs also include hexagonal and octagonal disks, which are suspected to have been used as calibration sources associated with historical Navy radiation detection instruments (TriEco-Tt, a Joint Venture of TriEco LLC and Tetra Tech EM, Inc., 2014).

3.0 FINAL STATUS SURVEY EVALUATION AND METHODOLOGY

This section provides an overview of the FSS process implementation of this NTCRA. Section 5.2 describes, in further detail, the step-by-step FSS activities.

Per California Department of Toxic Substances Control/California Department of Public Health-approved project Work Plan (CB&I, 2015a), each SWDA was divided into several SUs and evaluated according to criteria based on the MARSSIM process (NRC et. al., 2000).

Prior to FSS field activities for a particular SU, chemically and radiologically contaminated soil and debris from the SU were excavated until no visible debris or contamination could be identified in order to generate a representative FSS surface area. Once the contaminated soil and debris was removed, FSS field activities were performed for the purposes of characterizing the soil at the SU's final excavation surface. These activities included:

- Gamma count rate surveys covering 100 percent of the final excavation surface (either in situ at the dry excavation, or ex situ on RSY pads)
- Biased sampling (as needed according to gamma survey data results), followed by surgical remediation (as per MARSSIM, NRC et. al., 2000) for localized areas where biased sample results confirmed ^{226}Ra concentrations in excess of the project-screening level of 1.69 pCi/g
- Systematic soil sampling and off-site gamma spectroscopy analysis (to quantify radiological soil concentrations)

First, analytical results from the SU were compared with a dose-based criterion to demonstrate that the potential residual radioactivity within the SU meets federal dose standards. Second, analytical results and scanning measurements from the SU were statistically evaluated to demonstrate that residual radioactivity within the SU is comparable to Sitewide Background analytical results; Figure 3 shows background reference area locations). Both criteria are required for consideration of radiological release. To achieve radiological release criterion, FSS data were evaluated as per MARSSIM standards and included the following:

- Gamma spectroscopy results for SU soil samples were evaluated to confirm that ^{226}Ra concentrations do not exceed the screening level of 1.69 pCi/g, as indicated in the project Work Plan (CB&I, 2015a).
- Gamma spectroscopy results were statistically evaluated to demonstrate comparability to Sitewide Background soil concentrations for ^{226}Ra , and to demonstrate that adequate sampling was performed to satisfy DQOs; see Section 4.1 for more details.

- Gamma count rate survey results were evaluated to identify localized areas where gamma activity indicated possible ^{226}Ra concentrations exceeding the screening level of 1.69 pCi/g.
 - Gamma scan and static count rates were not used to make FSS decisions or to directly quantify ^{226}Ra soil concentrations.
 - Locations with gamma count rates exceeding the investigation criteria (IC) were further evaluated via additional gamma surveys and/or biased soil sampling; see Sections 3.4 and 5.2 for more details.
 - Localized areas with ^{226}Ra soil concentrations exceeding the screening level of 1.69 pCi/g were surgically remediated (as per MARSSIM specifications; NRC et. al., 2000) and gamma spectroscopy results from soil samples collected at the remediation boundaries were evaluated to confirm compliance with the project-screening level and DQOs; see Sections 4.1 and 5.2 for more details.
- Dose modeling and risk assessment for each SU was also performed via the RESRAD-ONSITE 7.2 code. Net ^{226}Ra concentrations were determined by subtracting the Sitewide Background average of 0.69 pCi/g from SU soil sample results. The maximum net concentration for each SU was then used to develop maximum possible excess (above background) dose and risk projections; see Section 7.6 for more details.

3.1 Planned Activities and Objectives

Per the Work Plan (CB&I, 2015a), planned FSS radiological activities during Phase III for SWDAs Bayside and North Point included the following:

- Determination of background radioactivity and radionuclide concentrations
- Gamma count rate surveys and sampling of final surfaces following SWDAs Bayside and North Point Phase III excavation and remediation operations; see PCSR (APTM, 2018) for project excavation and remediation details
 - Accessible surfaces above the excavation water line were surveyed in situ at final excavation bottom depths and sidewalls
 - Inaccessible surfaces submerged beneath the water line were surveyed ex situ on radiological screening yard (RSY) pads
- Evaluation of FSS radiological data (described in Section 3.0)

FSS operations were planned for SWDA SUs; however, final radiological characterization was not completed for sections of SWDA Bayside sidewall SU 9 and SWDA North Point sidewall SU 5 due to the presence of embedded debris in select sidewall surfaces. All planned SU excavation bottoms at SWDAs Bayside and North Point were excavated until they constituted a clean FSS surface area (free of debris).

Sidewalls were also excavated until they were free of debris with the exception of sidewalks facing Perimeter Road and a section along North Point Drive (Figures 7 and 8).

Systematic and biased sample results from remediated and debris-free surface areas are included in this report to support the RURR for SWDAs Bayside and North Point (refer to Section 1.5 for more details).

3.2 Radiological Survey Instrumentation

FSS gamma count rate surveys consisted of scan and static measurements collected using either a Ludlum Model 44-20 3-inch-by-3-inch sodium iodide (NaI) detector with a Ludlum Model 2221 ratemeter/scaler, or a Radiation Solutions, Inc., RS-700 gamma-scanning system, which consists of two 256-cubic-inch RSX-1 NaI detectors. Instruments were maintained at specified distances from the surface (10 centimeters for 44-20 NaI detectors and 15.24 cm for the RSX-1 detectors) during gamma count rate surveys.

Appendix A provides calibration and quality control records for gamma survey instruments used during SWDAs Bayside and North Point Phase III operations. Instruments were properly calibrated and used according to approved work procedures.

The following subsections provide details on the radiation detection instruments used during FSS operations.

3.2.1 Instrument Selection

Radiological survey instruments selected are suitable for the physical and environmental conditions at the Site work area. The instruments and measurement methods selected are able to detect ^{226}Ra and are, in relation to the survey or analytical technique, capable of measuring levels sufficient to support the DQOs described in Section 4.1. Radiological instruments were calibrated at least annually using appropriate National Institute of Standards and Technology traceable standards. Table 5 lists specific instruments used during FSS operations.

3.2.2 Instrument Calibration

Portable survey instrument calibration was completed on an annual frequency, and the RS-700 was calibrated on a biennial frequency. Instrument calibration was also performed after repairs or modifications, and instruments were calibrated according to manufacturer recommendations. Appendix A presents instrument calibration records for instruments used during FSS operations.

3.2.3 Instrument Operational Checks

Calibration verifications, physical inspections, battery checks, and source response quality control checks were performed daily in accordance with TIWI-12-01 (Shaw, 2012a) prior to use of survey instruments. Only those instruments that met the response check requirements, were free of physical damage, had appropriate battery voltage levels, and had current calibrations were used in the field. Appendix A provides instrument quality control check data.

3.2.4 Instruments for Measuring Gamma Activity

Gamma radiation surveys were performed using one of two types of gamma radiation detectors.

3.2.4.1 3-inch by 3-inch Sodium Iodide

A mounted gamma radiation detector was used during in situ gamma walkover survey (GWS) to scan excavation bottom surfaces and during ex situ GWSs of over-excavated soil on RSY pads. This detector set consisted of a Ludlum Model 44-20 3-inch-by-3-inch NaI gamma scintillation detector coupled with a Ludlum Model 2221 ratemeter/scaler. The Ludlum Model 44-20 detection system was paired with a Trimble global positioning system (GPS) unit to log measurements and collect positional data.

Gamma static surveys performed with the Ludlum Model 44-20/2221 combination were conducted in the same manner as a GWS, except that counts were acquired from a stationary position at a given survey location and collected for an interval of one minute. The technician ensured the face of the detector was maintained 4 inches above the surface while collecting the static measurement.

An *a priori* investigation level (IL) count rate was defined specifically for each ratemeter/scaler detector pair, for each media (e.g., soil and asphalt) and for each type of survey (GWS or gamma static), based on count rates collected at reference area locations. The IL is defined as the mean reference area count rate plus three standard deviations, and it represents the threshold below which 99.7 percent gamma count rates should occur in background. The IC for ratemeter/scaler detector pairs for FSS gamma scan data was primarily set to the soil reference area scan IL specific to the instrument pair. However, varying site conditions occasionally precipitated the need for additional screening criteria, in which case survey locations where count rates exceeded either the IL or three standard deviations of the dataset average were investigated further via one-minute static measurements.

All static measurement data collected with a ratemeter/scaler detector pair were evaluated using the soil reference area static IL specific to the instrument pair.

3.2.4.2 256-cubic-inch Sodium Iodide

A large area gamma-scanning system (RS-700) was also used for ex situ GWSs to scan over-excavated soil on RSY pads, where practical. The system consists of two Radiation Solutions, Inc., RSX-1 4-inch-by-4-inch-by-16-inch (256-cubic-inch) NaI scintillation detectors coupled to a RS-701 console for advanced digital spectrometry capability and an external Trimble GPS unit and antenna to collect positional data.

The IC for RS-700 FSS gamma scan data was established as per *the RSI Data Evaluation Process* (CB&I, 2015b), and primarily consisted of survey locations where the count rates at specific energy ranges resulted in Z-scores greater than three (compared to the scan dataset). All locations exceeding the IC were investigated further via one-minute static measurements with a Ludlum Model 44-20/2221.

4.0 RADIOLOGICAL SURVEY DESIGN

This section discusses radiological survey design elements, including a review of DQOs, minimum detectable ²²⁶Ra concentration calculations, reference area details, screening levels, and SU parameters.

4.1 Review of Data Quality Objectives

DQOs are qualitative and quantitative statements developed as follows:

- To define the purpose of the data collection effort
- To clarify what the data should represent to satisfy this purpose
- To specify the performance requirements for the quality of information to be obtained from the data

These outputs are used to develop a data collection design that meets performance criteria and other design requirements and constraints. U.S. Environmental Protection Agency specified a seven-step process to develop DQOs (U.S. Environmental Protection Agency, 2006) which was adapted for use in MARSSIM (NRC et al., 2000). The following subsections summarize and expand on the DQOs identified in the Work Plan (CB&I, 2015a).

4.1.1 Step One—State the Problem

Confirmation of complete remediation at SWDAs Bayside and North Point are required for unrestricted release of the SWDA project areas. Phase III FSS operations provide data showing that residual radiological contamination is not present within project area boundaries following remediation of the SWDAs. Further actions within areas delineated by excavation boundaries are not warranted.

4.1.2 Step Two—Identify the Decision

The decisions required for the FSS are as follows:

Do the survey and sampling results support a conclusion that radiological contamination within project area limits has been remediated, that the excavation bottom surfaces are free of debris, and that no further investigation is warranted? Do the survey and sampling results support a conclusion that the radioactivity at final excavation depths is comparable to background, and that the remediated and debris-free areas within SWDA excavation boundaries (SU bottoms and sidewalls) are suitable for a RURR?

4.1.3 Step Three—Identify Inputs to the Decision

Inputs to the decision included the following:

- Visual observation of debris
- Gamma scan data and gamma measurements at (biased) locations identified from scan data analysis
- Systematic soil samples collected from final excavation depths covering the entire span of SWDAs Bayside and North Point lateral boundaries
- Biased soil samples collected from the final excavation depths of project area surfaces

4.1.4 Step Four—Define the Study Boundaries

Figures 5 and 6 show the final lateral excavation boundaries for Phase III operations for SWDAs Bayside and North Point, respectively. Vertical excavation boundaries varied according to the variable depth of identifiable debris; see PCSR (APTIM, 2018) for more details. Each excavation was backfilled to the original grade following confirmation that soil from the final depth was deemed comparable to background.

For FSS activities and dose modeling, the FSS boundaries are defined as the top 6 inches of surface soil at final excavation depths. This soil was evaluated in situ where accessible, or otherwise over-excavated and evaluated ex situ on RSY pads (FSS RSY soil). Debris-free sidewall surfaces were also radiologically surveyed and sample results are provided in this FSSR to support the RURR for the excavated portions of SWDAs Bayside and North Point.

4.1.5 Step Five—Develop a Decision Rule

If the survey results do not exceed the project-screening level or federal dose and risk criteria, and there is no sign of debris or evidence of radiological contamination, then excavation and FSS data will be used to support a conclusion that excavated and debris-free surface areas at SWDAs Bayside and North Point meet the requirements for unrestricted radiological release. If the results of the survey exceed the project-screening level or federal dose criteria or if evidence of debris is found, then suspect areas will require further investigation or remediation.

4.1.6 Step Six—Specify Limits on Decision Errors

Limits on decision errors are set at 5 percent.

4.1.7 Step Seven—Optimize the Design for Obtaining Data

To the extent practical, the design for collecting data presented in this FSSR was optimized to achieve the stated DQOs. The scope of work and data collection process were designed to provide near real time data during implementation of field activities. These data were used to modify and expand the scope of field activities, as needed, and to verify that the DQOs were met.

4.2 Minimum Detectable Radium-226 Concentration

The analytical minimum detectable concentration (MDC) requirement was 0.5 pCi/g for the laboratory ^{226}Ra gamma spectroscopy. Analysis of TestAmerica MDCs using gamma spectroscopy analysis for ^{226}Ra for the FSS soil samples show all sample-specific ^{226}Ra MDCs are less than 0.5 pCi/g, with a maximum sample-specific ^{226}Ra MDC of 0.426 pCi/g. The precision error associated with the gamma spectroscopy results was 10 percent or less.

4.3 Reference Areas

Background surface soil samples were collected from 20 random non-impacted locations at NSTI. These 20 samples (known as the Sitewide Background dataset) were analyzed for ^{226}Ra using gamma spectroscopy. Data from these samples (Table 3) are discussed in additional detail in the memorandum *Analysis of Gamma Survey and Radium-226 Soil Concentration Data at the NSTI Sitewide Background Areas and the Area 7 Background Reference Area* (Shaw, 2012b). The mean ^{226}Ra concentration in these 20 soil samples is 0.69 pCi/g.

NSTI background Reference Area 7 and Reference Area 8 were used to establish appropriate instrument-specific gamma scan and static ILs for evaluating soil surfaces. NSTI background Reference Area 9 and Reference Area 6 were used to establish appropriate instrument-specific gamma scan and static ILs for evaluation of paved surfaces, such as asphalt or concrete. Figure 3 shows the reference areas and background soil sample locations.

An *a priori* IL count rate was defined specifically for each ratemeter/scaler detector pair, for each media (e.g., soil and asphalt), and for each type of survey (GWS or gamma static); Appendix B lists instrument-specific ILs.

4.4 Screening Level

The soil screening level for ^{226}Ra , intended to trigger further investigation and/or soil remediation activities, was 1 pCi/g above the mean reference area background ^{226}Ra concentration. Therefore, the screening level for ^{226}Ra was defined as 1.69 pCi/g. For the calculations in this FSS report, the 1 pCi/g value was used as the derived concentration guideline level (DCGL).

4.5 Radiological Analyses

Soil samples were sent to TestAmerica for preliminary (seven-day) ^{226}Ra analysis by gamma spectroscopy in accordance with the Sampling and Analysis Plan (Appendix D of the Work Plan; CB&I, 2015a). The gamma spectroscopy library included naturally-occurring radionuclides. Following initial review of 7-day results, samples were counted following the full 21-day ingrowth period and were reported using the 609-kiloelectron-volt gamma emission from bismuth-214. ^{226}Ra data from the 21-day ingrowth analysis are reported as the final data.

4.5.1 Radiological Sample Screening

Prior to sample collection, the surface of each sample location was screened for radioactivity using a Ludlum Model 44-20 gamma scintillation detector. Screening count rate measurements were compared with an instrument-specific IL to identify the need for further analysis or investigation prior to sample collection.

4.6 Survey Unit Design and Classification

SWDAs Bayside and North Point were subdivided into SUs according to the following chart (see Figures 5 and 6 for SU locations):

SWDA SU Descriptions

SWDA	SU	Description
Bayside	SU 1	FSS operations performed ex situ on soil over-excavated from the bottom surface at the final depth of the excavation (Figure 5).
Bayside	SU 2	FSS operations performed ex situ on soil over-excavated from the bottom surface at the final depth of the excavation (Figure 5).
Bayside	SU 3	FSS operations performed ex situ on soil over-excavated from the bottom surface at the final depth of the excavation (Figure 5).
Bayside	SU 4	FSS operations performed ex situ on soil over-excavated from the bottom surface at the final depth of the excavation (Figure 5).
Bayside	SU 5	FSS operations performed ex situ on soil over-excavated from the bottom surface at the final depth of the excavation (Figure 5).
Bayside	SU 6	FSS operations performed ex situ on soil over-excavated from the bottom surface at the final depth of the excavation (Figure 5).
Bayside	SU 7	FSS operations performed ex situ on soil over-excavated from the bottom surface at the final depth of the excavation (Figure 5).
Bayside	SU 8	FSS operations performed in situ for accessible (above water) surfaces at the bottom of the excavation, and ex situ on over-excavated soil for inaccessible (underwater) surfaces (Figure 5).
Bayside	SU 9	SWDA Bayside Sidewalls (Figure 7); radiological screening performed (Section 4.6.2). Soil sample results provided to support a RURR for SWDA Bayside.
North Point	SU 1	FSS operations performed in situ for accessible (above water) surfaces at the bottom of the excavation, and ex situ on over-excavated soil for inaccessible (underwater) surfaces (Figure 6).
North Point	SU 2	FSS operations performed ex situ on soil over-excavated from the bottom surface at the final depth of the excavation (Figure 6).
North Point	SU 3	FSS operations performed ex situ on soil over-excavated from the bottom surface at the final depth of the excavation (Figure 6).
North Point	SU 4	FSS operations performed ex situ on soil over-excavated from the bottom surface at the final depth of the excavation (Figure 6).
North Point	SU 5	SWDA North Point Sidewalls (Figure 8); radiological screening performed (Section 4.6.2). Soil sample results provided to support a RURR for SWDA North Point.

SWDA	SU	Description
North Point	SU 6	Not used (placeholder for possible SU designation/use).
North Point	SU 7	FSS operations performed in situ on the bottom surface at final excavation depths (Figure 6).

The following subsections describe the SWDAs Bayside and North Point SUs evaluation for FSS activities.

4.6.1 Excavation Bottom Surfaces at Final Excavation Depths

Both SWDAs Bayside and North Point were divided into SUs prior to excavation as described in the chart above (Figures 5 and 6). SUs were demarcated with a planned maximum surface area of approximately 1,000 square meters each and surveyed conservatively at a Class 1 frequency per MARSSIM (NRC et. al., 2000), with 100 percent gamma scanning and sampling at a minimum frequency of 20 samples per 1,000 square meters (Section 7.5). Note: SWDA North Point SU 6 was used as a SU designation placeholder for project planning purposes and was not used during project operations.

Following Phase III excavation operations, FSS activities were performed on soil originating from the bottom surface of the final excavation for each SU. Where accessible, gamma surveys and soil sampling were performed in situ; however, tidal water/groundwater infiltration of excavation areas prevented in situ FSS activities at final excavation depths for most of the SUs. In such cases, a 6-inch representative layer of soil was over-excavated from the final depth of the excavation and radiologically characterized ex situ on RSY pads (Figure 4).

Results from in situ and ex situ FSS activities performed on soil from bottom surfaces at final excavation depths are used as a conservative representation of the final status for project areas located within lateral SU boundaries. SUs deemed comparable to background at final excavation depths were subsequently backfilled to original grade; see PCSR (APTIM, 2018) for backfill material and operational details.

4.6.2 Excavation Sidewall Surfaces

Sidewall surfaces composing the lateral excavation boundaries for SWDAs Bayside and North Point above the water level were grouped together to form independent SUs (SWDA Bayside SU 9 and SWDA North Point SU 5, respectively). Extensive solid waste/debris beyond the planned lateral SWDAs Bayside and North Point boundaries was identified during excavation operations, and as such, radiological characterization activities were limited to debris-free sections of the excavation sidewall surfaces (Figures 7 and 8). Additional excavation and radiological characterization of SWDA sidewalls with identified debris was not performed. Complete lateral debris removal was not possible under this action due to contractual excavation volume limitations of the contract.

Remaining sidewall surfaces that were deemed free of debris following excavation activities were radiologically surveyed and characterized (Figures 7 and Figure 8). Soil sample data for sidewall surfaces included in this report are provided to support the RURR at SWDAs Bayside and North Point.

Gamma spectroscopy results for soil samples collected from sidewall surfaces at SWDA Bayside SU 9 (Figure 7) and SWDA North Point SU 5 (Figure 8) show ^{226}Ra concentrations less than the project-screening level of 1.69 pCi/g.

Prior to backfill, orange construction fencing was placed on select excavation bottom and sidewall surfaces to delineate excavation boundaries. For the sidewall surfaces that displayed visible debris, plastic sheeting was used as a delineator to protect the clean fill placed as backfill (APTIM, 2018).

5.0 FIELD ACTIVITIES

This section discusses FSS-related field activities.

5.1 Pre-Final Status Survey Activities

The following subsections describe pre-FSS activities conducted at SWDAs Bayside and North Point.

5.1.1 Community Relations

An ongoing community outreach program was part of the Site NTCRA. Bimonthly public meetings for the Restoration Advisory Board were held by the Navy on a regular basis throughout the course of the project to provide updates on work progress and to address questions or concerns from the residents. The Navy's Base Environmental Coordinator was available in person, and via telephone or email to respond to resident questions or concerns throughout the project duration.

As work began and progressed at SWDAs Bayside and North Point, the Navy provided information to residents near the work areas about activities that could affect them by means of printed materials and door-to-door notification.

5.1.2 Meetings

The project kick-off meeting with the client was held on October 15, 2013, to establish a mutual understanding of the work scope and objective, schedule, and project milestones. A pre-construction meeting was held on March 31, 2014, prior to mobilization of equipment and personnel to the Site. The purpose of the meeting was to discuss project-specific topics, roles, and responsibilities of project personnel, project schedule, health and safety concerns, and other topics that require discussions before field mobilization.

Additional meetings were held routinely throughout the project to review the work schedule, quality control, health and safety performance, confirmation sample results, proposed step-out excavations, etc. These included weekly quality control meetings. Regulatory meetings included monthly Base Realignment and Closure Cleanup Team meetings and technical meetings. APTIM also provided support to the Navy for management briefing meetings as needed.

5.1.3 Permits and Notifications

Permits and notifications were required prior to initiating the removal action. Permits included the following:

- The Navy and San Francisco Public Utilities Commission approved dig permits before excavation work began at each of the SWDAs.

- Underground Services Alert (800.227.2600) was notified to obtain utility clearance a minimum of 72 hours prior to intrusive activities at each of the SWDAs.
- The California Regional Water Quality Control Board, Bay Area Region was notified of construction as required in the Storm Water Pollution Prevention Plan, which was included as part of the project Work Plan (CB&I, 2015a).
- Written notification was sent to the Bay Area Air Quality Management District of the Navy's intent to conduct asbestos abatement, demolition, and foundation removal of Buildings 1119, 1125, 1319, 1207, 1209, 1211, 1213, 1231, 1233, and 1235; carport driveway removal for Buildings 1321 and 1323; and foundation removal of former Buildings 1121 and 1323 (Bay Area Air Quality Management District, 1982).
- Hot work permits were obtained as required from the APTIM Site Safety and Health Officer.
- Radiological work permits prepared according to the *Sitewide Radiation Protection Plan, Naval Station Treasure Island, San Francisco, California* (CB&I, 2014) were read and signed by field personnel at the start of each workday or as required if work tasks changed.
- APTIM posted a current copy of its California Department of Occupational Safety and Health annual excavation permit at the on-site project office throughout the duration of the Phase III work.

5.1.4 Building Survey and Demolition

In preparation for excavation work at SWDAs Bayside and North Point, features such as standing buildings, concrete, and asphalt within the planned excavation boundaries (Figure 2) were radiologically surveyed, demolished, and removed as described in the Work Plan (CB&I, 2015a). Buildings 1207, 1209, 1211, and 1213 in vicinity of SWDA Bayside and Buildings 1231, 1233, and 1235 in the vicinity of SWDA North Point were surveyed, demolished, and removed.

5.1.5 Radiological Building Surveys

Prior to demolition, radiological surveys were performed on exterior and interior surfaces of each building. The survey data were used as appropriate to support release and disposal of the building construction materials as non-radiologically contaminated construction debris. Specific requirements for the building surveys were detailed in the *Task-Specific Plan, Pre-Demolition Radiological Building Surveys, Installation Restoration Site 12, Solid Waste Disposal Areas A/B, 1207/1209, and 1231/1233, Former Naval Station Treasure Island* (Shaw E&I, 2013b). Data from the building surveys were compiled into stand-alone survey reports to document the findings. The stand-alone survey reports documented the results of the surveys which confirmed that there were no radiological impacts to the buildings, and the reports were provided to Navy Radiological Affairs Support Office for concurrence. Based on California Department of Public Health's request, a summary letter and compact disc (containing the radiological characterization data) were provided to California Department of Public Health prior to demolition of each of the buildings.

5.1.6 Foundation Characterization and Removal

Following removal of structural materials, concrete building foundations and carports were surveyed and sampled to support appropriate waste characterization or reuse.

For removal and characterization of building concrete, the following process was implemented:

- One-hundred percent surface contamination surveys (alpha/beta) were performed on the exposed concrete surfaces using a Ludlum Model 2360 with a Ludlum Model 43-68 or 43-37 detector, or equivalent. Concrete with surface activity concentrations equal to or exceeding the ^{226}Ra total surface contamination release limits for unrestricted use listed in Regulatory Guide 1.86 (U.S. Atomic Energy Commission, 1974) was removed and placed into Environmental Management Services, Inc., waste bins for disposal as low-level radioactive waste (LLRW).
- 100 percent gamma count rate scan survey with Ludlum Model 44-20 sodium iodide detectors coupled with a Ludlum Model 2221 ratemeter/scaler or equivalent was performed on the exposed concrete surface to identify areas of elevated subsurface gamma activity that were present in the soil directly below the concrete. The establishment of subsurface soil protection measures were then implemented during the removal of the concrete to prevent uncontrolled distribution of elevated gamma activity or LLROs.
- Collection of concrete samples via concrete coring or equivalent was completed. Concrete with volumetric ^{226}Ra concentrations exceeding the project-soil screening level of 1.69 pCi/g was removed and placed into Environmental Management Services, Inc., waste bins for disposal as LLRW.
- The concrete foundations and carports were broken and removed in sections. The underside of each concrete section was exposed and laid on an appropriate work surface (e.g., on the remaining intact concrete foundation, plastic) to facilitate a detailed survey of the newly exposed concrete surface, as appropriate. A gamma count rate survey of the soil surface directly below the removed concrete section was performed. Biased soil sampling below each section of concrete was performed once the concrete was removed. In some cases, biased soil sampling was conducted below the concrete while still in place through concrete coring at a frequency of approximately two samples per building unit. The exact number of samples collected was at the Project Radiation Safety Officer's discretion in coordination with Radiological Affairs Support Office.
- If samples meet ^{226}Ra materials release criteria and there was evidence of a demarcation layer such as plastic or clean import fill gravel, cobbles, or similar as evaluated by the Project Radiation Safety Officer, gamma count rate surveys of the underside of the concrete were not required. The concrete was then broken up, removed, and staged in sections for disposition as non-LLRW.

- As appropriate, supplemental volumetric samples of the concrete were collected for analysis to support waste characterization and determination of final disposition for concrete. Concrete was staged and tracked by location pending analytical results and review of gamma scan data.
- Concrete determined to be non-LLRW was stockpiled pending off-site transport and/or reuse and backfill bridging material following coordination and concurrence from the Navy and Radiological Affairs Support Office. The radiological clearance requirements were outlined in a radiological work permit for each site.

Concrete foundations from buildings in the vicinity of SWDAs Bayside and North Point were screened and radiologically cleared for reuse, including the following:

- Buildings 1207, 1209, 1211, and 1213 at Bayside Drive
- Buildings 1231, 1233, and 1235 at North Point Drive

The concrete foundations were crushed, sized, and stockpiled for reuse as backfill bridging material at SWDA excavation sites. Rebar was cut, removed, and disposed of as general construction waste following radiological clearance.

5.1.7 Soil Excavation Activities

Excavations of SWDAs Bayside and North Point were performed in accordance with Section 6.0 of the Work Plan (CB&I, 2015a), which involved handling and processing three categories of soil, as follows:

- Impacted soil—Soil that is impacted with radiological and/or chemical contaminants. This soil is primarily below building foundations and surrounding previously excavated areas.
- Buffer backfill—Clean import fill (non-impacted) placed as backfill during previous removal actions. This material is located within 1 foot of the original excavation bottom or sidewall. Based on its proximity to impacted soil, the buffer backfill soil was radiologically screened before being used as backfill material.
- Clean backfill—Clean import fill (non-impacted) placed as backfill during the site restoration phase of previous removal actions. This material is located within the interior portions of the backfilled excavation (i.e., not including the 1-foot buffer). Clean backfill was stockpiled at Building 570 Area and reused as backfill material.

In general, excavations were performed in the following order:

1. A licensed surveyor located and marked areas with previously identified sample or survey locations with elevated COCs or ²²⁶Ra, as described in Section 1.4 and Work Plan Figures 6 and 7 (CB&I, 2015a). These areas were generally located beneath the demolished building footprints for both SWDAs Bayside and North Point with the exception of two locations

Perimeter Road and North Point and one location at SWDA Bayside along Bayside Drive. A 1-foot buffer line was added along these areas with potentially contaminated soil (i.e., building foundations) to delineate the buffer backfill from the clean backfill.

2. For SWDAs Bayside and North Point, the clean backfill was excavated and then stockpiled adjacent to the excavation or at the Building 570 yard for reuse. The buffer materials were excavated and transported to RSY pads at Bigelow Court for radiological screening and sampling.
3. After the buildings foundations were removed per Section 5.1.6 of the Work Plan (CB&I, 2015a), the impacted materials were excavated in 1-foot lifts where possible. When the excavation was underwater, excavated materials were temporarily placed in drying cells adjacent to the excavation.
4. The excavations continued to depth until observations of no visible debris were confirmed.
5. The materials were transported to RSY pads after they were dry enough for controlled transport.
6. If the excavation bottom was submerged (under water), a separate 6-inch FSS layer was excavated and placed on an RSY pad as potential FSS material representative of the clean excavation bottom surface (FSS layer).

5.1.8 Drying Pads

During initial planning, it was assumed that tidal/groundwater would be encountered at the maximum planned excavation depth at SWDAs Bayside and North Point (4 feet bgs). However, most excavation areas encountered groundwater water at depths between 1.5 to 4 feet bgs, and the water level fluctuated due to tidal influence and storm water accumulation. In addition, many excavation areas extended below the planned 4 feet vertical boundary due to discovered pockets of debris. The saturated soil excavated from these areas was too wet for adequate radiological screening and was placed on drying pads adjacent to the excavation prior to transport to radiological screening pads. Hay bales were placed end-to-end around the perimeter of the soil drying-pad area, except for a drainage opening toward the open excavation. Heavy plastic sheeting was installed prior to excavating and extended over the hay-bale-perimeter berm to contain water that drained from the saturated soil until it drained back into the open excavation of origin or evaporated. This practice eliminated the need to collect and dispose of water.

5.1.9 Radiological Screening Yard Construction

Four existing RSY pads (RSYs 4 through 7) and 22 new RSY pads (RSYs 8 through 19, 12a, A1 through A3, B1 through B3, and D1 through D3) were utilized during excavation activities at SWDAs Bayside and North Point. Figure 4 presents the as-built locations of RSY pads. RSYs 4 through 9 (located at Bigelow Court) and RSY 19 (located at SWDA Bayside) were used primarily for screening buffer material. RSYs 10, 11, A1 through A3, B1 through B3, and D1 through D3 were primarily used to screen potential FSS

material. Other RSY pads were used primarily for impacted material from SWDA excavations or occasionally for screening potential FSS material.

Prior to RSY pad construction, gamma surveys were conducted of the underlying ground surface to establish a baseline and to determine if there is radiological contamination present. After the RSY footprint was cleared of potential material generating elevated gamma-scanning measurements, RSY pad footprints were marked with hand-held GPS units. RSY perimeters were bermed with hay bales to mark the RSY pad boundaries. RSY pad areas (including the hay bales) were then covered with 10-mil plastic sheeting. On-site clean imported fill was laid across the plastic within the bermed area in approximate 6-inch thick layers, and each soil layer was compacted via a minimum of four passes with an excavator or similar tracked machine.

Baseline radiological surveys of the newly constructed RSY pads were also performed prior to the initial placement of excavated soil. A California licensed surveyor surveyed the inner corners of each RSY pad and the surveyed points were used to calculate available area for each RSY pad. Figure 4 shows the area for each RSY pad that was used for FSS material.

5.2 Final Status Survey Activities

For SWDA Bayside SUs 1 through 8 and SWDA North Point SUs 1 through 4 and 7, FSS activities included gamma surveys and sampling of soil at final excavation depths. FSS activities were performed in situ where excavation bottom surfaces were accessible (above water) and ex situ (with soil over-excavated from SU final excavation depths) on RSY pads where inaccessible (underwater).

Debris-free vertical sidewall surfaces (SWDA Bayside SU 9 and SWDA North Point SU 5) were also radiologically surveyed. Soil sample data for these sidewall surfaces are included in this report to support the RURR for SWDAs Bayside and North Point.

5.2.1 Final Status Survey Gamma Surveys

FSS gamma surveys were performed to identify potential localized areas of elevated activity.

5.2.1.1 Field Methodology

In situ GWSs of accessible (above water) excavation bottom surfaces were performed using a Ludlum Model 2221 ratemeter/scaler equipped with a Ludlum Model 44-20 3-inch-by-3-inch NaI scintillation detector and attached Trimble GeoXH GPS. Gamma scans utilizing the Ludlum Model 2221/44-20 instrument set-up were performed at a rate of less than 0.5 meters per second with each pass offset 30 centimeters (12 inches) from the previous pass, in accordance with TIWI-07-00 and TIWI-12-01 (Shaw, 2012a).

During GWSs, geographic coordinates (i.e., northing and easting), date and time, and surface radiation count rate were recorded at a rate of once per second. GWS data were used to identify localized areas

with potential activity exceeding background levels, and locations exceeding instrument-specific reference area scan ILs were flagged for additional investigation.

Ex situ gamma scans of excavated FSS layers (FSS RSY soil) were performed using the RS-700 or the Ludlum Model 2221/44-20 instrument set-up with GPS. Gamma scans utilizing the motorized RS-700 system were performed at a rate of 0.25 meters per second. The detector was maintained at a constant 15.24 centimeters (6 inches) above the ground with each pass offset approximately 112 centimeters (44 inches) from the previous pass. Scan speed was validated daily (or whenever the speed was adjusted) by measuring a path of 7.5 meters (24.6 feet) and verifying that a minimum of 30 seconds was required to walk that path.

Follow-up gamma static surveys were performed at locations identified as exceeding the IC (Section 3.4.2). Follow-up static surveys were performed with a Ludlum Model 2221/44-20 instrument set-up for a count duration of one minute, with the detector held stationary over the survey location at a fixed distance of 10 centimeters. Survey locations with follow-up static readings exceeding the instrument-specific static IL were flagged for further investigation (biased sampling; Sections 7.0 through 7.6).

5.2.1.2 Gamma Survey Field Activities

In situ FSS gamma scans of excavation bottom surfaces were performed for portions of SWDA Bayside SU 8 and SWDA North Point SU 1, as well as the entire excavation bottom surface of SWDA North Point SU 7. The gamma scans were performed in September and October of 2015, as well as April and May of 2016, and covered 100 percent of accessible SWDA SU bottom surfaces.

Data from these surveys were used to identify localized areas with potential for activity exceeding background. Areas that exceeded the IC were further investigated via gamma static measurements; Sections 6.1 through 6.2.13 provide detailed information for each SU.

Ex situ gamma scans of excavated FSS layers (FSS RSY soil) were performed for portions of SWDA Bayside SU 8 and SWDA North Point SU 1, as well as SWDA Bayside SUs 1 through 7 and SWDA North Point SUs 2 through 4. The gamma scans were performed from October of 2015 to October of 2017, and assessed 100 percent of the over-excavated soil removed from SWDA SU bottom surfaces. Data from these surveys were used to identify areas with potential for ²²⁶Ra soil concentrations exceeding background. Areas that exceeded the IC were further investigated via gamma static measurements; see Sections 6.1 through 6.2.13 provide detailed information for each SU.

5.2.2 Final Status Survey Soil Sampling

Sections 7.0 through 7.6 provide detailed FSS sampling information, including results and analysis for each SU.

5.2.2.1 Sample Preparation

Soil samples were submitted for off-site analysis to TestAmerica St. Louis, which is accredited by the U.S. Department of Defense Environmental Laboratory Accreditation Program. Samples were dried and canned at the laboratory according to standard laboratory procedures (Sampling and Analysis Plan [Appendix D of the Work Plan; CB&I, 2015a]).

Packaged soil samples were surveyed prior to shipment, and surveys did not indicate measurements greater than 10 microrentgen per hour on contact for shipped samples.

5.2.2.2 Systematic Sampling

FSS systematic soil sample locations were collected to characterize bottom surface soil at final SU excavation depths. Sample locations were plotted within the original demarcated SU boundaries using a random-start approach and triangular grid, as per MARSSIM procedures (NRC et al., 2000). Due to tidal water/groundwater infiltration of excavation areas, most systematic samples could not be collected in situ, and, in such cases, a 6-inch representative layer of soil was over-excavated from the final depth of the excavation and systematically sampled ex situ on an RSY pad.

Unique systematic sample locations were plotted using Visual Sample Plan 7 with a random-start approach and triangular grid—as per MARSSIM procedures (NRC et al., 2000)—to adequately characterize the entire span of the over-excavated material. In some cases, surface soil at the final depth for a particular SU was over-excavated and placed onto multiple RSY pads, resulting in an excess of systematic samples (beyond the 20 required as per the survey design) (Sections 7.0 through 7.6).

A total of 35 FSS systematic surface soil samples were collected in situ from accessible (above water) SWDA SU excavation bottom surfaces, and a total of 332 systematic surface soil samples were collected ex situ for FSS RSY soil (Figures 5 and 6).

Twenty-five systematic soil samples were also collected in situ from Bayside SU 9 and North Point SU 5 (Figures 7 and 8); these results are provided to support the RURR for SWDAs Bayside and North Point.

5.2.2.3 Biased Sampling

FSS biased soil samples were collected to characterize the surface soil at locations identified during follow-up gamma static surveys with readings exceeding the instrument-specific static IL.

Thirteen FSS biased soil samples were collected at in situ locations in SWDA Bayside SU 8, SWDA North Point SU 1, and SWDA North Point SU 7 that exhibited gamma static count rates above the instrument-specific static IL. Figures 5 and 6 show biased sample locations. Sections 6.2.8, 6.2.9, 6.2.13, and 7.2 provide detailed information. Gamma spectroscopy results for all FSS biased soil samples indicated ²²⁶Ra concentrations less than the screening level of 1.69 pCi/g.

5.3 Post-Final Status Survey Activities and Site Restoration

Statistical analyses and dose/risk modeling were performed to determine the comparability of SU FSS radioactivity to background levels. ^{226}Ra concentrations exceeding the screening level of 1.69 pCi/g were not identified in FSS material from any SU at SWDAs Bayside or North Point, and all SU bottom surface material was deemed comparable to background.

Orange construction fence was then placed on select excavation bottom and sidewall locations to delineate excavation boundaries and excavated project areas prior to backfilling and restoring to previous grades; see PCSR (APTIM, 2018) for backfill material and operational details.

6.0 FINAL STATUS SURVEY GAMMA SURVEY RESULTS

The following subsections discuss the results of the FSS gamma survey operations.

6.1 Gamma Survey Results Summary

In situ gamma-scanning measurements were performed on 100 percent of accessible (above water) SU surfaces at final excavation depths for SWDAs Bayside and North Point. For submerged SUs, 6-inch representative soil layers were over-excavated from the submerged excavation bottom surface and screened ex situ on RSY pads. Ex situ gamma surveys were performed on dry soil and included 100 percent gamma scan coverage of soil placed on the RSY pads.

Appendix B provides gamma survey data for each SWDAs Bayside and North Point SU and the results are summarized as follows:

Summary of Final Status Gamma-Scanning Survey Results

SWDA	SU	Gamma Scan Locations Exceeding the IC ^a	Follow-up Static Locations Exceeding the Static IL	Biased Sampling Performed
Bayside	SU 1	26	0	No, not required
Bayside	SU 2	14	0	No, not required
Bayside	SU 3	40	0	No, not required
Bayside	SU 4	24	0	No, not required
Bayside	SU 5	43	0	No, not required
Bayside	SU 6	24	0	No, not required
Bayside	SU 7	117	0	No, not required
Bayside	SU 8	13 (ex situ) and 4 (in situ)	4 (in situ)	Yes, 4 locations (in situ)
North Point	SU 1	12 (ex situ) and 7 (in situ)	3 (in situ)	Yes, 3 locations (in situ)
North Point	SU 2	16	0	No, not required
North Point	SU 3	49	0	No, not required
North Point	SU 4	18	0	No, not required
North Point	SU 7	47 (in situ)	1 (in situ)	Yes, 6 locations (in situ) ^b

Notes:

^a See Sections 3.4 and 5.2 for more details.

^b LLRO 505 was identified and remediated following the FSS GWS of SWDA North Point SU 7; soil surrounding the detected LLRO was removed as LLRW and 5 biased samples were collected to characterize the surface at the post-remediation boundaries.

Ex situ gamma-scanning and static measurements were deemed comparable to background; however, eight in situ gamma static measurements exceeded reference area-based ILs. Biased samples were

collected at any location where a gamma static measurement exceeded the instrument-specific IL, and gamma spectroscopy results showed ^{226}Ra concentrations consistent with the TI Sitewide Background dataset for biased sample locations (Section 6.2.8).

LLRO 505 was identified following the FSS GWS of the bottom surface of SWDA North Point SU 7 and subsequently remediated. Five biased samples, four at the lateral corners of the remediation and the fifth capturing the soil beneath the remediation, were collected to characterize the soil at the remediation boundaries. Gamma spectroscopy results of biased samples associated with the remediation of LLRO 505 show ^{226}Ra concentrations consistent with the TI Sitewide Background dataset (Section 6.2.13).

6.2 Evaluation of Gamma Walkover and Gamma Static Survey Results

Gamma scan count rate data were evaluated to ensure that potential localized areas of elevated count rates (possible LLROs or isolated areas of elevated radiological activity) were identified. This evaluation included plotting the count rate data on a map of the survey area using colored data points to represent the count rate difference from the mean in units of standard deviation and identifying locations where count rates exceeded the IC. With in situ and ex situ surveys combined, gamma scans covered 100 percent of SU excavation bottom surface areas for SWDAs Bayside and North Point. Table 28 shows gamma survey data and is summarized as follows:

Summary of SWDA Bayside Gamma Survey Results

SU	RSY Pad(s)	Gamma Scan Locations Exceeding the IC ^a	Follow-Up Static Locations Above the Static IL	Biased Sampling Performed
1	RSY 10 (Use 1, Part 2), RSY 14 (Use 2), RSY 17 (Use 2)	26	0	No, not required
2	RSY 11 (Use 5)	14	0	No, not required
3	RSY 10 (Use 9, Part 2), RSY 11 (Use 7)	40	0	No, not required
4	RSY 10 (Use 8), RSY 10 (Use 9, Part 1)	24	0	No, not required
5	RSY 11 (Use 9), RSY 10 (Use 11, Part 1), RSY 15 (Use 9)	43	0	No, not required
6	RSY 11 (Use 1, Part 1), RSY 15 (Use 8)	24	0	No, not required
7	RSY 13 (Use 5), RSY A1-D3 (Use 1), RSY B3 (Use 2)	117	0	No, not required

SU	RSY Pad(s)	Gamma Scan Locations Exceeding the IC ^a	Follow-Up Static Locations Above the Static IL	Biased Sampling Performed
8	RSY 11 (Use 1, Part 2), In situ	13 (ex situ) and 4 (in situ)	4	Yes, 4 locations (in situ)

Notes:

^a See Sections 3.4 and 5.2 for more details.

Summary of SWDA North Point Gamma Survey Results

SU	RSY Pad(s)	Gamma Scan Locations Exceeding the IC ^a	Follow-Up Static Locations Above the Static IL	Biased Sampling Performed
1	RSY 10 (Use 1, Part 1), In situ	12 (ex situ) and 7 (in situ)	3 (in situ)	Yes, 3 locations (in situ)
2	RSY 10 (Use 2)	16	0	No, not required
3	RSY 10 (Use 7)	49	0	No, not required
4	RSY 10 (Use 5), RSY 11 (Use 1, Part 3)	18	0	No, not required
7	In situ	47 (in situ)	1 (in situ)	Yes, 6 locations (in situ) ^b

Notes:

^a See Sections 3.4 and 5.2 for more details.

^b LLRO 505 was identified and surgically remediated following the FSS GWS of SWDA North Point SU 7; soil surrounding the detected LLRO 505 was removed as LLRW and 5 biased samples were collected to characterize the surface at the post-remediation boundaries.

Appendix B presents documentation featuring gamma scan and follow-up static data for each SU.

6.2.1 SWDA Bayside SU 1

The bottom of the excavation at SWDA Bayside SU 1 was inaccessible for in situ radiological surveying due to infiltration of groundwater and possibly tidal water. The excavation of SU 1 was conducted in two phases as a result of the building foundation remaining at the start of the excavation. Following the removal of clean fill soil and the buffer layer of surrounding soil and the confirmation that the area was absent of visual debris within the excavation base soil excavated for RSY screening, a 6-inch FSS layer of soil was over-excavated from around the impacted building footprint of Building 1213 and screened on RSY 10 (Use 1, Part 2). Sixteen data points from the GWS exceeding the IC were identified and reinvestigated via static measurements. None of the follow-up static measurements exceeded the static IL, therefore, no further investigation was required.

Soil from the final depth of the excavation within the impacted building footprint (Building 1213) was evaluated ex situ on RSY 14 (Use 2) and 17 (Use 2). Ten data points from the GWS for RSY 14 (Use 2) and eight data points from the GWS for RSY 17 (Use 2) exceeding the IC were identified and reinvestigated

via static measurements. None of the follow-up static measurements exceeded the static IL; therefore, no further gamma survey investigation was required.

6.2.2 SWDA Bayside SU 2

The bottom of the excavation at SWDA Bayside SU 2 was inaccessible for in situ radiological surveying due to infiltration of groundwater. Following the removal of clean fill soil and the buffer layer of surrounding soil and the confirmation that the area was absent of visual debris within the excavation, a 6-inch FSS layer of soil was over-excavated and screened ex situ on RSY 11 (Use 5). Fourteen data points from the GWS exceeding the IC were identified and reinvestigated via static measurements. None of the follow-up static measurements exceeded the static IL; therefore, no further gamma survey investigation was required.

6.2.3 SWDA Bayside SU 3

The bottom of the excavation at SWDA Bayside SU 3 was inaccessible for in situ radiological surveying due to infiltration of groundwater. Following the removal of clean fill soil and the buffer layer of surrounding soil and the confirmation that the areas was absent of visual debris within the excavation, a 6-inch FSS layer was over-excavated and screened ex situ on RSY 10 (Use 9, Part 2) and 11 (Use 7). Ten data points from the GWS for RSY 10 (Use 9, Part 2) and 30 data points from the GWS for RSY 11 (Use 7) exceeding the IC were identified and reinvestigated via static measurements. None of the follow-up static measurements exceeded the static IL; therefore, no further gamma survey investigation was required.

6.2.4 SWDA Bayside SU 4

The bottom of the excavation at SWDA Bayside SU 4 was inaccessible for in situ radiological surveying due to infiltration of groundwater. Following the removal of clean fill soil and the buffer layer of surrounding soil and the confirmation that the area was absent of visual debris within the excavation, a 6-inch FSS layer of soil was over-excavated and screened ex situ on RSY 10 (Use 8) and 10 (Use 9, Part 1). Thirteen data points from the GWS for RSY 10 (Use 8) and 11 data points from the GWS for RSY 10 (Use 9, Part 1) exceeding the IC were identified and reinvestigated via static measurements. None of the follow-up static measurements exceeded the static IL; therefore, no further gamma survey investigation was required.

6.2.5 SWDA Bayside SU 5

The bottom of the excavation at SWDA Bayside SU 5 was inaccessible for in situ radiological surveying due to infiltration of groundwater. Following the removal of clean fill soil and the buffer layer of surrounding soil and the confirmation that the area was absent of visual debris within the excavation base soil excavated for RSY screening, a 6-inch FSS layer of soil was over-excavated from the bottom of the excavation and screened ex situ on RSY 11 (Use 9) and 10 (Use 11), and RSY 15 (Use 9). Twenty-one data points from the GWS for RSY 11 (Use 9), 10 data points from the GWS for RSY 10 (Use 11), and 12 data points from the GWS for RSY 15 (Use 9) exceeding the IC were identified and reinvestigated via

static measurements. None of the follow-up static measurements exceeded the static IL; therefore, no further gamma survey investigation was required.

6.2.6 SWDA Bayside SU 6

The bottom of the excavation at SWDA Bayside SU 6 was inaccessible for in situ radiological surveying due to infiltration of tidal water. Following the removal of clean fill soil and the buffer layer of surrounding soil and the confirmation that the area was absent of visual debris, a 6-inch FSS layer of soil was over-excavated and screened ex situ on RSY 11 (Use 1, Part 1) and 15 (Use 8). Ten data points from the GWS for RSY 11 (Use 1, Part 1) and 14 data points from the GWS for RSY 15 (Use 8) exceeding the IC were identified and reinvestigated via static measurements. None of the follow-up static measurements exceeded the static IL; therefore, no further gamma survey investigation was required.

6.2.7 SWDA Bayside SU 7

The bottom of the excavation at SWDA Bayside SU 7 was inaccessible for in situ radiological surveying due to infiltration of groundwater. Following the removal of clean fill soil and the buffer layer of surrounding soil and the confirmation that the area was absent of visual debris within the excavation base soil excavated for RSY screening, a 6-inch FSS layer of soil was over-excavated from the bottom of the excavation and screened ex situ on FSS RSY A1 through A3, B1 through B3, and D1 through D3. Thirty total data points from the GWSs for RSY A1 through A3, 24 data points from the GWSs for RSY B1 through B3 (for FSS material), and 52 data points from the GWSs for RSY D1-D3 exceeding the IC were identified and reinvestigated via static measurements. None of the follow-up static measurements exceeded the static IL; therefore, no further gamma survey investigation was required.

6.2.8 SWDA Bayside SU 8

A portion of the bottom of the excavation at SWDA Bayside SU 8 was inaccessible for in situ radiological surveying due to infiltration of groundwater and possibly tidal water. Following the removal of clean fill soil and the buffer layer of surrounding soil and the confirmation that the area was absent of visual debris within the excavation, a FSS 6-inch layer of soil was over-excavated from the underwater portion of the SU and screened ex situ on RSY 11 (Use 1, Part 2). Thirteen data points from the GWS exceeding the IC were identified and reinvestigated via static measurements. None of the follow-up static measurements exceeded the static IL; therefore, no further gamma survey investigation was required.

The accessible (above water) portion of the SU was surveyed in situ. Four locations exceeding the IC were identified and reinvestigated via static measurements. All four follow-up static measurements exceeded the static IL; biased samples were collected at each of the follow-up static investigation locations.

Analytical results of biased soil samples were below both the project ²²⁶Ra soil screening level of 1.69 pCi/g and the Sitewide Background average concentration of 0.69 pCi/g (Section 7.2); no further investigation was required.

6.2.9 SWDA Bayside SU 9

SU 9 constituted the above water sidewalls at SWDA Bayside (Figure 7). Following the removal of clean fill soil and the buffer layer of surrounding soil and the confirmation that the area was absent of visual debris, the sidewalls were radiologically surveyed in situ.

LLRO 711 was identified during gamma scan and follow-up static surveys at SWDA Bayside SU 9. The object, as well as surrounding soil within 5 feet of the identified location, was remediated to a depth of 1 foot beyond the original excavation surface. Biased bounding soil samples were collected at the four lateral corners of the remediation boundaries, and at the center point of the over-excavation (directly beneath the identified location of LLRO 711) after the soil was removed. ^{226}Ra concentrations for all biased bounding soil samples were less than the screening level of 1.69 pCi/g (Table 16).

Gamma scan and follow-up static surveys also resulted in an additional 20 locations selected for biased soil sampling; analytical results of biased soil samples were below the project ^{226}Ra soil screening level of 1.69 pCi/g and no further investigation was required at these locations (Table 16).

Thirteen systematic soil samples were collected from SWDA Bayside SU 9. Analytical results of all systematic soil samples were below both the project ^{226}Ra screening level of 1.69 pCi/g, as well as the Sitewide Background average of 0.69 pCi/g (Table 14).

6.2.10 SWDA North Point SU 1

A smaller portion of the bottom of the excavation at SWDA North Point SU 1 was inaccessible for in situ radiological surveying due to infiltration of groundwater and possibly tidal water. Following the removal of clean fill soil and the buffer layer of surrounding soil and the confirmation that the area was absent of visual debris within the excavation base soil excavated for RSY screening, a 6-inch FSS layer of soil was over-excavated from the bottom of the excavation in the underwater portion of the SU and screened ex situ on RSY 10 (Use 1, Part 1). Twelve data points from the GWS exceeding the IC were identified and reinvestigated via static measurements. None of the follow-up static measurements exceeded the static IL; therefore, no further gamma survey investigation was required.

The accessible (above water) portion of the SU was surveyed in situ. Seven locations exceeding the IC were identified and reinvestigated via static measurements. Three follow-up static measurements exceeded the static IL; biased samples were collected at each of the elevated follow-up static investigation locations.

Analytical results of biased soil samples were below the project ^{226}Ra soil screening level of 1.69 pCi/g and no further investigation was required (Section 7.2 and Table 23).

6.2.11 SWDA North Point SU 2

A portion of the bottom of the excavation at SWDA North Point SU 2 was inaccessible for in situ radiological surveying due to infiltration of groundwater. Following the removal of clean fill soil and the

buffer layer of surrounding soil and the confirmation that the area was absent of visual debris within the excavation base soil excavated for RSY screening, a 6-inch FSS layer of soil was over-excavated from the bottom of the excavation and screened ex situ on RSY 10 (Use 2). Sixteen data points from the GWS exceeding the IC were identified and reinvestigated via static measurements. None of the follow-up static measurements exceeded the static IL; therefore, no further gamma survey investigation was required.

6.2.12 SWDA North Point SU 3

The bottom of the excavation at SWDA North Point SU 3 was inaccessible for in situ radiological surveying due to infiltration of groundwater. Following the removal of clean fill soil and the buffer layer of surrounding soil and the confirmation that the area was absent of visual debris, a 6-inch FSS layer of soil was over-excavated and screened ex situ on RSY 10 (Use 7). Forty-nine data points from the GWS exceeding the IC were identified and reinvestigated via static measurements. None of the follow-up static measurements exceeded the static IL; therefore, no further gamma survey investigation was required.

6.2.13 SWDA North Point SU 4

The bottom of the excavation at SWDA North Point SU 4 was inaccessible for in situ radiological surveying due to infiltration of groundwater and possibly tidal water. Following the removal of clean fill soil and the buffer layer of surrounding soil and the confirmation that the area was absent of visual debris within the excavation, a 6-inch FSS layer of soil was over-excavated and screened ex situ on RSY 10 (Use 5) and 11 (Use 1, Part 3). Nine data points from the GWS for RSY 10 (Use 5) and nine data points from the GWS for RSY 11 (Use 1, Part 3) exceeding the IC were identified and reinvestigated via static measurements. None of the follow-up static measurements exceeded the static IL; therefore, no further gamma survey investigation was required.

6.2.14 SWDA North Point SU 5

SU 5 constituted the above water sidewalls at SWDA North Point (Figure 8). Following the removal of clean fill soil and the buffer layer of surrounding soil and the confirmation that the area was absent of visual debris, the sidewalls were radiologically surveyed in situ.

LLRO 518 was identified during gamma scan and follow-up static surveys at SWDA North Point SU 5. The object, as well as surrounding soil within 5 feet of the identified location, was remediated to a depth of 1 foot beyond the original bottom of the excavation. Biased bounding soil samples were collected at the four lateral corners of the remediation boundaries, and at the center point of the over-excavation (directly beneath the identified location of LLRO 518) after the soil was removed. ²²⁶Ra concentrations for all biased bounding soil samples were less than the screening level of 1.69 pCi/g (Table 24).

Gamma scan and follow-up static surveys also resulted in an additional six locations selected for biased soil sampling; analytical results of biased soil samples were below the project ²²⁶Ra soil screening level of 1.69 pCi/g and no further investigation was required at these locations (Table 24).

Twelve systematic soil samples were collected from SWDA North Point SU 5. Analytical results of all systematic soil samples were below both the project ^{226}Ra screening level of 1.69 pCi/g, as well as the Sitewide Background average of 0.69 pCi/g (Table 21).

6.2.15 SWDA North Point SU 7

Following the removal of clean fill soil and the buffer layer of surrounding soil and the confirmation that the area was absent of visual debris within the excavation base soil excavated for RSY screening, the bottom surface at the final excavation depth of SWDA North Point SU 7 was above water and accessible for in situ FSS surveys. Forty-seven GWS data points clustered around two distinct locations exceeding the IC were identified and reinvestigated via static measurements.

LLRO 505 was identified at the first follow-up static location following the GWS of the excavation bottom surface of SWDA North Point SU 7. The object, as well as surrounding soil within 5 feet of the identified location, was remediated to a depth of 1 foot beyond the original bottom of the excavation. Biased bounding soil samples were collected at the four lateral corners of the remediation boundaries, and at the center point of the over-excavation (directly beneath the identified location of LLRO 505) after the soil was removed. ^{226}Ra concentrations for all biased bounding soil samples were less than the average ^{226}Ra concentration of the background dataset (0.69 pCi/g) (Table 25) and follow-up static measurements collected at the identified location of LLRO 505 following remediation did not exceed the instrument-specific static IL.

7.0 FINAL STATUS SURVEY SOIL SAMPLE RESULTS

The following subsections discuss FSS soil sample results.

7.1 Analytical Requirements

Following the collection of systematic and biased samples, soil samples were shipped to TestAmerica St. Louis for ^{226}Ra analysis by gamma spectroscopy. TestAmerica St. Louis is accredited in the U.S. Department of Defense Environmental Laboratory Accreditation Program. Samples were analyzed in accordance with the Work Plan (CB&I, 2015a). The gamma spectroscopy library included naturally-occurring radionuclides and sample ^{226}Ra concentrations were reported using the 609-kiloelectron-volt gamma emission from bismuth-214 following a 21-day ingrowth period. Tables 6 through 25 present analytical results for each SU. Appendix C provides data reports.

7.2 Soil Sampling Data Summary

Tables 6 through 25 show soil sampling data for each SU. Summary statistics of systematic and biased sampling for SWDA Bayside and North Point debris-free excavation boundary surface areas are summarized as follows:

Systematic Soil Sample Summary Statistics

	NSTI Sitewide Background	SWDA Bayside ^c	SWDA North Point ^c
No. of Samples	20	268	124
Average ^{226}Ra Concentration ^{a, b}	0.688	0.360	0.354
Standard Deviation	0.161	0.079	0.077
Minimum ^{226}Ra Concentration	0.460	0.155	0.173
Maximum ^{226}Ra Concentration	0.980	0.640	0.665
Median ^{226}Ra Concentration	0.675	0.360	0.340
Skewness	0.240	0.520	0.769
Kurtosis	-1.249	1.189	1.392

Notes:

^a Units are pCi/g.

^b The project-screening level is 1.69 pCi/g. No samples were above the project-screening level.

^c Systematic sample results for SWDA Bayside SU 9 and SWDA North Point SU 5 are included.

Biased Soil Sample Summary Statistics

	SWDA Bayside ^c	SWDA North Point ^c
No. of Samples	29	20
Average ²²⁶ Ra Concentration ^{a, b}	0.547	0.559
Standard Deviation	0.176	0.182
Minimum ²²⁶ Ra Concentration	0.235	0.289
Maximum ²²⁶ Ra Concentration	0.931	0.918
Median ²²⁶ Ra Concentration	0.556	0.596
Skewness	0.162	0.175
Kurtosis	-0.016	-0.829

Notes:

^a Units are pCi/g.

^b The project-screening level is 1.69 pCi/g. No samples were above the project-screening level.

^c Biased sample results for SWDA Bayside SU 9 and SWDA North Point SU 5 are included.

²²⁶Ra concentrations for systematic samples (and the average ²²⁶Ra concentration for biased samples collected from each area) were determined to be less than the average concentration of the TI Sitewide Background dataset. Appendix D presents histograms comparing systematic soil sample data to the Sitewide Background dataset.

Using the background comparison process described in Section 7.5, soil sample data were compared with the TI Sitewide Background dataset. Appendix D includes the Wilcoxon Rank Sum (WRS) Test for the samples. As expected from the summary statistics and histograms, null hypothesis (H₀) was not rejected for the entire dataset, demonstrating that the range of measurements is within the expected range of background.

The number of systematic samples collected during screening activities was reviewed; Table 4 provides summary statistics. As noted in Section 7.5.4, the minimum number of required samples per SU is 12. However, at least 20 systematic samples were collected from each SU; therefore, sufficient sampling was performed for all SUs.

7.3 Graphical Plots

The primary graphical tool used to evaluate the ²²⁶Ra data was the histogram. Appendix D presents histograms comparing sample results to the Sitewide Background dataset. The histograms demonstrate that ²²⁶Ra data for FSS soil samples are comparable to background.

7.4 Summary Statistics

Summary statistics were prepared to summarize SU systematic soil sample ²²⁶Ra results. A total of 367 systematic samples were collected from excavation bottom soil for SWDAs Bayside and North Point,

and 25 systematic samples were collected from debris-free sidewall sections SWDA Bayside SU 9 and SWDA North Point SU 5. Results were below the project ^{226}Ra soil screening level of 1.69 pCi/g. Reviewing data with respect to background, the maximum systematic ^{226}Ra concentration for each SU is less than the Sitewide Background average (Tables 6 through 22 and summarized in this subsection).

SWDA Bayside Systematic Soil Sample Summary Statistics

	NSTI Sitewide Background	SU 1	SU 2	SU 3	SU 4	SU 5	SU 6	SU 7	SU 8	SU 9
No. of Systematic Samples	20	60	20	27	32	36	32	27	21	13
Average ^{226}Ra Concentration a, b	0.688	0.331	0.311	0.343	0.345	0.384	0.397	0.366	0.380	0.440
Standard Deviation	0.161	0.083	0.059	0.055	0.059	0.076	0.062	0.081	0.074	0.101
Minimum ^{226}Ra Concentration	0.460	0.155	0.234	0.207	0.247	0.250	0.231	0.251	0.252	0.319
Maximum ^{226}Ra Concentration	0.980	0.512	0.419	0.433	0.483	0.620	0.490	0.634	0.604	0.640
Median ^{226}Ra Concentration	0.675	0.335	0.306	0.341	0.331	0.369	0.397	0.359	0.354	0.415
Skewness	0.240	0.015	0.374	-0.472	0.373	0.992	-0.557	1.591	1.378	0.675
Kurtosis	-1.249	-0.254	-0.921	-0.107	-0.195	1.564	0.298	3.982	3.207	0.448

Notes:

^a Units are pCi/g.

^b The project-screening level is 1.69 pCi/g. No samples were above the project-screening level.

SWDA North Point Systematic Soil Sample Summary Statistics

	NSTI Sitewide Background	SU 1	SU 2	SU 3	SU 4	SU 5	SU 7
No. of Systematic Samples	20	20	20	20	32	12	20
Average ^{226}Ra Concentration ^{a, b}	0.688	0.329	0.352	0.349	0.331	0.388	0.402
Standard Deviation	0.161	0.063	0.081	0.064	0.057	0.094	0.095
Minimum ^{226}Ra Concentration	0.460	0.209	0.173	0.231	0.226	0.246	0.270
Maximum ^{226}Ra Concentration	0.980	0.538	0.500	0.460	0.435	0.560	0.665
Median ^{226}Ra Concentration	0.675	0.324	0.340	0.343	0.332	0.399	0.399
Skewness	0.240	1.658	-0.117	0.008	0.093	0.140	0.934
Kurtosis	-1.249	6.026	-0.017	-0.868	-0.750	-0.688	1.678

Notes:

^a Units are pCi/g.

^b The project-screening level is 1.69 pCi/g. No samples were above the project-screening level.

Tables 15, 23, and 25 summarize data from biased samples collected SWDA Bayside SU 8 and SU 9, as well as SWDA North Point SU 1, SU 5, and SU 7. Average biased sample ^{226}Ra concentrations for each SU do not exceed the Sitewide Background average.

7.5 Statistical Testing

The sample design was prepared with the objective of demonstrating that ^{226}Ra soil concentrations within the project area meet applicable excess dose and risk criteria. In addition, ^{226}Ra concentrations were evaluated for comparability with TI Sitewide Background concentrations. Based on this survey objective, the background comparison process described in MARSSIM (NRC et al., 2000) was used as the framework for evaluation of the data collected.

7.5.1 Null Hypothesis

The H_0 describes the default assumption that the statistical test will either fail to reject, or else reject in favor of an alternative hypothesis (H_a). For a comparison with background, the hypotheses may be described as follows (NUREG-1505; NRC, 1998):

- H_0 : The difference in the median concentration of radioactivity in the SU and in the reference area is less than the lower boundary of the gray region (LBGR).

- H_a : The difference in the median concentration of radioactivity in the SU and in the reference area is greater than the DCGL.
- H_0 and H_a are tested by the WRS Test (Section 7.5.2).

7.5.2 Wilcoxon Rank Sum Test

The WRS Test is a nonparametric two-sample test used when the contaminant is present in background. ^{226}Ra is present in background and therefore the use of the WRS Test is appropriate. The WRS Test was performed using the spreadsheet formulas provided in Section 6 of NUREG-1505 (NRC, 1998) and with the following parameters:

- LBGR: Based on the discussion in Section 13 of NUREG-1505, the standard deviation of the Sitewide Background dataset (0.161 pCi/g) multiplied by 3 (equal to 0.483 pCi/g)
- Type I error rate, α_w , equal to $\alpha/2$, or 0.025

Appendix D presents spreadsheets with the WRS Test conducted for each sampling survey. As expected from the summary statistics and histograms, H_0 was not rejected for any sample dataset.

7.5.3 Quantile Test

For a background comparison, the Quantile Test must also be performed if the WRS Test fails to reject H_0 . The Quantile Test looks for localized groups of sample results that exceed the LBGR. Using the Quantile Test in tandem with the WRS Test results in higher power to detect sample results exceeding background than either test has individually.

The Quantile Test was performed for each sample dataset (Appendix D). The results of the Quantile Tests demonstrate there are no isolated areas of activity within the project area.

7.5.4 Calculating Number and Location of Soil Samples

The number of systematic samples estimated during the survey design was 20. During the data quality assessment phase, the estimated number of samples determined during the survey design was compared to the actual minimum number of samples required for the appropriate statistical test using actual SU data to determine if the survey design assumptions were adequate. The following calculations are shown using the actual SU data for ^{226}Ra soil concentration in SWDA Bayside SU 1.

7.5.4.1 Calculate the Relative Shift

The relative shift (Δ/σ) is calculated first by determining the width of the gray region, or in other words the difference (Δ) between the DCGL and the LBGR. The standard deviation from the Sitewide Background dataset was greater than the standard deviations observed for the project area SU. Therefore, for this evaluation, the LBGR is set to the value used for the WRS Test, or 0.483 pCi/g, and the standard deviation from the Sitewide Background dataset is used. Therefore, the relative shift can be calculated for ^{226}Ra for SWDA Bayside SU 1 using the following equation:

$$\frac{\Delta}{\sigma} = \frac{DCGL - LBGR}{\sigma} = \frac{1 - 0.483}{0.161} = 3.21$$

Where:

DCGL = 1 pCi/g (Section 4.4 of this FSSR)

LBGR = 0.483 pCi/g

σ = 0.161 pCi/g; standard deviation of ^{226}Ra in the reference area that was greater than the observed SWDA Bayside SU 1 standard deviation of 0.083 pCi/g

7.5.4.2 Determine P_r

The probability that a random measurement from the SU exceeds a random measurement from the background reference area by less than the DCGL when the SU median is equal to the LBGR above background is defined as random shift probability (P_r). MARSSIM Table 5.1 lists relative shift values and the corresponding values for P_r (NRC, et al., 2000). When the actual value of the relative shift was not listed in MARSSIM Table 5.1, the next lower value that appeared in the table was used. For the evaluation of ^{226}Ra in SWDA Bayside SU 1 and a relative shift of 3.21, the corresponding $P_r = 0.983039$.

7.5.4.3 Calculate N

Using the P_r determined above and the Type I (α) and Type II (β) decision error percentiles, the total number of samples from the SU plus the reference area (N) is calculated using Equation 5-1 of MARSSIM (NRC et al, 2000) as follows:

$$N = \left\{ \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{3(P_r - 0.5)^2} \right\} (1.2)$$
$$\left\{ \frac{(1.960 + 1.645)^2}{3(0.983039 - 0.5)^2} \right\} (1.2) = 22.3$$

Where:

N = number of combined samples from the SU and reference area

$Z_{1-\alpha}$ = Type I decision error level (1.960 as determined from MARSSIM Table 5.2 and $\alpha = 0.025$)

$Z_{1-\beta}$	=	Type II decision error level (1.645 as determined from MARSSIM Table 5.2 and $\beta=.05$)
P_r	=	random shift probability (Section 7.5.4.2)
1.2	=	factor for over-sampling to account for missing or unusable data

The total number of samples (N) from both the SU and the reference area represents the minimum number required for the WRS Test based on the parameters for ^{226}Ra . This is calculated by rounding up N to the next even number and dividing by two (N/2). Therefore 22.3 is rounded up to 24 total samples and divided in half to equal 12. The actual number of systematic samples collected in SWDA Bayside SU 1 for ^{226}Ra was 60, which exceeds the required minimum number of samples. The same calculations were performed for ^{226}Ra in the other SUs. Table 26 presents a summary of the samples collected in each SU and the number of samples calculation per SU.

7.5.4.4 Statistical Power Evaluation

The statistical power associated with the data collected from each SU was evaluated as a retrospective power analysis. The power analysis was performed consistent with the guidance in Section 10 of NUREG-1505 (NRC, 1998) using the actual number of samples collected from sample dataset and the observed standard deviation from the Sitewide Background dataset to generate retrospective power curves (Appendix D). The analysis determined that the number of samples collected were sufficient to meet project DQOs.

7.6 Dose Modeling for Unrestricted Release

To translate the soil concentration data into a measure of potential excess dose, a dose model was developed. A conservative dose model was developed using RESRAD-ONSITE, Version 7.2 (Argonne National Laboratory, 2014). This dose modeling used the most conservative and restrictive scenario, the rural residential farmer scenario. The resident farmer scenario assumes a full time resident who in the modeled area, builds a home, works the farm full time, and raises crops and livestock for family consumption in the modeled area.

Site-specific inputs to the resident farmer model included the maximum net ^{226}Ra concentration corrected for background (0.69 pCi/g) from the excavation surface for each SU. Equilibrium of ^{226}Ra with its progeny lead-210 was also assumed. Table 27 shows the inputs and outputs for the RESRAD dose modeling (Argonne National Laboratory, 2014).

^{226}Ra concentrations are less than the project-soil screening level of 1.69 pCi/g for all SU soil samples and the maximum ^{226}Ra concentrations for most SUs were less than the Sitewide Background average of 0.69 pCi/g. As shown in Table 27, the maximum ^{226}Ra concentration (0.931 pCi/g) was identified in a biased sample from SWDA Bayside SU 9, resulting in a maximum excess dose projection of 5.053 millirem per year (mrem/yr) and a maximum excess lifetime cancer risk of 6.63 E-05.

These results are based on the most conservative model assumptions and demonstrate the minimal contribution of the observed naturally-occurring ^{226}Ra levels at the project area to the average reported exposure to terrestrial sources of background radiation of 19 mrem/yr (National Council on Radiation Protection and Measurements, 2009); full RESRAD dose and risk reports are provided in Appendix E.

7.7 Data Validation

TestAmerica St. Louis provided analytical data. No data were identified as rejected. Appendix C presents analytical data reports; Appendix F presents data validation reports.

8.0 CONCLUSIONS

FSS results support the conclusion that the remediated debris-free areas within SWDAs Bayside and North Point excavation boundaries (SU bottoms and sidewalls) are suitable for a RURR based on the following lines of evidence:

- Visual observation confirmed that remediated areas within SWDA excavation boundaries (SU bottoms and sidewalls) were free of debris (APTIM, 2018).
- Gamma spectroscopy results for FSS systematic soil samples from excavated surface areas show ^{226}Ra concentrations below both the project ^{226}Ra soil screening level of 1.69 pCi/g and the Sitewide Background average concentration of 0.69 pCi/g.
 - These results also show that sample efforts were sufficient to adequately characterize project areas as statistically comparable to background (Sections 7.2 through 7.5).
- Ex situ gamma survey results of FSS RSY soil (over-excavated at the final excavation depths for inaccessible, underwater project areas) show gamma activity comparable to background.
 - Gross gamma activity at follow-up static locations on RSY pads associated with FSS RSY soil is less than instrument-specific reference area static ILs.
- In situ gamma survey results of FSS soil at final excavation boundaries for accessible (above water) project areas show gamma activity that is overall comparable to background.
 - Biased samples were collected at in situ follow-up static locations with static gamma readings exceeding an instrument-specific reference area IL.
 - Gamma spectroscopy results of biased samples show ^{226}Ra concentrations below the project ^{226}Ra soil screening level of 1.69 pCi/g.
- None of the project area SU sample results had ^{226}Ra concentrations that exceeded the ^{226}Ra soil screening level of 1.69 pCi/g.

A conservative resident farmer dose and risk model was used to compile maximum excess dose rate and risk projections, and based on the highest ^{226}Ra concentration (0.931 pCi/g) for all samples collected from final excavation surfaces prior to backfill, the maximum excess dose rate is projected to be 5.053 mrem/yr, with a maximum projected excess lifetime cancer risk of 6.63 E-05. These projections are extremely conservative and well within federal limits.

No further investigation or remediation is warranted for areas within the excavation boundaries at SWDAs Bayside and North Point based on these data. Additional remediation activities for SWDA Westside and are planned under future Navy contracts. Additional radiological remediation activities are

also planned for the excavation boundaries at SWDAs Bayside and North Point where embedded debris was identified in sidewall surfaces.

The Navy respectfully requests California Department of Public Health concurrence with the RURR for SWDAs Bayside and North Point.

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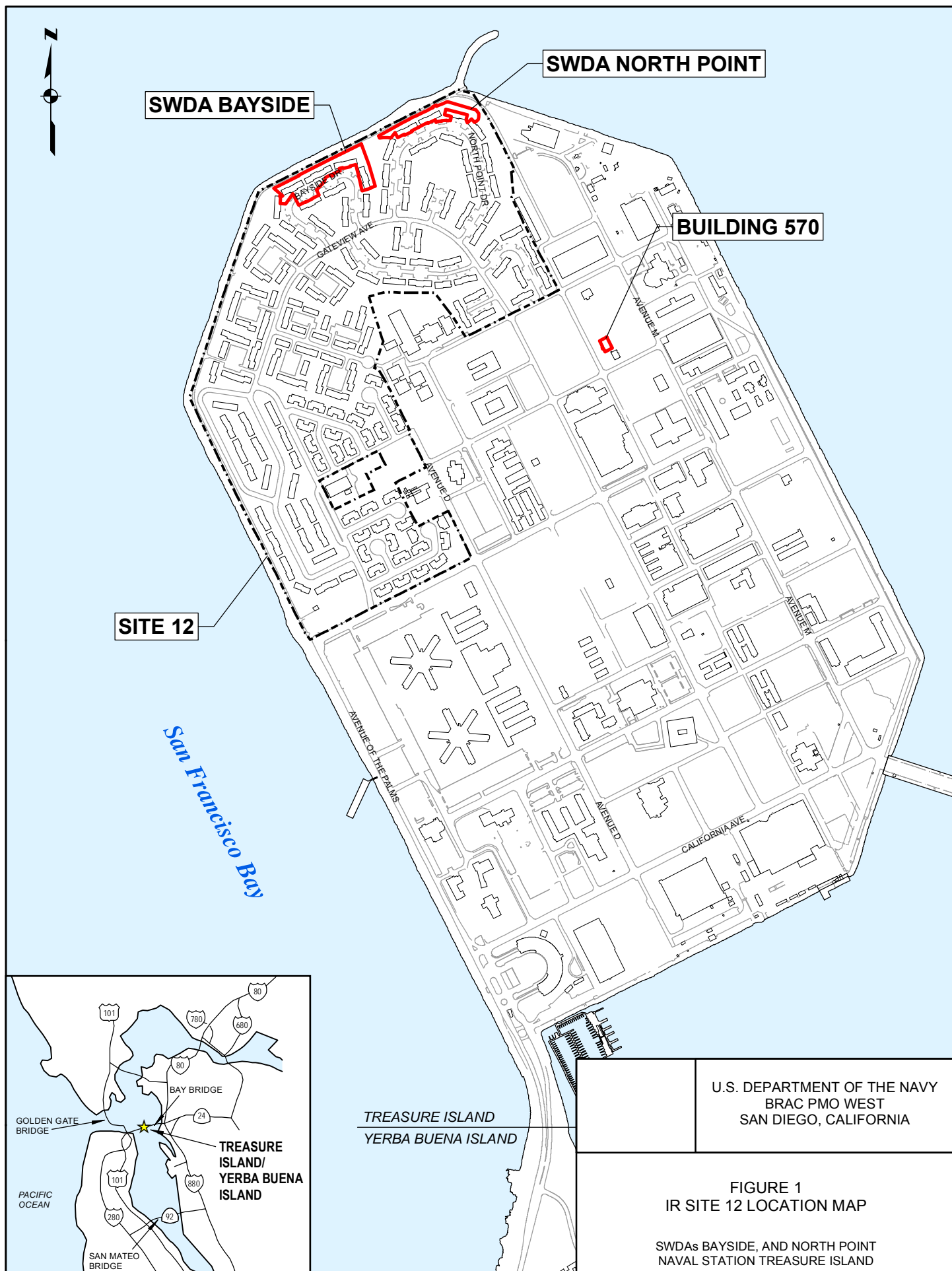
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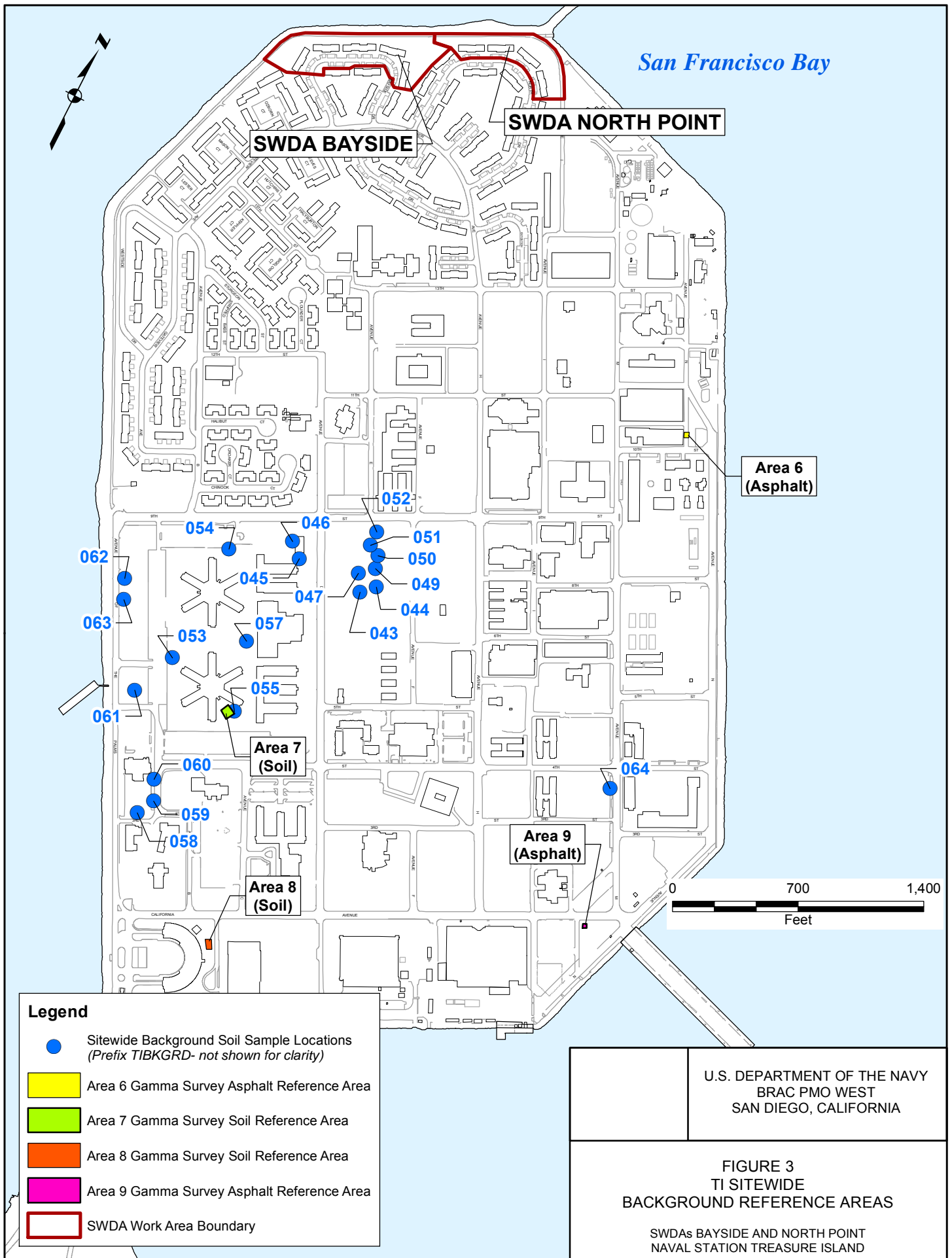
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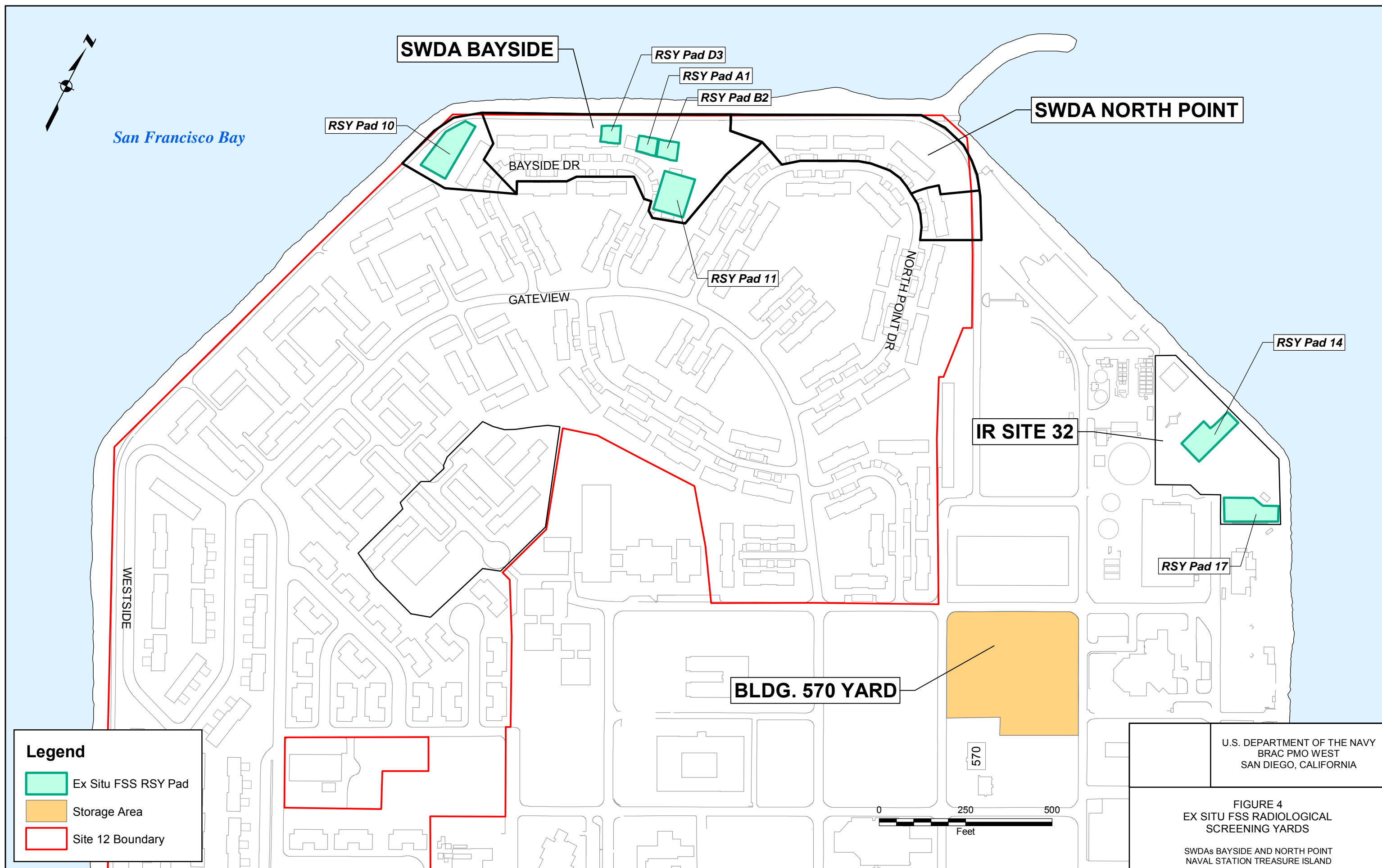
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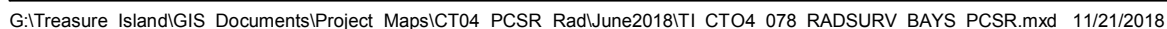
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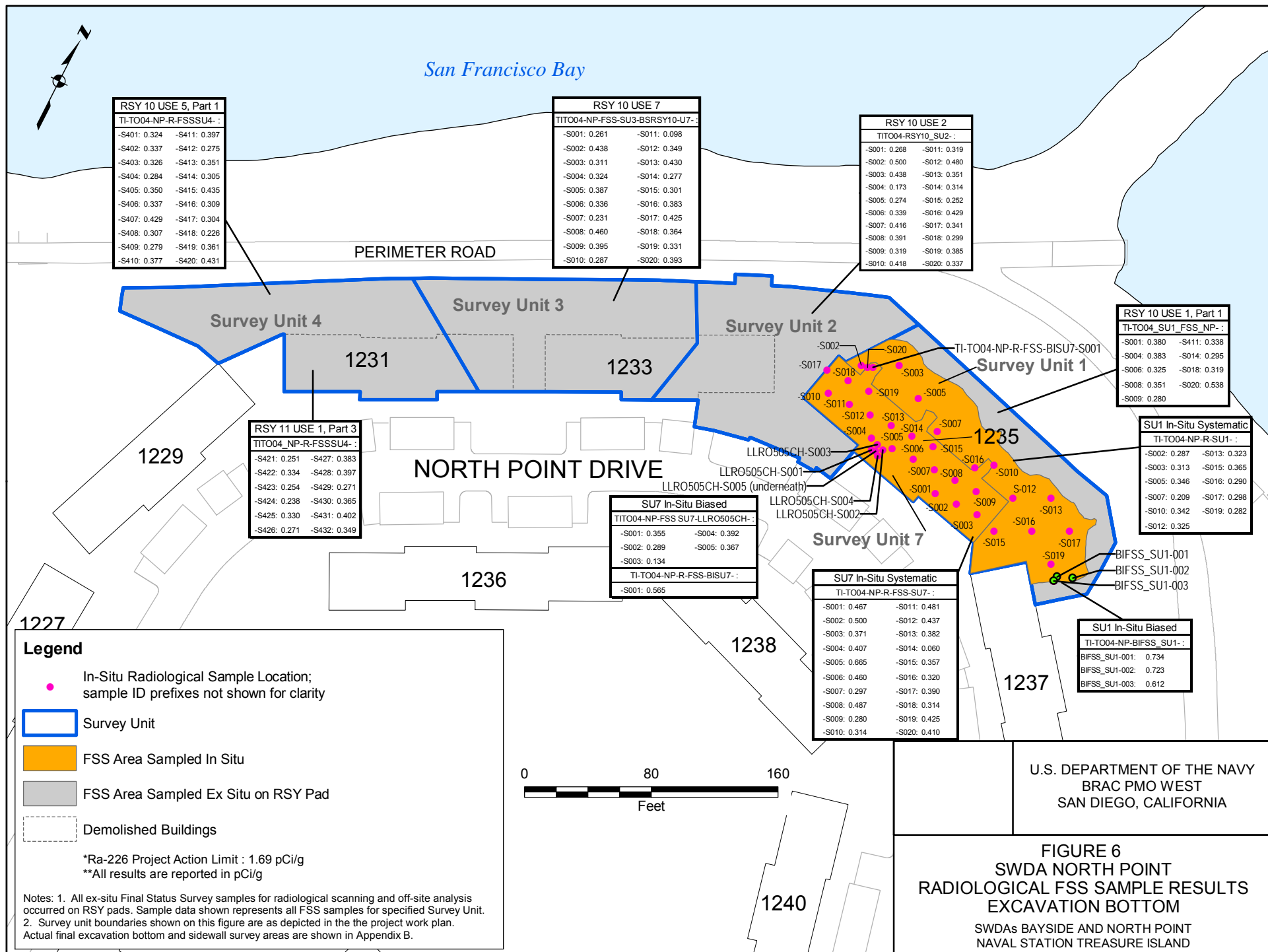
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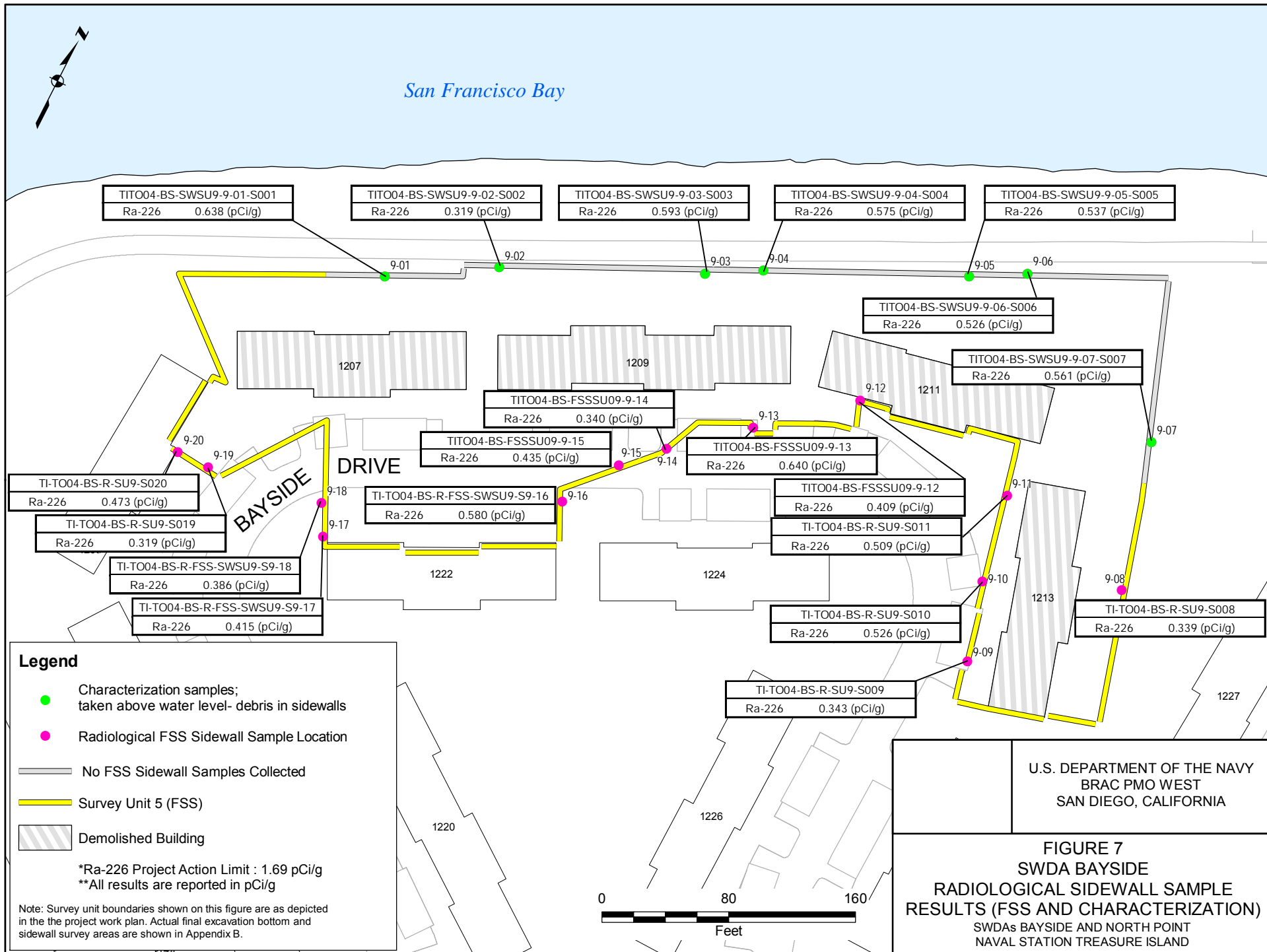


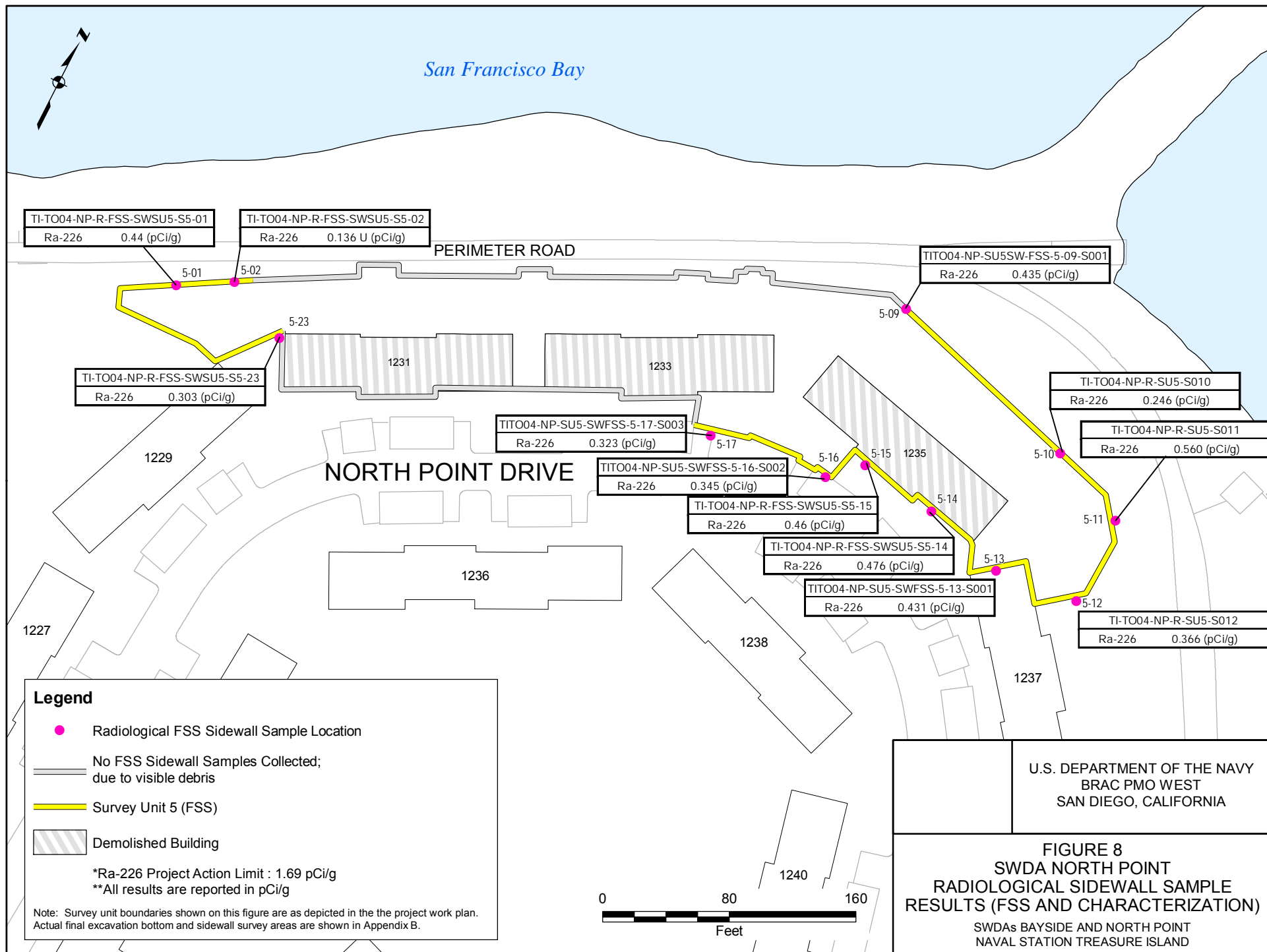












Tables

Table 1
Summary of Radiological Screening Data, SWDA Bayside

SU	Ex Situ RSY Pad(s)	Number of Ex Situ Samples	Number of In Situ Samples	Maximum ²²⁶ Ra Activity ^a
1	RSY 10 (Use 1, Part 2), RSY 14 (Use 2), RSY 17 (Use 2)	60	0	0.512
2	RSY 11 (Use 5)	20	0	0.419
3	RSY 10 (Use 9, Part 2), RSY 11 (Use 7)	27	0	0.433
4	RSY 10 (Use 8), RSY 10 (Use 9, Part 1)	32	0	0.483
5	RSY 11 (Use 9), RSY 10 (Use 11, Part 1), RSY 15 (Use 9)	36	0	0.620
6	RSY 11 (Use 1, Part 1), RSY 15 (Use 8)	32	0	0.490
7	RSY 13 (Use 15), RSY A1-A3, B1-B2, D1-D3 (Use 1), RSY B3 (Use 2)	27	0	0.634
8	RSY 11 (Use 1, Part 2)	17	4	0.604
9	N/A	0	13	0.640

Notes:

^a Values are reported in units of picocurie per gram.

²²⁶Ra radium-226
N/A not applicable
RSY radiological screening yard
SU survey unit
SWDA solid waste disposal area

Table 2
Summary of Radiological Screening Data, SWDA North Point

SU	Ex Situ RSY Pad(s)	Number of Ex Situ Samples	Number of In Situ Samples	Maximum ²²⁶ Ra Activity ^a
1	RSY 10 (Use 1, Part 1)	9	11	0.538
2	RSY 10 (Use 2)	20	0	0.500
3	RSY 10 (Use 7)	20	0	0.460
4	RSY 10 (Use 5), RSY 11 (Use 1, Part 3)	32	0	0.435
5	N/A	0	12	0.560
7	N/A	0	20	0.665

Notes:

^a Values are reported in units of picocurie per gram.

²²⁶Ra radium-226
N/A not applicable
RSY radiological screening yard
SU survey unit
SWDA solid waste disposal area

Table 3
Sitewide Background Analytical Results

Sample	²²⁶ Ra	
	Result ^a	MDC
TIBKGRD-043	0.49	0.13
TIBKGRD-044	0.98	0.16
TIBKGRD-045	0.83	0.19
TIBKGRD-046	0.54	0.08
TIBKGRD-047	0.57	0.13
TIBKGRD-049	0.55	0.12
TIBKGRD-050	0.57	0.14
TIBKGRD-051	0.46	0.11
TIBKGRD-052	0.50	0.11
TIBKGRD-053	0.66	0.10
TIBKGRD-054	0.75	0.08
TIBKGRD-055	0.70	0.10
TIBKGRD-057	0.86	0.15
TIBKGRD-058	0.51	0.14
TIBKGRD-059	0.91	0.14
TIBKGRD-060	0.83	0.11
TIBKGRD-061	0.79	0.16
TIBKGRD-062	0.90	0.10
TIBKGRD-063	0.66	0.13
TIBKGRD-064	0.69	0.09
Average	0.69	
Standard Deviation	0.16	
Minimum	0.46	
Maximum	0.98	
Median	0.68	

Notes:

^a Values are reported in units of picocurie per gram.

²²⁶Ra

radium-226

MDC

minimum detectable concentration

Table 4
Summary of Soil Sample Data

SWDA	Number of Systematic Samples	Number of Biased Samples	Maximum ^{226}Ra Activity ^a
Bayside	268	29	0.931 (biased)
North Point	124	20	0.918 (biased)

Notes:

^a Values are reported for systematic samples in units of picocuries per gram.

^{226}Ra

radium-226

SWDA

solid waste disposal area

Table 5
Radiological Instrumentation

Gamma Scan and Static Surveys—Ludlum Model 2221 (3-inch by 3-inch NaI Probe)					
Meter Serial Number	Calibration Due Date	Asphalt Investigation Level ^a (cpm)		Soil Investigation Level (cpm)	
		Scan	Static	Scan	Static
262337	2/8/2017	17,415	15,895	20,906	19,400
262301	1/12/2017	18,273	16,768	20,201	18,654
262322	8/12/2017	15,572	14,401	17,356	16,662
117648	8/12/2017	15,679	14,456	17,684	16,702
254783	10/31/2017	18,192	15,814	18,077	17,037
149942	2/10/2017	16,903	14,707	19,853	17,659
97290	4/28/2016	21,087	18,022	22,399	20,154
117652	3/30/2017	16,146	15,241	19,334	18,623
202370	9/12/2018	18,860	16,431	20,132	19,096
268650	9/13/2018	18,023	16,518	20,498	19,770
268645	6/15/2018	17,584	15,585	19,916	19,195

RS-700 with RSX-1 Detectors		
Component	Serial Number	Calibration Date
RS-701 Console	7236	6/22/2016
RSX-1 Detector	5447	
RSX-1 Detector	5448	

Notes:

^a For gamma surveys on concrete, the asphalt investigation level was conservatively used.

cpm

count per minute

NaI

sodium iodide

Table 6
SWDA Bayside Survey Unit 1 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TI-TO04-BS-FSS-SU1-S001	0.274		0.129	0.274
TI-TO04-BS-FSS-SU1-S002	0.202		0.097	0.202
TI-TO04-BS-FSS-SU1-S003	0.337		0.145	0.337
TI-TO04-BS-FSS-SU1-S004	0.391		0.089	0.391
TI-TO04-BS-FSS-SU1-S005	0.185		0.086	0.185
TI-TO04-BS-FSS-SU1-S006	0.384		0.114	0.384
TI-TO04-BS-FSS-SU1-S007	0.211		0.134	0.211
TI-TO04-BS-FSS-SU1-S008	0.259		0.102	0.259
TI-TO04-BS-FSS-SU1-S009	0.303		0.109	0.303
TI-TO04-BS-FSS-SU1-S010	0.277		0.130	0.277
TI-TO04-BS-FSS-SU1-S011	0.348		0.098	0.348
TI-TO04-BS-FSS-SU1-S012	0.268		0.119	0.268
TI-TO04-BS-FSS-SU1-S013	0.309		0.099	0.309
TI-TO04-BS-FSS-SU1-S014	0.155		0.139	0.155
TI-TO04-BS-FSS-SU1-S015	0.500	U	0.173	0.500
TI-TO04-BS-FSS-SU1-S016	0.244		0.086	0.244
TI-TO04-BS-FSS-SU1-S017	0.328		0.091	0.328
TI-TO04-BS-FSS-SU1-S018	0.317		0.103	0.317
TI-TO04-BS-FSS-SU1-S019	0.321		0.106	0.321
TI-TO04-BS-FSS-SU1-S020	0.299		0.105	0.299
TITO04_RSY14_2-CH-S201	0.375		0.095	0.375
TITO04_RSY14_2-CH-S202	0.347		0.067	0.347
TITO04_RSY14_2-CH-S203	0.214		0.119	0.214
TITO04_RSY14_2-CH-S204	0.237		0.110	0.237
TITO04_RSY14_2-CH-S205	0.355		0.102	0.355
TITO04_RSY14_2-CH-S206	0.403		0.077	0.403
TITO04_RSY14_2-CH-S207	0.280		0.131	0.280
TITO04_RSY14_2-CH-S208	0.388		0.109	0.388
TITO04_RSY14_2-CH-S209	0.222		0.157	0.222

Table 6 (continued)
SWDA Bayside Survey Unit 1 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TITO04_RSY14_2-CH-S210	0.243		0.094	0.243
TITO04_RSY14_2-CH-S211	0.362		0.067	0.362
TITO04_RSY14_2-CH-S212	0.275		0.083	0.275
TITO04_RSY14_2-CH-S213	0.364		0.082	0.364
TITO04_RSY14_2-CH-S214	0.367		0.102	0.367
TITO04_RSY14_2-CH-S215	0.300		0.109	0.300
TITO04_RSY14_2-CH-S216	0.318		0.087	0.318
TITO04_RSY14_2-CH-S217	0.403		0.065	0.403
TITO04_RSY14_2-CH-S218	0.310		0.084	0.310
TITO04_RSY14_2-CH-S219	0.324		0.088	0.324
TITO04_RSY14_2-CH-S220	0.351		0.120	0.351
TITO04_RSY17_2-CH-S201	0.367		0.100	0.367
TITO04_RSY17_2-CH-S202	0.386		0.121	0.386
TITO04_RSY17_2-CH-S203	0.512		0.108	0.512
TITO04_RSY17_2-CH-S204	0.366		0.101	0.366
TITO04_RSY17_2-CH-S205	0.394		0.093	0.394
TITO04_RSY17_2-CH-S206	0.443		0.118	0.443
TITO04_RSY17_2-CH-S207	0.406		0.125	0.406
TITO04_RSY17_2-CH-S208	0.200		0.124	0.200
TITO04_RSY17_2-CH-S209	0.399		0.114	0.399
TITO04_RSY17_2-CH-S210	0.494		0.142	0.494
TITO04_RSY17_2-CH-S211	0.430		0.090	0.430
TITO04_RSY17_2-CH-S212	0.426		0.108	0.426
TITO04_RSY17_2-CH-S213	0.172		0.150	0.172
TITO04_RSY17_2-CH-S214	0.261		0.115	0.261
TITO04_RSY17_2-CH-S215	0.304		0.090	0.304
TITO04_RSY17_2-CH-S216	0.362		0.124	0.362
TITO04_RSY17_2-CH-S217	0.372		0.103	0.372
TITO04_RSY17_2-CH-S218	0.500	U	0.131	0.500

Table 6 (continued)
SWDA Bayside Survey Unit 1 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TITO04_RSY17_2-CH-S219	0.333		0.116	0.333
TITO04_RSY17_2-CH-S220	0.399		0.089	0.399
Project-Screening Criterion	1.69			
Number of Samples	60			
Average	0.331			
Standard Deviation	0.083			
Minimum	0.155			
Maximum	0.512			
Median	0.335			
Skewness	0.015			
Kurtosis	-0.254			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥	greater than or equal to
²²⁶ Ra	radium-226
ID	identification
MDC	minimum detectable concentration
SWDA	solid waste disposal area

Table 7
SWDA Bayside Survey Unit 2 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TITO04-BS-FSS-SU2RSY11-5-S501	0.072	U	0.294	0.294
TITO04-BS-FSS-SU2RSY11-5-S502	0.366		0.097	0.366
TITO04-BS-FSS-SU2RSY11-5-S503	0.407		0.107	0.407
TITO04-BS-FSS-SU2RSY11-5-S504	0.051	U	0.241	0.241
TITO04-BS-FSS-SU2RSY11-5-S505	0.259		0.104	0.259
TITO04-BS-FSS-SU2RSY11-5-S506	0.067	U	0.250	0.25
TITO04-BS-FSS-SU2RSY11-5-S507	0.313		0.079	0.313
TITO04-BS-FSS-SU2RSY11-5-S508	0.315		0.115	0.315
TITO04-BS-FSS-SU2RSY11-5-S509	0.324		0.127	0.324
TITO04-BS-FSS-SU2RSY11-5-S510	0.296		0.137	0.296
TITO04-BS-FSS-SU2RSY11-5-S511	0.101	U	0.378	0.378
TITO04-BS-FSS-SU2RSY11-5-S512	0.234		0.067	0.234
TITO04-BS-FSS-SU2RSY11-5-S513	0.024	U	0.299	0.299
TITO04-BS-FSS-SU2RSY11-5-S514	0.334		0.125	0.334
TITO04-BS-FSS-SU2RSY11-5-S515	0.419		0.166	0.419
TITO04-BS-FSS-SU2RSY11-5-S516	0.244		0.090	0.244
TITO04-BS-FSS-SU2RSY11-5-S517	0.225	U	0.335	0.335
TITO04-BS-FSS-SU2RSY11-5-S518	0.235		0.103	0.235
TITO04-BS-FSS-SU2RSY11-5-S519	0.279		0.128	0.279
TITO04-BS-FSS-SU2RSY11-5-S520	0.394		0.105	0.394
Project-Screening Criterion	1.69			
Number of Samples	20			
Average	0.311			
Standard Deviation	0.059			
Minimum	0.234			
Maximum	0.419			
Median	0.306			
Skewness	0.374			
Kurtosis	-0.921			

Table 7 (continued)
SWDA Bayside Survey Unit 2 Systematic Sample Results

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

\geq	greater than or equal to
²²⁶ Ra	radium-226
ID	identification
MDC	minimum detectable concentration
SWDA	solid waste disposal area

Table 8
SWDA Bayside Survey Unit 3 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TITO04-BS-FSSSU3P2-RSY10-U9-S901	0.290		0.087	0.290
TITO04-BS-FSSSU3P2-RSY10-U9-S902	0.112	U	0.251	0.251
TITO04-BS-FSSSU3P2-RSY10-U9-S903	0.416		0.115	0.416
TITO04-BS-FSSSU3P2-RSY10-U9-S904	0.027	U	0.207	0.207
TITO04-BS-FSSSU3P2-RSY10-U9-S905	0.288		0.127	0.288
TITO04-BS-FSSSU3P2-RSY10-U9-S906	0.398		0.137	0.398
TITO04-BS-FSSSU3P2-RSY10-U9-S907	0.381		0.115	0.381
TITO04-BS-FSSSU3P2-RSY10-U9-S908	0.035	U	0.364	0.364
TITO04-BS-FSSSU3P2-RSY10-U9-S909	0.408		0.117	0.408
TITO04-BS-FSSSU3P2-RSY10-U9-S910	0.078	U	0.299	0.299
TITO04-BS-FSSSU3P2-RSY10-U9-S911	0.402		0.111	0.402
TITO04-BS-FSSSU3P2-RSY10-U9-S912	0.330		0.140	0.330
TITO04-BS-FSSSU3P2-RSY10-U9-S913	0.293		0.069	0.293
TITO04-BS-FSSSU3P2-RSY10-U9-S914	0.340		0.107	0.340
TITO04-BS-FSSSU3P2-RSY10-U9-S915	0.355		0.163	0.355
TITO04-BS-FSSSU3-RSY11-U7-S701	0.364		0.093	0.364
TITO04-BS-FSSSU3-RSY11-U7-S702	0.306		0.137	0.306
TITO04-BS-FSSSU3-RSY11-U7-S703	0.401		0.105	0.401
TITO04-BS-FSSSU3-RSY11-U7-S704	0.393		0.109	0.393
TITO04-BS-FSSSU3-RSY11-U7-S705	0.114	U	0.298	0.298
TITO04-BS-FSSSU3-RSY11-U7-S706	0.341		0.090	0.341
TITO04-BS-FSSSU3-RSY11-U7-S707	0.337		0.171	0.337
TITO04-BS-FSSSU3-RSY11-U7-S708	0.328		0.073	0.328
TITO04-BS-FSSSU3-RSY11-U7-S709	0.433		0.121	0.433
TITO04-BS-FSSSU3-RSY11-U7-S710	0.361		0.146	0.361
TITO04-BS-FSSSU3-RSY11-U7-S711	0.295		0.133	0.295
TITO04-BS-FSSSU3-RSY11-U7-S712	0.388		0.104	0.388

Table 8 (continued)
SWDA Bayside Survey Unit 3 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
Project-Screening Criterion	1.69			
Number of Samples	27			
Average	0.343			
Standard Deviation	0.055			
Minimum	0.207			
Maximum	0.433			
Median	0.341			
Skewness	-0.472			
Kurtosis	-0.107			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥ greater than or equal to

²²⁶Ra radium-226

ID identification

MDC minimum detectable concentration

SWDA solid waste disposal area

Table 9
SWDA Bayside Survey Unit 4 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TITO04-BS-FSSSU4-RSY10-U8-S801	0.283		0.083	0.283
TITO04-BS-FSSSU4-RSY10-U8-S802	0.319		0.095	0.319
TITO04-BS-FSSSU4-RSY10-U8-S803	0.248		0.101	0.248
TITO04-BS-FSSSU4-RSY10-U8-S804	0.390		0.111	0.390
TITO04-BS-FSSSU4-RSY10-U8-S805	0.334		0.108	0.334
TITO04-BS-FSSSU4-RSY10-U8-S806	0.327		0.099	0.327
TITO04-BS-FSSSU4-RSY10-U8-S807	0.462		0.110	0.462
TITO04-BS-FSSSU4-RSY10-U8-S808	0.323		0.135	0.323
TITO04-BS-FSSSU4-RSY10-U8-S809	0.374		0.109	0.374
TITO04-BS-FSSSU4-RSY10-U8-S810	0.371		0.121	0.371
TITO04-BS-FSSSU4-RSY10-U8-S811	0.324		0.078	0.324
TITO04-BS-FSSSU4-RSY10-U8-S812	0.286		0.108	0.286
TITO04-BS-FSSSU4-RSY10-U8-S813	0.401		0.138	0.401
TITO04-BS-FSSSU4-RSY10-U8-S814	0.414		0.110	0.414
TITO04-BS-FSSSU4-RSY10-U8-S815	0.325		0.093	0.325
TITO04-BS-FSSSU4-RSY10-U8-S816	0.366		0.083	0.366
TITO04-BS-FSSSU4-RSY10-U8-S817	0.281		0.090	0.281
TITO04-BS-FSSSU4-RSY10-U8-S818	0.319		0.134	0.319
TITO04-BS-FSSSU4-RSY10-U8-S819	0.385		0.117	0.385
TITO04-BS-FSSSU4-RSY10-U8-S820	0.349		0.122	0.349
TITO04-BS-FSSSU4P1-RSY10-U9-S901	0.247		0.095	0.247
TITO04-BS-FSSSU4P1-RSY10-U9-S902	0.356		0.068	0.356
TITO04-BS-FSSSU4P1-RSY10-U9-S903	0.267		0.114	0.267
TITO04-BS-FSSSU4P1-RSY10-U9-S904	0.362		0.108	0.362
TITO04-BS-FSSSU4P1-RSY10-U9-S905	0.315		0.092	0.315
TITO04-BS-FSSSU4P1-RSY10-U9-S906	0.142	U	0.272	0.272
TITO04-BS-FSSSU4P1-RSY10-U9-S907	0.153	U	0.413	0.413
TITO04-BS-FSSSU4P1-RSY10-U9-S908	0.314		0.106	0.314
TITO04-BS-FSSSU4P1-RSY10-U9-S909	0.390		0.070	0.39

Table 9 (continued)
SWDA Bayside Survey Unit 4 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TITO04-BS-FSSSU4P1-RSY10-U9-S910	0.483		0.123	0.483
TITO04-BS-FSSSU4P1-RSY10-U9-S911	0.327		0.087	0.327
TITO04-BS-FSSSU4P1-RSY10-U9-S912	0.117	U	0.426	0.426
Project-Screening Criterion	1.69			
Number of Samples	32			
Average	0.345			
Standard Deviation	0.059			
Minimum	0.247			
Maximum	0.483			
Median	0.331			
Skewness	0.373			
Kurtosis	-0.195			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥ greater than or equal to
²²⁶Ra radium-226
ID identification
MDC minimum detectable concentration
SWDA solid waste disposal area

Table 10
SWDA Bayside Survey Unit 5 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TITO04-BS-FSSSU5-RSY11-U9-S901	0.359		0.143	0.359
TITO04-BS-FSSSU5-RSY11-U9-S902	0.321		0.095	0.321
TITO04-BS-FSSSU5-RSY11-U9-S903	0.410		0.124	0.410
TITO04-BS-FSSSU5-RSY11-U9-S904	0.386		0.107	0.386
TITO04-BS-FSSSU5-RSY11-U9-S905	0.298		0.123	0.298
TITO04-BS-FSSSU5-RSY11-U9-S906	0.372		0.154	0.372
TITO04-BS-FSSSU5-RSY11-U9-S907	0.250		0.139	0.250
TITO04-BS-FSSSU5-RSY11-U9-S908	0.454		0.094	0.454
TITO04-BS-FSSSU5-RSY11-U9-S909	0.332		0.119	0.332
TITO04-BS-FSSSU5-RSY11-U9-S910	0.404		0.107	0.404
TITO04-BS-FSSSU5-RSY11-U9-S911	0.413		0.107	0.413
TITO04-BS-FSSSU5-RSY11-U9-S912	0.367		0.110	0.367
TITO04-BS-SU5P1-RSY10-U11-S001	0.521		0.119	0.521
TITO04-BS-SU5P1-RSY10-U11-S002	0.321		0.118	0.321
TITO04-BS-SU5P1-RSY10-U11-S003	0.400		0.123	0.400
TITO04-BS-SU5P1-RSY10-U11-S004	0.347		0.138	0.347
TITO04-BS-SU5P1-RSY10-U11-S005	0.442		0.119	0.442
TITO04-BS-SU5P1-RSY10-U11-S006	0.392		0.125	0.392
TITO04-BS-SU5P1-RSY10-U11-S007	0.453		0.083	0.453
TITO04-BS-SU5P1-RSY10-U11-S008	0.479		0.093	0.479
TITO04-BS-SU5P1-RSY10-U11-S009	0.335		0.106	0.335
TITO04-BS-SU5P1-RSY10-U11-S010	0.365		0.106	0.365
TITO04-BS-SU5P1-RSY10-U11-S011	0.477		0.107	0.477
TITO04-BS-SU5P1-RSY10-U11-S012	0.620		0.093	0.620
TITO04-RSY15-U9-BS-FSSSU5-S001	0.361		0.130	0.361
TITO04-RSY15-U9-BS-FSSSU5-S002	0.397		0.106	0.397
TITO04-RSY15-U9-BS-FSSSU5-S003	0.292		0.085	0.292
TITO04-RSY15-U9-BS-FSSSU5-S004	0.360		0.154	0.360
TITO04-RSY15-U9-BS-FSSSU5-S005	0.125	U	0.330	0.330

Table 10 (continued)
SWDA Bayside Survey Unit 5 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TITO04-RSY15-U9-BS-FSSSU5-S006	0.350		0.083	0.350
TITO04-RSY15-U9-BS-FSSSU5-S007	0.370		0.108	0.370
TITO04-RSY15-U9-BS-FSSSU5-S008	0.326		0.098	0.326
TITO04-RSY15-U9-BS-FSSSU5-S009	0.324		0.099	0.324
TITO04-RSY15-U9-BS-FSSSU5-S010	0.524		0.039	0.524
TITO04-RSY15-U9-BS-FSSSU5-S011	0.396		0.145	0.396
TITO04-RSY15-U9-BS-FSSSU5-S012	0.271		0.122	0.271
Project-Screening Criterion	1.69			
Number of Samples	36			
Average	0.384			
Standard Deviation	0.076			
Minimum	0.250			
Maximum	0.620			
Median	0.369			
Skewness	0.992			
Kurtosis	1.564			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥ greater than or equal to
²²⁶Ra radium-226
ID identification
MDC minimum detectable concentration
SWDA solid waste disposal area

Table 11
SWDA Bayside Survey Unit 6 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TI-TITO04-BS-R-FSSSU6-S601	0.472		0.108	0.472
TI-TITO04-BS-R-FSSSU6-S602	0.398		0.107	0.398
TI-TITO04-BS-R-FSSSU6-S603	0.490		0.116	0.49
TI-TITO04-BS-R-FSSSU6-S604	0.411		0.081	0.411
TI-TITO04-BS-R-FSSSU6-S605	0.399		0.075	0.399
TI-TITO04-BS-R-FSSSU6-S606	0.468		0.105	0.468
TI-TITO04-BS-R-FSSSU6-S607	0.398		0.115	0.398
TI-TITO04-BS-R-FSSSU6-S608	0.365		0.114	0.365
TI-TITO04-BS-R-FSSSU6-S609	0.390		0.076	0.39
TI-TITO04-BS-R-FSSSU6-S610	0.451		0.087	0.451
TI-TITO04-BS-R-FSSSU6-S611	0.484		0.031	0.484
TI-TITO04-BS-R-FSSSU6-S612	0.231		0.128	0.231
TI-TITO04-BS-R-FSSSU6-S613	0.387		0.087	0.387
TI-TITO04-BS-R-FSSSU6-S614	0.384		0.128	0.384
TI-TITO04-BS-R-FSSSU6-S615	0.459		0.070	0.459
TI-TITO04-BS-R-FSSSU6-S616	0.367		0.094	0.367
TI-TITO04-BS-R-FSSSU6-S617	0.422		0.136	0.422
TI-TITO04-BS-R-FSSSU6-S618	0.445		0.046	0.445
TI-TITO04-BS-R-FSSSU6-S619	0.396		0.134	0.396
TI-TITO04-BS-R-FSSSU6-S620	0.365		0.106	0.365
TITO04-RSY15-U8-BS-FSSSU6-S001	0.379		0.086	0.379
TITO04-RSY15-U8-BS-FSSSU6-S002	0.305		0.132	0.305
TITO04-RSY15-U8-BS-FSSSU6-S003	0.473		0.121	0.473
TITO04-RSY15-U8-BS-FSSSU6-S004	0.296		0.076	0.296
TITO04-RSY15-U8-BS-FSSSU6-S005	0.382		0.120	0.382
TITO04-RSY15-U8-BS-FSSSU6-S006	0.353		0.101	0.353
TITO04-RSY15-U8-BS-FSSSU6-S007	0.310		0.122	0.310
TITO04-RSY15-U8-BS-FSSSU6-S008	0.311		0.119	0.311
TITO04-RSY15-U8-BS-FSSSU6-S009	0.383		0.087	0.383

Table 11 (continued)
SWDA Bayside Survey Unit 6 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TITO04-RSY15-U8-BS-FSSSU6-S010	0.439		0.127	0.439
TITO04-RSY15-U8-BS-FSSSU6-S011	0.410		0.095	0.410
TITO04-RSY15-U8-BS-FSSSU6-S012	0.489		0.096	0.489
Project-Screening Criterion	1.69			
Number of Samples	32			
Average	0.397			
Standard Deviation	0.062			
Minimum	0.231			
Maximum	0.490			
Median	0.397			
Skewness	-0.557			
Kurtosis	0.298			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥ greater than or equal to
²²⁶Ra radium-226
ID identification
MDC minimum detectable concentration
SWDA solid waste disposal area

Table 12
SWDA Bayside Survey Unit 7 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TITO04-BS-FSS-SU7C-RSY13-U15-S001	0.432		0.077	0.432
TITO04-BS-FSS-SU7C-RSY13-U15-S002	0.409		0.141	0.409
TITO04-BS-FSS-SU7C-RSY13-U15-S003	0.537		0.088	0.537
TITO04-BS-FSS-SU7C-RSY13-U15-S004	0.386		0.130	0.386
TITO04-BS-FSS-SU7C-RSY13-U15-S005	0.399		0.120	0.399
TITO04-BS-FSS-SU7C-RSY13-U15-S006	0.634		0.051	0.634
TITO04-BS-FSS-SU7C-RSY13-U15-S007	0.386		0.117	0.386
TITO04-BS-FSS-SU7D-U1-S001	0.279		0.137	0.279
TITO04-BS-FSS-SU7D-U1-S002	0.323		0.127	0.323
TITO04-BS-FSS-SU7D-U1-S003	0.318		0.089	0.318
TITO04-BS-FSS-SU7D-U1-S004	0.382		0.113	0.382
TITO04-BS-FSS-SU7D-U1-S005	0.423		0.155	0.423
TITO04-BS-FSS-SU7D-U1-S006	0.323		0.081	0.323
TITO04-BS-FSS-SU7A-U1-S007	0.394		0.115	0.394
TITO04-BS-FSS-SU7A-U1-S008	0.359		0.065	0.359
TITO04-BS-FSS-SU7A-U1-S009	0.286		0.100	0.286
TITO04-BS-FSS-SU7A-U1-S010	0.335		0.051	0.335
TITO04-BS-FSS-SU7A-U1-S011	0.027	U	0.283	0.283
TITO04-BS-FSS-SU7A-U1-S012	0.343		0.166	0.343
TITO04-BS-FSS-SU7B-LANE1-U1-S013	0.272		0.085	0.272
TITO04-BS-FSS-SU7B-LANE1-U1-S014	0.339		0.069	0.339
TITO04-BS-FSS-SU7B-LANE1-U1-S015	0.251		0.067	0.251
TITO04-BS-FSS-SU7B-LANE2-U1-S016	0.009	U	0.296	0.296
TITO04-BS-FSS-SU7B-LANE2-U1-S017	0.384		0.169	0.384
TITO04-BS-FSS-SU7B-LANE2-U1-S018	0.350		0.089	0.350
TITO04-BS-FSS-SU7B-LANE3-U2-S021	0.372		0.123	0.372
TITO04-BS-FSS-SU7B-LANE3-U2-S022	0.377		0.098	0.377

Table 12 (continued)
SWDA Bayside Survey Unit 7 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
Project-Screening Criterion	1.69			
Number of Samples	27			
Average	0.366			
Standard Deviation	0.081			
Minimum	0.251			
Maximum	0.634			
Median	0.359			
Skewness	1.591			
Kurtosis	3.982			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥ greater than or equal to

²²⁶Ra radium-226

ID identification

MDC minimum detectable concentration

SWDA solid waste disposal area

Table 13
SWDA Bayside Survey Unit 8 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TI-TO04-BS-R-SU8-S001	0.336		0.094	0.336
TI-TO04-BS-R-SU8-S002	0.383		0.078	0.383
TI-TO04-BS-R-SU8-S003	0.391		0.108	0.391
TI-TO04-BS-R-SU8-S004	0.333		0.080	0.333
TI-TO04-BS-R-SU8-S005	0.351		0.120	0.351
TI-TO04-BS-R-SU8-S006	0.348		0.113	0.348
TI-TO04-BS-R-SU8-S007	0.252		0.078	0.252
TI-TO04-BS-R-SU8-S008	0.340		0.101	0.34
TI-TO04-BS-R-SU8-S009	0.358		0.110	0.358
TI-TO04-BS-R-SU8-S010	0.307		0.140	0.307
TI-TO04-BS-R-SU8-S011	0.463		0.095	0.463
TI-TO04-BS-R-SU8-S012	0.376		0.119	0.376
TI-TO04-BS-R-SU8-S013	0.354		0.096	0.354
TI-TO04-BS-R-SU8-S014	0.467		0.145	0.467
TI-TO04-BS-R-SU8-S015	0.354		0.118	0.354
TI-TO04-BS-R-SU8-S016	0.351		0.110	0.351
TI_TO04-BS-R-SU8-S017	0.464		0.161	0.464
TI_TO04-BS-R-SU8-S018	0.604		0.122	0.604
TI-TO04-BS-R-SU8-S019	0.331		0.097	0.331
TI_TO04-BS-R-SU8-S020	0.436		0.117	0.436
TI_TO04-BS-R-SU8-S021	0.391		0.157	0.391
Project-Screening Criterion	1.69			
Number of Samples	21			
Average	0.380			
Standard Deviation	0.074			
Minimum	0.252			
Maximum	0.604			
Median	0.354			

Table 13
SWDA Bayside Survey Unit 8 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
Skewness	1.378			
Kurtosis	3.207			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥ greater than or equal to

²²⁶Ra radium-226

ID identification

MDC minimum detectable concentration

SWDA solid waste disposal area

Table 14
SWDA Bayside Survey Unit 9 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TI-TO04-BS-R-FSS-SWSU9-S9-16	0.580		0.129	0.580
TI-TO04-BS-R-FSS-SWSU9-S9-17	0.415		0.080	0.415
TI-TO04-BS-R-FSS-SWSU9-S9-18	0.386		0.104	0.386
TI-TO04-BS-R-SU9-S008	0.339		0.119	0.339
TI-TO04-BS-R-SU9-S009	0.343		0.104	0.343
TI-TO04-BS-R-SU9-S010	0.526		0.157	0.526
TI-TO04-BS-R-SU9-S011	0.509		0.121	0.509
TI-TO04-BS-R-SU9-S019	0.319		0.114	0.319
TI-TO04-BS-R-SU9-S020	0.473		0.110	0.473
TITO04-BS-FSSSU09-9-12	0.409		0.089	0.409
TITO04-BS-FSSSU09-9-13	0.640		0.153	0.640
TITO04-BS-FSSSU09-9-14	0.340		0.097	0.340
TITO04-BS-FSSSU09-9-15	0.435		0.129	0.435
Project-Screening Criterion	1.69			
Number of Samples	13			
Average	0.440			
Standard Deviation	0.101			
Minimum	0.319			
Maximum	0.640			
Median	0.415			
Skewness	0.675			
Kurtosis	-0.448			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥ greater than or equal to
²²⁶Ra radium-226
ID identification
MDC minimum detectable concentration
SWDA solid waste disposal area

Table 15
SWDA Bayside Survey Unit 8 Biased Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TI-TO04-FSS-BISU8-S001	0.613		0.111	0.613
TI-TO04-FSS-BISU8-S002	0.656		0.163	0.656
TI-TO04-FSS-BISU8-S003	0.366		0.131	0.366
TI-TO04-FSS-BISU8-S004	0.556		0.133	0.556
Project-Screening Criterion	1.69			
Number of Samples	4			
Average	0.548			
Standard Deviation	0.128			
Minimum	0.366			
Maximum	0.656			
Median	0.585			
Skewness	-1.420			
Kurtosis	2.028			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥ greater than or equal to
²²⁶Ra radium-226
ID identification
MDC minimum detectable concentration
SWDA solid waste disposal area

Table 16
SWDA Bayside Survey Unit 9 Biased Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TI-TO04-FSS-BISU9-S001	0.523		0.126	0.523
TI-TO04-FSS-BISU9-S002	0.669		0.177	0.669
TI-TO04-FSS-BISU9-S003	0.529		0.220	0.529
TI-TO04-FSS-BISU9-S004	0.556		0.116	0.556
TI-TO04-FSS-BISU9-S005	0.238		0.154	0.238
TI-TO04-FSS-BISU9-S006	0.235		0.089	0.235
TI-TO04-BS-R-FSS-BISU9-S001	0.672		0.132	0.672
TI-TO04-BS-R-FSS-BISU9-S002	0.564		0.087	0.564
TI-TO04-BS-R-FSS-BISU9-S003	0.526		0.092	0.526
TI-TO04-BS-R-FSS-BISU9-S004	0.583		0.109	0.583
TI-TO04-BS-R-FSS-BISU9-S005	0.863		0.117	0.863
TI-TO04-BS-R-FSS-BISU9-S006	0.667		0.120	0.667
TI-TO04-BS-R-FSS-BISU9-S007	0.261		0.140	0.261
TI-TO04-BS-R-FSS-BISU9-S008	0.323		0.165	0.323
TI-TO04-BS-R-FSS-BISU9-S009	0.537		0.115	0.537
TI-TO04-BS-R-FSS-BISU9-S010	0.354		0.103	0.354
TI-TO04-BS-R-BISU9-S001	0.494		0.108	0.494
TI-TO04-BS-R-BISU9-S002	0.565		0.087	0.565
TITO04-BS-FSSSU9-B001	0.796		0.115	0.796
TITO04-BS-FSSSU9-B002	0.824		0.139	0.824
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B001	0.556		0.081	0.556
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B002	0.487		0.115	0.487
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B003	0.431		0.105	0.431
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B004	0.476		0.111	0.476
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B005	0.931		0.113	0.931

Table 16 (continued)
SWDA Bayside Survey Unit 9 Biased Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
Project-Screening Criterion	1.69			
Number of Samples	25			
Average	0.546			
Standard Deviation	0.185			
Minimum	0.235			
Maximum	0.931			
Median	0.537			
Skewness	0.200			
Kurtosis	-0.143			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥ greater than or equal to
²²⁶Ra radium-226
ID identification
MDC minimum detectable concentration
SWDA solid waste disposal area

Table 17
SWDA North Point Survey Unit 1 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TI-TO04-NP-R-SU1-S002	0.287		0.100	0.287
TI-TO04-NP-R-SU1-S003	0.313		0.108	0.313
TI-TO04-NP-R-SU1-S005	0.346		0.050	0.346
TI-TO04-NP-R-SU1-S007	0.209		0.161	0.209
TI-TO04-NP-R-SU1-S010	0.342		0.089	0.342
TI-TO04-NP-R-SU1-S012	0.325		0.106	0.325
TI-TO04-NP-R-SU1-S013	0.323		0.095	0.323
TI-TO04-NP-R-SU1-S015	0.365		0.036	0.365
TI-TO04-NP-R-SU1-S016	0.290		0.159	0.29
TI-TO04-NP-R-SU1-S017	0.298		0.118	0.298
TI-TO04-NP-R-SU1-S019	0.282		0.082	0.282
TI-TO04_SU1_FSS_NP-S001	0.380		0.145	0.38
TI-TO04_SU1_FSS_NP-S004	0.383		0.098	0.383
TI-TO04_SU1_FSS_NP-S006	0.325		0.083	0.325
TI-TO04_SU1_FSS_NP-S008	0.351		0.098	0.351
TI-TO04_SU1_FSS_NP-S009	0.280		0.105	0.28
TI-TO04_SU1_FSS_NP-S011	0.338		0.105	0.338
TI-TO04_SU1_FSS_NP-S014	0.295		0.153	0.295
TI-TO04_SU1_FSS_NP-S018	0.319		0.094	0.319
TI-TO04_SU1_FSS_NP-S020	0.538		0.098	0.538
Project-Screening Criterion	1.69			
Number of Samples	20			
Average	0.329			
Standard Deviation	0.063			
Minimum	0.209			
Maximum	0.538			
Median	0.324			
Skewness	1.658			
Kurtosis	6.026			

Table 17 (continued)
SWDA North Point Survey Unit 1 Systematic Sample Results

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

\geq	greater than or equal to
²²⁶ Ra	radium-226
ID	identification
MDC	minimum detectable concentration
SWDA	solid waste disposal area

Table 18
SWDA North Point Survey Unit 2 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TITO04-RSY10_SU2-S001	0.268		0.122	0.268
TITO04-RSY10_SU2-S002	0.500	U	0.168	0.5
TITO04-RSY10_SU2-S003	0.438		0.096	0.438
TITO04-RSY10_SU2-S004	0.173		0.146	0.173
TITO04-RSY10_SU2-S005	0.274		0.066	0.274
TITO04-RSY10_SU2-S006	0.339		0.133	0.339
TITO04-RSY10_SU2-S007	0.416		0.115	0.416
TITO04-RSY10_SU2-S008	0.391		0.149	0.391
TITO04-RSY10_SU2-S009	0.319		0.091	0.319
TITO04-RSY10_SU2-S010	0.418		0.092	0.418
TITO04-RSY10_SU2-S011	0.319		0.102	0.319
TITO04-RSY10_SU2-S012	0.480		0.102	0.48
TITO04-RSY10_SU2-S013	0.351		0.123	0.351
TITO04-RSY10_SU2-S014	0.314		0.157	0.314
TITO04-RSY10_SU2-S015	0.252		0.147	0.252
TITO04-RSY10_SU2-S016	0.429		0.155	0.429
TITO04-RSY10_SU2-S017	0.341		0.078	0.341
TITO04-RSY10_SU2-S018	0.299		0.104	0.299
TITO04-RSY10_SU2-S019	0.385		0.151	0.385
TITO04-RSY10_SU2-S020	0.337		0.100	0.337
Project-Screening Criterion	1.69			
Number of Samples	20			
Average	0.352			
Standard Deviation	0.081			
Minimum	0.173			
Maximum	0.500			
Median	0.340			
Skewness	-0.117			
Kurtosis	-0.017			

Table 18 (continued)
SWDA North Point Survey Unit 2 Systematic Sample Results

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

\geq	greater than or equal to
²²⁶ Ra	radium-226
ID	identification
MDC	minimum detectable concentration
SWDA	solid waste disposal area

Table 19
SWDA North Point Survey Unit 3 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TITO04-NP-FSS-SU3-BSRSY10-U7-S001	0.261		0.117	0.261
TITO04-NP-FSS-SU3-BSRSY10-U7-S002	0.438		0.113	0.438
TITO04-NP-FSS-SU3-BSRSY10-U7-S003	0.311		0.097	0.311
TITO04-NP-FSS-SU3-BSRSY10-U7-S004	0.324		0.058	0.324
TITO04-NP-FSS-SU3-BSRSY10-U7-S005	0.387		0.187	0.387
TITO04-NP-FSS-SU3-BSRSY10-U7-S006	0.336		0.107	0.336
TITO04-NP-FSS-SU3-BSRSY10-U7-S007	0.231		0.106	0.231
TITO04-NP-FSS-SU3-BSRSY10-U7-S008	0.460		0.102	0.460
TITO04-NP-FSS-SU3-BSRSY10-U7-S009	0.395		0.106	0.395
TITO04-NP-FSS-SU3-BSRSY10-U7-S010	0.287		0.077	0.287
TITO04-NP-FSS-SU3-BSRSY10-U7-S011	0.098	U	0.302	0.302
TITO04-NP-FSS-SU3-BSRSY10-U7-S012	0.349		0.101	0.349
TITO04-NP-FSS-SU3-BSRSY10-U7-S013	0.430		0.113	0.430
TITO04-NP-FSS-SU3-BSRSY10-U7-S014	0.277		0.095	0.277
TITO04-NP-FSS-SU3-BSRSY10-U7-S015	0.301		0.084	0.301
TITO04-NP-FSS-SU3-BSRSY10-U7-S016	0.383		0.089	0.383
TITO04-NP-FSS-SU3-BSRSY10-U7-S017	0.425		0.097	0.425
TITO04-NP-FSS-SU3-BSRSY10-U7-S018	0.364		0.099	0.364
TITO04-NP-FSS-SU3-BSRSY10-U7-S019	0.331		0.080	0.331
TITO04-NP-FSS-SU3-BSRSY10-U7-S020	0.393		0.136	0.393
Project-Screening Criterion	1.69			
Number of Samples	20			
Average	0.349			
Standard Deviation	0.064			
Minimum	0.231			
Maximum	0.460			
Median	0.343			
Skewness	0.008			
Kurtosis	-0.868			

Table 19 (continued)
SWDA North Point Survey Unit 3 Systematic Sample Results

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

\geq	greater than or equal to
²²⁶ Ra	radium-226
ID	identification
MDC	minimum detectable concentration
SWDA	solid waste disposal area

Table 20
SWDA North Point Survey Unit 4 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TI-TO04-NP-R-FSSSU4-S401	0.324		0.140	0.324
TI-TO04-NP-R-FSSSU4-S402	0.337		0.038	0.337
TI-TO04-NP-R-FSSSU4-S403	0.326		0.148	0.326
TI-TO04-NP-R-FSSSU4-S404	0.284		0.063	0.284
TI-TO04-NP-R-FSSSU4-S405	0.350		0.085	0.350
TI-TO04-NP-R-FSSSU4-S406	0.337		0.114	0.337
TI-TO04-NP-R-FSSSU4-S407	0.429		0.113	0.429
TI-TO04-NP-R-FSSSU4-S408	0.307		0.103	0.307
TI-TO04-NP-R-FSSSU4-S409	0.279		0.145	0.279
TI-TO04-NP-R-FSSSU4-S410	0.377		0.106	0.377
TI-TO04-NP-R-FSSSU4-S411	0.397		0.089	0.397
TI-TO04-NP-R-FSSSU4-S412	0.275		0.091	0.275
TI-TO04-NP-R-FSSSU4-S413	0.351		0.054	0.351
TI-TO04-NP-R-FSSSU4-S414	0.305		0.123	0.305
TI-TO04-NP-R-FSSSU4-S415	0.435		0.127	0.435
TI-TO04-NP-R-FSSSU4-S416	0.309		0.071	0.309
TI-TO04-NP-R-FSSSU4-S417	0.304		0.096	0.304
TI-TO04-NP-R-FSSSU4-S418	0.226		0.088	0.226
TI-TO04-NP-R-FSSSU4-S419	0.361		0.075	0.361
TI-TO04-NP-R-FSSSU4-S420	0.431		0.116	0.431
TITO04_NP-R-FSSSU4-S421	0.251		0.122	0.251
TITO04_NP-R-FSSSU4-S422	0.334		0.131	0.334
TITO04_NP-R-FSSSU4-S423	0.254		0.094	0.254
TITO04_NP-R-FSSSU4-S424	0.238		0.090	0.238
TITO04_NP-R-FSSSU4-S425	0.330		0.068	0.330
TITO04_NP-R-FSSSU4-S426	0.271		0.092	0.271
TITO04_NP-R-FSSSU4-S427	0.383		0.134	0.383
TITO04_NP-R-FSSSU4-S428	0.397		0.093	0.397
TITO04_NP-R-FSSSU4-S429	0.271		0.081	0.271

Table 20 (continued)
SWDA North Point Survey Unit 4 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TITO04_NP-R-FSSSU4-S430	0.365		0.120	0.365
TITO04_NP-R-FSSSU4-S431	0.402		0.135	0.402
TITO04_NP-R-FSSSU4-S432	0.349		0.077	0.349
Project-Screening Criterion	1.69			
Number of Samples	32			
Average	0.331			
Standard Deviation	0.057			
Minimum	0.226			
Maximum	0.435			
Median	0.332			
Skewness	0.093			
Kurtosis	-0.750			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥ greater than or equal to
²²⁶Ra radium-226
ID identification
MDC minimum detectable concentration
SWDA solid waste disposal area

Table 21
SWDA North Point Survey Unit 5 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TI-TO04-NP-R-FSS-SWSU5-S5-14	0.476		0.172	0.476
TI-TO04-NP-R-FSS-SWSU5-S5-15	0.460		0.104	0.460
TITO04-NP-SU5-SWFSS-5-13-S001	0.431		0.114	0.431
TITO04-NP-SU5-SWFSS-5-16-S002	0.345		0.115	0.345
TITO04-NP-SU5-SWFSS-5-17-S003	0.323		0.113	0.323
TI-TO04-NP-R-SU5-S010	0.246		0.078	0.246
TI-TO04-NP-R-SU5-S011	0.560		0.140	0.560
TI-TO04-NP-R-SU5-S012	0.366		0.104	0.366
TI-TO04-NP-R-FSS-SWSU5-S5-01	0.440		0.094	0.440
TI-TO04-NP-R-FSS-SWSU5-S5-02	0.136	U	0.273	0.273
TI-TO04-NP-R-FSS-SWSU5-S5-23	0.303		0.099	0.303
TITO04-NP-SU5SW-FSS-5-09-S001	0.435		0.109	0.435
Project-Screening Criterion	1.69			
Number of Samples	12			
Average	0.388			
Standard Deviation	0.094			
Minimum	0.246			
Maximum	0.560			
Median	0.399			
Skewness	0.140			
Kurtosis	-0.688			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥ greater than or equal to
²²⁶Ra radium-226
ID identification
MDC minimum detectable concentration
SWDA solid waste disposal area

Table 22
SWDA North Point Survey Unit 7 Systematic Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TI-TO04-NP-R-FSS-SU7-S001	0.467		0.113	0.467
TI-TO04-NP-R-FSS-SU7-S002	0.500		0.138	0.500
TI-TO04-NP-R-FSS-SU7-S003	0.371		0.156	0.371
TI-TO04-NP-R-FSS-SU7-S004	0.407		0.124	0.407
TI-TO04-NP-R-FSS-SU7-S005	0.665		0.099	0.665
TI-TO04-NP-R-FSS-SU7-S006	0.460		0.118	0.460
TI-TO04-NP-R-FSS-SU7-S007	0.297		0.113	0.297
TI-TO04-NP-R-FSS-SU7-S008	0.487		0.084	0.487
TI-TO04-NP-R-FSS-SU7-S009	0.280		0.159	0.280
TI-TO04-NP-R-FSS-SU7-S010	0.314		0.093	0.314
TI-TO04-NP-R-FSS-SU7-S011	0.481		0.093	0.481
TI-TO04-NP-R-FSS-SU7-S012	0.437		0.060	0.437
TI-TO04-NP-R-FSS-SU7-S013	0.382		0.141	0.382
TI-TO04-NP-R-FSS-SU7-S014	0.060	U	0.270	0.270
TI-TO04-NP-R-FSS-SU7-S015	0.357		0.095	0.357
TI-TO04-NP-R-FSS-SU7-S016	0.320		0.118	0.320
TI-TO04-NP-R-FSS-SU7-S017	0.390		0.088	0.390
TI-TO04-NP-R-FSS-SU7-S018	0.314		0.131	0.314
TI-TO04-NP-R-FSS-SU7-S019	0.425		0.117	0.425
TI-TO04-NP-R-FSS-SU7-S020	0.410		0.103	0.410
Project-Screening Criterion	1.69			
Number of Samples	20			
Average	0.402			
Standard Deviation	0.095			
Minimum	0.270			
Maximum	0.665			
Median	0.399			
Skewness	0.934			
Kurtosis	1.678			

Table 22 (continued)
SWDA North Point Survey Unit 7 Systematic Sample Results

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

\geq	greater than or equal to
²²⁶ Ra	radium-226
ID	identification
MDC	minimum detectable concentration
SWDA	solid waste disposal area

Table 23
SWDA North Point Survey Unit 1 Biased Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TI-TO04-NP-BIFSS_SU1-001	0.734		0.137	0.734
TI-TO04-NP-BIFSS_SU1-002	0.723		0.139	0.723
TI-TO04-NP-BIFSS_SU1-003	0.612		0.141	0.612
Project-Screening Criterion	1.69			
Number of Samples	3			
Average	0.690			
Standard Deviation	0.067			
Minimum	0.612			
Maximum	0.734			
Median	0.723			
Skewness	-1.680			
Kurtosis	N/A			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥ greater than or equal to
²²⁶Ra radium-226
ID identification
MDC minimum detectable concentration
SWDA solid waste disposal area

Table 24
SWDA North Point Survey Unit 5 Biased Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TITO04-NP-SU5-SWSU2-BI#8-S001	0.598		0.079	0.598
TITO04-NP-SU5-SWSU2-BI#18-S002	0.370		0.100	0.370
TITO04-NP-SU5-SWSU2-BI#30-S003	0.918		0.167	0.918
TI-TO04-NP-R-FSSBISU5-002	0.365		0.127	0.365
TI-TO04-NP-R-FSSBISU5-003	0.517		0.101	0.517
TI-TO04-NP-R-BISU5-S001	0.730		0.159	0.730
TITO04-NP-FSS SU5-LLRO518CH-S001	0.846		0.173	0.846
TITO04-NP-FSS SU5-LLRO518CH-S002	0.629		0.121	0.629
TITO04-NP-FSS SU5-LLRO518CH-S003	0.629		0.146	0.629
TITO04-NP-FSS SU5-LLRO518CH-S004	0.624		0.221	0.624
TITO04-NP-FSS SU5-LLRO518CH-S005	0.593		0.077	0.593
Project-Screening Criterion	1.69			
Number of Samples	11			
Average	0.620			
Standard Deviation	0.171			
Minimum	0.365			
Maximum	0.918			
Median	0.624			
Skewness	0.150			
Kurtosis	-0.091			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥ greater than or equal to
²²⁶Ra radium-226
ID identification
MDC minimum detectable concentration
SWDA solid waste disposal area

Table 25
SWDA North Point Survey Unit 7 Biased Sample Results

Sample ID	²²⁶ Ra			
	Result ^a	Flag ^b	MDC	≥ MDC ^c
TI-TO04-NP-R-FSS-BISU7-S001	0.565		0.081	0.565
TITO04-NP-FSS SU7-LLRO505CH-S001	0.355		0.104	0.355
TITO04-NP-FSS SU7-LLRO505CH-S002	0.289		0.102	0.289
TITO04-NP-FSS SU7-LLRO505CH-S003	0.134	U	0.315	0.315
TITO04-NP-FSS SU7-LLRO505CH-S004	0.392		0.079	0.392
TITO04-NP-FSS SU7-LLRO505CH-S005	0.367		0.097	0.367
Project-Screening Criterion	1.69			
Number of Samples	6			
Average	0.381			
Standard Deviation	0.098			
Minimum	0.289			
Maximum	0.565			
Median	0.361			
Skewness	1.681			
Kurtosis	3.360			

Notes:

^a Units are picocuries per gram.

^b "U" indicates "Result is less than the sample detection limit"; "J" indicates "Result is greater than the sample detection limit but less than the stated reporting limit." The laboratory did not assign flags to these sample results.

^c If the reported result is less than the method detection limit, the method detection limit is reported in this column. Summary statistics are calculated using these values.

≥ greater than or equal to
²²⁶Ra radium-226
ID identification
MDC minimum detectable concentration
SWDA solid waste disposal area

Table 26
IR Site 12 (Phase III) Survey Unit and Number of FSS Soil Samples Calculation

SWDA	SU	Total Area (m ²)	σ SU	σ Used for Calculation ^a	LBGR	Δ/σ	P _r	N	N/2	Actual N (Systematic Locations)	Number of Biased Locations	Total Samples
Bayside	1	1000	0.083	0.161	0.483	3.21	0.983039	22.28	12	60	0	60
Bayside	2	1000	0.059	0.161	0.483	3.21	0.983039	22.28	12	20	0	20
Bayside	3	1000	0.055	0.161	0.483	3.21	0.983039	22.28	12	27	0	27
Bayside	4	1000	0.059	0.161	0.483	3.21	0.983039	22.28	12	32	0	32
Bayside	5	1000	0.076	0.161	0.483	3.21	0.983039	22.28	12	36	0	36
Bayside	6	1000	0.062	0.161	0.483	3.21	0.983039	22.28	12	32	0	32
Bayside	7	1000	0.081	0.161	0.483	3.21	0.983039	22.28	12	27	0	27
Bayside	8	1000	0.074	0.161	0.483	3.21	0.983039	22.28	12	21	4	25
Bayside	9	<1000	0.101	0.161	0.483	3.21	0.983039	22.28	12	13	25	38
North Point	1	1000	0.063	0.161	0.483	3.21	0.983039	22.28	12	20	3	23
North Point	2	1000	0.081	0.161	0.483	3.21	0.983039	22.28	12	20	0	20
North Point	3	1000	0.064	0.161	0.483	3.21	0.983039	22.28	12	20	0	20
North Point	4	1000	0.057	0.161	0.483	3.21	0.983039	22.28	12	32	0	32
North Point	5	<1000	0.094	0.161	0.483	3.21	0.983039	22.28	12	12	11	23
North Point	7	1000	0.095	0.161	0.483	3.21	0.983039	22.28	12	20	6	26
											Total	441

Table 26 (continued)
IR Site 12 (Phase III) Survey Unit and Number of FSS Soil Samples Calculation

Notes:

^a The standard deviation (σ) used for the calculation is either the survey unit σ or, if higher, the Site Background dataset σ (0.161), to obtain the most conservative number of samples value.

<	less than
Δ	delta
σ	sigma
IR	installation restoration
LBGR	lower bound of gray region
m ²	square meter
N	number of samples
Pr	probability value from Table 5.1 of MARSSIM (U.S. Nuclear Regulatory Commission et al., 2000)
Site	Installation Restoration Site
SU	survey unit
SWDA	solid waste disposal area

Table 27
RESRAD Summary

SWDA	SU	SU Area (m ²)	Maximum ²²⁶ Ra Activity (pCi/g)	Net Maximum ²²⁶ Ra Activity (pCi/g)	Dose (mrem/yr)	Maximum Excess Cancer Risk
Bayside	1	1000	0.512	-0.176	N/A	N/A
Bayside	2	1000	0.419	-0.269	N/A	N/A
Bayside	3	1000	0.433	-0.255	N/A	N/A
Bayside	4	1000	0.483	-0.205	N/A	N/A
Bayside	5	1000	0.620	-0.068	N/A	N/A
Bayside	6	1000	0.490	-0.198	N/A	N/A
Bayside	7	1000	0.634	-0.054	N/A	N/A
Bayside	8	1000	0.656 (biased)	-0.032	N/A	N/A
Bayside	9	<1000	0.931 (biased)	0.243	5.053	6.63 E-05
North Point	1	1000	0.734 (biased)	0.046	0.957	1.25 E-05
North Point	2	1000	0.500	-0.188	N/A	N/A
North Point	3	1000	0.460	-0.228	N/A	N/A
North Point	4	1000	0.435	-0.253	N/A	N/A
North Point	5	<1000	0.918 (biased)	0.230	4.783	6.27 E-05
North Point	7	1000	0.665	-0.023	N/A	N/A

Notes:

N/A not applicable; no excess dose or cancer risk applicable due to negative net maximum ²²⁶Ra activity

< less than

²²⁶Ra radium-226

mrem/yr millirem per year

m² square meter

pCi/g picocurie per gram

SU survey unit

SWDA solid waste disposal area

Table 28
Gamma Survey Summary

SWDA	SU	Survey Type	Survey Number	Instrument IL ^{a,b}	Average Count ^a	Standard Deviation ^a	Minimum Count ^a	Maximum Count ^a	Number of Measurements >IC ^c
Bayside	1	RSI Gamma Walkover	TIRS-10192015-12P3-ROV-1494	8,275	5,324	134	4,926	5,885	0
Bayside	1	Follow-up	TIRS-10202015-12P3-JSS-1507	19,608	13,997	612	13,242	15,077	0
Bayside	1	Systematic Sampling	TIRS-10212015-12P3-JSS-1515	19,608	14,037	243	13,578	14,482	0
Bayside	1	RSI Gamma Walkover	TIRS-07272015-12P3-ROV-951	8,275	5,519	214	4,927	7,437	0
Bayside	1	Follow-up	TIRS-07292015-12P3-JSS-983	18,663	14,224	1,339	12,978	17,706	0
Bayside	1	Systematic Sampling	TIRS-07292015-12P3-JSS-979	18,663	12,957	460	12,323	14,197	0
Bayside	1	RSI Gamma Walkover	TIRS-07292015-12P3-ROV-974	8,275	5,716	233	4,817	6,373	0
Bayside	1	Follow-up	TIRS-07302015-12P3-JSS-994	18,663	13,571	405	13,100	14,080	0
Bayside	1	Systematic Sampling	TIRS-07302015-12P3-JSS-985	18,663	13,344	625	12,168	14,569	0
Bayside	2	Gamma Walkover	TIRS-10212016-12P3-GWS-2558	17,356	10,703	470	8,955	12,501	0
Bayside	2	Gamma Walkover	TIRS-10212016-12P3-GWS-2559	17,356	10,602	473	9,068	12,336	0
Bayside	2	Follow-up	TIRS-10262016-12P3-JSS-2575	16,662	10,738	183	10,422	11,077	0
Bayside	2	Systematic Sampling	TIRS-10262016-12P3-JSS-2578	16,662	11,010	135	10,712	11,269	0
Bayside	3	Gamma Walkover	TIRS-11112016-12P3-GWS-2627	17,684	11,948	552	11,420	18,366	2
Bayside	3	Follow-up	TIRS-11152016-12P3-JSS-2637	16,702	11,118	1,055	10,002	13,092	0
Bayside	3	Systematic Sampling	TIRS-11152016-12P3-JSS-2635	16,702	10,429	214	9,998	10,958	0
Bayside	3	Gamma Walkover	TIRS-11042016-12P3-GWS-2607	17,356	10,857	258	10,525	12,452	0
Bayside	3	Follow-up	TIRS-11072016-12P3-JSS-2608	16,662	11,034	202	10,370	11,483	0
Bayside	3	Systematic Sampling	TIRS-11082016-12P3-JSS-2613	16,662	10,951	95	10,793	11,074	0
Bayside	4	Gamma Walkover	TIRS-11072016-12P3-GWS-2611	17,684	10,629	478	8,890	12,207	0

Table 28 (continued)
Gamma Survey Summary

SWDA	SU	Survey Type	Survey Number	Instrument IL ^{a,b}	Average Count ^a	Standard Deviation ^a	Minimum Count ^a	Maximum Count ^a	Number of Measurements >IC ^c
Bayside	4	Gamma Walkover	TIRS-11072016-12P3-GWS-2611	17,684	10,539	425	9,845	12,908	0
Bayside	4	Follow-up	TIRS-11092016-12P3-JSS-2615	16,702	12,600	881	11,186	14,602	0
Bayside	4	Systematic Sampling	TIRS-11092016-12P3-JSS-2617	18,654	11,607	236	11,275	12,130	0
Bayside	4	Gamma Walkover	TIRS-11102016-12P3-GWS-2622	17,684	11,875	802	9,455	15,138	0
Bayside	4	Follow-up	TIRS-11112016-12P3-JSS-2626	16,702	11,554	355	10,908	12,083	0
Bayside	4	Systematic Sampling	TIRS-11142016-12P3-JSS-2631	16,702	12,565	263	12,242	13,013	0
Bayside	5	Gamma Walkover	TIRS-11162016-12P3-GWS-2639	18,077	11,327	661	10,489	16,918	0
Bayside	5	Follow-up	TIRS-11172016-12P3-JSS-2643	17,037	11,060	124	10,793	11,286	0
Bayside	5	Systematic Sampling	TIRS-11172016-12P3-JSS-2647	17,037	11,056	159	10,829	11,304	0
Bayside	5	Gamma Walkover	TIRS-12282016-12P3-GWS-2707	18,077	11,076	928	8,123	15,278	0
Bayside	5	Follow-up	TIRS-01062017-12P3-JSS-2712	17,037	11,592	718	10,589	12,784	0
Bayside	5	Systematic Sampling	TIRS-01062017-12P3-JSS-2713	17,037	11,233	591	10,327	12,010	0
Bayside	5	Gamma Walkover	TIRS-03182017-12P3-GWS-2798	17,684	9,939	716	7,827	12,682	0
Bayside	5	Follow-up	TIRS-03202017-12P3-JSS-2799	16,702	11,102	614	10,554	12,863	0
Bayside	5	Systematic Sampling	TIRS-03202017-12P3-JSS-2803	16,702	11,285	174	11,076	11,535	0
Bayside	6	RSI Gamma Walkover	TIRS-03312016-12P3-ROV-2051	8,275	6,360	135	5,926	6,921	0
Bayside	6	Follow-up	TIRS-04012016-12P3-JSS-2060	17,659	14,187	332	13,796	14,917	0
Bayside	6	Systematic Sampling	TIRS-04042016-12P3-JSS-2068	17,659	14,156	152	13,867	14,509	0
Bayside	6	Gamma Walkover	TIRS-03142017-12P3-GWS-2777	18,077	11,224	840	8,679	14,549	0
Bayside	6	Follow-up	TIRS-03152017-12P3-JSS-2781	17,037	11,503	412	10,630	12,287	0

Table 28 (continued)
Gamma Survey Summary

SWDA	SU	Survey Type	Survey Number	Instrument IL ^{a,b}	Average Count ^a	Standard Deviation ^a	Minimum Count ^a	Maximum Count ^a	Number of Measurements >IC ^c
Bayside	6	Systematic Sampling	TIRS-03152017-12P3-JSS-2780	17,037	11,156	211	10,981	11,692	0
Bayside	7	Gamma Walkover	TIRS-092922017-12P3-GWS-2989	20,132	12,345	811	9,383	15,437	0
Bayside	7	Follow-up	TIRS-10022017-12P3-JSS-2991	19,096	13,908	376	13,328	14,594	0
Bayside	7	Systematic Sampling	TIRS-10032017-12P3-JSS-2993	19,096	14,246	309	13,768	14,617	0
Bayside	7	Gamma Walkover	TIRS-10092017-12P3-GWS-3004	20,498	13,340	1,252	10,242	18,375	0
Bayside	7	Follow-up	TIRS-10112017-12P3-JSS-3017	19,770	14,813	348	14,387	15,491	0
Bayside	7	Gamma Walkover	TIRS-10092017-12P3-GWS-3005	20,498	13,630	1,581	9,925	19,235	0
Bayside	7	Follow-up	TIRS-10112017-12P3-JSS-3018	19,770	15,325	564	14,678	16,444	0
Bayside	7	Gamma Walkover	TIRS-10092017-12P3-GWS-3006	20,498	13,821	1,696	10,519	20,668	1
Bayside	7	Follow-up	TIRS-10112017-12P3-JSS-3023	19,770	15,205	267	14,884	15,662	0
Bayside	7	Gamma Walkover	TIRS-10092017-12P3-GWS-3007	20,132	14,471	1,769	11,145	21,063	6
Bayside	7	Follow-up	TIRS-10112017-12P3-JSS-3019	19,096	15,175	754	14,411	16,543	0
Bayside	7	Gamma Walkover	TIRS-10092017-12P3-GWS-3034	20,498	15,704	1,259	12,392	20,024	0
Bayside	7	Follow-up	TIRS-10112017-12P3-JSS-3020	19,770	15,631	N/A	15,631	15,631	0
Bayside	7	Gamma Walkover	TIRS-10092017-12P3-GWS-3008	20,132	14,066	1,550	10,346	20,545	1
Bayside	7	Follow-up	TIRS-10112017-12P3-JSS-3016	19,096	15,202	448	14,264	15,761	0
Bayside	7	Gamma Walkover	TIRS-10092017-12P3-GWS-3035	20,498	15,909	1,294	12,674	19,898	0
Bayside	7	Follow-up	TIRS-10112017-12P3-JSS-3021	19,770	15,237	N/A	15,237	15,237	0
Bayside	7	Gamma Walkover	TIRS-10122017-12P3-GWS-3025	20,132	12,605	942	10,177	16,160	0
Bayside	7	Follow-up	TIRS-10132017-12P3-JSS-3027	19,096	14,761	299	14,566	15,105	0

Table 28 (continued)
Gamma Survey Summary

SWDA	SU	Survey Type	Survey Number	Instrument IL ^{a,b}	Average Count ^a	Standard Deviation ^a	Minimum Count ^a	Maximum Count ^a	Number of Measurements >IC ^c
Bayside	7	Gamma Walkover	TIRS-10062017-12P3-GWS-3000	19,916	12,723	1,296	9,273	18,450	0
Bayside	7	Follow-up	TIRS-10102017-12P3-JSS-3015	19,195	15,170	643	14,011	16,131	0
Bayside	7	Gamma Walkover	TIRS-10062017-12P3-GWS-3001	19,916	13,357	1,309	10,278	18,813	0
Bayside	7	Follow-up	TIRS-10092017-12P3-JSS-3002	19,195	14,907	438	14,302	15,602	0
Bayside	7	Gamma Walkover	TIRS-10092017-12P3-GWS-3010	20,498	13,261	1,231	9,712	18,643	0
Bayside	7	Follow-up	TIRS-10102017-12P3-JSS-3014	19,770	14,492	383	14,083	15,110	0
Bayside	7	Systematic Sampling	TIRS-10112017-12P3-JSS-3022	19,770	14,166	512	13,301	15,047	0
Bayside	7	Systematic Sampling	TIRS-10132017-12P3-JSS-3026	19,096	14,576	54	14,538	14,614	0
Bayside	8	RSI Gamma Walkover	TIRS-04132016-12P3-ROV-2092	8,275	5,547	131	5,166	6,099	0
Bayside	8	Follow-up	TIRS-04142016-12P3-JSS-2100	18,654	13,587	189	13,353	13,927	0
Bayside	8	Systematic Sampling	TIRS-04142016-12P3-JSS-2101	18,654	13,725	265	13,348	14,333	0
Bayside	8	Gamma Walkover	TIRS-10142015-12P3-GWS-1472	19,654	15,286	1,499	11,450	20,721	7
Bayside	8	Follow-up, Biased Sampling	TIRS-10262015-12P3-JSS-1544, TIRS-10262015-12P3-JSS-1538	18,663	21,271	2,177	19,488	24,420	4
Bayside	8	Systematic Sampling	TIRS-10142015-12P3-JSS-1468	18,663	17,007	1,634	15,069	18,377	0
North Point	1	RSI Gamma Walkover	TIRS-10082015-12P3-ROV-1420	8,275	5,592	154	5,085	6,135	0
North Point	1	Follow-up	TIRS-10092015-12P3-JSS-1437	19,608	13,854	280	13,414	14,377	0
North Point	1	Systematic Sampling	TIRS-10092015-12P3-JSS-1426	20,154	14,216	364	13,627	14,817	0
North Point	1	Gamma Walkover	TIRS-09182015-12P3-GWS-1252	19,654	13,490	2,708	8,871	227,797	58
North Point	1	Follow-up	TIRS-09242015-12P3-JSS-1296	18,663	17,825	2,645	14,655	21,151	3

Table 28 (continued)
Gamma Survey Summary

SWDA	SU	Survey Type	Survey Number	Instrument IL ^{a,b}	Average Count ^a	Standard Deviation ^a	Minimum Count ^a	Maximum Count ^a	Number of Measurements >IC ^c
North Point	1	Biased Sampling	TIRS-09252015-12P3-JSS-1301	18,663	20,499	676	19,802	21,151	3
North Point	1	Systematic Sampling	TIRS-09252015-12P3-JSS-1308	18,663	14,129	1,135	12,117	16,346	0
North Point	2	RSI Gamma Walkover	TIRS-11182015-12P3-ROV-1623	8,275	5,277	156	4,807	6,089	0
North Point	2	Follow-up	TIRS-11192015-12P3-JSS-1625	19,608	12,783	361	12,077	13,471	0
North Point	2	Systematic Sampling	TIRS-11202015-12P3-JSS-1633	19,608	14,147	248	13,540	14,764	0
North Point	3	RSI Gamma Walkover	TIRS-10242016-12P3-ROV-2564, TIRS-10262016-12P3-ROV-2582	8,872	5,078	160	4,538	5,662	0
North Point	3	RSI Gamma Walkover	TIRS-10242016-12P3-ROV-2565, TIRS-10262016-12P3-ROV-2583	8,872	5,087	135	4,461	5,511	0
North Point	3	Follow-up	TIRS-10312016-12P3-JSS-2588	16,662	10,274	205	9,940	10,742	0
North Point	3	Follow-up	TIRS-10312016-12P3-JSS-2589	16,662	10,149	235	9,828	10,713	0
North Point	3	Systematic Sampling	TIRS-11012016-12P3-JSS-2592	16,662	10,039	212	9,685	10,510	0
North Point	4	RSI Gamma Walkover	TIRS-03312016-12P3-ROV-2045	8,275	4,847	133	4,426	5,635	0
North Point	4	Follow-up	TIRS-04012016-12P3-JSS-2059	17,659	11,937	1,090	11,018	14,741	0
North Point	4	Systematic Sampling	TIRS-04042016-12P3-JSS-2067	17,659	10,965	188	10,684	11,402	0
North Point	4	RSI Gamma Walkover	TIRS-04212016-12P3-ROV-2132	8,275	5,262	131	4,821	5,771	0
North Point	4	Follow-up	TIRS-04252016-12P3-JSS-2145	20,154	13,242	220	12,888	13,501	0
North Point	4	Systematic Sampling	TIRS-04252016-12P3-JSS-2149	20,154	13,266	439	12,295	13,698	0
North Point	7	Gamma Walkover	TIRS-04272016-12P3-GWS-2160	19,334	13,128	3,595	8,939	125,526	47
North Point	7	Biased Sampling	TIRS-05032016-12P3-JSS-2189	18,623	15,055	559	14,212	15,570	0

Table 28 (continued)
Gamma Survey Summary

SWDA	SU	Survey Type	Survey Number	Instrument IL ^{a,b}	Average Count ^a	Standard Deviation ^a	Minimum Count ^a	Maximum Count ^a	Number of Measurements >IC ^c
North Point	7	Follow-up	TIRS-04292016-12P3-JSS-2168	18,623	17,426	3,262	15,119	19,732	1
North Point	7	Biased Sampling	TIRS-05032016-12P3-JSS-2201	18,623	19,605	N/A	19,605	19,605	1
North Point	7	Systematic Sampling	TIRS-05032016-12P3-JSS-2190	18,623	13,789	776	12,550	15,279	0

Notes:

^a Gamma walkover surveys and follow-up survey measurement values are provided in cpm and were performed with a 3-inch by 3-inch sodium iodide detector. RSI gamma scan measurement values are provided in cps and were performed with the RSI RS-700 system. The data reported for RSI gamma scans represent Virtual Detector 1 (both detectors summed) at Region of Interest 10 (all channels).

^b Instrument-specific IL is calculated as the mean background count rate plus three standard deviations.

^c IC are established for gamma survey data analysis purposes; survey locations exceeding the IC for a particular survey indicate additional investigation is required.

> greater than
 cpm count per minute
 cps count per second
 IL investigation level
 N/A not applicable
 RSI Radiation Solutions, Inc.
 SU survey unit
 SWDA solid waste disposal area

Appendices A through G

(provided on electronic copy only)

Appendix A

Instrument Calibration Data



Designer and Manufacturer
of
Scientific and Industrial
Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

501 Oak Street

☐ 10744 Dutchtown Road

325-235-5494

865-392-4601

Sweetwater, TX 79556, U.S.A.

Knoxville, TN 37932, U.S.A.

CUSTOMER CB & I

ORDER NO. 20266706/420297

Mfr. Ludlum Measurements, Inc. Model 2221 Serial No. 47290

Mfr. Ludlum Measurements, Inc. Model 44-20 Serial No. PR255572

Cal. Date 28-Apr-15 Cal Due Date 28-Apr-16 Cal. Interval 1 Year Meterface 202-159

Check mark ☒ Applies to applicable instr. and/or detector IAW mfg. spec. T. 73 °F RH 25 % Alt 700.8 mm Hg

☐ New Instrument ☐ Instrument Received ☐ Within Toler. +10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☒ Other-See comments

☒ Mechanical ck. ☒ Meter Zeroed ☐ Background Subtract ☒ Input Sens. Linearity

☒ F/S Resp. ck. ☒ Reset ck. ☒ Window Operation ☒ Geotropism

☒ Audio ck. ☒ Alarm Setting ck. ☒ Batt. ck. (Min. Volt) 4.4 VDC

☐ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set Comments V Input Sens. Comments mV Det. Oper. Comments V at Comments mV Threshold Dial Ratio 100 = 10 mV

☒ HV Readout (2 points) Ref./Inst. 500 / 457 V Ref./Inst. 2000 / 1993 V

COMMENTS:

Peak settings

High Voltage: 670 V

Threshold dial: 642

Window dial: 40

Window Position: "IN"

Resolution for Cs137: ~8.91%

OL checked but not set. Calibrated with 5' cable. Ra226~189.9pCi (S/N:Y982)

Count at 100pR/hr (205.8 C/m) for Cs137~1.9mCi (S/N:M565) is: 206,589cpm

No as found readings for Ra226 conversion chart due to new 44-20.

Gross Counts

1000 V

100 (10mv)

n/a

"OUT"

n/a

Model 2221 currently set

for gross counts.

High voltage set with detector connected.

Firmware: 261027

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER

REFERENCE CAL. POINT

INSTRUMENT REC'D "AS FOUND READING"

INSTRUMENT METER READING*

x1K	400kcpm	400	400
x1K	100kcpm	100	100
x100	40kcpm	400	400
x100	10kcpm	100	100
x10	4kcpm	400	400
x10	1kcpm	100	100
x1	400cpm	400	400
x1	100cpm	100	100

*Uncertainty within ± 10% C.F. within ± 20%

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	Log Scale	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout						
400kcpm	40043 100	40043 100		500kcpm	50043 400	50043 400
40kcpm	4004	4004		50kcpm	50 1	50 1
4kcpm	400	400		5kcpm	5 1	5 1
400cpm	40	40		500cpm	500	500
40cpm	4	4		50cpm	50	50

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques.

The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978

State of Texas Calibration License No. LO-1963

Reference instruments and/or Sources: Cs-137 S/N: ☐ 059 ☐ 2171CP ☐ 2261CP ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 1909 ☐ 1916CP ☐ 5105 ☐ 5717CO
☐ 5719CO ☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☐ G112 ☐ M565 ☐ S-394 ☐ S-1054 ☐ T10061 ☐ T10062 Neutron Am-241 Be S/N: ☐ T-304 Ra-226 S/N: ☐ Y982

☐ Alpha S/N ☐ Beta S/N ☐ Other

☒ 500 S/N 289158 ☐ Oscilloscope S/N ☒ Multimeter S/N 93870637

Calibrated By: *Jeremy Thayer* Date: 28-Apr-15

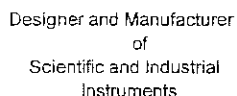
Reviewed By: *Phil H.* Date: 28-Apr-15

This certificate shall not be reproduced except in full, without the written approval of Ludlum Measurements, Inc.

FORM C22A 05/19/2014

Page 1 of 3

AC Inst. ☐ Passed Dielectric (Hi-Pot) and Continuity Test
Only ☐ Failed:



Knoxville, TN 37932, U.S.A.

● *Serving The Nuclear Industry Since 1962* ●



Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.

501 Oak Street

325-235-5494

Sweetwater, TX 79556, U.S.A.

☐ 10744 Dutchtown Road

865-392-4601

Knoxville, TN 37932, U.S.A.

CONVERSION CHART

Customer CB & I Date 28-Apr-15 Order # 20266706/420297

Model 2221 Serial No. 97290 Detector Model 44-20 Serial No. PR 245 572

Source Ra226 - 185.9 μ Ci High Voltage 1000 V

Input Sensitivity 10 mV

"As Found" Readings (CPM):

Reference Point	Analog	Range/Scale
200 μ R/h	9944m	NA
150	112.54m	
100	141.64m	

After Adjustment Readings (CPM):

Analog	Range/Scale
430	XIX
320	
21	

"As Found" Readings:

Reference Point	Digital	Count Time
200 μ R/h	99.4 c/m	NA
150	113.5 c/m	
100	141.6 c/m	

After Adjustment Readings:

Digital	Count Time
412348	6 Seconds
32180	
21078	

Signature: Jeremy Thayer

Date 28-Apr-15



Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 108878
Detector: Manufacturer: Ludlum Model Number: 44-20 Serial Number: PR233069

- ☒ Mechanical Check ☒ THR/WIN Operation
☒ F/S Response Check ☒ Reset Check
☒ Geotropism ☒ Audio Check
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V
Cable Length: ☐ 39-inch ☐ 72-inch ☒ Other: 60"

Source Distance: ☐ Contact ☒ 6 inches ☐ Other:
Source Geometry ☒ Side ☐ Below ☐ Other:

Threshold: 10 mV
Window:

Barometric Pressure: 24.38 inches Hg
Temperature: 77 °F
Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	399755	400
x 1000	100	100	100		100
x 100	400	400	400	39977	400
x 100	100	100	100		100
x 10	400	400	400	3995	400
x 10	100	100	100		100
x 1	400	400	400	399	400
x 1	100	100	100		100

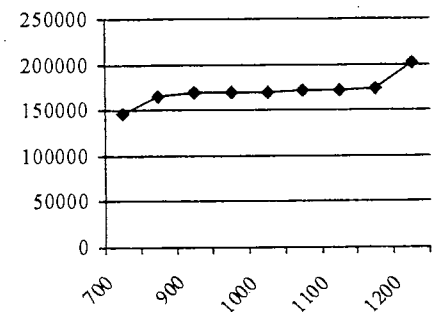
High Voltage

Source Counts
146433
164947
168513
169804
170136
171010
171109
174105
201532

Background

21893

Voltage Plateau



COPY

Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 1000

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932

☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03

☐ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: ☐ 8749012

☒ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03

☐ Other Source:

Calibrated By:

Calibration Date: 3-30-16

Calibration Due 3-30-17

Reviewed By:

Date: 3/30/16

ERG Form ITC. 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997



Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 117648

Detector: Manufacturer: Ludlum Model Number: 44-20 Serial Number: PR262403

- ☒ Mechanical Check ☒ THR/WIN Operation
☒ F/S Response Check ☒ Reset Check
☒ Geotropism ☒ Audio Check
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V

Cable Length: ☐ 39-inch ☐ 72-inch ☒ Other: 60"

Source Distance: ☐ Contact ☒ 6 inches ☐ Other:

Threshold: 10 mV

Barometric Pressure: 24.66 inches Hg

Temperature: 70 °F

Source Geometry: ☒ Side ☐ Below ☐ Other:

Window:

Relative Humidity: 21 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	399132	400
x 1000	100	100	100		100
x 100	400	400	400	39931	400
x 100	100	100	100		100
x 10	400	400	400	3993	400
x 10	100	100	100		100
x 1	400	400	400	399	400
x 1	100	100	100		100

High Voltage

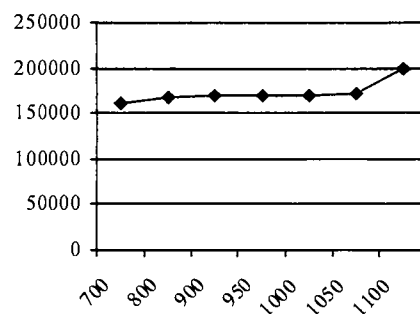
Source Counts

Background

Voltage Plateau

700	161148
800	168229
900	169877
950	170382
1000	170448
1050	171142
1100	198247

21315



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 900

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932

Fluke multimeter serial number: ☐ 87490128

☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03

☒ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03

☐ Beta Source: Tl-99 @ 17,700 dpm (1/4/12) sn: 4099-03

☐ Other Source:

Calibrated By:

Calibration Date: 8/12/16

Calibration Due: 8/12/17

Reviewed By:

Date: 8/12/16

ERG Form ITC. 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997



Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 117652
Detector: Manufacturer: Ludlum Model Number: 44-20 Serial Number: PR201774

- ☒ Mechanical Check ☒ THR/WIN Operation
☒ F/S Response Check ☒ Reset Check
☒ Geotropism ☒ Audio Check
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V
Cable Length: ☐ 39-inch ☐ 72-inch ☒ Other: 60"

Source Distance: ☐ Contact ☒ 6 inches ☐ Other:
Source Geometry ☒ Side ☐ Below ☐ Other:

Threshold: 10 mV
Window:

Barometric Pressure: 24.33 inches Hg
Temperature: 76 °F
Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	410	400	399267	400
x 1000	100	100	100		100
x 100	400	400	400	39923	400
x 100	100	100	100		100
x 10	400	400	400	3990	400
x 10	100	100	100		100
x 1	400	400	400	399	400
x 1	100	100	100		100

High Voltage

700
800
900
950
1000
1050
1100

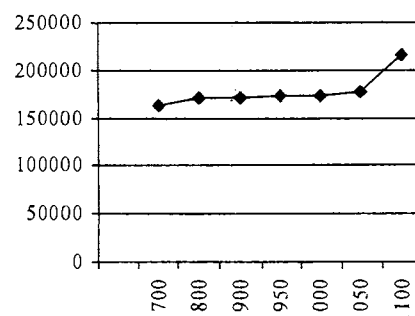
Source Counts

163037
171125
172319
172554
173023
176815
215060

Background

22485

Voltage Plateau



COPY

Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 900

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932

☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03

☐ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: ☐ 8749012

☒ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03

☐ Other Source:

Calibrated By:

Calibration Date: 3-30-16

Calibration Due 3-30-17

Reviewed By:

Date: 3/30/16

ERG Form ITC. 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323.4 - 1997



Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 149942
Detector: Manufacturer: Ludlum Model Number: 44-20 Serial Number: PR298554

- ☒ Mechanical Check ☒ THR/WIN Operation
☒ F/S Response Check ☒ Reset Check
☒ Geotropism ☒ Audio Check
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V
Cable Length: ☐ 39-inch ☒ 72-inch ☐ Other:

Source Distance: ☐ Contact ☒ 6 inches ☐ Other:
Source Geometry ☒ Side ☐ Below ☐ Other:

Threshold: 10 mV
Window:

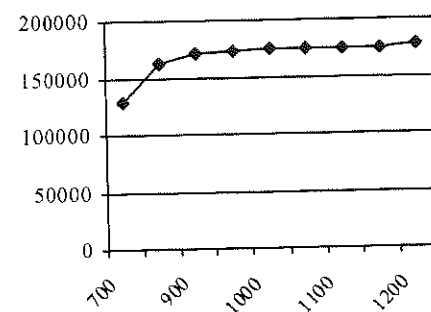
Barometric Pressure: 24.83 inches Hg
Temperature: 71 °F
Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	398759	400
x 1000	100	100	100		100
x 100	400	400	400	39674	400
x 100	100	100	100		100
x 10	400	400	400	3984	400
x 10	100	100	100		100
x 1	400	400	400	399	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	129066	
800	163020	
900	171224	
950	173073	
1000	174348	22981
1050	174175	
1100	174845	
1150	175366	
1200	177770	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 1000

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932
☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: ☐ 8749012
☒ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03
☐ Other Source:

Calibrated By:

Calibration Date: 2-10-16

Calibration Due 2-10-17

Reviewed By:

Date: 2/20/16

ERG Form ITC. 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323.4 - 1997



Environmental Restoration Group, Inc.
8809 Washington NE, Ste. 150
Albuquerque, NM 87113

ph: 505.298.4224
fax: 505.797-1404
web: www.ERGOffice.com

EQUIPMENT PACKING SLIP

Company Name: CB & I

Order Number: 3080

Contact Name: Zachary Peckham

P.O. or Reference Number:

Contact Telephone: 208-380-0693

Date Ordered: 02/10/2016

Shipping Method:

Date Shipped: 02/10/2016

Shipping Number: ERG FedEx Number

Date of Delivery: 02/11/2016

Ship To Information:

CB & I

Billing Address:

CB & I - CA

Accounts Payable

650 Ave M

San Francisco, CA 94130

Equipment Enclosed:

Instrument Tested

Instrument

Serial Number

☐

Ludlum 2221r

149942

☐

Ludlum 44-20

PR298554

Special Instructions:

None



Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 228808
Detector: Manufacturer: Ludlum Model Number: 44-20 Serial Number: PR298554

- ☒ Mechanical Check ☒ THR/WIN Operation
☒ F/S Response Check ☒ Reset Check
☒ Geotropism ☒ Audio Check
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V

Cable Length: ☐ 39-inch ☒ 72-inch ☐ Other:

Source Distance: ☐ Contact ☒ 6 inches ☐ Other:

Threshold: 10 mV

Barometric Pressure: 24.63 inches Hg

Source Geometry: ☒ Side ☐ Below ☐ Other:

Window:

Temperature: 73 °F

Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	398754	400
x 1000	100	100	100		100
x 100	400	400	400	39880	400
x 100	100	100	100		100
x 10	400	400	400	3988	400
x 10	100	100	100		100
x 1	400	400	400	399	400
x 1	100	100	100		

High Voltage

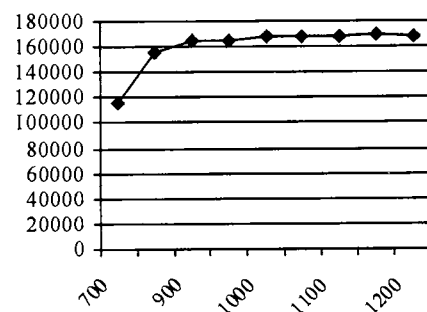
Source Counts

Background

700	116327
800	155331
900	164007
950	165327
1000	167109
1050	167770
1100	167808
1150	169016
1200	168361

22330

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 1000

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932

Fluke multimeter serial number: ☐ 87490128

☐ Alpha Source: Th-230 sn: 4098-03 @ 12,800dpm/6,520 cpm (1/4/1)

☒ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03

☐ Beta Source: Tc-99 sn: 4099-03 @ 17,700dpm/11,100cpm (1/4/12)

☐ Other Source:

Calibrated By:

Calibration Date: 3-14-17

Calibration Due: 3-14-18

Reviewed By:

Date: 14 March 2017

ERG Form ITC. 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323.4 - 1997



Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 254783
Detector: Manufacturer: Ludlum Model Number: 44-20 Serial Number: PR233067

☒ Mechanical Check ☒ TIR/WIN Operation
☒ F/S Response Check ☒ Reset Check
☒ Geotropism ☒ Audio Check
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V
Cable Length: ☐ 39-inch ☐ 72-inch ☒ Other: 60"

Source Distance: ☐ Contact ☒ 6 inches ☐ Other:
Source Geometry: ☒ Side ☐ Below ☐ Other:

Threshold: 10 mV
Window:

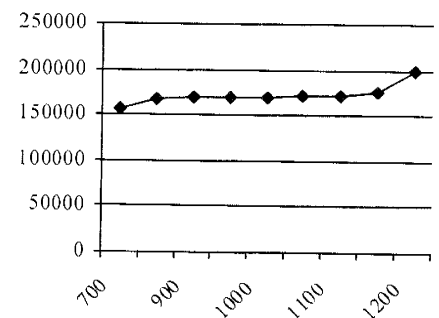
Barometric Pressure: 24.6 inches Hg
Temperature: 71 °F
Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	380	400	398134	400
x 1000	100	100	100		100
x 100	400	400	400	39819	400
x 100	100	100	100		100
x 10	400	400	400	3982	400
x 10	100	100	100		100
x 1	400	400	400	399	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	157059	22619
800	166877	
900	170069	
950	170222	
1000	170013	
1050	170647	
1100	171523	
1150	175034	
1200	200044	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 1000

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932
☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: ☐ 87490128
☒ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03
☐ Other Source:

Calibrated By:

Calibration Date: 10-31-16

Calibration Due: 10-31-17

Reviewed By:

Date:

10/31/16

ERG Form ITC, 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323.1 - 1997



Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 262295
Detector: Manufacturer: Ludlum Model Number: 44-20 Serial Number: PR269980

☒ Mechanical Check ☒ THR/WIN Operation
☒ F/S Response Check ☒ Reset Check
☒ Geotropism ☒ Audio Check
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V
Cable Length: ☐ 39-inch ☐ 72-inch ☒ Other: 60"

Source Distance: ☐ Contact ☒ 6 inches ☐ Other:
Source Geometry: ☒ Side ☐ Below ☐ Other:

Threshold: 10 mV
Window:

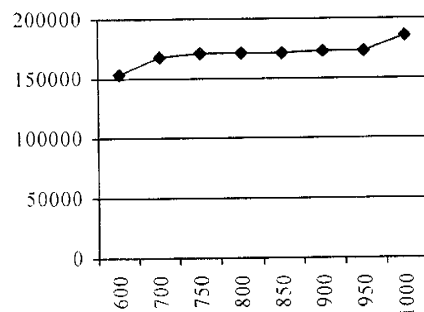
Barometric Pressure: 24.57 inches Hg
Temperature: 75 °F
Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	398840	400
x 1000	100	100	100		100
x 100	400	400	400	39887	400
x 100	100	100	100		100
x 10	400	400	400	3989	400
x 10	100	100	100		100
x 1	400	400	400	399	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
600	153897	
700	167749	
750	170309	
800	171058	21048
850	171566	
900	172369	
950	172642	
1000	184899	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 800

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932
☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03
☐ Beta Source: ☐ 99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: ☐ 87490128
☒ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03
☐ Other Source:

Calibrated By:

Calibration Date: 10-5-16

Calibration Due: 10-5-17

Reviewed By:

Date: 10/5/16

ERG Form ITC 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N3234 - 1997

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

501 Oak Street
325-235-5494

Sweetwater, TX 79556, U.S.A.



CERT # 4084.01

Customer CB&I

ORDER NO. 20303816/444947

Mfg. Ludlum Measurements, Inc. Model 2221 Serial No. 262258
 Mfg. Alpha Spectra Model 12112/3B Serial No. 010616K
 Cal. Date 19-Jan-17 Cal Due Date 19-Jan-18 Cal. Interval 1 Year Meterface 202-159

Check mark ☒ Applies to applicable instr. and/or detector IAW mfg. spec. T. 73 °F RH 31 % Alt 699.0 mm Hg

☐ New Instrument ☐ Instrument Received ☒ Within Toler. $\pm 10\%$ ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☒ Mechanical ck. ☒ Meter Zeroed ☐ Background Subtract ☒ Input Sens. Linearity

☒ F/S Resp. ck. ☒ Reset ck. ☒ Window Operation ☒ Geotropism

☒ Audio ck. ☒ Alarm Setting ck. ☒ Batt. ck.

☒ Calibrated in accordance with LMI SOP 14.8

☐ Calibrated in accordance with LMI SOP 14.9

Instrument Volt Set Comments V Input Sens. Comments mV Det. Oper. Comments V at Comments mV Threshold Dial Ratio 100 = 10 mV

☒ HV Readout (2 points) Ref./Inst. 500 / 504 V Ref./Inst. 2000 / 2013 V

COMMENTS:

Peak settings Gross Counts Model 2221 currently set
 High Voltage: 608 V 950 V for gross counts
 Threshold dial: 642 100 (10mv) High voltage set with detector
 Window dial: 40 N/A connected.
 Window Position: "IN" "OUT"
 Resolution for Cs137: $\approx 8.76\%$ N/A Firmware: 261027
 OL checked but not set. Calibrated with 5' cable.
 Serial# of crystal: 010616K Reading for Cs137 $\approx 4\text{mCi}$ @100pR/hr (343.5c/m) is: 223,066cpm

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
x1K	400kcpm	400	400
x1K	100kcpm	100	100
x100	40kcpm	400	400
x100	10kcpm	100	100
x10	4kcpm	400	400
x10	1kcpm	100	100
x1	400cpm	400	400
x1	100cpm	100	100

*Uncertainty within $\pm 10\%$ C.F. within $\pm 20\%$

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	Log Scale	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
400kcpm	39936 (w)	39936 (w)		500kcpm	500 K cpm	500 K cpm
40kcpm	3994	3994		50kcpm	50	50
4kcpm	399	399		5kcpm	5	5
400cpm	40	40		500cpm	500	500
40cpm	4	4		50cpm	50	50

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 ISO/IE 17025:2005(E) State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 S/N: ☐ 059 ☐ 2171CP ☐ 2261CP ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 1909 ☐ 1916CP ☐ 2324/2521
☐ 5717CO ☐ 5719CO ☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☐ G112 ☐ 2168CP ☐ S-394 ☐ S-1054 ☐ T10081 ☐ T10082 Neutron Am-241 Be ☐ T-304 Ra-226 ☐ Y982
☐ Alpha S/N ☐ Beta S/N ☐ Other
☒ m 500 S/N 289158 ☐ Oscilloscope S/N ☒ Multimeter S/N 93870637

Calibrator Jeremy Thompson Title Calibrator Date 19-Jan-17
 QC'd By Donnie Miebas Title Calibrator Date 19-Jan-17

Designer and Manufacturer
of
Scientific and Industrial
Instruments



CONVERSION CHART

Customer CB&I ORDER NO. 20303816/444947

Date 19-Jan-17

Model 2221 Serial No. 262253 Detector Model 12I12/3B Serial No. 010616K

Source Rc226-175.9 µCi

High Voltage V

Input Sensitivity 10 mV

"As Found" Readings (CPM):

After Adjustment Readings (CPM):

Reference Point	Distance	Analog	Range/Scale
200 µR/hr	100.1 cm	430	XIX
150	116.6 cm	320	(
100	145.4 cm	210	(

Analog	Range/Scale
430	XIX
320	(
210	(

"As Found" Readings:

After Adjustment Readings:

Reference Point	Distance	Digital	Count Time
200 µR/hr	100.1 cm	43082	6 seconds
150	116.6 cm	32060	(
100	145.4 cm	20935	(

Digital	Count Time
43082	6 seconds
32060	(
20935	(

Signature: Jeremy Thompson Jeremy Thompson Date 19-Jan-17



Designer and Manufacturer
of
Scientific and Industrial
Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

501 Oak Street
325-235-5484
Sweetwater, TX 79556, U.S.A.

☐ 10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CUSTOMER CB&I

ORDER NO. 20281604/430136

Mfg. Ludlum Measurements, Inc. Model 2221 Serial No. 262301
Mfg. Alpha Spectra Model 12112/3B Serial No. 012612A1
Cal. Date 12-Jan-16 Cal Due Date 12-Jan-17 Cal. Interval 1 Year Meterface 202-159

Check mark ☒ applies to applicable instr. and/or detector IAW mfg. spec. T. 71 °F RH 21 % Alt 710.0 mm Hg

- ☐ New Instrument ☐ Instrument Received ☒ Within Toler. +10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments
- ☒ Mechanical ck. ☒ Meter Zeroed ☐ Background Subtract ☒ Input Sens. Linearity
☒ F/S Resp. ck. ☒ Reset ck. ☒ Window Operation ☒ Geotropism
☒ Audio ck. ☒ Alarm Setting ck. ☒ Batt. ck. (Min. Volt) 4.4 VDC
☐ Calibrated in accordance with LMI SOP 14.8 ☐ Calibrated in accordance with LMI SOP 14.9

Instrument Volt Set Comments V Input Sens. Comments mV Det. Oper. Comments V at Comments mV Threshold Dial Ratio 100 = 10 mV

☒ HV Readout (2 points) Ref./Inst. 500 / 458 V Ref./Inst. 2000 / 2000 V

COMMENTS:

Peak settings Gross Counts Model 2221 currently set
High Voltage: 586 V 900 V for gross counts.
Threshold dial: 642 100(10mv) High voltage set with detector
Window dial: 40 n/a connected.
Window Position: "IN" "OUT"
Resolution for Cs137: ~9.51% n/a Firmware: 261028
OL checked but not set. Calibrated with 5' cable.
Cs137~4mCi S/N: 781 reading at 100pR/hr(354.3c/m) is: 198,931cpm

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
x1K	400kcpm	400	400
x1K	100kcpm	100	100
x100	40kcpm	400	400
x100	10kcpm	100	100
x10	4kcpm	400	400
x10	1kcpm	100	100
x1	400cpm	400	400
x1	100cpm	100	100

*Uncertainty within ± 10% C.F. within ± 20%

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	Log Scale	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout	400kcpm	39984		500kcpm	50084	50084
	40kcpm	3999		50kcpm	50	50
	4kcpm	400		5kcpm	5	5
	400cpm	40		500cpm	500	500
	40cpm	4		50cpm	50	50

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques.

The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978

State of Texas Calibration License No. LO-1983

Reference Instruments and/or Sources: Cs-137 S/N: ☐ 059 ☐ 2171CP ☐ 2261CP ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1695 ☐ 1909 ☐ 1916CP ☐ 5105 ☐ 5717CO
☐ 5719CO ☐ 60846 ☐ 70897 ☐ 73410 ☐ E552 ☐ G112 ☐ M565 ☐ S-394 ☐ S-1054 ☐ T10081 ☐ T10082 Neutron Am-241 Be S/N: ☐ T-304 Ra-226 S/N: ☐ Y982

☐ Alpha S/N ☐ Beta S/N ☐ Other

☒ m 500 S/N 289158 ☐ Oscilloscope S/N ☒ Multimeter S/N 93870637

Calibrated By: Jeremy Shuman

Date 12-Jan-16

Reviewed By: Paul H.

Date 13-Jan-16

Bench Test Data For Detector

Detector 1212/3B Serial No. 012612A1

Customer CB&I

Order #. 20281604/430136

Counter 2221 Serial No. 262301

Counter Input Sensitivity 10 mV

Count Time 6 seconds

Distance Source to Detector Surface

Other _____

High Voltage _____ Isotope Am-241 Isotope _____ Isotope _____ Isotope _____
Background _____ Size 30.00mm Size _____ Size _____ Size _____

[illegible]

Signature

Jeremy Thompson

Date 12.24.16



Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.

501 Oak Street

325-235-5494

Sweetwater, TX 79556, U.S.A.

☐ 10744 Dutchtown Road

865-392-4601

Knoxville, TN 37932, U.S.A.

CONVERSION CHART

Customer CB&I Date 12-Jan-16 Order # 20281604/430136

Model 2221 Serial No. 26231 Detector Model 12112/3B Serial No. 012612A1

Source Ra-225 = 184.5 μ Ci High Voltage 900 V

Input Sensitivity 10 mV

"As Found" Readings (CPM):

Distance Reference Point

97.4 cm 200 μ R/hr

113.5 cm 150

141.6 cm 100

Analog

Range/Scale

NA

NA

(

(

After Adjustment Readings (CPM):

Analog

Range/Scale

400

X1X

310

210

"As Found" Readings:

Distance Reference Point

97.4 cm 200 μ R/hr

113.5 cm 150

141.6 cm 100

Digital

Count Time

NA

NA

(

(

After Adjustment Readings:

Digital

Count Time

40654

6 seconds

30664

21154

Signature: Jeremy Thompson


Date 12-Jan-16

Instrument Setup Sheet				
Model #	Meter S/N	Probe #	Probe S/N	Cal Due
2201	262301	44-20	PR295576	01-27-16
Static counts	Counting Time: <u>1</u> minute (s)			
	BKGD (counts) ^{2/19/15} (cpm)		Source Check (counts) ^{2/19/15} (cpm)	
	Alpha	Beta/Gamma	Alpha	Beta/Gamma
1		10572		320442
2		10865		320975
3		10916		320530
4		10664		320375
5		10730		321564
6		10874		320462
7		10853		320835
8		10623		319355
9		10568		320147
10		10640		319922
Mean		10730.5		320460.7

Source Name	Source S/N	Source Name	Source S/N
Th-230 disc	G4-790	Tc-99 plate	G4-796
Tc-99 disc	G4-789	Cs-137	1405-22-1
Th-230 plate	G4-798		

Performed By: Dennis Morrison

Date: 02-19-2015

Reviewed By: Takeshi Ibuki 

Date: 2/19/2015



Designer and Manufacturer
of
Scientific and Industrial
Instruments

66996
CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.

☐ 10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CUSTOMER CB&I

ORDER NO. 20260980/416519

Mfg. Ludlum Measurements, Inc. Model 2221 Serial No. 262301

Mfg. Ludlum Measurements, Inc. Model 44-20 Serial No. PR245576

Cal. Date 27-Jan-15 Cal Due Date 27-Jan-16 Cal. Interval 1 Year Meterface 202-159

Check mark ☒ applies to applicable instr. and/or detector IAW mfg. spec. T. 74 °F RH 20 % Alt 703.8 mm Hg

☐ New Instrument ☐ Instrument Received ☒ Within Toler. $\pm 10\%$ ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☒ Mechanical ck. ☒ Meter Zeroed ☐ Background Subtract ☒ Input Sens. Linearity

☒ F/S Resp. ck. ☒ Reset ck. ☒ Window Operation ☒ Geotropism

☒ Audio ck. ☒ Alarm Setting ck. ☒ Batt. ck. (Min. Volt) 4.4 VDC

☒ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set Comments V Input Sens. Comments mV Det. Oper. Comments V at Comments mV Threshold 100 = 10 mV

☒ HV Readout (2 points) Ref./Inst. 500 / 442 V Ref./Inst. 2000 / 1484 V

COMMENTS:

Peak settings Gross Counts Model 2221 currently set
High Voltage: 827 V 1150 V for gross counts.
Threshold dial: 642 100(10mv) High voltage set with detector
Window dial: 40 n/a connected.
Window Position: "IN" "OUT" OL checked but not set.
Resolution for Cs137: $\approx 11.02\%$ n/a Firmware: 261028
Cs137 $\approx 3\text{mCi}$ (S/N:2171CP) count at 100 $\mu\text{R/hr}$ is:215,830cpm Distance is 361.6 cm
Count taken with crystal end facing source. Calibrated with 5' cable.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
x1K	400kcpm	400	400
x1K	100kcpm	100	100
x100	40kcpm	400	400
x100	10kcpm	100	100
x10	4kcpm	400	400
x10	1kcpm	100	100
x1	400cpm	400	400
x1	100cpm	100	100

*Uncertainty within $\pm 10\%$ C.F. within $\pm 20\%$

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	Log Scale	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
400kcpm	40008 10	40008 10		500kcpm	500K 4m	500K 4m
40kcpm	4002	4002		50kcpm	50	50
4kcpm	400	400		5kcpm	5	5
400cpm	40	40		500cpm	500	500
40cpm	4	4		50cpm	50	50

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques.

The calibration system conforms to the requirements of ANSI/NCCL Z540-1-1994 and ANSI N323-1978

State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 S/N: ☐ 059 ☐ 2171CP ☐ 2261CP ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 1909 ☐ 1916CP ☐ 5105 ☐ 5717CO
☐ 5719CO ☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☐ G112 ☐ M565 ☐ S-394 ☐ S-1054 ☐ T10081 ☐ T10082 Neutron Am-241 Be S/N: ☐ T-304 Ra-226 S/N: ☐ Y982

☐ Alpha S/N ☐ Beta S/N ☐ Other

☒ m 500 S/N 289158 ☐ Oscilloscope S/N ☒ Multimeter S/N 93870637

Calibrated By: Jerry Thompson

Date 27-Jan-15

Reviewed By: Phal H.

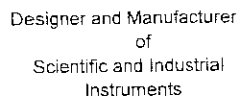
Date 28 Jan 15

This certificate shall not be reproduced except in full, without the written approval of Ludlum Measurements, Inc.

FORM C22A 05/19/2014

Page 1 of 3

AC Inst. ☐ Passed Dielectric (Hi-Pot) and Continuity Test
Only ☐ Failed



Knoxville, TN 37932, U.S.A.



Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.

501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.

☐ 10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CONVERSION CHART

Customer CB&I Date 27-Jan-15 Order # 20260980/416519

Model 2221 Serial No. 262301 Detector Model 44-20 Serial No. PR245576

Source Ba226: 184.4 μ Ci

High Voltage 1150 V

Input Sensitivity 10 mV

"As Found" Readings (CPM):

Reference Point	Analog	Range/Scale
200 mR/hr	97.4	X1K
150	113.5	
100	141.6	

After Adjustment Readings (CPM):

Analog	Range/Scale
410	X1K
310	
210	

"As Found" Readings:

Reference Point	Digital	Count Time
200 mR/hr	41445	6 Seconds
150	31331	
100	20991	

After Adjustment Readings:

Digital	Count Time
41383	6 Seconds
31331	
20991	

Signature: Jeremy Thompson

Date 27-Jan-15

ORDER#: 20260980

SHIP VIA:
UPS WAYBILL



20260980

PACKING LIST FROM:
LUDLUM MEASUREMENTS, INC.
501 OAK ST PO BOX 810
SWEETWATER TEXAS USA 79556
TEL: 325-235-5494

SHIP DATE:
1/28/2015
LMI CUST. #:
11362

CUST PO #: MC HINDALL

SHIP TO: *2/3*
CB&I
BAY DOOR #5
16406 US ROUTE 224 EAST
FINDLAY, OH 45840
USA

Ordered By: MIKE HINGALL PHONE NUMBER: (419) 424-4960

BOX# / # OF BOXES:

BOX LN	ORD	QTY	SHIP	QTY	PART NO.	DESCRIPTION	ADDITIONAL INFO
08	1.00	EA	1.00	EA	2221	M 2221 FOR REPAIR/CAL	SN 262301
09	1.00	EA	1.00	EA	44-20	M 44-20 FOR REPAIR/CAL	PR 295576
10	1.00	EA	1.00	EA	12/12/3		SN 060910B
11	1.00	EA	1.00	EA	LNG CABLE		
12	1.00	EA	1.00	EA	M	MANUAL	
13	1.00	EA	1.00	EA	MPEL	PELICAN CASE MEDIUM	
14	1.00	EA	1.00	EA	UPS WAY BILL		
24	12.00	EA	4.00	EA	21-9313	BATTERY-DURACELL "D	
25	3.00	EA	1.00	EA	223	EXTENDED CALIBRATION	

COMMENTS:

UPS
FAIR/ BAD DENTS 44-20
1 YR/ SPEC INST.

(D) Product is export controlled for AT reasons under ECCN 1A 999. As such, these commodities, technology or software are eligible for export from the United States only in accordance with Export Administration regulations. Diversion contrary to U.S. law is prohibited.



Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 262322

Detector: Manufacturer: Ludlum Model Number: 44-20 Serial Number: PR298556

- ☒ Mechanical Check ☒ THR/WIN Operation
☒ F/S Response Check ☒ Reset Check
☒ Geotropism ☒ Audio Check
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V
Cable Length: ☐ 39-inch ☐ 72-inch ☒ Other: 60"

Source Distance: ☐ Contact ☒ 6 inches ☐ Other:
Source Geometry: ☒ Side ☐ Below ☐ Other:

Threshold: 10 mV
Window:

Barometric Pressure: 24.69 inches Hg
Temperature: 72 °F
Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	399120	400
x 1000	100	100	100		100
x 100	400	400	400	39913	400
x 100	100	100	100		100
x 10	400	400	400	3991	400
x 10	100	100	100		100
x 1	400	400	400	399	400
x 1	100	100	100		100

High Voltage

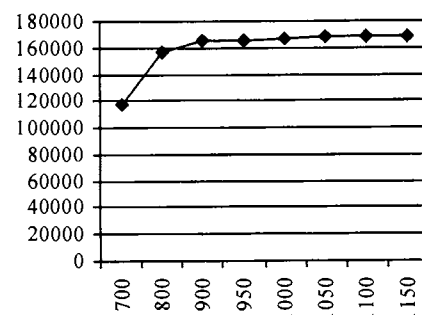
Source Counts

Background

700	117079
800	156089
900	165326
950	165694
1000	167077
1050	167711
1100	168099
1150	167683

20768

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 1000

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932
☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: ☐ 87490128
☒ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03
☐ Other Source:

Calibrated By:

Calibration Date: 8/12/16

Calibration Due: 8/12/17

Reviewed By:

Date: 8/12/16

ERG Form ITC. 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323.A - 1997



Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 262325
Detector: Manufacturer: Ludlum Model Number: 44-20 Serial Number: PR233064

- ☒ Mechanical Check ☒ THR/WIN Operation
☒ F/S Response Check ☒ Reset Check
☒ Geotropism ☒ Audio Check
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V
Cable Length: ☐ 39-inch ☒ 72-inch ☐ Other:

Source Distance: ☐ Contact ☒ 6 inches ☐ Other:
Source Geometry: ☒ Side ☐ Below ☐ Other:

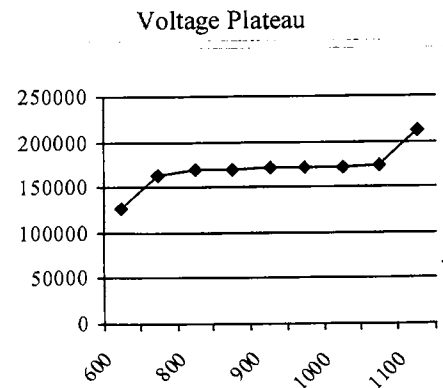
Threshold: 10 mV
Window:

Barometric Pressure: 24.66 inches Hg
Temperature: 74 °F
Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	399854	400
x 1000	100	100	100		100
x 100	400	400	400	39988	400
x 100	100	100	100		100
x 10	400	400	400	3998	400
x 10	100	100	100		100
x 1	400	400	400	400	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
600	127082	
700	162214	
800	168523	
850	169976	
900	170801	22175
950	170887	
1000	171334	
1050	174301	
1100	211003	



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 900

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932

Fluke multimeter serial number: ☐ 87490128

☐ Alpha Source: Th-230 sn: 4098-03 @ 12,800dpm/6,520 cpm (1/4/1)

☒ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03

☐ Beta Source: Tc-99 sn: 4099-03 @ 17,700dpm/11,100cpm (1/4/12)

☐ Other Source:

Calibrated By:

Calibration Date: 3-14-17

Calibration Due: 3-14-18

Reviewed By:

Date: 14 March 17

ERG Form ITC. 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323.A - 1997



Designer and Manufacturer
of
Scientific and Industrial
Instruments

CERTIFICATE OF CALIBRATION

66998
LUDLUM MEASUREMENTS, INC.

501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.
10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CUSTOMER CB&I ORDER NO. 20260980/416519

Mfg. Ludlum Measurements, Inc. Model 2221 Serial No. 262337

Mfg. Ludlum Measurements, Inc. Model 44-20 Serial No. 02337255

Cal. Date 27-Jan-15 Cal Due Date 27-Jan-16 Cal. Interval 1 Year Meterface 202-159

check mark ☒ applies to applicable instr. and/or detector IAW mfg. spec. T. 74 °F RH 20 % Alt 703.8 mm Hg

☐ New Instrument ☐ Instrument Received ☒ Within Toler. $\pm 10\%$ ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☒ Mechanical ck. ☒ Meter Zeroed ☐ Background Subtract ☒ Input Sens. Linearity

☒ F/S Resp. ck. ☒ Reset ck. ☒ Window Operation ☒ Geotropism

☒ Audio ck. ☒ Alarm Setting ck. ☒ Batt. ck. (Min. Volt) 4.4 VDC

☒ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set Comments V Input Sens. Comments mV Det. Oper. Comments V at Comments mV Threshold 100 = 10 mV

☒ HV Readout (2 points) Ref./Inst. 500 / 500 V Ref./Inst. 2000 / 1996 V

COMMENTS:

Peak settings Gross Counts Model 2221 currently set
High Voltage: 593 V 900 V for gross counts.
Threshold dial: 642 100(10mv) High voltage set with detector
Window dial: 40 n/a connected.
Window Position: "IN" "OUT" OL checked but not set.
Resolution for Cs137: $\approx 11.01\%$ n/a Firmware: 261028
Cs137=3mCi (S/N: 2171CP) count at 100 μ R/hr is: 219,395cpm Distance is 361.6 cm
Count taken with crystal end facing source. Calibrated with 5' cable.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
x1K	400kcpm	<u>400</u>	<u>400</u>
x1K	100kcpm	<u>100</u>	<u>100</u>
x100	40kcpm	<u>400</u>	<u>400</u>
x100	10kcpm	<u>100</u>	<u>100</u>
x10	4kcpm	<u>400</u>	<u>400</u>
x10	1kcpm	<u>100</u>	<u>100</u>
x1	400cpm	<u>400</u>	<u>400</u>
x1	100cpm	<u>100</u>	<u>100</u>

*Uncertainty within $\pm 10\%$ C.F. within $\pm 20\%$

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
400kcpm	<u>40019</u>	<u>101</u>	500kcpm	<u>50019</u>	<u>101</u>
40kcpm	<u>4002</u>	<u>101</u>	50kcpm	<u>50</u>	<u>101</u>
4kcpm	<u>400</u>	<u>101</u>	5kcpm	<u>5</u>	<u>101</u>
400cpm	<u>40</u>	<u>101</u>	500cpm	<u>500</u>	<u>101</u>
40cpm	<u>4</u>	<u>101</u>	50cpm	<u>50</u>	<u>101</u>

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques.

State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 S/N: ☐ 059 ☐ 2171CP ☐ 2261CP ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 1909 ☐ 1916CP ☐ 5105 ☐ 5717CO
☐ 5719CO ☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☐ G112 ☐ M565 ☐ S-394 ☐ S-1054 ☐ T10081 ☐ T10082 Neutron Am-241 Be S/N: ☐ T-304 Ra-226 S/N: ☐ Y982

☐ Alpha S/N ☐ Beta S/N ☐ Other

☒ m 500 S/N 289158 ☐ Oscilloscope S/N ☒ Multimeter S/N 93870637

Calibrated By: Jeremy Thompson Date 27 Jan 15

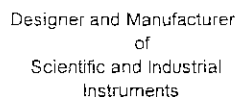
Reviewed By: Mark H. Date 28 Jan 15

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FORM C22A 05/19/2014

Page 1 of 3

AC Inst. ☐ Passed Dielectric (Hi-Pot) and Continuity Test
Only ☐ Failed:



Knoxville, TN 37932, U.S.A.



Designer and Manufacturer
of
Scientific and Industrial
Instruments

LU DLUM MEASUREMENTS, INC.

501 Oak Street

325-235-5494

Sweetwater, TX 79556, U.S.A.

☐ 10744 Dutchtown Road

865-392-4601

Knoxville, TN 37932, U.S.A.

CONVERSION CHART

Customer CB&I Date 27-Jan-15 Order # 20260980/416519

Model 2221 Serial No. 262337 Detector Model 44-20 Serial No. P0337255

Source Ba226: 125.9 pCi

High Voltage 900 V

Input Sensitivity 10 mV

"As Found" Readings (CPM):

Reference Point	Analog	Range/Scale
200 pCi/hr 974 cpm	4140	X1K
150 } 113.5	350	}
100 } 141.6	220	}

After Adjustment Readings (CPM):

Analog	Range/Scale
4140	X1K
350	}
220	}

"As Found" Readings:

Reference Point	Digital	Count Time
200 pCi/hr 974 cpm	44596	6 Seconds
150 } 113.5	33267	}
100 } 141.6	22114	}

After Adjustment Readings:

Digital	Count Time
44596	6 Seconds
33267	}
22114	}

Signature: Jeremy Thompson

Date 27-Jan-15

ORDER#: 20260980

SHIP VIA:
UPS WAYBILL



PACKING LIST FROM:
LUDLUM MEASUREMENTS, INC.
501 OAK ST PO BOX 810
SWEETWATER TEXAS USA 79556
TEL: 325-235-5494

SHIP DATE:
1/28/2015
IMI CUST. #:
11362

20260980

CUST PO #: MC HINDALL

SHIP TO:

CB&I
BAY DOOR #5
16406 US ROUTE 224 EAST
FINDLAY, OH 45840
USA

3/3

Ordered By: MIKE HINGALL PHONE NUMBER: (419) 424-4960

BOX# / # OF BOXES:

BOX LN	ORD	QTY	SHIP	QTY	PART NO.	DESCRIPTION	ADDITIONAL INFO
15	1.00	EA	1.00	EA	2221	M 2221 FOR REPAIR/CAL	SN262337
16	1.00	EA	1.00	EA	44-20	M 44-20 FOR REPAIR/CAL	PR337255
17	1.00	EA	1.00	EA	12/12/3		SN092413E
18	1.00	EA	1.00	EA	LNG CABLE		/
19	1.00	EA	1.00	EA	M	MANUAL	/
20	1.00	EA	1.00	EA	MPEL	Pelican Case Medium	/
21	1.00	EA	1.00	EA	UPS WAY BILL		/
24	12.00	EA	4.00	EA	21-9313	BATTERY-DURACELL "D	/
25	3.00	EA	1.00	EA	223	EXTENDED CALIBRATION	/

COMMENTS:

UPS
FAIR/ BAD DENTS 44-20
1 YR/ SPEC INST.

(D) Product is export controlled for AT reasons under ECCN 1A 999. As such, these commodities, technology or software are eligible for export from the United States only in accordance with Export Administration regulations. Diversion contrary to U.S. law is prohibited.



Designer and Manufacturer
of
Scientific and Industrial
Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.

☐ 10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CUSTOMER CB&I

ORDER NO. 20283227/431232

Mfg. Ludlum Measurements, Inc. Model 2221 Serial No. 262337
Mfg. Alpha Spectra Model 12112/3B Serial No. 06091071
Cal. Date 8-Feb-16 Cal Due Date 8-Feb-17 Cal. Interval 1 Year Meterface 202-159

Check mark ☒ Applies to applicable instr. and/or detector IAW mfg. spec. T. 73 °F RH 20 % Alt 704.0 mm Hg

- ☐ New Instrument ☐ Instrument Received ☒ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments
- ☒ Mechanical ck. ☒ Meter Zeroed ☐ Background Subtract ☒ Input Sens. Linearity
☒ F/S Resp. ck. ☒ Reset ck. ☒ Window Operation ☒ Geotropism
☒ Audio ck. ☒ Alarm Setting ck. ☒ Batt. ck. (Min. Volt) 4.4 VDC
☐ Calibrated in accordance with LMI SOP 14.8 ☐ Calibrated in accordance with LMI SOP 14.9

Instrument Volt Set Comments V Input Sens. Comments mV Det. Oper. Comments V at Comments mV Threshold Dial Ratio 100 = 10 mV

☒ HV Readout (2 points) Ref./Inst. 500 / 500 V Ref./Inst. 2000 / 2000 V

COMMENTS:

Peak settings Gross Counts Model 2221 currently set
High Voltage: 581 V 900 V for gross counts.
Threshold dial: 642 100 (10mv) High voltage set with detector
Window dial: 40 n/a connected.
Window Position: "IN" "OUT"
Resolution for Cs137: ~8.76% n/a Firmware: 261028
OL checked but not set. Calibrated with 5' cable.
1 minute count for Cs137~4mCi (S/N:781) at 100pR/hr (354.3c/m) is: 207,869cpm

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
x1K	400kcpm	400	400
x1K	100kcpm	100	100
x100	40kcpm	400	400
x100	10kcpm	100	100
x10	4kcpm	400	400
x10	1kcpm	100	100
x1	400cpm	400	400
x1	100cpm	100	100

*Uncertainty within ± 10% C.F. within ± 20%

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
400kcpm	40047	40047	500kcpm	50045	50045
40kcpm	4004	4004	50kcpm	50	50
4kcpm	400	400	5kcpm	5	5
400cpm	40	40	500cpm	500	500
40cpm	4	4	50cpm	50	50

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques.

The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978

State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 S/N: ☐ 059 ☐ 2171CP ☐ 2261CP ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 1909 ☐ 1916CP ☐ 5105 ☐ 5717CO
☐ 5719CO ☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☐ G112 ☐ M565 ☐ S-394 ☐ S-1054 ☐ T100B1 ☐ T100B2 Neutron Am-241 Be S/N: ☐ T-304 Ra-226 S/N: ☐ Y982

☐ Alpha S/N ☐ Beta S/N ☐ Other

☒ m 500 S/N 289158 ☐ Oscilloscope S/N ☒ Multimeter S/N 93870637

Calibrated By: Jeremy Sharpen

Date 8-Feb-16

Reviewed By: Paul D.

Date 8-Feb-16

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.

501 Oak Street

325-235-5494

Sweetwater, TX 79556, U.S.A.

10744 Dutchtown Road

865-392-4601

Knoxville, TN 37932, U.S.A.

Bench Test Data For Detector

Detector 12112/3B Serial No. 0609121

Customer CB&I

Order #. 20283227/431232

Counter 2221 Serial No. 262357

Counter Input Sensitivity 10 mV

Count Time 6 seconds

Distance Source to Detector Surface

Other _____

High Voltage Background Isotope As241 Isotope _____ Isotope _____ Isotope _____
Size 3.02 x 5' Size _____ Size _____ Size _____

[illegible]

Signature

Jeremy Thompson

Date 8 Feb 16



Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.

501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.

☐ 10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CONVERSION CHART

Customer CB&I Date 8-Feb-16 Order # 20283227/431232

Model 2221 Serial No. 262537 Detector Model 12112/3B Serial No. 06091071

Source Ra-226 3184.9 pCi High Voltage 900 V

Input Sensitivity 10 mV

"As Found" Readings (CPM):

Reference Point	Distance	Analog	Range/Scale
200 pB/hr	974.45	4410	X15
150	113.5	330	
100	141.6	220	

After Adjustment Readings (CPM):

Analog	Range/Scale
4410	X15
330	
220	

"As Found" Readings:

Reference Point	Digital	Count Time
200 pB/hr Distance 974.45	44207	6 seconds
150 113.5	33576	
100 141.6	21752	

After Adjustment Readings:

Digital	Count Time
44207	6 seconds
33576	
21752	

Signature: Jeremy Thompson

Date 8-Feb-16



Designer and Manufacturer
of
Scientific and Industrial
Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

501 Oak Street

10744 Dutchtown Road

325-235-5494

865-392-4601

Sweetwater, TX 79556, U.S.A.

Knoxville, TN 37932, U.S.A.

CUSTOMER CB&I

ORDER NO. 20260980/416519

Mfg. Ludlum Measurements, Inc. Model 2221 Serial No. 268642

Mfg. Ludlum Measurements, Inc. Model 44-20 Serial No. PR315689

Cal. Date 27-Jan-15 Cal Due Date 27-Jan-16 Cal. Interval 1 Year Meterface 202-159

Check mark ☒ applies to applicable instr. and/or detector IAW mfg. spec. T. 74 °F RH 20 % Alt 703.8 mm Hg

☐ New Instrument ☐ Instrument Received ☒ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☒ Mechanical ck. ☒ Meter Zeroed ☐ Background Subtract ☒ Input Sens. Linearity

☒ F/S Resp. ck. ☒ Reset ck. ☒ Window Operation ☒ Geotropism

☒ Audio ck. ☒ Alarm Setting ck. ☒ Batt. ck. (Min. Volt) 4.4 VDC

☒ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set Comments V Input Sens. Comments mV Det. Oper. Comments V at Comments mV Threshold Dial Ratio 100 = 10 mV

☒ HV Readout (2 points) Ref./Inst. 500 / 498 V Ref./Inst. 2000 / 1996 V

COMMENTS:

Peak settings Gross Counts Model 2221 currently set
High Voltage: 657 V 1000 V for gross counts.
Threshold dial: 642 100 (10mv) High voltage set with detector
Window dial: 40 n/a connected.
Window Position: "IN" "OUT" OL checked but not set.
Resolution for Cs137: ~9.21% n/a Firmware: 261028
Cs137~3mCi (S/N:2171CP) count at 100µR/hr is:213,805cpm Distance is 361.6 cm
Count taken with crystal end facing source. Calibrated with 5' cable.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
x1K	400kcpm	400	400
x1K	100kcpm	100	100
x100	40kcpm	400	400
x100	10kcpm	100	100
x10	4kcpm	400	400
x10	1kcpm	100	100
x1	400cpm	400	400
x1	100cpm	100	100

*Uncertainty within ± 10% C.F. within ± 20%

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	Log Scale	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
400kcpm	40022 10	40022 10		500kcpm	50022 10	50022 10
40kcpm	4002	4002		50kcpm	50	50
4kcpm	399	399		5kcpm	5	5
400cpm	40	40		500cpm	500	500
40cpm	4	4		50cpm	50	50

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques.

State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 S/N: ☐ 059 ☐ 2171CP ☐ 2261CP ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 1909 ☐ 1916CP ☐ 5105 ☐ 5717CO ☐ 5719CO ☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☐ G112 ☐ M565 ☐ S-394 ☐ S-1054 ☐ T10081 ☐ T10082 Neutron Am-241 Be S/N: ☐ T-304 Ra-226 S/N: ☐ Y982

☐ Alpha S/N ☐ Beta S/N ☐ Other

☐ 500 S/N 289158 ☐ Oscilloscope S/N ☒ Multimeter S/N 93870637

Calibrated By: *Jeremy Chapman* Date 27-Jan-15

Reviewed By: *Phil H* Date 28-Jan-15

Bench Test Data For Detector

Detector 44-20 Serial No. PR 315679

Customer CB&I

Order #. 20260980/416519

Counter 2221 Serial No. 268642

Counter Input Sensitivity 10 _____ mV

Count Time 6 seconds

Distance Source to Detector Surface

Other _____

High
Voltage

Background

Isotope Am-241
Size 20.7mc.

Isotope
Size

Isotope
SizeIsotope
Size

400

1450

1550

950

1157

18546

* 1000

1196

18893

1050

1304

17516

1100

1402

12713

1150

1633

18906

1200

2534

19534

Signature

Date 27-29.15



Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.

501 Oak Street

325-235-5494

Sweetwater, TX 79556, U.S.A.

☐ 10744 Dutchtown Road

865-392-4601

Knoxville, TN 37932, U.S.A.

CONVERSION CHART

Customer CB&I Date 27-Jan-15 Order # 20260980/416519

Model 2221 Serial No. 267642 Detector Model 44-20 Serial No. PR315689

Source Ra-226: 189.9 µCi High Voltage 1000 V

Input Sensitivity 10 mV

"As Found" Readings (CPM):

Reference Point	Analog	Range/Scale
200 µR/hr 974 cpm	450	1K
150 } 113.5	340	}
100 } 141.6	220	}

After Adjustment Readings (CPM):

Analog	Range/Scale
450	1K
340	}
220	}

"As Found" Readings:

Reference Point	Digital	Count Time
200 µR/hr 974 cpm	44528	6 Seconds
150 } 113.5	33440	}
100 } 141.6	21472	}

After Adjustment Readings:

Digital	Count Time
44528	6 Seconds
33440	}
21472	}

Signature: Jeremy Thompson

Date 27-Jan-15

260' DETECTOR CABLE

Instrument Setup Sheet

Model #	Meter S/N	Probe #	Probe S/N	Cal Due
2221	268656	44-2	PR 095281	2-25-2016
Static counts	Counting Time: <u>1</u> minute (s)			
	BKGD (counts)		Source Check (counts)	
	Alpha	Beta/Gamma	Alpha	Beta/Gamma
1		761		30,149
2		792		29,487
3		819		28,313
4		831		29,802
5		719		29,809
6		836		29,201
7		775		29,477
8		817		30,110
9		771		30,088
10		840		28,621
Mean		796.1		29,505.7

Source Name	Source S/N	Source Name	Source S/N
Th-230 disc	G4-790	Tc-99 plate	G4-796
Tc-99 disc	G4-789	Cs-137	1405-22-1
Th-230 plate	G4-798		

Performed By: JOHN G. MASSEYDate: 2/27/2015Reviewed By: Takeshi IbukiDate: 2/27/2015

Background Determination

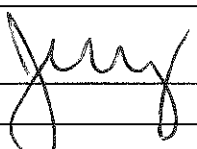
Instrument Model	Instrument Serial #	Probe Model	Probe Serial #	Calibration Due Date
2221	268656	44-2	PR095281	2/25/2016

Surface Type :	Push cart table assembly (Bldg 570 Lab)
Date Collected :	2/27/2015
Collected By :	J. Massey
Count Time	1

#	Counts	cpm
1	761	761
2	792	792
3	819	819
4	831	831
5	719	719
6	836	836
7	775	775
8	817	817
9	771	771
10	840	840
Mean	796.1	
Std dev	39.39387995	
20%	159.22	

Bkgd -3σ Value
914.28
Bkgd + 20%
955

Bkgd +3σ Value
677.92
Bkgd - 20%
637

Completed By :	John Massey 	Date :	2/27/2015
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Reviewed By :	Takeshi Ibuki 	Date :	2/27/2015
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Source Determination

Instrument Model	Instrument Serial #	Probe Model	Probe Serial #	Calibration Due Date
2221	268656	44-2	PR095281	2/25/2016

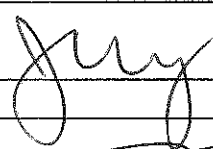
Source ID #	Source Nuclide	#N/A	Creation Date	Half Life	#N/A
1405-22-1	Cs-137	9.958	11/1/2009	30.17	8.81


Surface Type :	Push cart table assembly (Bldg 570 Lab)
Date Collected :	2/27/2015
Collected By :	J. Massey
Count Time	1

#	Counts	cpm
1	30149	30149
2	29487	29487
3	28313	28313
4	29802	29802
5	29809	29809
6	29201	29201
7	29477	29477
8	30110	30110
9	30088	30088
10	28621	28621
Mean	29505.7	
Std dev	632.2019807	
20%	5901.14	

Source -3σ Value
31402
Bkgd + 20%
35406

Source +3σ Value
27609
Bkgd - 20%
23605

Completed By :	John Massey 	Date :	2/27/2015
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Reviewed By :	Takeshi Ibuki 	Date :	2/27/2015
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**CALIBRATION
CERTIFICATE**
Page 1 of 2

EnergySolutions Services, Inc.
1570 Bear Creek Road
Oak Ridge, TN 37830
Phone: (877) 462-4873
Email: JSFStaff@energysolutions.com

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION			INSTRUMENT INFORMATION	
Customer Name: CB&I Federal Services			Manufacturer: Ludlum	
Address: 2130 Research Forest Drive, The Woodlands, TX 77380			Model: 2221	Serial Number: 268656
Contact Name: James Click			Probe: See attached cert	Serial Number: See attached cert
Customer Purchase Order Number: Credit Card	Work Order Number: 2015-14080	Calibration Method: Electronic		

INSTRUMENT CALIBRATION INFORMATION

Instrument Range	Calibration Standard Value (cpm)	Ratemeter Response (cpm) (Tolerance $\pm 10\%$ of Calibration Std. Values)		Calibration Standard Value	Time Base (min)	Tolerances (counts) $\pm 2\%$	Scaler Response (counts)	
		As Found	As Left				As Found	As Left
X 1	100	90	90	1,000 cpm	0.1	98 - 102	99	99
X 1	250	250	250	1,000 cpm	0.2	196 - 204	198	198
X 1	400	400	400	1,000 cpm	0.5	490 - 510	497	497
X 10	1,000	1,000	1,000	1,000 cpm	1	980 - 1,020	993	993
X 10	2,500	2,500	2,500	1,000 cpm	2	1,960 - 2,040	1,987	1,987
X 10	4,000	4,000	4,000	1,000 cpm	5	4,900 - 5,100	4,968	4,968
X 100	10,000	10,000	10,000	1,000 cpm	10	9,800 - 10,200	9,935	9,935
X 100	25,000	25,000	25,000	Calibrated in accordance with OEM Technical Manual				
X 100	40,000	40,000	40,000					
X 1000	100,000	100,000	100,000					
X 1000	250,000	250,000	250,000					
X 1000	400,000	400,000	400,000					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument			
Calibrated By:	<i>Mike Yoner</i>	Reviewed By:	<i>[Signature]</i>
Calibration Date: 02/25/2015		Date:	<i>2/25/15</i>
		Calibration Due: 02/25/2016	

Model: 2221

Serial Number: 268656

M&TE					Environmental Conditions				
Volt Meter	Due Date:	05/31/15	ID#:	83880126	Temp / Press	Due Date:	01/06/16	ID#:	3076
Pulser	Due Date:	02/04/16	ID#:	246163	Humidity	Due Date:	03/12/15	ID#:	992290
Timer	Due Date:	06/27/15	ID#:	ES0088	Temp: 20.8 °C	Pressure: 740 mmHg	Humidity: 15.0 %		
INSTRUMENT CALIBRATION INFORMATION									
Special Test									
Geotropism	Sat (✓) Unsat ()		Hold		Sat (✓) Unsat ()				
BAT > 4.5	Sat (✓) Unsat ()		Volume Test		Sat (✓) Unsat ()				
Mechanical Zero	Sat (✓) Unsat ()		Audio Divide		Sat (✓) Unsat ()				
Digital Zero	Sat (✓) Unsat ()		Window Switch		Sat (✓) Unsat ()				
Count	Sat (✓) Unsat ()		Lamp		Sat (✓) Unsat ()				
HV Adjust (50 - 2,400)	Sat (✓) Unsat ()								
High Voltage Calibration									
Voltage (volts)		Tolerance (volts) ± 2%			As Found (volts)		As Left (volts)		
400		392 - 408			394		399		
1,000		980 - 1,020			990		1,000		
1,500		1,470 - 1,530			1,486		1,501		
1,900		1,862 - 1,938			1,885		1,902		
Threshold / Gain Calibration (Desired Ratio 10 mV/100)									
<u>Threshold Setting</u>	<u>Pulser Input</u>	<u>As Found Ratio (mV/100)</u>	<u>Pulser Input</u>	<u>As Left Ratio (mV/100)</u>	<u>Window</u>	<u>Threshold Cutoff (mV)</u>			
100	9.0	9.0	10.0	10.0	100	20.0			
200	18.2	9.1	20.2	10.1	200	30.0			
300	27.3	9.1	30.3	10.1	300	40.0			
400	36.0	9.0	40.0	10.0	400	49.7			
500	45.0	9.0	50.0	10.0	N/A	N/A			
Logmeter Scale Linearity Check									
<u>Input (cpm)</u>		<u>Tolerance (cpm) ±20%</u>			<u>As Found (cpm)</u>		<u>As Left (cpm)</u>		
LOG 400		320 - 480			400		400		
LOG 4,000		3,200 - 4,800			4,200		4,200		
LOG 40,000		32,000 - 48,000			42,000		42,000		
LOG 400,000		320,000 - 480,000			410,000		410,000		
COMMENTS									
Calibrated in accordance with OEM Technical Manual.									
Limited Use: Use with 44-2, #095281, HV = 1,250V. Calibrated with 260 ft. cable. THR = 100, WIN = OUT.									
Instrument									
Calibrated By: <i>Mike Yoner</i>					Reviewed By: <i>[Signature]</i> Date: <i>2/25/15</i>				
Calibration Date: 02/25/2015					Calibration Due: 02/25/2016				

EnergySolutions Services, Inc.
1570 Bear Creek Road
Oak Ridge, TN 37830
Phone: (877) 462-4873
Email: ISPStaff@energysolutions.com

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION			DETECTOR INFORMATION		
Customer Name: EnergySolutions Services, Inc.			Manufacturer: Ludlum		
Address: 1570 Bear Creek Rd., Oak Ridge, TN 37830			Detector Model: 44-2		
Contact Name: Tony Riggs			Serial Number: 095281		
Customer Purchase Order Number: N/A		Work Order Number: 2015-14084	Evaluation Method: Source		
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
1) Source Nuclide: Cs ¹³⁷	Serial Number: 090230		Activity: 1 µCi nominal	Due Date: N/A (Used for Plateau Only)	
2) Source Nuclide: Cs ¹³⁷	Serial Number: 049711		Activity: Variable	Cal Due: 09/09/15	
Desired Exposure (µR/hr)	Detector Response (cpm)	(cpm/µR/hr)	Precision Test @250 µR/hr	cpm (Source #2)	
250	42,467	169.9	Count 1	42,467	
500	84,447	168.9	Count 2	42,521	
1,000	166,716	166.7	Count 3	42,434	
Average cpm/µR/hr	168.5		Average	42,474	
			Tolerance ±10%	All counts within ±10% of Average	
			Pass/Fail	PASS	
SCALER INFORMATION			DETECTOR INFORMATION		
Model	Serial Number	Due Date	Background (cpm)	Operating Voltage	Threshold
2221	268656	02/25/16	2,155	1,250V	100 = 10 mV
Voltage Plateau: YES <input checked="" type="checkbox"/> NO					
COMMENTS					
<p>**Detectors calibrated with a 2221 may be used with any 2221 provided that the instrument is in calibration and the specific detector parameters (High Voltage & Threshold) are entered into the 2221 prior to use**</p> <p>Calibrated with 260 ft. cable.</p>					
STATEMENT OF CERTIFICATION					
<p>We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).</p>					
Detector					
Certified By: <i>Mike Yon</i>	Reviewed By: <i>[Signature]</i>	Date: 2/25/15			
Certification Date: 02/25/2015		* Certification Due (6 mo.): 08/25/2015 * Certification Due (12 mo.): 02/25/2016			

* Calibration due date is dependent on users regulatory requirements.

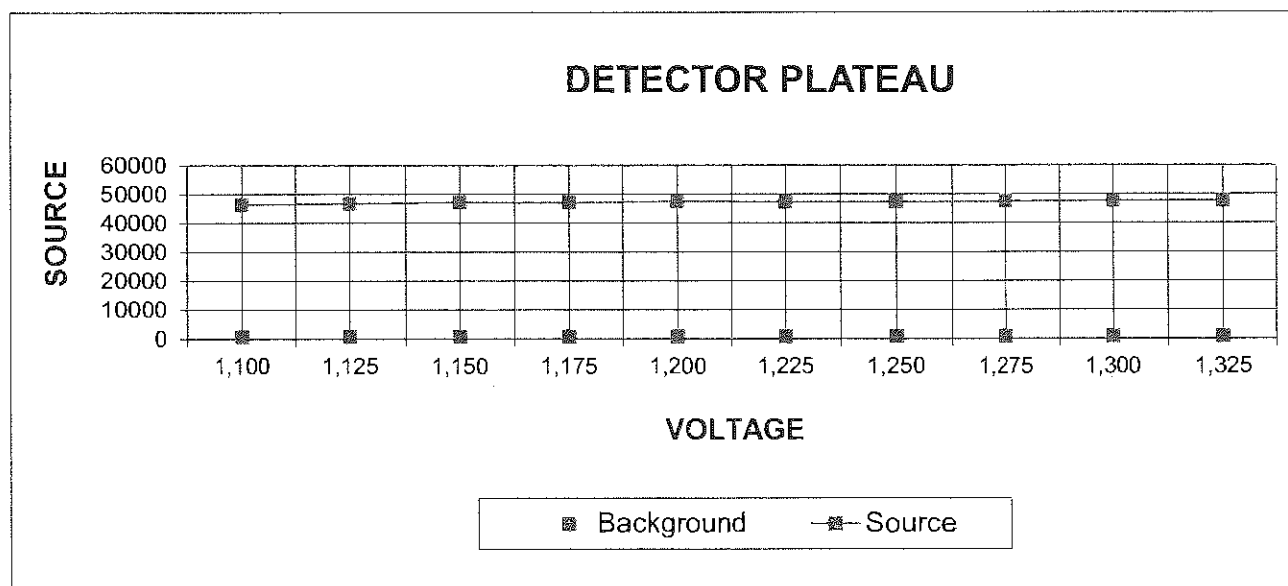


PLATEAU WORKSHEET

Model: 44-2
 Detector S/N: 095281
 Operating Voltage: 1,250V

Voltage	Background (cpm)	Source (cpm)
1,100	815	45,684
1,125	850	45,917
1,150	863	46,335
1,175	879	46,310
1,200	859	46,581
1,225	892	46,467
1,250	888	46,521
1,275	888	46,603
1,300	896	46,846
1,325	916	46,871
1,350	935	47,217

Source Information: S/N (090230) Nuclide (Cs-137) ~1 uCi Button on contact with detector



Performed by: Mike Yonca Date: 2-25-15

Reviewed by: [Signature] Date: 2/25/15



Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 271420
Detector: Manufacturer: Ludlum Model Number: 44-20 Serial Number: PR298555

☒ Mechanical Check ☒ THR/WIN Operation
☒ F/S Response Check ☒ Reset Check
☒ Geotropism ☒ Audio Check
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V
Cable Length: ☐ 39-inch ☐ 72-inch ☒ Other: 10'

Source Distance: ☐ Contact ☒ 6 inches ☐ Other:
Source Geometry ☒ Side ☐ Below ☐ Other:

Threshold: 10 mV
Window:

Barometric Pressure: 24.24 inches Hg
Temperature: 77 °F
Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	399335	400
x 1000	100	100	100		100
x 100	400	400	400	39935	400
x 100	100	100	100		100
x 10	400	400	400	3993	400
x 10	100	100	100		100
x 1	400	400	400	400	400
x 1	100	100	100		100

High Voltage

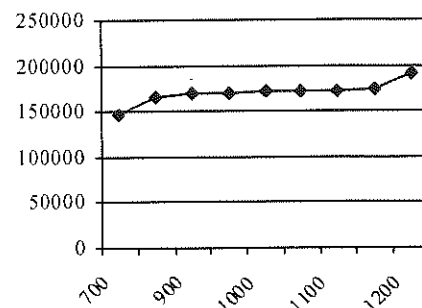
Source Counts

Background

Voltage Plateau

700 145288
800 165303
900 170278
950 170435
1000 170862
1050 171212
1100 172222
1150 173064
1200 191638

22197



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 1000

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932
☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: ☐ 8749012
☒ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03
☐ Other Source:

Calibrated By:

Calibration Date: 4-28-16

Calibration Due 4-28-17

Reviewed By:

Date: 4/28/16

ERG Form ITC. 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323.A - 1997



Environmental Restoration Group, Inc.
8809 Washington NE, Ste. 150
Albuquerque, NM 87113

ph: 505.298.4224
fax: 505.797-1404
web: www.ERGOffice.com

EQUIPMENT PACKING SLIP

Company Name: CB & I - CA

Contact Name: Oscar Gonzales

Contact Telephone: 415-398-6547

Order Number: 3140

P.O. or Reference Number:

Date Ordered: 04/28/2016

Date Shipped: 04/28/2016

Date of Delivery: 04/29/2016

Shipping Method:

Shipping Number: ERG FedEx Number

Ship To Information:

CB & I - CA

Billing Address:

CB & I - CA

Accounts Payable

650 Ave M

San Francisco, CA 94130

Equipment Enclosed:

Instrument Tested	Instrument
<input type="checkbox"/>	Ludlum 2221r
<input type="checkbox"/>	Ludlum 44-20

Serial Number

271420

PR298555

Special Instructions:

950 Ave M, Treasure Island, San Francisco, CA 94130



Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 271435
Detector: Manufacturer: Ludlum Model Number: 44-20 Serial Number: PR269980

☒ Mechanical Check ☒ THR/WIN Operation
☒ F/S Response Check ☒ Reset Check
☒ Geotropism ☒ Audio Check
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V
Cable Length: ☐ 39-inch ☐ 72-inch ☒ Other: 60"

Source Distance: ☐ Contact ☒ 6 inches ☐ Other:
Source Geometry ☒ Side ☐ Below ☐ Other:

Threshold:
Window:

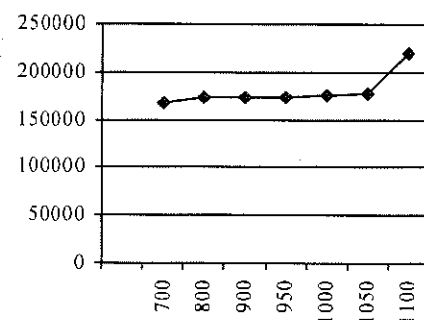
Barometric Pressure: 24.83 inches Hg
Temperature: 71 °F
Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	397507	400
x 1000	100	100	100		100
x 100	400	400	400	39751	400
x 100	100	100	100		100
x 10	400	400	400	3975	400
x 10	100	100	100		100
x 1	400	400	400	397	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	166601	22263
800	172681	
900	173589	
950	173854	
1000	174406	
1050	177961	
1100	219059	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 900

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932
☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: ☐ 8749012
☒ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03
☐ Other Source:

Calibrated By:

Calibration Date: 10-13-15

Calibration Due 10-13-16

Reviewed By:

Date: 10/13/15

ERG Form ITC, 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323.4 - 1997



Environmental Restoration Group, Inc.
8809 Washington NE, Ste. 150
Albuquerque, NM 87113

ph: 505.298.4224
fax: 505.797-1404
web: www.ERGOffice.com

EQUIPMENT PACKING SLIP

Company Name: CB & I - CA

Order Number: 3033

Contact Name: Oscar Gonzales

P.O. or Reference Number:

Contact Telephone: 415-398-6547

Date Ordered: 10/26/2015

Shipping Method:

Date Shipped: 10/26/2015

Shipping Number: ERG FedEx Number

Date of Delivery: 10/27/2015

Ship To Information:

Billing Address:

CB & I - CA

CB & I - CA

Accounts Payable

650 Ave M

San Francisco, CA 94130

Equipment Enclosed:

Instrument Tested	Instrument
<input type="checkbox"/>	Ludlum 2221r
<input type="checkbox"/>	Ludlum 44-20

Serial Number

271435

PR269980

Special Instructions:

None



Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-1224
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 271439
Detector: Manufacturer: Ludlum Model Number: 44-20 Serial Number: PR202073

☒ Mechanical Check ☒ THR/WIN Operation
☒ F/S Response Check ☒ Reset Check
☒ Geotropism ☒ Audio Check
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V
Cable Length: 39-inch 72-inch ☒ Other: 60"

Source Distance: ☐ Contact ☒ 6 inches ☐ Other:
Source Geometry: ☒ Side ☐ Below ☐ Other:

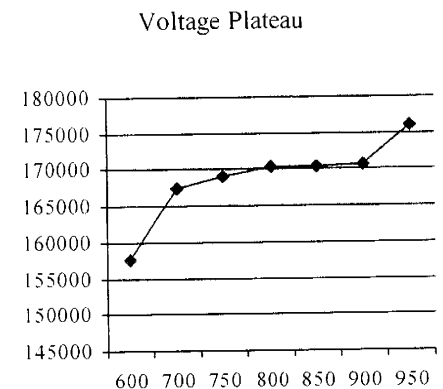
Threshold: 10 mV
Window:

Barometric Pressure: 24.51 inches Hg
Temperature: 76 °F
Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	398609	400
x 1000	100	100	100		100
x 100	400	400	400	39853	400
x 100	100	100	100		100
x 10	400	400	400	3982	400
x 10	100	100	100		100
x 1	400	400	400	398	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
600	157578	
700	167378	
750	169020	
800	170258	21489
850	170277	
900	170684	
950	176030	



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 800

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932
☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03
☐ Beta Source: ⁹⁹Tc @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: ☐ 87490128
☒ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03
☐ Other Source:

Calibrated By:

Calibration Date: 10-5-16

Calibration Due: 10-5-17

Reviewed By:

Date: 10/5/16

ERG Form ITC 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323.4 - 1997



Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 282966
Detector: Manufacturer: Ludlum Model Number: 44-20 Serial Number: PR262403

☒ Mechanical Check ☒ THR/WIN Operation
☒ F/S Response Check ☒ Reset Check
☒ Geotropism ☒ Audio Check
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)
Source Distance: ☐ Contact ☒ 6 inches ☐ Other:
Source Geometry ☒ Side ☐ Below ☐ Other:

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☐ 1500 V
Cable Length: ☒ 39-inch ☐ 72-inch ☐ Other:

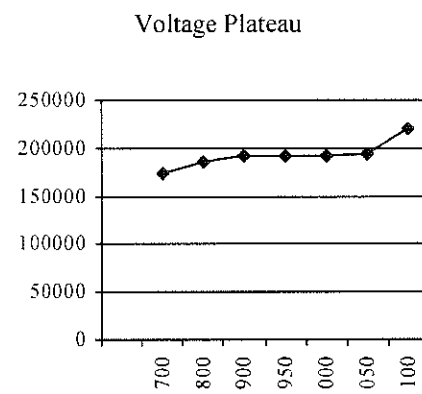
Barometric Pressure: 24.66 inches Hg
Temperature: 72 °F
Relative Humidity: 20 %

Threshold: 10 mV
Window:

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	396761	400
x 1000	100	100	100		100
x 100	400	400	400	39681	400
x 100	100	100	100		100
x 10	400	400	400	3968	400
x 10	100	100	100		100
x 1	400	400	400	397	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	173228	26124
800	186214	
900	190584	
950	190704	
1000	191222	
1050	194055	
1100	219393	



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 950

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932
☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: ☐ 8749012
☒ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03
☐ Other Source:

Calibrated By:

Calibration Date: 9-29-15

Calibration Due 9-29-16

Reviewed By:

Date: 9/29/15

ERG Form ITC. 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323.A - 1997



Environmental Restoration Group, Inc.
8809 Washington NE, Ste. 150
Albuquerque, NM 87113

ph: 505.298.4224
fax: 505.797-1404
web: www.ERGOffice.com

EQUIPMENT PACKING SLIP

Company Name: CB & I - CA
Contact Name: Oscar Gonzales
Contact Telephone: 415-398-6547

Order Number: 3005

P.O. or Reference Number: 500060

Date Ordered: 09/29/2015
Date Shipped: 09/29/2015
Date of Delivery: 09/30/2015

Shipping Method:
Shipping Number: ERG FedEx Number

Ship To Information:

CB & I - CA

Billing Address:

CB & I - CA
Accounts Payable
650 Ave M
San Francisco, CA 94130

Equipment Enclosed:

Instrument Tested	Instrument	Serial Number
<input type="checkbox"/>	Ludlum 2221r	282966
<input type="checkbox"/>	Ludlum 44-20	PR262403

Special Instructions:

None

Chi, Minhsec

From: Scott Heronimus <ScottHeronimus@ERGOFFICE.COM>
Sent: Wednesday, September 30, 2015 11:51 AM
To: Chi, Minhsec
Subject: RE: ERG 2221 rental received 09302015

We were aware of the "dents" and they had no effect on the instruments when calibrated they were calibrated yesterday.

Scott Heronimus



Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113
phone: (505) 298-4224
fax: (505) 797-1404

check us out at: <http://www.ERGoffice.com>

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From: Chi, Minhsec [<mailto:Minhsec.Chi@Cbifederalservices.com>]
Sent: Wednesday, September 30, 2015 12:44 PM
To: Scott Heronimus <ScottHeronimus@ERGOFFICE.COM>
Cc: Morrison, Dennis <Dennis.Morrison@Cbifederalservices.com>; Coffey, Lisa M <lisa.coffey@CBIFederalServices.com>
Subject: ERG 2221 rental received 09302015

Scott,

The Ludlum 2221/44-20 S/N: 282966/PR262403 that we received from ERG has some dents on both the meter and probe, photos attached for your reference. Was wondering if you were aware of this since there is no documentation stating the damage. It could be possible the instrument was damaged during shipping. The meter and probe does function properly.



Minhsec Chi
Radiological Control Technician 4
Federal Services
Environmental & Infrastructure
minhsec.chi@cbifederalservices.com

CB&I
950 Avenue M
Treasure Island
San Francisco, CA 94130
United States of America
www.CBI.com

From: Coffey, Lisa M
Sent: Wednesday, September 30, 2015 11:15 AM
To: Morrison, Dennis

Cc: Chi, Minhsec

Subject: ERG 2221 rental received 09302015

Dennis,

Attached are photos of the 2221 rented from ERG. I received the box and took inventory, noticing the side of the 2221 itself as well as the probe had a few dents. Informed Min and handed over to perform his checks and documentation for set up. Just FYI.

Thanks,

Lisa



Lisa Coffey

Scientist III

Radiation Safety

Federal Services

Tel: +1 925.288.2180

Cell: +1 717.250.7723

lisa.coffey@cbifederalservices.com

CB&I

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Suite 200

Concord, CA 94520

United States of America

www.CBI.com

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CALIBRATION SHEET

Instrument: **RSX-1**

Customer: CB&I
Contact: Jeff Guillory
Console : 7236
Detector 1: 5447
Detector 2: 5448

Date: June 22, 2016
Tech.: Jim C
Job Order: RMA# 10858
Customer PO PO#

Channels: 1024 **ADC Offset:** N/A

	A1	A2	A3	A4	A5
High Voltages	592	621			

Stripping Constant	"this system"	"normal"
Alpha	0.270	0.250
Beta	0.582	0.400
Gamma	0.950	0.810
a	0.061	0.060
b	0.009	0.000
g	0.001	0.003

ROI#	Channel	IAEA Specification [keV]	Label
1	137-937	410-2810	Total Count
2	457-523	1370-1570	Potassium K
3	553-620	1660-1860	Uranium U
4	803-937	2410-2810	Thorium Th
5			
6			
7			
8	553-620	1660-1860	Uranium Upper U

Det#	Peak Cs	Cs FWHM		Peak Th	Th FWHM
A1	220.12	7.59		873.31	4.74
A2	220.21	7.29		873.59	4.33
A3					
A4					
Sum Dn	220.15	7.45		873.43	4.50
Sum Up					

**CALIBRATION SHEET****Instrument: RSX-1****Customer:** CB&I**Contact:****Console :** 7236**Detector 1:** 5447**Detector 2:** 5448**Date:**

Feb. 26, 2014

Tech.:

GP

Job Order:

SO#2634

Customer PO

PO#1105766-000

OP

Channels: 1024**ADC Offset:** N/A**High Voltages**

A1	A2	A3	A4	A5
595	619			

Stripping Constant	"this system"	"normal"
Alpha	0.268	0.250
Beta	0.401	0.400
Gamma	0.744	0.810
a	0.049	0.060
b	0.001	0.000
g	-0.001	0.003

ROI#	Channel	IAEA Specification [keV]	Label
1	137-937	410-2810	Total Count
2	457-523	1370-1570	Potassium K
3	553-620	1660-1860	Uranium U
4	803-937	2410-2810	Thorium Th
5			
6			
7			
8	553-620	1660-1860	Uranium Upper U

Det#	Peak Cs	Cs FWHM	Peak Th	Th FWHM
A1	220.15	7.53	872.98	4.50
A2	220.28	7.20	873.19	4.28
A3				
A4				
Sum Dn	220.23	7.35	873.08	4.37
Sum Up				

Appendix B

Gamma-Scanning Data



Instrument # 117652

• <Mean + 3 std dev (IL 19,334 cpm)

• ≥Mean + 3 std dev (IL 19,334 cpm)

□ SU Boundaries

CB&I Federal Services, LLC

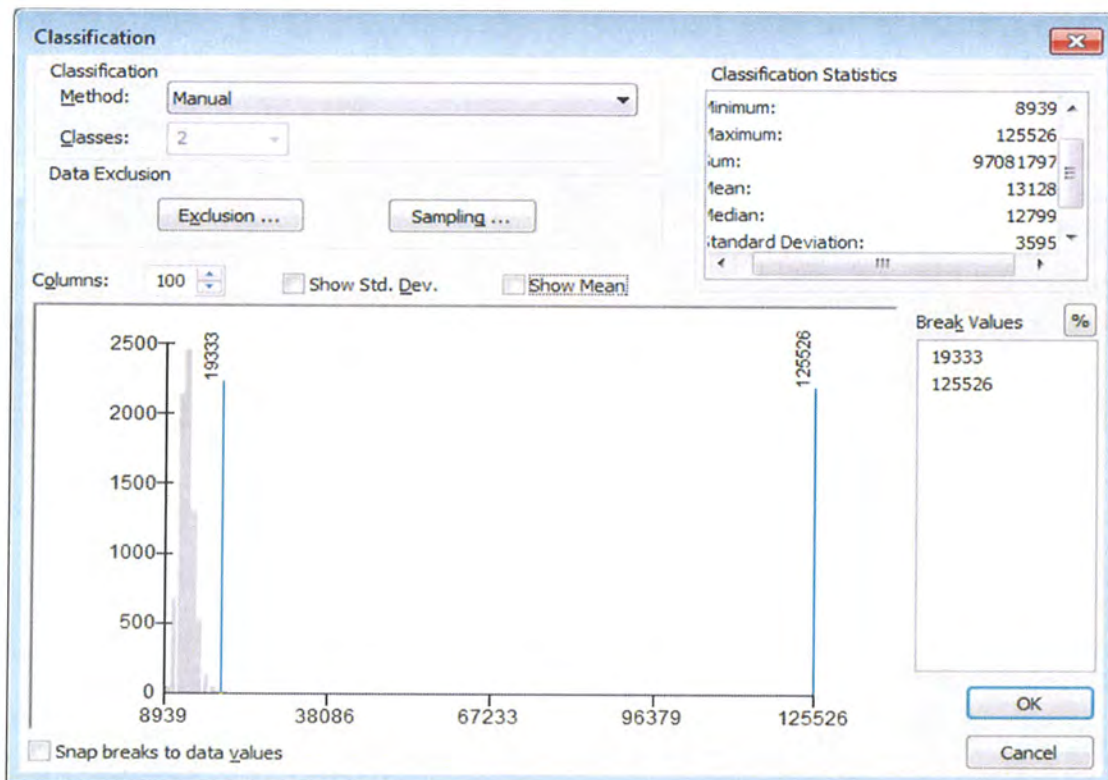
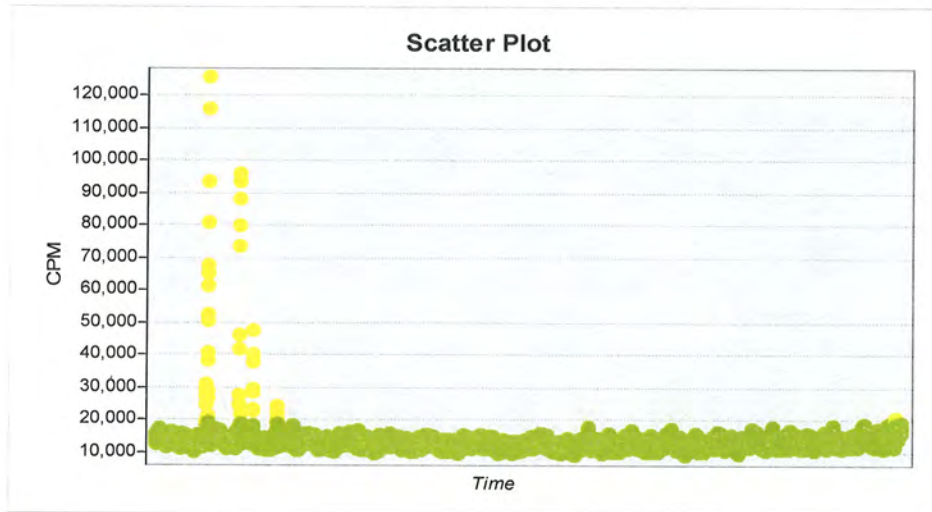
0 5 10 20
Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot

Data Processed In Treasure Island Office

RSI Survey of Northpoint FSS SU 7

< 10,000 37	In the 10,000 406	In the 11,000 1466	In the 12,000 2220	In the 13,000 1760	In the 14,000 884	In the 15,000 382
In the 16,000 118	In the 17,000 49	In the 18,000 25	In the 19,000 6	In the 20,000 5	In the 21,000 2	>= 22,000 72



**Instrument # 149942**

- | | | |
|------------------------------|--------------------------------------|-----------------|
| ♦ LLRO Location | • < Mean + 3 std dev (IL 19,334 cpm) | □ SU Boundaries |
| ▲ Follow-up Static Locations | • ≥ Mean + 3 std dev (IL 19,334 cpm) | |

CB&I Federal Services, LLC

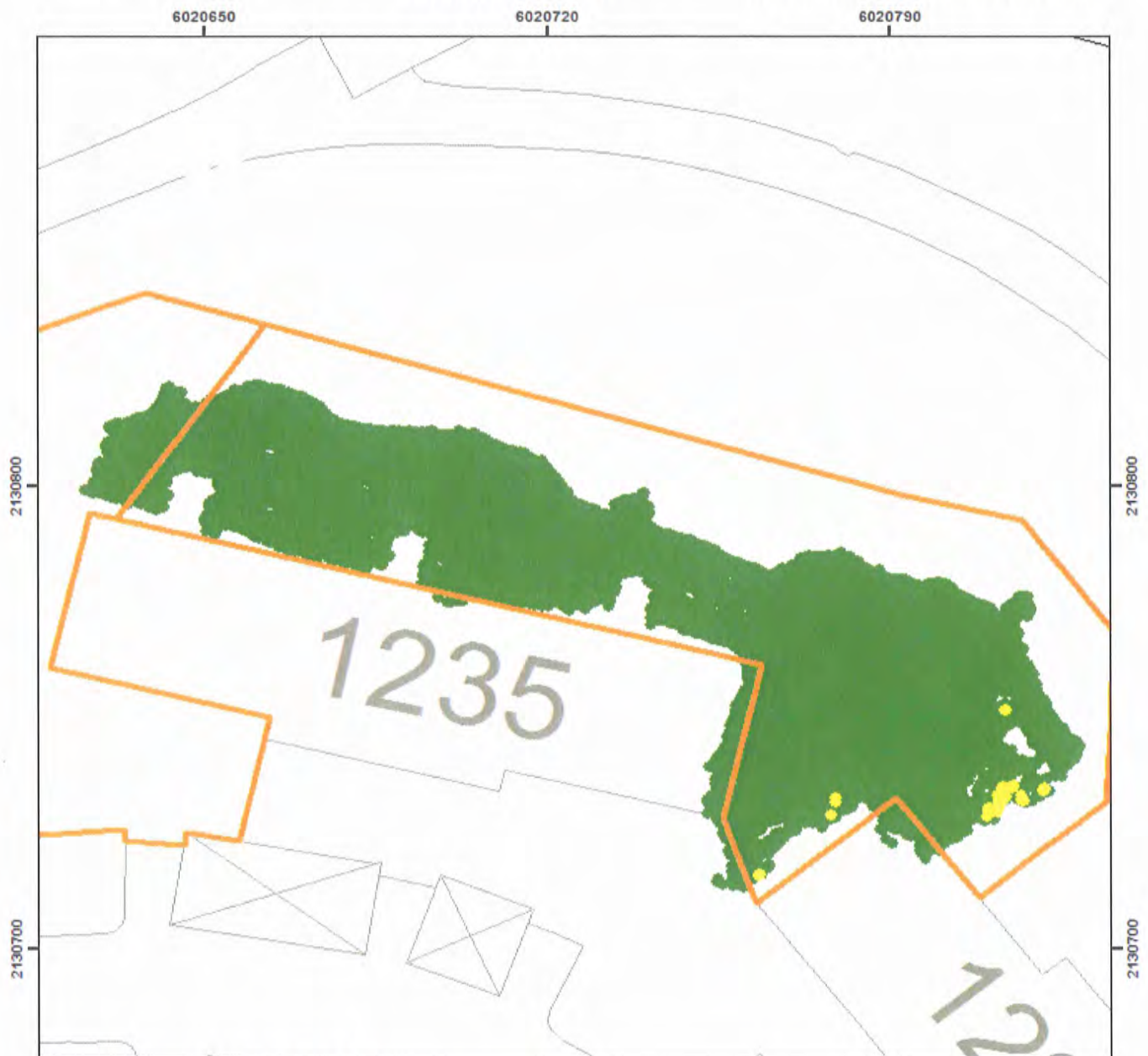
Data Processed In Treasure Island Office

10/22/2015
Date

Gamma Walk Over Survey

Northpoint - SU 1

Survey Number:
TIRS-09182015-12P3-GWS-1252



Instrument # 262301

● \geq Mean + 3 std dev (19,654 cpm)

● < Mean + 3 std dev (19,654 cpm)

□ SU Boundaries

CB&I Federal Services, LLC

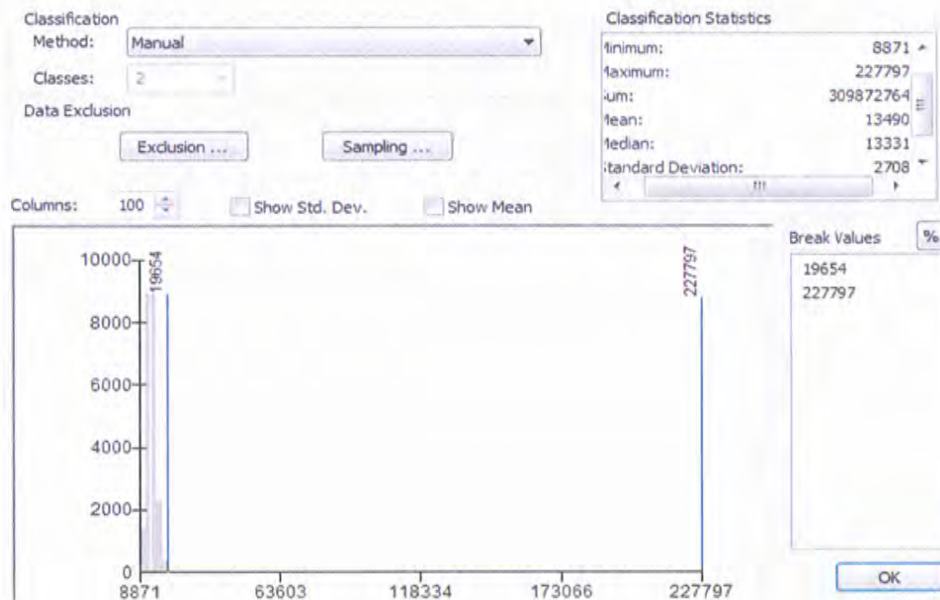
0 12.5 25 50 Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

Data Processed In Treasure Island Office

**RSI Survey of
Northpoint SU 1**

< Than 10,000 91	In the 11,000 1103	In the 12,000 3510	In the 13,000 4989	In the 14,000 5355	In the 15,000 3994	In the 16,000 2225	In the 17,000 1010
In the 18,000 389	In the 19,000 191	In the 20,000 69	In the 21,000 7	In the 22,000 2225	In the 24,000 1010	In the 27,000 389	In the 33,000 191
In the 34,000 69	In the 47,000 7	In the 56,000 69	In the 75,000 7	In the 79,000 7			



[illegible]

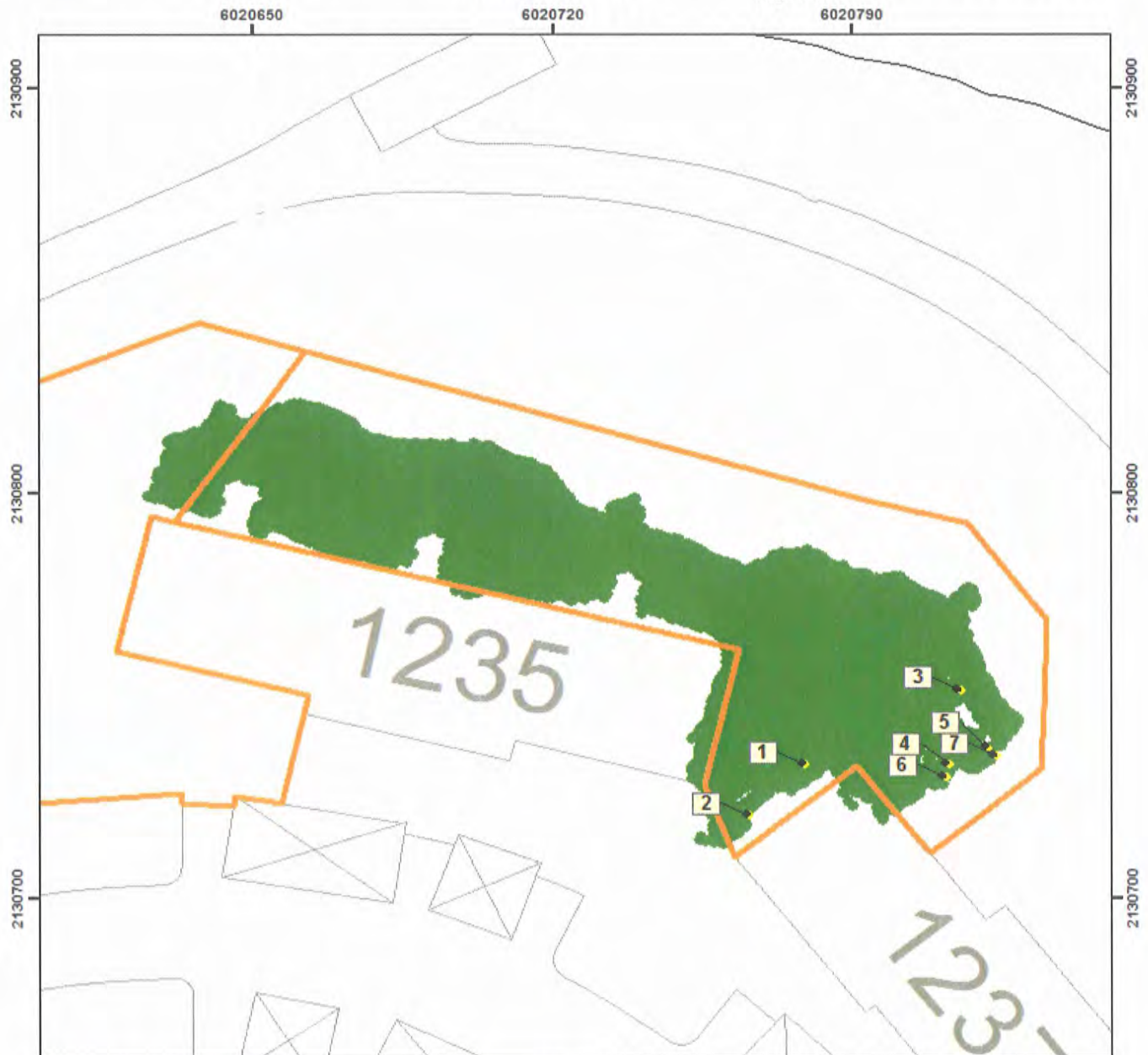
10/22/2015
Date

Follow-up Static Survey

Northpoint - SU 1

Survey Number:
TIRS-09242015-12P3-JSS-1296

Page 2 of 2



Instrument # 262301

- Investigation Point
- Data Points Not Requiring Further Investigation
- SU Boundaries

CB&I Federal Services, LLC

0 12.5 25 50 Feet

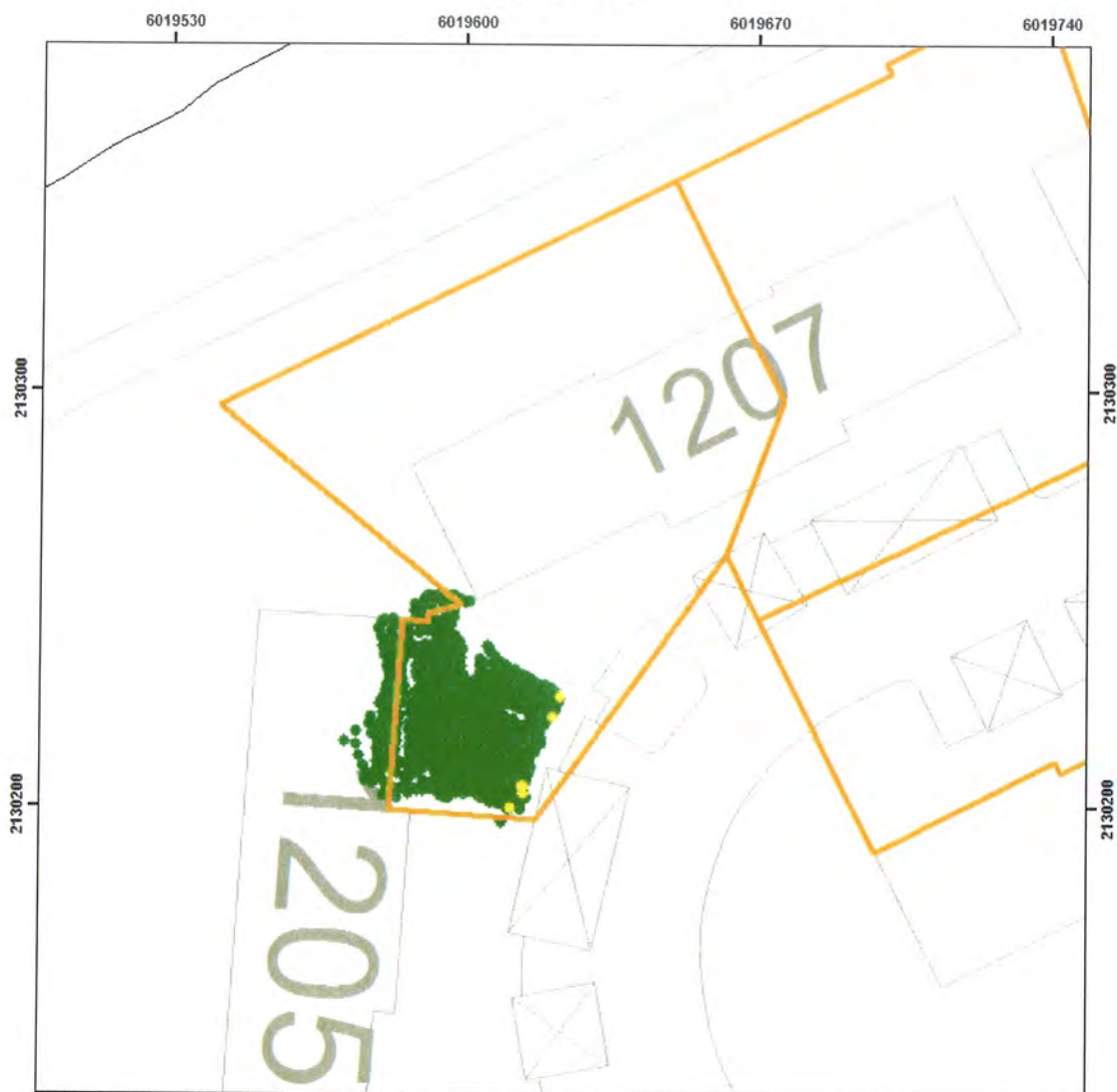
Coordinate system: CSP Zone III, NAD83, US Survey Foot

Data Processed In Treasure Island Office

Gamma Walk Over Survey

Bayside SU 8

Survey Number:
TIRS-10142015-12P3-GWS-1472



Instrument # 262301

● < Mean + 3 std dev (19,654 cpm)

● ≥ Mean + 3 std dev (19,654 cpm)

□ SU Boundaries

CB&I Federal Services, LLC

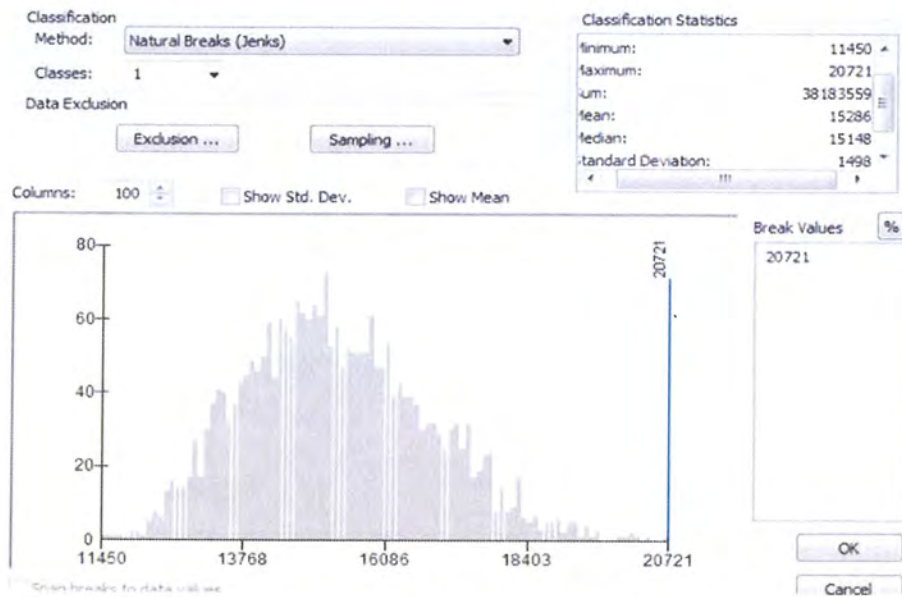
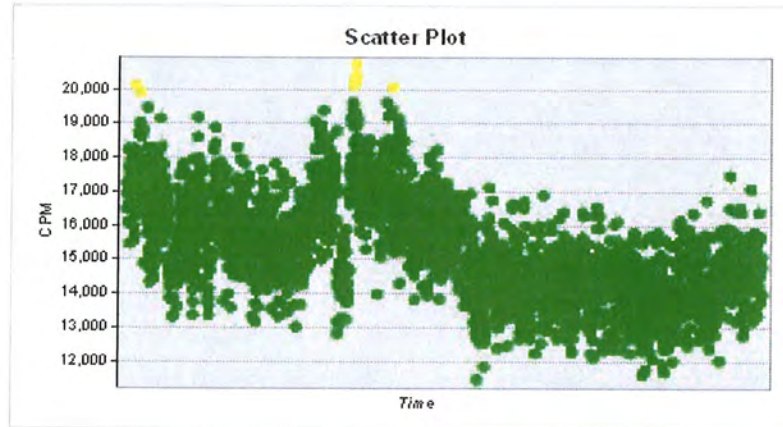
0 15 30 60 Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot

Data Processed In Treasure Island Office

**Gamma Walkover Survey of
Bayside SU 8**

In the 11,000	In the 12,000	In the 13,000	In the 14,000	In the 15,000	In the 16,000
7	116	402	615	592	413
In the 17,000	In the 18,000	In the 19,000	In the 20,000		
250	75	22	6		

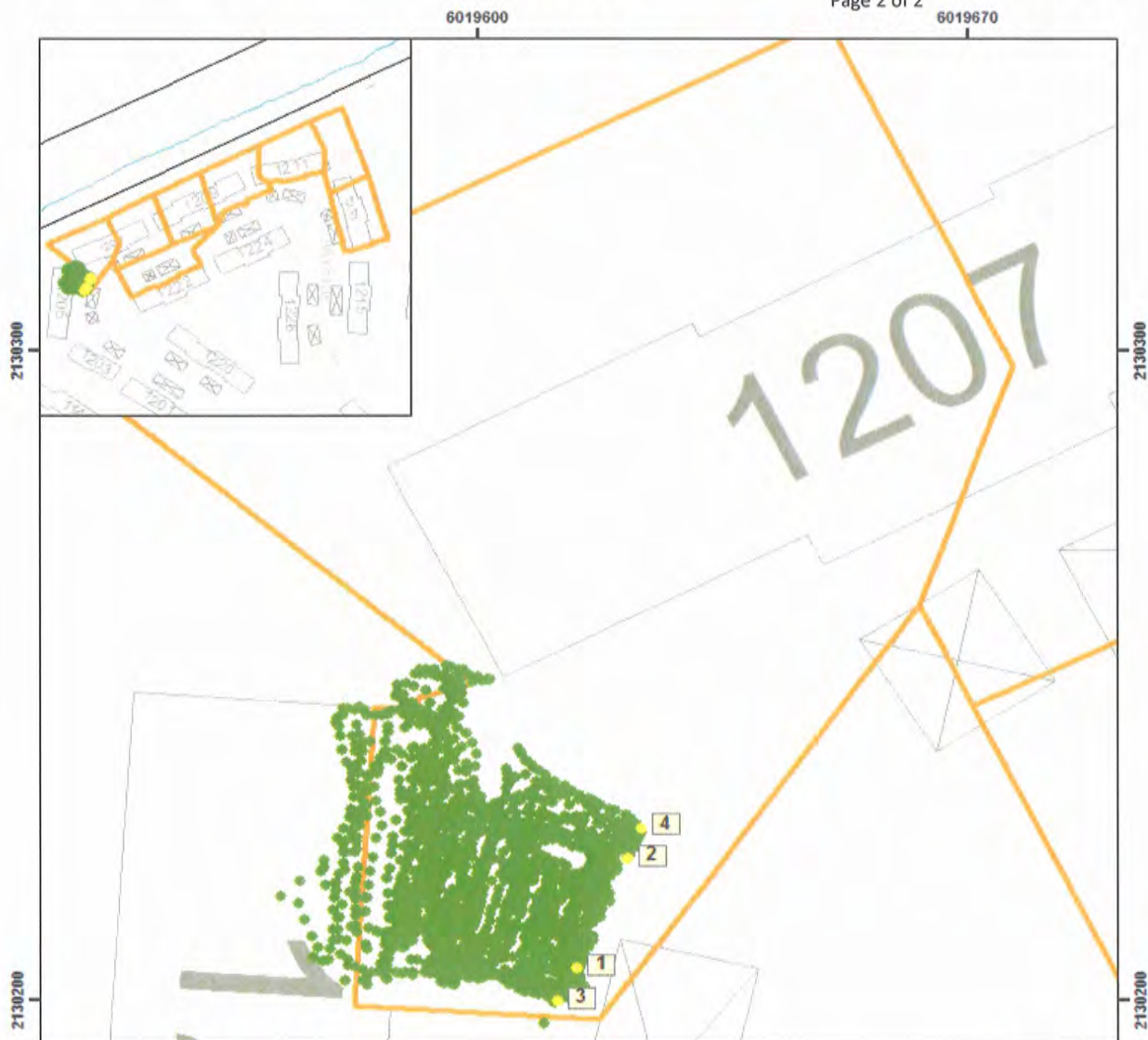


RADIOLOGICAL SURVEY FORM						Smear Counter (Inst. #1)			
Survey Number: TIRS- 12262015 12P3 JSS 1544						Model: _____		4 π Efficiency: α β/γ	
Survey Description: Bayside- Follow up gamma statics survey of SU-8. Follow up gamma static survey was performed on soil at locations determined after previous gamma walkover survey of part of SU-1 that exceeded the scan investigation level (IL). Refer to original survey TIRS-10132015-12P3-GWS-1455. All gamma statics were taken at 10cm away from the soil surface at highest reading around the waypoints. Survey locations found to be over the IL will be evaluated for biased sampling.						Serial #: _____		Bkgd (lab) CPM: _____	
						Probe #: _____		MDA (dpm/100cm ²): _____	
						Cal. Due: _____		Count Time(min): _____	
RWP: 2015 12P3 JS 01 3 Start Date: 10/22/15 Time: 1320 End Date: 10/28/2015 Time: 1100 Surveyor (Name) Tobin Wells Bryon Rogers (Signature) <i>Tobin Wells</i> <i>Bryon Rogers</i> Date: 11/4/15						Survey Meter (Inst. #2)		α β/γ	
						Model: _____		2 π Efficiency: _____	
						Serial #: _____		Bkgd (lab) CPM: _____	
						Probe / #: _____		MDA (dpm/100cm ²): _____	
						Cal. Due: _____		Count Time(min): _____	
						Probe Area(cm ²): _____		Area Bkg (count): _____	
Survey Meter (Inst. #3)						Exposure Rate Meter (Inst. #4)		α β/γ	
						Model: 2221/44-20		Model: _____	
						Serial #: 262301		Serial #: _____	
						Cal. Due: 1/27/2016		Cal. Due: _____	
						Ref Area BKG(Scan): 16,595 cpm		Bkgd (lab): _____	
						Ref Area IL(Scan): 19,654 cpm		Area Bkgd: _____	
Site: Soil Area 7						Sat/Unsat: _____		sat	

[illegible]

Signature _____

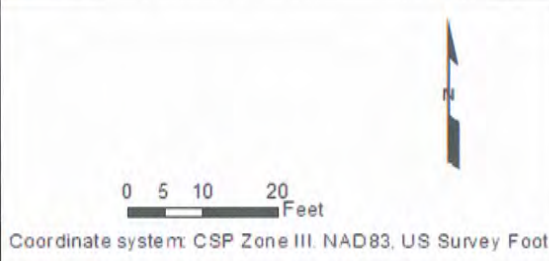
11/4/2015
Date



Instrument # 262301

- Investigation Point
- GWS Coverage
- RSYPAD Boundaries

CB&I Federal Services, LLC



Data Processed In Treasure Island Office

Guillory, Jeffrey

From: Weyant, David B CIV NAVSEA 04, 04N <david.weyant@navy.mil>
Sent: Tuesday, November 14, 2017 5:56 AM
To: Guillory, Jeffrey
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Schul, Raymond; Morrison, Dennis; Bohannon, Derek; Rothell, Natalie I
Subject: RE: NSTI RSY Soil Release Request - RSY 13 (Use 15)

Jeff,

I concur to designating the Revised RSY-13 (Use 15) soil as Non-LLRW soil.

VR

David Weyant
Health Physicist/Environmental Protection Manager
Environmental Protection Division
NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [mailto:jeffrey.guillory@aptim.com]
Sent: Tuesday, November 07, 2017 6:11 PM
To: Weyant, David B CIV NAVSEA 04, 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Schul, Raymond; Morrison, Dennis; Bohannon, Derek; Rothell, Natalie I
Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 13 (Use 15)

Mr. Weyant,

APTIM request RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Description: Description: APTIM

Jeffrey Guillory

Scientist 3, Federal Services

Cell: +1 979 422 5534

jeffrey.guillory@aptim.com <mailto:jeffrey.guillory@aptim.com>



Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY 13	RSY Unit Use Number: USE 15	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 11/7/2017

Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static Survey Meter (Model 2221) Serial Number	One-Minute Static Reading (CPM)	Static Count Exceeds Reference Area IL?	²²⁶ Ra Final Analytical Results (pCi/g)
Upper limit of site reference background						1.69
TITO04-BS-FSS-SU7C-RSY13-U15-S001	1	Systematic	202370	14,267	No	0.432
TITO04-BS-FSS-SU7C-RSY13-U15-S002	2	Systematic	202370	14,612	No	0.409
TITO04-BS-FSS-SU7C-RSY13-U15-S003	3	Systematic	202370	14,077	No	0.537
TITO04-BS-FSS-SU7C-RSY13-U15-S004	4	Systematic	202370	13,940	No	0.386
TITO04-BS-FSS-SU7C-RSY13-U15-S005	5	Systematic	202370	13,768	No	0.399
TITO04-BS-FSS-SU7C-RSY13-U15-S006	6	Systematic	202370	14,560	No	0.634
TITO04-BS-FSS-SU7C-RSY13-U15-S007	7	Systematic	202370	14,617	No	0.386
TITO04-RSY13-U15-S008	8	Systematic	202370	14,236	No	0.320
TITO04-RSY13-U15-S009	9	Systematic	202370	13,878	No	0.387
TITO04-RSY13-U15-S010	10	Systematic	202370	14,000	No	0.334
TITO04-RSY13-U15-S011	11	Systematic	202370	14,561	No	0.333
TITO04-RSY13-U15-S012	12	Systematic	202370	14,437	No	0.344

CPM Counts per minute
 IL Investigation Level (based on Reference Area data set)
²²⁶Ra Radium-226
 pCi/g Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd (CPM)	Reference Area Static 3σ IL (CPM)	Reference Area Scan Bkgd (CPM)	Reference Area Scan 3σ IL (CPM)	Range (CPM)
Gamma Walkover Survey (Part 1)	TIRS-092922017-12P3-GWS-2989	9/29/2017	2221	4/21/2018	202370	N/A	N/A	16,279	20,132	9,383 – 15,437
Gamma Walkover Survey (Part 2)	TIRS-10022017-12P3-GWS-2990	10/2/2017	2221	4/21/2018	202370	N/A	N/A	16,279	20,132	10,830 – 14,066
Follow-up Static Survey (Part 1)	TIRS-10022017-12P3-JSS-2991	10/2/2017	2221	4/21/2018	202370	16,222	19,096	N/A	N/A	13,328 – 14,594
Follow-up Static Survey (Part 2)	TIRS-10032017-12P3-JSS-2994	10/3/2017	2221	4/21/2018	202370	16,222	19,096	N/A	N/A	13,689 – 14,057
Systematic Sampling Survey	TIRS-10032017-12P3-JSS-2993	10/3/2017 – 10/4/2017	2221	4/21/2018	202370	16,222	19,096	N/A	N/A	13,768 – 14,617

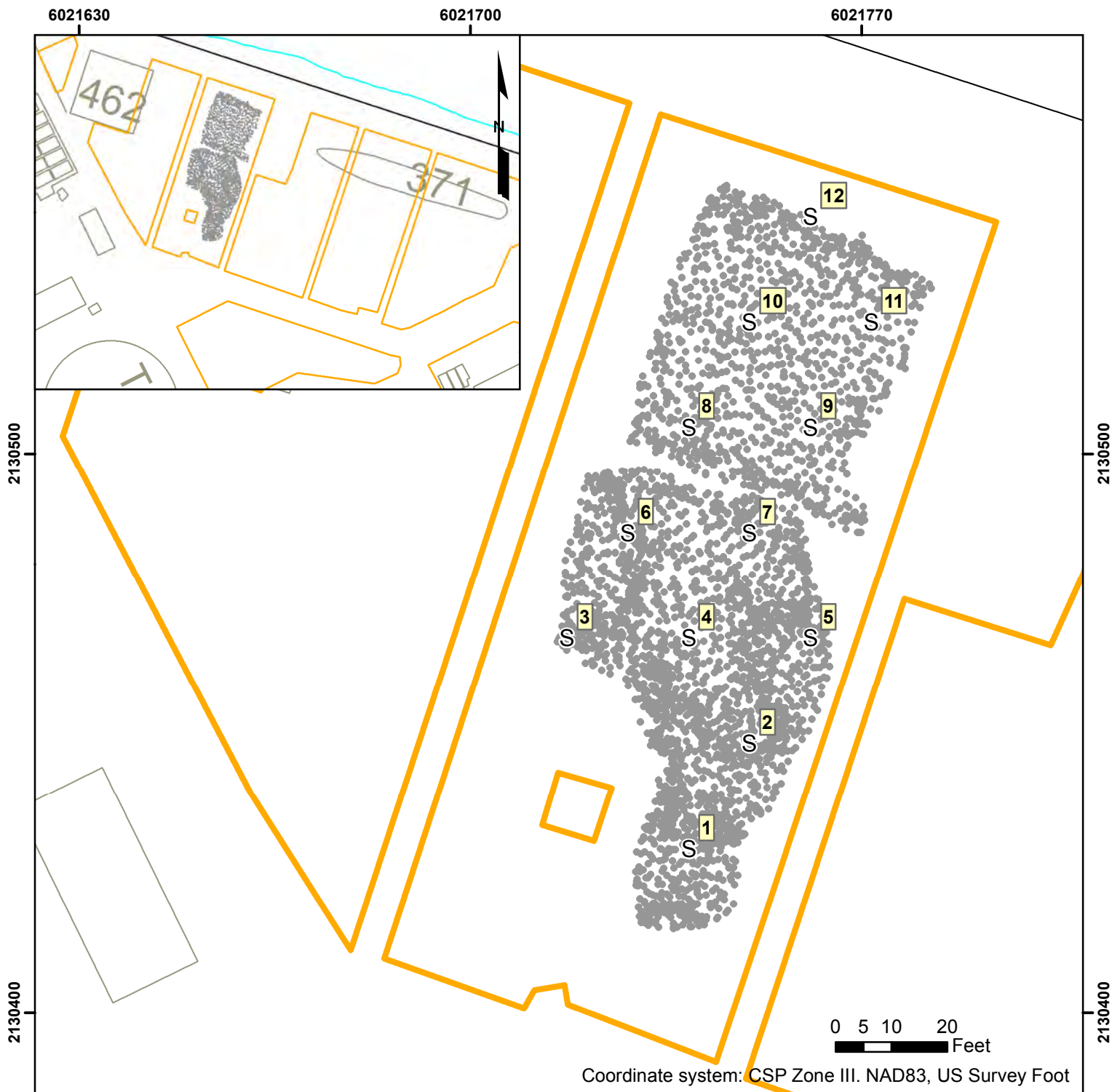
3σ IL Investigation Level (established at 3σ above the mean of the Reference Area data set)
 CPM Counts per minute

Summary
<p>1) Gamma walkover survey and data review (Part 1, FSS Bayside SU 7 Quadrant C)—all locations surveyed were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the dataset average for RSY 13 (Use 15, Part 1) were evaluated for follow-up investigation. 11 individual data points from the GWS clustered around 11 distinct locations were identified as exceeding the investigative criteria. Gamma scan coverage is shown on the Systematic Sample Survey map (page 3). GWS count rate statistics also provided (page 4).</p>
<p>2) Gamma walkover survey and data review (Part 2, non-FSS Bayside SU 7 Quadrant B)—all locations surveyed were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the data set average for RSY 13 (Use 15, Part 2) were evaluated for follow-up investigation; 3 total data points clustered around 3 discrete locations were identified as exceeding three standard deviations of the data set average. Gamma scan coverage is shown on the Systematic Sample Survey map (page 3). GWS count rate statistics are also provided (page 5).</p>
<p>3) Follow-up static survey (Part 1, FSS Bayside SU 7 Quadrant C)—11 clustered locations (11 GWS data points) identified during the data review process were investigated, with readings less than the Reference Area static IL at all locations. Follow-up locations are shown on the Follow-up Static Survey map (page 6).</p>
<p>4) Follow-up static survey (Part 2, non-FSS Bayside SU 7 Quadrant B)—3 clustered locations (3 GWS data points) identified during the data review process were investigated, with readings less than the Reference Area static IL at all locations. Follow-up locations are shown on the Follow-up Static Survey map (page 7).</p>
<p>5) Twelve systematic soil samples (S001-S012) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with static readings < Reference Area static IL for all sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 10-40).</p>
<p>Conclusions:</p> <p>All areas identified as exceeding three standard deviations of the data set averages and/or Reference Area scan IL for RSY 13 (Use 15, Part 1) and RSY 13 (Use 15, Part 2) were investigated and deemed comparable to background. 11 follow-up static locations were investigated on RSY 13 (Use 15, Part 1) and 3 follow-up static locations were investigated on RSY 13 (Use 15, Part 2), with readings less than the Reference Area static IL at all locations.</p> <p>Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 8-9. These statistical tools were utilized to verify the appropriate level of reasonable effort.</p> <hr/> <p>RSY 13 (Use 15, Part 1) contains FSS soil from the Bayside SU 7 excavation area, Quadrant C.</p> <p><u>Note:</u> Soil on RSY Pad 13 (Use 15, Part 1) was over-excavated at the final depth from the bottom of the excavation at Bayside SU 7 Quadrant C, and no visible debris and/or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.</p> <hr/> <p>RSY 13 (Use 15, Part 2) contains soil from the Bayside SU 7 excavation area, Quadrant B.</p> <p><u>Note:</u> All soil on RSY 13 (Use 15, Part 2) is considered non-FSS material.</p> <hr/> <p>APTIM request RASO concurrence to release this soil as Non-LLRW.</p> <p>Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.</p>

Systematic Sample Survey

RSY 13 (Use 15, Parts 1 & 2)
FSS Bayside SU 7 Quadrant C (Part 1, Southern Half)
Bayside SU 7 Quadrant B (Part 2, Northern Half)

Survey Number:
TIRS-10032017-12P3-JSS-2993



GWS Instrument #202370

Systematic Sample Survey Instrument #202370

S Systematic Sample Location

• GWS Coverage

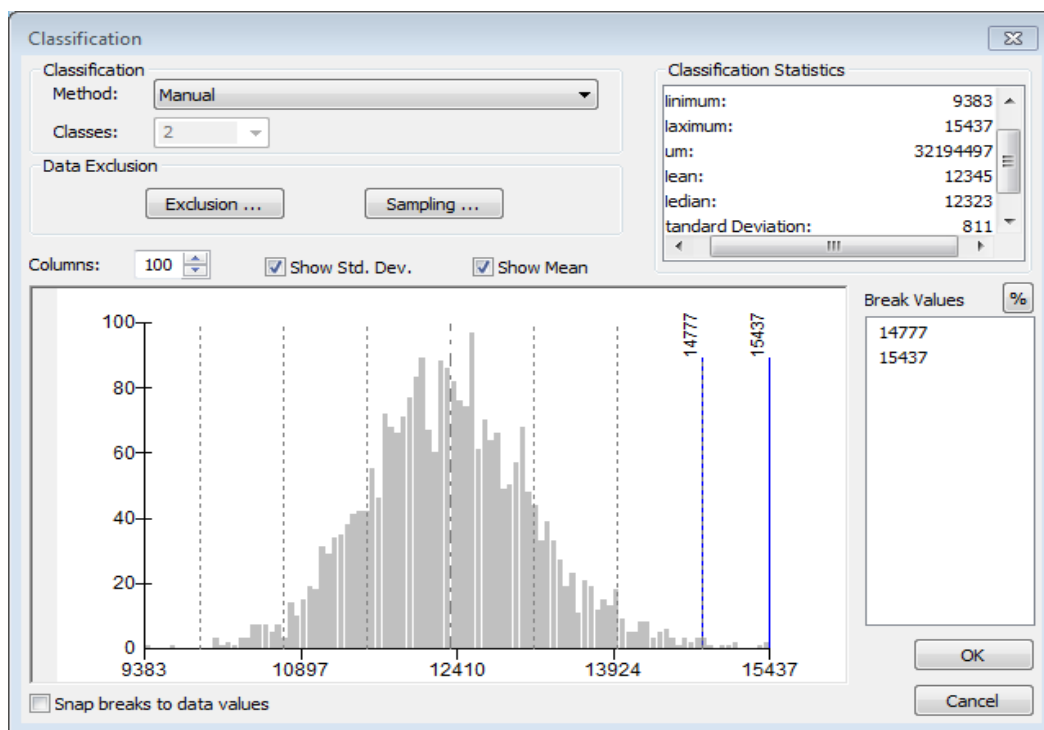
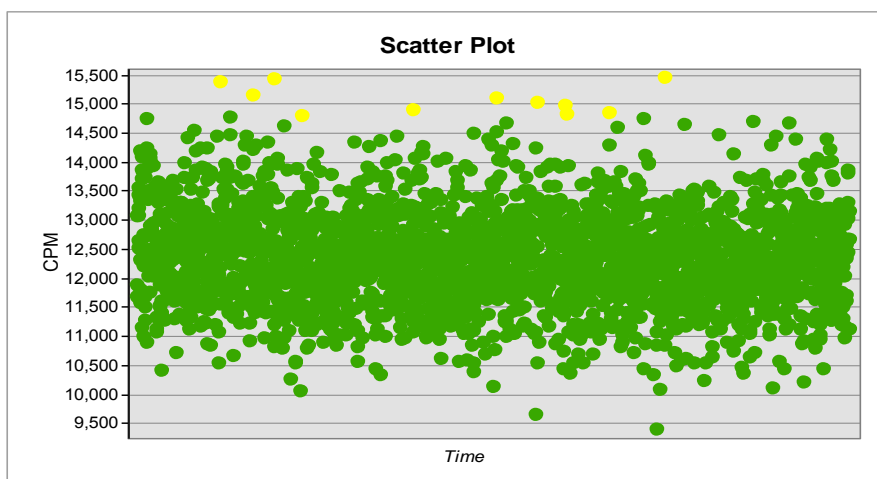
RSY Boundaries

APTIM Federal Services, LLC

Survey: TIRS-092922017-12P3-GWS-2989

GWS Count Rate Statistics
 FSS Bayside SU 7 (Quadrant C)
 RSY 13 (Use 15, Part 1)

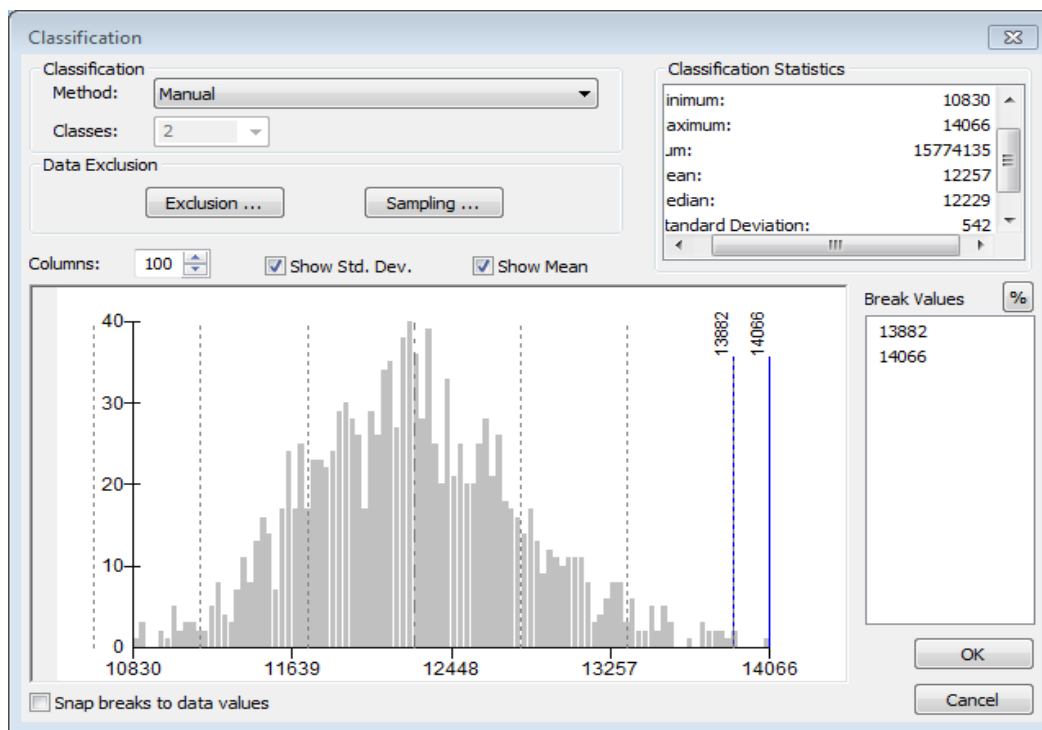
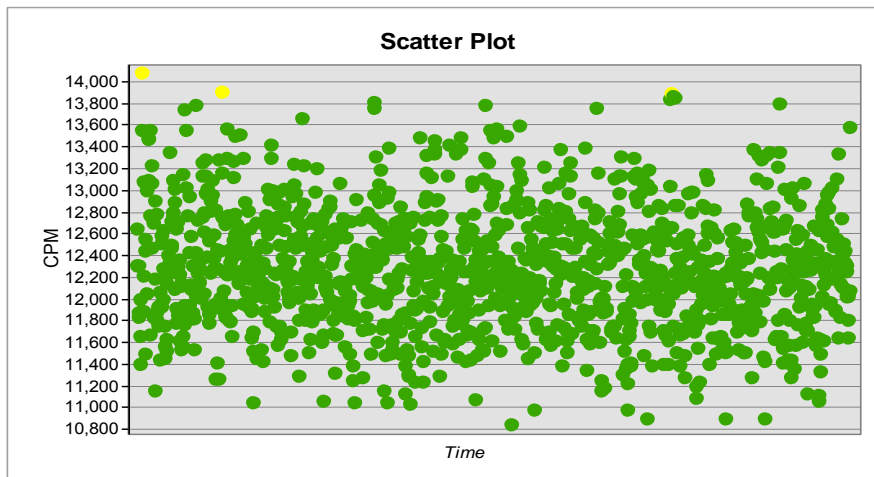
In the 9,000	In the 10,000	In the 11,000	In the 12,000	In the 13,000
2	99	794	1186	457
In the 14,000	In the 15,000			
64	6			



Survey: TIRS-10022017-12P3-GWS-2990

GWS Count Rate Statistics
 Bayside SU 7 (non-FSS) (Quadrant B)
 RSY 13 (Use 15, Part 2)

In the 10,000	In the 11,000	In the 12,000	In the 13,000	In the 14,000
6	420	739	121	1



Follow-up Static Survey

RSY 13 (Use 15, Part 1)
FSS Bayside SU 7 (Quadrant C)

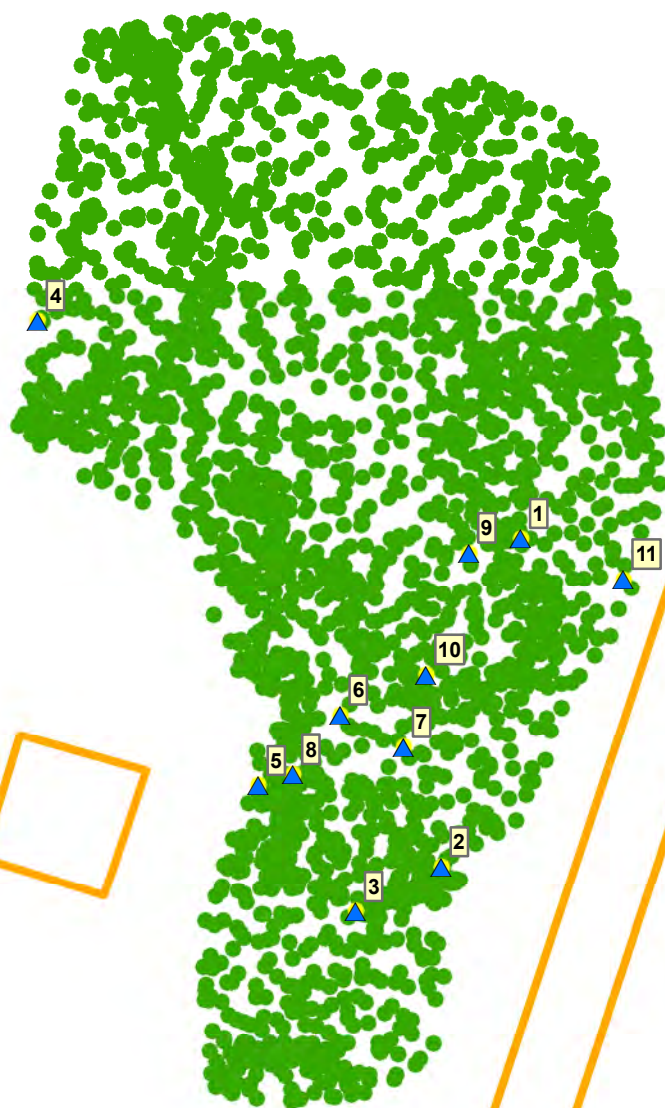
 Survey Number:
 TIRS-10022017-12P3-JSS-2991

6021700

6021770

2130500

2130500


 0 5 10 20
 Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



GWS Instrument #202370**Follow-up Static Survey Instrument #202370**

- ▲ Follow-up Location
- > Mean + 3 std. dev. (14,778 cpm)
- < Mean + 3 std. dev.
- RSY Boundaries

APTIM Federal Services, LLC

Follow-up Static Survey

RSY 13 (Use 15, Part 2)
Bayside SU 7 (Quadrant B)Survey Number:
TIRS-10032017-12P3-JSS-2994**GWS Instrument #202370****Follow-up Static Survey Instrument #202370**

- | | |
|--|---|
|  Follow-up Location |  > Mean + 3 std. dev. (13,883 cpm) |
|  RSY Boundaries |  < Mean + 3 std. dev. |

APTIM Federal Services, LLC

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 13-15
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

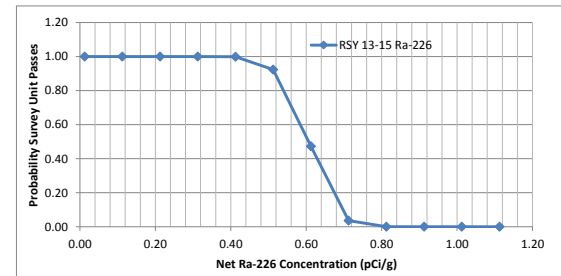
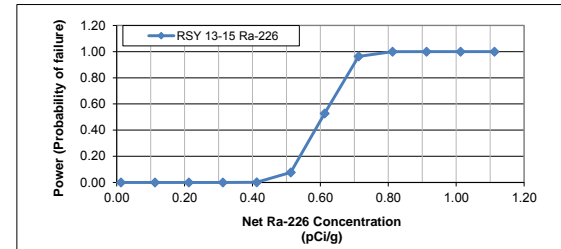
POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4	S
0.57	R	0.57	19.5	0	5.5	S
0.55	R	0.55	18	0	5.5	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.432	S	-0.050939192	10	10	21.5	R
0.409	S	-0.073939192	9	9	21.5	R
0.537	S	0.054060808	11	11	23	R
0.386	S	-0.096939192	5.5	5.5	24	R
0.399	S	-0.083939192	8	8	25	R
0.634	S	0.151060808	12	12	26	R
0.386	S	-0.096939192	5.5	5.5	27.5	R
0.320	S	-0.162939192	1	1	27.5	R
0.387	S	-0.095939192	7	7	29	R
0.334	S	-0.148939192	3	3	30	R
0.333	S	-0.149939192	2	2	31	R
0.344	S	-0.138939192	4	4	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.092
Z(1-alpha)	1.960
Z(1-beta)	1.645

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
1.5	0.81	2.0	0.92135	0.86577	221.124	138.9359	11.787107	-4.34973	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)
 Use:
 $m = 20$
 $n = 15$
 $6 r$
 $5 k$
 0.04 α

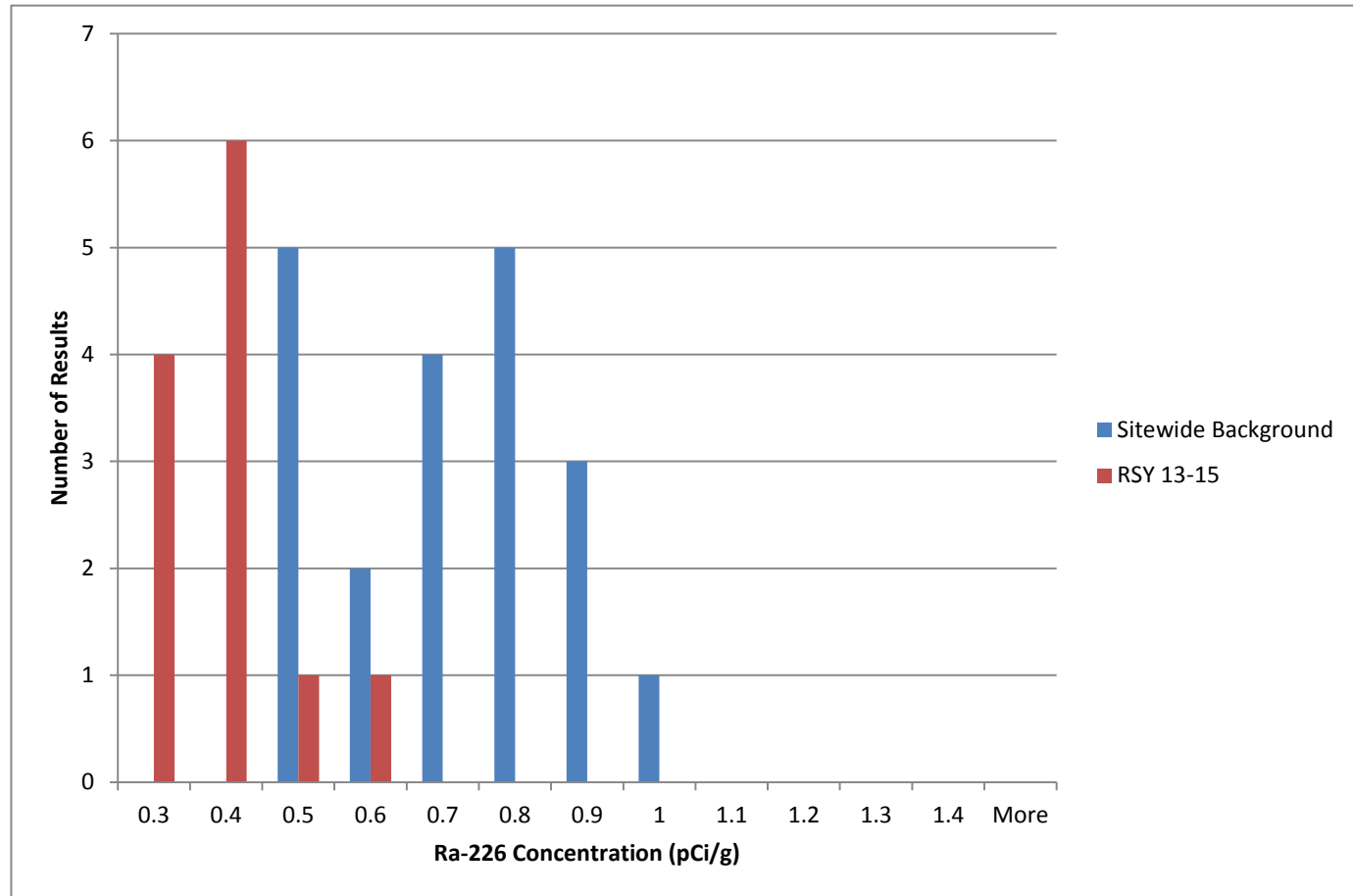
If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

Histogram, RSY 13 (Use 15) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 13-15	
<i>Bin</i>	<i>Frequency</i>
0.3	4
0.4	6
0.5	1
0.6	1
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-24829-2

Client Project/Site: Treasure Island - 500060

For:

Aptim Federal Services LLC
420 Exchange, Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Rhonda Ridenhower

Authorized for release by:

10/30/2017 9:37:53 AM

Rhonda Ridenhower, Manager of Project Management
(314)298-8566

rhonda.ridenhower@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Job ID: 160-24829-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-24829-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Job ID: 160-24829-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/04/2017; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 19.0 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSS-SU7C-RSY13-U15-S001 (160-24829-1), TITO04-BS-FSS-SU7C-RSY13-U15-S002 (160-24829-2), TITO04-BS-FSS-SU7C-RSY13-U15-S003 (160-24829-3), TITO04-BS-FSS-SU7C-RSY13-U15-S004 (160-24829-4), TITO04-BS-FSS-SU7C-RSY13-U15-S005 (160-24829-5), TITO04-BS-FSS-SU7C-RSY13-U15-S006 (160-24829-6) and TITO04-BS-FSS-SU7C-RSY13-U15-S007 (160-24829-7) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/05/2017, prepared on 10/06/2017 and analyzed on 10/27/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-24829-2

Login Number: 24829**List Source: TestAmerica St. Louis****List Number: 1****Creator: Daniels, Brian J**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



Sample Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-24829-1	TITO04-BS-FSS-SU7C-RSY13-U15-S001	Solid	10/03/17 09:13	10/04/17 08:30
160-24829-2	TITO04-BS-FSS-SU7C-RSY13-U15-S002	Solid	10/03/17 09:14	10/04/17 08:30
160-24829-3	TITO04-BS-FSS-SU7C-RSY13-U15-S003	Solid	10/03/17 09:16	10/04/17 08:30
160-24829-4	TITO04-BS-FSS-SU7C-RSY13-U15-S004	Solid	10/03/17 09:18	10/04/17 08:30
160-24829-5	TITO04-BS-FSS-SU7C-RSY13-U15-S005	Solid	10/03/17 09:19	10/04/17 08:30
160-24829-6	TITO04-BS-FSS-SU7C-RSY13-U15-S006	Solid	10/03/17 09:21	10/04/17 08:30
160-24829-7	TITO04-BS-FSS-SU7C-RSY13-U15-S007	Solid	10/03/17 09:22	10/04/17 08:30

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S001

Lab Sample ID: 160-24829-1

Date Collected: 10/03/17 09:13

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.147	U	0.181	0.182		0.273	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Actinium-227	0.0212	U	0.312	0.312		1.18	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Bismuth-212	0.000	U	0.395	0.395		0.626	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Bismuth-214	0.432		0.111	0.120		0.0771	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Cesium-137	-0.0127	U	0.0603	0.0603		0.104	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Lead-210	-0.713	U	1.54	1.54		2.58	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Lead-212	0.325		0.0689	0.0807		0.0718	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Lead-214	0.418		0.101	0.110		0.0994	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Potassium-40	11.0		1.29	1.71		0.281	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Protactinium-231	-0.731	U	2.27	2.27		3.80	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Radium-226	0.432		0.111	0.120	0.500	0.0771	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Radium-228	0.147	U	0.181	0.182		0.273	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Thallium-208	0.0884		0.0395	0.0405		0.0386	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Thorium-228	0.325		0.0689	0.0807		0.0718	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Thorium-232	0.147	U	0.181	0.182		0.273	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Thorium-234	0.587	U	1.23	1.23		2.06	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Uranium-235	0.000	U	0.120	0.120		0.661	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Uranium-238	0.587	U	1.23	1.23		2.06	pCi/g	10/06/17 21:19	10/27/17 12:10	1

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S002

Lab Sample ID: 160-24829-2

Date Collected: 10/03/17 09:14

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.482		0.165	0.172		0.0984	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Actinium-227	-0.126	U	0.431	0.432		0.945	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Bismuth-212	0.360	U	0.677	0.678		1.15	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Bismuth-214	0.409		0.149	0.155		0.141	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Cesium-137	-0.0234	U	0.0543	0.0544		0.0939	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Lead-210	0.747	U	0.908	0.912		1.36	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Lead-212	0.279		0.0765	0.0847		0.0881	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Lead-214	0.357		0.120	0.126		0.121	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Potassium-40	11.7		1.62	2.02		0.667	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Protactinium-231	-0.650	U	1.70	1.71		2.89	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Radium-226	0.409		0.149	0.155	0.500	0.141	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Radium-228	0.482		0.165	0.172		0.0984	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Thallium-208	0.132		0.0596	0.0612		0.0546	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Thorium-228	0.279		0.0765	0.0847		0.0881	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Thorium-232	0.482		0.165	0.172		0.0984	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Thorium-234	0.153	U	0.260	0.261		1.82	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Uranium-235	0.114	U	0.261	0.261		0.475	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Uranium-238	0.153	U	0.260	0.261		1.82	pCi/g	10/06/17 21:19	10/27/17 12:30	1

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S003

Lab Sample ID: 160-24829-3

Date Collected: 10/03/17 09:16

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.340		0.300	0.302		0.320	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Actinium-227	0.00979	U	0.0200	0.0201		1.45	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Bismuth-212	0.000	U	0.692	0.692		0.751	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Bismuth-214	0.537		0.146	0.157		0.0884	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Cesium-137	-0.0543	U	0.0903	0.0905		0.151	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-210	-1.29	U	1.80	1.81		2.98	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-212	0.186		0.0985	0.101		0.147	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-214	0.397		0.135	0.142		0.119	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Potassium-40	10.9		1.70	2.04		0.722	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Protactinium-231	0.206	U	2.74	2.74		4.66	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Radium-226	0.537		0.146	0.157	0.500	0.0884	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Radium-228	0.340		0.300	0.302		0.320	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thallium-208	0.103		0.0668	0.0676		0.0724	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-228	0.186		0.0985	0.101		0.147	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-232	0.340		0.300	0.302		0.320	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-234	-0.0426	U	1.33	1.33		2.27	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Uranium-235	-0.229	U	0.412	0.412		1.08	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Uranium-238	-0.0426	U	1.33	1.33		2.27	pCi/g	10/06/17 21:19	10/27/17 12:25	1

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S004

Lab Sample ID: 160-24829-4

Date Collected: 10/03/17 09:18

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.509		0.181	0.189		0.233	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Actinium-227	-0.299	U	0.810	0.811		1.36	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Bismuth-212	0.231	U	0.626	0.627		1.09	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Bismuth-214	0.386		0.141	0.147		0.130	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Cesium-137	-0.0284	U	0.0377	0.0378		0.102	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Lead-210	1.42	U	1.38	1.39		1.82	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Lead-212	0.293		0.0853	0.0934		0.109	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Lead-214	0.447		0.117	0.126		0.112	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Potassium-40	9.74		1.38	1.70		0.842	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Protactinium-231	0.636	U	1.40	1.41		3.23	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Radium-226	0.386		0.141	0.147	0.500	0.130	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Radium-228	0.509		0.181	0.189		0.233	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Thallium-208	0.157		0.0533	0.0558		0.0486	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Thorium-228	0.293		0.0853	0.0934		0.109	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Thorium-232	0.509		0.181	0.189		0.233	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Thorium-234	-0.0680	U	0.370	0.370		2.35	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Uranium-235	0.0615	U	0.417	0.417		0.703	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Uranium-238	-0.0680	U	0.370	0.370		2.35	pCi/g	10/06/17 21:19	10/27/17 12:23	1

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S005

Lab Sample ID: 160-24829-5

Date Collected: 10/03/17 09:19

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.535		0.144	0.154		0.118	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Actinium-227	0.110	U	0.275	0.275		0.948	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Bismuth-212	0.319	U	0.591	0.592		1.01	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Bismuth-214	0.399		0.126	0.132		0.120	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Cesium-137	0.00653	U	0.0661	0.0661		0.116	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Lead-210	1.17	U	1.39	1.40		1.92	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Lead-212	0.438		0.0955	0.111		0.110	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Lead-214	0.438		0.111	0.120		0.116	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Potassium-40	11.0		1.46	1.84		0.661	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Protactinium-231	0.000	U	0.212	0.212		3.70	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Radium-226	0.399		0.126	0.132	0.500	0.120	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Radium-228	0.535		0.144	0.154		0.118	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Thallium-208	0.149		0.0629	0.0648		0.0592	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Thorium-228	0.438		0.0955	0.111		0.110	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Thorium-232	0.535		0.144	0.154		0.118	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Thorium-234	1.56		0.862	0.878		1.30	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Uranium-235	0.0768	U	0.267	0.268		0.526	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Uranium-238	1.56		0.862	0.878		1.30	pCi/g	10/06/17 21:19	10/27/17 12:21	1

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S006

Lab Sample ID: 160-24829-6

Date Collected: 10/03/17 09:21

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.502		0.184	0.191		0.288	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Actinium-227	0.00599	U	0.826	0.826		1.42	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Bismuth-212	0.325	U	0.775	0.776		1.34	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Bismuth-214	0.634		0.132	0.148		0.0508	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Cesium-137	-0.0239	U	0.0699	0.0700		0.130	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Lead-210	0.703	U	1.44	1.45		2.43	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Lead-212	0.384		0.0923	0.105		0.102	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Lead-214	0.217	U	0.0952	0.0978		0.254	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Potassium-40	9.94		1.61	1.90		0.663	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Protactinium-231	0.235	U	1.52	1.52		4.88	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Radium-226	0.634		0.132	0.148	0.500	0.0508	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Radium-228	0.502		0.184	0.191		0.288	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Thallium-208	0.125		0.0540	0.0555		0.0512	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Thorium-228	0.384		0.0923	0.105		0.102	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Thorium-232	0.502		0.184	0.191		0.288	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Thorium-234	-0.986	U	1.69	1.69		2.94	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Uranium-235	-0.282	U	0.494	0.495		0.931	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Uranium-238	-0.986	U	1.69	1.69		2.94	pCi/g	10/06/17 21:19	10/27/17 12:22	1

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S007

Lab Sample ID: 160-24829-7

Date Collected: 10/03/17 09:22

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.440		0.262	0.266		0.266	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Actinium-227	-0.225	U	0.689	0.689		1.16	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Bismuth-212	-0.301	U	1.00	1.00		1.72	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Bismuth-214	0.386		0.125	0.131		0.117	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Cesium-137	-0.0362	U	0.0606	0.0607		0.102	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-210	0.0809	U	1.23	1.23		2.11	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-212	0.289		0.0784	0.0869		0.0982	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-214	0.447		0.102	0.112		0.0967	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Potassium-40	8.17		1.33	1.57		0.529	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Protactinium-231	-0.128	U	2.30	2.30		3.91	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Radium-226	0.386		0.125	0.131	0.500	0.117	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Radium-228	0.440		0.262	0.266		0.266	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thallium-208	0.145		0.0450	0.0474		0.0368	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-228	0.289		0.0784	0.0869		0.0982	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-232	0.440		0.262	0.266		0.266	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-234	0.533	U	0.355	0.359		1.29	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Uranium-235	0.0568	U	0.393	0.393		0.663	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Uranium-238	0.533	U	0.355	0.359		1.29	pCi/g	10/06/17 21:19	10/27/17 12:25	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-330775/1-A

Matrix: Solid

Analysis Batch: 334219

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 330775

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.07562	U	0.166	0.166		0.304	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Actinium-227	-0.04958	U	0.0968	0.0970		1.15	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Bismuth-212	0.4377	U	0.905	0.906		1.54	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Bismuth-214	-0.1189	U	0.156	0.157		0.297	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Cesium-137	0.02884	U	0.0585	0.0586		0.101	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Lead-210	0.2977	U	0.928	0.929		1.51	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Lead-212	0.02763	U	0.0815	0.0815		0.139	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Lead-214	0.01614	U	0.124	0.124		0.164	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Potassium-40	0.008088	U	0.505	0.505		0.975	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Protactinium-231	0.5708	U	1.84	1.84		3.14	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Radium-226	-0.1189	U	0.156	0.157	0.500	0.297	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Radium-228	0.07562	U	0.166	0.166		0.304	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Thallium-208	-0.03635	U	0.0747	0.0748		0.0941	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Thorium-228	0.02763	U	0.0815	0.0815		0.139	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Thorium-232	0.07562	U	0.166	0.166		0.304	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Thorium-234	0.7180	U	0.726	0.730		1.06	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Uranium-235	0.1127	U	0.261	0.262		0.421	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Uranium-238	0.7180	U	0.726	0.730		1.06	pCi/g	10/06/17 21:19	10/27/17 11:36	1

Lab Sample ID: LCS 160-330775/2-A

Matrix: Solid

Analysis Batch: 334218

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 330775

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.9	91.96		9.67		1.13	pCi/g	95	87 - 116
Cesium-137	28.7	27.71		2.94		0.162	pCi/g	96	87 - 120
Cobalt-60	14.3	13.43		1.39		0.0587	pCi/g	94	87 - 115

Lab Sample ID: 160-24829-1 DU

Matrix: Solid

Analysis Batch: 334218

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S001

Prep Type: Total/NA

Prep Batch: 330775

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.147	U	0.2935		0.206		0.210	pCi/g	0.38	1
Actinium-227	0.0212	U	0.2705	U	0.652		1.10	pCi/g	0.26	1
Bismuth-212	0.000	U	-0.01090	U	0.637		1.14	pCi/g	0.01	1
Bismuth-214	0.432		0.4184		0.117		0.0919	pCi/g	0.06	1
Cesium-137	-0.0127	U	-0.00303	U	0.0621		0.109	pCi/g	0.08	1
Lead-210	-0.713	U	0.6677	U	1.29		2.16	pCi/g	0.49	1
Lead-212	0.325		0.3513		0.0875		0.0790	pCi/g	0.15	1
Lead-214	0.418		0.4510		0.124		0.106	pCi/g	0.14	1
Potassium-40	11.0		12.26		1.91		0.652	pCi/g	0.36	1
Protactinium-231	-0.731	U	0.5564	U	1.62		3.66	pCi/g	0.33	1
Radium-226	0.432		0.4184		0.117	0.500	0.0919	pCi/g	0.06	1
Radium-228	0.147	U	0.2935		0.206		0.210	pCi/g	0.38	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-24829-1 DU
Matrix: Solid
Analysis Batch: 334218

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S001
Prep Type: Total/NA
Prep Batch: 330775

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.0884		0.1097		0.0545		0.0553	pCi/g	0.22	1
Thorium-228	0.325		0.3513		0.0875		0.0790	pCi/g	0.15	1
Thorium-232	0.147	U	0.2935		0.206		0.210	pCi/g	0.38	1
Thorium-234	0.587	U	0.0000	U	0.557		2.10	pCi/g	0.33	1
Uranium-235	0.000	U	-0.1591	U	0.445		0.743	pCi/g	0.28	1
Uranium-238	0.587	U	0.0000	U	0.557		2.10	pCi/g	0.33	1

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Rad

Leach Batch: 330397

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24829-1	TITO04-BS-FSS-SU7C-RSY13-U15-S001	Total/NA	Solid	Dry and Grind	
160-24829-2	TITO04-BS-FSS-SU7C-RSY13-U15-S002	Total/NA	Solid	Dry and Grind	
160-24829-3	TITO04-BS-FSS-SU7C-RSY13-U15-S003	Total/NA	Solid	Dry and Grind	
160-24829-4	TITO04-BS-FSS-SU7C-RSY13-U15-S004	Total/NA	Solid	Dry and Grind	
160-24829-5	TITO04-BS-FSS-SU7C-RSY13-U15-S005	Total/NA	Solid	Dry and Grind	
160-24829-6	TITO04-BS-FSS-SU7C-RSY13-U15-S006	Total/NA	Solid	Dry and Grind	
160-24829-7	TITO04-BS-FSS-SU7C-RSY13-U15-S007	Total/NA	Solid	Dry and Grind	
160-24829-1 DU	TITO04-BS-FSS-SU7C-RSY13-U15-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 330775

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24829-1	TITO04-BS-FSS-SU7C-RSY13-U15-S001	Total/NA	Solid	Fill_Geo-21	330397
160-24829-2	TITO04-BS-FSS-SU7C-RSY13-U15-S002	Total/NA	Solid	Fill_Geo-21	330397
160-24829-3	TITO04-BS-FSS-SU7C-RSY13-U15-S003	Total/NA	Solid	Fill_Geo-21	330397
160-24829-4	TITO04-BS-FSS-SU7C-RSY13-U15-S004	Total/NA	Solid	Fill_Geo-21	330397
160-24829-5	TITO04-BS-FSS-SU7C-RSY13-U15-S005	Total/NA	Solid	Fill_Geo-21	330397
160-24829-6	TITO04-BS-FSS-SU7C-RSY13-U15-S006	Total/NA	Solid	Fill_Geo-21	330397
160-24829-7	TITO04-BS-FSS-SU7C-RSY13-U15-S007	Total/NA	Solid	Fill_Geo-21	330397
MB 160-330775/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-330775/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-24829-1 DU	TITO04-BS-FSS-SU7C-RSY13-U15-S001	Total/NA	Solid	Fill_Geo-21	330397

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-24869-2

Client Project/Site: Treasure Island - 500060

For:

Aptim Federal Services LLC
420 Exchange, Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Rhonda Ridenhower

Authorized for release by:
10/31/2017 1:28:42 PM

Rhonda Ridenhower, Manager of Project Management
(314)298-8566
rhonda.ridenhower@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24869-2

Job ID: 160-24869-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-24869-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24869-2

Job ID: 160-24869-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/06/2017; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 19.0 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-RSY13-U15-S008 (160-24869-1), TITO04-RSY13-U15-S009 (160-24869-2), TITO04-RSY13-U15-S010 (160-24869-3), TITO04-RSY13-U15-S011 (160-24869-4) and TITO04-RSY13-U15-S012 (160-24869-5) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/06/2017, prepared on 10/09/2017 and analyzed on 10/30/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_RSY13_U15_#417
Page 1 of 1



160-24869 Chain of Custody

Project Number: **500060**
CTO-04 Phase III Site 32 RSY 13
Project Name / Location: USE 15 Systematic
Purchase Order #: 201455

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Renata Vidovic
Phone/Fax Number: 408-505-7319

Address: renata.vidovic@cbifederalservices.com
City:

Shipment Date: 10/5/17
Waybill Number: 1766V6451396822003
Lab Destination: Earth Toxics Inc To Test America

Contact Name / ph. #: Mike Dryden

Gamma Scan - Gamma Spec Ra-226

Sampler's Name(s): J. Ramirez

Sample ID Number	Sample Description	Collection Information			Matrix	# of containers	Preservative (water)			Dose Rate μ R/hr
		Date	Time	Method			Preservative (water)	Preservative (soil)	Container Type	
TITO04-RSY13-U15-S008	Site 32 RSY 13 Lift 15 Systematic	10/4/17	12:45	G	SO	1			16 oz Plastic	X
TITO04-RSY13-U15-S009	Site 32 RSY 13 Lift 15 Systematic	10/4/17	12:46	G	SO	1			16 oz Plastic	X
TITO04-RSY13-U15-S010	Site 32 RSY 13 Lift 15 Systematic	10/4/17	12:42	G	SO	1			16 oz Plastic	X
TITO04-RSY13-U15-S011	Site 32 RSY 13 Lift 15 Systematic	10/4/17	12:33	G	SO	1			16 oz Plastic	X
TITO04-RSY13-U15-S012	Site 32 RSY 13 Lift 15 Systematic	10/4/17	12:37	G	SO	1			16 oz Plastic	X
<i>NA</i>										

Special Instructions: **7 days ingrown draft and follow with 21 days final**

Level Of QC Required:

Standard TAT ☐ 24-hr ☐ 3-day ☐ 7-day

Project Specific:

Relinquished By: <u>JOAQUIN RAMIREZ</u>	Date: <u>10/4/17</u> Time: <u>1350</u>	Received By: <u>[Signature]</u>	Date: <u>10-4-17</u> Time: <u>1350</u>
Relinquished By: <u>[Signature]</u>	Date: <u>10/4/17</u> Time: <u>1005</u>	Received By: <u>Renata Vidovic</u>	Date: <u>10-5-17</u> Time: <u>1005</u>
Relinquished By: <u>Renata Vidovic</u>	Date: <u>10/4/17</u> Time: <u>1330</u>	Received By: <u>UPS</u>	Date: <u>10/5/17</u> Time: <u>1330</u>
Relinquished By: <u>UPS</u>	Date: <u>10/4/17</u> Time: <u>1330</u>	Received By: <u>[Signature]</u>	Date: <u>10/4/17</u> Time: <u>0830</u>

Method Codes

C = Composite
G = Grab

Matrix Codes

DW = Drinking Water
GW = Ground Water
WW = Waste Water
A = Air
SO = Soil
SL = Sludge
CP = Chip Samples
ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-24869-2

Login Number: 24869**List Source: TestAmerica St. Louis****List Number: 1****Creator: Daniels, Brian J**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24869-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24869-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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Sample Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24869-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-24869-1	TITO04-RSY13-U15-S008	Solid	10/04/17 12:45	10/06/17 08:30
160-24869-2	TITO04-RSY13-U15-S009	Solid	10/04/17 12:28	10/06/17 08:30
160-24869-3	TITO04-RSY13-U15-S010	Solid	10/04/17 12:42	10/06/17 08:30
160-24869-4	TITO04-RSY13-U15-S011	Solid	10/04/17 12:33	10/06/17 08:30
160-24869-5	TITO04-RSY13-U15-S012	Solid	10/04/17 12:37	10/06/17 08:30

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24869-2

Client Sample ID: TITO04-RSY13-U15-S008

Date Collected: 10/04/17 12:45

Date Received: 10/06/17 08:30

Lab Sample ID: 160-24869-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.518		0.138	0.147		0.0950	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Actinium-227	0.216	U	0.512	0.512		0.738	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Bismuth-212	0.0206	U	0.745	0.745		1.34	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Bismuth-214	0.320		0.117	0.122		0.123	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Cesium-137	-0.00678	U	0.0575	0.0575		0.103	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Lead-210	0.859	U	1.00	1.01		1.48	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Lead-212	0.281		0.0815	0.0893		0.102	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Lead-214	0.368		0.0912	0.0989		0.117	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Potassium-40	10.2		1.48	1.81		0.645	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Protactinium-231	0.000	U	0.265	0.265		3.68	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Radium-226	0.320		0.117	0.122	0.500	0.123	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Radium-228	0.518		0.138	0.147		0.0950	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Thallium-208	0.118		0.0593	0.0605		0.0582	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Thorium-228	0.281		0.0815	0.0893		0.102	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Thorium-232	0.518		0.138	0.147		0.0950	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Thorium-234	0.316	U	0.907	0.908		1.34	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Uranium-235	0.0720	U	0.176	0.177		0.597	pCi/g	10/09/17 12:38	10/30/17 15:32	1
Uranium-238	0.316	U	0.907	0.908		1.34	pCi/g	10/09/17 12:38	10/30/17 15:32	1

Client Sample ID: TITO04-RSY13-U15-S009

Date Collected: 10/04/17 12:28

Date Received: 10/06/17 08:30

Lab Sample ID: 160-24869-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.240	U	0.159	0.161		0.283	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Actinium-227	-0.385	U	0.778	0.779		1.30	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Bismuth-212	0.000	U	0.310	0.310		1.15	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Bismuth-214	0.387		0.104	0.111		0.0632	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Cesium-137	-0.00537	U	0.0363	0.0363		0.0698	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Lead-210	-0.102	U	1.16	1.16		2.35	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Lead-212	0.0227	U	0.107	0.107		0.182	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Lead-214	0.390		0.104	0.111		0.0872	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Potassium-40	10.2		1.49	1.82		0.564	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Protactinium-231	0.000	U	0.452	0.452		4.09	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Radium-226	0.387		0.104	0.111	0.500	0.0632	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Radium-228	0.240	U	0.159	0.161		0.283	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Thallium-208	0.0970		0.0652	0.0660		0.0670	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Thorium-228	0.0227	U	0.107	0.107		0.182	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Thorium-232	0.240	U	0.159	0.161		0.283	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Thorium-234	1.07	U	0.836	0.844		1.32	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Uranium-235	-0.246	U	0.159	0.161		0.838	pCi/g	10/09/17 12:38	10/30/17 10:09	1
Uranium-238	1.07	U	0.836	0.844		1.32	pCi/g	10/09/17 12:38	10/30/17 10:09	1

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24869-2

Client Sample ID: TITO04-RSY13-U15-S010

Lab Sample ID: 160-24869-3

Date Collected: 10/04/17 12:42

Matrix: Solid

Date Received: 10/06/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.221	U	0.207	0.209		0.239	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Actinium-227	0.227	U	0.382	0.383		1.10	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Bismuth-212	-0.426	U	0.747	0.749		1.26	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Bismuth-214	0.334		0.115	0.120		0.116	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Cesium-137	0.000924	U	0.0449	0.0449		0.0813	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Lead-210	-0.185	U	1.52	1.52		2.61	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Lead-212	0.268		0.0782	0.0855		0.101	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Lead-214	0.294		0.125	0.129		0.182	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Potassium-40	9.73		1.30	1.64		0.672	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Protactinium-231	-0.746	U	2.60	2.61		4.37	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Radium-226	0.334		0.115	0.120	0.500	0.116	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Radium-228	0.221	U	0.207	0.209		0.239	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Thallium-208	0.0241	U	0.0794	0.0794		0.0830	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Thorium-228	0.268		0.0782	0.0855		0.101	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Thorium-232	0.221	U	0.207	0.209		0.239	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Thorium-234	0.877	U	0.888	0.893		1.22	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Uranium-235	0.0293	U	0.0860	0.0860		0.566	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Uranium-238	0.877	U	0.888	0.893		1.22	pCi/g	10/09/17 12:38	10/30/17 10:10	1

Client Sample ID: TITO04-RSY13-U15-S011

Lab Sample ID: 160-24869-4

Date Collected: 10/04/17 12:33

Matrix: Solid

Date Received: 10/06/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.432		0.150	0.156		0.0906	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Actinium-227	0.211	U	0.500	0.501		0.720	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Bismuth-212	-0.288	U	0.876	0.877		1.51	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Bismuth-214	0.333		0.113	0.118		0.0997	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Cesium-137	0.00455	U	0.0627	0.0627		0.111	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Lead-210	-0.282	U	1.17	1.17		1.79	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Lead-212	0.256		0.0807	0.0873		0.0885	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Lead-214	0.403		0.121	0.128		0.154	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Potassium-40	10.7		1.48	1.84		0.615	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Protactinium-231	0.472	U	1.51	1.51		3.31	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Radium-226	0.333		0.113	0.118	0.500	0.0997	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Radium-228	0.432		0.150	0.156		0.0906	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Thallium-208	0.103		0.0422	0.0435		0.0336	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Thorium-228	0.256		0.0807	0.0873		0.0885	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Thorium-232	0.432		0.150	0.156		0.0906	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Thorium-234	-0.0591	U	0.978	0.978		1.68	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Uranium-235	0.135	U	0.289	0.289		0.520	pCi/g	10/09/17 12:38	10/30/17 10:06	1
Uranium-238	-0.0591	U	0.978	0.978		1.68	pCi/g	10/09/17 12:38	10/30/17 10:06	1

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24869-2

Client Sample ID: TITO04-RSY13-U15-S012

Lab Sample ID: 160-24869-5

Date Collected: 10/04/17 12:37

Matrix: Solid

Date Received: 10/06/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.379		0.148	0.153		0.213	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Actinium-227	-0.114	U	0.665	0.665		1.13	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Bismuth-212	-0.289	U	0.680	0.680		1.16	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Bismuth-214	0.344		0.116	0.121		0.114	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Cesium-137	0.0193	U	0.0472	0.0472		0.0812	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Lead-210	0.215	U	1.19	1.19		1.71	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Lead-212	0.333		0.0767	0.0880		0.0855	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Lead-214	0.357		0.0946	0.102		0.101	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Potassium-40	10.7		1.37	1.75		0.769	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Protactinium-231	0.650	U	1.78	1.79		4.03	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Radium-226	0.344		0.116	0.121	0.500	0.114	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Radium-228	0.379		0.148	0.153		0.213	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Thallium-208	0.135		0.0647	0.0662		0.0615	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Thorium-228	0.333		0.0767	0.0880		0.0855	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Thorium-232	0.379		0.148	0.153		0.213	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Thorium-234	-0.215	U	1.23	1.23		2.10	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Uranium-235	0.0797	U	0.416	0.416		0.698	pCi/g	10/09/17 12:38	10/30/17 10:10	1
Uranium-238	-0.215	U	1.23	1.23		2.10	pCi/g	10/09/17 12:38	10/30/17 10:10	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24869-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-331038/1-A

Matrix: Solid

Analysis Batch: 334719

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 331038

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.05893	U	0.105	0.105		0.165	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Actinium-227	0.1138	U	0.279	0.279		0.742	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Bismuth-212	-0.3174	U	0.946	0.946		1.62	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Bismuth-214	-0.01489	U	0.108	0.108		0.194	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Cesium-137	0.0000	U	0.00669	0.00669		0.0770	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Lead-210	0.5622	U	0.487	0.491		0.712	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Lead-212	-0.06520	U	0.0686	0.0691		0.153	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Lead-214	-0.008665	U	0.0202	0.0202		0.134	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Potassium-40	-0.4710	U	0.525	0.527		1.18	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Protactinium-231	0.0000	U	0.225	0.226		3.10	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Radium-226	-0.01489	U	0.108	0.108	0.500	0.194	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Radium-228	0.05893	U	0.105	0.105		0.165	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Thallium-208	-0.01150	U	0.0187	0.0188		0.0685	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Thorium-228	-0.06520	U	0.0686	0.0691		0.153	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Thorium-232	0.05893	U	0.105	0.105		0.165	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Thorium-234	0.2980	U	0.683	0.684		1.17	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Uranium-235	0.07013	U	0.136	0.136		0.671	pCi/g	10/09/17 12:38	10/30/17 10:03	1
Uranium-238	0.2980	U	0.683	0.684		1.17	pCi/g	10/09/17 12:38	10/30/17 10:03	1

Lab Sample ID: LCS 160-331038/2-A

Matrix: Solid

Analysis Batch: 334718

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 331038

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.9	92.37		9.69		1.04	pCi/g	95	87 - 116
Cesium-137	28.7	27.50		2.92		0.194	pCi/g	96	87 - 120
Cobalt-60	14.3	13.51		1.40		0.0861	pCi/g	95	87 - 115

Lab Sample ID: 160-24869-1 DU

Matrix: Solid

Analysis Batch: 334719

Client Sample ID: TITO04-RSY13-U15-S008

Prep Type: Total/NA

Prep Batch: 331038

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.518		0.3727		0.135		0.101	pCi/g	0.51	1
Actinium-227	0.216	U	0.1710	U	0.373		0.929	pCi/g	0.05	1
Bismuth-212	0.0206	U	0.2334	U	0.527		0.904	pCi/g	0.17	1
Bismuth-214	0.320		0.4012		0.111		0.0890	pCi/g	0.35	1
Cesium-137	-0.00678	U	-0.03742	U	0.0599		0.0999	pCi/g	0.26	1
Lead-210	0.859	U	-0.6827	U	0.909		2.51	pCi/g	0.81	1
Lead-212	0.281		0.2375		0.0743		0.0850	pCi/g	0.27	1
Lead-214	0.368		0.4234		0.0893		0.0746	pCi/g	0.30	1
Potassium-40	10.2		10.44		1.66		0.594	pCi/g	0.08	1
Protactinium-231	0.000	U	-0.00000	U	2.00		3.40	pCi/g	0	1
			01581							
Radium-226	0.320		0.4012		0.111	0.500	0.0890	pCi/g	0.35	1
Radium-228	0.518		0.3727		0.135		0.101	pCi/g	0.51	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24869-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-24869-1 DU
Matrix: Solid
Analysis Batch: 334719

Client Sample ID: TITO04-RSY13-U15-S008
Prep Type: Total/NA
Prep Batch: 331038

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.118		0.1213		0.0787		0.0735	pCi/g	0.03	1
Thorium-228	0.281		0.2375		0.0743		0.0850	pCi/g	0.27	1
Thorium-232	0.518		0.3727		0.135		0.101	pCi/g	0.51	1
Thorium-234	0.316	U	0.3544	U	0.580		1.90	pCi/g	0.03	1
Uranium-235	0.0720	U	0.1275	U	0.359		0.602	pCi/g	0.10	1
Uranium-238	0.316	U	0.3544	U	0.580		1.90	pCi/g	0.03	1

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24869-2

Rad

Leach Batch: 330740

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24869-1	TITO04-RSY13-U15-S008	Total/NA	Solid	Dry and Grind	
160-24869-2	TITO04-RSY13-U15-S009	Total/NA	Solid	Dry and Grind	
160-24869-3	TITO04-RSY13-U15-S010	Total/NA	Solid	Dry and Grind	
160-24869-4	TITO04-RSY13-U15-S011	Total/NA	Solid	Dry and Grind	
160-24869-5	TITO04-RSY13-U15-S012	Total/NA	Solid	Dry and Grind	
160-24869-1 DU	TITO04-RSY13-U15-S008	Total/NA	Solid	Dry and Grind	

Prep Batch: 331038

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24869-1	TITO04-RSY13-U15-S008	Total/NA	Solid	Fill_Geo-21	330740
160-24869-2	TITO04-RSY13-U15-S009	Total/NA	Solid	Fill_Geo-21	330740
160-24869-3	TITO04-RSY13-U15-S010	Total/NA	Solid	Fill_Geo-21	330740
160-24869-4	TITO04-RSY13-U15-S011	Total/NA	Solid	Fill_Geo-21	330740
160-24869-5	TITO04-RSY13-U15-S012	Total/NA	Solid	Fill_Geo-21	330740
MB 160-331038/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-331038/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-24869-1 DU	TITO04-RSY13-U15-S008	Total/NA	Solid	Fill_Geo-21	330740

Guillory, Jeffrey

From: Weyant, David B CIV NAVSEA 04, 04N <david.weyant@navy.mil>
Sent: Friday, December 01, 2017 5:50 AM
To: Guillory, Jeffrey
Cc: Edwards, Zachary L CIV SEA 04 04N
Subject: RE: NSTI RSY Soil Release Request - RSY A1-D3 (Bayside SU 7 final over-excavations)

Jeff,

I concur to designating the RSY-A1-D3(Bayside SU 7 final over-excavations) soil as Non-LLRW soil.

VR

David Weyant
Health Physicist/Environmental Protection Manager
Environmental Protection Division
NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [mailto:jeffrey.guillory@aptim.com]
Sent: Thursday, November 30, 2017 9:04 AM
To: Weyant, David B CIV NAVSEA 04, 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Schul, Raymond; Morrison, Dennis; Bohannon, Derek; Rothell, Natalie I
Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY A1-D3 (Bayside SU 7 final over-excavations)

Mr. Weyant,

APTIM request RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Description: Description: APTIM

Jeffrey Guillory

Scientist 3, Federal Services
Cell: +1 979 422 5534
jeffrey.guillory@aptim.com



Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY A1, A2, A3, B1, B2, B3, D1, D2, D3	RSY Unit Use Number: USE 1 (all) and USE 2 (RSY B3)	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 11/30/2017

Operations Summary
<p>In situ surveying and sampling of the final depth of the excavation at Bayside SU 7 was not possible due to water infiltration, therefore the survey unit was divided into four quadrants (A, B, C, and D), and 6-inch layers of soil were over-excavated from the bottom surface of each quadrant and surveyed ex situ on RSY pads.</p> <p>Soil over-excavated from the final depth at the bottom of the excavation from Quadrant C was surveyed and sampled ex situ on RSY 13 (Use 15). The soil displayed no visible debris and/or staining, and the soil was cleared for disposal as Non-LLRW, Final Status Survey (FSS) material following RASO concurrence on 11/14/2017.</p> <p>The bottom surface of Quadrants A, B, and D was further delineated into separate lanes (three per quadrant), and over-excavated soil from each lane was staged on separate RSY pads for ex situ radiological screening. Soil from Quadrant A was staged on RSY A1, A2, and A3; soil from Quadrant B was staged on RSY B1, B2, and B3; soil from Quadrant D was staged on RSY D1, D2, and D3.</p> <p>An LLRO was identified during excavation of the first six-inch layer from lane 3 of Quadrant B, therefore the soil placed onto RSY B3 (Use 1)* is considered non-FSS material; radiological screening did not indicate any additional contamination in the over-excavated soil on RSY B3 (Use 1)*. A second 6-inch layer was subsequently over-excavated from lane 3 of Quadrant B and staged on top of the previous layer as RSY B3 (Use 2)*. No objects or contamination were identified during excavation or ex situ radiological screening of soil on RSY B3 (Use 2)*, and because no visible debris and/or staining was identified, the soil is considered FSS material.</p> <p>Soil over-excavated from Quadrants A and D—as well as soil over-excavated from lanes 1 and 2 from Quadrant B—displayed no visible debris and/or staining, and no objects or contamination were identified during excavation or ex situ radiological screening. All soil on RSY pads A1, A2, A3, B1, B2, D1, D2, and D3 is therefore considered FSS material.</p> <p><i>*Note:</i> The term “Use” in this context represents vertical layering, i.e., the bottom layer of a stacked RSY pad is referred to as “Use 1,” the second layer “Use 2,” etc. RSY pads A1, A2, A3, B1, B2, D1, D2, and D3 consist of only one layer and are therefore referred to as “Use 1” in survey documentation and included figures.</p>

Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static Survey Meter (Model 2221) Serial Number	One-Minute Static Reading (CPM)	Static Count Exceeds Reference Area IL?	²²⁶ Ra Final Analytical Results (pCi/g)
Upper limit of site reference background						1.69
TITO04-BS-FSS-SU7D-U1-S001	1	Systematic	268650	13,555	No	0.279
TITO04-BS-FSS-SU7D-U1-S002	2	Systematic	268650	13,605	No	0.323
TITO04-BS-FSS-SU7D-U1-S003	3	Systematic	268650	13,301	No	0.318
TITO04-BS-FSS-SU7D-U1-S004	4	Systematic	268650	13,554	No	0.382
TITO04-BS-FSS-SU7D-U1-S005	5	Systematic	268650	14,571	No	0.423
TITO04-BS-FSS-SU7D-U1-S006	6	Systematic	268650	14,298	No	0.323
TITO04-BS-FSS-SU7A-U1-S007	7	Systematic	268650	14,398	No	0.394
TITO04-BS-FSS-SU7A-U1-S008	8	Systematic	268650	14,086	No	0.359
TITO04-BS-FSS-SU7A-U1-S009	9	Systematic	268650	14,236	No	0.286
TITO04-BS-FSS-SU7A-U1-S010	10	Systematic	268650	14,498	No	0.335
TITO04-BS-FSS-SU7A-U1-S011	11	Systematic	268650	13,913	No	0.0268
TITO04-BS-FSS-SU7A-U1-S012	12	Systematic	268650	14,192	No	0.343
TITO04-BS-FSS-SU7B-LANE1-U1-S013	13	Systematic	268650	13,481	No	0.272
TITO04-BS-FSS-SU7B-LANE1-U1-S014	14	Systematic	268650	14,652	No	0.339
TITO04-BS-FSS-SU7B-LANE1-U1-S015	15	Systematic	268650	14,219	No	0.251
TITO04-BS-FSS-SU7B-LANE2-U1-S016	16	Systematic	268650	14,387	No	0.00893
TITO04-BS-FSS-SU7B-LANE2-U1-S017	17	Systematic	268650	15,047	No	0.384
TITO04-BS-FSS-SU7B-LANE2-U1-S018	18	Systematic	268650	14,995	No	0.350
TITO04-BS-SU7B-LANE3-U1-S019	19	Systematic	268645	15,544	No	0.297
TITO04-BS-SU7B-LANE3-U1-S020	20	Systematic	268645	15,516	No	0.141
TITO04-BS-FSS-SU7B-LANE3-U2-S021	21	Systematic	202370	14,614	No	0.372
TITO04-BS-FSS-SU7B-LANE3-U2-S022	22	Systematic	202370	14,538	No	0.377

	Systematic sample collected from Final Status Survey (FSS) material
	Systematic sample collected from non-FSS material
CPM	Counts per minute
IL	Investigation Level (based on Reference Area data set)
²²⁶ Ra	Radium-226
pCi/g	Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd (CPM)	Reference Area Static 3σ IL (CPM)	Reference Area Scan Bkgd (CPM)	Reference Area Scan 3σ IL (CPM)	Range (CPM)
Gamma Walkover Survey RSY A1 (Use 1) FSS Bayside SU 7, Quadrant A	TIRS-10092017-12P3-GWS-3004	10/9/2017 – 10/10/2017	2221	9/13/2018	268650	N/A	N/A	16,911	20,498	10,242 – 18,375
Follow-up Static Survey RSY A1 (Use 1) FSS Bayside SU 7, Quadrant A	TIRS-10112017-12P3-JSS-3017	10/11/2017	2221	9/13/2018	268650	16,952	19,770	N/A	N/A	14,387 – 15,491
Gamma Walkover Survey RSY A2 (Use 1) FSS Bayside SU 7, Quadrant A	TIRS-10092017-12P3-GWS-3005	10/9/2017	2221	9/13/2018	268650	N/A	N/A	16,911	20,498	9,925 – 19,235
Follow-up Static Survey RSY A2 (Use 1) FSS Bayside SU 7, Quadrant A	TIRS-10112017-12P3-JSS-3018	10/11/2017	2221	9/13/2018	268650	16,952	19,770	N/A	N/A	14,678 – 16,444
Gamma Walkover Survey RSY A3 (Use 1) FSS Bayside SU 7, Quadrant A	TIRS-10092017-12P3-GWS-3006	10/9/2017	2221	9/13/2018	268650	N/A	N/A	16,911	20,498	10,519 – 20,668
Follow-up Static Survey RSY A3 (Use 1) FSS Bayside SU 7, Quadrant A	TIRS-10112017-12P3-JSS-3023	10/11/2017	2221	9/13/2018	268650	16,952	19,770	N/A	N/A	14,884 – 15,662
Gamma Walkover Survey RSY B1 (Use 1) - Middle FSS Bayside SU 7, Quadrant B	TIRS-10092017-12P3-GWS-3007	10/9/2017 – 10/10/2017	2221	4/21/2018	202370	N/A	N/A	16,279	20,132	11,145 – 21,063
Follow-up Static Survey RSY B1 (Use 1) - Middle FSS Bayside SU 7, Quadrant B	TIRS-10112017-12P3-JSS-3019	10/11/2017	2221	4/21/2018	202370	16,222	19,096	N/A	N/A	14,411 – 16,543
Gamma Walkover Survey RSY B1 (Use 1) - Edges FSS Bayside SU 7, Quadrant B	TIRS-10092017-12P3-GWS-3034	10/9/2017	2221	9/13/2018	268650	N/A	N/A	16,911	20,498	12,392 – 20,024
Follow-up Static Survey RSY B1 (Use 1) - Edges FSS Bayside SU 7, Quadrant B	TIRS-10112017-12P3-JSS-3020	10/11/2017	2221	9/13/2018	268650	16,952	19,770	N/A	N/A	15,631 (1 location only)
Gamma Walkover Survey RSY B2 (Use 1) - Middle FSS Bayside SU 7, Quadrant B	TIRS-10092017-12P3-GWS-3008	10/9/2017 – 10/10/2017	2221	4/21/2018	202370	N/A	N/A	16,279	20,132	10,346 – 20,545
Follow-up Static Survey RSY B2 (Use 1) - Middle FSS Bayside SU 7, Quadrant B	TIRS-10112017-12P3-JSS-3016	10/11/2017	2221	4/21/2018	202370	16,222	19,096	N/A	N/A	14,264 – 15,761
Gamma Walkover Survey RSY B2 (Use 1) - Edges FSS Bayside SU 7, Quadrant B	TIRS-10092017-12P3-GWS-3035	10/9/2017	2221	9/13/2018	268650	N/A	N/A	16,911	20,498	12,674 – 19,898
Follow-up Static Survey RSY B2 (Use 1) - Edges FSS Bayside SU 7, Quadrant B	TIRS-10112017-12P3-JSS-3021	10/11/2017 – 10/13/2017	2221	9/13/2018	268650	16,952	19,770	N/A	N/A	15,237 (1 location only)
Gamma Walkover Survey RSY B3 (Use 1) - Middle Bayside SU 7 (non-FSS), Quadrant B	TIRS-10092017-12P3-GWS-3009	10/9/2017	2221	4/21/2018	202370	N/A	N/A	16,279	20,132	10,358 – 17,370
Follow-up Static Survey RSY B3 (Use 1) - Middle Bayside SU 7 (non-FSS), Quadrant B	TIRS-10102017-12P3-JSS-3011	10/10/2017	2221	4/21/2018	202370	16,222	19,096	N/A	N/A	15,886 – 17,386
Gamma Walkover Survey RSY B3 (Use 1) - Edges Bayside SU 7 (non-FSS), Quadrant B	TIRS-10092017-12P3-GWS-3036	10/9/2017	2221	9/13/2018	268650	N/A	N/A	16,911	20,498	13,173 – 20,205
Follow-up Static Survey RSY B3 (Use 1) - Edges Bayside SU 7 (non-FSS), Quadrant B	TIRS-10102017-12P3-JSS-3012	10/10/2017	2221	9/13/2018	268650	16,952	19,770	N/A	N/A	16,637 – 16,725
Gamma Walkover Survey RSY B3 (Use 2) FSS Bayside SU 7, Quadrant B	TIRS-10122017-12P3-GWS-3025	10/12/2017	2221	4/21/2018	202370	N/A	N/A	16,279	20,132	10,177 – 16,160
Follow-up Static Survey RSY B3 (Use 2) FSS Bayside SU 7, Quadrant B	TIRS-10132017-12P3-JSS-3017	10/13/2017	2221	4/21/2018	202370	16,222	19,096	N/A	N/A	14,566 – 15,105
Gamma Walkover Survey RSY D1 (Use 1) FSS Bayside SU 7, Quadrant D	TIRS-10062017-12P3-GWS-3000	10/6/2017 – 10/10/2017	2221	6/15/2018	268645	N/A	N/A	16,187	19,916	9,273 – 18,450
Follow-up Static Survey RSY D1 (Use 1) FSS Bayside SU 7, Quadrant D	TIRS-10102017-12P3-JSS-3015	10/10/2017	2221	6/15/2018	268645	16,369	19,195	N/A	N/A	14,011 – 16,131
Gamma Walkover Survey RSY D2 (Use 1) FSS Bayside SU 7, Quadrant D	TIRS-10062017-12P3-GWS-3001	10/6/2017	2221	6/15/2018	268645	N/A	N/A	16,187	19,916	10,278 – 18,813
Follow-up Static Survey RSY D2 (Use 1) FSS Bayside SU 7, Quadrant D	TIRS-10092017-12P3-JSS-3002	10/9/2017	2221	6/15/2018	268645	16,369	19,195	N/A	N/A	14,302 – 15,602
Gamma Walkover Survey RSY D3 (Use 1) FSS Bayside SU 7, Quadrant D	TIRS-10092017-12P3-GWS-3010	10/9/2017	2221	9/13/2018	268650	N/A	N/A	16,911	20,498	9,712 – 18,643
Follow-up Static Survey RSY D3 (Use 1) FSS Bayside SU 7, Quadrant D	TIRS-10102017-12P3-JSS-3014	10/10/2017	2221	9/13/2018	268650	16,952	19,770	N/A	N/A	14,083 – 15,110
Systematic Sample Surveys B3 (Use 1), S019 – S020 (non-FSS)	TIRS-10102017-12P3-JSS-3013	10/10/2017	2221	6/15/2018	268645	16,369	19,195	N/A	N/A	15,516 – 15,544
A1, A2, A3, B1, B2, D1, D2, D3 (Use 1) S001 – S018 (FSS)	TIRS-10112017-12P3-JSS-3022	10/11/2017	2221	9/13/2018	268650	16,952	19,770	N/A	N/A	13,301 – 15,047
B3 (Use 2), S021-S022 (FSS)	TIRS-10132017-12P3-JSS-3026	10/13/2017	2221	4/21/2018	202370	16,222	19,096	N/A	N/A	14,538 – 14,614



3σ IL
CPM

Gamma survey of Final Status Survey (FSS) material
Gamma survey of non-FSS material
Investigation Level (established at 3σ above the mean of the Reference Area data set)
Counts per minute

Radiological Survey Summary
<p>RSY A1 (FSS, Quadrant A)</p> <p>1) Gamma walkover survey and data review—all locations surveyed were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the dataset average were evaluated for follow-up investigation. 19 individual data points from the GWS clustered around 14 distinct locations were identified as exceeding the investigative criteria. Gamma scan coverage is shown on the Systematic Sample Survey map (page 5). GWS count rate statistics are also provided (page 6).</p> <p>2) Follow-up static survey—14 clustered locations (19 GWS data points) identified during the data review process were investigated, with readings less than the Reference</p>

Radiological Survey Summary	
Area static IL at all locations. Follow-up locations are shown on the Follow-up Static Survey map (page 19).	
RSY A2 (FSS, Quadrant A)	
3) Gamma walkover survey and data review—all locations surveyed were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the dataset average were evaluated for follow-up investigation. 9 individual data points from the GWS clustered around 8 distinct locations were identified as exceeding the investigative criteria. Gamma scan coverage is shown on the Systematic Sample Survey map (page 5). GWS count rate statistics are also provided (page 7).	
4) Follow-up static survey—8 clustered locations (9 GWS data points) identified during the data review process were investigated, with readings less than the Reference Area static IL at all locations. Follow-up locations are shown on the Follow-up Static Survey map (page 20).	
RSY A3 (FSS, Quadrant A)	
5) Gamma walkover survey and data review—as a conservative measure, data points exceeding either the Reference Area scan IL or three standard deviations of the dataset average were evaluated for follow-up investigation. 12 individual data points from the GWS clustered around 8 distinct locations were identified as exceeding the investigative criteria. Gamma scan coverage is shown on the Systematic Sample Survey map (page 5). GWS count rate statistics are also provided (page 8).	
6) Follow-up static survey—8 clustered locations (12 GWS data points) identified during the data review process were investigated, with readings less than the Reference Area static IL at all locations. Follow-up locations are shown on the Follow-up Static Survey map (page 21).	
RSY B1 (FSS, Quadrant B)	
7) Gamma walkover survey and data review (middle section)—as a conservative measure, data points exceeding either the Reference Area scan IL or three standard deviations of the dataset average were evaluated for follow-up investigation. 9 individual data points from the GWS clustered around 6 distinct locations were identified as exceeding the investigative criteria. Gamma scan coverage is shown on the Systematic Sample Survey map (page 5). GWS count rate statistics are also provided (page 9).	
8) Follow-up static survey (middle section)—6 clustered locations (9 GWS data points) identified during the data review process were investigated, with readings less than the Reference Area static IL at all locations. Follow-up locations are shown on the Follow-up Static Survey map (page 22).	
9) Gamma walkover survey and data review (edges)—all locations surveyed were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the dataset average were evaluated for follow-up investigation. 1 individual data point from the GWS clustered around 1 distinct location was identified as exceeding the investigative criteria. Gamma scan coverage is shown on the Systematic Sample Survey map (page 5). GWS count rate statistics are also provided (page 10).	
10) Follow-up static survey (edges)—1 clustered location (1 GWS data point) identified during the data review process was investigated, with readings less than the Reference Area static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 23).	
RSY B2 (FSS, Quadrant B)	
11) Gamma walkover survey and data review (middle section)—as a conservative measure, data points exceeding either the Reference Area scan IL or three standard deviations of the dataset average were evaluated for follow-up investigation. 13 individual data points from the GWS clustered around 13 distinct locations were identified as exceeding the investigative criteria. Gamma scan coverage is shown on the Systematic Sample Survey map (page 5). GWS count rate statistics are also provided (page 11).	
12) Follow-up static survey (middle section)—13 clustered locations (13 GWS data points) identified during the data review process were investigated, with readings less than the Reference Area static IL at all locations. Follow-up locations are shown on the Follow-up Static Survey map (page 24).	
13) Gamma walkover survey and data review (edges)—all locations surveyed were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the dataset average were evaluated for follow-up investigation. 1 individual data point from the GWS clustered around 1 distinct location was identified as exceeding the investigative criteria. Gamma scan coverage is shown on the Systematic Sample Survey map (page 5). GWS count rate statistics are also provided (page 12).	
14) Follow-up static survey (edges)—1 clustered location (1 GWS data point) identified during the data review process was investigated, with readings less than the Reference Area static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 25).	
RSY B3 (Use 1, non-FSS, Quadrant B)	
15) Gamma walkover survey and data review (middle section)—all locations surveyed were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the dataset average were evaluated for follow-up investigation. 10 individual data points from the GWS clustered around 6 distinct locations were identified as exceeding the investigative criteria. Gamma scan coverage is shown on the Systematic Sample Survey map (page 5). GWS count rate statistics are also provided (page 13).	
<u>Note:</u> RSY material on RSY B3 (Use 1) is considered non-FSS material due to the identification of an LLRO during soil excavation at the excavation site.	
16) Follow-up static survey (middle section)—6 clustered locations (10 GWS data points) identified during the data review process were investigated, with readings less than the Reference Area static IL at all locations. Follow-up locations are shown on the Follow-up Static Survey map (page 26).	
17) Gamma walkover survey and data review (edges)—all locations surveyed were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the dataset average were evaluated for follow-up investigation. 5 individual data points from the GWS clustered around 2 distinct locations were identified as exceeding the investigative criteria. Gamma scan coverage is shown on the Systematic Sample Survey map (page 5). GWS count rate statistics are also provided (page 14).	
<u>Note:</u> RSY material on RSY B3 (Use 1) is considered non-FSS material due to the identification of an LLRO during soil excavation at the excavation site.	
18) Follow-up static survey (edges)—2 clustered locations (5 GWS data points) identified during the data review process were investigated, with readings less than the Reference Area static IL at all locations. Follow-up locations are shown on the Follow-up Static Survey map (page 27).	

Radiological Survey Summary	
RSY B3 (Use 2, FSS, Quadrant B)	
19) Gamma walkover survey and data review—all locations surveyed were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the dataset average were evaluated for follow-up investigation. 3 individual data points from the GWS clustered around 3 distinct locations were identified as exceeding the investigative criteria. Gamma scan coverage is shown on the Systematic Sample Survey map (page 5). GWS count rate statistics are also provided (page 18).	
20) Follow-up static survey—3 clustered locations (3 GWS data points) identified during the data review process were investigated, with readings less than the Reference Area static IL at all locations. Follow-up locations are shown on the Follow-up Static Survey map (page 31).	
RSY D1 (FSS, Quadrant D)	
21) Gamma walkover survey and data review—all locations surveyed were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the dataset average were evaluated for follow-up investigation. 45 individual data points from the GWS clustered around 28 distinct locations were identified as exceeding the investigative criteria. Gamma scan coverage is shown on the Systematic Sample Survey map (page 5). GWS count rate statistics are also provided (page 15).	
22) Follow-up static survey—28 clustered locations (45 GWS data points) identified during the data review process were investigated, with readings less than the Reference Area static IL at all locations. Follow-up locations are shown on the Follow-up Static Survey map (page 28).	
RSY D2 (FSS, Quadrant D)	
23) Gamma walkover survey and data review—all locations surveyed were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the dataset average were evaluated for follow-up investigation. 33 individual data points from the GWS clustered around 17 distinct locations were identified as exceeding the investigative criteria. Gamma scan coverage is shown on the Systematic Sample Survey map (page 5). GWS count rate statistics are also provided (page 16).	
24) Follow-up static survey—17 clustered locations (33 GWS data points) identified during the data review process were investigated, with readings less than the Reference Area static IL at all locations. Follow-up locations are shown on the Follow-up Static Survey map (page 29).	
RSY D3 (FSS, Quadrant D)	
25) Gamma walkover survey and data review—all locations surveyed were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the dataset average were evaluated for follow-up investigation. 10 individual data points from the GWS clustered around 7 distinct locations were identified as exceeding the investigative criteria. Gamma scan coverage is shown on the Systematic Sample Survey map (page 5). GWS count rate statistics are also provided (page 17).	
26) Follow-up static survey—7 clustered locations (10 GWS data points) identified during the data review process were investigated, with readings less than the Reference Area static IL at all locations. Follow-up locations are shown on the Follow-up Static Survey map (page 30).	
Systematic Sampling (all RSY pads)	
27) Twenty-two systematic soil samples (S001-S022) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with static readings < Reference Area static IL for all sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 5). TestAmerica sample results are attached (pages 34-104).	
<u>Note:</u> Twenty systematic soil samples were collected from Bayside SU 7 FSS material (S001-S018 and S021-S022) and two systematic samples were collected from Bayside SU 7 non-FSS material (S019-S020) on RSY B3 (Use 1); systematic sample locations were plotted and are reported collectively in this report for the purposes of waste disposition. The total surface area spanning all surveyed RSY material is approximately 800 m ² —see the Systematic Sample Survey map (page 5) for more details.	
Conclusions	
All areas identified as exceeding three standard deviations of the data set averages and/or Reference Area scan IL were investigated and deemed comparable to background. 114 total follow-up static locations were investigated on RSY A1, A2, A3, B1, B2, B3, D1, D2, D3 (all Use 1) and RSY B3 (Use 2) combined, with readings less than the Reference Area static IL at all locations.	
Final analytical results for systematic samples from these RSY pads are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 32-33. These statistical tools were utilized to verify the appropriate level of reasonable effort.	
RSY A1, A2, A3, B1, B2, D1, D2, D3 (all Use 1) and RSY B3 (Use 2) contain FSS soil from the Bayside SU 7 excavation area (Quadrants A, B, and D).	
<u>Note:</u> Soil on RSY Pad A1, A2, A3, B1, B2, D1, D2, D3 (all Use 1) and B3 (Use 2) was over-excavated at the final depth from the bottom of the excavation at Bayside SU 7 (Quadrants A, B, and D), and no visible debris and/or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.	
RSY B3 (Use 1) contains soil from the Bayside SU 7 excavation area, Quadrant B.	
<u>Note:</u> All soil on RSY B3 (Use 1) is considered non-FSS material.	
APTIM request RASO concurrence to release this soil as Non-LLRW.	
Disposition: This soil shall be dispositioned as non-LLRW material to be disposed of offsite following appropriate chemical characterization.	

Systematic Sample Surveys

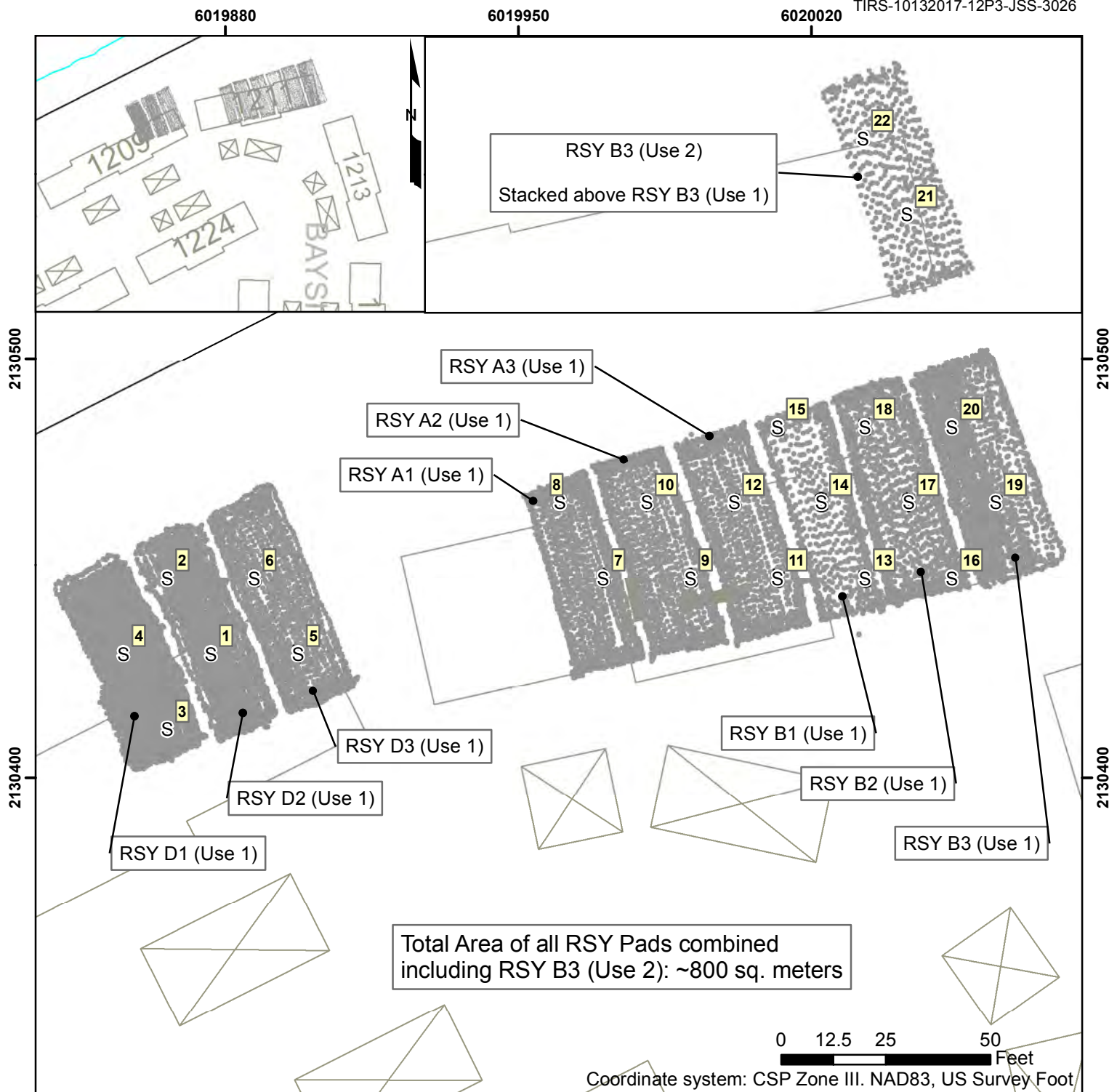
RSY A1, A2, A3, B1, B2, B3, D1, D2, D3 (Use 1)
RSY B3 (Use 2) (shown at top right)

Survey Numbers:

TIRS-10102017-12P3-JSS-3013

TIRS-10112017-12P3-JSS-3022

TIRS-10132017-12P3-JSS-3026



GWS Instruments # 202370, 268650, 268645

Systematic Sample Survey Instrument # 202370, 268650, 268645

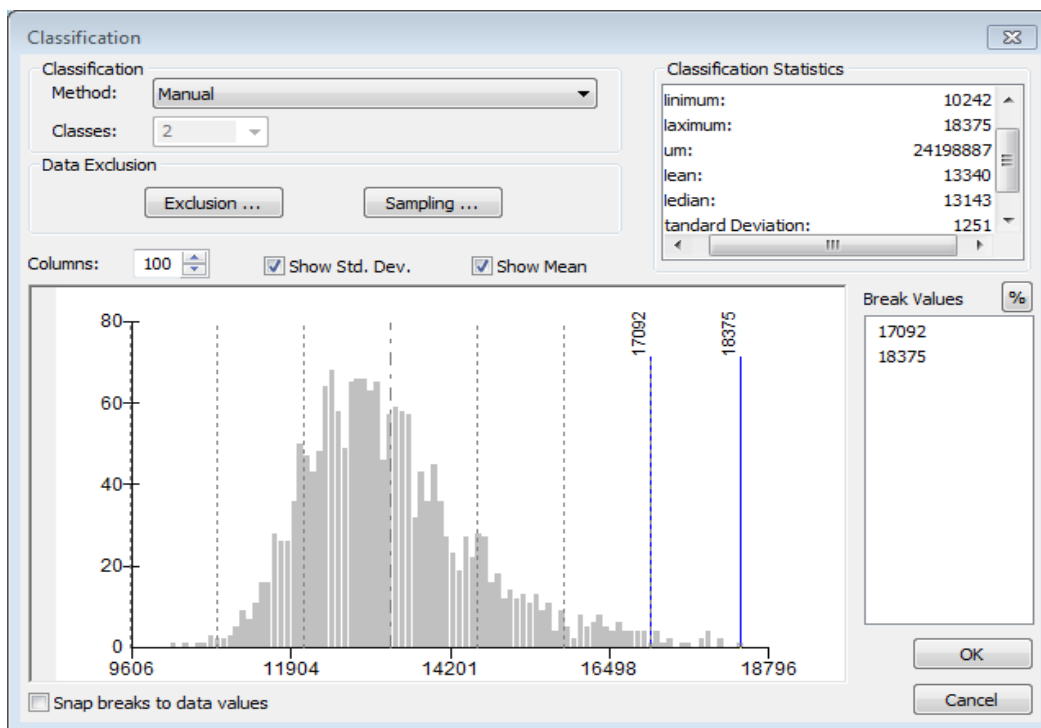
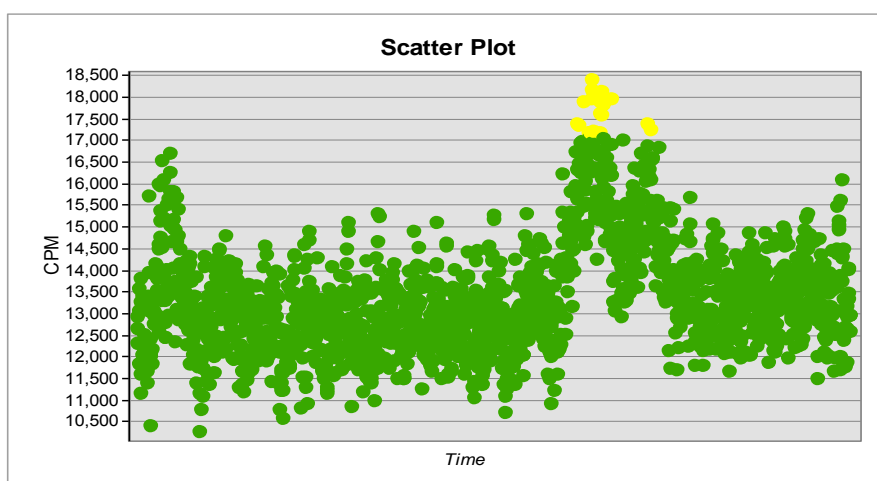
• GWS Coverage

S Systematic Sample Location

Survey: TIRS-10092017-12P3-GWS-3004

GWS Count Rate Statistics
Bayside SU 7 FSS (Quadrant A)
RSY A1 (Use 1)

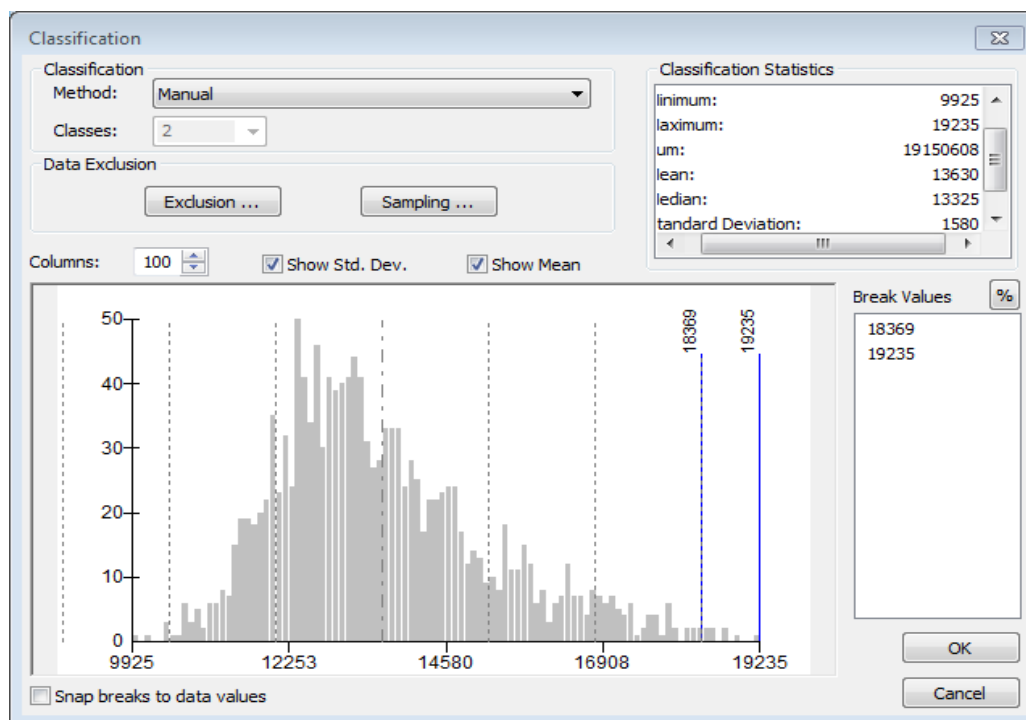
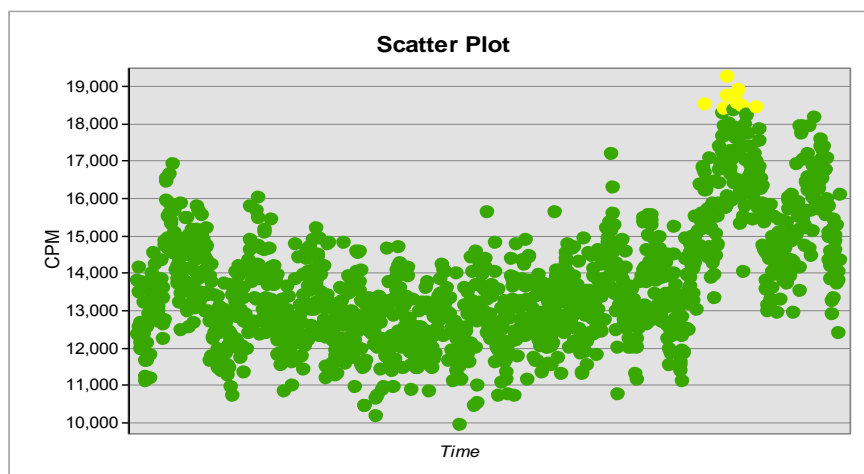
In the 10,000	In the 11,000	In the 12,000	In the 13,000	In the 14,000
11	184	620	552	264
In the 15,000	In the 16,000	In the 17,000	In the 18,000	
105	57	18	3	



Survey: TIRS-10092017-12P3-GWS-3005

GWS Count Rate Statistics
Bayside SU 7 FSS (Quadrant A)
RSY A2 (Use 1)

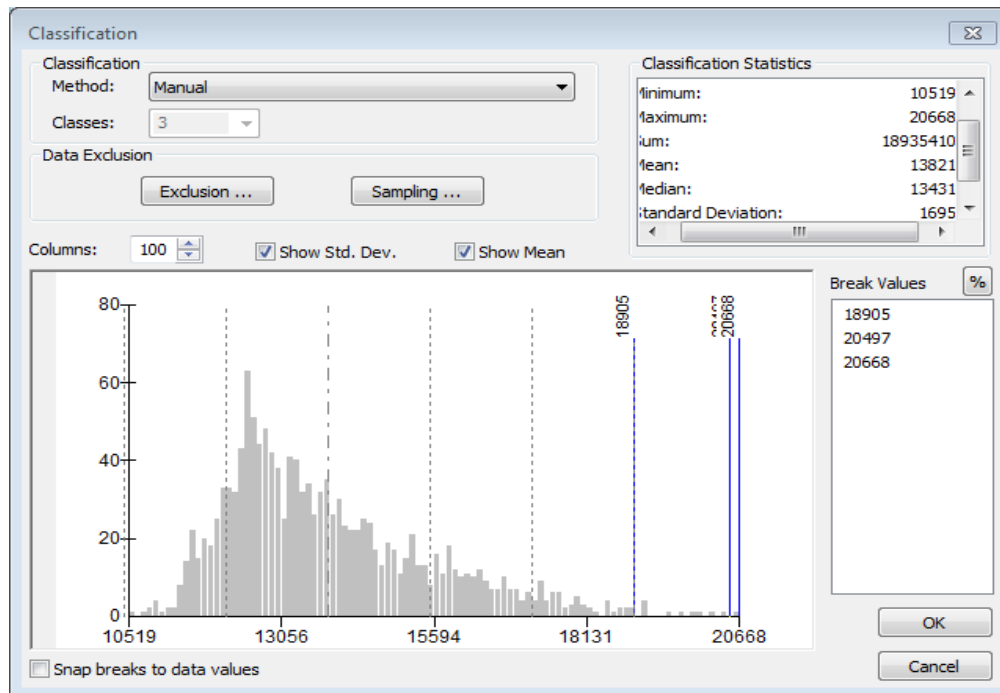
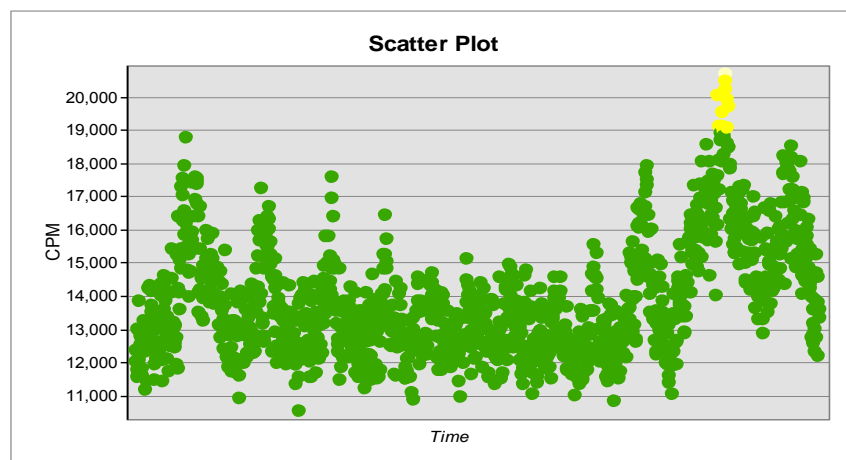
In the 9,000	In the 10,000	In the 11,000	In the 12,000	In the 13,000	In the 14,000
1	22	154	382	365	233
In the 15,000	In the 16,000	In the 17,000	In the 18,000	In the 19,000	
117	75	42	13	1	



Survey: TIRS-10092017-12P3-GWS-3006

GWS Count Rate Statistics
Bayside SU 7 FSS (Quadrant A)
RSY A3 (Use 1)

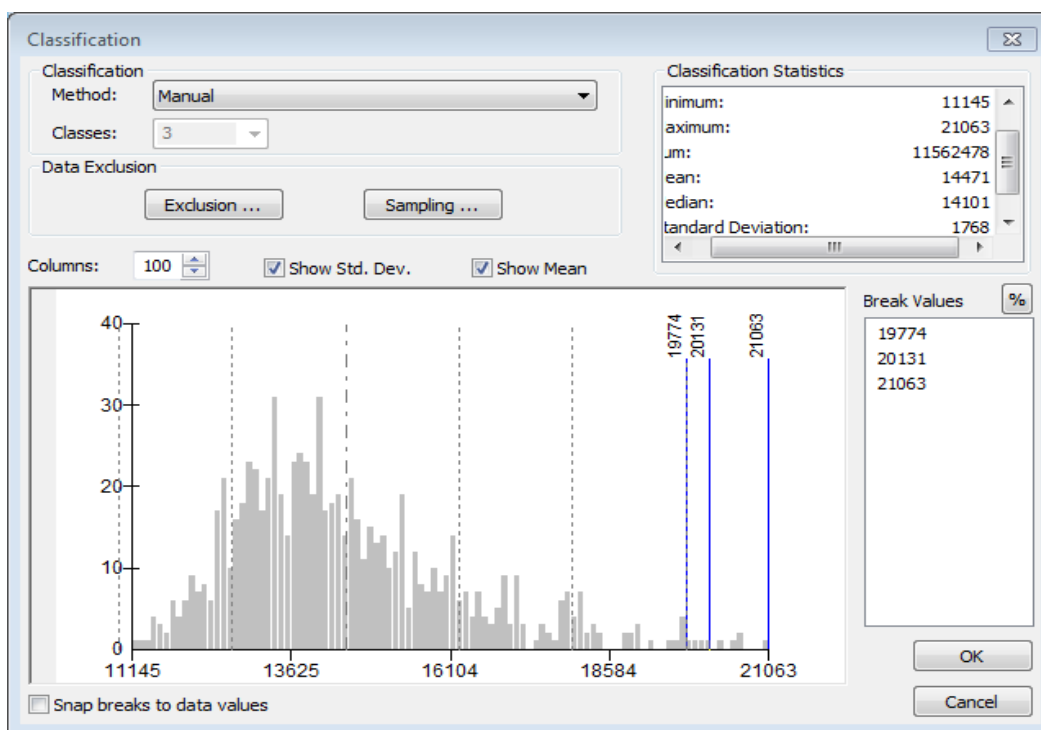
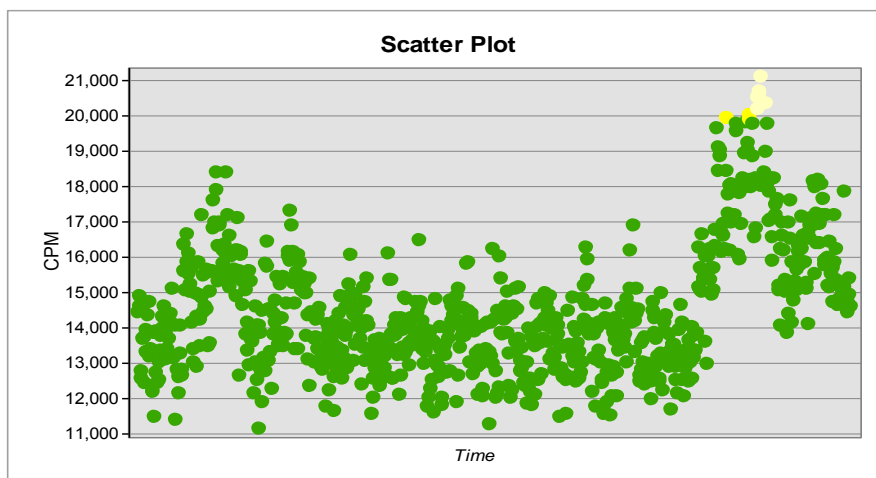
In the 10,000	In the 11,000	In the 12,000	In the 13,000	In the 14,000	In the 15,000
6	120	416	320	206	135
In the 16,000	In the 17,000	In the 18,000	In the 19,000	In the 20,000	
88	48	20	7	4	



Survey: TIRS-10092017-12P3-GWS-3007

GWS Count Rate Statistics
 Bayside SU 7 FSS (Quadrant B)
 RSY B1 (Use 1, middle)

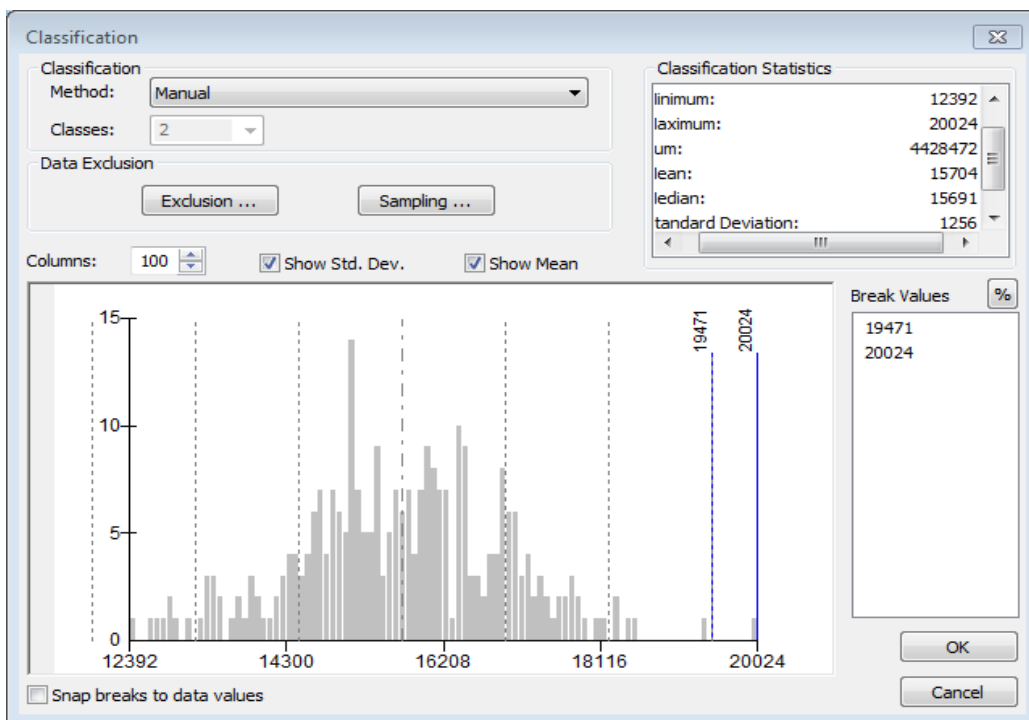
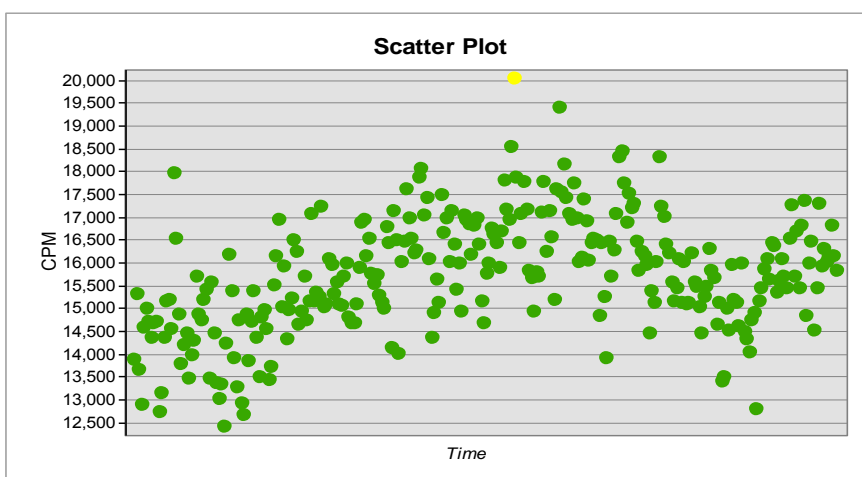
In the 11,000	In the 12,000	In the 13,000	In the 14,000	In the 15,000	In the 16,000
23	128	220	178	104	70
In the 17,000	In the 18,000	In the 19,000	In the 20,000	In the 21,000	
35	23	12	5	1	



Survey: TIRS-10092017-12P3-GWS-3034

GWS Count Rate Statistics
 Bayside SU 7 FSS (Quadrant B)
 RSY B1 (Use 1, Edges)

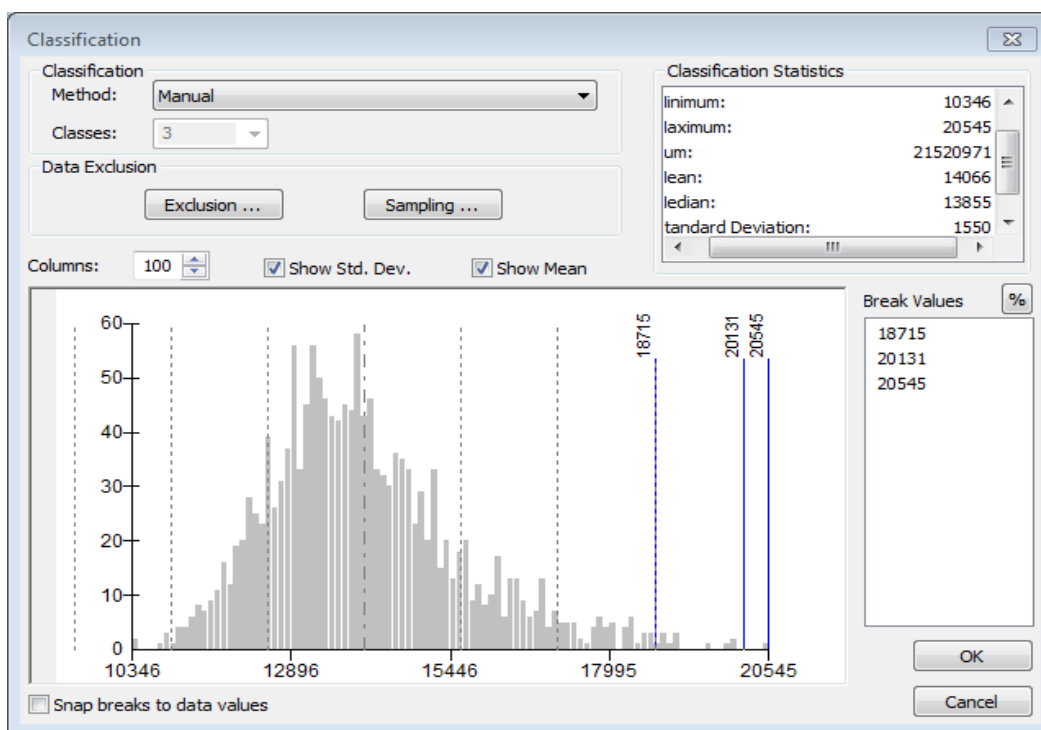
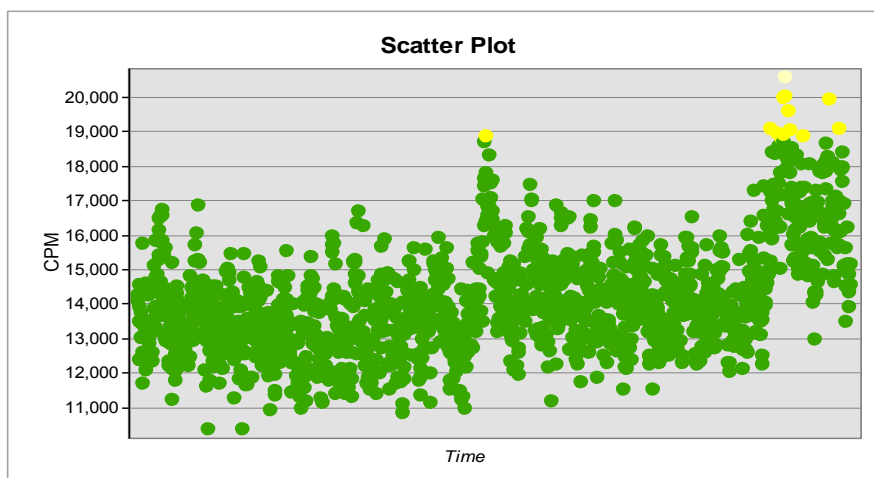
In the 12,000	In the 13,000	In the 14,000	In the 15,000	In the 16,000
6	20	52	86	75
In the 17,000	In the 18,000	In the 19,000	In the 20,000	
35	6	1	1	



Survey: TIRS-10092017-12P3-GWS-3008

GWS Count Rate Statistics
 Bayside SU 7 FSS (Quadrant B)
 RSY B2 (Use 1, middle)

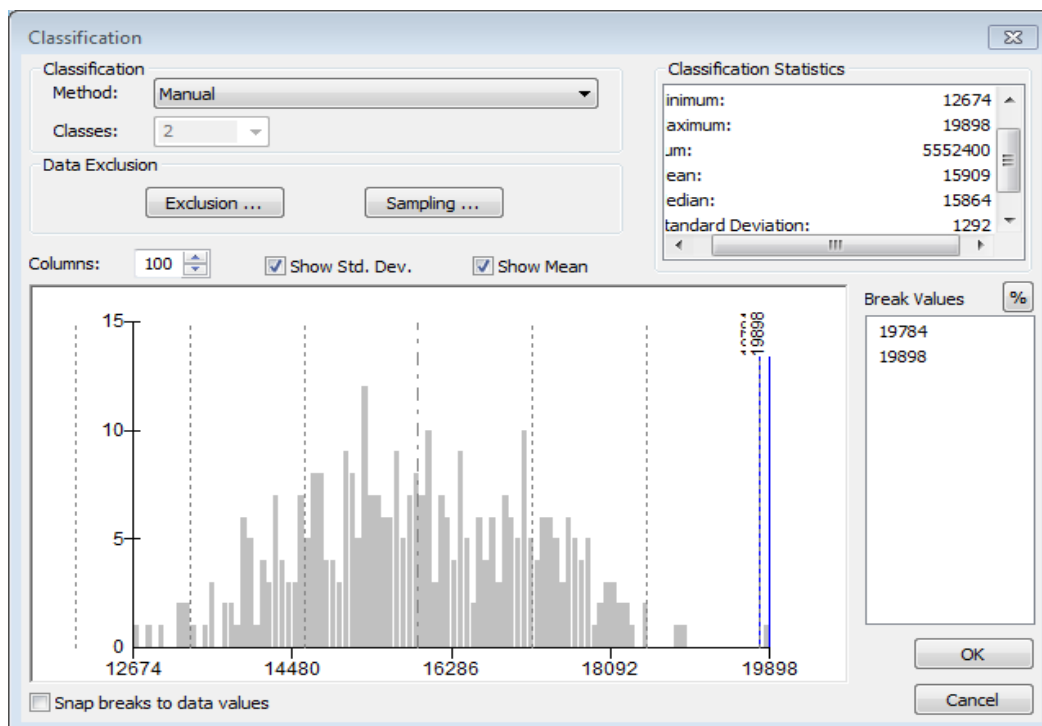
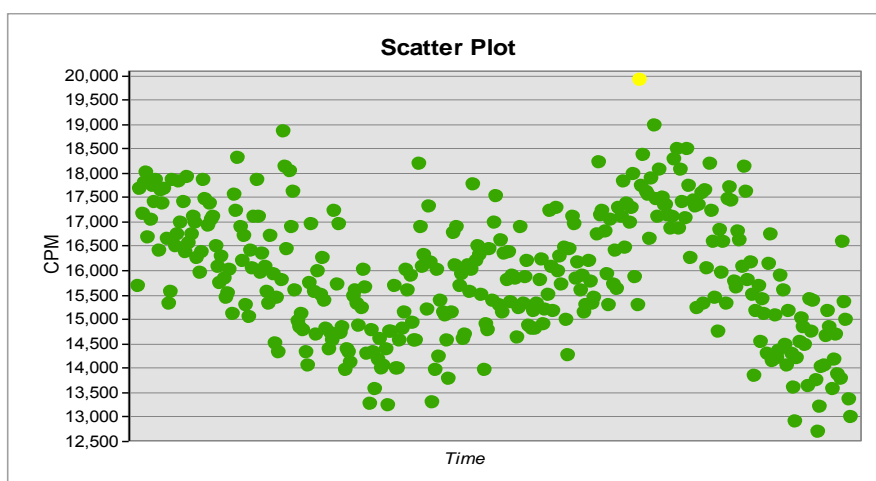
In the 10,000	In the 11,000	In the 12,000	In the 13,000	In the 14,000	In the 15,000
6	79	304	451	336	177
In the 16,000	In the 17,000	In the 18,000	In the 19,000	In the 20,000	
101	41	27	6	2	



Survey: TIRS-10092017-12P3-GWS-3035

GWS Count Rate Statistics
Bayside SU 7 FSS (Quadrant B)
RSY B2 (Use 1, Edges)

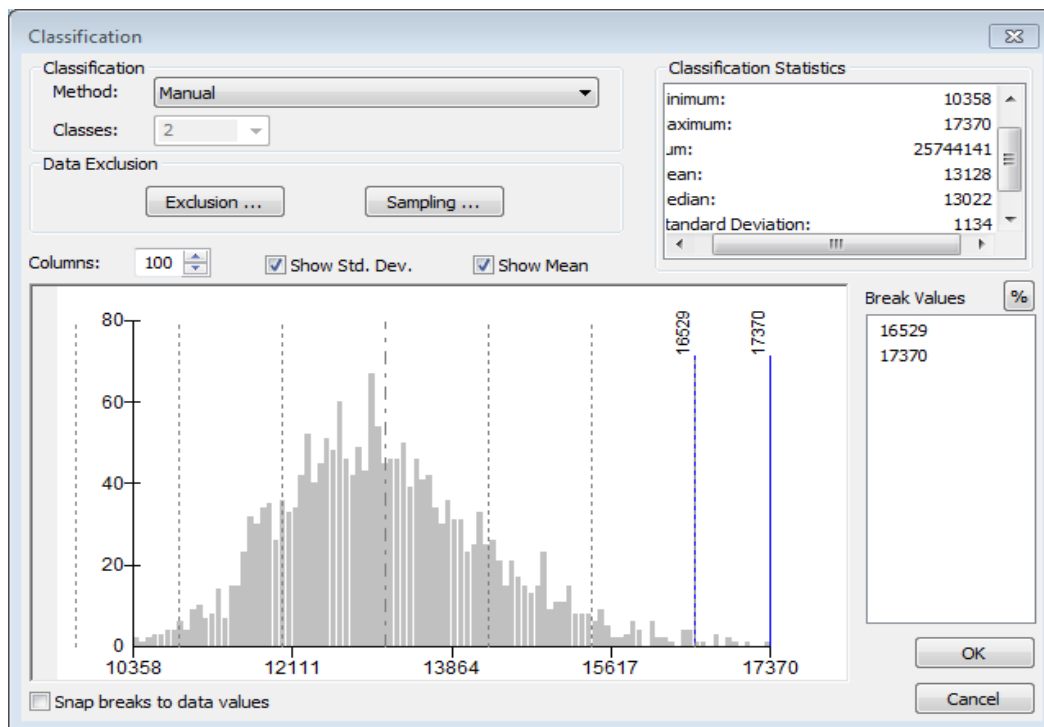
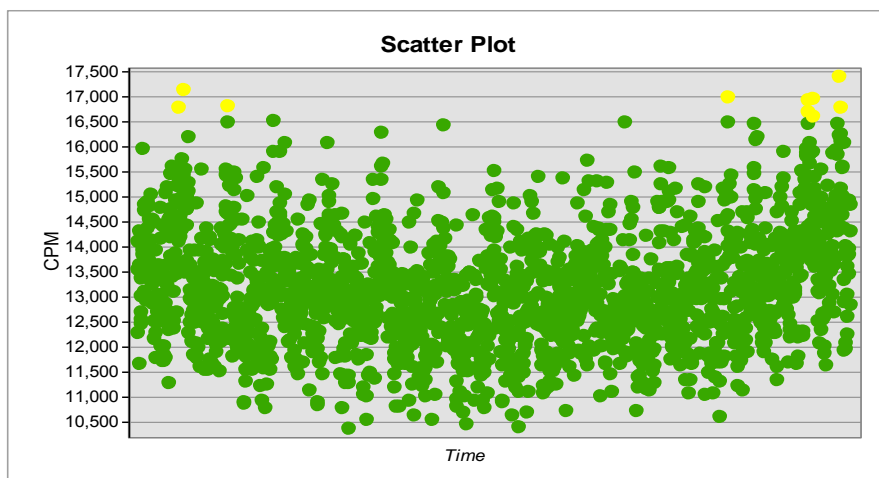
In the 12,000	In the 13,000	In the 14,000	In the 15,000	In the 16,000
3	20	66	99	78
In the 17,000	In the 18,000	In the 19,000		
66	16	1		



Survey: TIRS-10092017-12P3-GWS-3009

GWS Count Rate Statistics
 Bayside SU 7 (non-FSS) (Quadrant B)
 RSY B3 (Use 1, middle)

In the 10,000	In the 11,000	In the 12,000	In the 13,000	In the 14,000
31	274	656	591	284
In the 15,000	In the 16,000	In the 17,000		
96	27	2		

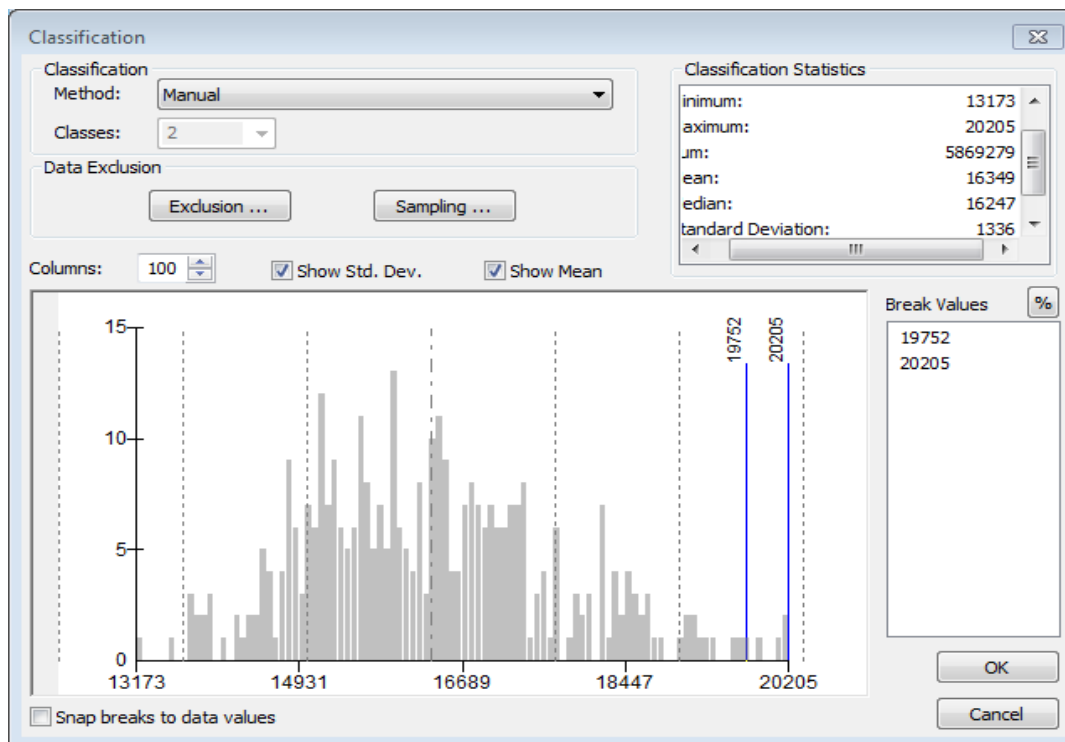
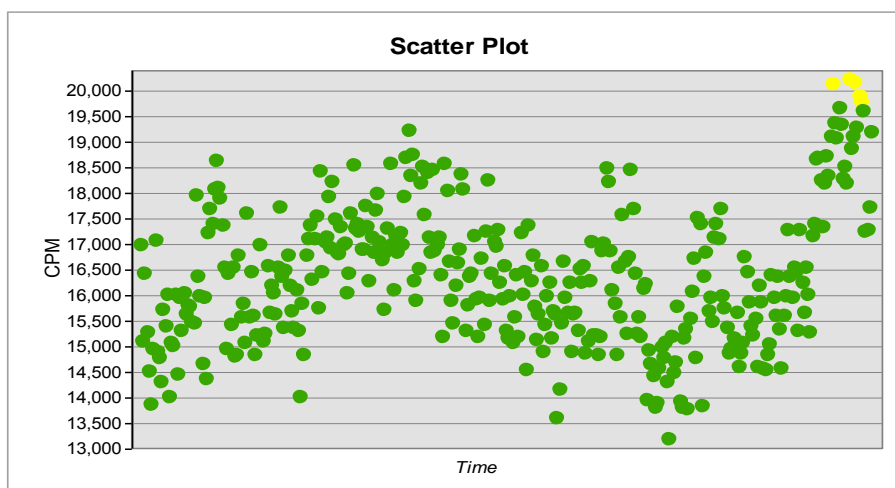


Survey: TIRS-10092017-12P3-GWS-3036

GWS Count Rate Statistics
 Bayside SU 7 (non-FSS) (Quadrant B)
 RSY B3 (Use 1, Edges)

In the 13,000	In the 14,000	In the 15,000	In the 16,000	In the 17,000
12	40	109	93	58

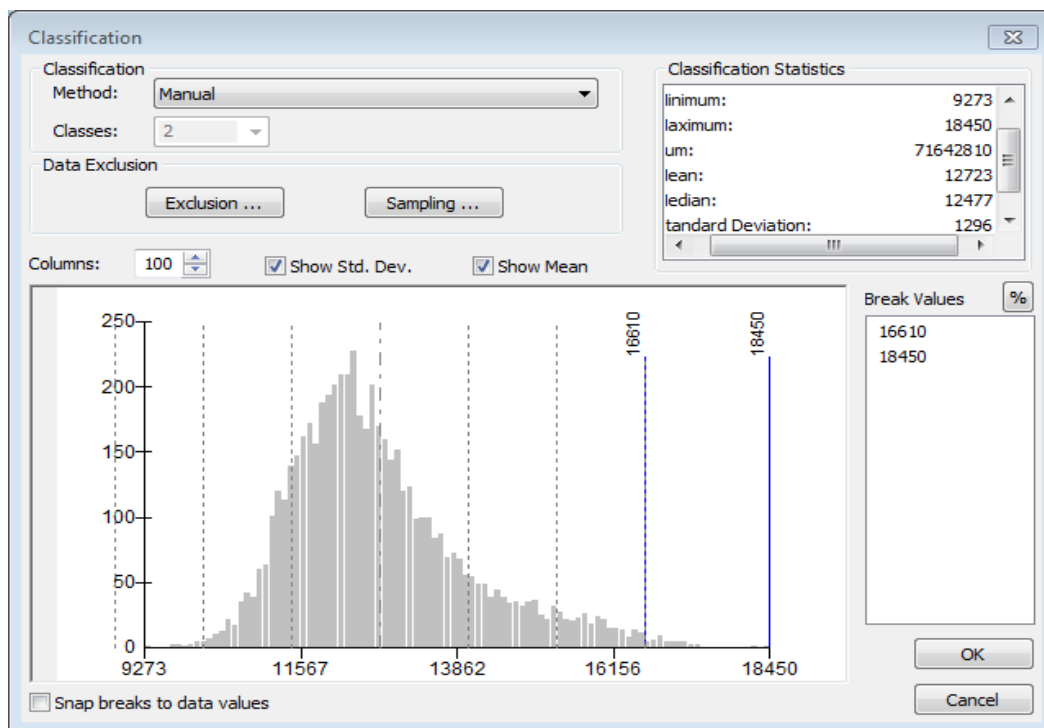
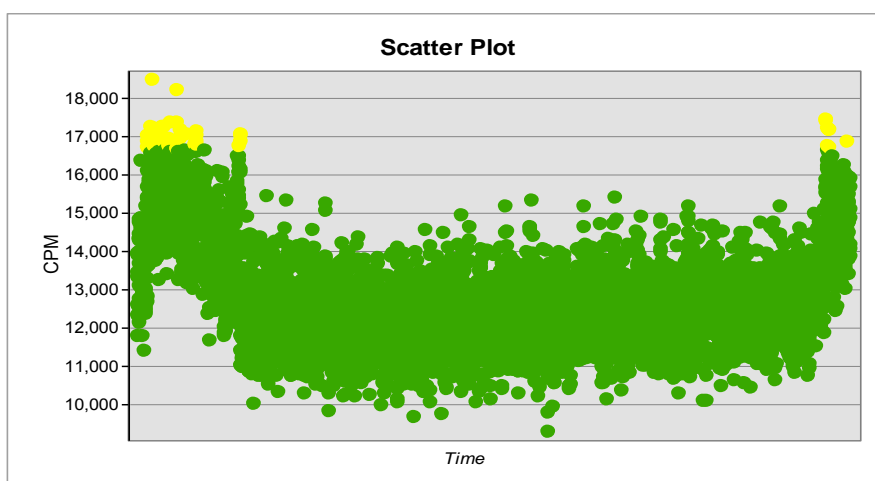
In the 18,000	In the 19,000	In the 20,000
32	12	3



Survey: TIRS-10062017-12P3-GWS-3000

GWS Count Rate Statistics
Bayside SU 7 FSS (Quadrant D)
RSY D1 (Use 1)

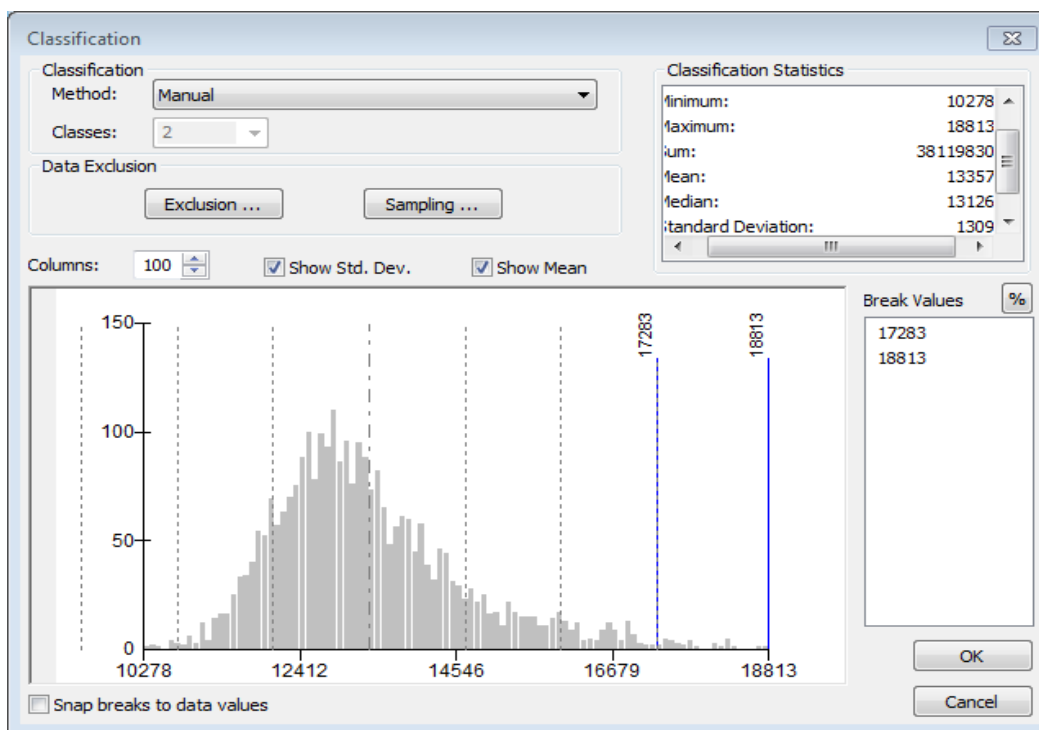
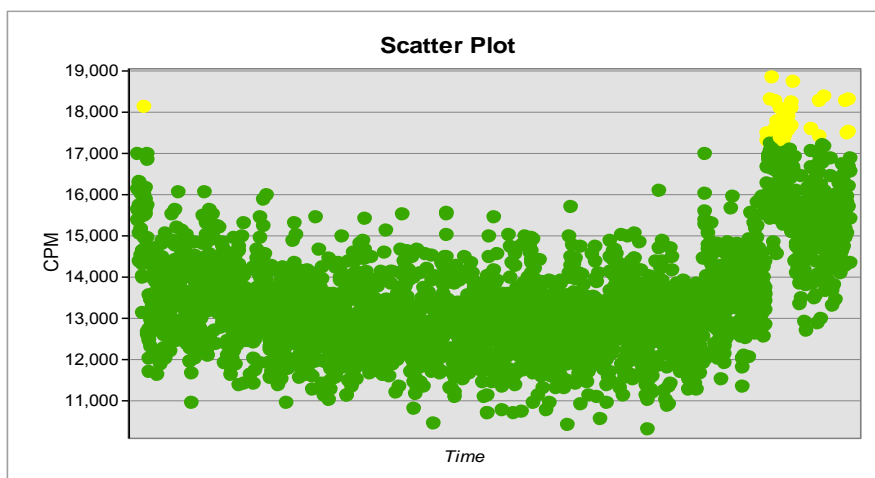
In the 9,000	In the 10,000	In the 11,000	In the 12,000	In the 13,000
8	239	1505	2019	1008
In the 14,000	In the 15,000	In the 16,000	In the 17,000	In the 18,000
448	267	118	17	2



Survey: TIRS-10062017-12P3-GWS-3001

GWS Count Rate Statistics
Bayside SU 7 FSS (Quadrant D)
RSY D2 (Use 1)

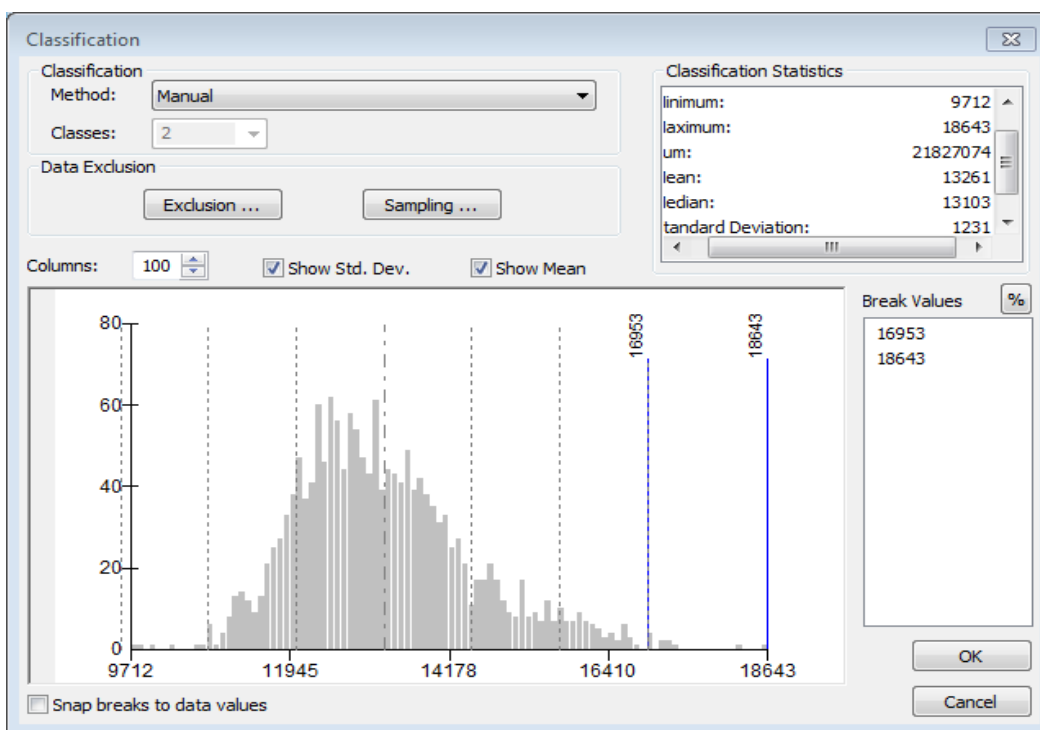
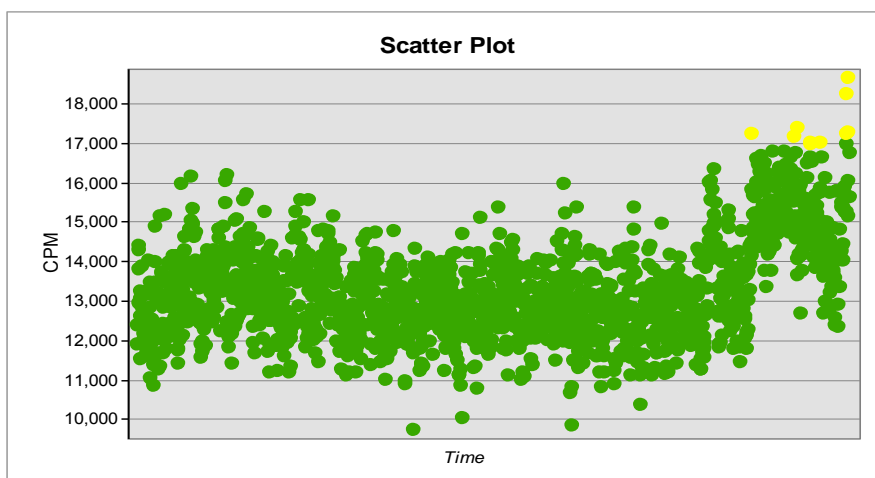
In the 10,000	In the 11,000	In the 12,000	In the 13,000	In the 14,000
22	313	965	837	402
In the 15,000	In the 16,000	In the 17,000	In the 18,000	
175	98	30	12	



Survey: TIRS-10092017-12P3-GWS-3010

GWS Count Rate Statistics
Bayside SU 7 FSS (Quadrant D)
RSY D3 (Use 1)

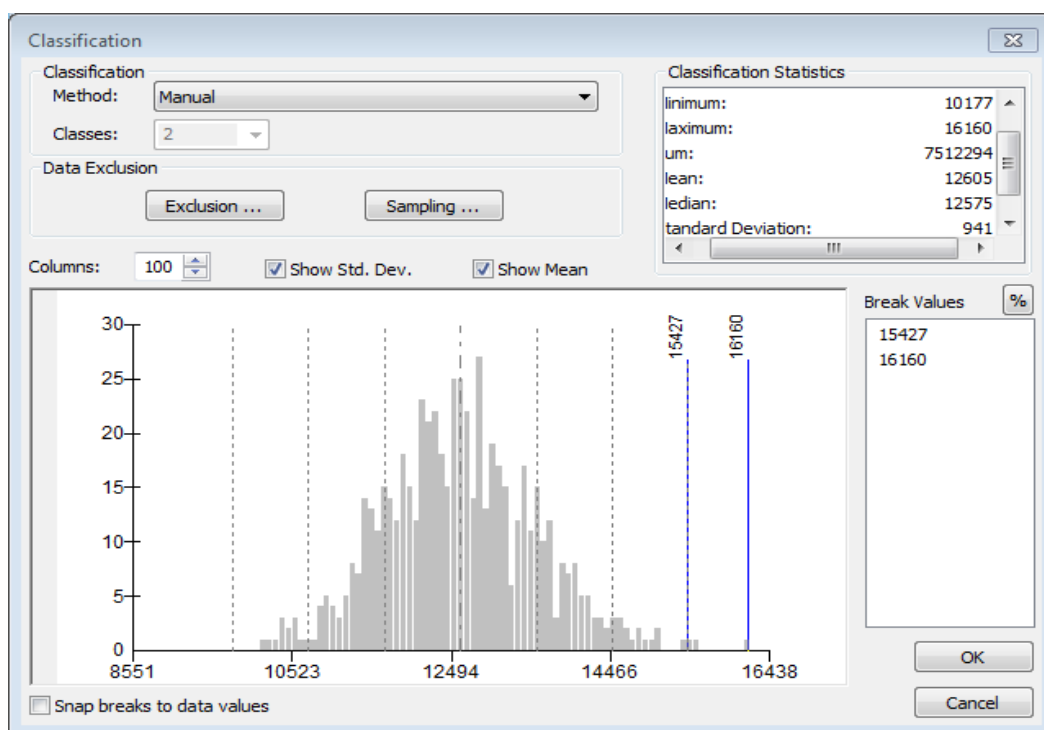
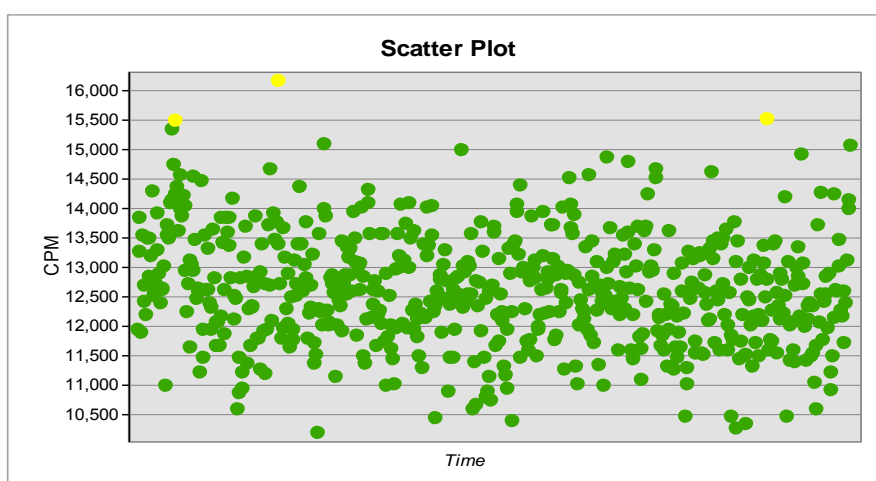
In the 9,000	In the 10,000	In the 11,000	In the 12,000	In the 13,000
3	12	202	556	483
In the 14,000	In the 15,000	In the 16,000	In the 17,000	In the 18,000
233	103	46	6	2



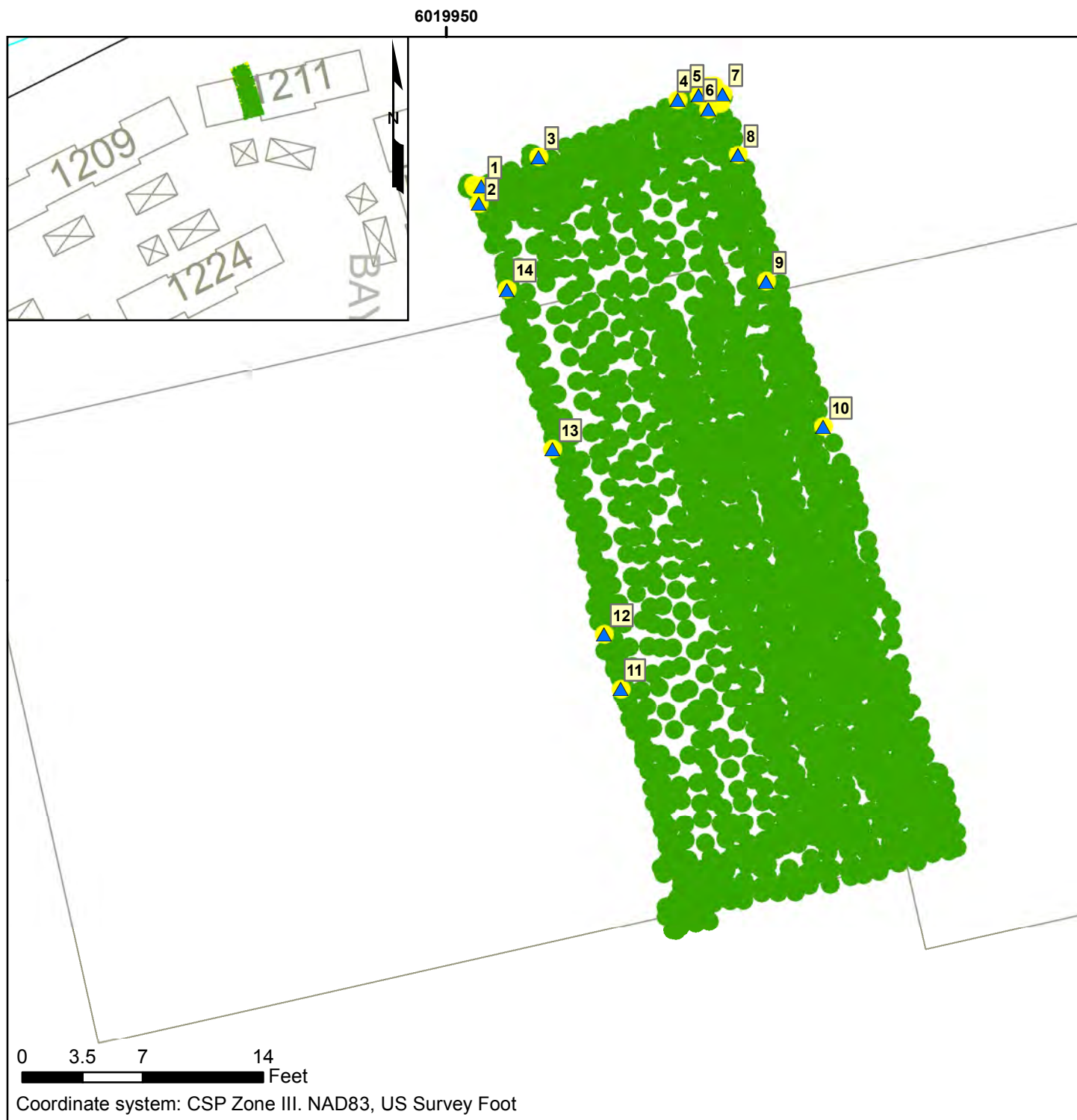
Survey: TIRS-10122017-12P3-GWS-3025

GWS Count Rate Statistics
 Bayside SU 7 FSS (Quadrant B)
 RSY B3 (Use 2)

In the 10,000	In the 11,000	In the 12,000	In the 13,000	In the 14,000
24	134	249	144	39
In the 15,000	In the 16,000			
5	1			



Follow-up Static Survey

RSY A1 (Use 1)
FSS Bayside SU 7 (Quadrant A)Survey Number:
TIRS-10112017-12P3-JSS-3017**GWS Instrument # 268650****Follow-up Static Survey Instrument # 268650**

- ▲ Follow-up Location
- > Mean + 3 std. dev. (17,093 cpm)
- < Mean + 3 std. dev.

Follow-up Static Survey

RSY A2 (Use 1)
FSS Bayside SU 7 (Quadrant A)

Survey Number:
 TIRS-10112017-12P3-JSS-3018



GWS Instrument # 268650

Follow-up Static Survey Instrument # 268650

- ▲ Follow-up Location
- > Mean + 3 std. dev. (18,370 cpm)
- < Mean + 3 std. dev.

Follow-up Static Survey

RSY A3 (Use 1)
FSS Bayside SU 7 (Quadrant A)

Survey Number:
 TIRS-10112017-12P3-JSS-3023

6020020

**GWS Instrument # 268650****Follow-up Static Survey Instrument # 268650**

- ▲ Follow-up Location
- > Ref. Area 8 Scan IL (20,498 cpm)
- > Mean + 3 std. dev. (18,906 cpm)
- < Mean + 3 std. dev.

APTIM Federal Services, LLC

Follow-up Static Survey

RSY B1 (Use 1, middle)
FSS Bayside SU 7 (Quadrant B)

Survey Number:
 TIRS-10112017-12P3-JSS-3019

6020020



GWS Instrument # 202370 (middle)
Follow-up Static Survey Instrument # 202370

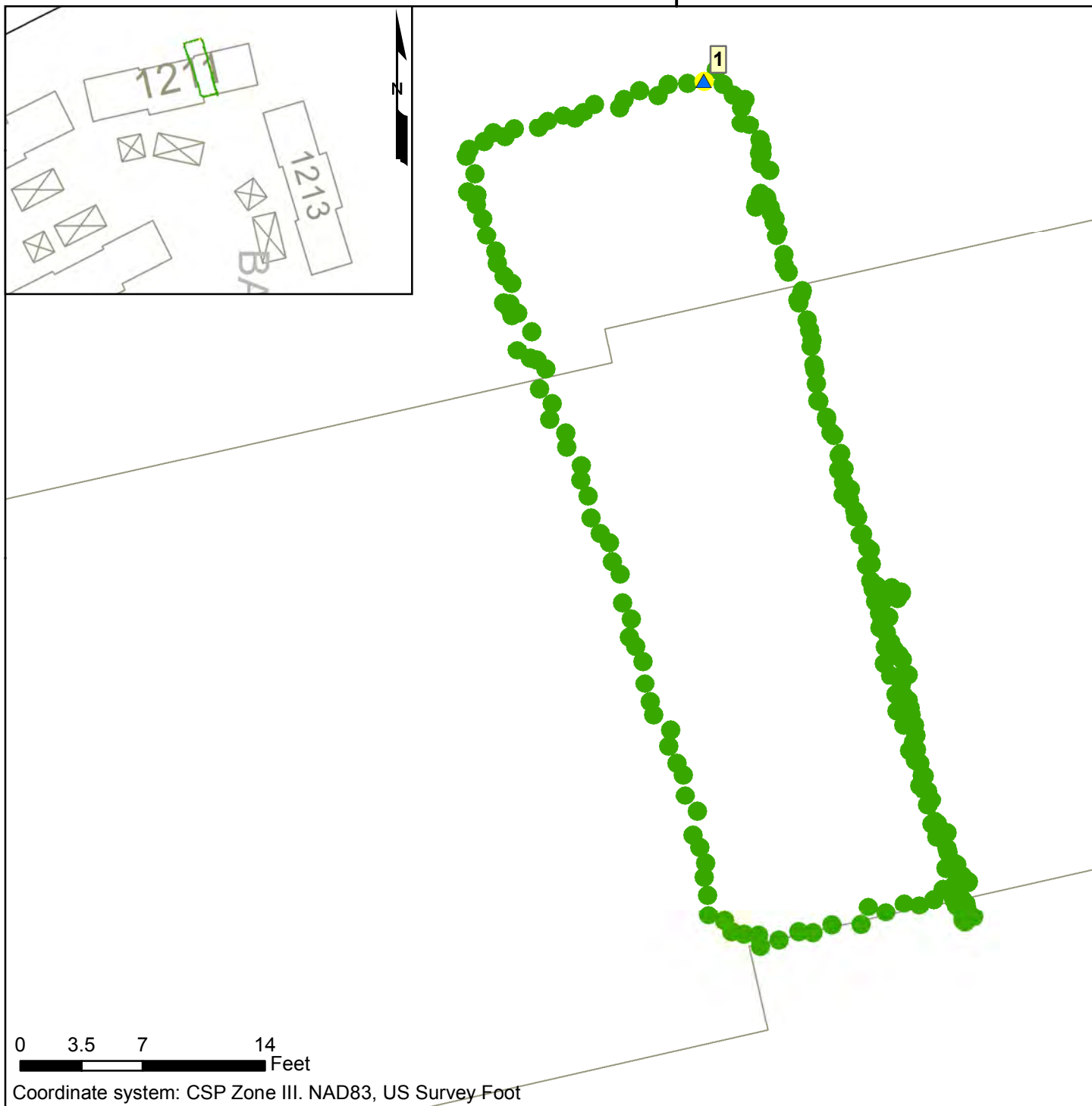
- ▲ Follow-up Location
- > Ref. Area 8 Scan IL (20,132 cpm)
- > Mean + 3 std. dev. (19,775 cpm)
- < Mean + 3 std. dev.

Follow-up Static Survey

RSY B1 (Use 1, edges)
FSS Bayside SU 7 (Quadrant B)

Survey Number:
 TIRS-10112017-12P3-JSS-3020

6020020

**GWS Instrument # 268650 (edges)****Follow-up Static Survey Instrument # 268650**

- ▲ Follow-up Location
- > Mean + 3 std. dev. (19,472 cpm)
- < Mean + 3 std. dev.

Follow-up Static Survey

RSY B2 (Use 1, middle)
FSS Bayside SU 7 (Quadrant B)

Survey Number:
 TIRS-10112017-12P3-JSS-3016



GWS Instrument # 202370 (middle)
Follow-up Static Survey Instrument # 202370

- ▲ Follow-up Location
- > Ref. Area 8 Scan IL (20,132 cpm)
- > Mean + 3 std. dev. (18,716 cpm)
- < Mean + 3 std. dev.

Follow-up Static Survey

**RSY B2 (Use 1, edges)
FSS Bayside SU 7 (Quadrant B)**Survey Number:
TIRS-10112017-12P3-JSS-3021**GWS Instrument # 268650 (edges)
Follow-up Static Survey Instrument # 268650**

- ▲ Follow-up Location
- > Mean + 3 std. dev. (19,785 cpm)
- < Mean + 3 std. dev.

Follow-up Static Survey

RSY B3 (Use 1, middle)
Bayside SU 7 (non-FSS) (Quadrant B)

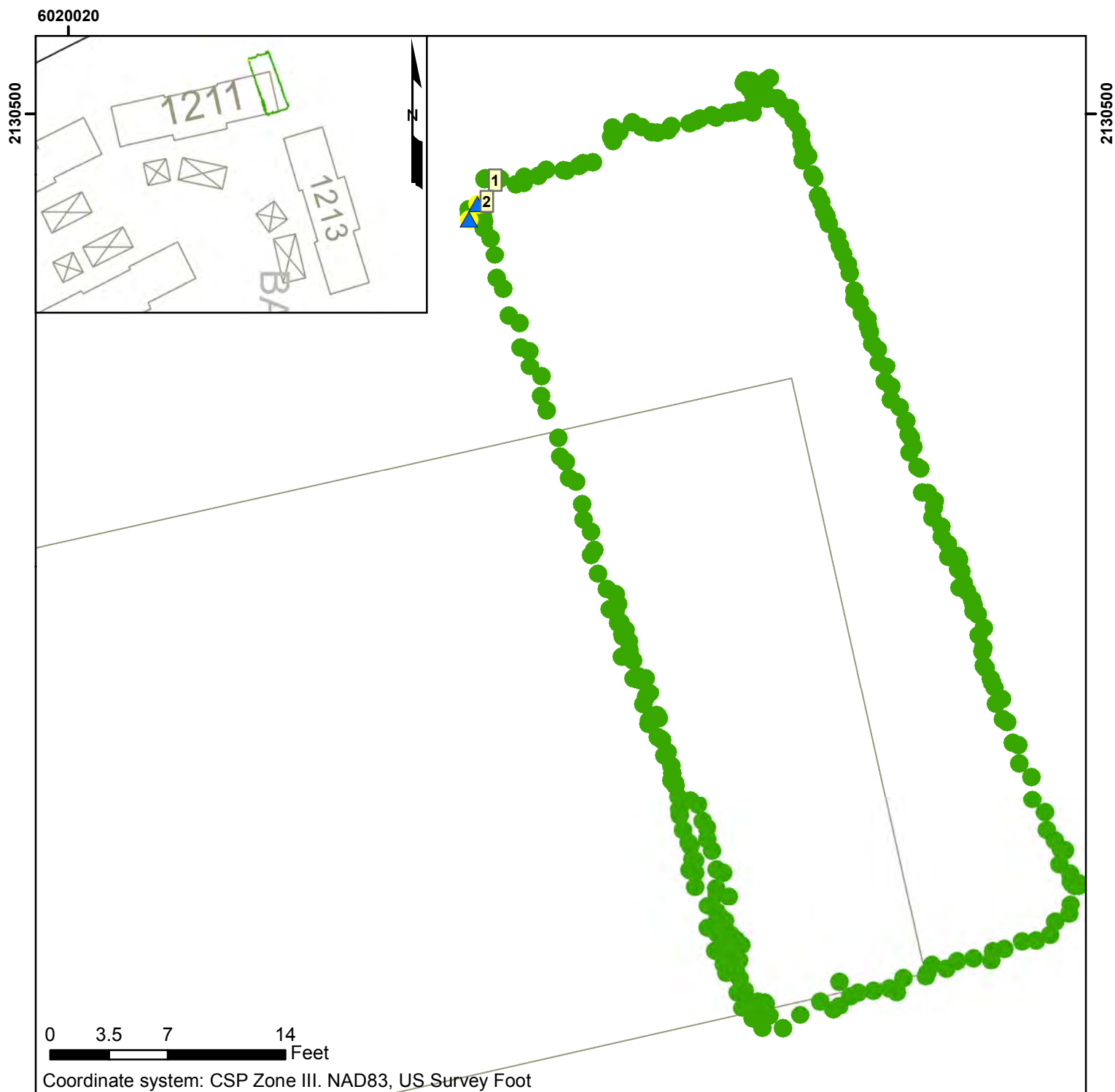
Survey Number:
 TIRS-10102017-12P3-JSS-3011



GWS Instruments # 202370 (middle)
Follow-up Static Survey Instrument # 202370

- ▲ Follow-up Location
- > Mean + 3 std. dev. (16,530 cpm)
- < Mean + 3 std. dev.

Follow-up Static Survey

**RSY B3 (Use 1, edges)
Bayside SU 7 (non-FSS) (Quadrant B)**Survey Number:
TIRS-10102017-12P3-JSS-3012**GWS Instruments # 268650 (edges)
Follow-up Static Survey Instrument # 268650**

- ▲ Follow-up Location
- > Mean + 3 std. dev. (19,753 cpm)
- < Mean + 3 std. dev.

Follow-up Static Survey

RSY D1 (Use 1)
FSS Bayside SU 7 (Quadrant D)

Survey Number:
 TIRS-10102017-12P3-JSS-3015

**GWS Instrument # 268645****Follow-up Static Survey Instrument # 268645**

- ▲ Follow-up Location
- > Mean + 3 std. dev. (16,611 cpm)
- < Mean + 3 std. dev.

Follow-up Static Survey

RSY D2 (Use 1)
FSS Bayside SU 7 (Quadrant D)

Survey Number:
 TIRS-10092017-12P3-JSS-3002

6019880

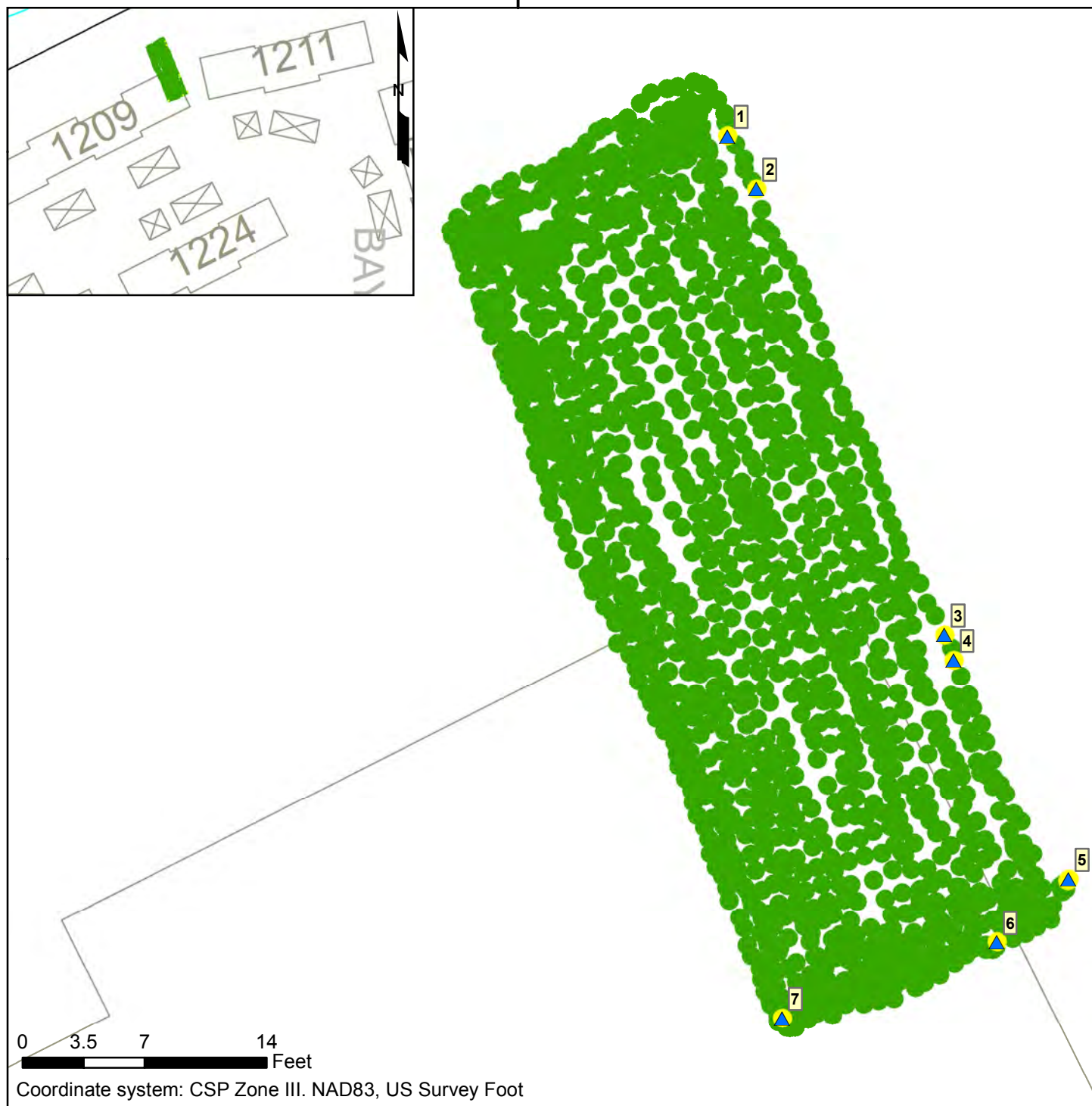
**GWS Instrument # 268645****Follow-up Static Survey Instrument # 268645**

- ▲ Follow-up Location
- > Mean + 3 std. dev. (17,284 cpm)
- < Mean + 3 std. dev.

Follow-up Static Survey

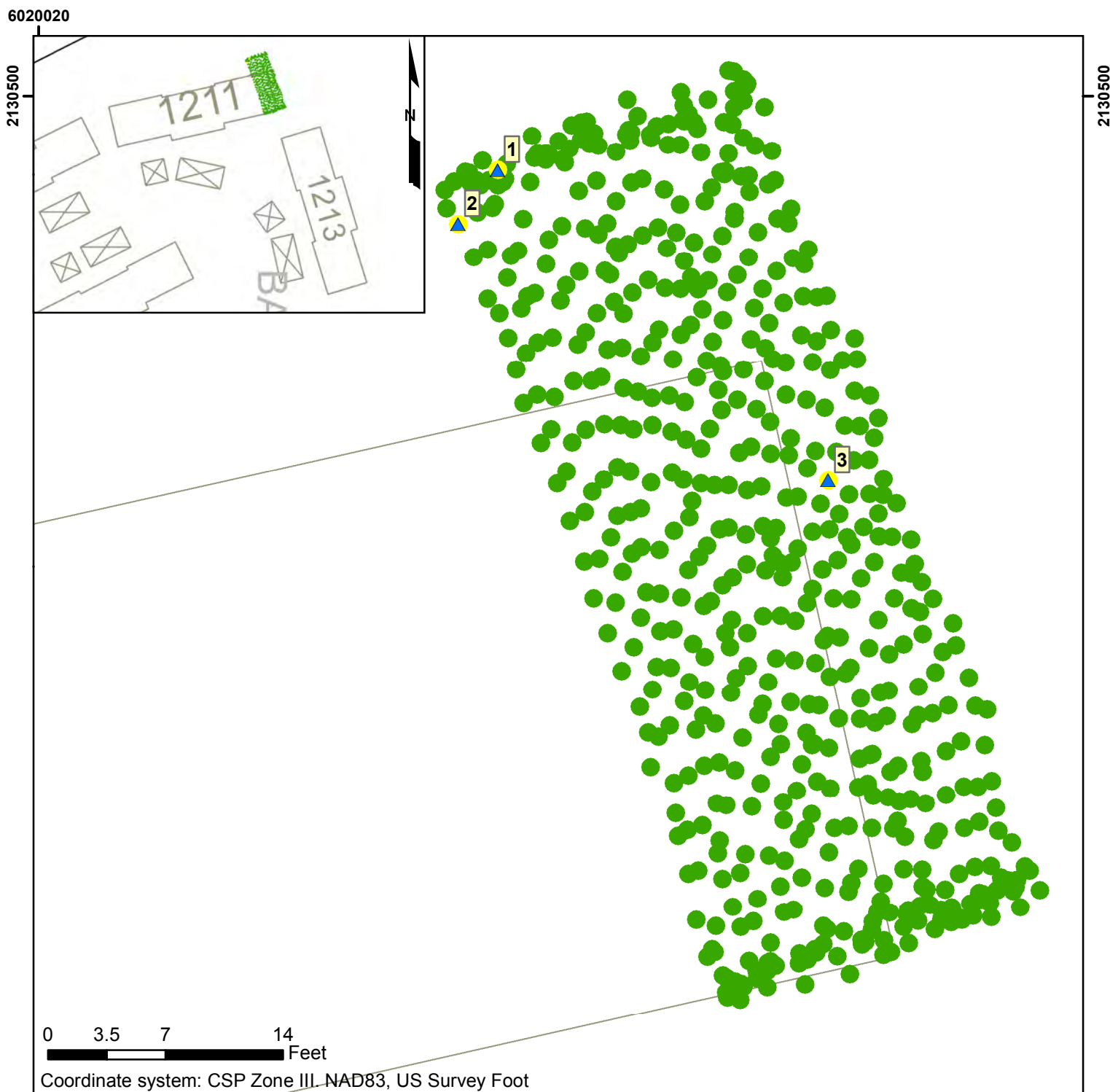
RSY D3 (Use 1)
FSS Bayside SU 7 (Quadrant D)Survey Number:
TIRS-10102017-12P3-JSS-3014

6019880

**GWS Instrument # 268650****Follow-up Static Survey Instrument # 268650**

- ▲ Follow-up Location
- > Mean + 3 std. dev. (16,954 cpm)
- < Mean + 3 std. dev.

Follow-up Static Survey

RSY B3 (Use 2)
FSS Bayside SU 7 (Quadrant B)Survey Number:
TIRS-10132017-12P3-JSS-3027**GWS Instrument # 202370****Follow-up Static Survey Instrument # 202370**

- ▲ Follow-up Location
- > Mean + 3 std. dev. (15,428 cpm)
- < Mean + 3 std. dev.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY A1-D3
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

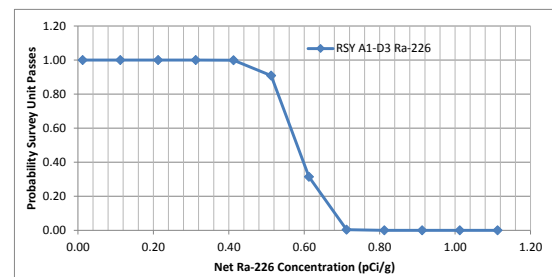
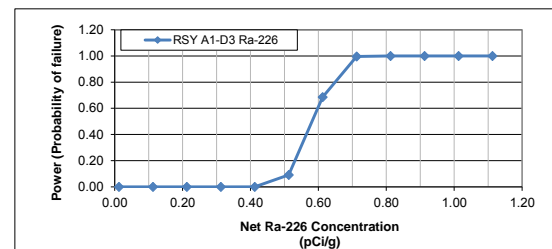
The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT RANKS
0.49	R	0.49	24	0
0.98	R	0.98	42	0
0.83	R	0.83	37.5	0
0.54	R	0.54	27	0
0.57	R	0.57	29.5	0
0.55	R	0.55	28	0
0.57	R	0.57	29.5	0
0.46	R	0.46	23	0
0.50	R	0.5	25	0
0.66	R	0.66	31.5	0
0.75	R	0.75	35	0
0.70	R	0.7	34	0
0.86	R	0.86	39	0
0.51	R	0.51	26	0
0.91	R	0.91	41	0
0.83	R	0.83	37.5	0
0.79	R	0.79	36	0
0.90	R	0.9	40	0
0.66	R	0.66	31.5	0
0.69	R	0.69	33	0
0.279	S	-0.203939192	6	10.5
0.323	S	-0.159939192	10.5	22
0.318	S	-0.164939192	9	23
0.382	S	-0.100939192	19	24
0.423	S	-0.059939192	22	25
0.323	S	-0.159939192	10.5	26
0.394	S	-0.088939192	21	27
0.359	S	-0.123939192	16	28
0.286	S	-0.196939192	7	29.5
0.335	S	-0.147939192	12	29.5
0.027	S	-0.456139192	2	31.5
0.343	S	-0.139939192	14	31.5
0.272	S	-0.210939192	5	33
0.339	S	-0.143939192	13	34
0.251	S	-0.231939192	4	35
0.009	S	-0.474009192	1	36
0.384	S	-0.098939192	20	37.5
0.350	S	-0.132939192	15	37.5
0.297	S	-0.185939192	8	39
0.141	S	-0.341939192	3	40
0.372	S	-0.110939192	17	41
0.377	S	-0.105939192	18	42
Sum =			903	253

Sorted Ranks	Location Associated with Sorted Rank
1	S
2	S
3	S
4	S
5	S
6	S
7	S
8	S
9	S
10.5	S
10.5	S
12	S
13	S
14	S
15	S
16	S
17	S
18	S
19	S
20	S
21	S
22	S
23	R
24	R
25	R
26	R
27	R
28	R
29.5	R
29.5	R
31.5	R
31.5	R
33	R
34	R
35	R
36	R
37.5	R
37.5	R
39	R
40	R
41	R
42	R

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	22
SU σ	0.109
Z(1-alpha)	1.960
Z(1-beta)	1.645

	SU Stats	
Count	22	m
SD	0.109	
Median	0.329	
	Ref Stats	
Count	20	n
SD	0.161	
Critical Value	550.8	



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 22 m
 Avg Rank R: 32.5
 Avg Rank S: 11.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 550.8$

$\alpha_W = \alpha/2 = 0.025$
 $\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α Is Approximately 0.05

22 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:

$m = 20$
 $n = 25$
 $r = 5$
 $k = 5$
 0.043 α

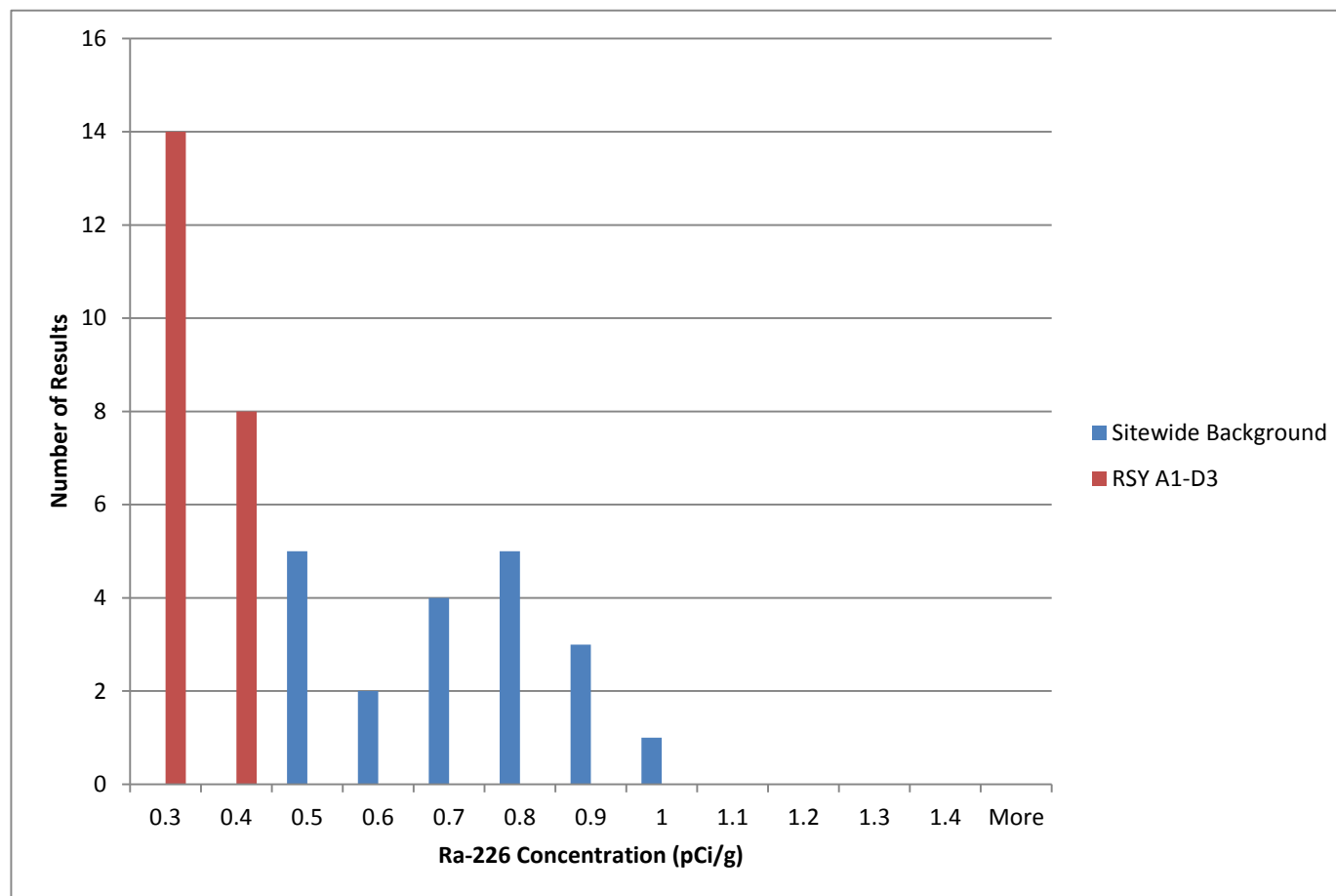
If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 5 adjusted measurements are from S. The null hypothesis is accepted.

Histogram, RSY A1, A2, A3, B1, B2, B3, D1, D2, D3 (all Use 1) and RSY B3 (Use 2) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY A1-D3	
<i>Bin</i>	<i>Frequency</i>
0.3	14
0.4	8
0.5	0
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-24995-2

Client Project/Site: Treasure Island - 500060

For:

Aptim Federal Services LLC
420 Exchange, Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korrinhizer

Authorized for release by:

11/8/2017 11:49:39 AM

Micha Korrinhizer, Project Management Assistant II
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Designee for

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rhonda.ridenhower@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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QC Sample Results	13
QC Association Summary	15

1

2

3

4

5

6

7

8

9

10

11

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Job ID: 160-24995-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-24995-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Job ID: 160-24995-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/13/2017; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 16.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSS-SU7A-U1-S007 (160-24995-1), TITO04-BS-FSS-SU7A-U1-S008 (160-24995-2), TITO04-BS-FSS-SU7A-U1-S009 (160-24995-3), TITO04-BS-FSS-SU7A-U1-S010 (160-24995-4), TITO04-BS-FSS-SU7A-U1-S011 (160-24995-5) and TITO04-BS-FSS-SU7A-U1-S012 (160-24995-6) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/13/2017, prepared on 10/16/2017 and analyzed on 11/06/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



CBI Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_BS_FSS_SU7A_U1_#422

Page 1 of 1

Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside SU7
Quadrant A Use 1 Systematic

Purchase Order #: 201455

Shipment Date: 10/12/17

Waybill Number: 12665451393605904

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Renata Vidovic

Phone/Fax Number: 408-505-7319

Address: renata.vidovic@cbifederalservices.com

City:

Gamma Scan - Gamma Spec. Ra-226



160-24995 Chain of Custody

Sample ID Number	Sampler's Name(s)	Sample Description	Collection Information			Matrix	# of containers	Preservative (water)		Dose Rate μ R/h
			Date	Time	Method			Preservative (soil)	Container Type	
TITO04-BS-FSS-SU7A-U1-S007	R. George	Bayside FSS SU7 Quadrant A Lift 1 Systematic	10/11/17	1313	G	SO	1		16 oz Plastic	5
TITO04-BS-FSS-SU7A-U1-S008		Bayside FSS SU7 Quadrant A Lift 1 Systematic	10/11/17	1311	G	SO	1		16 oz Plastic	5
TITO04-BS-FSS-SU7A-U1-S009		Bayside FSS SU7 Quadrant A Lift 1 Systematic	10/11/17	1316	G	SO	1		16 oz Plastic	5
TITO04-BS-FSS-SU7A-U1-S010		Bayside FSS SU7 Quadrant A Lift 1 Systematic	10/11/17	1314	G	SO	1		16 oz Plastic	5
TITO04-BS-FSS-SU7A-U1-S011		Bayside FSS SU7 Quadrant A Lift 1 Systematic	10/11/17	1322	G	SO	1		16 oz Plastic	5
TITO04-BS-FSS-SU7A-U1-S012		Bayside FSS SU7 Quadrant A Lift 1 Systematic	10/11/17	1323	G	SO	1		16 oz Plastic	5

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

I

II

III

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening

Relinquished By: <u>Renata Vidovic</u>	Date: 10/11/17	Received By: <u>Renata Vidovic</u>	Date: 10/11/17
Relinquished By: <u>Renata Vidovic</u>	Time: 1500	Received By: <u>UPS</u>	Time: 1503
Relinquished By: <u>UPS</u>	Date: 10/12/17	Received By: <u>Kristen Taylor</u>	Date: 10/12/17
Relinquished By: <u>UPS</u>	Time: 1200	Received By: <u>UPS</u>	Time: 1200
Relinquished By: <u>UPS</u>	Date: 10/12/17	Received By: <u>UPS</u>	Date: 10/13/17
Relinquished By: <u>UPS</u>	Time: 1200	Received By: <u>UPS</u>	Time: 0830

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-24995-2

Login Number: 24995**List Source: TestAmerica St. Louis****List Number: 1****Creator: Taylor, Kristene N**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:
DOE = U.S. Department of Energy

Laboratory References:
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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Sample Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-24995-1	TITO04-BS-FSS-SU7A-U1-S007	Solid	10/11/17 13:13	10/13/17 08:30
160-24995-2	TITO04-BS-FSS-SU7A-U1-S008	Solid	10/11/17 13:11	10/13/17 08:30
160-24995-3	TITO04-BS-FSS-SU7A-U1-S009	Solid	10/11/17 13:16	10/13/17 08:30
160-24995-4	TITO04-BS-FSS-SU7A-U1-S010	Solid	10/11/17 13:14	10/13/17 08:30
160-24995-5	TITO04-BS-FSS-SU7A-U1-S011	Solid	10/11/17 13:22	10/13/17 08:30
160-24995-6	TITO04-BS-FSS-SU7A-U1-S012	Solid	10/11/17 13:23	10/13/17 08:30

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S007

Date Collected: 10/11/17 13:13

Date Received: 10/13/17 08:30

Lab Sample ID: 160-24995-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.481		0.210	0.215		0.224	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Actinium-227	-0.327	U	0.717	0.718		1.02	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Bismuth-212	0.265	U	0.868	0.869		1.52	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Bismuth-214	0.394		0.124	0.131		0.115	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Cesium-137	0.000343	U	0.0678	0.0678		0.122	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-210	-0.0646	U	1.14	1.14		1.76	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-212	0.294		0.0833	0.0915		0.0962	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-214	0.441		0.125	0.133		0.134	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Potassium-40	10.6		1.70	2.02		0.721	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Protactinium-231	0.000	U	0.843	0.843		4.15	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Radium-226	0.394		0.124	0.131	0.500	0.115	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Radium-228	0.481		0.210	0.215		0.224	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thallium-208	0.109		0.0616	0.0626		0.0698	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-228	0.294		0.0833	0.0915		0.0962	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-232	0.481		0.210	0.215		0.224	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-234	-0.881	U	0.957	0.961		1.85	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Uranium-235	0.140	U	0.273	0.274		0.488	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Uranium-238	-0.881	U	0.957	0.961		1.85	pCi/g	10/16/17 21:43	11/06/17 14:10	1

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S008

Date Collected: 10/11/17 13:11

Date Received: 10/13/17 08:30

Lab Sample ID: 160-24995-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.366		0.200	0.204		0.216	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Actinium-227	0.266	U	0.418	0.419		1.08	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Bismuth-212	0.269	U	0.698	0.699		1.21	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Bismuth-214	0.359		0.0980	0.105		0.0652	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Cesium-137	-0.0192	U	0.0538	0.0538		0.101	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Lead-210	-0.775	U	1.16	1.17		2.74	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Lead-212	0.0235	U	0.107	0.107		0.181	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Lead-214	0.332		0.115	0.120		0.118	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Potassium-40	10.7		1.55	1.90		0.573	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Protactinium-231	0.599	U	1.54	1.54		3.52	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Radium-226	0.359		0.0980	0.105	0.500	0.0652	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Radium-228	0.366		0.200	0.204		0.216	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thallium-208	0.132		0.0481	0.0500		0.0445	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thorium-228	0.0235	U	0.107	0.107		0.181	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thorium-232	0.366		0.200	0.204		0.216	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thorium-234	0.375	U	0.804	0.805		1.22	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Uranium-235	0.0344	U	0.0930	0.0930		0.757	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Uranium-238	0.375	U	0.804	0.805		1.22	pCi/g	10/16/17 21:43	11/06/17 14:11	1

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S009

Lab Sample ID: 160-24995-3

Date Collected: 10/11/17 13:16

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.419		0.123	0.130		0.156	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Actinium-227	0.138	U	0.391	0.391		0.958	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Bismuth-212	0.220	U	0.510	0.511		0.876	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Bismuth-214	0.286		0.0971	0.102		0.100	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Cesium-137	0.00155	U	0.0408	0.0408		0.0733	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-210	-0.431	U	0.748	0.750		2.23	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-212	0.230		0.0625	0.0692		0.0768	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-214	0.305		0.0704	0.0773		0.0644	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Potassium-40	9.94		1.20	1.57		0.529	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Protactinium-231	0.000	U	0.429	0.429		3.14	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Radium-226	0.286		0.0971	0.102	0.500	0.100	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Radium-228	0.419		0.123	0.130		0.156	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thallium-208	0.123		0.0411	0.0431		0.0364	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-228	0.230		0.0625	0.0692		0.0768	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-232	0.419		0.123	0.130		0.156	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-234	0.0980	U	1.01	1.01		1.73	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Uranium-235	0.156	U	0.276	0.276		0.576	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Uranium-238	0.0980	U	1.01	1.01		1.73	pCi/g	10/16/17 21:43	11/06/17 14:10	1

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S010

Lab Sample ID: 160-24995-4

Date Collected: 10/11/17 13:14

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.197		0.130	0.132		0.148	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Actinium-227	0.169	U	0.417	0.417		0.707	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Bismuth-212	0.155	U	0.274	0.275		0.472	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Bismuth-214	0.335		0.0837	0.0906		0.0509	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Cesium-137	0.0156	U	0.0336	0.0336		0.0579	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Lead-210	0.804	U	0.845	0.850		1.02	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Lead-212	0.279		0.0602	0.0702		0.0636	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Lead-214	0.406		0.0829	0.0930		0.0853	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Potassium-40	9.88		1.15	1.53		0.247	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Protactinium-231	-0.682	U	2.08	2.08		3.48	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Radium-226	0.335		0.0837	0.0906	0.500	0.0509	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Radium-228	0.197		0.130	0.132		0.148	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Thallium-208	0.0836		0.0315	0.0326		0.0237	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Thorium-228	0.279		0.0602	0.0702		0.0636	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Thorium-232	0.197		0.130	0.132		0.148	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Thorium-234	0.334	U	1.04	1.05		1.76	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Uranium-235	0.0210	U	0.198	0.198		0.580	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Uranium-238	0.334	U	1.04	1.05		1.76	pCi/g	10/16/17 21:43	11/06/17 14:12	1

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S011

Lab Sample ID: 160-24995-5

Date Collected: 10/11/17 13:22

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.415		0.141	0.147		0.195	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Actinium-227	-0.0617	U	0.101	0.102		1.26	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Bismuth-212	0.180	U	0.585	0.586		1.02	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Bismuth-214	0.0268	U	0.118	0.118		0.283	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Cesium-137	0.0273	U	0.0489	0.0490		0.0827	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-210	0.273	U	0.871	0.872		1.38	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-212	0.237		0.0708	0.0772		0.0889	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-214	0.353		0.0937	0.101		0.0878	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Potassium-40	10.3		1.35	1.71		0.693	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Protactinium-231	-0.603	U	2.32	2.32		3.91	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Radium-226	0.0268	U	0.118	0.118	0.500	0.283	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Radium-228	0.415		0.141	0.147		0.195	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thallium-208	0.0913		0.0389	0.0400		0.0418	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-228	0.237		0.0708	0.0772		0.0889	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-232	0.415		0.141	0.147		0.195	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-234	0.734	U	1.04	1.04		1.72	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Uranium-235	-0.0345	U	0.337	0.337		0.563	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Uranium-238	0.734	U	1.04	1.04		1.72	pCi/g	10/16/17 21:43	11/06/17 15:19	1

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S012

Lab Sample ID: 160-24995-6

Date Collected: 10/11/17 13:23

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.229	U	0.182	0.184		0.365	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Actinium-227	0.168	U	0.591	0.591		0.864	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Bismuth-212	-0.513	U	0.762	0.764		2.19	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Bismuth-214	0.343		0.156	0.160		0.166	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Cesium-137	-0.0480	U	0.0595	0.0598		0.153	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-210	-0.0134	U	1.37	1.37		2.09	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-212	0.285		0.0930	0.100		0.118	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-214	0.377		0.119	0.125		0.148	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Potassium-40	9.64		1.69	1.96		0.781	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Protactinium-231	0.000	U	0.345	0.345		4.69	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Radium-226	0.343		0.156	0.160	0.500	0.166	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Radium-228	0.229	U	0.182	0.184		0.365	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thallium-208	0.0991	U	0.114	0.114		0.112	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-228	0.285		0.0930	0.100		0.118	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-232	0.229	U	0.182	0.184		0.365	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-234	-0.313	U	1.07	1.07		1.90	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Uranium-235	0.108	U	0.336	0.336		0.503	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Uranium-238	-0.313	U	1.07	1.07		1.90	pCi/g	10/16/17 21:43	11/06/17 15:19	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-332173/1-A

Matrix: Solid

Analysis Batch: 335900

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 332173

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Actinium-227	0.0000	U	0.406	0.406		1.29	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-212	-0.6171	U	0.642	0.645		1.48	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-214	-0.07514	U	0.0806	0.0809		0.210	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Cesium-137	-0.04555	U	0.0471	0.0474		0.129	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-210	1.132	U	1.32	1.33		1.79	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-212	-0.09664	U	0.0901	0.0909		0.205	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-214	0.002476	U	0.108	0.108		0.191	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Potassium-40	-0.4904	U	1.06	1.06		1.43	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Protactinium-231	0.2012	U	1.28	1.28		4.16	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-226	-0.07514	U	0.0806	0.0809	0.500	0.210	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-228	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thallium-208	0.007674	U	0.0172	0.0172		0.0657	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-228	-0.09664	U	0.0901	0.0909		0.205	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-232	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-234	-0.9046	U	1.10	1.10		2.01	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-235	0.03409	U	0.0937	0.0938		0.481	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-238	-0.9046	U	1.10	1.10		2.01	pCi/g	10/16/17 21:43	11/06/17 12:53	1

Lab Sample ID: LCS 160-332173/2-A

Matrix: Solid

Analysis Batch: 335894

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.9	100.2		10.5		0.882	pCi/g	103	87 - 116
Cesium-137	28.7	26.66		2.84		0.217	pCi/g	93	87 - 120
Cobalt-60	14.2	13.04		1.35		0.131	pCi/g	92	87 - 115

Lab Sample ID: 160-24992-A-1-E DU

Matrix: Solid

Analysis Batch: 335902

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1
Actinium-227	0.227	U	0.1468	U	0.710		1.21	pCi/g	0.07	1
Bismuth-212	-0.0280	U	-0.2606	U	0.864		1.81	pCi/g	0.14	1
Bismuth-214	0.279		0.3160		0.117		0.0955	pCi/g	0.15	1
Cesium-137	-0.0226	U	-0.07625	U	0.0705		0.156	pCi/g	0.41	1
Lead-210	-0.132	U	0.6555	U	1.49		2.51	pCi/g	0.29	1
Lead-212	0.238		0.2624		0.0854		0.0960	pCi/g	0.14	1
Lead-214	0.218		0.3577		0.100		0.0781	pCi/g	0.60	1
Potassium-40	10.4		11.69		2.03		0.594	pCi/g	0.33	1
Protactinium-231	-0.912	U	0.0000	U	0.159		3.90	pCi/g	0.39	1
Radium-226	0.279		0.3160		0.117	0.500	0.0955	pCi/g	0.15	1
Radium-228	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-24992-A-1-E DU

Matrix: Solid

Analysis Batch: 335902

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Sample		DU		Total	LOQ	MDC	Unit	RER	RER Limit
	Result	Qual	Result	Qual	Uncert. (2 σ +/-)					
Thallium-208	0.0350	U	0.1089		0.0698		0.0782	pCi/g	0.47	1
Thorium-228	0.238		0.2624		0.0854		0.0960	pCi/g	0.14	1
Thorium-232	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1
Thorium-234	-0.113	U	0.1822	U	0.198		2.33	pCi/g	0.26	1
Uranium-235	-0.00738	U	0.1270	U	0.340		0.703	pCi/g	0.37	1
Uranium-238	-0.113	U	0.1822	U	0.198		2.33	pCi/g	0.26	1

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Rad

Leach Batch: 331792

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24995-1	TITO04-BS-FSS-SU7A-U1-S007	Total/NA	Solid	Dry and Grind	
160-24995-2	TITO04-BS-FSS-SU7A-U1-S008	Total/NA	Solid	Dry and Grind	
160-24995-3	TITO04-BS-FSS-SU7A-U1-S009	Total/NA	Solid	Dry and Grind	
160-24995-4	TITO04-BS-FSS-SU7A-U1-S010	Total/NA	Solid	Dry and Grind	
160-24995-5	TITO04-BS-FSS-SU7A-U1-S011	Total/NA	Solid	Dry and Grind	
160-24995-6	TITO04-BS-FSS-SU7A-U1-S012	Total/NA	Solid	Dry and Grind	
160-24992-A-1-E DU	Duplicate	Total/NA	Solid	Dry and Grind	

Prep Batch: 332173

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24995-1	TITO04-BS-FSS-SU7A-U1-S007	Total/NA	Solid	Fill_Geo-21	331792
160-24995-2	TITO04-BS-FSS-SU7A-U1-S008	Total/NA	Solid	Fill_Geo-21	331792
160-24995-3	TITO04-BS-FSS-SU7A-U1-S009	Total/NA	Solid	Fill_Geo-21	331792
160-24995-4	TITO04-BS-FSS-SU7A-U1-S010	Total/NA	Solid	Fill_Geo-21	331792
160-24995-5	TITO04-BS-FSS-SU7A-U1-S011	Total/NA	Solid	Fill_Geo-21	331792
160-24995-6	TITO04-BS-FSS-SU7A-U1-S012	Total/NA	Solid	Fill_Geo-21	331792
MB 160-332173/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-332173/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-24992-A-1-E DU	Duplicate	Total/NA	Solid	Fill_Geo-21	331792

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-24996-2

Client Project/Site: Treasure Island - 500060

For:

Aptim Federal Services LLC
420 Exchange, Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korrinhizer

Authorized for release by:

11/8/2017 11:52:58 AM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Job ID: 160-24996-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-24996-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Job ID: 160-24996-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/13/2017; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 16.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSS-SU7B-LANE1-U1-S013 (160-24996-1), TITO04-BS-FSS-SU7B-LANE1-U1-S014 (160-24996-2), TITO04-BS-FSS-SU7B-LANE1-U1-S015 (160-24996-3), TITO04-BS-FSS-SU7B-LANE2-U1-S016 (160-24996-4), TITO04-BS-FSS-SU7B-LANE2-U1-S017 (160-24996-5) and TITO04-BS-FSS-SU7B-LANE2-U1-S018 (160-24996-6) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/13/2017, prepared on 10/16/2017 and analyzed on 11/06/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-24996-2

Login Number: 24996**List Source: TestAmerica St. Louis****List Number: 1****Creator: Taylor, Kristene N**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:
DOE = U.S. Department of Energy

Laboratory References:
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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Sample Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-24996-1	TITO04-BS-FSS-SU7B-LANE1-U1-S013	Solid	10/11/17 13:27	10/13/17 08:30
160-24996-2	TITO04-BS-FSS-SU7B-LANE1-U1-S014	Solid	10/11/17 13:29	10/13/17 08:30
160-24996-3	TITO04-BS-FSS-SU7B-LANE1-U1-S015	Solid	10/11/17 13:31	10/13/17 08:30
160-24996-4	TITO04-BS-FSS-SU7B-LANE2-U1-S016	Solid	10/11/17 13:33	10/13/17 08:30
160-24996-5	TITO04-BS-FSS-SU7B-LANE2-U1-S017	Solid	10/11/17 13:36	10/13/17 08:30
160-24996-6	TITO04-BS-FSS-SU7B-LANE2-U1-S018	Solid	10/11/17 13:38	10/13/17 08:30

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Client Sample ID: TITO04-BS-FSS-SU7B-LANE1-U1-S013

Date Collected: 10/11/17 13:27

Date Received: 10/13/17 08:30

Lab Sample ID: 160-24996-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.100	U	0.204	0.204		0.339	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Actinium-227	0.320	U	0.692	0.693		1.16	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Bismuth-212	0.406	U	0.707	0.708		1.19	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Bismuth-214	0.272		0.0970	0.101		0.0847	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Cesium-137	0.00360	U	0.0495	0.0495		0.0890	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-210	-0.824	U	1.32	1.33		2.91	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-212	0.302		0.107	0.114		0.155	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-214	0.285		0.105	0.109		0.138	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Potassium-40	10.7		1.50	1.86		0.542	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Protactinium-231	-0.778	U	2.52	2.52		4.24	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Radium-226	0.272		0.0970	0.101	0.500	0.0847	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Radium-228	0.100	U	0.204	0.204		0.339	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thallium-208	0.0751	U	0.0703	0.0707		0.0834	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-228	0.302		0.107	0.114		0.155	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-232	0.100	U	0.204	0.204		0.339	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-234	0.550	U	0.470	0.474		1.42	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Uranium-235	0.249	U	0.149	0.151		0.784	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Uranium-238	0.550	U	0.470	0.474		1.42	pCi/g	10/16/17 21:43	11/06/17 15:21	1

Client Sample ID: TITO04-BS-FSS-SU7B-LANE1-U1-S014

Date Collected: 10/11/17 13:29

Date Received: 10/13/17 08:30

Lab Sample ID: 160-24996-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.274		0.140	0.142		0.152	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Actinium-227	-0.0200	U	0.576	0.576		0.988	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Bismuth-212	0.266	U	0.430	0.431		0.725	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Bismuth-214	0.339		0.0826	0.0899		0.0692	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Cesium-137	-0.0144	U	0.0512	0.0513		0.0884	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-210	-0.635	U	0.676	0.680		1.86	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-212	0.285		0.0648	0.0746		0.0740	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-214	0.347		0.0741	0.0825		0.0801	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Potassium-40	9.02		1.13	1.46		0.518	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Protactinium-231	-0.639	U	2.01	2.01		3.37	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Radium-226	0.339		0.0826	0.0899	0.500	0.0692	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Radium-228	0.274		0.140	0.142		0.152	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thallium-208	0.0998		0.0408	0.0421		0.0356	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-228	0.285		0.0648	0.0746		0.0740	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-232	0.274		0.140	0.142		0.152	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-234	0.445	U	0.946	0.947		1.58	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Uranium-235	0.000	U	0.0539	0.0539		0.561	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Uranium-238	0.445	U	0.946	0.947		1.58	pCi/g	10/16/17 21:43	11/06/17 15:21	1

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Client Sample ID: TITO04-BS-FSS-SU7B-LANE1-U1-S015

Lab Sample ID: 160-24996-3

Date Collected: 10/11/17 13:31

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.409		0.0959	0.105		0.107	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Actinium-227	-0.147	U	0.534	0.534		0.905	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Bismuth-212	0.210	U	0.348	0.349		0.590	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Bismuth-214	0.251		0.0798	0.0839		0.0671	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Cesium-137	-0.0410	U	0.0661	0.0663		0.110	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Lead-210	0.493	U	0.943	0.945		1.58	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Lead-212	0.312		0.0958	0.104		0.140	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Lead-214	0.346		0.0713	0.0799		0.0808	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Potassium-40	10.1		1.14	1.54		0.237	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Protactinium-231	0.502	U	1.71	1.71		2.88	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Radium-226	0.251		0.0798	0.0839	0.500	0.0671	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Radium-228	0.409		0.0959	0.105		0.107	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Thallium-208	0.0925		0.0296	0.0311		0.0200	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Thorium-228	0.312		0.0958	0.104		0.140	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Thorium-232	0.409		0.0959	0.105		0.107	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Thorium-234	0.405	U	0.844	0.845		1.42	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Uranium-235	0.0352	U	0.165	0.165		0.569	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Uranium-238	0.405	U	0.844	0.845		1.42	pCi/g	10/16/17 21:43	11/06/17 15:18	1

Client Sample ID: TITO04-BS-FSS-SU7B-LANE2-U1-S016

Lab Sample ID: 160-24996-4

Date Collected: 10/11/17 13:33

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0954	U	0.0531	0.0540		0.363	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Actinium-227	0.0779	U	0.610	0.610		1.04	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-212	-0.400	U	1.22	1.22		1.12	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-214	0.00893	U	0.173	0.173		0.296	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Cesium-137	-0.0285	U	0.0996	0.0997		0.102	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-210	-0.213	U	1.22	1.22		2.11	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-212	0.251		0.0711	0.0782		0.0895	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-214	0.325		0.0980	0.104		0.116	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Potassium-40	11.1		1.34	1.76		0.647	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Protactinium-231	-0.175	U	2.25	2.25		3.81	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-226	0.00893	U	0.173	0.173	0.500	0.296	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-228	0.0954	U	0.0531	0.0540		0.363	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thallium-208	0.0960		0.0386	0.0399		0.0399	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-228	0.251		0.0711	0.0782		0.0895	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-232	0.0954	U	0.0531	0.0540		0.363	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-234	-0.0499	U	0.902	0.902		1.55	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-235	-0.0156	U	0.290	0.290		0.498	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-238	-0.0499	U	0.902	0.902		1.55	pCi/g	10/16/17 21:43	11/06/17 16:41	1

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Client Sample ID: TITO04-BS-FSS-SU7B-LANE2-U1-S017

Lab Sample ID: 160-24996-5

Date Collected: 10/11/17 13:36

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.208	U	0.273	0.273		0.397	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Actinium-227	-0.311	U	0.684	0.685		0.980	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-212	0.321	U	0.781	0.782		1.36	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-214	0.384		0.157	0.162		0.169	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Cesium-137	-0.00824	U	0.0699	0.0699		0.128	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-210	-0.915	U	1.41	1.41		2.32	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-212	0.242		0.0863	0.0918		0.112	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-214	0.306		0.129	0.132		0.167	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Potassium-40	11.6		1.82	2.17		0.754	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Protactinium-231	-0.0000000	U	2.44	2.44		4.20	pCi/g	10/16/17 21:43	11/06/17 16:41	1
	243									
Radium-226	0.384		0.157	0.162	0.500	0.169	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-228	0.208	U	0.273	0.273		0.397	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thallium-208	0.0615	U	0.0802	0.0804		0.101	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-228	0.242		0.0863	0.0918		0.112	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-232	0.208	U	0.273	0.273		0.397	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-234	0.0266	U	1.22	1.22		1.82	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-235	0.110	U	0.309	0.309		0.511	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-238	0.0266	U	1.22	1.22		1.82	pCi/g	10/16/17 21:43	11/06/17 16:41	1

Client Sample ID: TITO04-BS-FSS-SU7B-LANE2-U1-S018

Lab Sample ID: 160-24996-6

Date Collected: 10/11/17 13:38

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.321		0.191	0.194		0.212	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Actinium-227	-0.201	U	0.649	0.650		1.25	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-212	0.167	U	0.621	0.621		1.10	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-214	0.350		0.118	0.124		0.0888	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Cesium-137	-0.0279	U	0.113	0.113		0.111	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-210	0.605	U	1.38	1.38		2.32	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-212	0.0199	U	0.101	0.101		0.171	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-214	0.343		0.123	0.128		0.117	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Potassium-40	10.5		1.52	1.86		0.563	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Protactinium-231	-0.867	U	3.04	3.04		5.11	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-226	0.350		0.118	0.124	0.500	0.0888	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-228	0.321		0.191	0.194		0.212	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thallium-208	0.152		0.0569	0.0590		0.0487	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-228	0.0199	U	0.101	0.101		0.171	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-232	0.321		0.191	0.194		0.212	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-234	1.82		1.26	1.27		1.49	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-235	-0.224	U	0.256	0.257		0.886	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-238	1.82		1.26	1.27		1.49	pCi/g	10/16/17 21:43	11/06/17 16:41	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-332173/1-A

Matrix: Solid

Analysis Batch: 335900

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 332173

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Actinium-227	0.0000	U	0.406	0.406		1.29	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-212	-0.6171	U	0.642	0.645		1.48	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-214	-0.07514	U	0.0806	0.0809		0.210	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Cesium-137	-0.04555	U	0.0471	0.0474		0.129	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-210	1.132	U	1.32	1.33		1.79	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-212	-0.09664	U	0.0901	0.0909		0.205	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-214	0.002476	U	0.108	0.108		0.191	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Potassium-40	-0.4904	U	1.06	1.06		1.43	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Protactinium-231	0.2012	U	1.28	1.28		4.16	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-226	-0.07514	U	0.0806	0.0809	0.500	0.210	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-228	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thallium-208	0.007674	U	0.0172	0.0172		0.0657	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-228	-0.09664	U	0.0901	0.0909		0.205	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-232	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-234	-0.9046	U	1.10	1.10		2.01	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-235	0.03409	U	0.0937	0.0938		0.481	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-238	-0.9046	U	1.10	1.10		2.01	pCi/g	10/16/17 21:43	11/06/17 12:53	1

Lab Sample ID: LCS 160-332173/2-A

Matrix: Solid

Analysis Batch: 335894

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.9	100.2		10.5		0.882	pCi/g	103	87 - 116
Cesium-137	28.7	26.66		2.84		0.217	pCi/g	93	87 - 120
Cobalt-60	14.2	13.04		1.35		0.131	pCi/g	92	87 - 115

Lab Sample ID: 160-24992-A-1-E DU

Matrix: Solid

Analysis Batch: 335902

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1
Actinium-227	0.227	U	0.1468	U	0.710		1.21	pCi/g	0.07	1
Bismuth-212	-0.0280	U	-0.2606	U	0.864		1.81	pCi/g	0.14	1
Bismuth-214	0.279		0.3160		0.117		0.0955	pCi/g	0.15	1
Cesium-137	-0.0226	U	-0.07625	U	0.0705		0.156	pCi/g	0.41	1
Lead-210	-0.132	U	0.6555	U	1.49		2.51	pCi/g	0.29	1
Lead-212	0.238		0.2624		0.0854		0.0960	pCi/g	0.14	1
Lead-214	0.218		0.3577		0.100		0.0781	pCi/g	0.60	1
Potassium-40	10.4		11.69		2.03		0.594	pCi/g	0.33	1
Protactinium-231	-0.912	U	0.0000	U	0.159		3.90	pCi/g	0.39	1
Radium-226	0.279		0.3160		0.117	0.500	0.0955	pCi/g	0.15	1
Radium-228	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-24992-A-1-E DU

Matrix: Solid

Analysis Batch: 335902

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Sample		DU		Total	LOQ	MDC	Unit	RER	RER Limit
	Result	Qual	Result	Qual	Uncert. (2 σ +/-)					
Thallium-208	0.0350	U	0.1089		0.0698		0.0782	pCi/g	0.47	1
Thorium-228	0.238		0.2624		0.0854		0.0960	pCi/g	0.14	1
Thorium-232	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1
Thorium-234	-0.113	U	0.1822	U	0.198		2.33	pCi/g	0.26	1
Uranium-235	-0.00738	U	0.1270	U	0.340		0.703	pCi/g	0.37	1
Uranium-238	-0.113	U	0.1822	U	0.198		2.33	pCi/g	0.26	1

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Rad

Leach Batch: 331792

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24996-1	TITO04-BS-FSS-SU7B-LANE1-U1-S013	Total/NA	Solid	Dry and Grind	
160-24996-2	TITO04-BS-FSS-SU7B-LANE1-U1-S014	Total/NA	Solid	Dry and Grind	
160-24996-3	TITO04-BS-FSS-SU7B-LANE1-U1-S015	Total/NA	Solid	Dry and Grind	
160-24996-4	TITO04-BS-FSS-SU7B-LANE2-U1-S016	Total/NA	Solid	Dry and Grind	
160-24996-5	TITO04-BS-FSS-SU7B-LANE2-U1-S017	Total/NA	Solid	Dry and Grind	
160-24996-6	TITO04-BS-FSS-SU7B-LANE2-U1-S018	Total/NA	Solid	Dry and Grind	
160-24992-A-1-E DU	Duplicate	Total/NA	Solid	Dry and Grind	

Prep Batch: 332173

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24996-1	TITO04-BS-FSS-SU7B-LANE1-U1-S013	Total/NA	Solid	Fill_Geo-21	331792
160-24996-2	TITO04-BS-FSS-SU7B-LANE1-U1-S014	Total/NA	Solid	Fill_Geo-21	331792
160-24996-3	TITO04-BS-FSS-SU7B-LANE1-U1-S015	Total/NA	Solid	Fill_Geo-21	331792
160-24996-4	TITO04-BS-FSS-SU7B-LANE2-U1-S016	Total/NA	Solid	Fill_Geo-21	331792
160-24996-5	TITO04-BS-FSS-SU7B-LANE2-U1-S017	Total/NA	Solid	Fill_Geo-21	331792
160-24996-6	TITO04-BS-FSS-SU7B-LANE2-U1-S018	Total/NA	Solid	Fill_Geo-21	331792
MB 160-332173/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-332173/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-24992-A-1-E DU	Duplicate	Total/NA	Solid	Fill_Geo-21	331792

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-24992-2

Client Project/Site: Treasure Island - 500060

For:

Aptim Federal Services LLC
420 Exchange, Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korrinhizer

Authorized for release by:

11/9/2017 10:35:05 AM

Micha Korrinhizer, Project Management Assistant II
(314)298-8566

micha.korrinhizer@testamericainc.com

Designee for

Rhonda Ridenhower, Manager of Project Management
(314)298-8566

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Job ID: 160-24992-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-24992-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Job ID: 160-24992-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/13/2017; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 16.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSS-SU7D-U1-S001 (160-24992-1), TITO04-BS-FSS-SU7D-U1-S002 (160-24992-2), TITO04-BS-FSS-SU7D-U1-S003 (160-24992-3), TITO04-BS-FSS-SU7D-U1-S004 (160-24992-4), TITO04-BS-FSS-SU7D-U1-S005 (160-24992-5) and TITO04-BS-FSS-SU7D-U1-S006 (160-24992-6) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/13/2017, prepared on 10/16/2017 and analyzed on 11/06/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_BS_FSS_SU7D_U1_#420

Page 1 of 1

Project Number: **500060**

Project Name / Location: CTO-04 Phase III Bayside SU7
Quadrant D Use 1 Systematic

Purchase Order #: 201455

Shipment Date: 10/12/17

Waybill Number: 1266V5451393605904

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph #: Mike Dryden

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Renata Vidovic

Phone/Fax Number: 408-505-7319

Address: renata.vidovic@cbifederalservices.com

City:

Analyses Requested



160-24992 Chain of Custody

Sample ID Number	Sample Description	Collection Information			Matrix	# of containers	Preservative (water)		Dose Rate μ R/hr
		Date	Time	Method			Preservative (soil)	Container Type	
TITO04-BS-FSS-SU7D-U1-S001	Bayside FSS SU7 Quadrant D Lift 1 Systematic	10/11/17	1215	G	SO	1	16 oz Plastic	X	5
TITO04-BS-FSS-SU7D-U1-S002	Bayside FSS SU7 Quadrant D Lift 1 Systematic	10/11/17	1218	G	SO	1	16 oz Plastic	X	5
TITO04-BS-FSS-SU7D-U1-S003	Bayside FSS SU7 Quadrant D Lift 1 Systematic	10/11/17	1221	G	SO	1	16 oz Plastic	X	5
TITO04-BS-FSS-SU7D-U1-S004	Bayside FSS SU7 Quadrant D Lift 1 Systematic	10/11/17	1223	G	SO	1	16 oz Plastic	X	5
TITO04-BS-FSS-SU7D-U1-S005	Bayside FSS SU7 Quadrant D Lift 1 Systematic	10/11/17	1226	G	SO	1	16 oz Plastic	X	5
TITO04-BS-FSS-SU7D-U1-S006	Bayside FSS SU7 Quadrant D Lift 1 Systematic	10/11/17	1229	G	SO	1	16 oz Plastic	X	5

Special Instructions: **7 days ingrown draft and follow with 21 days final**

Level Of QC Required

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

I

II

III

Relinquished By: Renata Vidovic

Date: 10/11/17

Time: 1500

Relinquished By: Renata Vidovic

Date: 10-12-17

Time: 1200

Relinquished By: Renata Vidovic

Date: 10-12-17

Time: 1200

Received By: Renata Vidovic

Date: 10/11/17

Time: 1500

Received By: UPS

Date: 10/12/17

Time: 1200

Received By: UPS

Date: 10/12/17

Time: 1200

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-24992-2

Login Number: 24992**List Source: TestAmerica St. Louis****List Number: 1****Creator: Taylor, Kristene N**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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Sample Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-24992-1	TITO04-BS-FSS-SU7D-U1-S001	Solid	10/11/17 12:15	10/13/17 08:30
160-24992-2	TITO04-BS-FSS-SU7D-U1-S002	Solid	10/11/17 12:18	10/13/17 08:30
160-24992-3	TITO04-BS-FSS-SU7D-U1-S003	Solid	10/11/17 12:21	10/13/17 08:30
160-24992-4	TITO04-BS-FSS-SU7D-U1-S004	Solid	10/11/17 12:23	10/13/17 08:30
160-24992-5	TITO04-BS-FSS-SU7D-U1-S005	Solid	10/11/17 12:26	10/13/17 08:30
160-24992-6	TITO04-BS-FSS-SU7D-U1-S006	Solid	10/11/17 12:29	10/13/17 08:30

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S001

Lab Sample ID: 160-24992-1

Date Collected: 10/11/17 12:15

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.290		0.213	0.216		0.232	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Actinium-227	0.227	U	0.504	0.504		0.730	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-212	-0.0280	U	0.744	0.744		1.38	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-214	0.279		0.124	0.127		0.137	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Cesium-137	-0.0226	U	0.0608	0.0608		0.118	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-210	-0.132	U	1.24	1.24		1.91	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-212	0.238		0.0803	0.0860		0.0994	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-214	0.218		0.129	0.131		0.151	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Potassium-40	10.4		1.71	2.02		0.746	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Protactinium-231	-0.912	U	2.17	2.17		3.66	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-226	0.279		0.124	0.127	0.500	0.137	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-228	0.290		0.213	0.216		0.232	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thallium-208	0.0350	U	0.0879	0.0879		0.114	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-228	0.238		0.0803	0.0860		0.0994	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-232	0.290		0.213	0.216		0.232	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-234	-0.113	U	0.936	0.936		1.65	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-235	-0.00738	U	0.0196	0.0196		0.566	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-238	-0.113	U	0.936	0.936		1.65	pCi/g	10/16/17 21:43	11/06/17 12:53	1

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S002

Lab Sample ID: 160-24992-2

Date Collected: 10/11/17 12:18

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.285		0.188	0.190		0.214	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Actinium-227	-0.346	U	0.408	0.410		1.23	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Bismuth-212	-0.292	U	0.573	0.574		1.24	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Bismuth-214	0.323		0.133	0.137		0.127	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Cesium-137	-0.0306	U	0.102	0.103		0.107	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Lead-210	1.01	U	0.865	0.873		1.11	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Lead-212	0.311		0.0728	0.0832		0.0729	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Lead-214	0.418		0.122	0.129		0.0921	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Potassium-40	10.3		1.51	1.84		0.569	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Protactinium-231	0.544	U	1.64	1.65		3.75	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Radium-226	0.323		0.133	0.137	0.500	0.127	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Radium-228	0.285		0.188	0.190		0.214	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Thallium-208	0.113		0.0493	0.0506		0.0493	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Thorium-228	0.311		0.0728	0.0832		0.0729	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Thorium-232	0.285		0.188	0.190		0.214	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Thorium-234	0.521	U	0.856	0.858		1.43	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Uranium-235	0.0150	U	0.0556	0.0556		0.691	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Uranium-238	0.521	U	0.856	0.858		1.43	pCi/g	10/16/17 21:43	11/06/17 12:54	1

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S003

Lab Sample ID: 160-24992-3

Date Collected: 10/11/17 12:21

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.316		0.0978	0.103		0.150	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Actinium-227	-0.264	U	0.566	0.567		0.950	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Bismuth-212	0.302	U	0.550	0.551		0.930	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Bismuth-214	0.318		0.0929	0.0986		0.0890	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Cesium-137	-0.0361	U	0.0555	0.0557		0.0926	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Lead-210	0.476	U	1.14	1.14		1.91	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Lead-212	0.306		0.0606	0.0723		0.0591	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Lead-214	0.304		0.0715	0.0782		0.0679	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Potassium-40	10.1		1.18	1.57		0.509	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Protactinium-231	0.000	U	0.320	0.320		3.21	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Radium-226	0.318		0.0929	0.0986	0.500	0.0890	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Radium-228	0.316		0.0978	0.103		0.150	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Thallium-208	0.135		0.0414	0.0437		0.0309	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Thorium-228	0.306		0.0606	0.0723		0.0591	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Thorium-232	0.316		0.0978	0.103		0.150	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Thorium-234	-0.377	U	0.840	0.841		1.41	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Uranium-235	-0.0366	U	0.0690	0.0691		0.629	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Uranium-238	-0.377	U	0.840	0.841		1.41	pCi/g	10/16/17 21:43	11/06/17 12:52	1

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S004

Lab Sample ID: 160-24992-4

Date Collected: 10/11/17 12:23

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.478		0.108	0.118		0.171	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Actinium-227	0.0621	U	0.278	0.279		1.12	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Bismuth-212	0.225	U	0.892	0.892		1.53	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Bismuth-214	0.382		0.118	0.125		0.113	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Cesium-137	0.00152	U	0.0486	0.0486		0.0872	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-210	-0.203	U	1.47	1.47		2.53	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-212	0.290		0.0797	0.0880		0.101	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-214	0.341		0.104	0.110		0.105	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Potassium-40	10.5		1.36	1.73		0.692	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Protactinium-231	0.000	U	0.421	0.421		3.93	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Radium-226	0.382		0.118	0.125	0.500	0.113	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Radium-228	0.478		0.108	0.118		0.171	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thallium-208	0.0836		0.0735	0.0740		0.0747	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-228	0.290		0.0797	0.0880		0.101	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-232	0.478		0.108	0.118		0.171	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-234	-0.133	U	1.01	1.01		1.74	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Uranium-235	-0.174	U	0.310	0.311		0.592	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Uranium-238	-0.133	U	1.01	1.01		1.74	pCi/g	10/16/17 21:43	11/06/17 13:30	1

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S005

Lab Sample ID: 160-24992-5

Date Collected: 10/11/17 12:26

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.458		0.190	0.196		0.125	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Actinium-227	0.281	U	0.620	0.621		0.892	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Bismuth-212	-0.00138	U	0.814	0.814		1.49	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Bismuth-214	0.423		0.170	0.175		0.155	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Cesium-137	-0.0213	U	0.0650	0.0650		0.127	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-210	0.0954	U	1.19	1.19		1.82	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-212	0.200		0.0826	0.0865		0.113	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-214	0.364		0.112	0.119		0.111	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Potassium-40	11.3		1.78	2.12		0.747	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Protactinium-231	-0.876	U	2.82	2.82		4.75	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Radium-226	0.423		0.170	0.175	0.500	0.155	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Radium-228	0.458		0.190	0.196		0.125	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thallium-208	0.0948		0.0694	0.0701		0.0826	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-228	0.200		0.0826	0.0865		0.113	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-232	0.458		0.190	0.196		0.125	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-234	0.122	U	0.258	0.258		1.71	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Uranium-235	0.0450	U	0.320	0.320		0.614	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Uranium-238	0.122	U	0.258	0.258		1.71	pCi/g	10/16/17 21:43	11/06/17 13:30	1

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S006

Lab Sample ID: 160-24992-6

Date Collected: 10/11/17 12:29

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.337		0.186	0.189		0.185	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Actinium-227	0.216	U	0.502	0.503		0.847	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Bismuth-212	0.000	U	0.417	0.417		0.964	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Bismuth-214	0.323		0.0887	0.0948		0.0810	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Cesium-137	0.0252	U	0.0463	0.0464		0.0784	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Lead-210	0.460	U	1.11	1.11		1.87	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Lead-212	0.329		0.0653	0.0780		0.0658	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Lead-214	0.316		0.0829	0.0891		0.0756	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Potassium-40	9.40		1.17	1.52		0.534	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Protactinium-231	0.000	U	0.274	0.274		3.51	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Radium-226	0.323		0.0887	0.0948	0.500	0.0810	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Radium-228	0.337		0.186	0.189		0.185	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Thallium-208	0.116		0.0328	0.0350		0.0194	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Thorium-228	0.329		0.0653	0.0780		0.0658	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Thorium-232	0.337		0.186	0.189		0.185	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Thorium-234	0.362	U	0.884	0.884		1.49	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Uranium-235	0.0719	U	0.147	0.147		0.582	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Uranium-238	0.362	U	0.884	0.884		1.49	pCi/g	10/16/17 21:43	11/06/17 13:29	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-332173/1-A

Matrix: Solid

Analysis Batch: 335900

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 332173

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Actinium-227	0.0000	U	0.406	0.406		1.29	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-212	-0.6171	U	0.642	0.645		1.48	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-214	-0.07514	U	0.0806	0.0809		0.210	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Cesium-137	-0.04555	U	0.0471	0.0474		0.129	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-210	1.132	U	1.32	1.33		1.79	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-212	-0.09664	U	0.0901	0.0909		0.205	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-214	0.002476	U	0.108	0.108		0.191	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Potassium-40	-0.4904	U	1.06	1.06		1.43	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Protactinium-231	0.2012	U	1.28	1.28		4.16	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-226	-0.07514	U	0.0806	0.0809	0.500	0.210	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-228	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thallium-208	0.007674	U	0.0172	0.0172		0.0657	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-228	-0.09664	U	0.0901	0.0909		0.205	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-232	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-234	-0.9046	U	1.10	1.10		2.01	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-235	0.03409	U	0.0937	0.0938		0.481	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-238	-0.9046	U	1.10	1.10		2.01	pCi/g	10/16/17 21:43	11/06/17 12:53	1

Lab Sample ID: LCS 160-332173/2-A

Matrix: Solid

Analysis Batch: 335894

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.9	100.2		10.5		0.882	pCi/g	103	87 - 116
Cesium-137	28.7	26.66		2.84		0.217	pCi/g	93	87 - 120
Cobalt-60	14.2	13.04		1.35		0.131	pCi/g	92	87 - 115

Lab Sample ID: 160-24992-1 DU

Matrix: Solid

Analysis Batch: 335902

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S001

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1
Actinium-227	0.227	U	0.1468	U	0.710		1.21	pCi/g	0.07	1
Bismuth-212	-0.0280	U	-0.2606	U	0.864		1.81	pCi/g	0.14	1
Bismuth-214	0.279		0.3160		0.117		0.0955	pCi/g	0.15	1
Cesium-137	-0.0226	U	-0.07625	U	0.0705		0.156	pCi/g	0.41	1
Lead-210	-0.132	U	0.6555	U	1.49		2.51	pCi/g	0.29	1
Lead-212	0.238		0.2624		0.0854		0.0960	pCi/g	0.14	1
Lead-214	0.218		0.3577		0.100		0.0781	pCi/g	0.60	1
Potassium-40	10.4		11.69		2.03		0.594	pCi/g	0.33	1
Protactinium-231	-0.912	U	0.0000	U	0.159		3.90	pCi/g	0.39	1
Radium-226	0.279		0.3160		0.117	0.500	0.0955	pCi/g	0.15	1
Radium-228	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-24992-1 DU

Matrix: Solid

Analysis Batch: 335902

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S001

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Sample		DU		Total Uncert. (2 σ +/-)	LOQ	MDC	Unit	RER	
	Result	Qual	Result	Qual					RER	Limit
Thallium-208	0.0350	U	0.1089		0.0698		0.0782	pCi/g	0.47	1
Thorium-228	0.238		0.2624		0.0854		0.0960	pCi/g	0.14	1
Thorium-232	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1
Thorium-234	-0.113	U	0.1822	U	0.198		2.33	pCi/g	0.26	1
Uranium-235	-0.00738	U	0.1270	U	0.340		0.703	pCi/g	0.37	1
Uranium-238	-0.113	U	0.1822	U	0.198		2.33	pCi/g	0.26	1

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Rad

Leach Batch: 331792

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24992-1	TITO04-BS-FSS-SU7D-U1-S001	Total/NA	Solid	Dry and Grind	
160-24992-2	TITO04-BS-FSS-SU7D-U1-S002	Total/NA	Solid	Dry and Grind	
160-24992-3	TITO04-BS-FSS-SU7D-U1-S003	Total/NA	Solid	Dry and Grind	
160-24992-4	TITO04-BS-FSS-SU7D-U1-S004	Total/NA	Solid	Dry and Grind	
160-24992-5	TITO04-BS-FSS-SU7D-U1-S005	Total/NA	Solid	Dry and Grind	
160-24992-6	TITO04-BS-FSS-SU7D-U1-S006	Total/NA	Solid	Dry and Grind	
160-24992-1 DU	TITO04-BS-FSS-SU7D-U1-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 332173

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24992-1	TITO04-BS-FSS-SU7D-U1-S001	Total/NA	Solid	Fill_Geo-21	331792
160-24992-2	TITO04-BS-FSS-SU7D-U1-S002	Total/NA	Solid	Fill_Geo-21	331792
160-24992-3	TITO04-BS-FSS-SU7D-U1-S003	Total/NA	Solid	Fill_Geo-21	331792
160-24992-4	TITO04-BS-FSS-SU7D-U1-S004	Total/NA	Solid	Fill_Geo-21	331792
160-24992-5	TITO04-BS-FSS-SU7D-U1-S005	Total/NA	Solid	Fill_Geo-21	331792
160-24992-6	TITO04-BS-FSS-SU7D-U1-S006	Total/NA	Solid	Fill_Geo-21	331792
MB 160-332173/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-332173/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-24992-1 DU	TITO04-BS-FSS-SU7D-U1-S001	Total/NA	Solid	Fill_Geo-21	331792

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-24994-2

Client Project/Site: Treasure Island - 500060

For:

Aptim Federal Services LLC
420 Exchange, Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korrinhizer

Authorized for release by:

11/9/2017 10:41:10 AM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24994-2

Job ID: 160-24994-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-24994-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24994-2

Job ID: 160-24994-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/13/2017; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 16.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-SU7B-LANE3-U1-S019 (160-24994-1) and TITO04-BS-SU7B-LANE3-U1-S020 (160-24994-2) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/13/2017, prepared on 10/16/2017 and analyzed on 11/06/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-24994-2

Login Number: 24994**List Source: TestAmerica St. Louis****List Number: 1****Creator: Taylor, Kristene N**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24994-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24994-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:
DOE = U.S. Department of Energy

Laboratory References:
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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Sample Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24994-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-24994-1	TITO04-BS-SU7B-LANE3-U1-S019	Solid	10/10/17 12:45	10/13/17 08:30
160-24994-2	TITO04-BS-SU7B-LANE3-U1-S020	Solid	10/10/17 12:48	10/13/17 08:30

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Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24994-2

Client Sample ID: TITO04-BS-SU7B-LANE3-U1-S019

Lab Sample ID: 160-24994-1

Date Collected: 10/10/17 12:45

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.293		0.153	0.156		0.146	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Actinium-227	-0.279	U	0.564	0.565		0.945	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Bismuth-212	0.839		0.301	0.314		0.199	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Bismuth-214	0.297		0.0836	0.0891		0.0663	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Cesium-137	0.000	U	0.0167	0.0167		0.0738	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Lead-210	-0.0940	U	0.977	0.977		1.68	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Lead-212	0.259		0.0579	0.0669		0.0621	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Lead-214	0.383		0.0685	0.0792		0.0708	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Potassium-40	10.5		1.18	1.60		0.244	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Protactinium-231	0.000	U	0.212	0.212		3.04	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Radium-226	0.297		0.0836	0.0891	0.500	0.0663	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Radium-228	0.293		0.153	0.156		0.146	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Thallium-208	0.109		0.0377	0.0393		0.0308	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Thorium-228	0.259		0.0579	0.0669		0.0621	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Thorium-232	0.293		0.153	0.156		0.146	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Thorium-234	0.723	U	0.326	0.335		1.83	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Uranium-235	-0.0419	U	0.0947	0.0948		0.607	pCi/g	10/16/17 21:43	11/06/17 13:31	1
Uranium-238	0.723	U	0.326	0.335		1.83	pCi/g	10/16/17 21:43	11/06/17 13:31	1

Client Sample ID: TITO04-BS-SU7B-LANE3-U1-S020

Lab Sample ID: 160-24994-2

Date Collected: 10/10/17 12:48

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.415		0.119	0.127		0.132	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Actinium-227	-0.240	U	0.633	0.634		0.858	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Bismuth-212	-0.0767	U	0.630	0.630		1.13	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Bismuth-214	0.141	U	0.0983	0.0994		0.337	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Cesium-137	0.000766	U	0.0403	0.0403		0.0734	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Lead-210	0.0464	U	1.14	1.14		1.96	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Lead-212	0.249		0.0783	0.0847		0.105	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Lead-214	0.404		0.0981	0.107		0.0892	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Potassium-40	9.64		1.28	1.62		0.668	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Protactinium-231	-0.0558	U	0.135	0.135		3.48	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Radium-226	0.141	U	0.0983	0.0994	0.500	0.337	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Radium-228	0.415		0.119	0.127		0.132	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thallium-208	0.0595	U	0.0719	0.0722		0.0804	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thorium-228	0.249		0.0783	0.0847		0.105	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thorium-232	0.415		0.119	0.127		0.132	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thorium-234	-0.0619	U	0.980	0.980		1.69	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Uranium-235	-0.0124	U	0.0206	0.0207		0.556	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Uranium-238	-0.0619	U	0.980	0.980		1.69	pCi/g	10/16/17 21:43	11/06/17 14:11	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24994-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-332173/1-A

Matrix: Solid

Analysis Batch: 335900

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 332173

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Actinium-227	0.0000	U	0.406	0.406		1.29	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-212	-0.6171	U	0.642	0.645		1.48	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-214	-0.07514	U	0.0806	0.0809		0.210	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Cesium-137	-0.04555	U	0.0471	0.0474		0.129	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-210	1.132	U	1.32	1.33		1.79	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-212	-0.09664	U	0.0901	0.0909		0.205	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-214	0.002476	U	0.108	0.108		0.191	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Potassium-40	-0.4904	U	1.06	1.06		1.43	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Protactinium-231	0.2012	U	1.28	1.28		4.16	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-226	-0.07514	U	0.0806	0.0809	0.500	0.210	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-228	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thallium-208	0.007674	U	0.0172	0.0172		0.0657	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-228	-0.09664	U	0.0901	0.0909		0.205	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-232	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-234	-0.9046	U	1.10	1.10		2.01	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-235	0.03409	U	0.0937	0.0938		0.481	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-238	-0.9046	U	1.10	1.10		2.01	pCi/g	10/16/17 21:43	11/06/17 12:53	1

Lab Sample ID: LCS 160-332173/2-A

Matrix: Solid

Analysis Batch: 335894

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.9	100.2		10.5		0.882	pCi/g	103	87 - 116
Cesium-137	28.7	26.66		2.84		0.217	pCi/g	93	87 - 120
Cobalt-60	14.2	13.04		1.35		0.131	pCi/g	92	87 - 115

Lab Sample ID: 160-24992-A-1-E DU

Matrix: Solid

Analysis Batch: 335902

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1
Actinium-227	0.227	U	0.1468	U	0.710		1.21	pCi/g	0.07	1
Bismuth-212	-0.0280	U	-0.2606	U	0.864		1.81	pCi/g	0.14	1
Bismuth-214	0.279		0.3160		0.117		0.0955	pCi/g	0.15	1
Cesium-137	-0.0226	U	-0.07625	U	0.0705		0.156	pCi/g	0.41	1
Lead-210	-0.132	U	0.6555	U	1.49		2.51	pCi/g	0.29	1
Lead-212	0.238		0.2624		0.0854		0.0960	pCi/g	0.14	1
Lead-214	0.218		0.3577		0.100		0.0781	pCi/g	0.60	1
Potassium-40	10.4		11.69		2.03		0.594	pCi/g	0.33	1
Protactinium-231	-0.912	U	0.0000	U	0.159		3.90	pCi/g	0.39	1
Radium-226	0.279		0.3160		0.117	0.500	0.0955	pCi/g	0.15	1
Radium-228	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24994-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-24992-A-1-E DU

Matrix: Solid

Analysis Batch: 335902

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Sample		DU		Total Uncert. (2 σ +/-)	LOQ	MDC	Unit	RER	
	Result	Qual	Result	Qual					RER	Limit
Thallium-208	0.0350	U	0.1089		0.0698		0.0782	pCi/g	0.47	1
Thorium-228	0.238		0.2624		0.0854		0.0960	pCi/g	0.14	1
Thorium-232	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1
Thorium-234	-0.113	U	0.1822	U	0.198		2.33	pCi/g	0.26	1
Uranium-235	-0.00738	U	0.1270	U	0.340		0.703	pCi/g	0.37	1
Uranium-238	-0.113	U	0.1822	U	0.198		2.33	pCi/g	0.26	1

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24994-2

Rad

Leach Batch: 331792

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24994-1	TITO04-BS-SU7B-LANE3-U1-S019	Total/NA	Solid	Dry and Grind	
160-24994-2	TITO04-BS-SU7B-LANE3-U1-S020	Total/NA	Solid	Dry and Grind	
160-24992-A-1-E DU	Duplicate	Total/NA	Solid	Dry and Grind	

Prep Batch: 332173

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24994-1	TITO04-BS-SU7B-LANE3-U1-S019	Total/NA	Solid	Fill_Geo-21	331792
160-24994-2	TITO04-BS-SU7B-LANE3-U1-S020	Total/NA	Solid	Fill_Geo-21	331792
MB 160-332173/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-332173/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-24992-A-1-E DU	Duplicate	Total/NA	Solid	Fill_Geo-21	331792

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-25032-2

Client Project/Site: Treasure Island - 500060

For:

Aptim Federal Services LLC
420 Exchange, Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korrinhizer

Authorized for release by:

11/10/2017 8:30:32 AM

Micha Korrinhizer, Project Management Assistant II
(314)298-8566

micha.korrinhizer@testamericainc.com

Designee for

Rhonda Ridenhower, Manager of Project Management
(314)298-8566

rhonda.ridenhower@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Job ID: 160-25032-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-25032-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Job ID: 160-25032-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/16/2017; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSS-SU7B-LANE3-U2-S021 (160-25032-1) and TITO04-BS-FSS-SU7B-LANE3-U2-S022 (160-25032-2) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/16/2017, prepared on 10/17/2017 and analyzed on 11/07/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-25032-2

Login Number: 25032**List Source: TestAmerica St. Louis****List Number: 1****Creator: Daniels, Brian J**

Question	Answer	Comment
Radioactivity wasn't checked or is <= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:
DOE = U.S. Department of Energy

Laboratory References:
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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Sample Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-25032-1	TITO04-BS-FSS-SU7B-LANE3-U2-S021	Solid	10/13/17 08:39	10/16/17 08:40
160-25032-2	TITO04-BS-FSS-SU7B-LANE3-U2-S022	Solid	10/13/17 08:38	10/16/17 08:40

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Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Client Sample ID: TITO04-BS-FSS-SU7B-LANE3-U2-S021

Date Collected: 10/13/17 08:39

Date Received: 10/16/17 08:40

Lab Sample ID: 160-25032-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.405		0.143	0.149		0.267	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Actinium-227	-0.293	U	0.724	0.725		0.977	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Bismuth-212	-0.111	U	0.618	0.618		1.12	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Bismuth-214	0.372		0.127	0.132		0.123	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Cesium-137	0.0268	U	0.0463	0.0464		0.0782	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Lead-210	-0.0749	U	1.50	1.50		2.57	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Lead-212	0.325		0.0843	0.0942		0.107	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Lead-214	0.413		0.100	0.109		0.0843	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Potassium-40	10.5		1.39	1.76		0.792	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Protactinium-231	0.000	U	0.262	0.262		4.03	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Radium-226	0.372		0.127	0.132	0.500	0.123	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Radium-228	0.405		0.143	0.149		0.267	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Thallium-208	0.155		0.0618	0.0638		0.0613	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Thorium-228	0.325		0.0843	0.0942		0.107	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Thorium-232	0.405		0.143	0.149		0.267	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Thorium-234	0.785	U	1.14	1.14		1.55	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Uranium-235	0.0760	U	0.281	0.281		0.475	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Uranium-238	0.785	U	1.14	1.14		1.55	pCi/g	10/17/17 22:41	11/07/17 09:28	1

Client Sample ID: TITO04-BS-FSS-SU7B-LANE3-U2-S022

Date Collected: 10/13/17 08:38

Date Received: 10/16/17 08:40

Lab Sample ID: 160-25032-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.127	U	0.180	0.181		0.321	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Actinium-227	-0.0430	U	0.0729	0.0731		0.824	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Bismuth-212	-0.211	U	0.663	0.663		1.15	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Bismuth-214	0.377		0.116	0.122		0.0981	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Cesium-137	0.0259	U	0.0556	0.0557		0.0949	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Lead-210	-0.657	U	1.30	1.30		1.98	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Lead-212	0.284		0.0749	0.0834		0.0896	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Lead-214	0.318		0.0904	0.0963		0.109	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Potassium-40	10.7		1.44	1.81		0.546	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Protactinium-231	-0.662	U	2.15	2.15		3.62	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Radium-226	0.377		0.116	0.122	0.500	0.0981	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Radium-228	0.127	U	0.180	0.181		0.321	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Thallium-208	0.0919		0.0449	0.0459		0.0466	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Thorium-228	0.284		0.0749	0.0834		0.0896	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Thorium-232	0.127	U	0.180	0.181		0.321	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Thorium-234	0.608	U	0.451	0.455		1.08	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Uranium-235	-0.00770	U	0.286	0.286		0.513	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Uranium-238	0.608	U	0.451	0.455		1.08	pCi/g	10/17/17 22:41	11/07/17 09:51	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-332289/1-A

Matrix: Solid

Analysis Batch: 335965

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 332289

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.08985	U	0.146	0.146		0.172	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Actinium-227	-0.2566	U	0.536	0.537		0.908	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Bismuth-212	0.01351	U	0.456	0.456		0.857	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Bismuth-214	-0.02833	U	0.109	0.109		0.197	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Cesium-137	0.01102	U	0.0358	0.0358		0.0646	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Lead-210	-0.1019	U	0.176	0.176		1.68	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Lead-212	-0.03448	U	0.0687	0.0688		0.118	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Lead-214	-0.003396	U	0.0960	0.0960		0.171	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Potassium-40	0.3284	U	0.749	0.750		0.979	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Protactinium-231	0.0000	U	0.391	0.391		3.84	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Radium-226	-0.02833	U	0.109	0.109	0.500	0.197	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Radium-228	0.08985	U	0.146	0.146		0.172	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Thallium-208	-0.008705	U	0.0481	0.0481		0.0652	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Thorium-228	-0.03448	U	0.0687	0.0688		0.118	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Thorium-232	0.08985	U	0.146	0.146		0.172	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Thorium-234	-0.4035	U	0.889	0.890		1.51	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Uranium-235	0.07079	U	0.269	0.269		0.460	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Uranium-238	-0.4035	U	0.889	0.890		1.51	pCi/g	10/17/17 22:41	11/07/17 17:37	1

Lab Sample ID: LCS 160-332289/2-A

Matrix: Solid

Analysis Batch: 335959

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 332289

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.9	95.39		10.0		0.990	pCi/g	98	87 - 116
Cesium-137	28.7	26.88		2.85		0.180	pCi/g	94	87 - 120
Cobalt-60	14.2	13.09		1.36		0.0612	pCi/g	92	87 - 115

Lab Sample ID: 160-25032-1 DU

Matrix: Solid

Analysis Batch: 335961

Client Sample ID: TITO04-BS-FSS-SU7B-LANE3-U2-S021

Prep Type: Total/NA

Prep Batch: 332289

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.405		0.1700		0.130		0.149	pCi/g	0.84	1
Actinium-227	-0.293	U	0.3378	U	0.740		1.24	pCi/g	0.43	1
Bismuth-212	-0.111	U	0.0000	U	0.175		1.62	pCi/g	0.14	1
Bismuth-214	0.372		0.3090		0.112		0.0911	pCi/g	0.26	1
Cesium-137	0.0268	U	-0.02465	U	0.0635		0.110	pCi/g	0.47	1
Lead-210	-0.0749	U	-0.1147	U	1.74		2.97	pCi/g	0.01	1
Lead-212	0.325		0.4048		0.148		0.133	pCi/g	0.33	1
Lead-214	0.413		0.2314		0.137		0.204	pCi/g	0.74	1
Potassium-40	10.5		9.322		1.84		0.918	pCi/g	0.32	1
Protactinium-231	0.000	U	0.3708	U	1.31		4.29	pCi/g	0.24	1
Radium-226	0.372		0.3090		0.112	0.500	0.0911	pCi/g	0.26	1
Radium-228	0.405		0.1700		0.130		0.149	pCi/g	0.84	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-25032-1 DU
Matrix: Solid
Analysis Batch: 335961

Client Sample ID: TITO04-BS-FSS-SU7B-LANE3-U2-S021
Prep Type: Total/NA
Prep Batch: 332289

Analyte	Sample		DU		Total	LOQ	MDC	Unit	RER	RER Limit
	Result	Qual	Result	Qual	Uncert. (2σ+/-)					
Thallium-208	0.155		0.1269		0.0757		0.0784	pCi/g	0.20	1
Thorium-228	0.325		0.4048		0.148		0.133	pCi/g	0.33	1
Thorium-232	0.405		0.1700		0.130		0.149	pCi/g	0.84	1
Thorium-234	0.785	U	-0.4419	U	1.36		2.95	pCi/g	0.49	1
Uranium-235	0.0760	U	0.1923	U	0.340		0.674	pCi/g	0.19	1
Uranium-238	0.785	U	-0.4419	U	1.36		2.95	pCi/g	0.49	1

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Rad

Leach Batch: 332144

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-25032-1	TITO04-BS-FSS-SU7B-LANE3-U2-S021	Total/NA	Solid	Dry and Grind	
160-25032-2	TITO04-BS-FSS-SU7B-LANE3-U2-S022	Total/NA	Solid	Dry and Grind	
160-25032-1 DU	TITO04-BS-FSS-SU7B-LANE3-U2-S021	Total/NA	Solid	Dry and Grind	

Prep Batch: 332289

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-25032-1	TITO04-BS-FSS-SU7B-LANE3-U2-S021	Total/NA	Solid	Fill_Geo-21	332144
160-25032-2	TITO04-BS-FSS-SU7B-LANE3-U2-S022	Total/NA	Solid	Fill_Geo-21	332144
MB 160-332289/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-332289/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-25032-1 DU	TITO04-BS-FSS-SU7B-LANE3-U2-S021	Total/NA	Solid	Fill_Geo-21	332144

From: [Sevcik, Joseph T CIV SEA 04 04N](#)
To: [Guillory, Jeffrey](#)
Cc: [Edwards, Zachary L CIV SEA 04 04N](#); [Yantos, Christopher N CIV NAVFAC SW, BRAC](#); [Messer, Ulrika](#); [Hackett, John R](#); [Schul, Raymond](#); [Coffey, Lisa M](#); [Morrison, Dennis](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 10 Use 1, Part 1
Date: Thursday, March 10, 2016 12:52:44 PM

Jeff,
I concur with designating RSY 10 Use 1, Part 1 soil as non-LLRW.

v/r,

Joe Sevcik
Environmental Protection Manager
NAVSEADET RASO
160 Main Road
Building 1959
NWS Yorktown, VA 23691
Office: (757) 887-4483
DSN: 953-4483
Fax: (757) 887-4900

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederaleservices.com>]
Sent: Monday, January 25, 2016 4:00 PM
To: Sevcik, Joseph T CIV SEA 04 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Coffey, Lisa M; Morrison, Dennis
Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 10 Use 1, Part 1

Mr. Sevcik,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Description: Description: Description: Description: cid:_1_0AD725A00AD721CC001388C386257B11

Jeffrey Guillory

Health Physics Support

Radiation Safety

Federal Services

+1 415 398 6547 ext.238

Cell: +1 979.422.5534

jeffrey.guillory@cbifederalservices.com <<mailto:jeffrey.guillory@cbifederalservices.com>>

CB&I

950 Avenue M

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United States of America

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Naval Station Treasure Island Site 12 Phase 3
RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY #10	RSY Unit Use Number: USE 1, Part 1	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Lisa Coffey/Tina Piquet/Jeff Guillory		Data Report Submittal Date: 01/25/2016

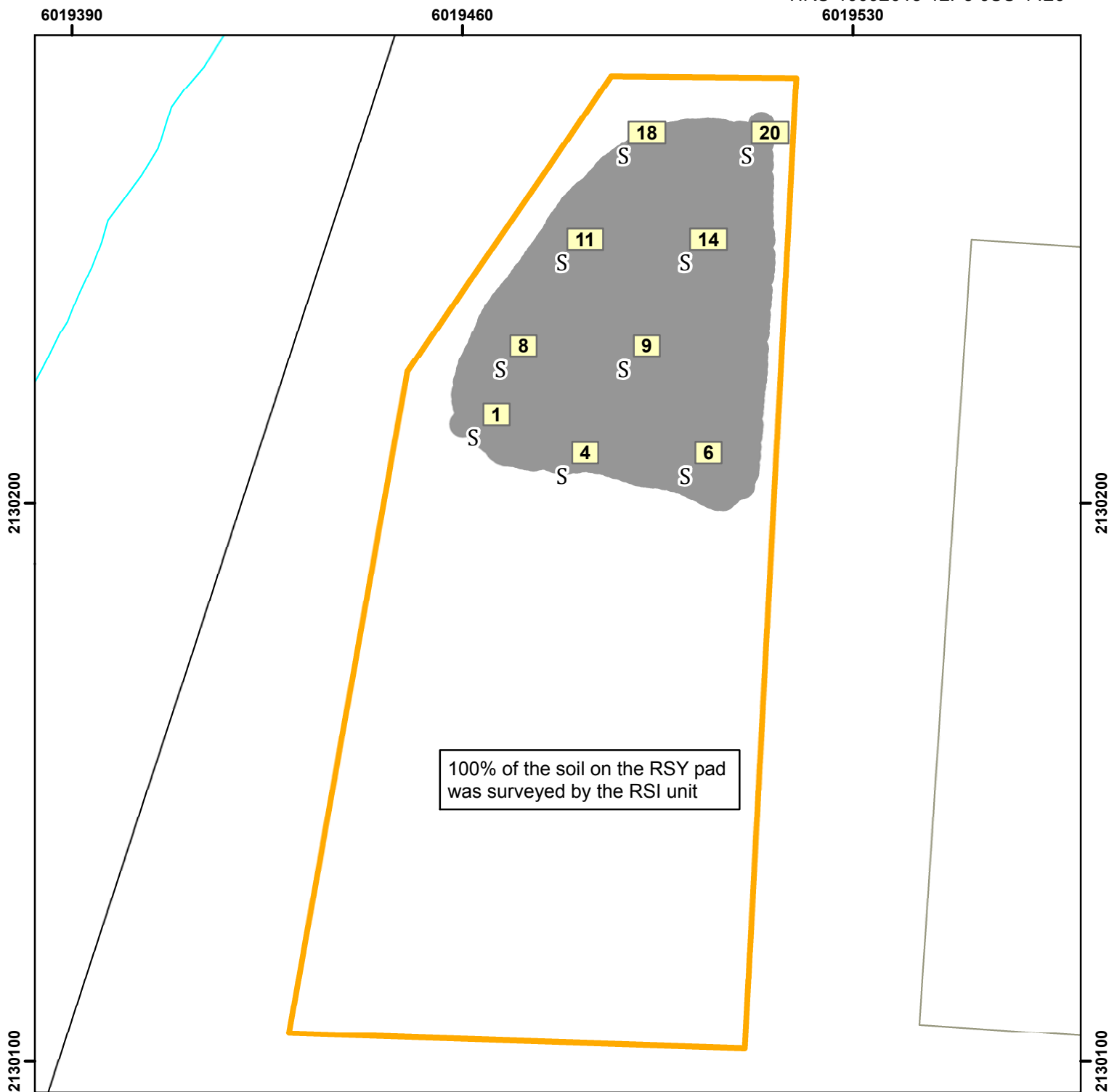
Soil Sample Data						
Sample Identification	Survey Location*	Sample Type	Static 2221 Meter Serial Number	One Minute Static Reading (CPM)	Static Count Over Static Mean + 3σ	Ra ²²⁶ Final Analytical Results
TITO04_SU1_FSS_NP-CH-S001	1	Systematic	97290	14,817	No	0.380
TITO04_SU1_FSS_NP-CH-S004	4	Systematic	97290	14,398	No	0.383
TITO04_SU1_FSS_NP-CH-S006	6	Systematic	97290	14,213	No	0.325
TITO04_SU1_FSS_NP-CH-S008	8	Systematic	97290	14,034	No	0.351
TITO04_SU1_FSS_NP-CH-S009	9	Systematic	97290	13,627	No	0.280
TITO04_SU1_FSS_NP-CH-S011	11	Systematic	97290	14,278	No	0.338
TITO04_SU1_FSS_NP-CH-S014	14	Systematic	97290	13,842	No	0.295
TITO04_SU1_FSS_NP-CH-S018	18	Systematic	97290	14,585	No	0.319
TITO04_SU1_FSS_NP-CH-S020	20	Systematic	97290	14,150	No	0.538

*Additional systematic soil samples were obtained in-situ and are not included in this report—see [Note](#) on the following page.

Instrument Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Static Background (CPM)	Static Background Plus 3σ (CPM)	Scan Background	Scan Background Plus 3σ	Range
General Area Exposure Rates	TIRS-10072015- 12P3-JSS-1380	10/07/2015	19	1/27/2016	138426	N/A	N/A	N/A	N/A	6 – 7 μR/hr
Gamma Scan Walkover	TIRS-10082015- 12P3-ROV-1420	10/8/2015	RS-701/ RSX-1	N/A	Console: B-1051 / Detectors: 5447, 5448	N/A	N/A	837 CPS	972 CPS	607 – 820 CPS
Follow-up Required Static	TIRS-10092015- 12P3-JSS-1437	10/9/2015	2221	1/27/2016	262337	17,610	19,608	N/A	N/A	13,414 – 14,377 CPM
One Minute Systematic Sampling Static Counts	TIRS-10092015- 12P3-JSS-1426	10/9/2015 - 10/12/2015	2221	4/28/2016	97290	18,301	20,154	N/A	N/A	13,627 – 14,817 CPM

CPM = Counts Per Minute
CPS = Counts Per Second

Summary
1) General area survey performed of staged soil piles prior to soil being spread to the 9-inch screening layer.
2) Initial RSI gamma scan and data review—upon review of initial scan data, follow-up static investigations were deemed necessary, and investigation locations were identified as per the RSI Data Evaluation Process (page 4). Gamma scan coverage shown on Systematic Sample Survey map (page 3). Contour maps of initial scan data are shown on RSI Data Plots (page 5). Data review results are summarized on RSI Review Summary (page 6).
3) Follow-up static survey—12 locations identified during the data review process were investigated, resulting in all locations < static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 7).
4) Nine systematic soil samples (001, 004, 006, 008, 009, 011, 014, 018, 020) obtained and submitted for gamma spectroscopy analysis—see note below. Static measurements were performed at all systematic sample locations, with all readings < static IL. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). Test America sample results are attached.
<u>Note:</u>
This soil sampling represents the soil from a portion of North Point SU 1 that is underwater. All accessible areas at the final excavation depth of North Point SU 1 were surveyed onsite. Eleven (of the required twenty) systematic soil samples of FSS soil were collected in-situ, and the remaining nine systematic soil samples (of the required twenty) were obtained from the over excavated FSS soil (6" depth) staged on RSY Pad 10 Use 1, Part 1.
For the purposes of this report, only gamma spectroscopy analysis results for soil samples originating from RSY Pad 10 Use 1, Part 1 were used in the statistical evaluation of the RSY pad. However, the entire set of systematic samples (twenty total samples, collected both in-situ and from the RSY pad) was also evaluated and concluded to be comparable to background—these results will be included in a more comprehensive data package for North Point SU 1.
Summary:
All locations with elevated Z-scores identified by the initial RSI gamma scan were deemed comparable to background. 12 follow-up static locations were investigated, with readings < static IL at all locations.
Additional locations (a-c, page 5) with elevated Z-scores that did not meet the criteria for a follow-up investigation were evaluated by spectral analysis of the RSI gamma scan data, which did not indicate the presence of Ra-226 above background levels (pages 10-15).
Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 8-9. These statistical tools were utilized to verify the appropriate level of reasonable effort.
RSY 10 (Use 1, Part 1) contains soil from the final 6-inch over excavation of North Point SU 1.
Note: Soil on RSY Pad 10 (Use 1, Part 1) was removed from the final depth of the excavation at North Point SU 1, and no visible debris or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.
CB&I requests RASO concurrence to release this soil as Non-LLRW.
Disposition: This soil shall be dispositioned as CERCLA Class I waste following additional on-site chemical characterization.



Instrument # 97290

S Systematic Sample Location

● RSI Coverage

▭ RSYPAD Boundaries

CB&I Federal Services, LLC



0 10 20 40
 Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

RSI Data Evaluation Process

RS-700 Mobile Radiation Monitoring System

- Self-contained gamma-ray radiation detection and monitoring system
- Built-in GPS receiver
- (2) RSX-1 4-liter NaI(Tl) gamma detectors oriented perpendicular to the direction of travel (VD1 denotes both detectors summed; VD3 refers to the left detector; and VD4 refers to the right detector)
- Multi-Channel Analyzer, allowing for monitoring of energy-specific regions of interest (ROIs)
- RadAssist survey software for control, monitoring, and recording

Ten ROIs have been established for radium and progeny as well as other naturally-occurring or anthropogenic gamma-emitting radionuclides that may be of interest:

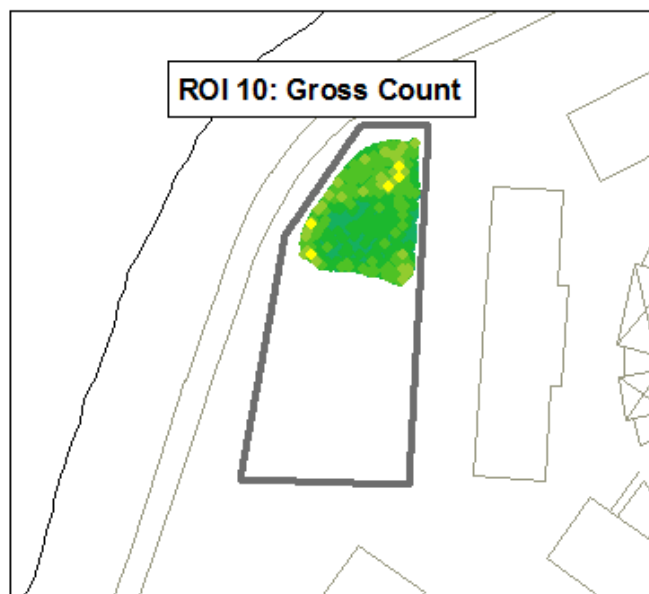
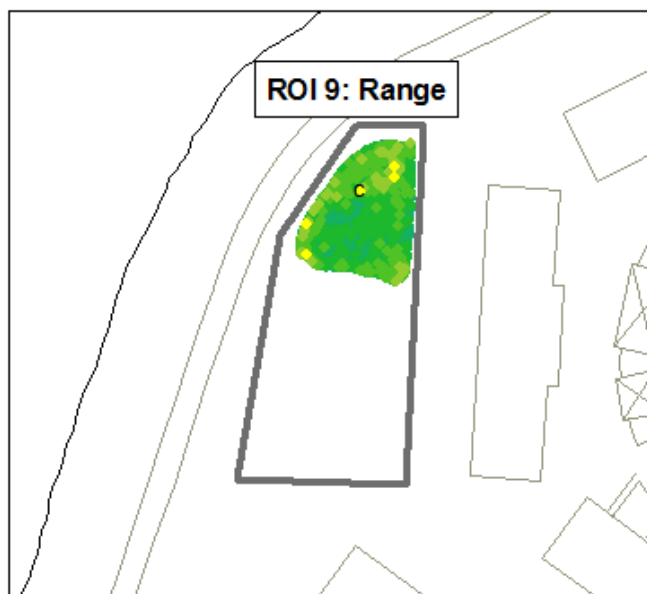
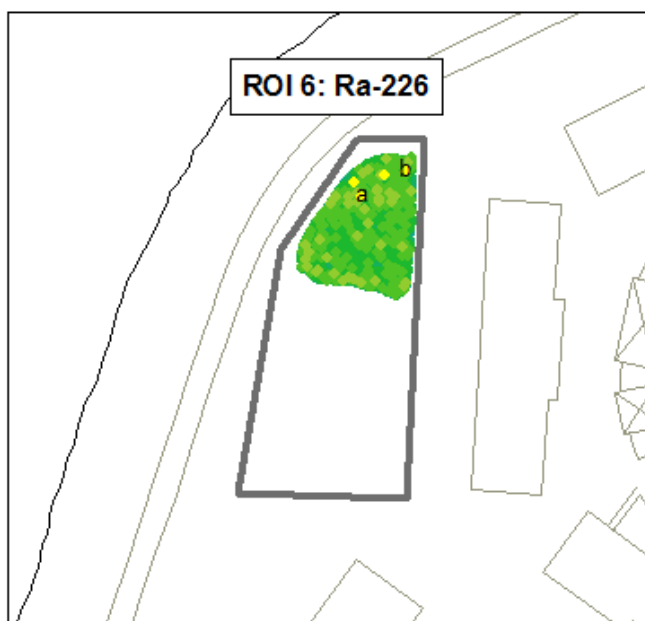
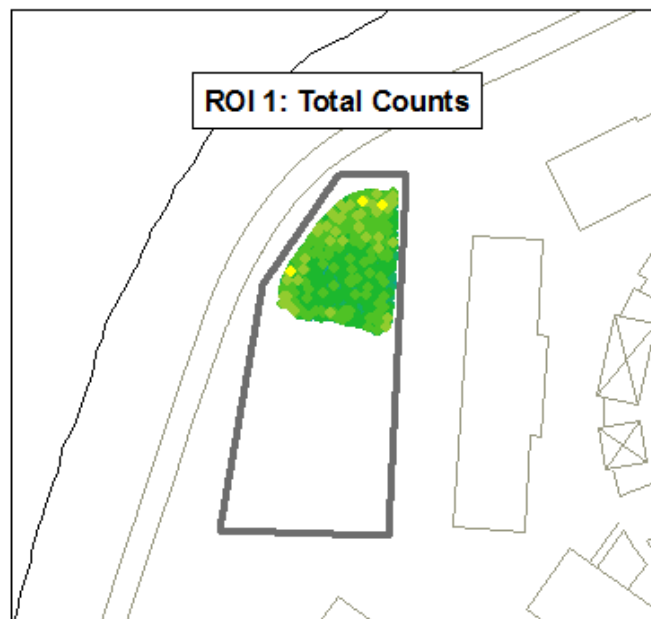
ROI	Description	Energy Range (keV)	Primary Peak (keV)
1	Total counts	411 – 2811	N/A
2	Potassium	1371 – 1569	1460
3	U/Ra-226	1659 – 1860	1764 (Bi-214)
4	Thorium	2409 – 2811	2614 (Tl-208)
5	Annihilation	456 – 570	511
6	Ra-226	546 – 666	609 (Bi-214)
7	Cs-137	549 – 741	662
8	I-131	327 – 399	364
9	Range	45 – 1980	N/A
10	Gross Counts	3 – 3072	N/A

A tiered approach is used during data review to identify follow-up locations. Raw data are exported to a comma delimited format using RadAssist and imported into an Excel spreadsheet for review and analysis. Count rate data are compared with ROI- and material-specific investigation levels (ILs). In addition, the following review steps are completed to determine if additional follow-up measurements are necessary:

- **Playback Review:** The data file is replayed in RadAssist and reviewed for elevated count rates in ROIs 1, 3, 6, and 10 for virtual detector (VD) 1 (both detectors summed). The scan screen is also monitored for elevated count rates and alarms.
- **Count Rate Time Series Review:** The count rates for ROIs 1, 3, 6, and 10 for VDs 1, 3 (detector 1), and 4 (detector 2) are plotted in a time series and reviewed for additional peaks in count rate.
- **Z-Scores:** The Z-Scores are calculated for each location in all ROIs for VDs 1, 3, and 4. Any location with four or more ROIs having a Z-Score greater than three ($Z > 3$) is marked for follow-up.
- **Local Z-Scores:** Local Z-Scores are calculated using a moving average for each data point in all ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with four or more ROIs having a local $Z > 3$ is marked for follow-up.
- **Semi-local Z-Scores:** Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with four or more ROIs having a semi-local $Z > 3$ is marked for follow-up.
- **Z-Score Time Series Review:** The three types of Z-Scores for ROIs 1, 3, 6, and 10 for VDs 1, 3, and 4 are plotted in a time series and reviewed for additional peaks in Z-Scores.
- **Count Rate Ratio Review:** Count rate ratios are calculated for ROIs 3:4, 3:2, 3:6, 6:2, and 6:7. The count rate ratios are then plotted in a time series and reviewed for obvious peaks or outliers.


RSI DATA PLOT

RSY 10 – Use 1, Part 1
FSS Soil from North Point SU 1



ROI from RSI Walkover Survey (VD1)

- | | | |
|----------------------|------------------------|------------------------|
| • > 3 std dev | • > 0 to < 1 std dev | • > -3 to < -2 std dev |
| • > 2 to < 3 std dev | • > -1 to < 0 std dev | • < -3 std dev |
| • > 1 to < 2 std dev | • > -2 to < -1 std dev | |

 RSY PAD Boundaries

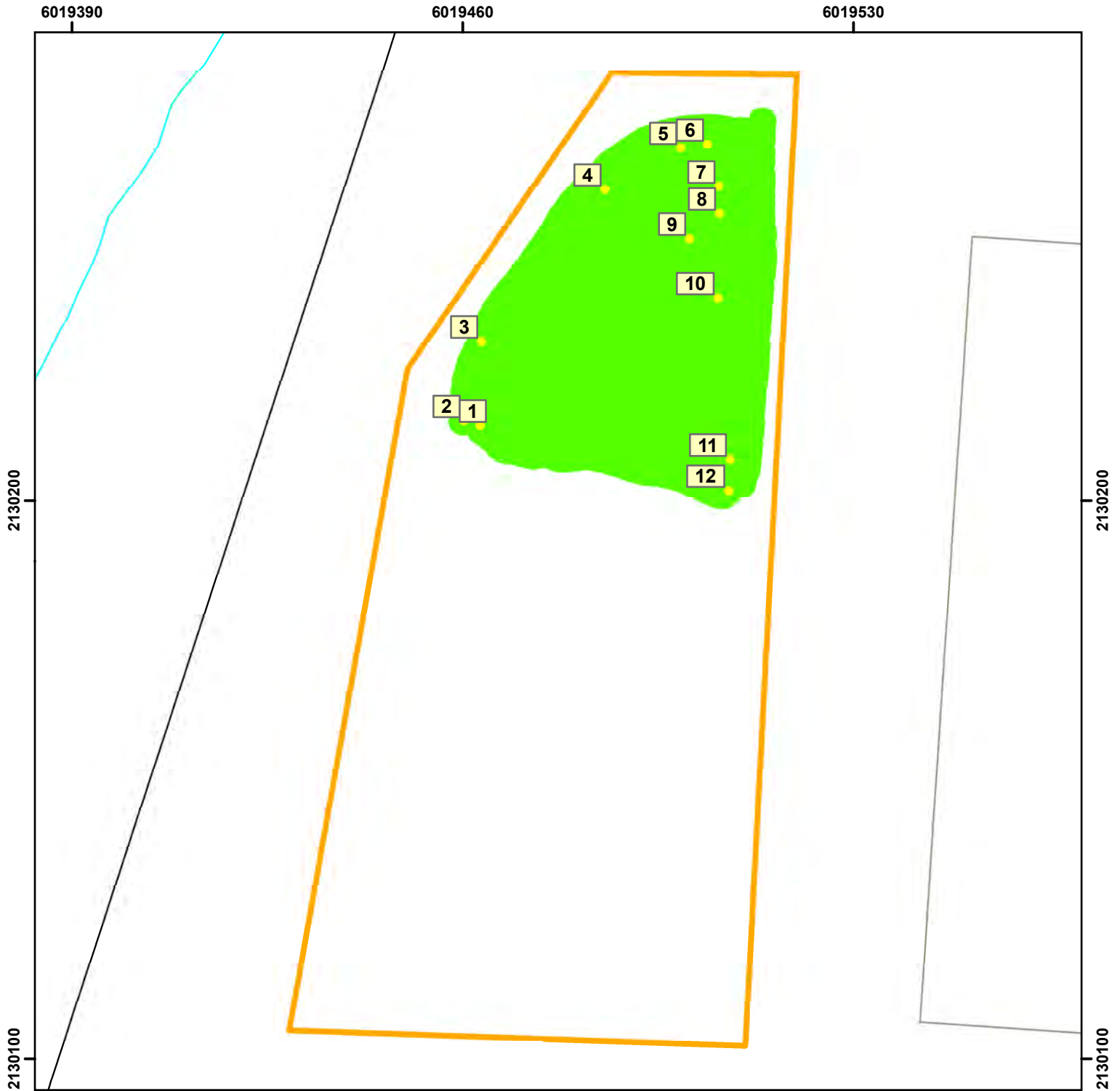
RSI Review Summary

Summary:

12 locations were selected for follow-up investigation. Locations were identified by elevated peaks noted in the playback review and/or time series charts, and by using the Z-Score, Local Z-Score, and Semi-Local Z-Score reviews as described in the RSI Data Evaluation Process on page 4. The table below details the reasons for each investigation by location.

Locations denoted a-c on the RSI Data Plot page (see previous page) did not meet the evaluation criteria for further investigation. Elevated Z-scores at these locations were identified only in specific ROIs, including: two locations exclusive to ROI 6 (a-b), and one location exclusive to ROI 9 (c). Elevated gross count rates at these locations were not identified, and a review of the data did not reveal any additional indicators warranting a follow-up investigation. Furthermore, spectral analyses performed on data obtained from these locations did not confirm the presence of Radium-226; figures are provided on pages 10-15.

Bayside RSY 10 Material from SU 1 (underwater) Investigation										
Longitude	Latitude	Details	Maximum Result (Ra/Tot)				Meter SN	Static Count (cpm)	Static IL (cpm)	Comments
			VD	ROI	Z-Score	Type:				
-122.3775204	37.8302489	>4 ROIS Z>3 (all ROIs), >4 ROIs Local Z>3 (all ROIs), >4 ROIs Semi-Local Z>3 (all ROIs), 3-4 ROIs Semi-Local Z>3 (Ra/Total ROIs), 3-4 ROIs Local Z>3 (Ra/Total ROIs), 3-4 ROIs Z>3 (Ra/Total ROIs)	4	1	3.70	Normal	262337	14,377	19,608	< IL
-122.3775305	37.8302510	>4 ROIs Local Z>3 (all ROIs), 3-4 ROIs Local Z>3 (Ra/Total ROIs)	4	10	3.44	Local	262337	13,769	19,608	< IL
-122.3775205	37.8302902	>4 ROIS Z>3 (all ROIs), >4 ROIs Local Z>3 (all ROIs), 3-4 ROIs Semi-Local Z>3 (Ra/Total ROIs)	1	9	3.55	Semi-Local	262337	13,599	19,608	< IL
-122.3774459	37.8303662	>4 ROIs Local Z>3 (all ROIs), >4 ROIs, Semi-Local Z>3 (all ROIs)	1	6	3.76	Semi-Local	262337	13,726	19,608	< IL
-122.3773995	37.8303874	3-4 ROIs Semi-Local Z>3 (Ra/Total ROIs)	4	1	3.46	Semi-Local	262337	13,532	19,608	< IL
-122.3773829	37.8303893	Highest Z-Score, Local Z-Score, Semi-Local Z-Score (Ra/Total ROIs)	4	3	5.55	Normal	262337	13,790	19,608	< IL
-122.3773754	37.8303688	>4 ROIs Semi-Local Z>3 (all ROIs), 3-4 ROIs Semi-Local Z>3 (Ra/Total ROIs), 3-4 ROIs Z>3 (Ra/Total ROIs)	1	9	3.31	Semi-Local	262337	13,134	19,608	< IL
-122.3773747	37.8303556	>4 ROIs Semi-Local Z>3 (all ROIs), 3-4 ROIs Semi-Local Z>3 (Ra/Total ROIs), 3-4 ROIs Z>3 (Ra/Total ROIs)	4	10	3.25	Semi-Local	262337	13,903	19,608	< IL
-122.3773929	37.8303429	>4 ROIs Local Z>3 (all ROIs), >4 ROIs Semi-Local Z>3 (all ROIs), 3-4 ROIs Semi-Local Z>3 (Ra/Total ROIs), 3-4 ROIs Local Z>3 (Ra/Total ROIs), 3-4 ROIs Z>3 (Ra/Total ROIs)	3	10	3.70	Local	262337	13,909	19,608	< IL
-122.3773744	37.8303139	Count Rate Ratio (609/K = 1.46341461930353)					262337	13,414	19,608	< IL
-122.3773649	37.8302346	>4 ROIs Local Z>3 (all ROIs), >4 ROIs Semi-Local Z>3 (all ROIs), 3-4 ROIs Semi-Local Z>3 (Ra/Total ROIs), 3-4 ROIs Local Z>3 (Ra/Total ROIs)	4	9	3.73	Local	262337	13,914	19,608	< IL
-122.3773655	37.8302193	3-4 ROIs Local Z>3 (Ra/Total ROIs)	4	10	3.22	Local	262337	14,185	19,608	< IL



Instrument # 262337

- Investigation Points
- Data Points Not Requiring Further Investigation
- RSYPAD Boundaries
- # Investigation Point ID

CB&I Federal Services, LLC



0 10 20 40
 Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: North Point SU 1 RSY
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

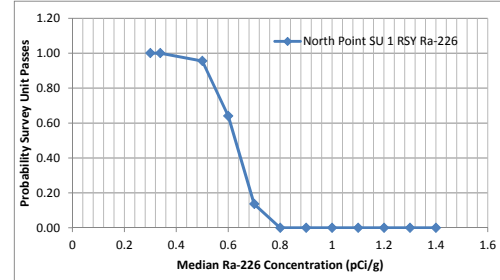
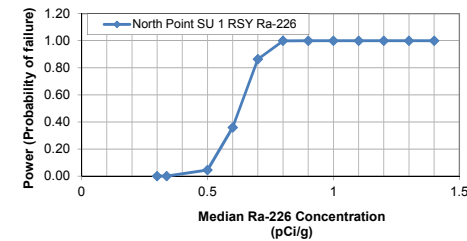
POWER CURVE CALCULATION

The power curve demonstrates that at a median Ra-226 concentration of 0.8 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the observed Ra-226 median concentration of 0.338 pCi/g and estimated LBGR of 0.483, the SU will pass the WRS test at a 100% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	11	0	1	S
0.98	R	0.98	29	0	2	S
0.83	R	0.83	24.5	0	3	S
0.54	R	0.54	14	0	4	S
0.57	R	0.57	16.5	0	5	S
0.55	R	0.55	15	0	6	S
0.57	R	0.57	16.5	0	7	S
0.46	R	0.46	10	0	8	S
0.50	R	0.5	12	0	9	S
0.66	R	0.66	18.5	0	10	R
0.75	R	0.75	22	0	11	R
0.70	R	0.7	21	0	12	R
0.86	R	0.86	26	0	13	R
0.51	R	0.51	13	0	14	R
0.91	R	0.91	28	0	15	R
0.83	R	0.83	24.5	0	16.5	R
0.79	R	0.79	23	0	16.5	R
0.90	R	0.9	27	0	18.5	R
0.66	R	0.66	18.5	0	18.5	R
0.69	R	0.69	20	0	20	R
0.380	S	-0.10	7	7	21	R
0.383	S	-0.10	8	8	22	R
0.325	S	-0.16	4	4	23	R
0.351	S	-0.13	6	6	24.5	R
0.280	S	-0.20	1	1	24.5	R
0.338	S	-0.14	5	5	26	R
0.295	S	-0.19	2	2	27	R
0.319	S	-0.16	3	3	28	R
0.538	S	0.06	9	9	29	R
Sum =			435	45		

Number of Samples	
σ	0.161
LBGR	0.483
$\Delta\sigma$	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	9
SU σ	0.076
Z(1-alpha)	1.960
Z(1-beta)	1.645

Measurement	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.3	-1.1	0.218338	0.098892	39.30084	280	16.72279	5.488142	0.00	1.00
0.338	-0.9	0.262259	0.12892	47.20662	327.1077	18.08612	4.637328	0.00	1.00
0.5	0.1	0.528186	0.361978	95.07348	448.2251	21.17133	1.700621	0.04	0.96
0.6	0.7	0.689691	0.544073	124.1444	370.9438	19.2599	0.359997	0.36	0.64
0.7	1.3	0.821015	0.716331	147.7827	231.8606	15.22697	-1.09705	0.86	0.14
0.8	2.0	0.92135	0.865767	165.843	95.08607	9.751209	-3.56521	1.00	0.00
0.9	2.6	0.967004	0.940817	174.0607	33.54379	5.7917	-7.42145	1.00	0.00
1	3.2	0.988174	0.977961	177.8713	9.360194	3.059443	-15.2948	1.00	0.00
1.1	3.8	0.997661	0.995497	179.579	1.243947	1.115324	-43.4861	1.00	0.00
1.2	4.5	0.999796	0.999599	179.9633	0.07053	0.265575	-184.074	1.00	0.00
1.3	5.1	0.999796	0.999599	179.9633	0.07053	0.265575	-184.074	1.00	0.00
1.4	5.7	0.999989	0.999978	179.998	0.001979	0.04449	-1099.57	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 9 m
 Avg Rank R: 19.5
 Avg Rank S: 5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 176.6$

$\alpha_W = \alpha/2 = 0.025$
 $\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05
 9 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 10$
 8 r
 5 k
 0.056 α

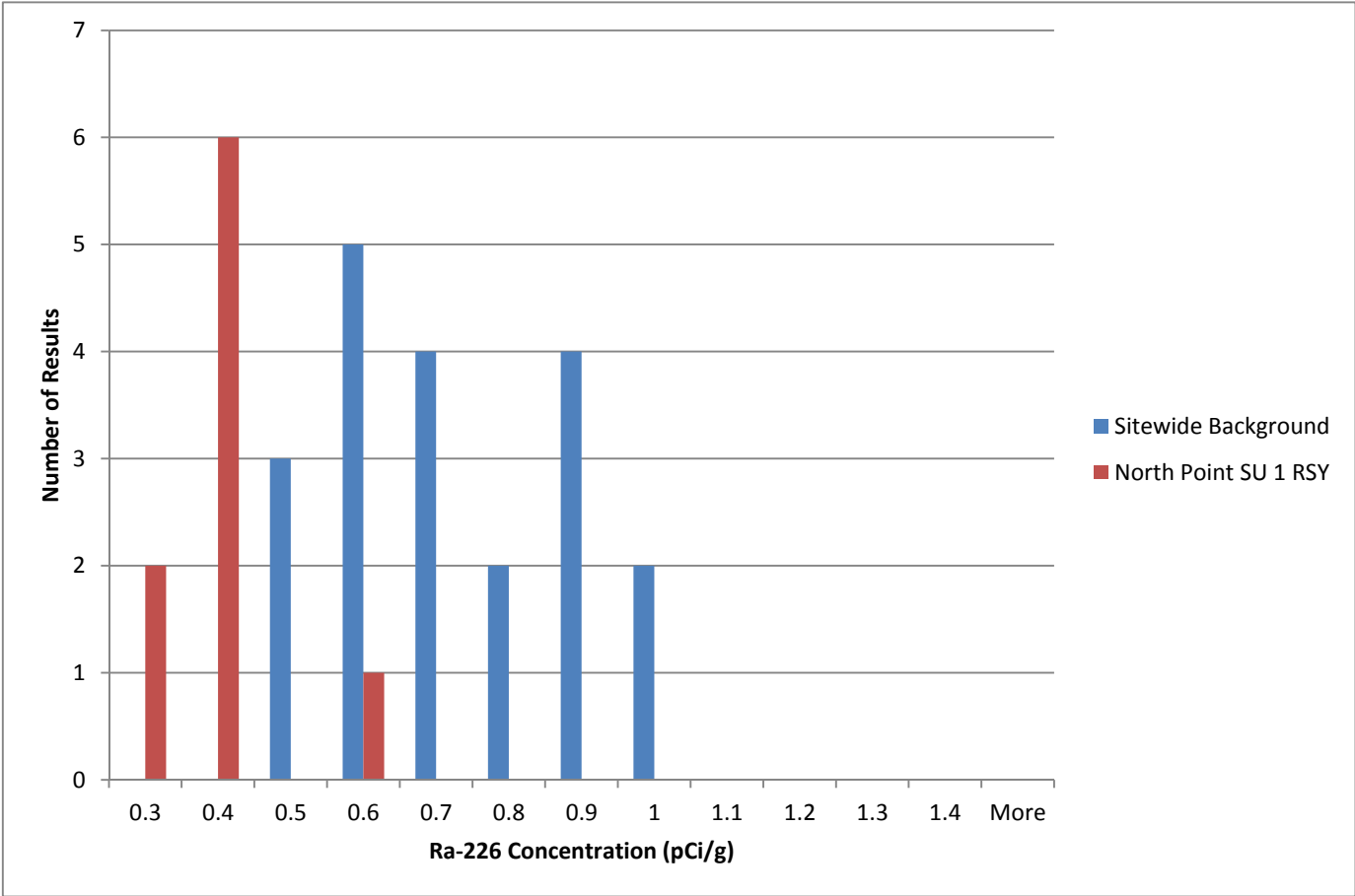
If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 8 adjusted measurements are from S. The null hypothesis is accepted.

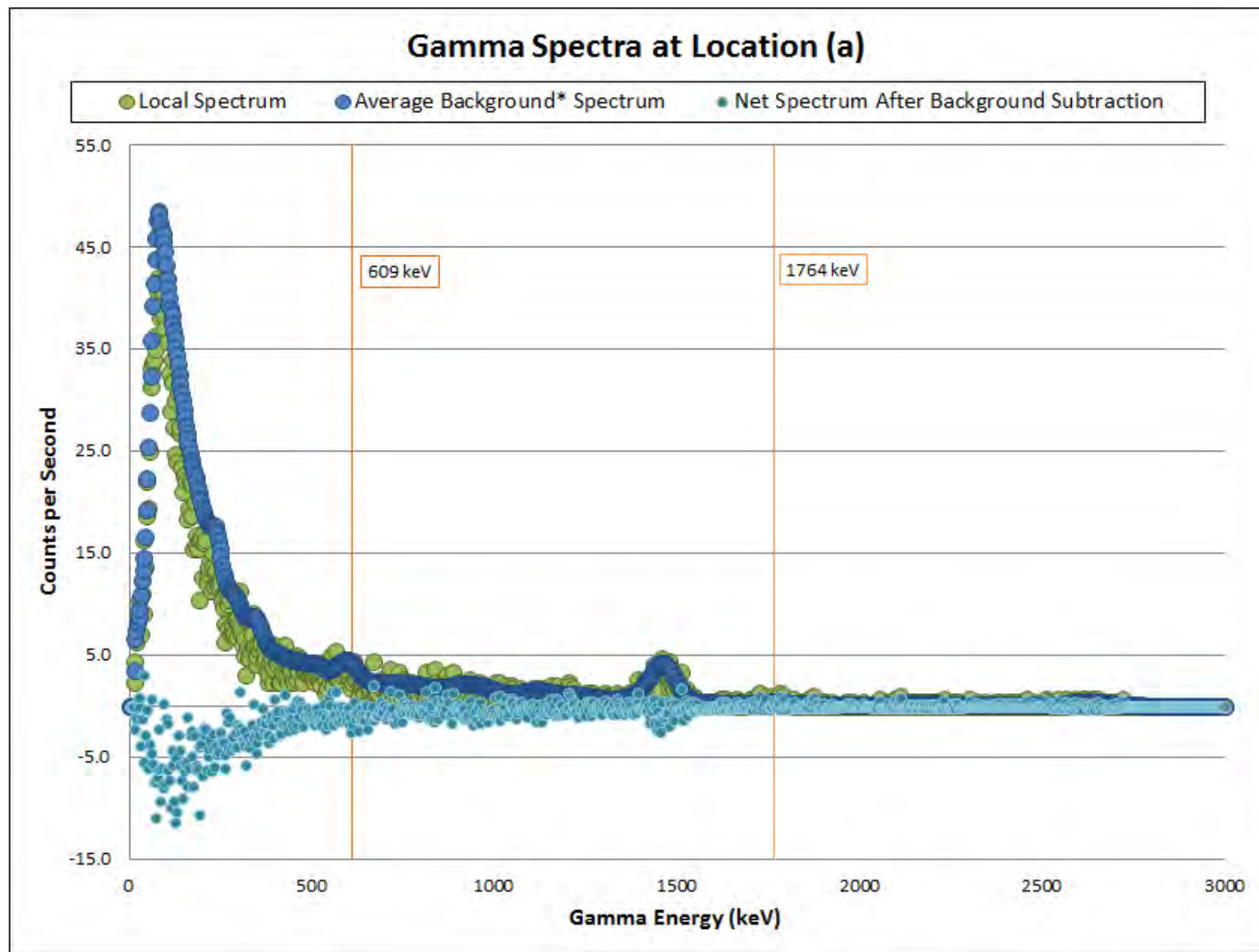
Histogram, North Point SU 1 RSY vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

North Point SU 1 RSY	
<i>Bin</i>	<i>Frequency</i>
0.3	2
0.4	6
0.5	0
0.6	1
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



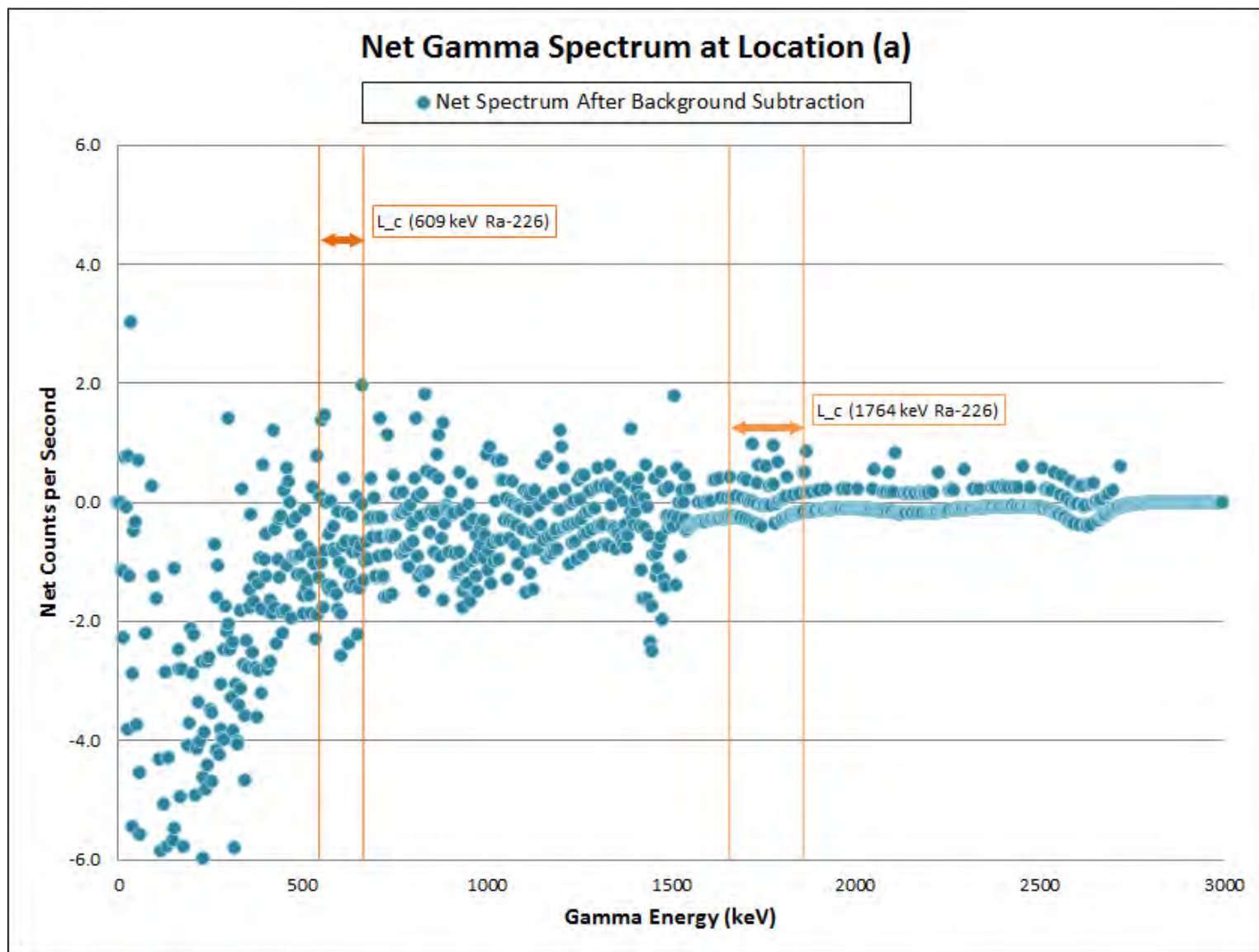
RSI Spectral Analysis Results: RSY 10 Use 1, Part 1 – **Gamma Spectra at Location (a)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (a)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 10 Use 1, Part 1 – **Net Gamma Spectrum at Location (a)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (a): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

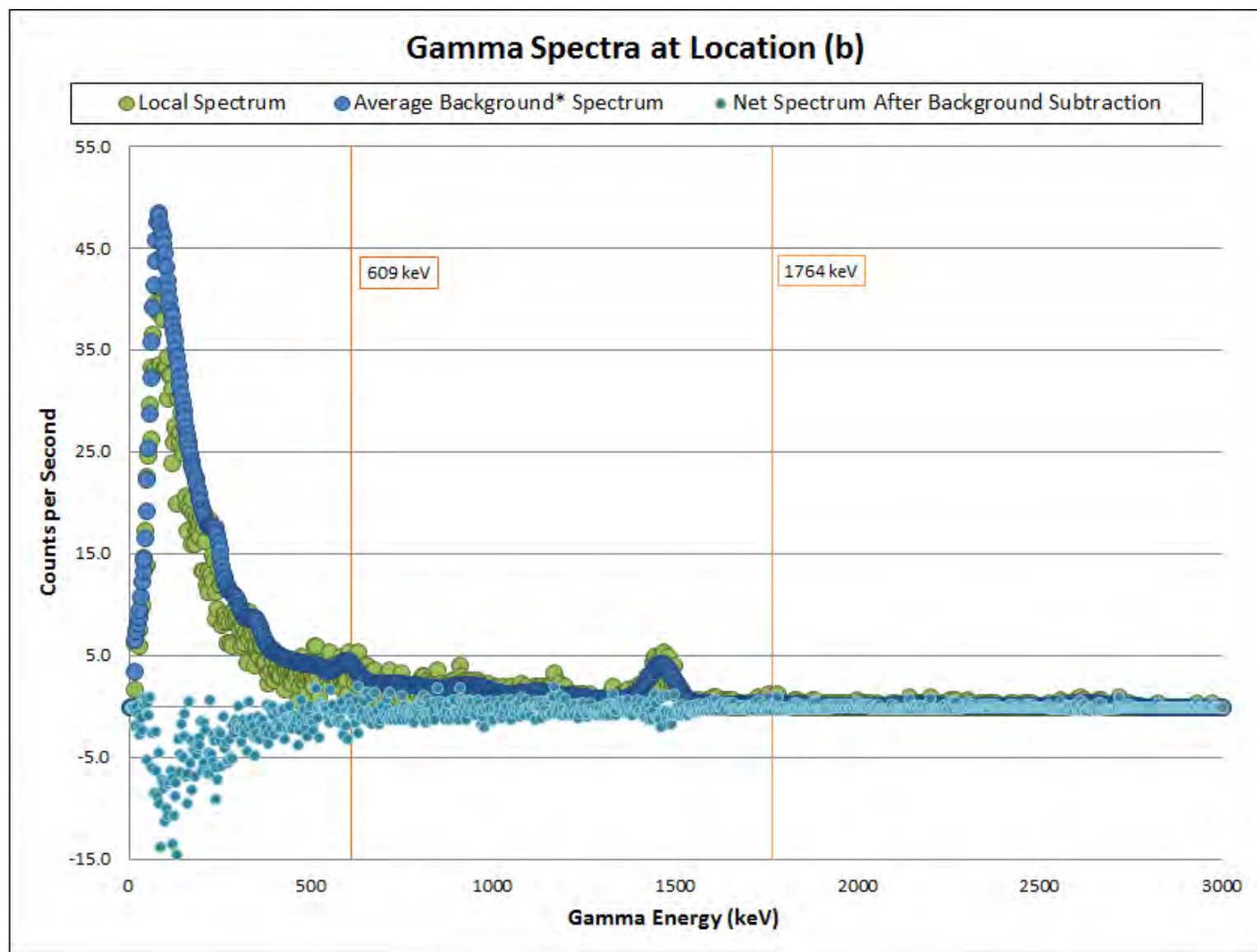
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ **B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

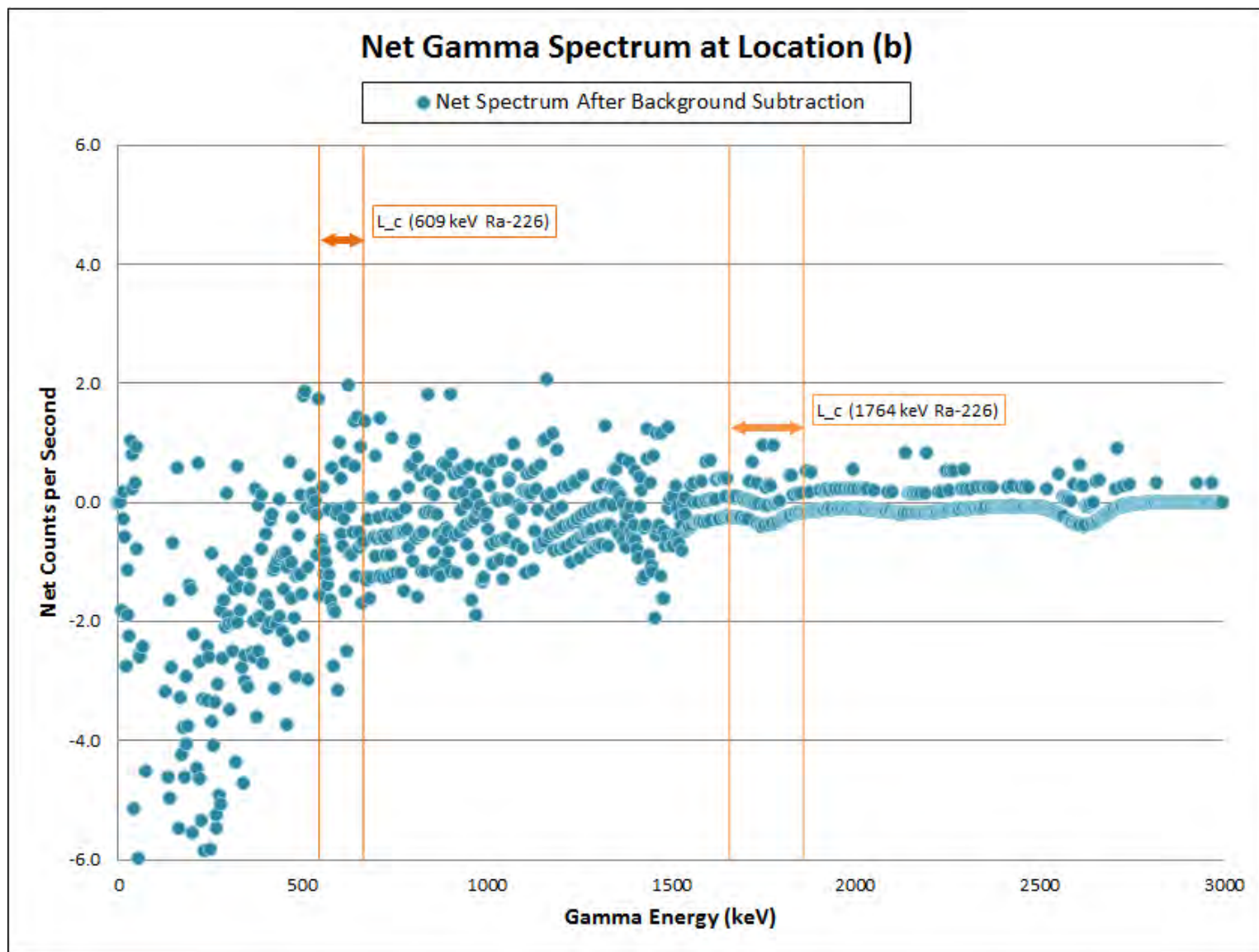
RSI Spectral Analysis Results: RSY 10 Use 1, Part 1 – **Gamma Spectra at Location (b)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (b)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 10 Use 1, Part 1 – **Net Gamma Spectrum at Location (b)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (b): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

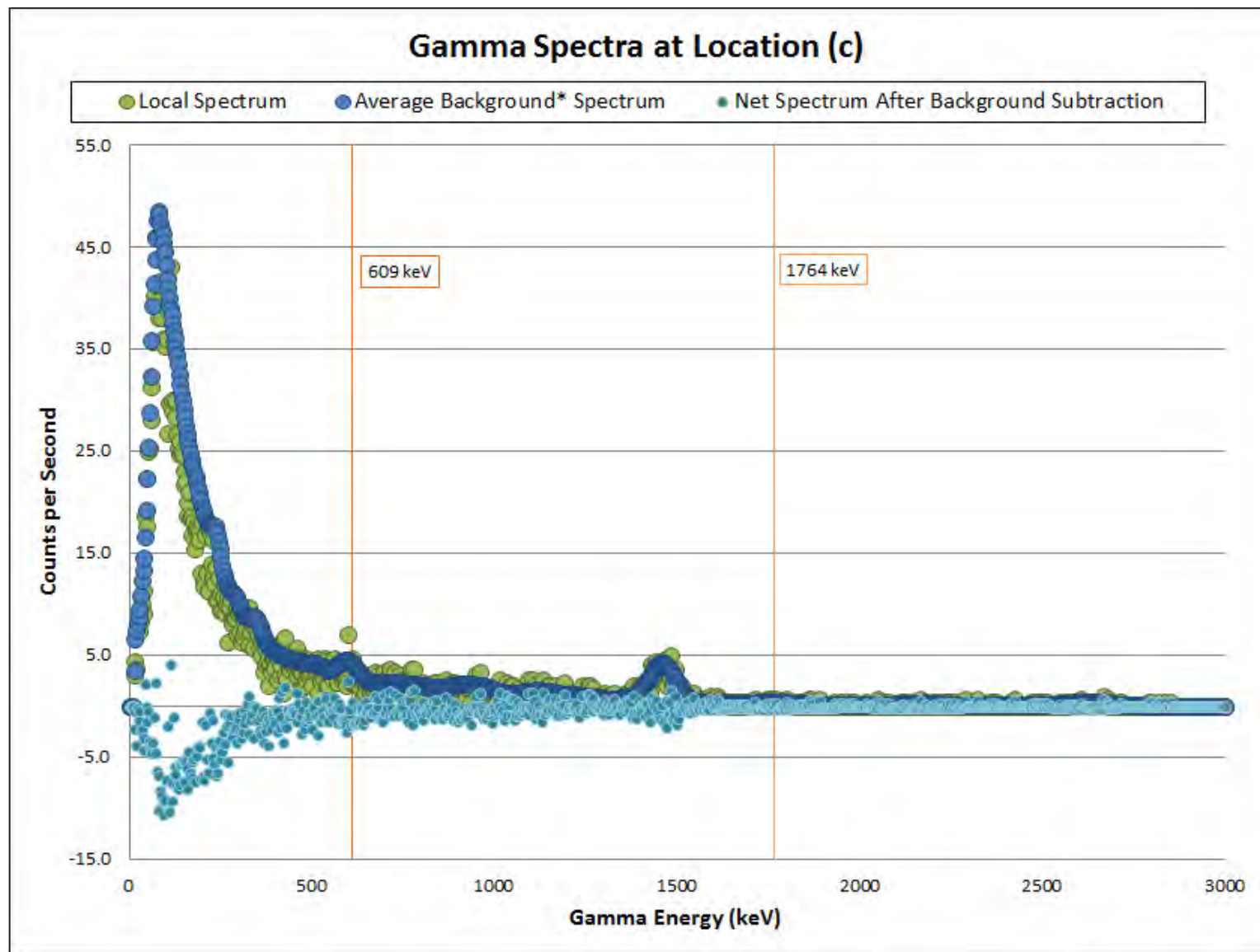
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

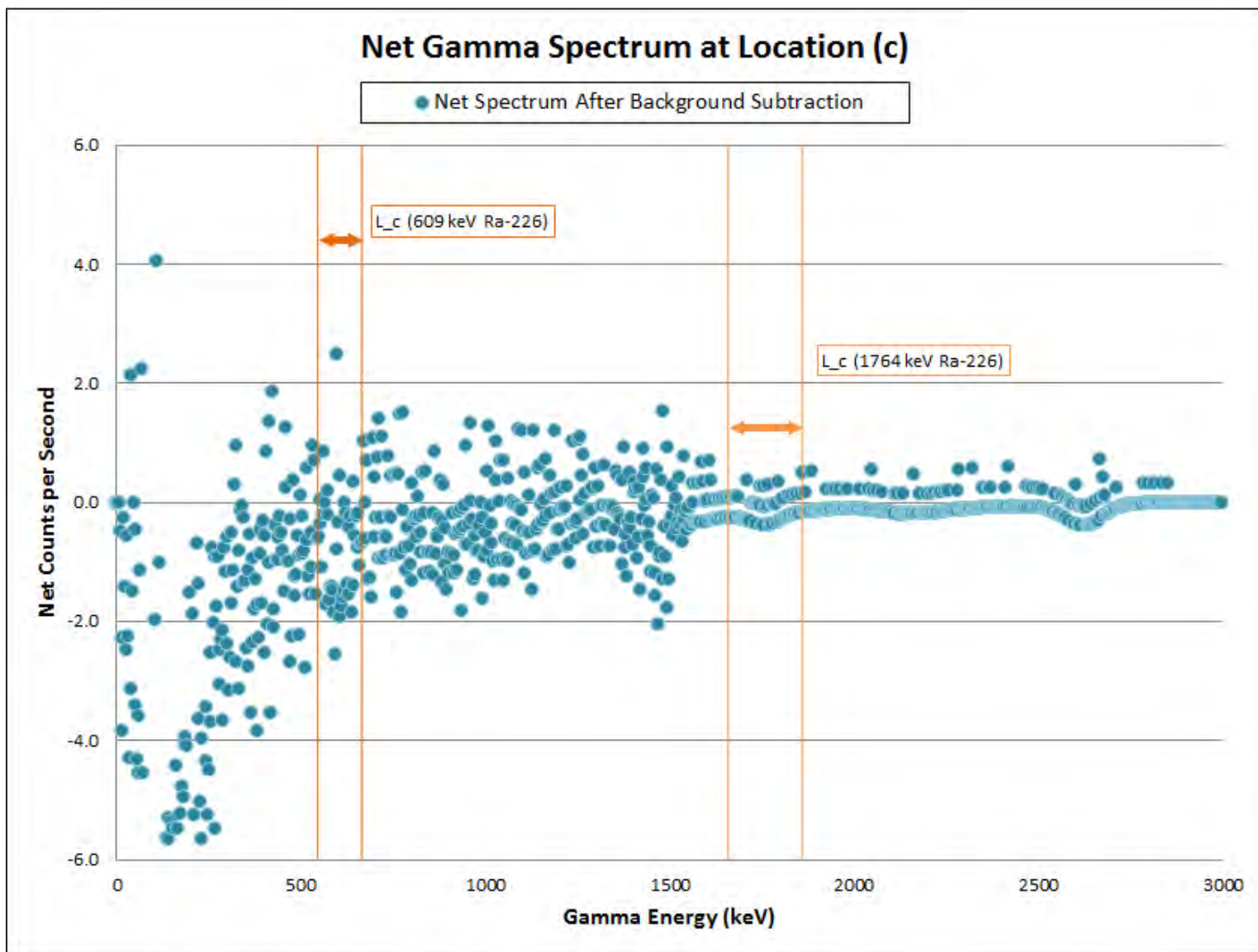
RSI Spectral Analysis Results: RSY 10 Use 1, Part 1 – **Gamma Spectra at Location (c)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (c)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 10 Use 1, Part 1 – **Net Gamma Spectrum at Location (c)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (c): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-14255-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
11/12/2015 3:14:17 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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QC Association Summary	19



Case Narrative

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Job ID: 160-14255-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-14255-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 19 of 34

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Job ID: 160-14255-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/14/2015 8:45 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04_SU1_FSS_NP-S001 (160-14255-1), TI-TO04_SU1_FSS_NP-S004 (160-14255-2), TI-TO04_SU1_FSS_NP-S006 (160-14255-3), TI-TO04_SU1_FSS_NP-S008 (160-14255-4), TI-TO04_SU1_FSS_NP-S009 (160-14255-5), TI-TO04_SU1_FSS_NP-S011 (160-14255-6), TI-TO04_SU1_FSS_NP-S014 (160-14255-7), TI-TO04_SU1_FSS_NP-S018 (160-14255-8) and TI-TO04_SU1_FSS_NP-S020 (160-14255-9) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/14/2015, prepared on 10/15/2015 and analyzed on 11/06/2015 and 11/10/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Shaw Environmental and Infrastructure Inc. (a CBI company)
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_FSS_SU1_NP_113

Page 1 of 3

Project Number: 500060
Project Name / Location: CTO-04 Phase III NorthPoint
Purchase Order #: FSS SU1
201455

Shipment Date: 10-13-2015
Waybill Number: 128901620102210697
Lab Destination: Earth Toxics Inc To Test America
Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer (Name & phone #)
Send Report To: Patricia Flynn
Phone/Fax Number: 925-288-2037
Address: 4005 Port Chicago Hwy
City: Concord, CA, 94520

Sample ID Number	Sample Description	Sampler's Name(s): N. Munson
TI-TO04_SU1_FSS_NP-S001	North Point FSS Survey Unit I	
TI-TO04_SU1_FSS_NP-S002	North Point FSS Survey Unit I	
TI-TO04_SU1_FSS_NP-S003	North Point FSS Survey Unit I	
TI-TO04_SU1_FSS_NP-S004	North Point FSS Survey Unit I	
TI-TO04_SU1_FSS_NP-S005	North Point FSS Survey Unit I	
TI-TO04_SU1_FSS_NP-S006	North Point FSS Survey Unit I	
TI-TO04_SU1_FSS_NP-S007	North Point FSS Survey Unit I	
TI-TO04_SU1_FSS_NP-S008	North Point FSS Survey Unit I	
TI-TO04_SU1_FSS_NP-S009	North Point FSS Survey Unit I	

Collection Information		Matrix	# of containers	Preservative (water)	
Date	Time			Preservative (soil)	Container Type
10-9-15	1307	SO	1		16 oz Plastic
previously shipped		SO	1		16 oz Plastic
previously shipped		SO	1		16 oz Plastic
10-9-15	1306	SO	1		16 oz Plastic
previously shipped		SO	1		16 oz Plastic
10-9-15	1303	SO	1		16 oz Plastic
previously shipped		SO	1		16 oz Plastic
10-9-15	1309	SO	1		16 oz Plastic
10-9-15	1315	SO	1		16 oz Plastic

Special Instructions: 7 days ingrown draft and follow with 21 days final

Level Of QC Required: ☐ 24-hr ☐ 3-day ☐ 7-day

Standard TAT ☐ ☐ 3-day ☐ 7-day

Project Specific: ☐ I ☐ II ☒ III

Relinquished By: *97* Date: 10-13-15 Time: 1330 Received By: *Die Clark* Date: 10-14-15 Time: 0845

Relinquished By: Date: Time: Received By: Date: Time:



160-14255 Chain of Custody



Shaw Environmental and Infrastructure Inc. (a CBI company)

Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # T1_P3_FSS_SU1_NP_113

Page 2 of 3

Project Number: 500060

Project Name / Location: CTO-04 Phase III NorthPoint

FSS SU1

Purchase Order #: 201455

Shipment Date: 10-13-2015

Waybill Number: 128900020192612097

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Sampler's Name(s): J. Martinez

Sample ID Number	Sample Description	Collection Information		Matrix	# of containers	Preservative (water)		Gamma Scan	Analyses Requested					Dose Rate μ R/hr
		Date	Time			Preservative (soil)	Container Type							
TI-TO04_SU1_FSS_NP-S010	North Point FSS Survey Unit 1	Previously Shipped		G	SO 1	16 oz Plastic		X						
TI-TO04_SU1_FSS_NP-S011	North Point FSS Survey Unit 1	10-9-15	1312	G	SO 1	16 oz Plastic		X						5
TI-TO04_SU1_FSS_NP-S012	North Point FSS Survey Unit 1	Previously Shipped		G	SO 1	16 oz Plastic		X						
TI-TO04_SU1_FSS_NP-S013	North Point FSS Survey Unit 1	Previously Shipped		G	SO 1	16 oz Plastic		X						
TI-TO04_SU1_FSS_NP-S014	North Point FSS Survey Unit 1	10-9-15	1315	G	SO 1	16 oz Plastic		X						5
TI-TO04_SU1_FSS_NP-S015	North Point FSS Survey Unit 1	Previously Shipped		G	SO 1	16 oz Plastic		X						
TI-TO04_SU1_FSS_NP-S016	North Point FSS Survey Unit 1	Previously Shipped		G	SO 1	16 oz Plastic		X						
TI-TO04_SU1_FSS_NP-S017	North Point FSS Survey Unit 1	Previously Shipped		G	SO 1	16 oz Plastic		X						
TI-TO04_SU1_FSS_NP-S018	North Point FSS Survey Unit 1	10-9-15	1326	G	SO 1	16 oz Plastic		X						5

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

I

II

III

G = Grab

C = Composite

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening

Relinquished By:

Date: 10-13-15

Time: 1330

Received By:

Date: 10-14-15

Time: 0845

Relinquished By:

Date:

Time:

Date:

Time:

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-14255-2

Login Number: 14255**List Number: 1****Creator: Clarke, Jill C****List Source: TestAmerica St. Louis**

Question	Answer	Comment
Radioactivity wasn't checked or is <= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-14255-1	TI-TO04_SU1_FSS_NP-S001	Solid	10/09/15 13:07	10/14/15 08:45
160-14255-2	TI-TO04_SU1_FSS_NP-S004	Solid	10/09/15 13:06	10/14/15 08:45
160-14255-3	TI-TO04_SU1_FSS_NP-S006	Solid	10/09/15 13:03	10/14/15 08:45
160-14255-4	TI-TO04_SU1_FSS_NP-S008	Solid	10/09/15 13:09	10/14/15 08:45
160-14255-5	TI-TO04_SU1_FSS_NP-S009	Solid	10/09/15 13:15	10/14/15 08:45
160-14255-6	TI-TO04_SU1_FSS_NP-S011	Solid	10/09/15 13:12	10/14/15 08:45
160-14255-7	TI-TO04_SU1_FSS_NP-S014	Solid	10/09/15 13:15	10/14/15 08:45
160-14255-8	TI-TO04_SU1_FSS_NP-S018	Solid	10/09/15 13:26	10/14/15 08:45
160-14255-9	TI-TO04_SU1_FSS_NP-S020	Solid	10/09/15 13:22	10/14/15 08:45

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S001

Lab Sample ID: 160-14255-1

Date Collected: 10/09/15 13:07

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.192	U	0.144	0.146		0.211	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Actinium-227	0.0993	U	0.524	0.524		0.905	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Bismuth-212	0.371	U	0.451	0.452		0.734	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Bismuth-214	0.380		0.132	0.138		0.145	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Cesium-137	0.00281	U	0.0412	0.0412		0.0757	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Lead-210	1.22	U	1.19	1.20		1.91	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Lead-212	0.324		0.0907	0.0999		0.0994	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Lead-214	0.335		0.101	0.107		0.133	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Potassium-40	10.5		1.40	1.77		0.587	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Protactinium-231	-0.0316	U	0.0770	0.0771		1.84	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Radium-226	0.380		0.132	0.138	0.500	0.145	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Radium-228	0.192	U	0.144	0.146		0.211	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Thallium-208	0.107		0.0422	0.0436		0.0457	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Thorium-228	0.324		0.0907	0.0999		0.0994	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Thorium-232	0.192	U	0.144	0.146		0.211	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Thorium-234	0.150	U	0.485	0.485		1.72	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Uranium-235	0.0518	U	0.177	0.177		0.336	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Uranium-238	0.150	U	0.485	0.485		1.72	pCi/g	10/15/15 14:22	11/10/15 19:43	1

Client Sample ID: TI-TO04_SU1_FSS_NP-S004

Lab Sample ID: 160-14255-2

Date Collected: 10/09/15 13:06

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.300		0.162	0.165		0.232	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Actinium-227	-0.127	U	0.433	0.433		0.750	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Bismuth-212	0.332	U	0.556	0.557		0.945	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Bismuth-214	0.383		0.117	0.123		0.0979	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Cesium-137	-0.0220	U	1.05	1.05		0.0949	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-210	0.746	U	0.944	0.948		1.55	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-212	0.307		0.105	0.113		0.110	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-214	0.392		0.124	0.131		0.115	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Potassium-40	11.9		1.69	2.08		0.675	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Protactinium-231	-0.269	U	1.00	1.00		1.76	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Radium-226	0.383		0.117	0.123	0.500	0.0979	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Radium-228	0.300		0.162	0.165		0.232	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thallium-208	0.162		0.0471	0.0500		0.0252	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-228	0.307		0.105	0.113		0.110	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-232	0.300		0.162	0.165		0.232	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-234	0.637	U	1.12	1.12		1.56	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Uranium-235	0.0560	U	0.183	0.183		0.369	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Uranium-238	0.637	U	1.12	1.12		1.56	pCi/g	10/15/15 14:22	11/06/15 18:00	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S006

Lab Sample ID: 160-14255-3

Date Collected: 10/09/15 13:03

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.406		0.105	0.113		0.0673	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Actinium-227	0.000	U	0.314	0.314		0.626	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Bismuth-212	0.0864	U	0.373	0.373		0.671	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Bismuth-214	0.325		0.0877	0.0940		0.0833	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Cesium-137	-0.00268	U	0.0284	0.0284		0.0526	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-210	0.362	U	0.773	0.774		1.31	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-212	0.353		0.0892	0.100		0.0829	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-214	0.245		0.0796	0.0836		0.103	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Potassium-40	9.43		1.19	1.53		0.592	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Protactinium-231	0.0130	U	0.0242	0.0243		1.44	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Radium-226	0.325		0.0877	0.0940	0.500	0.0833	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Radium-228	0.406		0.105	0.113		0.0673	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thallium-208	0.125		0.0403	0.0423		0.0316	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-228	0.353		0.0892	0.100		0.0829	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-232	0.406		0.105	0.113		0.0673	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-234	0.369	U	0.371	0.373		1.18	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Uranium-235	0.00197	U	0.00589	0.00589		0.298	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Uranium-238	0.369	U	0.371	0.373		1.18	pCi/g	10/15/15 14:22	11/06/15 18:00	1

Client Sample ID: TI-TO04_SU1_FSS_NP-S008

Lab Sample ID: 160-14255-4

Date Collected: 10/09/15 13:09

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.235	U	0.154	0.156		0.259	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Actinium-227	0.819	U	1.04	1.04		1.71	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Bismuth-212	0.295	U	0.490	0.491		0.831	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Bismuth-214	0.351		0.0959	0.103		0.0983	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Cesium-137	0.00465	U	0.0403	0.0403		0.0740	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-210	1.03	U	1.35	1.35		2.10	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-212	0.351		0.103	0.112		0.116	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-214	0.355		0.0993	0.106		0.102	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Potassium-40	10.1		1.40	1.74		0.648	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Protactinium-231	-0.0522	U	0.789	0.789		1.44	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Radium-226	0.351		0.0959	0.103	0.500	0.0983	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Radium-228	0.235	U	0.154	0.156		0.259	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thallium-208	0.0929		0.0536	0.0545		0.0802	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-228	0.351		0.103	0.112		0.116	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-232	0.235	U	0.154	0.156		0.259	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-234	1.15	U	1.10	1.11		1.57	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Uranium-235	0.0783	U	0.217	0.217		0.354	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Uranium-238	1.15	U	1.10	1.11		1.57	pCi/g	10/15/15 14:22	11/06/15 18:01	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S009

Lab Sample ID: 160-14255-5

Date Collected: 10/09/15 13:15

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.165	U	0.107	0.108		0.237	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Actinium-227	0.0583	U	0.152	0.152		0.721	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Bismuth-212	0.0903	U	0.441	0.441		0.792	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Bismuth-214	0.280		0.0923	0.0968		0.105	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Cesium-137	-0.00828	U	0.0371	0.0371		0.0663	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-210	0.819	U	0.961	0.966		1.55	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-212	0.295		0.0809	0.0894		0.0850	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-214	0.302		0.0843	0.0899		0.106	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Potassium-40	10.7		1.36	1.75		0.680	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Protactinium-231	-0.239	U	0.758	0.759		1.32	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Radium-226	0.280		0.0923	0.0968	0.500	0.105	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Radium-228	0.165	U	0.107	0.108		0.237	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thallium-208	0.119		0.0397	0.0415		0.0374	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-228	0.295		0.0809	0.0894		0.0850	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-232	0.165	U	0.107	0.108		0.237	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-234	0.603	U	0.879	0.881		1.52	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Uranium-235	-0.114	U	0.459	0.460		0.358	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Uranium-238	0.603	U	0.879	0.881		1.52	pCi/g	10/15/15 14:22	11/06/15 18:01	1

Client Sample ID: TI-TO04_SU1_FSS_NP-S011

Lab Sample ID: 160-14255-6

Date Collected: 10/09/15 13:12

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.513		0.133	0.143		0.127	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Actinium-227	-0.000693	U	0.396	0.396		0.704	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Bismuth-212	-0.123	U	0.516	0.517		0.928	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Bismuth-214	0.338		0.106	0.112		0.105	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Cesium-137	-0.00658	U	0.0375	0.0375		0.0689	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Lead-210	-0.424	U	2.18	2.18		1.71	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Lead-212	0.0574	U	0.0938	0.0941		0.159	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Lead-214	0.296		0.0923	0.0973		0.122	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Potassium-40	11.9		1.55	1.97		0.373	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Protactinium-231	0.556	U	0.531	0.534		1.44	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Radium-226	0.338		0.106	0.112	0.500	0.105	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Radium-228	0.513		0.133	0.143		0.127	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Thallium-208	0.0654	U	0.0518	0.0522		0.0752	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Thorium-228	0.0574	U	0.0938	0.0941		0.159	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Thorium-232	0.513		0.133	0.143		0.127	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Thorium-234	0.288	U	0.448	0.449		1.43	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Uranium-235	0.0177	U	0.0484	0.0484		0.308	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Uranium-238	0.288	U	0.448	0.449		1.43	pCi/g	10/15/15 14:22	11/06/15 18:02	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S014

Lab Sample ID: 160-14255-7

Date Collected: 10/09/15 13:15

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.199	U	0.131	0.133		0.253	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Actinium-227	0.226	U	0.423	0.423		0.712	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Bismuth-212	0.0320	U	0.492	0.492		0.930	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Bismuth-214	0.295		0.144	0.147		0.153	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Cesium-137	-0.0146	U	0.0459	0.0460		0.0802	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Lead-210	0.0641	U	1.05	1.05		1.99	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Lead-212	0.328		0.107	0.115		0.120	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Lead-214	0.460		0.105	0.115		0.0918	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Potassium-40	11.5		1.39	1.82		0.735	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Protactinium-231	0.165	U	0.640	0.641		1.55	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Radium-226	0.295		0.144	0.147	0.500	0.153	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Radium-228	0.199	U	0.131	0.133		0.253	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Thallium-208	0.169		0.0565	0.0592		0.0557	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Thorium-228	0.328		0.107	0.115		0.120	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Thorium-232	0.199	U	0.131	0.133		0.253	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Thorium-234	0.943	U	0.777	0.783		1.33	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Uranium-235	0.0496	U	0.205	0.206		0.365	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Uranium-238	0.943	U	0.777	0.783		1.33	pCi/g	10/15/15 14:22	11/06/15 18:03	1

Client Sample ID: TI-TO04_SU1_FSS_NP-S018

Lab Sample ID: 160-14255-8

Date Collected: 10/09/15 13:26

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.442		0.135	0.142		0.0831	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Actinium-227	0.0953	U	0.477	0.477		0.827	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Bismuth-212	0.170	U	0.449	0.449		0.792	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Bismuth-214	0.319		0.101	0.107		0.0944	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Cesium-137	0.0147	U	0.0287	0.0288		0.0501	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Lead-210	0.456	U	1.24	1.24		1.95	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Lead-212	0.348		0.0921	0.103		0.0961	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Lead-214	0.373		0.100	0.107		0.0989	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Potassium-40	10.6		1.38	1.76		0.604	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Protactinium-231	0.267	U	0.444	0.444		1.43	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Radium-226	0.319		0.101	0.107	0.500	0.0944	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Radium-228	0.442		0.135	0.142		0.0831	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Thallium-208	0.125		0.0396	0.0417		0.0386	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Thorium-228	0.348		0.0921	0.103		0.0961	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Thorium-232	0.442		0.135	0.142		0.0831	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Thorium-234	0.256	U	0.361	0.362		1.70	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Uranium-235	0.0406	U	0.188	0.188		0.332	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Uranium-238	0.256	U	0.361	0.362		1.70	pCi/g	10/15/15 14:22	11/06/15 18:04	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S020

Lab Sample ID: 160-14255-9

Date Collected: 10/09/15 13:22

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.193	U	0.130	0.131		0.324	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Actinium-227	0.137	U	0.389	0.389		0.675	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Bismuth-212	0.000	U	0.418	0.418		1.27	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Bismuth-214	0.538		0.130	0.142		0.0982	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Cesium-137	-0.0197	U	0.272	0.272		0.0974	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Lead-210	0.243	U	1.12	1.12		2.05	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Lead-212	0.285		0.109	0.115		0.118	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Lead-214	0.451		0.104	0.114		0.111	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Potassium-40	10.2		1.77	2.05		1.33	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Protactinium-231	0.136	U	0.552	0.552		1.69	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Radium-226	0.538		0.130	0.142	0.500	0.0982	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Radium-228	0.193	U	0.130	0.131		0.324	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Thallium-208	0.138		0.0570	0.0588		0.0427	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Thorium-228	0.285		0.109	0.115		0.118	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Thorium-232	0.193	U	0.130	0.131		0.324	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Thorium-234	-0.0274	U	0.0458	0.0459		1.67	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Uranium-235	0.000411	U	0.00189	0.00189		0.365	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Uranium-238	-0.0274	U	0.0458	0.0459		1.67	pCi/g	10/15/15 14:22	11/06/15 18:34	1

QC Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-216722/1-A

Matrix: Solid

Analysis Batch: 220522

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 216722

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.09145	U	0.139	0.139		0.235	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Actinium-227	-0.08146	U	0.394	0.394		0.713	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Bismuth-212	0.0000	U	0.298	0.298		1.15	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Bismuth-214	-0.01082	U	0.114	0.114		0.181	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Cesium-137	-0.01192	U	0.0966	0.0966		0.119	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Lead-210	-0.1111	U	1.15	1.15		2.03	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Lead-212	-0.03897	U	0.364	0.364		0.108	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Lead-214	-0.02351	U	0.193	0.193		0.163	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Potassium-40	-0.4119	U	16.5	16.5		1.18	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Protactinium-231	-0.03712	U	0.0723	0.0725		2.08	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Radium-226	-0.01082	U	0.114	0.114	0.500	0.181	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Radium-228	0.09145	U	0.139	0.139		0.235	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Thallium-208	-0.004964	U	0.0463	0.0463		0.0893	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Thorium-228	-0.03897	U	0.364	0.364		0.108	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Thorium-232	0.09145	U	0.139	0.139		0.235	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Thorium-234	0.8720	U	0.989	0.993		1.42	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Uranium-235	-0.02962	U	0.145	0.145		0.267	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Uranium-238	0.8720	U	0.989	0.993		1.42	pCi/g	10/15/15 14:22	11/06/15 17:58	1

Lab Sample ID: LCS 160-216722/2-A

Matrix: Solid

Analysis Batch: 220512

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 216722

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.2	94.31		9.90		1.05	pCi/g	97	87 - 116
Cesium-137	30.1	29.28		3.12		0.226	pCi/g	97	87 - 120
Cobalt-60	18.5	17.74		1.83		0.0657	pCi/g	96	87 - 115

Lab Sample ID: 160-14255-1 DU

Matrix: Solid

Analysis Batch: 221048

Client Sample ID: TI-TO04_SU1_FSS_NP-S001

Prep Type: Total/NA

Prep Batch: 216722

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.192	U	0.4441		0.144		0.118	pCi/g	0.87	1
Actinium-227	0.0993	U	-0.00961	4	0.404		0.707	pCi/g	0.12	1
Bismuth-212	0.371	U	-0.1816	U	0.442		0.766	pCi/g	0.62	1
Bismuth-214	0.380		0.4305		0.111		0.0960	pCi/g	0.20	1
Cesium-137	0.00281	U	0.01610	U	0.0188		0.0297	pCi/g	0.22	1
Lead-210	1.22	U	0.6210	U	0.674		1.09	pCi/g	0.32	1
Lead-212	0.324		0.4003		0.133		0.111	pCi/g	0.33	1
Lead-214	0.335		0.3502		0.0947		0.0934	pCi/g	0.07	1
Potassium-40	10.5		10.91		1.69		0.559	pCi/g	0.12	1
Protactinium-231	-0.0316	U	-0.2083	U	0.717		1.25	pCi/g	0.22	1
Radium-226	0.380		0.4305		0.111	0.500	0.0960	pCi/g	0.20	1
Radium-228	0.192	U	0.4441		0.144		0.118	pCi/g	0.87	1

QC Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-14255-1 DU

Matrix: Solid

Analysis Batch: 221048

Client Sample ID: TI-TO04_SU1_FSS_NP-S001

Prep Type: Total/NA

Prep Batch: 216722

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.107		0.1392		0.0450		0.0383	pCi/g	0.37	1
Thorium-228	0.324		0.4003		0.133		0.111	pCi/g	0.33	1
Thorium-232	0.192	U	0.4441		0.144		0.118	pCi/g	0.87	1
Thorium-234	0.150	U	0.3745	U	0.737		1.24	pCi/g	0.18	1
Uranium-235	0.0518	U	-0.04839	U	0.180		0.309	pCi/g	0.28	1
Uranium-238	0.150	U	0.3745	U	0.737		1.24	pCi/g	0.18	1

QC Association Summary

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Rad

Leach Batch: 216474

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14255-1	TI-TO04_SU1_FSS_NP-S001	Total/NA	Solid	Dry and Grind	
160-14255-1 DU	TI-TO04_SU1_FSS_NP-S001	Total/NA	Solid	Dry and Grind	
160-14255-2	TI-TO04_SU1_FSS_NP-S004	Total/NA	Solid	Dry and Grind	
160-14255-3	TI-TO04_SU1_FSS_NP-S006	Total/NA	Solid	Dry and Grind	
160-14255-4	TI-TO04_SU1_FSS_NP-S008	Total/NA	Solid	Dry and Grind	
160-14255-5	TI-TO04_SU1_FSS_NP-S009	Total/NA	Solid	Dry and Grind	
160-14255-6	TI-TO04_SU1_FSS_NP-S011	Total/NA	Solid	Dry and Grind	
160-14255-7	TI-TO04_SU1_FSS_NP-S014	Total/NA	Solid	Dry and Grind	
160-14255-8	TI-TO04_SU1_FSS_NP-S018	Total/NA	Solid	Dry and Grind	
160-14255-9	TI-TO04_SU1_FSS_NP-S020	Total/NA	Solid	Dry and Grind	

Prep Batch: 216722

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14255-1	TI-TO04_SU1_FSS_NP-S001	Total/NA	Solid	Fill_Geo-21	216474
160-14255-1 DU	TI-TO04_SU1_FSS_NP-S001	Total/NA	Solid	Fill_Geo-21	216474
160-14255-2	TI-TO04_SU1_FSS_NP-S004	Total/NA	Solid	Fill_Geo-21	216474
160-14255-3	TI-TO04_SU1_FSS_NP-S006	Total/NA	Solid	Fill_Geo-21	216474
160-14255-4	TI-TO04_SU1_FSS_NP-S008	Total/NA	Solid	Fill_Geo-21	216474
160-14255-5	TI-TO04_SU1_FSS_NP-S009	Total/NA	Solid	Fill_Geo-21	216474
160-14255-6	TI-TO04_SU1_FSS_NP-S011	Total/NA	Solid	Fill_Geo-21	216474
160-14255-7	TI-TO04_SU1_FSS_NP-S014	Total/NA	Solid	Fill_Geo-21	216474
160-14255-8	TI-TO04_SU1_FSS_NP-S018	Total/NA	Solid	Fill_Geo-21	216474
160-14255-9	TI-TO04_SU1_FSS_NP-S020	Total/NA	Solid	Fill_Geo-21	216474
LCS 160-216722/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-216722/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

From: [Sevcik, Joseph T CIV SEA 04 04N](#)
To: [Guillory, Jeffrey](#)
Cc: [Schul, Raymond](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 10 Use 1, Part 2
Date: Thursday, February 18, 2016 6:56:42 AM

Jeff,

I concur with RSY 10 Use 1 Part 2 soil being designated at non-LLRW.

v/r,

Joe Sevcik
Environmental Protection Manager
NAVSEADET RASO
160 Main Road
Building 1959
NWS Yorktown, VA 23691
Office: (757) 887-4483
DSN: 953-4483
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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederaleservices.com>]
Sent: Tuesday, February 16, 2016 3:18 PM
To: Sevcik, Joseph T CIV SEA 04 04N
Cc: Schul, Raymond
Subject: [Non-DoD Source] RE: NSTI RSY Soil Release Request - RSY 10 Use 1, Part 2

Joe,

As far as soil disposition goes, my understanding is that the soil on RSY Pad 10 Use 1, Part 2, will definitely be disposed of in a CERCLA landfill, but it may go as Class 2 depending on the chemical characterization.

I have removed the reference to the disposition of the soil as Class 1, and attached (another) revision to this report. My apologies for the confusion.

Please let me know if you have any additional questions.

-jeff-

Jeffrey Guillory
Scientist 3
Technical Services

Federal Services
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jeffrey.guillory@cbifederalservices.com

CB&I
950 Avenue M - Treasure Island
San Francisco, CA 94130
United States of America
www.CBI.com

-----Original Message-----

From: Sevcik, Joseph T CIV SEA 04 04N [<mailto:joseph.sevcik@navy.mil>]
Sent: Wednesday, February 10, 2016 7:20 AM
To: Guillory, Jeffrey
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Coffey, Lisa M; Morrison, Dennis
Subject: RE: NSTI RSY Soil Release Request - RSY 10 Use 1, Part 2

Jeff,

It is my understanding that part of the assessment for reaching FSS for these soil SUs is documentation by an appropriate engineer/geologist that the soil is native fill and doesn't contain staining/debris. I see we have a note in the summary making the statement. What is the intent about the official documentation of that for this soil?

Also, there is a summary statement "Disposition: This soil shall be dispositioned as CERCLA Class I waste following additional on-site chemical characterization" is the CERCLA Class 1 disposal a definite or is that just a possibility based on the chemical characterization .

v/r,

Joe Sevcik
Environmental Protection Manager
NAVSEADET RASO
160 Main Road
Building 1959
NWS Yorktown, VA 23691
Office: (757) 887-4483
DSN: 953-4483
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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederalservices.com>]
Sent: Monday, January 25, 2016 11:09 AM
To: Sevcik, Joseph T CIV SEA 04 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Coffey, Lisa M; Morrison, Dennis

Subject: [Non-DoD Source] RE: NSTI RSY Soil Release Request - RSY 10 Use 1, Part 2

Mr. Sevcik,

Attached is a revised copy of NSTI RSY Soil Release Request - RSY 10 (Use 1, Part 2). Revisions to this report include an updated Systematic Sample Survey map (page 3), and additional information regarding gamma walkover coverage (pages 1, 2, & 3).

My apologies for the inconvenience. If you have any questions, please do not hesitate to contact me.
Thank you for your time.

Jeffrey Guillory

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CB&I

950 Avenue M

Treasure Island

San Francisco, CA 94130

United States of America

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From: Guillory, Jeffrey

Sent: Thursday, January 21, 2016 7:38 AM

To: 'Sevcik, Joseph T CIV SEA 04 04N'

Cc: zachary.edwards@navy.mil; Yantos, Christopher N CIV NAVFAC SW, BRAC
(christopher.yantos@navy.mil); Messer, Ulrika; Hackett, John R; Schul, Raymond; Coffey, Lisa M;
Morrison, Dennis

Subject: NSTI RSY Soil Release Request - RSY 10 Use 1, Part 2

Mr. Sevcik,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Description: Description: Description: Description: cid:_1_0AD725A00AD721CC001388C386257B11

Jeffrey Guillory

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Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

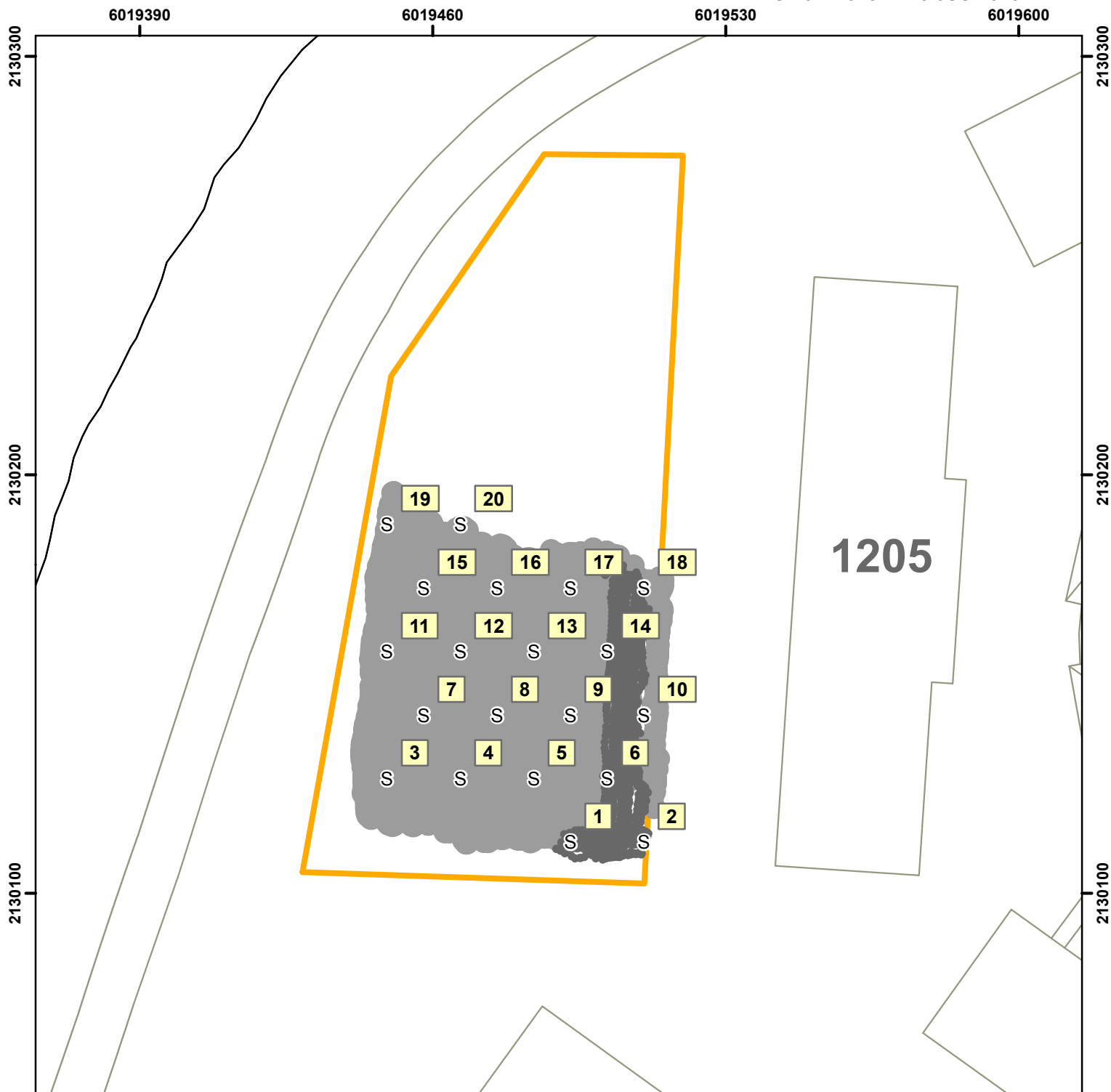
Contract No. EMAC III CTO-0004		
RSY Unit: RSY #10	RSY Unit Use Number: USE 1, Part 2	First Submittal <input type="checkbox"/> Second Submittal <input checked="" type="checkbox"/>
Data attached and submitted by: Lisa Coffey/Tina Piquet/Jeff Guillory		Data Report Submittal Date: 01/22/2016

Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static 2221 Meter Serial Number	One Minute Static Reading (CPM)	Static Count Over Static Mean + 3σ	Ra ²²⁶ Final Analytical Results
TI-TO04-BS-FSS-SU1-S001	1	Systematic	262337	14,144	No	0.274
TI-TO04-BS-FSS-SU1-S002	2	Systematic	262337	14,029	No	0.202
TI-TO04-BS-FSS-SU1-S003	3	Systematic	262337	14,092	No	0.337
TI-TO04-BS-FSS-SU1-S004	4	Systematic	262337	14,083	No	0.391
TI-TO04-BS-FSS-SU1-S005	5	Systematic	262337	14,381	No	0.185
TI-TO04-BS-FSS-SU1-S006	6	Systematic	262337	14,482	No	0.384
TI-TO04-BS-FSS-SU1-S007	7	Systematic	262337	13,923	No	0.211
TI-TO04-BS-FSS-SU1-S008	8	Systematic	262337	13,948	No	0.259
TI-TO04-BS-FSS-SU1-S009	9	Systematic	262337	13,808	No	0.303
TI-TO04-BS-FSS-SU1-S010	10	Systematic	262337	14,161	No	0.277
TI-TO04-BS-FSS-SU1-S011	11	Systematic	262337	14,059	No	0.348
TI-TO04-BS-FSS-SU1-S012	12	Systematic	262337	14,314	No	0.268
TI-TO04-BS-FSS-SU1-S013	13	Systematic	262337	13,578	No	0.309
TI-TO04-BS-FSS-SU1-S014	14	Systematic	262337	13,634	No	0.155
TI-TO04-BS-FSS-SU1-S015	15	Systematic	262337	13,869	No	0.500
TI-TO04-BS-FSS-SU1-S016	16	Systematic	262337	13,650	No	0.244
TI-TO04-BS-FSS-SU1-S017	17	Systematic	262337	14,262	No	0.328
TI-TO04-BS-FSS-SU1-S018	18	Systematic	262337	14,147	No	0.317
TI-TO04-BS-FSS-SU1-S019	19	Systematic	262337	14,113	No	0.321
TI-TO04-BS-FSS-SU1-S020	20	Systematic	262337	14,061	No	0.299

Instrument Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Static Background (CPM)	Static Background Plus 3σ (CPM)	Scan Background	Scan Background Plus 3σ	Range
General Area Exposure Rates	TIRS-10142015-12P3-JSS-1467	10/14/2015	19	7/16/2016	267096	N/A	N/A	N/A	N/A	7 µR/hr
Gamma Scan Walkover	TIRS-10192015-12P3-ROV-1494	10/19/2015	RS-701/RSX-1	N/A	Console: B-1051 / Detectors: 5447, 5448	N/A	N/A	837 CPS	972 CPS	576 – 817 CPS
Follow-up Required Static and Gamma Scan Fill-in	TIRS-10202015-12P3-JSS-1507	10/20/2015	2221	1/27/2016	262337	17,610	19,608	17,916 CPM	21,105 CPM	Static: 13,242 – 15,077 CPM Scan: 10,200 – 16,073 CPM
One Minute Systematic Sampling Static Counts	TIRS-10212015-12P3-JSS-1515	10/8/2015 - 10/12/2015	2221	1/27/2016	262337	17,610	19,608	N/A	N/A	13,578 – 14,482 CPM

CPM = Counts Per Minute
CPS = Counts Per Second

Summary
1) General area survey performed of staged soil piles prior to soil being spread to the 9-inch screening layer.
2) Initial RSI gamma scan and data review—upon review of initial scan data, follow-up static investigations were deemed necessary, and investigation locations were identified as per the RSI Data Evaluation Process (page 4). Gamma scan coverage shown on Systematic Sample Survey map (page 3). Contour maps of initial scan data are shown on RSI Data Plots (page 5). Data review results are summarized on RSI Review Summary (page 6).
3) Follow-up static survey and gamma scan fill-in—8 locations identified during the data review process were investigated, resulting in all locations < static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 7). An additional gamma scan walkover survey was also performed to fill in a small area of the RSY pad where data from the initial RSI gamma scan was not obtained, as shown in the gamma scan coverage plot in the Systematic Sample Survey map (page 3). All locations investigated during the additional gamma scan fill-in survey were < scan IL.
4) Twenty systematic soil samples (001-020) obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with all readings < static IL. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). Test America sample results are attached.
Summary:
All locations with elevated Z-scores identified by the initial RSI gamma scan were deemed comparable to background. 8 follow-up static locations were investigated, with readings < static IL at all locations. All locations investigated during the additional gamma scan fill-in survey were also < scan IL—see 3) above.
Additional locations (a-g, page 5) with elevated Z-scores that did not meet the criteria for a follow-up investigation were evaluated by spectral analysis of the RSI gamma scan data, which did not indicate the presence of Ra-226 above background levels (pages 10-23).
Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 8-9. These statistical tools were utilized to verify the appropriate level of reasonable effort.
RSY 10 (Use 1, Part 2) contains soil from the final 6-inch over excavation from Bayside Drive SU 1.
Note: Soil on RSY Pad 10 (Use 1, Part 2) was removed from the base of the excavation at Bayside Drive SU 1, and visual inspection of the soil was performed by the Project Engineer and ROICC. No debris or soil staining was identified, and the soil appeared consistent with original Treasure Island construction fill. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.
CB&I requests RASO concurrence to release this soil as Non-LLRW.
Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed offsite following appropriate chemical characterization.



Instrument # 262337

- S Systematic Sample Location
- Gamma Walkover Survey Coverage
- RSI Coverage
- RSYPAD Boundaries

CB&I Federal Services, LLC



0 12.5 25 50 Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

RSI Data Evaluation Process

RS-700 Mobile Radiation Monitoring System

- Self-contained gamma-ray radiation detection and monitoring system
- Built-in GPS receiver
- (2) RSX-1 4-liter NaI(Tl) gamma detectors oriented perpendicular to the direction of travel (VD1 denotes both detectors summed; VD3 refers to the left detector; and VD4 refers to the right detector)
- Multi-Channel Analyzer, allowing for monitoring of energy-specific regions of interest (ROIs)
- RadAssist survey software for control, monitoring, and recording

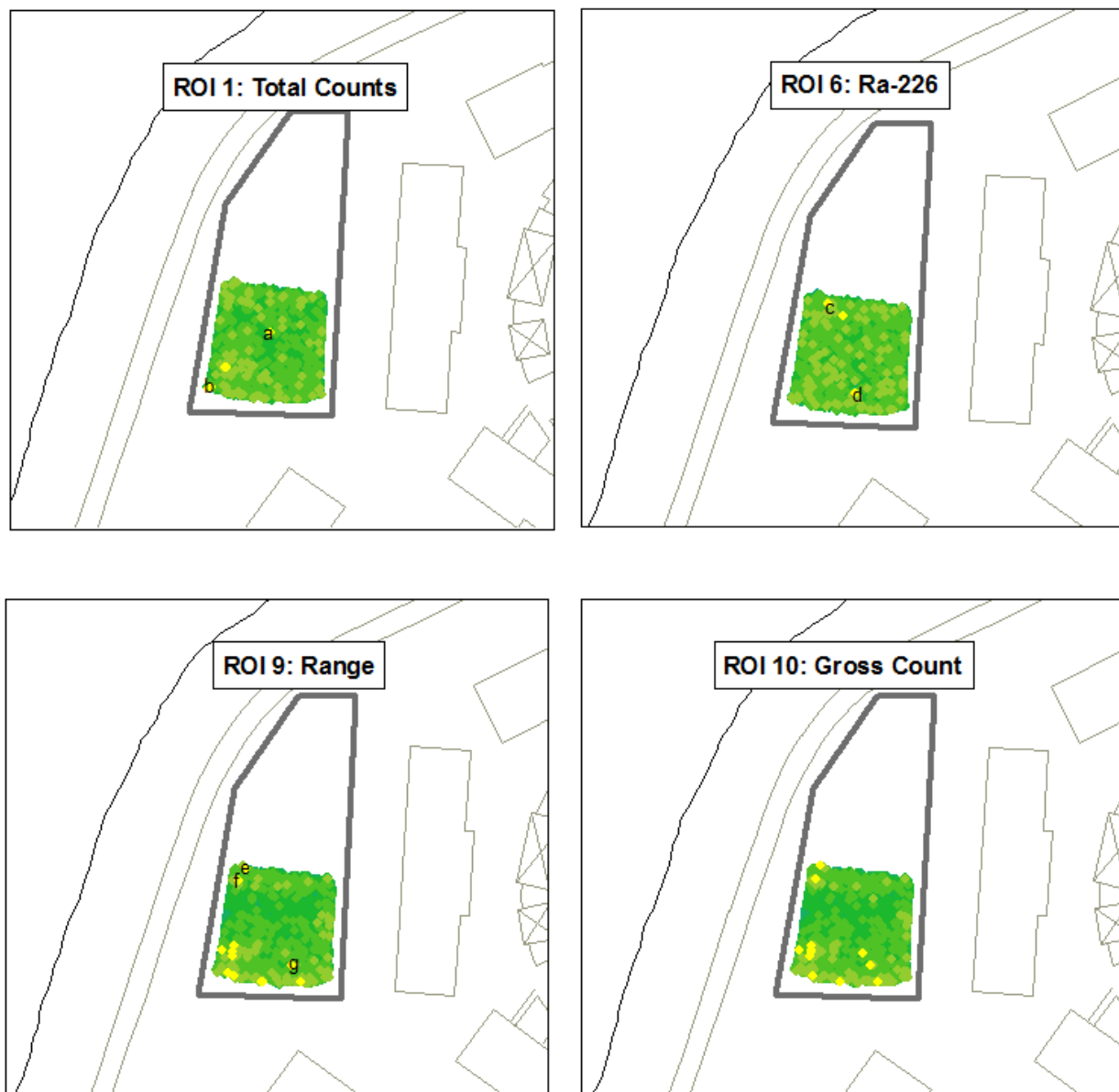
Ten ROIs have been established for radium and progeny as well as other naturally-occurring or anthropogenic gamma-emitting radionuclides that may be of interest:

ROI	Description	Energy Range (keV)	Primary Peak (keV)
1	Total counts	411 – 2811	N/A
2	Potassium	1371 – 1569	1460
3	U/Ra-226	1659 – 1860	1764 (Bi-214)
4	Thorium	2409 – 2811	2614 (Tl-208)
5	Annihilation	456 – 570	511
6	Ra-226	546 – 666	609 (Bi-214)
7	Cs-137	549 – 741	662
8	I-131	327 – 399	364
9	Range	45 – 1980	N/A
10	Gross Counts	3 – 3072	N/A

A tiered approach is used during data review to identify follow-up locations. Raw data are exported to a comma delimited format using RadAssist and imported into an Excel spreadsheet for review and analysis. Count rate data are compared with ROI- and material-specific investigation levels (ILs). In addition, the following review steps are completed to determine if additional follow-up measurements are necessary:

- **Playback Review:** The data file is replayed in RadAssist and reviewed for elevated count rates in ROIs 1, 3, 6, and 10 for virtual detector (VD) 1 (both detectors summed). The scan screen is also monitored for elevated count rates and alarms.
- **Count Rate Time Series Review:** The count rates for ROIs 1, 3, 6, and 10 for VDs 1, 3 (detector 1), and 4 (detector 2) are plotted in a time series and reviewed for additional peaks in count rate.
- **Z-Scores:** The Z-Scores are calculated for each location in all ROIs for VDs 1, 3, and 4. Any location with four or more ROIs having a Z-Score greater than three ($Z > 3$) is marked for follow-up.
- **Local Z-Scores:** Local Z-Scores are calculated using a moving average for each data point in all ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with four or more ROIs having a local $Z > 3$ is marked for follow-up.
- **Semi-local Z-Scores:** Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with four or more ROIs having a semi-local $Z > 3$ is marked for follow-up.
- **Z-Score Time Series Review:** The three types of Z-Scores for ROIs 1, 3, 6, and 10 for VDs 1, 3, and 4 are plotted in a time series and reviewed for additional peaks in Z-Scores.
- **Count Rate Ratio Review:** Count rate ratios are calculated for ROIs 3:4, 3:2, 3:6, 6:2, and 6:7. The count rate ratios are then plotted in a time series and reviewed for obvious peaks or outliers.

RSI DATA PLOT
RSY 10 – Use 1, Part 2
FSS Soil from Bayside Dr. SU 1



ROI from RSI Walkover Survey (VD1)

● > 3 std dev	● > 0 to < 1 std dev	● > -3 to < -2 std dev
● > 2 to < 3 std dev	● > -1 to < 0 std dev	● < -3 std dev
● > 1 to < 2 std dev	● > -2 to < -1 std dev	■ RSYPAD Boundaries

RSI Review Summary

Summary:

8 locations were selected for follow-up investigation. Locations were identified by elevated peaks noted in the playback review and/or time series charts, and by using the Z-Score, Local Z-Score, and Semi-Local Z-Score reviews as described in the RSI Data Evaluation Process on page 4. The table below details the reasons for each investigation by location.

Locations denoted a-g on the Comparison Evaluation Map (see previous page) did not meet the evaluation criteria for further investigation. Elevated Z-scores at these locations were identified only in specific ROIs, including: two locations exclusive to ROI 1 (a-b), two locations exclusive to ROI 6 (c-d), and three locations exclusive to ROI 9 (e-g). Elevated gross count rates at these locations were not identified, and a review of the data did not reveal any additional indicators warranting a follow-up investigation. Furthermore, spectral analyses performed on data obtained from these locations failed to confirm the presence of Radium-226; figures are provided on pages 10-23.

Bayside RSY 10 Material removed from SU 1 Investigation										
Longitude	Latitude	Details	Maximum Result (Ra/Tot)				Meter SN	Static Count (cpm)	Static IL (cpm)	Comments
			VD	ROI	Z-Score	Type:				
-122.3775071	37.8301361	Elevated count rate ratio	12		1764/Th		262337	13,852	19,608	< IL
-122.3774268	37.8299716	5 ROIs Z>3 (Ra/Tot)	4	10	5.06	Normal	262337	14,040	19,608	< IL
-122.3775575	37.8299799	4 ROIs Z>3 (Ra/Tot)	1	9	3.67	Normal	262337	14,733	19,608	< IL
-122.3775695	37.8299844	3 ROIs Z>3 (Ra/Tot)	3	9	3.90	Normal	262337	13,612	19,608	< IL
-122.3775784	37.8300097	3 ROIs Z>3 (Ra/Tot)	1	3	4.19	Normal	262337	13,656	19,608	< IL
-122.3775373	37.8300834	Highest Z-Score (normal, local, Ra/Tot)	4	3	5.80	Normal	262337	13,242	19,608	< IL
-122.3775618	37.8300187	4-5 ROIs Z>3 (Ra/Tot)	1	1	4.78	Normal	262337	13,765	19,608	< IL
-122.3775635	37.8300105									
-122.3775028	37.8299709	4 ROIs Local Z>3 (Ra/Tot)	1	10	3.67	Local	262337	15,077	19,608	< IL

6019460

6019530

2130200

2130200

2130100

2130100

Instrument # 262337

- Investigation Point
- Data Points Not Requiring Further Investigation
- RSYPAD Boundaries
- # Investigation Point ID

CB&I Federal Services, LLC



0 10 20 40
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: Bayside SU 1
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a median Ra-226 concentration of 0.8 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the observed Ra-226 median concentration of 0.301 pCi/g and estimated LBGR of 0.483, the SU will pass the WRS test at a 100% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.274	S	-0.21	8	8	21	R
0.202	S	-0.28	3	3	22	R
0.337	S	-0.15	16	16	23	R
0.391	S	-0.09	19	19	24	R
0.185	S	-0.30	2	2	25	R
0.384	S	-0.10	18	18	26	R
0.211	S	-0.27	4	4	27.5	R
0.259	S	-0.22	6	6	27.5	R
0.303	S	-0.18	11	11	29.5	R
0.277	S	-0.21	9	9	29.5	R
0.348	S	-0.13	17	17	31	R
0.268	S	-0.21	7	7	32	R
0.309	S	-0.17	12	12	33	R
0.155	S	-0.33	1	1	34	R
0.500	S	0.02	20	20	35.5	R
0.244	S	-0.24	5	5	35.5	R
0.328	S	-0.15	15	15	37	R
0.317	S	-0.17	13	13	38	R
0.321	S	-0.16	14	14	39	R
0.299	S	-0.18	10	10	40	R
Sum =			820	210		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 20 m
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 482.5$

$\alpha_W = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c: Values of r and k for the Quantile Test When α is Approximately 0.05

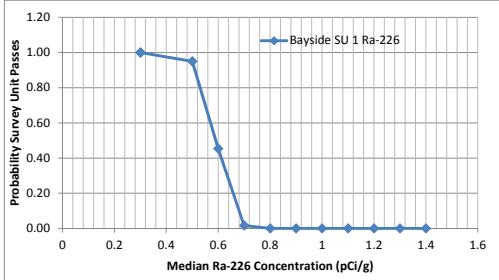
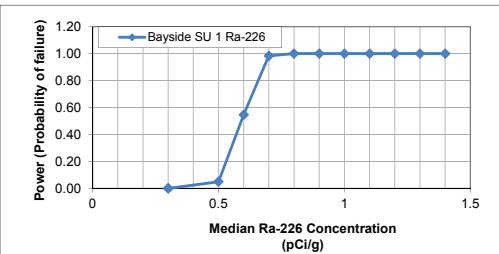
20 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 20$
 4 r
 4 k
 0.053 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

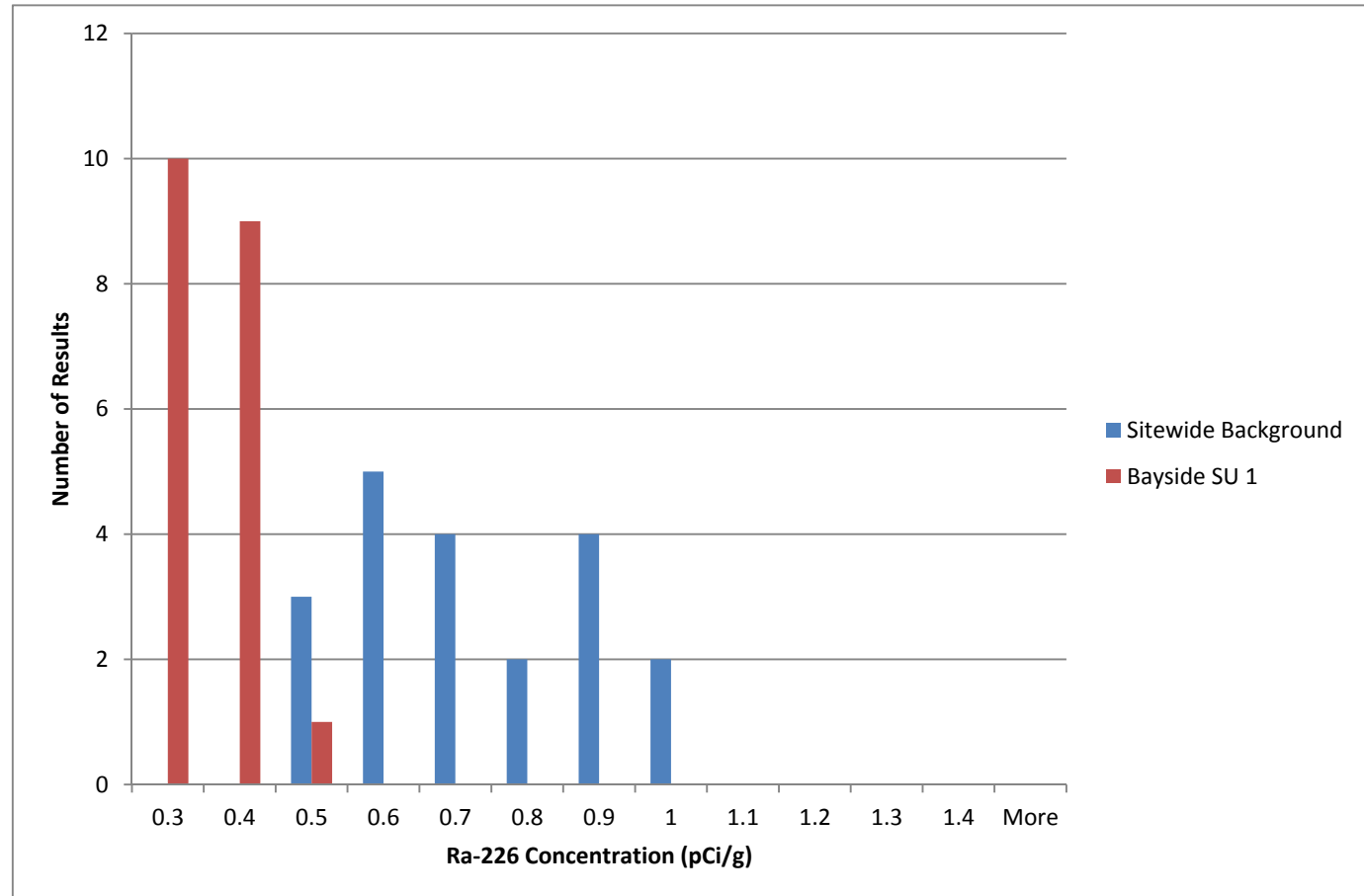
0 of the largest 4 adjusted measurements are from S. The null hypothesis is accepted.

Measurement	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.3	-1.1	0.218338	0.098892	87.3352	847	29.10015	6.3444	0.00	1.00
0.301	-1.1	0.218338	0.098892	87.3352	846.8185	29.10015	6.3444	0.00	1.00
0.5	0.1	0.528186	0.361978	211.2744	1361.245	36.89505	1.644767	0.05	0.95
0.6	0.7	0.689691	0.544073	275.8764	1125.277	33.54514	-0.1168	0.55	0.45
0.7	1.3	0.821015	0.716331	328.406	701.2134	26.48043	-2.13168	0.98	0.02
0.8	2.0	0.92135	0.865767	368.54	285.5796	16.8991	-5.71521	1.00	0.00
0.9	2.6	0.967004	0.940817	386.8016	99.71092	9.985535	-11.501	1.00	0.00
1	3.2	0.988174	0.977961	395.2696	27.37027	5.231661	-23.5702	1.00	0.00
1.1	3.8	0.997661	0.995497	399.0644	3.510254	1.873567	-67.8418	1.00	0.00
1.2	4.5	0.999796	0.999599	399.9184	0.187351	0.43284	-295.629	1.00	0.00
1.3	5.1	0.999796	0.999599	399.9184	0.187351	0.43284	-295.629	1.00	0.00
1.4	5.7	0.999989	0.999978	399.9956	0.004398	0.066318	-1930.65	1.00	0.00

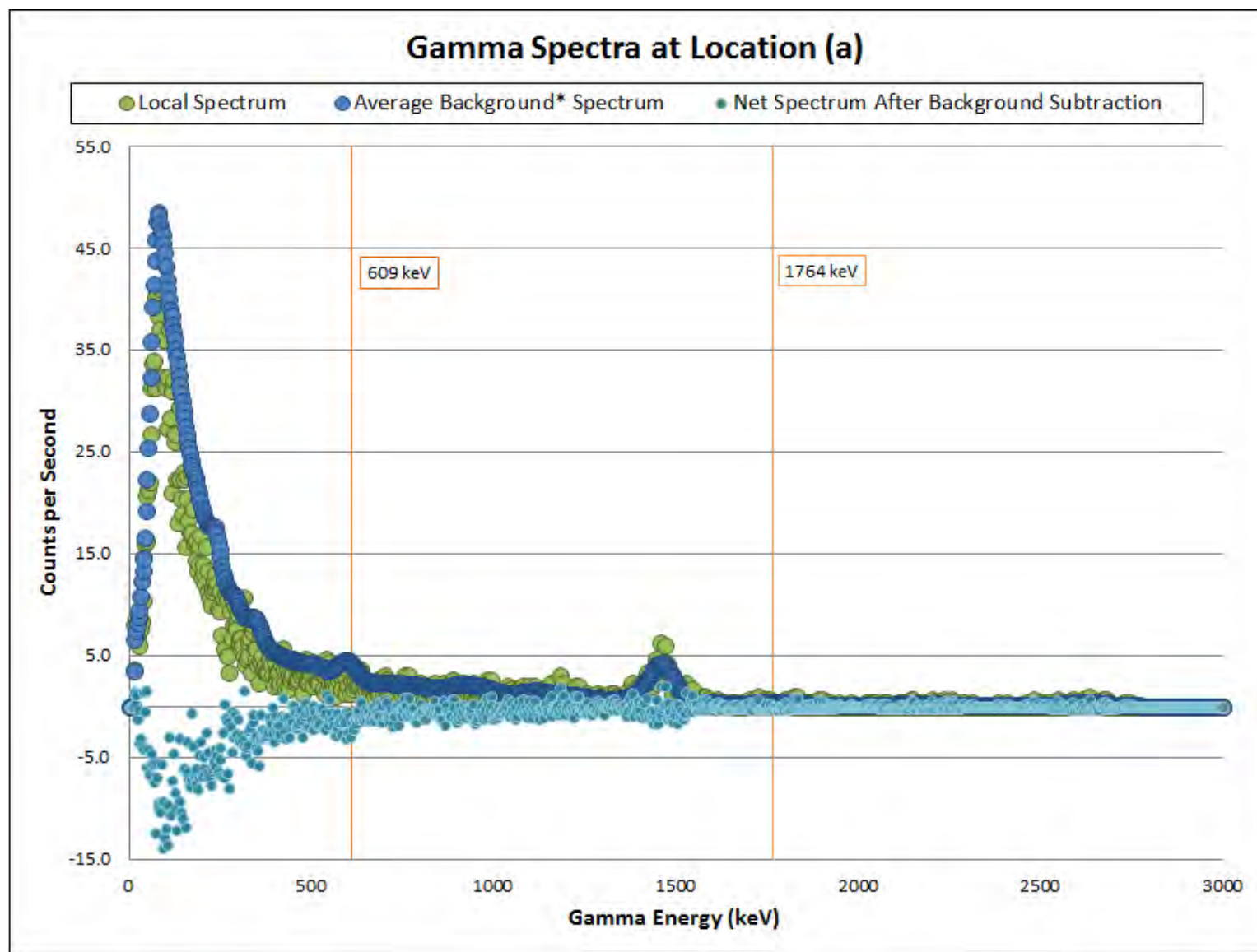


Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

Bayside SU 1	
<i>Bin</i>	<i>Frequency</i>
0.3	10
0.4	9
0.5	1
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



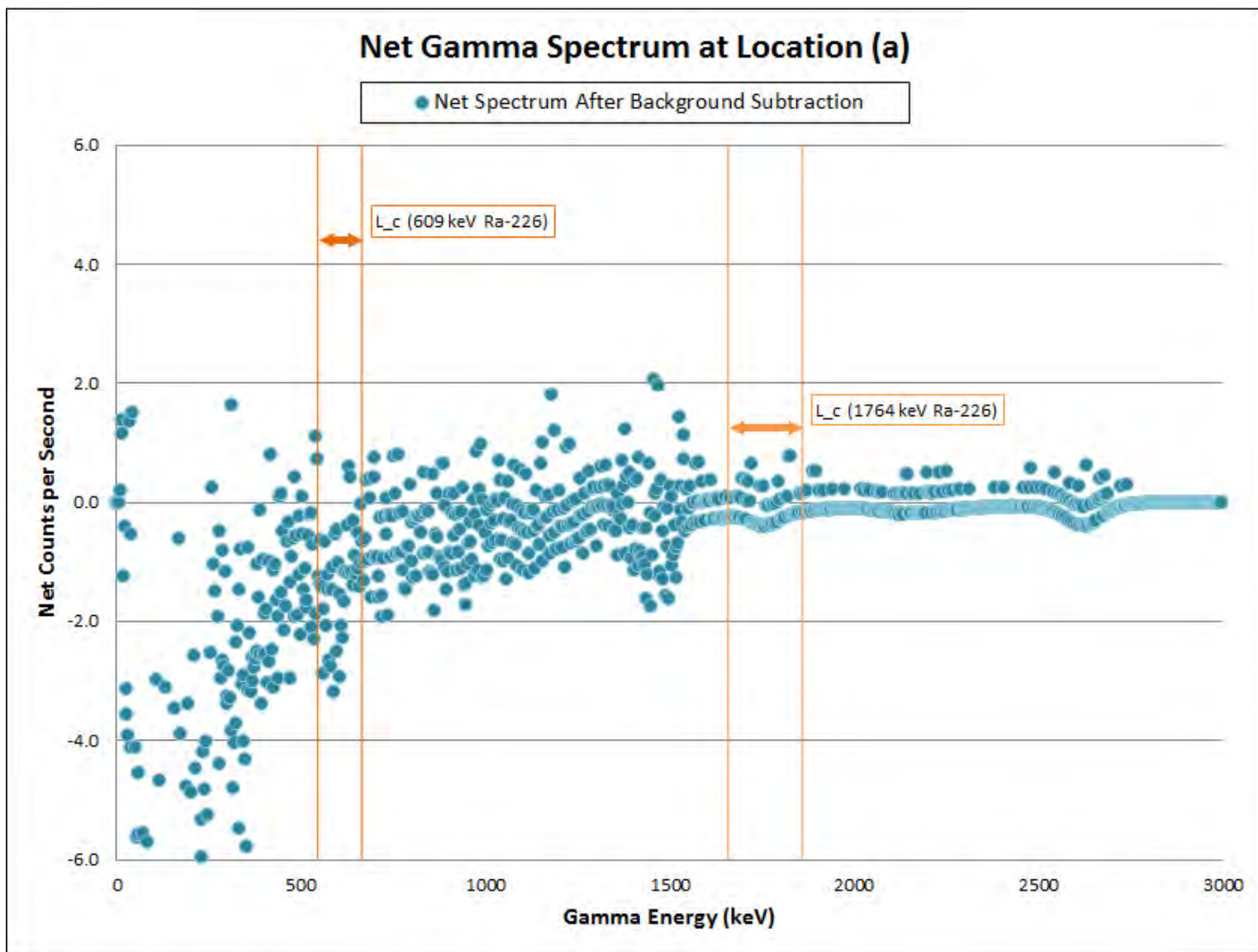
RSI Spectral Analysis Results: RSY 10 Use 1 – **Gamma Spectra at Location (a)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (a)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 10 Use 1 – **Net Gamma Spectrum at Location (a)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (a): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

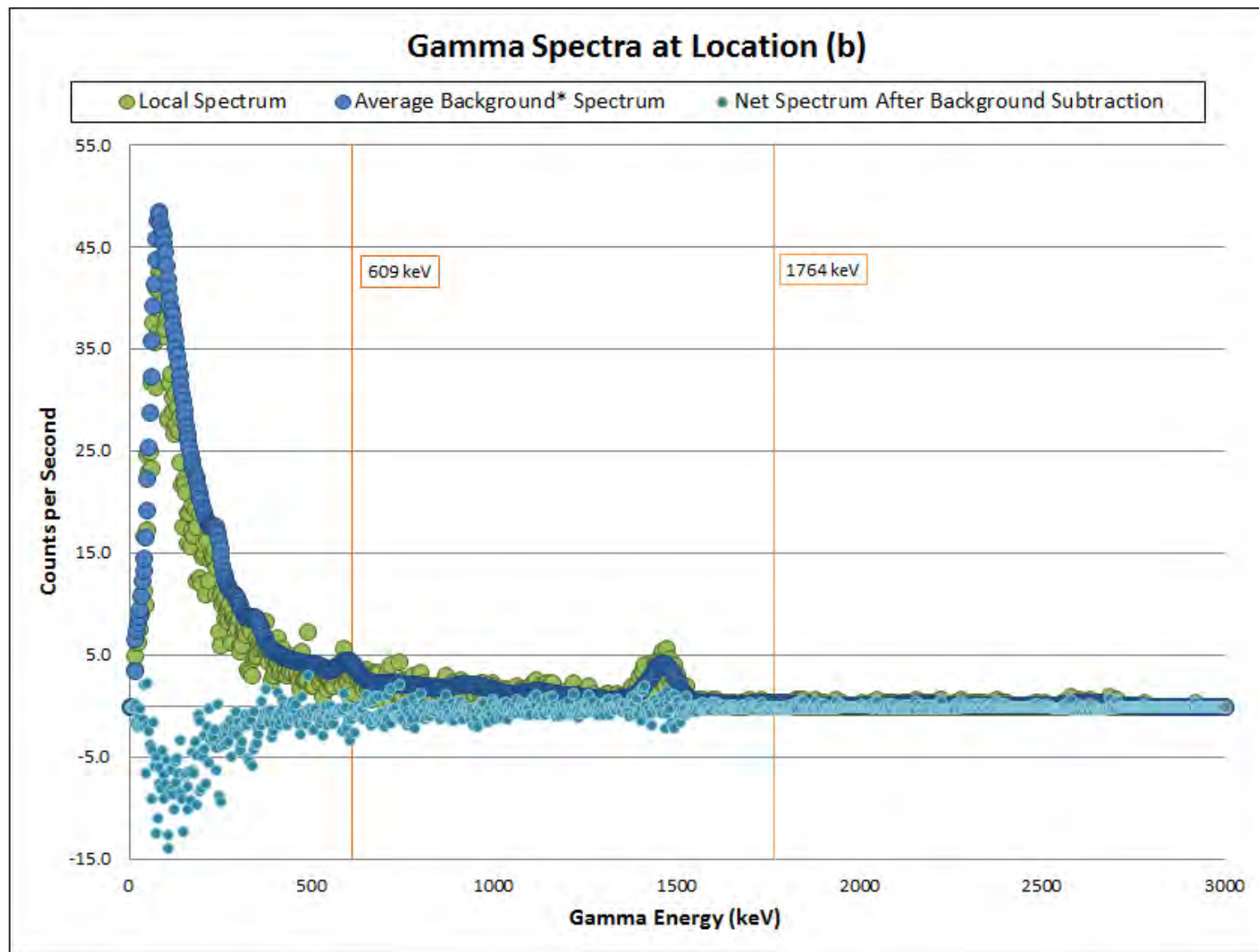
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 Use 1 – **Gamma Spectra at Location (b)**
(VD1 – Right and Left Detectors Summed)

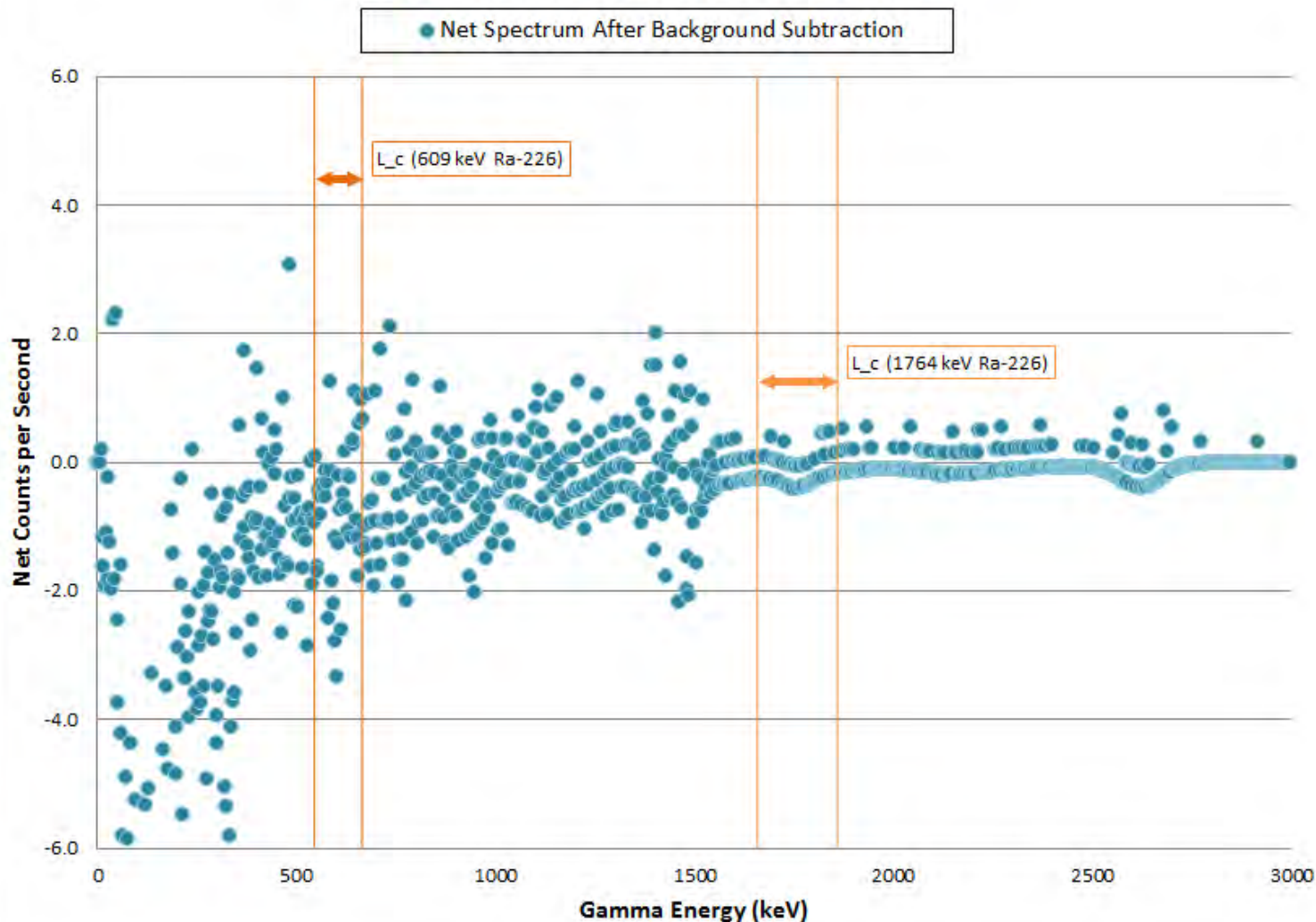


Gamma spectra for **Location (b)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 10 Use 1 – **Net Gamma Spectrum at Location (b)**
(VD1 – Right and Left Detectors Summed)

Net Gamma Spectrum at Location (b)



Net spectrum for Location (b): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

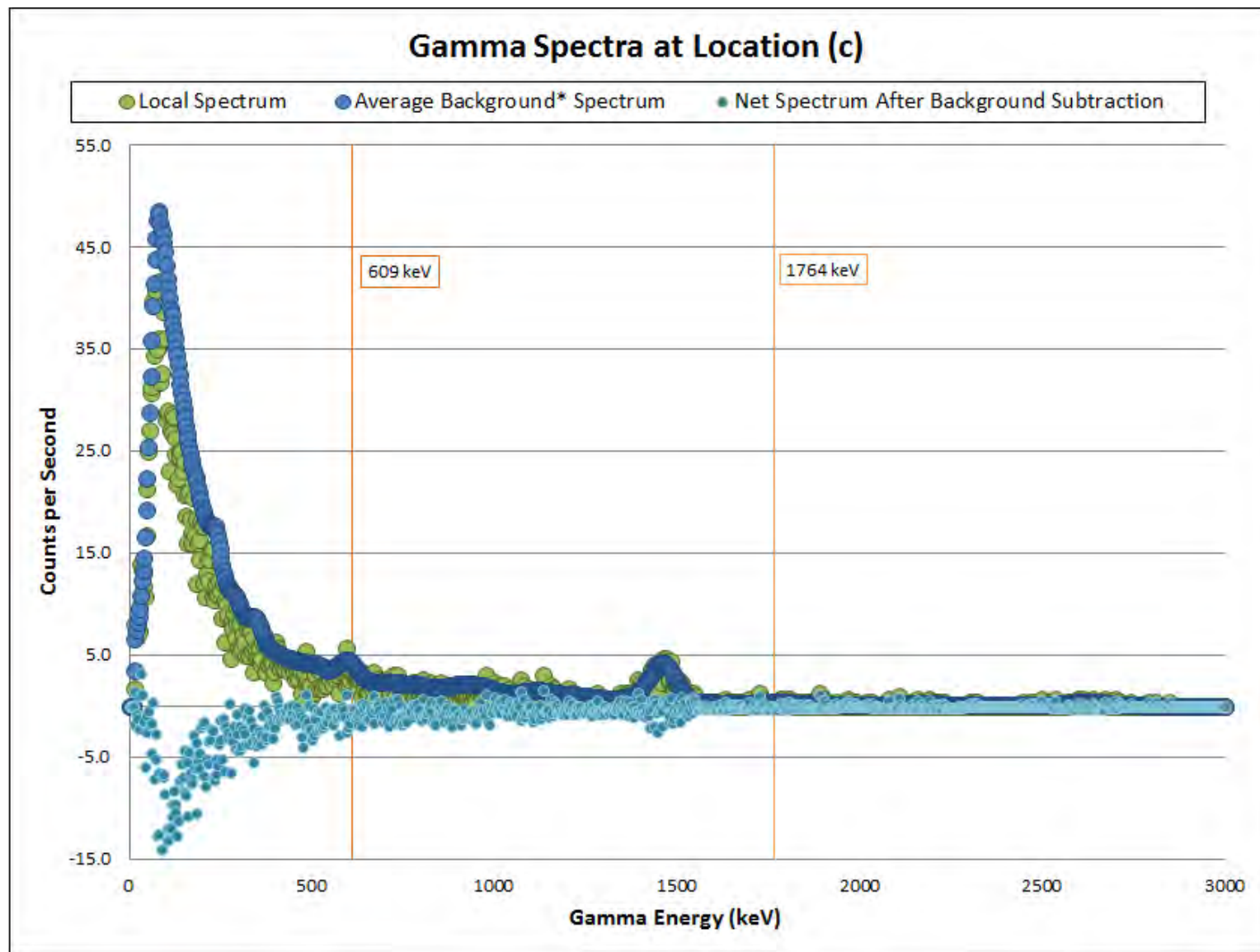
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ **B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

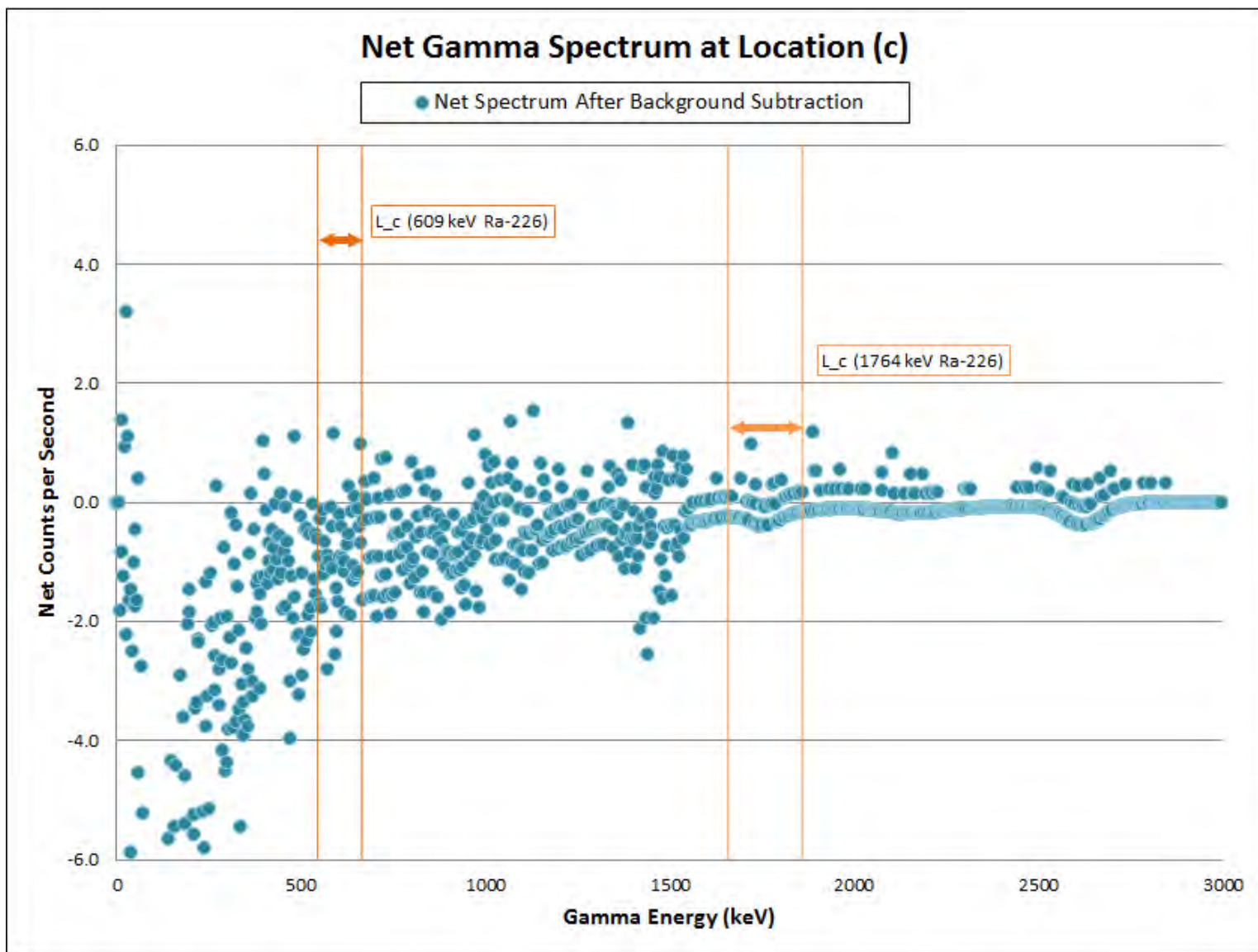
RSI Spectral Analysis Results: RSY 10 Use 1 – **Gamma Spectra at Location (c)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (c)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 10 Use 1 – **Net Gamma Spectrum at Location (c)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (c): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

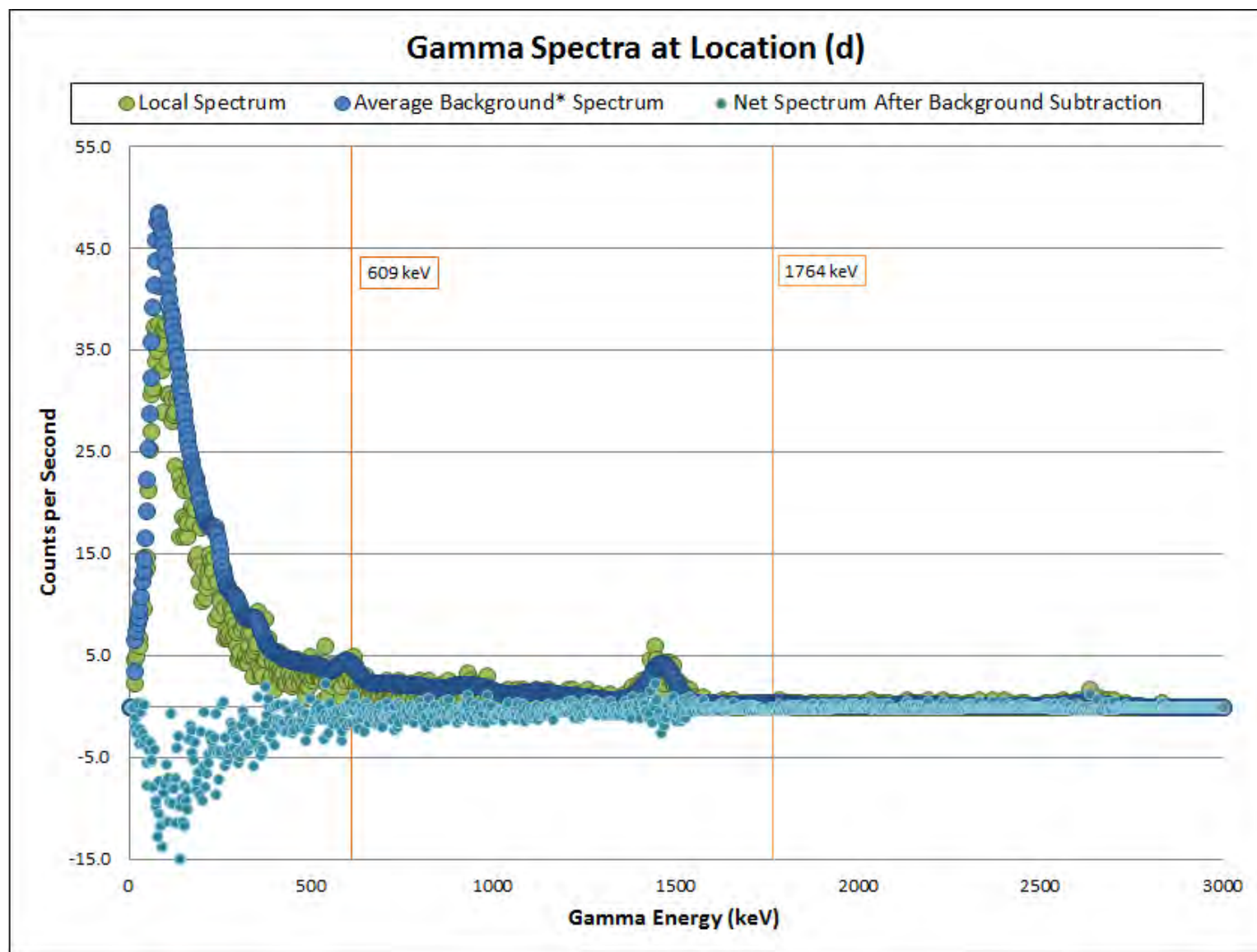
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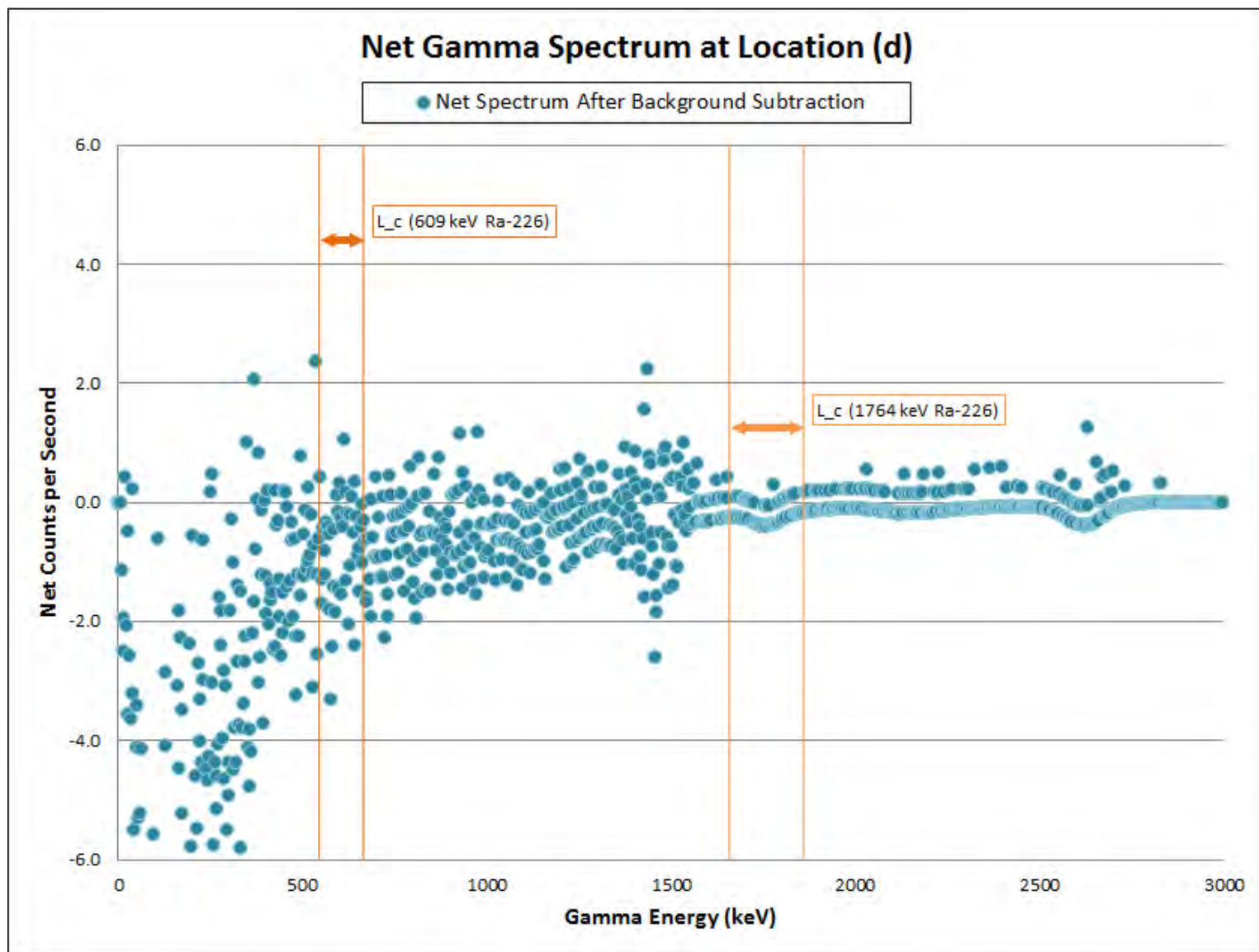
RSI Spectral Analysis Results: RSY 10 Use 1 – **Gamma Spectra at Location (d)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (d)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 10 Use 1 – **Net Gamma Spectrum at Location (d)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (d): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

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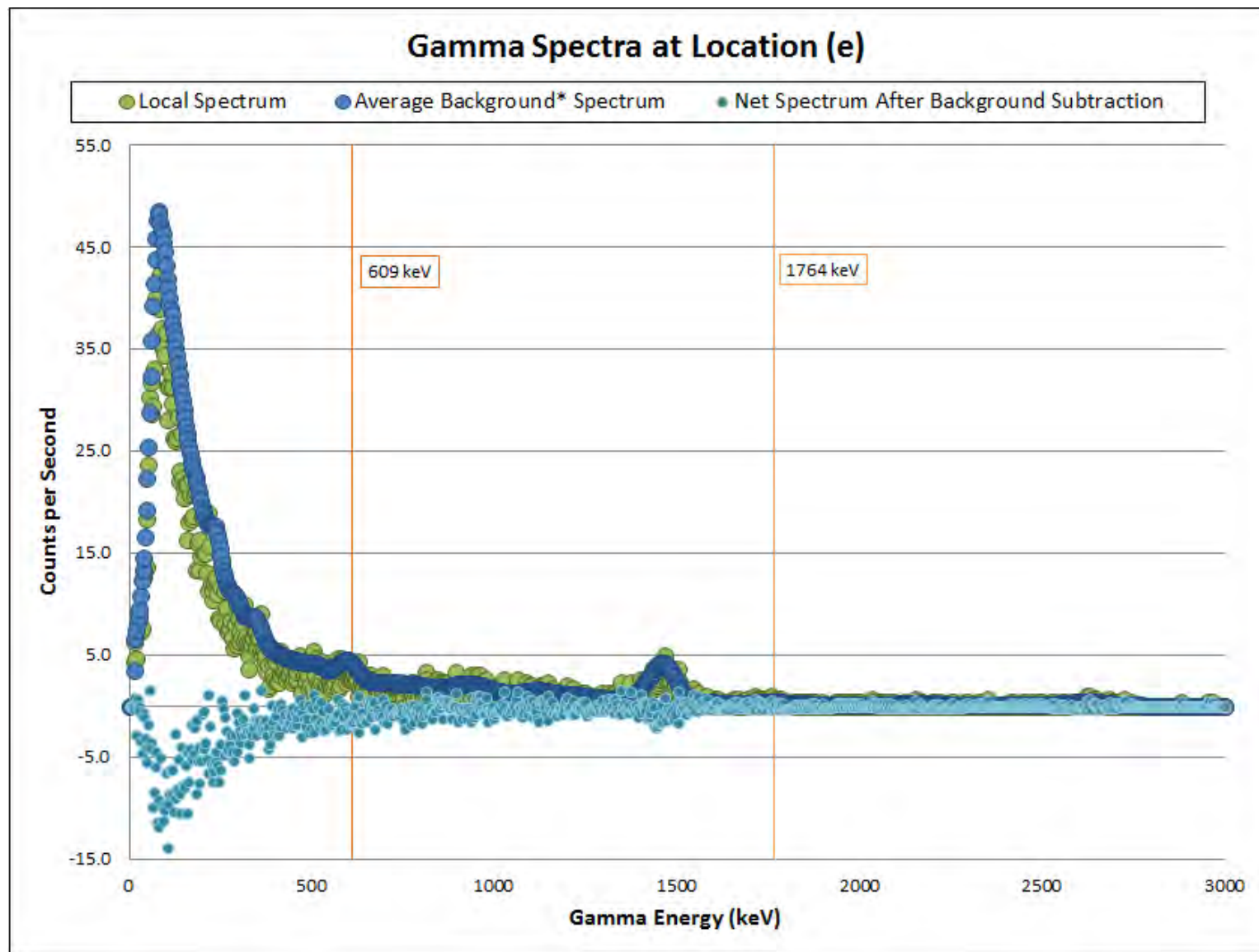
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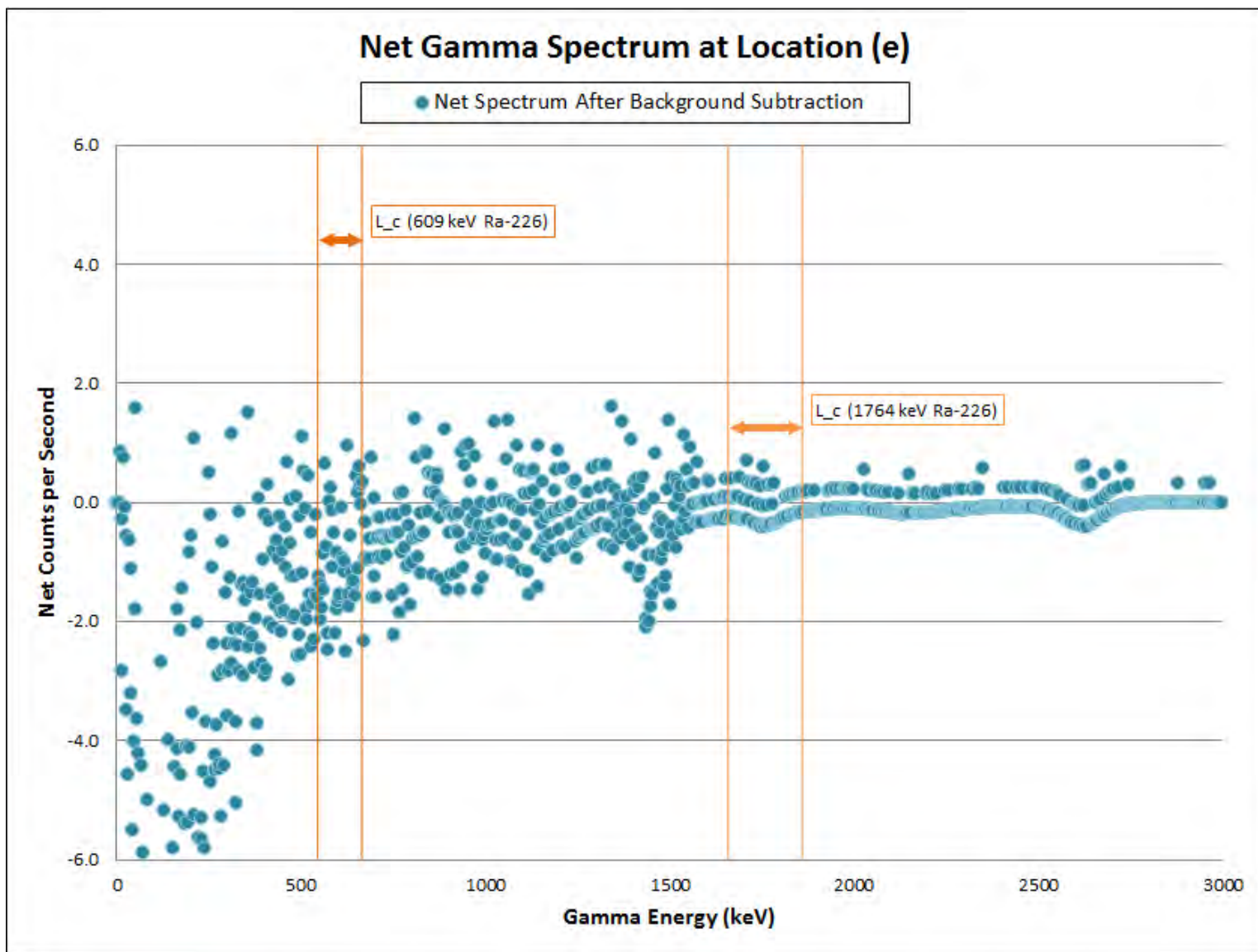
RSI Spectral Analysis Results: RSY 10 Use 1 – **Gamma Spectra at Location (e)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (e)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 10 Use 1 – **Net Gamma Spectrum at Location (e)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (e): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

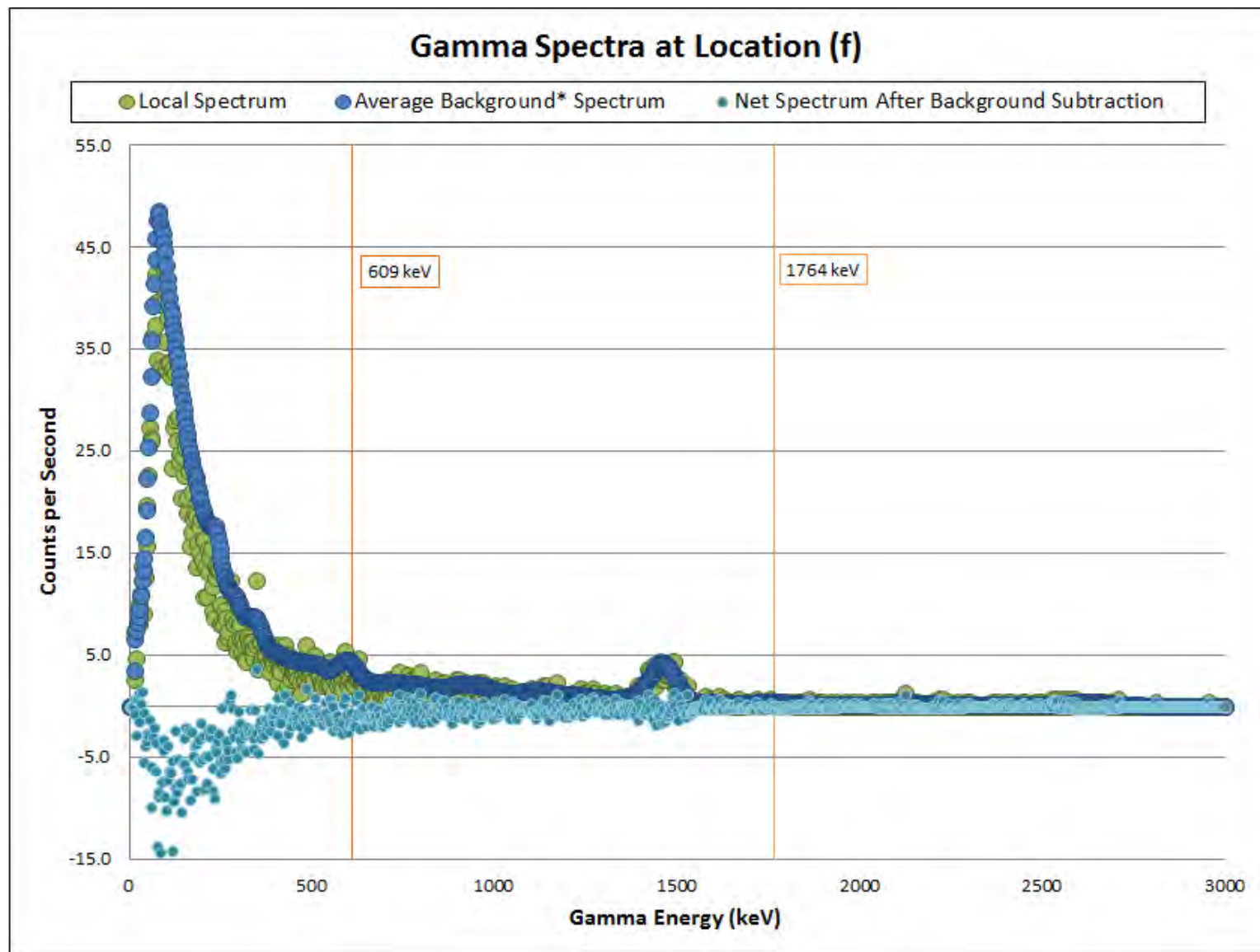
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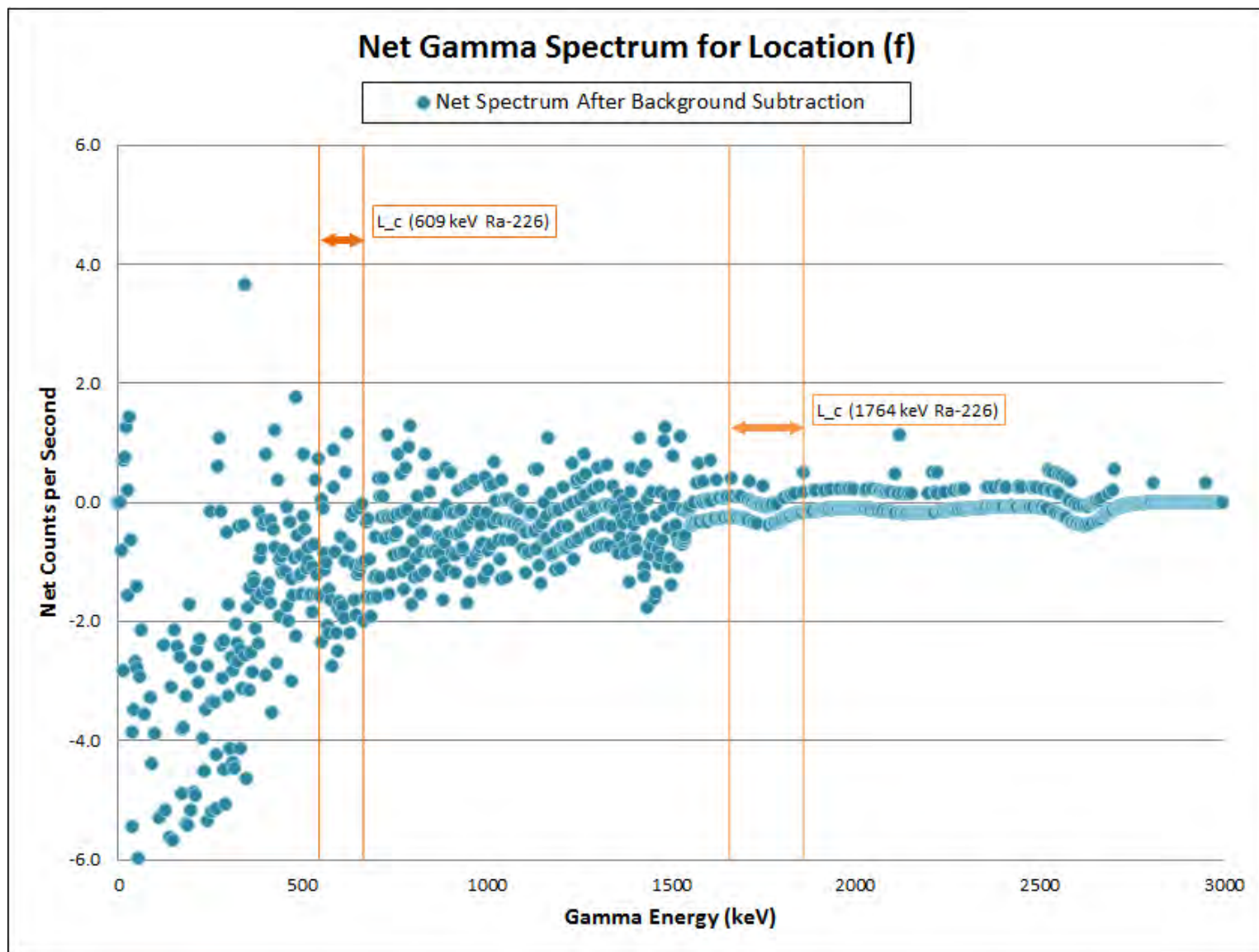
RSI Spectral Analysis Results: RSY 10 Use 1 – **Gamma Spectra at Location (f)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for Location (f): local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 10 Use 1 – **Net Gamma Spectrum at Location (f)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (f): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

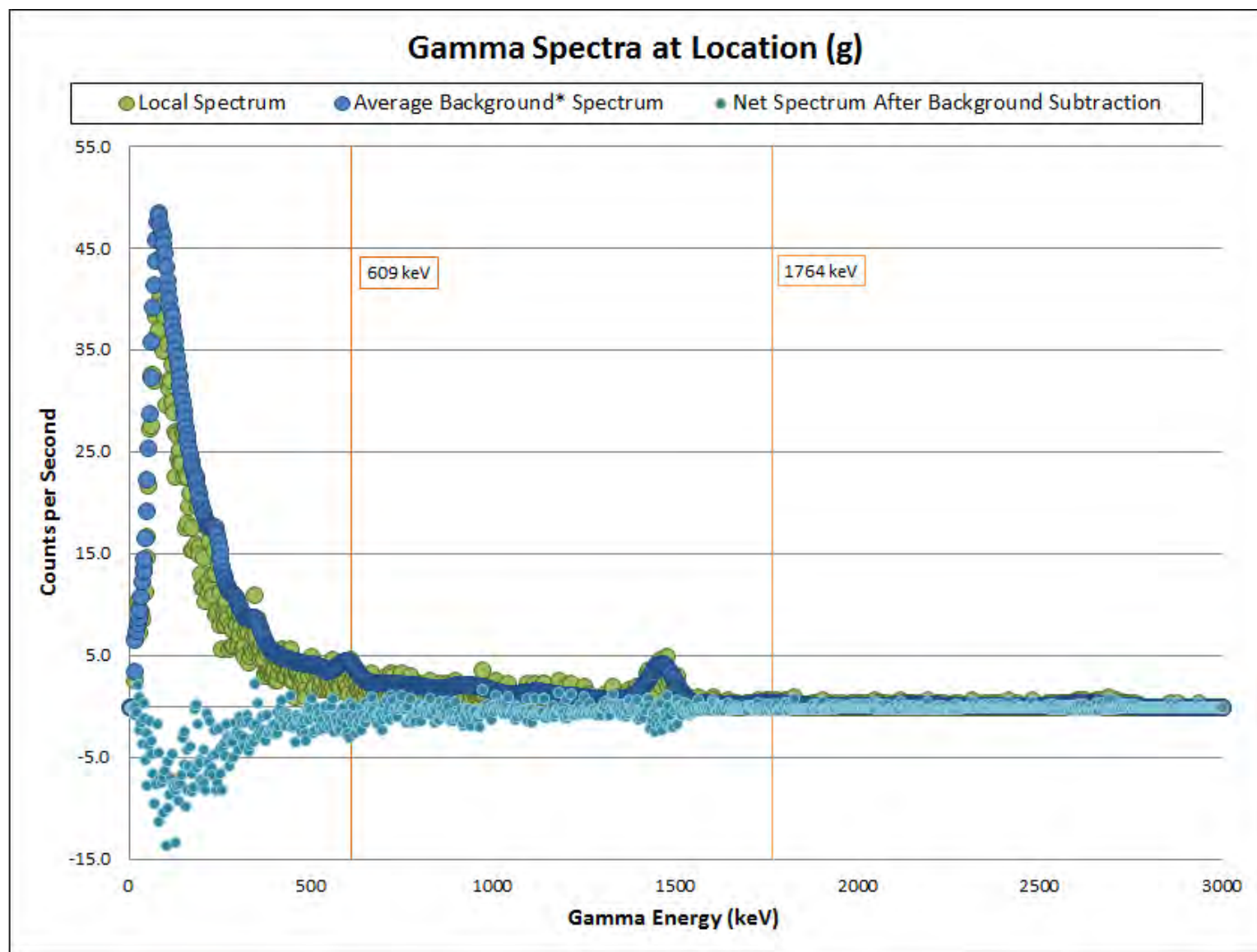
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ **B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

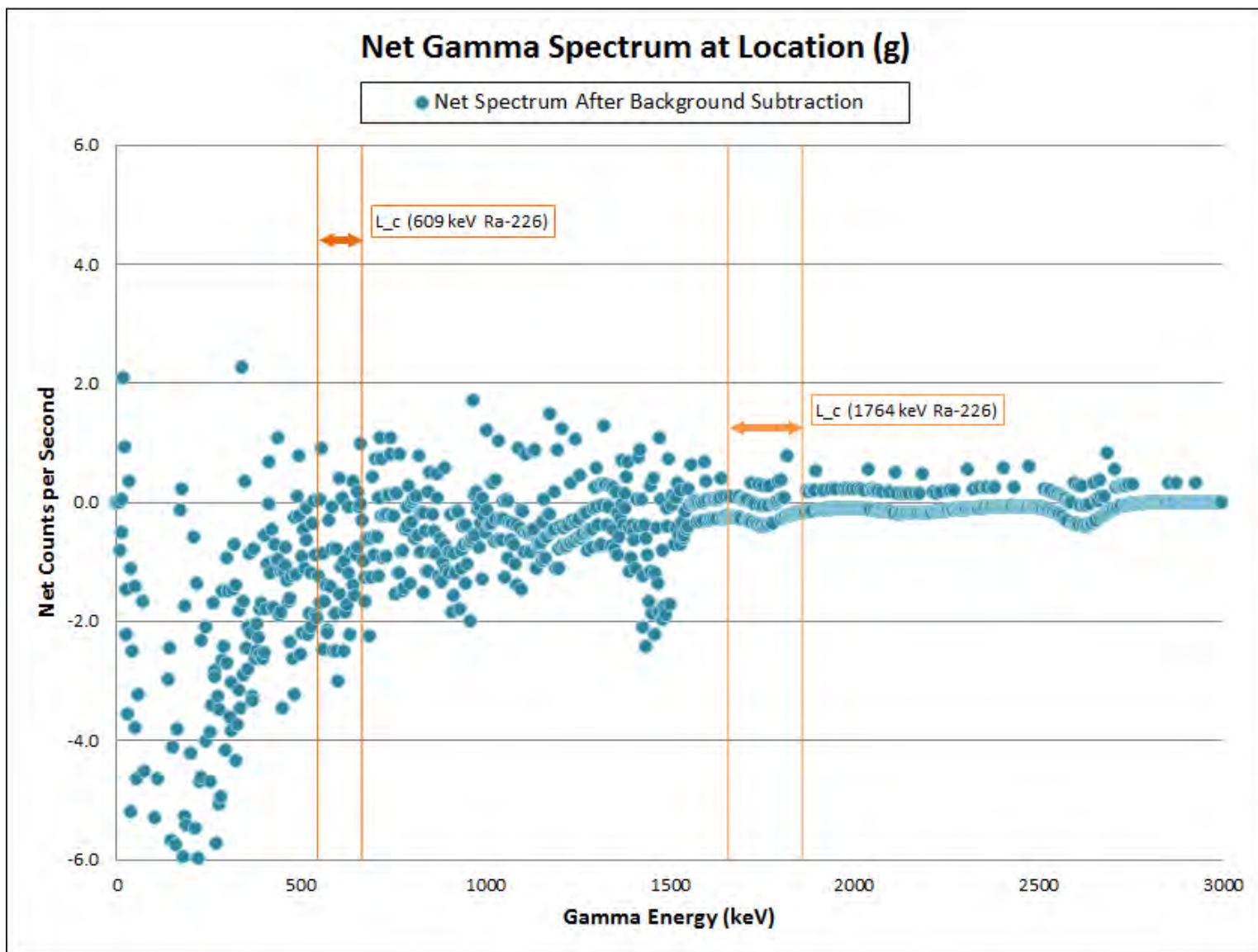
RSI Spectral Analysis Results: RSY 10 Use 1 – **Gamma Spectra at Location (g)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for Location (g): local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 10 Use 1 – **Net Gamma Spectrum at Location (g)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (g): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ **B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-14498-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn

Rhonda Ridenhower

Authorized for release by:

11/24/2015 11:21:00 AM

Rhonda Ridenhower, Manager of Project Management
rhonda.ridenhower@testamericainc.com

Designee for

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

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Case Narrative	3
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QC Sample Results	22
QC Association Summary	24



Case Narrative

Page 26 of 47

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Job ID: 160-14498-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-14498-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 27 of 47

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Job ID: 160-14498-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/27/2015; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 20.1 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-BS-FSS-SU1-S001 (160-14498-1), TI-TO04-BS-FSS-SU1-S002 (160-14498-2), TI-TO04-BS-FSS-SU1-S003 (160-14498-3), TI-TO04-BS-FSS-SU1-S004 (160-14498-4), TI-TO04-BS-FSS-SU1-S005 (160-14498-5), TI-TO04-BS-FSS-SU1-S006 (160-14498-6), TI-TO04-BS-FSS-SU1-S007 (160-14498-7), TI-TO04-BS-FSS-SU1-S008 (160-14498-8), TI-TO04-BS-FSS-SU1-S009 (160-14498-9), TI-TO04-BS-FSS-SU1-S010 (160-14498-10), TI-TO04-BS-FSS-SU1-S011 (160-14498-11), TI-TO04-BS-FSS-SU1-S012 (160-14498-12), TI-TO04-BS-FSS-SU1-S013 (160-14498-13), TI-TO04-BS-FSS-SU1-S014 (160-14498-14), TI-TO04-BS-FSS-SU1-S015 (160-14498-15), TI-TO04-BS-FSS-SU1-S016 (160-14498-16), TI-TO04-BS-FSS-SU1-S017 (160-14498-17), TI-TO04-BS-FSS-SU1-S018 (160-14498-18), TI-TO04-BS-FSS-SU1-S019 (160-14498-19) and TI-TO04-BS-FSS-SU1-S020 (160-14498-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/27/2015, prepared on 10/29/2015 and analyzed on 11/19/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Shaw Environmental and Infrastructure Inc. (a CBI company)
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TI_P3_FSS_SU1_BS_134

Page 1 of 3

Project Number: 500060

Project Name / Location: CTO-04 Phase III BAYSIDE

Purchase Order #: 201455

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date: 10-23-2015

Waybill Number: 3665434499033552

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Sampler's Name(s): T. WELLS

Sample ID Number	Sample Description	Date	Time	Method
TI-T004-BS-FSS-SU1-S001	BAYSIDE FSS Survey Unit 1	10-21-15	1102	G
TI-T004-BS-FSS-SU1-S002	BAYSIDE FSS Survey Unit 1	10-21-15	1103	G
TI-T004-BS-FSS-SU1-S003	BAYSIDE FSS Survey Unit 1	10-21-15	1107	G
TI-T004-BS-FSS-SU1-S004	BAYSIDE FSS Survey Unit 1	10-21-15	1108	G
TI-T004-BS-FSS-SU1-S005	BAYSIDE FSS Survey Unit 1	10-21-15	1114	G
TI-T004-BS-FSS-SU1-S006	BAYSIDE FSS Survey Unit 1	10-21-15	1117	G
TI-T004-BS-FSS-SU1-S007	BAYSIDE FSS Survey Unit 1	10-21-15	1119	G
TI-T004-BS-FSS-SU1-S008	BAYSIDE FSS Survey Unit 1	10-21-15	1221	G
TI-T004-BS-FSS-SU1-S009	BAYSIDE FSS Survey Unit 1	10-21-15	1227	G

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

Received By:

Date: 10/23/15

Time: 1200

Received By:

Date: 10-27-15

Time: 0900

Relinquished By:

Date: 10-27-15

Time: 0900

Analyses Requested									
Gamma Scan									
Dose Rate μ R/h									

Preservative (water)

Preservative (soil)

Container Type

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

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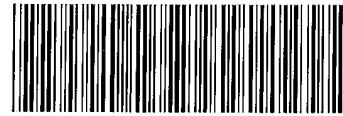
16 oz Plastic

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160-14498 Chain of Custody





Shaw Environmental and Infrastructure Inc. (a CB&I company)

Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TI_P3_FSS_SU1 BS_134

Page 2 of 3

Project Number: **500060**

Project Name / Location: CTO-04 Phase III BAYSIDE

FSS SU1

Purchase Order #: 201455

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date: 10/23/15

Waybill Number: 126654344993352

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Sampler's Name(s): T. W. Ellis

Collection Information

Date Time Method

Matrix # of containers

Preservative (water)

Preservative (soil)

Container Type

Dose Rate $\mu\text{R/hr}$

Analyses Requested

Gamma Scan

Method Codes

Matrix Codes

SO = Soil

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

ABS=Asbestos, PO=Pipe Opening

G = Grab

C = Composite

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GW = Ground Water

WW = Waste Water

A = Air

ABS=Asbestos, PO=Pipe Opening

G = Grab

C



4005 Port Chicago Hwy
Concord, CA 94520

Ref. Document # TI P3 FSS SU1 BS 134

Page 3 of 3

Project Number: 500060

Project Name / Location: CTO-04 Phase III BAYSIDE

FSS SU1

Project Manager: *Ulrika Messer*

(Name & phone #)

Send Report To: *Patricia Flynn*

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date:

Waybill Number: 131115

Waybill Number: 1Z66V59544990335Z

Lab Contact Name / ph. #: Mike Dryden

Sampler's Name(s): T. Wells

T. wells

[illegible]

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hrStandard TAT ☐☐ 3-day☐ 7-day

Project Specific:

III

Relinquished By:

Date: 10/23/18

Received By:

Date: 10.20.25

Relinquished By:

Unit.	(✓)
Date:	

Received By:

Time: 0740

ABS=Asbestos, PO=Pipe Opening

 $G = \text{Graph}$

C = Composite

Matrix Codes

matrix cones

LW = Drinking water

GW = Ground Water

WW = Waste Water

$$A = \text{Air}$$

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-14498-2

Login Number: 14498**List Number: 1****Creator: Clarke, Jill C****List Source: TestAmerica St. Louis**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Page 32 of 47

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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Sample Summary

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-14498-1	TI-TO04-BS-FSS-SU1-S001	Solid	10/21/15 11:02	10/27/15 09:00
160-14498-2	TI-TO04-BS-FSS-SU1-S002	Solid	10/21/15 11:03	10/27/15 09:00
160-14498-3	TI-TO04-BS-FSS-SU1-S003	Solid	10/21/15 11:07	10/27/15 09:00
160-14498-4	TI-TO04-BS-FSS-SU1-S004	Solid	10/21/15 11:08	10/27/15 09:00
160-14498-5	TI-TO04-BS-FSS-SU1-S005	Solid	10/21/15 11:14	10/27/15 09:00
160-14498-6	TI-TO04-BS-FSS-SU1-S006	Solid	10/21/15 11:17	10/27/15 09:00
160-14498-7	TI-TO04-BS-FSS-SU1-S007	Solid	10/21/15 11:19	10/27/15 09:00
160-14498-8	TI-TO04-BS-FSS-SU1-S008	Solid	10/21/15 12:21	10/27/15 09:00
160-14498-9	TI-TO04-BS-FSS-SU1-S009	Solid	10/21/15 12:27	10/27/15 09:00
160-14498-10	TI-TO04-BS-FSS-SU1-S010	Solid	10/21/15 12:26	10/27/15 09:00
160-14498-11	TI-TO04-BS-FSS-SU1-S011	Solid	10/21/15 12:33	10/27/15 09:00
160-14498-12	TI-TO04-BS-FSS-SU1-S012	Solid	10/21/15 12:32	10/27/15 09:00
160-14498-13	TI-TO04-BS-FSS-SU1-S013	Solid	10/21/15 12:39	10/27/15 09:00
160-14498-14	TI-TO04-BS-FSS-SU1-S014	Solid	10/21/15 12:45	10/27/15 09:00
160-14498-15	TI-TO04-BS-FSS-SU1-S015	Solid	10/21/15 12:44	10/27/15 09:00
160-14498-16	TI-TO04-BS-FSS-SU1-S016	Solid	10/21/15 12:38	10/27/15 09:00
160-14498-17	TI-TO04-BS-FSS-SU1-S017	Solid	10/21/15 12:52	10/27/15 09:00
160-14498-18	TI-TO04-BS-FSS-SU1-S018	Solid	10/21/15 12:53	10/27/15 09:00
160-14498-19	TI-TO04-BS-FSS-SU1-S019	Solid	10/21/15 12:59	10/27/15 09:00
160-14498-20	TI-TO04-BS-FSS-SU1-S020	Solid	10/21/15 13:00	10/27/15 09:00

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S001

Lab Sample ID: 160-14498-1

Date Collected: 10/21/15 11:02

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.433		0.158	0.164		0.152	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Actinium-227	0.340		0.232	0.235		0.325	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Bismuth-212	0.0529	U	0.440	0.440		0.822	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Bismuth-214	0.274		0.113	0.117		0.129	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Cesium-137	0.00536	U	0.0371	0.0371		0.0688	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Lead-210	0.367	U	0.860	0.861		1.53	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Lead-212	0.274		0.0943	0.101		0.105	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Lead-214	0.235		0.0871	0.0904		0.117	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Potassium-40	11.0		1.53	1.90		0.669	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Protactinium-231	0.218	U	0.616	0.617		1.10	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Radium-226	0.274		0.113	0.117	0.500	0.129	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Radium-228	0.433		0.158	0.164		0.152	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Thallium-208	0.102		0.0427	0.0440		0.0472	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Thorium-228	0.274		0.0943	0.101		0.105	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Thorium-232	0.433		0.158	0.164		0.152	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Thorium-234	0.000882	U	0.804	0.804		1.47	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Uranium-235	0.152	U	0.183	0.183		0.299	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Uranium-238	0.000882	U	0.804	0.804		1.47	pCi/g	10/29/15 09:48	11/19/15 15:47	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S002

Lab Sample ID: 160-14498-2

Date Collected: 10/21/15 11:03

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.410		0.152	0.158		0.116	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Actinium-227	-0.00538	U	0.351	0.351		0.629	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Bismuth-212	0.291	U	0.416	0.417		0.695	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Bismuth-214	0.202		0.0846	0.0872		0.0972	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Cesium-137	-0.00856	U	0.0388	0.0388		0.0696	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-210	0.337	U	1.04	1.04		1.71	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-212	0.276		0.0764	0.0843		0.0814	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-214	0.412		0.125	0.132		0.121	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Potassium-40	9.49		1.28	1.61		0.547	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Protactinium-231	0.423	U	0.461	0.464		0.971	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Radium-226	0.202		0.0846	0.0872	0.500	0.0972	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Radium-228	0.410		0.152	0.158		0.116	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thallium-208	0.142		0.0461	0.0484		0.0429	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-228	0.276		0.0764	0.0843		0.0814	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-232	0.410		0.152	0.158		0.116	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-234	0.127	U	0.243	0.243		1.33	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Uranium-235	0.0401	U	0.185	0.185		0.348	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Uranium-238	0.127	U	0.243	0.243		1.33	pCi/g	10/29/15 09:48	11/19/15 15:48	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S003

Lab Sample ID: 160-14498-3

Date Collected: 10/21/15 11:07

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.295		0.126	0.130		0.234	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Actinium-227	0.0147	U	0.398	0.398		0.708	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Bismuth-212	0.303	U	0.487	0.488		0.823	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Bismuth-214	0.337		0.129	0.134		0.145	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Cesium-137	-0.0000995	U	0.0329	0.0329		0.0625	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-210	0.399	U	1.23	1.23		1.91	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-212	0.282		0.0808	0.0887		0.0945	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-214	0.253		0.0963	0.0999		0.139	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Potassium-40	10.4		1.39	1.75		0.579	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Protactinium-231	0.456	U	0.482	0.484		1.63	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Radium-226	0.337		0.129	0.134	0.500	0.145	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Radium-228	0.295		0.126	0.130		0.234	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thallium-208	0.0646		0.0465	0.0470		0.0598	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-228	0.282		0.0808	0.0887		0.0945	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-232	0.295		0.126	0.130		0.234	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-234	0.339	U	0.424	0.426		1.38	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Uranium-235	0.0811	U	0.182	0.182		0.308	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Uranium-238	0.339	U	0.424	0.426		1.38	pCi/g	10/29/15 09:48	11/19/15 16:20	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S004

Lab Sample ID: 160-14498-4

Date Collected: 10/21/15 11:08

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.190	U	0.131	0.132		0.303	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Actinium-227	-0.00905	U	0.336	0.336		0.605	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Bismuth-212	0.261	U	0.482	0.482		0.828	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Bismuth-214	0.391		0.101	0.109		0.0888	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Cesium-137	-0.00588	U	0.0370	0.0370		0.0683	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-210	1.23	U	0.990	1.00		1.55	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-212	0.0155	U	0.0979	0.0979		0.170	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-214	0.332		0.0938	0.100		0.124	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Potassium-40	9.88		1.45	1.77		0.671	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Protactinium-231	-0.183	U	0.788	0.788		1.40	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Radium-226	0.391		0.101	0.109	0.500	0.0888	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Radium-228	0.190	U	0.131	0.132		0.303	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thallium-208	0.153		0.0585	0.0606		0.0584	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-228	0.0155	U	0.0979	0.0979		0.170	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-232	0.190	U	0.131	0.132		0.303	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-234	0.349	U	0.462	0.464		1.41	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Uranium-235	0.132	U	0.142	0.142		0.291	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Uranium-238	0.349	U	0.462	0.464		1.41	pCi/g	10/29/15 09:48	11/19/15 16:20	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S005

Lab Sample ID: 160-14498-5

Date Collected: 10/21/15 11:14

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.290		0.117	0.121		0.196	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Actinium-227	0.270	U	0.242	0.243		0.614	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Bismuth-212	0.318	U	0.462	0.464		0.773	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Bismuth-214	0.185		0.0738	0.0763		0.0861	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Cesium-137	0.0120	U	0.0280	0.0280		0.0497	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Lead-210	0.00551	U	0.931	0.931		1.71	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Lead-212	0.311		0.0760	0.0860		0.0774	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Lead-214	0.356		0.0876	0.0951		0.102	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Potassium-40	9.95		1.31	1.66		0.551	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Protactinium-231	0.0742	U	0.308	0.308		1.26	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Radium-226	0.185		0.0738	0.0763	0.500	0.0861	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Radium-228	0.290		0.117	0.121		0.196	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Thallium-208	0.0850		0.0418	0.0427		0.0585	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Thorium-228	0.311		0.0760	0.0860		0.0774	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Thorium-232	0.290		0.117	0.121		0.196	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Thorium-234	0.182	U	0.431	0.432		1.43	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Uranium-235	0.0856	U	0.150	0.150		0.288	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Uranium-238	0.182	U	0.431	0.432		1.43	pCi/g	10/29/15 09:48	11/19/15 16:21	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S006

Lab Sample ID: 160-14498-6

Date Collected: 10/21/15 11:17

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.418		0.146	0.152		0.189	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Actinium-227	0.158	U	0.173	0.174		0.662	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Bismuth-212	0.0275	U	0.421	0.421		0.807	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Bismuth-214	0.384		0.114	0.121		0.114	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Cesium-137	-0.00651	U	0.0314	0.0314		0.0573	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-210	0.554	U	1.09	1.09		1.62	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-212	0.263		0.0892	0.0955		0.102	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-214	0.310		0.0946	0.0999		0.125	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Potassium-40	12.1		1.48	1.93		0.790	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Protactinium-231	0.0107	U	0.735	0.735		1.34	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Radium-226	0.384		0.114	0.121	0.500	0.114	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Radium-228	0.418		0.146	0.152		0.189	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thallium-208	0.118		0.0480	0.0495		0.0545	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-228	0.263		0.0892	0.0955		0.102	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-232	0.418		0.146	0.152		0.189	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-234	0.163	U	0.787	0.788		1.41	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Uranium-235	0.0960	U	0.150	0.150		0.295	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Uranium-238	0.163	U	0.787	0.788		1.41	pCi/g	10/29/15 09:48	11/19/15 17:23	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S007

Lab Sample ID: 160-14498-7

Date Collected: 10/21/15 11:19

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.321		0.160	0.163		0.242	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Actinium-227	-0.207	U	0.464	0.464		0.791	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Bismuth-212	0.189	U	0.459	0.460		0.824	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Bismuth-214	0.211		0.0986	0.101		0.134	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Cesium-137	-0.0253	U	9.13	9.13		0.0942	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Lead-210	0.375	U	0.947	0.948		1.73	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Lead-212	0.230		0.0897	0.0945		0.105	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Lead-214	0.293		0.106	0.110		0.131	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Potassium-40	12.1		1.80	2.19		0.680	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Protactinium-231	0.0405	U	0.604	0.604		1.16	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Radium-226	0.211		0.0986	0.101	0.500	0.134	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Radium-228	0.321		0.160	0.163		0.242	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Thallium-208	0.0618	U	0.0589	0.0592		0.0882	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Thorium-228	0.230		0.0897	0.0945		0.105	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Thorium-232	0.321		0.160	0.163		0.242	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Thorium-234	0.887	U	0.975	0.979		1.34	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Uranium-235	0.113	U	0.159	0.159		0.243	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Uranium-238	0.887	U	0.975	0.979		1.34	pCi/g	10/29/15 09:48	11/19/15 17:22	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S008

Lab Sample ID: 160-14498-8

Date Collected: 10/21/15 12:21

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.408		0.190	0.194		0.162	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Actinium-227	0.197	U	0.287	0.287		0.882	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Bismuth-212	0.325	U	0.537	0.538		0.911	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Bismuth-214	0.259		0.0931	0.0969		0.102	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Cesium-137	0.0111	U	0.0435	0.0435		0.0850	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-210	0.552	U	1.03	1.03		1.74	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-212	0.264		0.0813	0.0882		0.0913	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-214	0.219		0.0853	0.0883		0.132	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Potassium-40	10.9		1.59	1.94		0.663	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Protactinium-231	0.156	U	0.785	0.786		1.41	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Radium-226	0.259		0.0931	0.0969	0.500	0.102	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Radium-228	0.408		0.190	0.194		0.162	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thallium-208	0.114		0.0445	0.0460		0.0474	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-228	0.264		0.0813	0.0882		0.0913	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-232	0.408		0.190	0.194		0.162	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-234	0.170	U	0.458	0.458		1.42	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Uranium-235	0.0231	U	0.0410	0.0411		0.372	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Uranium-238	0.170	U	0.458	0.458		1.42	pCi/g	10/29/15 09:48	11/19/15 17:23	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S009

Lab Sample ID: 160-14498-9

Date Collected: 10/21/15 12:27

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.225		0.104	0.107		0.212	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Actinium-227	0.114	U	0.209	0.209		0.651	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-212	0.201	U	0.366	0.367		0.627	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-214	0.303		0.115	0.119		0.109	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Cesium-137	0.00517	U	0.0260	0.0260		0.0477	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-210	-0.0568	U	0.748	0.748		1.31	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-212	0.272		0.0755	0.0833		0.0796	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-214	0.242		0.0728	0.0771		0.0918	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Potassium-40	10.3		1.21	1.60		0.546	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Protactinium-231	0.0708	U	0.166	0.167		1.37	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-226	0.303		0.115	0.119	0.500	0.109	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-228	0.225		0.104	0.107		0.212	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thallium-208	0.131		0.0444	0.0464		0.0426	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-228	0.272		0.0755	0.0833		0.0796	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-232	0.225		0.104	0.107		0.212	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-234	0.403	U	0.716	0.718		1.20	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-235	0.163	U	0.147	0.148		0.258	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-238	0.403	U	0.716	0.718		1.20	pCi/g	10/29/15 09:48	11/19/15 17:20	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S010

Lab Sample ID: 160-14498-10

Date Collected: 10/21/15 12:26

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.224	U	0.130	0.132		0.250	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Actinium-227	0.0708	U	0.230	0.230		0.644	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-212	0.000	U	0.451	0.451		0.907	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-214	0.277		0.109	0.113		0.130	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Cesium-137	-0.0241	U	0.0458	0.0459		0.0783	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-210	0.910	U	1.28	1.28		1.97	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-212	0.266		0.0923	0.0986		0.109	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-214	0.283		0.0921	0.0967		0.138	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Potassium-40	9.18		1.29	1.60		0.567	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Protactinium-231	0.143	U	0.185	0.185		1.69	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-226	0.277		0.109	0.113	0.500	0.130	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-228	0.224	U	0.130	0.132		0.250	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thallium-208	0.102		0.0485	0.0497		0.0559	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-228	0.266		0.0923	0.0986		0.109	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-232	0.224	U	0.130	0.132		0.250	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-234	1.01	U	0.985	0.990		1.40	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-235	0.0863	U	0.146	0.147		0.257	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-238	1.01	U	0.985	0.990		1.40	pCi/g	10/29/15 09:48	11/19/15 17:20	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S011

Lab Sample ID: 160-14498-11

Date Collected: 10/21/15 12:33

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.160	U	0.114	0.115		0.232	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Actinium-227	0.136	U	0.234	0.235		0.694	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Bismuth-212	0.0781	U	0.413	0.413		0.751	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Bismuth-214	0.348		0.0968	0.103		0.0975	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Cesium-137	0.00621	U	0.0359	0.0359		0.0651	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-210	1.05	U	1.36	1.37		1.84	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-212	0.268		0.0843	0.0911		0.0973	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-214	0.345		0.0906	0.0974		0.0884	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Potassium-40	10.7		1.41	1.79		0.755	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Protactinium-231	0.237	U	0.639	0.640		1.55	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Radium-226	0.348		0.0968	0.103	0.500	0.0975	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Radium-228	0.160	U	0.114	0.115		0.232	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thallium-208	0.0541	U	0.0424	0.0428		0.0672	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-228	0.268		0.0843	0.0911		0.0973	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-232	0.160	U	0.114	0.115		0.232	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-234	0.109	U	0.243	0.244		1.53	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Uranium-235	0.0843	U	0.177	0.177		0.262	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Uranium-238	0.109	U	0.243	0.244		1.53	pCi/g	10/29/15 09:48	11/19/15 17:21	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S012

Lab Sample ID: 160-14498-12

Date Collected: 10/21/15 12:32

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0860	U	0.0974	0.0978		0.262	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Actinium-227	0.0539	U	0.125	0.125		0.701	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-212	0.178	U	0.489	0.489		0.866	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-214	0.268		0.108	0.111		0.119	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Cesium-137	-0.00209	U	0.0341	0.0341		0.0647	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-210	0.527	U	1.01	1.01		1.62	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-212	0.307		0.0832	0.0922		0.0913	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-214	0.241		0.120	0.123		0.140	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Potassium-40	12.4		1.61	2.05		0.663	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Protactinium-231	0.0820	U	0.695	0.695		1.27	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-226	0.268		0.108	0.111	0.500	0.119	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-228	0.0860	U	0.0974	0.0978		0.262	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thallium-208	0.0447	U	0.0509	0.0511		0.0704	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-228	0.307		0.0832	0.0922		0.0913	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-232	0.0860	U	0.0974	0.0978		0.262	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-234	0.233	U	0.435	0.436		1.40	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-235	0.171	U	0.164	0.165		0.263	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-238	0.233	U	0.435	0.436		1.40	pCi/g	10/29/15 09:48	11/19/15 17:20	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S013

Lab Sample ID: 160-14498-13

Date Collected: 10/21/15 12:39

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.240		0.0993	0.102		0.225	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Actinium-227	0.000	U	0.418	0.418		0.778	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Bismuth-212	0.141	U	0.542	0.543		0.962	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Bismuth-214	0.309		0.0959	0.101		0.0990	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Cesium-137	-0.00890	U	0.0434	0.0434		0.0777	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-210	1.08	U	1.27	1.28		1.87	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-212	0.316		0.0921	0.101		0.0998	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-214	0.280		0.0833	0.0882		0.135	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Potassium-40	10.8		1.41	1.79		0.584	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Protactinium-231	0.0299	U	0.0474	0.0475		1.64	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Radium-226	0.309		0.0959	0.101	0.500	0.0990	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Radium-228	0.240		0.0993	0.102		0.225	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thallium-208	0.123		0.0435	0.0453		0.0435	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-228	0.316		0.0921	0.101		0.0998	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-232	0.240		0.0993	0.102		0.225	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-234	0.433	U	0.509	0.511		1.51	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Uranium-235	0.0128	U	0.171	0.172		0.311	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Uranium-238	0.433	U	0.509	0.511		1.51	pCi/g	10/29/15 09:48	11/19/15 17:21	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S014

Lab Sample ID: 160-14498-14

Date Collected: 10/21/15 12:45

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.241		0.155	0.157		0.222	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Actinium-227	0.0782	U	0.413	0.413		0.718	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Bismuth-212	0.151	U	0.428	0.429		0.789	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Bismuth-214	0.155		0.0882	0.0896		0.139	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Cesium-137	0.00219	U	0.0382	0.0382		0.0701	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-210	0.653	U	0.951	0.954		1.48	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-212	0.261		0.0811	0.0879		0.0917	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-214	0.246		0.0909	0.0945		0.107	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Potassium-40	10.7		1.36	1.74		0.670	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Protactinium-231	0.0996	U	0.442	0.442		1.39	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Radium-226	0.155		0.0882	0.0896	0.500	0.139	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Radium-228	0.241		0.155	0.157		0.222	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thallium-208	0.115		0.0514	0.0527		0.0532	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-228	0.261		0.0811	0.0879		0.0917	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-232	0.241		0.155	0.157		0.222	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-234	0.456	U	0.361	0.364		1.11	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Uranium-235	0.102	U	0.143	0.144		0.256	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Uranium-238	0.456	U	0.361	0.364		1.11	pCi/g	10/29/15 09:48	11/19/15 17:55	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S015

Lab Sample ID: 160-14498-15

Date Collected: 10/21/15 12:44

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.180	U	0.166	0.167		0.295	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Actinium-227	-0.126	U	0.426	0.427		0.743	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Bismuth-212	0.0561	U	0.569	0.569		1.07	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Bismuth-214	0.119	U	0.127	0.127		0.173	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Cesium-137	0.00293	U	0.0491	0.0491		0.0997	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Lead-210	-0.0400	U	0.883	0.883		1.55	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Lead-212	0.370		0.0973	0.108		0.0912	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Lead-214	0.252		0.0958	0.0993		0.154	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Potassium-40	9.92		1.67	1.96		0.715	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Protactinium-231	-0.00944	U	0.0195	0.0196		1.83	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Radium-226	0.119	U	0.127	0.127	0.500	0.173	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Radium-228	0.180	U	0.166	0.167		0.295	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Thallium-208	0.0516	U	0.0488	0.0491		0.0757	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Thorium-228	0.370		0.0973	0.108		0.0912	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Thorium-232	0.180	U	0.166	0.167		0.295	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Thorium-234	0.280	U	0.387	0.388		1.20	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Uranium-235	0.148	U	0.163	0.163		0.265	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Uranium-238	0.280	U	0.387	0.388		1.20	pCi/g	10/29/15 09:48	11/19/15 17:54	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S016

Lab Sample ID: 160-14498-16

Date Collected: 10/21/15 12:38

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.336		0.124	0.129		0.215	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Actinium-227	0.143	U	0.154	0.155		0.570	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Bismuth-212	-0.00294	U	0.337	0.337		0.651	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Bismuth-214	0.244		0.0895	0.0930		0.0857	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Cesium-137	0.0194	U	0.0278	0.0278		0.0464	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-210	0.317	U	0.747	0.748		1.37	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-212	0.319		0.0706	0.0818		0.0713	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-214	0.292		0.0843	0.0896		0.0753	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Potassium-40	10.9		1.48	1.86		0.768	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Protactinium-231	0.350	U	0.434	0.435		1.72	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Radium-226	0.244		0.0895	0.0930	0.500	0.0857	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Radium-228	0.336		0.124	0.129		0.215	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thallium-208	0.101		0.0437	0.0449		0.0492	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-228	0.319		0.0706	0.0818		0.0713	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-232	0.336		0.124	0.129		0.215	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-234	0.243	U	0.324	0.325		1.07	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Uranium-235	0.0407	U	0.0538	0.0539		0.249	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Uranium-238	0.243	U	0.324	0.325		1.07	pCi/g	10/29/15 09:48	11/19/15 17:55	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S017

Lab Sample ID: 160-14498-17

Date Collected: 10/21/15 12:52

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.252		0.125	0.128		0.245	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Actinium-227	0.209	U	0.290	0.291		0.814	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Bismuth-212	0.000	U	0.557	0.557		0.967	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Bismuth-214	0.328		0.0944	0.100		0.0914	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Cesium-137	0.00566	U	0.0429	0.0429		0.0860	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Lead-210	0.363	U	0.972	0.973		1.67	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Lead-212	0.397		0.120	0.131		0.122	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Lead-214	0.222		0.0929	0.0957		0.127	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Potassium-40	10.2		1.55	1.87		0.677	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Protactinium-231	0.239	U	0.534	0.534		2.32	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Radium-226	0.328		0.0944	0.100	0.500	0.0914	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Radium-228	0.252		0.125	0.128		0.245	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Thallium-208	0.142		0.0530	0.0550		0.0524	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Thorium-228	0.397		0.120	0.131		0.122	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Thorium-232	0.252		0.125	0.128		0.245	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Thorium-234	1.12	U	0.882	0.890		1.32	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Uranium-235	0.0797	U	0.193	0.193		0.312	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Uranium-238	1.12	U	0.882	0.890		1.32	pCi/g	10/29/15 09:48	11/19/15 17:56	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S018

Lab Sample ID: 160-14498-18

Date Collected: 10/21/15 12:53

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.310		0.120	0.124		0.0932	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Actinium-227	0.0573	U	0.382	0.382		0.665	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Bismuth-212	0.329	U	0.430	0.431		0.710	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Bismuth-214	0.317		0.101	0.106		0.103	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Cesium-137	0.00617	U	0.0297	0.0297		0.0538	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Lead-210	0.252	U	0.771	0.772		1.33	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Lead-212	0.365		0.0810	0.0938		0.0774	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Lead-214	0.262		0.0840	0.0883		0.0951	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Potassium-40	10.4		1.25	1.64		0.574	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Protactinium-231	0.142	U	0.206	0.206		1.23	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Radium-226	0.317		0.101	0.106	0.500	0.103	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Radium-228	0.310		0.120	0.124		0.0932	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Thallium-208	0.168		0.0457	0.0489		0.0387	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Thorium-228	0.365		0.0810	0.0938		0.0774	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Thorium-232	0.310		0.120	0.124		0.0932	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Thorium-234	0.424	U	0.366	0.369		1.17	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Uranium-235	0.0551	U	0.164	0.164		0.267	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Uranium-238	0.424	U	0.366	0.369		1.17	pCi/g	10/29/15 09:48	11/19/15 17:51	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S019

Lab Sample ID: 160-14498-19

Date Collected: 10/21/15 12:59

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.247		0.160	0.162		0.226	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Actinium-227	0.0211	U	0.245	0.245		0.811	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Bismuth-212	-0.0101	U	0.376	0.376		0.722	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Bismuth-214	0.321		0.0937	0.0994		0.106	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Cesium-137	0.00876	U	0.0339	0.0339		0.0618	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Lead-210	1.22	U	1.10	1.11		1.78	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Lead-212	0.282		0.0873	0.0946		0.105	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Lead-214	0.321		0.0926	0.0984		0.149	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Potassium-40	10.4		1.42	1.77		0.603	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Protactinium-231	-0.0234	U	0.690	0.690		1.28	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Radium-226	0.321		0.0937	0.0994	0.500	0.106	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Radium-228	0.247		0.160	0.162		0.226	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Thallium-208	0.0891		0.0498	0.0506		0.0688	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Thorium-228	0.282		0.0873	0.0946		0.105	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Thorium-232	0.247		0.160	0.162		0.226	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Thorium-234	0.164	U	0.361	0.361		1.83	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Uranium-235	0.147	U	0.198	0.199		0.351	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Uranium-238	0.164	U	0.361	0.361		1.83	pCi/g	10/29/15 09:48	11/19/15 17:52	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S020

Lab Sample ID: 160-14498-20

Date Collected: 10/21/15 13:00

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.445		0.134	0.142		0.0740	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Actinium-227	0.00860	U	0.403	0.403		0.712	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Bismuth-212	-0.00300	U	0.412	0.412		0.766	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Bismuth-214	0.299		0.0999	0.105		0.105	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Cesium-137	0.00760	U	0.0259	0.0259		0.0473	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Lead-210	0.137	U	0.851	0.852		1.64	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Lead-212	0.343		0.0862	0.0970		0.0894	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Lead-214	0.270		0.108	0.112		0.111	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Potassium-40	9.89		1.26	1.62		0.580	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Protactinium-231	0.189	U	0.392	0.392		1.20	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Radium-226	0.299		0.0999	0.105	0.500	0.105	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Radium-228	0.445		0.134	0.142		0.0740	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Thallium-208	0.0586	U	0.0394	0.0398		0.0617	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Thorium-228	0.343		0.0862	0.0970		0.0894	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Thorium-232	0.445		0.134	0.142		0.0740	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Thorium-234	0.169	U	0.450	0.450		1.42	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Uranium-235	0.0524	U	0.0960	0.0962		0.340	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Uranium-238	0.169	U	0.450	0.450		1.42	pCi/g	10/29/15 09:48	11/19/15 17:53	1

QC Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-219385/1-A

Matrix: Solid

Analysis Batch: 222784

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 219385

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-228	0.08059	U	0.115	0.116		0.269	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Actinium-227	0.02847	U	0.346	0.346		1.49	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Bismuth-212	0.1148	U	0.366	0.366		0.689	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Bismuth-214	-0.03998	U	0.186	0.186		0.180	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Cesium-137	0.01344	U	0.0461	0.0462		0.0836	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-210	0.6642	U	2.05	2.05		2.91	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-212	-0.04493	U	0.455	0.455		0.118	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-214	-0.06436	U	0.444	0.444		0.178	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Potassium-40	-0.2975	U	11.9	11.9		0.817	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Protactinium-231	-0.08920	U	0.823	0.823		1.53	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Radium-226	-0.03998	U	0.186	0.186	0.500	0.180	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Radium-228	0.08059	U	0.115	0.116		0.269	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thallium-208	-0.007865	U	0.0268	0.0268		0.0930	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-228	-0.04493	U	0.455	0.455		0.118	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-232	0.08059	U	0.115	0.116		0.269	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-234	0.7365	U	0.499	0.505		1.66	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Uranium-235	-0.06805	U	2.92	2.92		0.341	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Uranium-238	0.7365	U	0.499	0.505		1.66	pCi/g	10/29/15 09:48	11/19/15 15:48	1

Lab Sample ID: LCS 160-219385/2-A

Matrix: Solid

Analysis Batch: 222780

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 219385

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.2	97.12		10.2		1.12	pCi/g	100	87 - 116
Cesium-137	30.0	29.44		3.14		0.284	pCi/g	98	87 - 120
Cobalt-60	18.4	17.86		1.84		0.110	pCi/g	97	87 - 115

Lab Sample ID: 160-14498-1 DU

Matrix: Solid

Analysis Batch: 222780

Client Sample ID: TI-TO04-BS-FSS-SU1-S001

Prep Type: Total/NA

Prep Batch: 219385

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium-228	0.433		0.4986		0.154		0.126	pCi/g	0.21	1
Actinium-227	0.340		-0.1437	U	0.483		0.828	pCi/g	0.67	1
Bismuth-212	0.0529	U	0.1807	U	0.369		0.643	pCi/g	0.16	1
Bismuth-214	0.274		0.2155		0.0815		0.0955	pCi/g	0.30	1
Cesium-137	0.00536	U	0.0000	U	0.0228		0.119	pCi/g	0.09	1
Lead-210	0.367	U	-0.04737	U	1.07		1.89	pCi/g	0.21	1
Lead-212	0.274		0.2823		0.123		0.129	pCi/g	0.04	1
Lead-214	0.235		0.3791		0.100		0.106	pCi/g	0.75	1
Potassium-40	11.0		11.99		1.89		0.616	pCi/g	0.26	1
Protactinium-231	0.218	U	0.1120	U	0.367		1.27	pCi/g	0.11	1
Radium-226	0.274		0.2155		0.0815	0.500	0.0955	pCi/g	0.30	1
Radium-228	0.433		0.4986		0.154		0.126	pCi/g	0.21	1

QC Sample Results

Page 46 of 47

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-14498-1 DU

Matrix: Solid

Analysis Batch: 222780

Client Sample ID: TI-TO04-BS-FSS-SU1-S001

Prep Type: Total/NA

Prep Batch: 219385

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.102		0.1228		0.0639		0.0626	pCi/g	0.19	1
Thorium-228	0.274		0.2823		0.123		0.129	pCi/g	0.04	1
Thorium-232	0.433		0.4986		0.154		0.126	pCi/g	0.21	1
Thorium-234	0.000882	U	0.2833	U	0.426		1.57	pCi/g	0.23	1
Uranium-235	0.152	U	-0.06223	U	0.425		0.331	pCi/g	0.35	1
Uranium-238	0.000882	U	0.2833	U	0.426		1.57	pCi/g	0.23	1

QC Association Summary

Page 47 of 47

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Rad

Leach Batch: 218695

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14498-1	TI-TO04-BS-FSS-SU1-S001	Total/NA	Solid	Dry and Grind	
160-14498-1 DU	TI-TO04-BS-FSS-SU1-S001	Total/NA	Solid	Dry and Grind	
160-14498-2	TI-TO04-BS-FSS-SU1-S002	Total/NA	Solid	Dry and Grind	
160-14498-3	TI-TO04-BS-FSS-SU1-S003	Total/NA	Solid	Dry and Grind	
160-14498-4	TI-TO04-BS-FSS-SU1-S004	Total/NA	Solid	Dry and Grind	
160-14498-5	TI-TO04-BS-FSS-SU1-S005	Total/NA	Solid	Dry and Grind	
160-14498-6	TI-TO04-BS-FSS-SU1-S006	Total/NA	Solid	Dry and Grind	
160-14498-7	TI-TO04-BS-FSS-SU1-S007	Total/NA	Solid	Dry and Grind	
160-14498-8	TI-TO04-BS-FSS-SU1-S008	Total/NA	Solid	Dry and Grind	
160-14498-9	TI-TO04-BS-FSS-SU1-S009	Total/NA	Solid	Dry and Grind	
160-14498-10	TI-TO04-BS-FSS-SU1-S010	Total/NA	Solid	Dry and Grind	
160-14498-11	TI-TO04-BS-FSS-SU1-S011	Total/NA	Solid	Dry and Grind	
160-14498-12	TI-TO04-BS-FSS-SU1-S012	Total/NA	Solid	Dry and Grind	
160-14498-13	TI-TO04-BS-FSS-SU1-S013	Total/NA	Solid	Dry and Grind	
160-14498-14	TI-TO04-BS-FSS-SU1-S014	Total/NA	Solid	Dry and Grind	
160-14498-15	TI-TO04-BS-FSS-SU1-S015	Total/NA	Solid	Dry and Grind	
160-14498-16	TI-TO04-BS-FSS-SU1-S016	Total/NA	Solid	Dry and Grind	
160-14498-17	TI-TO04-BS-FSS-SU1-S017	Total/NA	Solid	Dry and Grind	
160-14498-18	TI-TO04-BS-FSS-SU1-S018	Total/NA	Solid	Dry and Grind	
160-14498-19	TI-TO04-BS-FSS-SU1-S019	Total/NA	Solid	Dry and Grind	
160-14498-20	TI-TO04-BS-FSS-SU1-S020	Total/NA	Solid	Dry and Grind	

Prep Batch: 219385

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14498-1	TI-TO04-BS-FSS-SU1-S001	Total/NA	Solid	Fill_Geo-21	218695
160-14498-1 DU	TI-TO04-BS-FSS-SU1-S001	Total/NA	Solid	Fill_Geo-21	218695
160-14498-2	TI-TO04-BS-FSS-SU1-S002	Total/NA	Solid	Fill_Geo-21	218695
160-14498-3	TI-TO04-BS-FSS-SU1-S003	Total/NA	Solid	Fill_Geo-21	218695
160-14498-4	TI-TO04-BS-FSS-SU1-S004	Total/NA	Solid	Fill_Geo-21	218695
160-14498-5	TI-TO04-BS-FSS-SU1-S005	Total/NA	Solid	Fill_Geo-21	218695
160-14498-6	TI-TO04-BS-FSS-SU1-S006	Total/NA	Solid	Fill_Geo-21	218695
160-14498-7	TI-TO04-BS-FSS-SU1-S007	Total/NA	Solid	Fill_Geo-21	218695
160-14498-8	TI-TO04-BS-FSS-SU1-S008	Total/NA	Solid	Fill_Geo-21	218695
160-14498-9	TI-TO04-BS-FSS-SU1-S009	Total/NA	Solid	Fill_Geo-21	218695
160-14498-10	TI-TO04-BS-FSS-SU1-S010	Total/NA	Solid	Fill_Geo-21	218695
160-14498-11	TI-TO04-BS-FSS-SU1-S011	Total/NA	Solid	Fill_Geo-21	218695
160-14498-12	TI-TO04-BS-FSS-SU1-S012	Total/NA	Solid	Fill_Geo-21	218695
160-14498-13	TI-TO04-BS-FSS-SU1-S013	Total/NA	Solid	Fill_Geo-21	218695
160-14498-14	TI-TO04-BS-FSS-SU1-S014	Total/NA	Solid	Fill_Geo-21	218695
160-14498-15	TI-TO04-BS-FSS-SU1-S015	Total/NA	Solid	Fill_Geo-21	218695
160-14498-16	TI-TO04-BS-FSS-SU1-S016	Total/NA	Solid	Fill_Geo-21	218695
160-14498-17	TI-TO04-BS-FSS-SU1-S017	Total/NA	Solid	Fill_Geo-21	218695
160-14498-18	TI-TO04-BS-FSS-SU1-S018	Total/NA	Solid	Fill_Geo-21	218695
160-14498-19	TI-TO04-BS-FSS-SU1-S019	Total/NA	Solid	Fill_Geo-21	218695
160-14498-20	TI-TO04-BS-FSS-SU1-S020	Total/NA	Solid	Fill_Geo-21	218695
LCS 160-219385/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-219385/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

From: [Sevcik, Joseph T CIV SEA 04 04N](#)
To: [Guillory, Jeffrey](#)
Cc: [Edwards, Zachary L CIV SEA 04 04N](#); [Yantos, Christopher N CIV NAVFAC SW, BRAC](#); [Messer, Ulrika](#); [Hackett, John R](#); [Schul, Raymond](#); [Coffey, Lisa M](#); [Morrison, Dennis](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 10 Use 2, Part 1
Date: Thursday, January 28, 2016 5:28:35 AM

Jeff,

I concur with designating RSY 10 Use 2, Part 1 soil as non-LLRW.

v/r,

Joe Sevcik
Environmental Protection Manager
NAVSEADET RASO
160 Main Road
Building 1959
NWS Yorktown, VA 23691
Office: (757) 887-4483
DSN: 953-4483
Fax: (757) 887-4900

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederaleservices.com>]
Sent: Wednesday, January 27, 2016 10:50 AM
To: Sevcik, Joseph T CIV SEA 04 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Coffey, Lisa M; Morrison, Dennis
Subject: [Non-DoD Source] RE: NSTI RSY Soil Release Request - RSY 10 Use 2, Part 1

Mr. Sevcik,

Attached is a revised copy of NSTI RSY Soil Release Request - RSY 10 Use 2, Part 1, which has been edited as per our previous correspondence.

My apologies for the inconvenience. If you have any questions, please do not hesitate to contact me. Thank you for your time.

Description: Description: Description: Description: cid:_1_OAD725A00AD721CC001388C386257B11

Jeffrey Guillory

Health Physics Support

Radiation Safety

Federal Services

+1 415 398 6547 ext.238

Cell: +1 979.422.5534

jeffrey.guillory@cbifederalservices.com

CB&I

950 Avenue M

Treasure Island

San Francisco, CA 94130

United States of America

www.CBI.com <<http://www.cbi.com/>>

From: Guillory, Jeffrey

Sent: Monday, January 25, 2016 7:55 AM

To: 'Sevcik, Joseph T CIV SEA 04 04N'

Cc: zachary.edwards@navy.mil; Yantos, Christopher N CIV NAVFAC SW, BRAC (christopher.yantos@navy.mil); Messer, Ulrika; Hackett, John R; Schul, Raymond; Coffey, Lisa M; Morrison, Dennis

Subject: NSTI RSY Soil Release Request - RSY 10 Use 2, Part 1

Mr. Sevcik,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Description: Description: Description: Description: cid:_1_0AD725A00AD721CC001388C386257B11

Jeffrey Guillory

Health Physics Support

Radiation Safety

Federal Services

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jeffrey.guillory@cbifederalservices.com

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Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY #10	RSY Unit Use Number: USE 2, Part 1	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Lisa Coffey/Tina Piquet/Jeff Guillory		Data Report Submittal Date: 01/25/2016

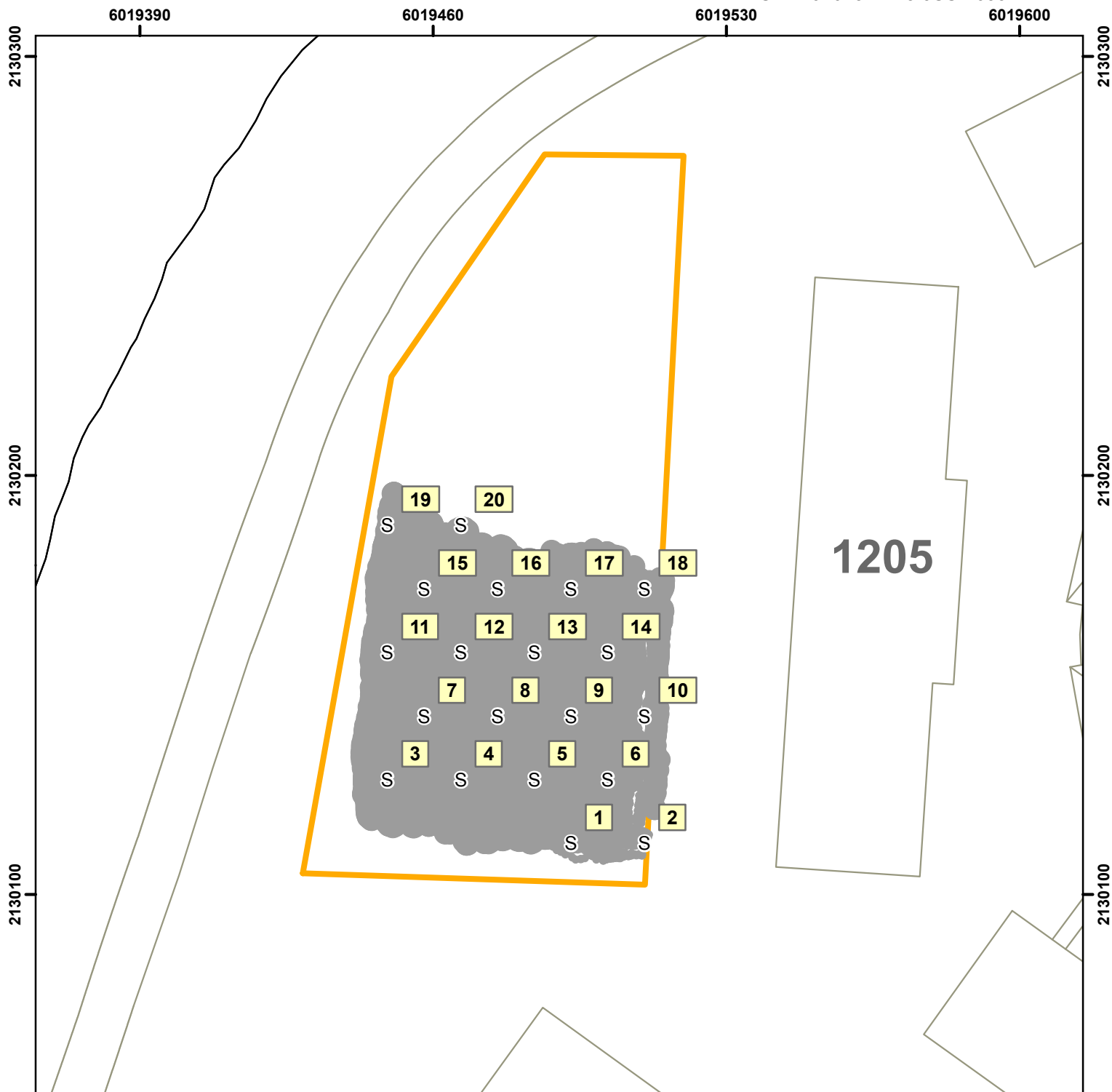
Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static 2221 Meter Serial Number	One Minute Static Reading (CPM)	Static Count Over Static Mean + 3σ	Ra ²²⁶ Final Analytical Results
TITO04-RSY10_SU2-S001	1	Systematic	262337	13,928	No	0.268
TITO04-RSY10_SU2-S002	2	Systematic	262337	14,192	No	0.117
TITO04-RSY10_SU2-S003	3	Systematic	262337	14,228	No	0.438
TITO04-RSY10_SU2-S004	4	Systematic	262337	13,540	No	0.173
TITO04-RSY10_SU2-S005	5	Systematic	262337	13,990	No	0.274
TITO04-RSY10_SU2-S006	6	Systematic	262337	13,858	No	0.339
TITO04-RSY10_SU2-S007	7	Systematic	262337	14,110	No	0.416
TITO04-RSY10_SU2-S008	8	Systematic	262337	14,102	No	0.391
TITO04-RSY10_SU2-S009	9	Systematic	262337	14,330	No	0.319
TITO04-RSY10_SU2-S010	10	Systematic	262337	14,764	No	0.418
TITO04-RSY10_SU2-S011	11	Systematic	262337	14,438	No	0.319
TITO04-RSY10_SU2-S012	12	Systematic	262337	14,285	No	0.480
TITO04-RSY10_SU2-S013	13	Systematic	262337	13,927	No	0.351
TITO04-RSY10_SU2-S014	14	Systematic	262337	14,279	No	0.314
TITO04-RSY10_SU2-S015	15	Systematic	262337	14,122	No	0.252
TITO04-RSY10_SU2-S016	16	Systematic	262337	14,214	No	0.429
TITO04-RSY10_SU2-S017	17	Systematic	262337	14,053	No	0.341
TITO04-RSY10_SU2-S018	18	Systematic	262337	14,161	No	0.299
TITO04-RSY10_SU2-S019	19	Systematic	262337	14,315	No	0.385
TITO04-RSY10_SU2-S020	20	Systematic	262337	14,107	No	0.337

Instrument Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Static Background (CPM)	Static Background Plus 3σ (CPM)	Scan Background	Scan Background Plus 3σ	Range
General Area Exposure Rates	TIRS-11122015-12P3-JSS-1600	11/12/2015	19	11/4/2016	267085	N/A	N/A	N/A	N/A	5 – 7 μR/hr
Gamma Scan Walkover	TIRS-11182015-12P3-ROV-1623	11/18/2015	RS-701/RSX-1	N/A	Console: B-1051 / Detectors: 5447, 5448	N/A	N/A	837 CPS	972 CPS	585 – 858 CPS
Follow-up Required Static	TIRS-11192015-12P3-JSS-1625	11/19/2015	2221	1/27/2016	262337	17,610	19,608	N/A	N/A	12,077 – 13,471 CPM
One Minute Systematic Sampling Static Counts	TIRS-11202015-12P3-JSS-1633	11/20/2015	2221	1/27/2016	262337	17,610	19,608	N/A	N/A	13,540 – 14,764 CPM

CPM = Counts Per Minute

CPS = Counts Per Second

Summary
1) General area survey performed of staged soil piles prior to soil being spread to the 9-inch screening layer.
2) Initial RSI gamma scan and data review—upon review of initial scan data, follow-up static investigations were deemed necessary, and investigation locations were identified as per the RSI Data Evaluation Process (page 4). Gamma scan coverage shown on Systematic Sample Survey map (page 3). Contour maps of initial scan data are shown on RSI Data Plots (page 5). Data review results are summarized on RSI Review Summary (page 6).
3) Follow-up static survey—16 locations identified during the data review process were investigated, resulting in all locations < static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 7).
4) Twenty systematic soil samples (001-020) obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with all readings < static IL. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). Test America sample results are attached.
Summary:
All locations with elevated Z-scores identified by the initial RSI gamma scan were deemed comparable to background. 16 follow-up static locations were investigated, with readings < static IL at all locations.
Additional locations (a-d, page 5) with elevated Z-scores that did not meet the criteria for a follow-up investigation were evaluated by spectral analysis of the RSI gamma scan data, which did not indicate the presence of Ra-226 above background levels (pages 10-17).
Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 8-9. These statistical tools were utilized to verify the appropriate level of reasonable effort.
RSY 10 (Use 2, Part 1) contains soil from the final 6-inch over excavation of North Point SU 2.
Note: Soil on RSY Pad 10 (Use 2, Part 1) was removed from the final depth of the excavation at North Point SU 2, and no visible debris or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.
CB&I requests RASO concurrence to release this soil as Non-LLRW.
Disposition: This soil shall be dispositioned as CERCLA Class I waste following additional on-site chemical characterization.

**Instrument # 262337**

- S Systematic Sample Location
- Gamma WalkOver Survey Coverage
- RSI Coverage
- RSYPAD Boundaries

CB&I Federal Services, LLC0 12.5 25 50
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

RSI Data Evaluation Process

RS-700 Mobile Radiation Monitoring System

- Self-contained gamma-ray radiation detection and monitoring system
- Built-in GPS receiver
- (2) RSX-1 4-liter NaI(Tl) gamma detectors oriented perpendicular to the direction of travel (VD1 denotes both detectors summed; VD3 refers to the left detector; and VD4 refers to the right detector)
- Multi-Channel Analyzer, allowing for monitoring of energy-specific regions of interest (ROIs)
- RadAssist survey software for control, monitoring, and recording

Ten ROIs have been established for radium and progeny as well as other naturally-occurring or anthropogenic gamma-emitting radionuclides that may be of interest:

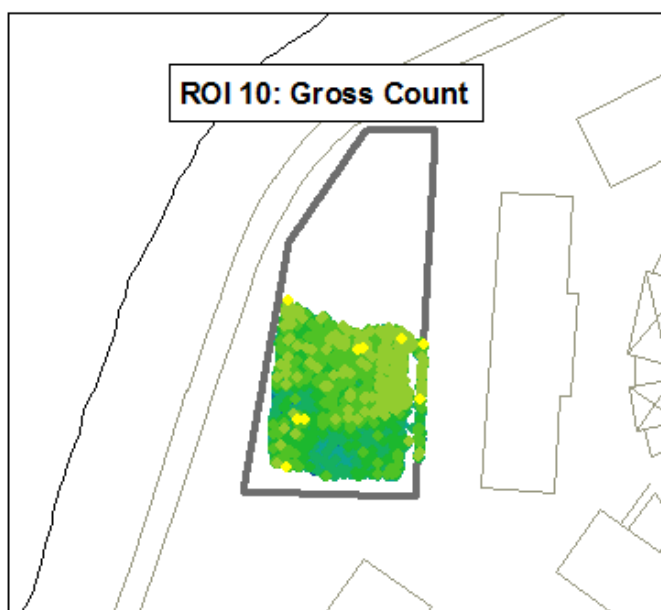
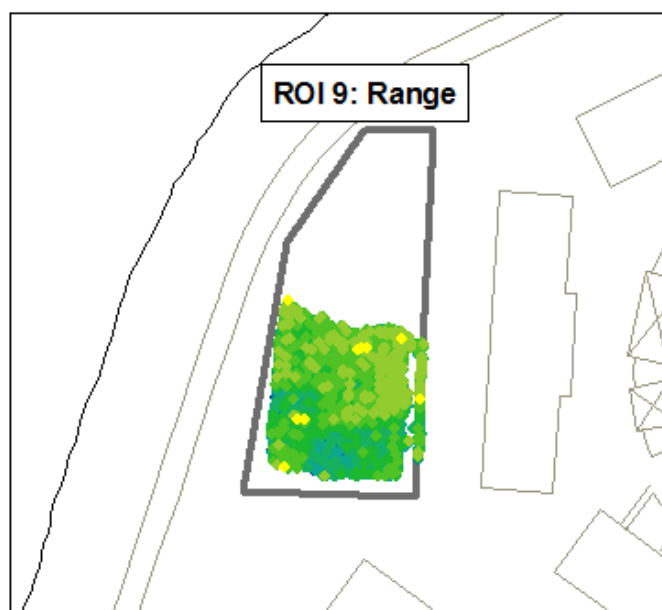
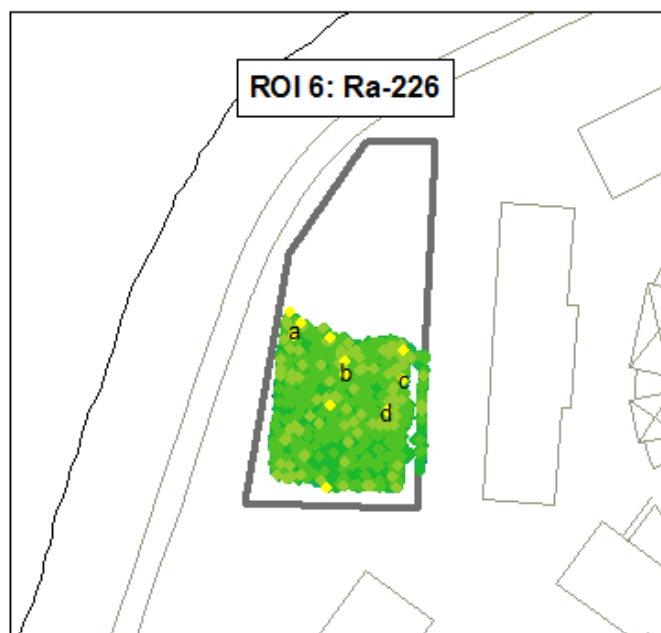
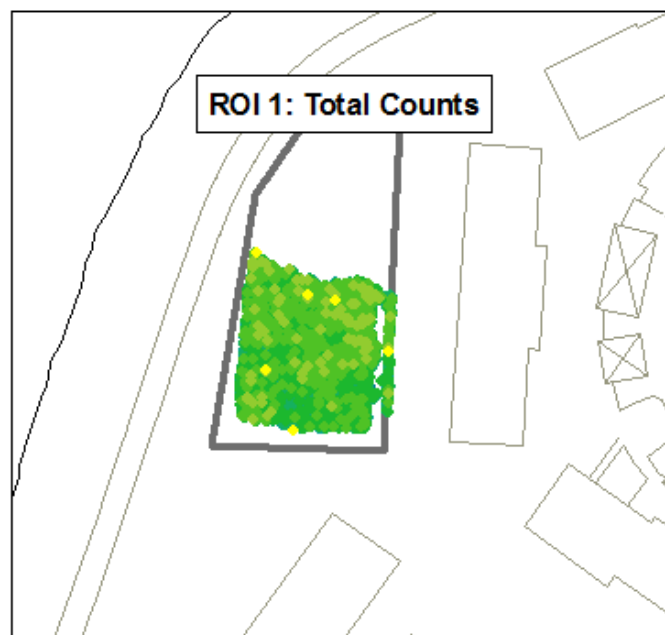
ROI	Description	Energy Range (keV)	Primary Peak (keV)
1	Total counts	411 – 2811	N/A
2	Potassium	1371 – 1569	1460
3	U/Ra-226	1659 – 1860	1764 (Bi-214)
4	Thorium	2409 – 2811	2614 (Tl-208)
5	Annihilation	456 – 570	511
6	Ra-226	546 – 666	609 (Bi-214)
7	Cs-137	549 – 741	662
8	I-131	327 – 399	364
9	Range	45 – 1980	N/A
10	Gross Counts	3 – 3072	N/A

A tiered approach is used during data review to identify follow-up locations. Raw data are exported to a comma delimited format using RadAssist and imported into an Excel spreadsheet for review and analysis. Count rate data are compared with ROI- and material-specific investigation levels (ILs). In addition, the following review steps are completed to determine if additional follow-up measurements are necessary:

- **Playback Review:** The data file is replayed in RadAssist and reviewed for elevated count rates in ROIs 1, 3, 6, and 10 for virtual detector (VD) 1 (both detectors summed). The scan screen is also monitored for elevated count rates and alarms.
- **Count Rate Time Series Review:** The count rates for ROIs 1, 3, 6, and 10 for VDs 1, 3 (detector 1), and 4 (detector 2) are plotted in a time series and reviewed for additional peaks in count rate.
- **Z-Scores:** The Z-Scores are calculated for each location in all ROIs for VDs 1, 3, and 4. Any location with four or more ROIs having a Z-Score greater than three ($Z > 3$) is marked for follow-up.
- **Local Z-Scores:** Local Z-Scores are calculated using a moving average for each data point in all ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with four or more ROIs having a local $Z > 3$ is marked for follow-up.
- **Semi-local Z-Scores:** Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with four or more ROIs having a semi-local $Z > 3$ is marked for follow-up.
- **Z-Score Time Series Review:** The three types of Z-Scores for ROIs 1, 3, 6, and 10 for VDs 1, 3, and 4 are plotted in a time series and reviewed for additional peaks in Z-Scores.
- **Count Rate Ratio Review:** Count rate ratios are calculated for ROIs 3:4, 3:2, 3:6, 6:2, and 6:7. The count rate ratios are then plotted in a time series and reviewed for obvious peaks or outliers.

RSI DATA PLOT

RSY 10 – Use 2 Part 1
FSS Soil from North Point SU 2



ROI from RSI Walkover Survey (VD1)

• > 3 std dev

• > 2 to < 3 std dev

• > 1 to < 2 std dev

• > 0 to < 1 std dev

• > -1 to < 0 std dev

• > -2 to < -1 std dev

• > -3 to < -2 std dev

• < -3 std dev

□ Bayside RSY PAD 10

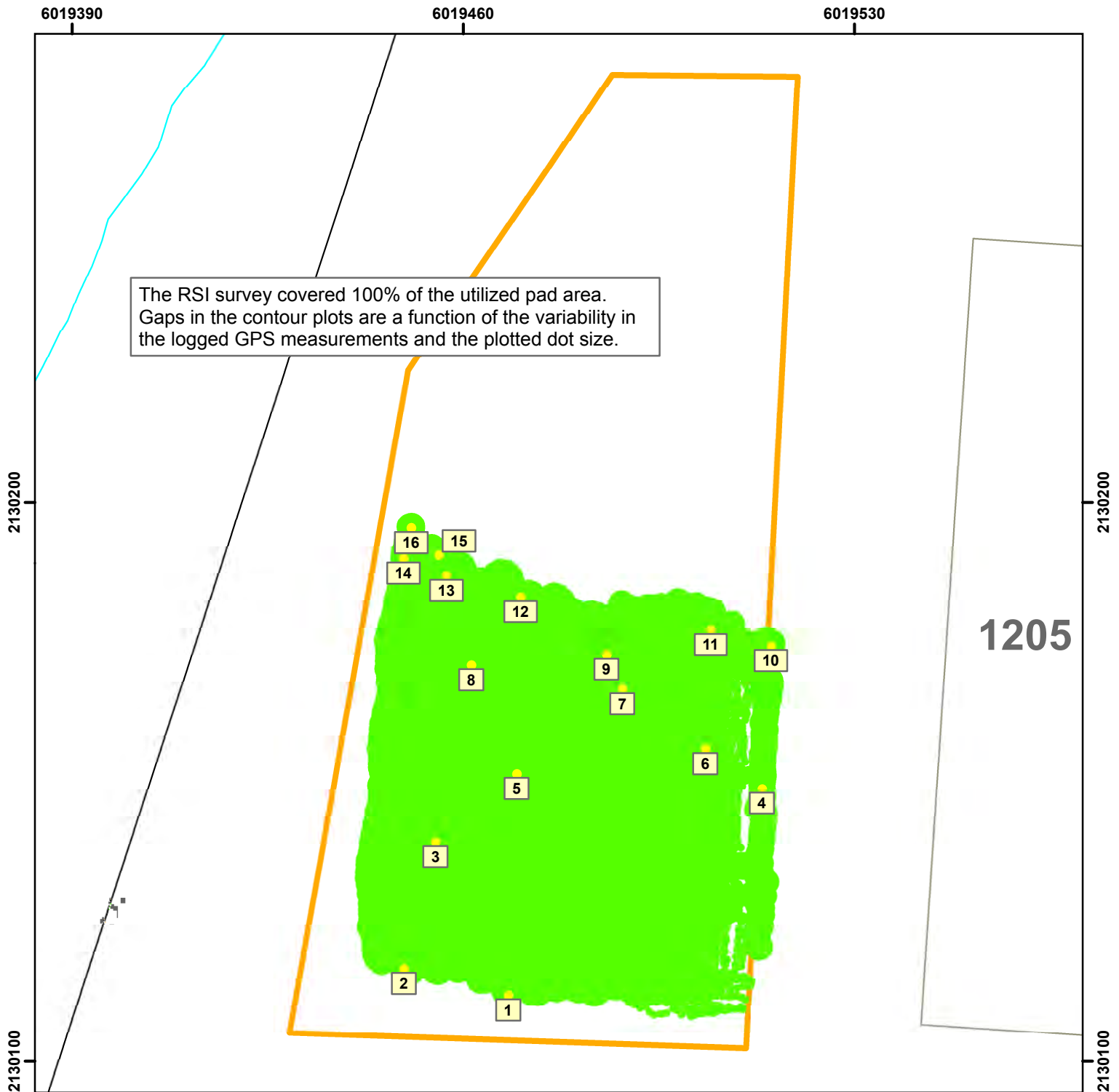
RSI Review Summary

Summary:

16 locations were selected for follow-up investigation. Locations were identified by elevated peaks noted in the playback review and/or time series charts, and by using the Z-Score, Local Z-Score, and Semi-Local Z-Score reviews as described in the RSI Data Evaluation Process on page 4. The table below details the reasons for each investigation by location.

Locations denoted a-d on the RSI Data Plot page (see previous page) did not meet the evaluation criteria for further investigation. Elevated Z-scores at these locations were identified only in specific ROIs, including: four locations exclusive to ROI 6 (a-d). Elevated gross count rates at these locations were not identified, and a review of the data did not reveal any additional indicators warranting a follow-up investigation. Furthermore, spectral analyses performed on data obtained from these locations failed to confirm the presence of Radium-226; figures are provided on pages 10 to 17.

Bayside RSY 10-2 Investigation								Follow-up					
Location	Longitude	Latitude	Details	Maximum Result (Ra/Tot)				Northing	Easting	Meter SN	Static Count (cpm)	Static IL (cpm)	Comments
				VD	ROI	Z-Score	Type:						
1	2130174.30768	6019515.04746	Time Series Peak					2130174.30768	6019515.04746	262337	12,528	19,608	< IL
2	2130189.97629	6019449.29843	3-9 ROIs Z>3 (Ra/Tot)	1	1	6	Normal	2130189.97629	6019449.29843	262337	13,135	19,608	< IL
3	2130195.41157	6019449.29843						2130195.41157	6019449.29843	262337	13,172	19,608	< IL
4	2130190.54168	6019455.60703	4 Local ROIs Z>3 (Ra/Tot)	1	10	3.63	Local	2130190.54168	6019455.60703	262337	12,718	19,608	< IL
5	2130186.87220	6019456.97772						2130186.87220	6019456.97772	262337	12,849	19,608	< IL
6	2130183.07323	6019470.24706	>4 ROIs Z>3 (all ROIs)					2130183.07323	6019470.24706	262337	12,726	19,608	< IL
7	2130172.74953	6019485.60974	4-5 Local/Normal ROIs Z>3 (Ra/Tot)	1	10	3.97	Local	2130172.74953	6019485.60974	262337	13,471	19,608	< IL
8	2130177.18250	6019504.27270	5 ROIs Z>3 (Ra/Tot), 6 Local ROIs Z>3 (Ra/Tot)	3	10	4.15	Normal	2130177.18250	6019504.27270	262337	12,972	19,608	< IL
9	2130174.30768	6019515.04746	3 ROIs Z>3 (Ra/Tot)	3	10	3.10	Normal	2130174.30768	6019515.04746	262337	12,881	19,608	< IL
10	2130148.77384	6019513.40860	4 ROIs Z>3 (Ra/Tot)	1	9	3.45	Normal	2130148.77384	6019513.40860	262337	13,053	19,608	< IL
11	2130155.82368	6019503.29533	Time Series Peak					2130155.82368	6019503.29533	262337	12,813	19,608	< IL
12	2130166.57437	6019488.43227	3 Local/Normal ROIs Z>3 (Ra/Tot)	4	3	3.68	Normal	2130166.57437	6019488.43227	262337	12,577	19,608	< IL
13	2130151.40247	6019469.52494	>4 ROIs Z>3 (all ROIs)					2130151.40247	6019469.52494	262337	12,315	19,608	< IL
14	2130111.73474	6019468.03574	3 Local ROIs Z>3 (Ra/Tot)	1	1	4.06	Local	2130111.73474	6019468.03574	262337	12,677	19,608	< IL
15	2130116.47995	6019449.35469	4 Local ROIs Z>3 (Ra/Tot)	1	9	3.89	Local	2130116.47995	6019449.35469	262337	12,305	19,608	< IL
16	2130139.20170	6019455.01018						2130139.20170	6019455.01018	262337	12,932	19,608	< IL

**Instrument # 262337**

- Investigation Points
- Data Points Not Requiring Further Investigation
- RSYPAD Boundaries

Investigation Point ID

CB&I Federal Services, LLC0 10 20 40
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: North Point SU 2
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a median Ra-226 concentration of 0.8 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the observed Ra-226 median concentration of 0.338 pCi/g and estimated LBGR of 0.483, the SU will pass the WRS test at a 100% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8.5	S
0.50	R	0.5	23	0	8.5	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.268	S	-0.21	4	4	21	R
0.117	S	-0.37	1	1	22	R
0.438	S	-0.04	19	19	23	R
0.173	S	-0.31	2	2	24	R
0.274	S	-0.21	5	5	25	R
0.339	S	-0.14	11	11	26	R
0.416	S	-0.07	16	16	27.5	R
0.391	S	-0.09	15	15	27.5	R
0.319	S	-0.16	8.5	8.5	29.5	R
0.418	S	-0.06	17	17	29.5	R
0.319	S	-0.16	8.5	8.5	31	R
0.480	S	0.00	20	20	32	R
0.351	S	-0.13	13	13	33	R
0.314	S	-0.17	7	7	34	R
0.252	S	-0.23	3	3	35.5	R
0.429	S	-0.05	18	18	35.5	R
0.341	S	-0.14	12	12	37	R
0.299	S	-0.18	6	6	38	R
0.385	S	-0.10	14	14	39	R
0.337	S	-0.15	10	10	40	R
Sum =			820	210		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 20 m
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 482.5$

$\alpha_W = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

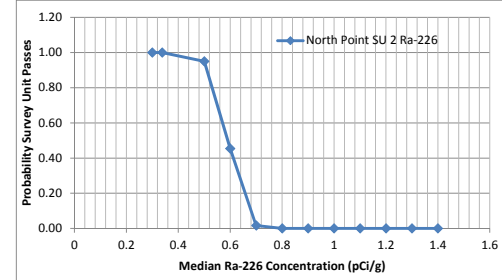
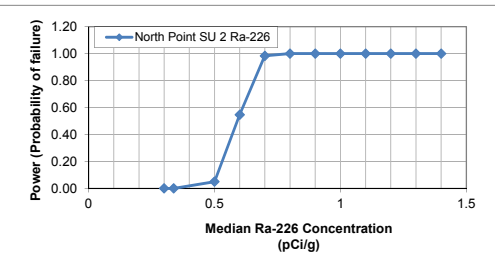
From NUREG 1505, Table A.7c: Values of r and k for the Quantile Test When α is Approximately 0.05

20 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 20$
 4 r
 4 k
 0.053 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

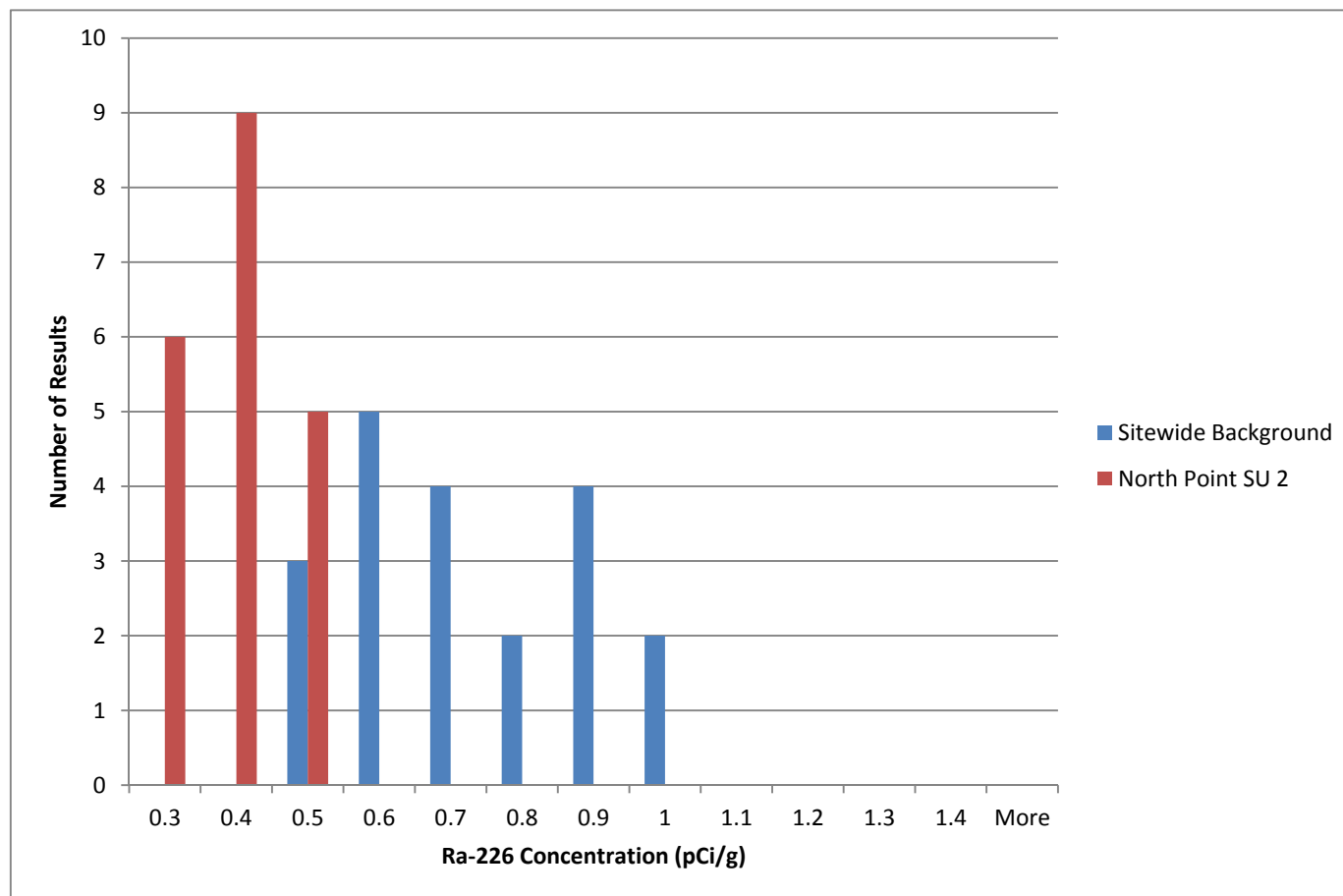
0 of the largest 4 adjusted measurements are from S. The null hypothesis is accepted.



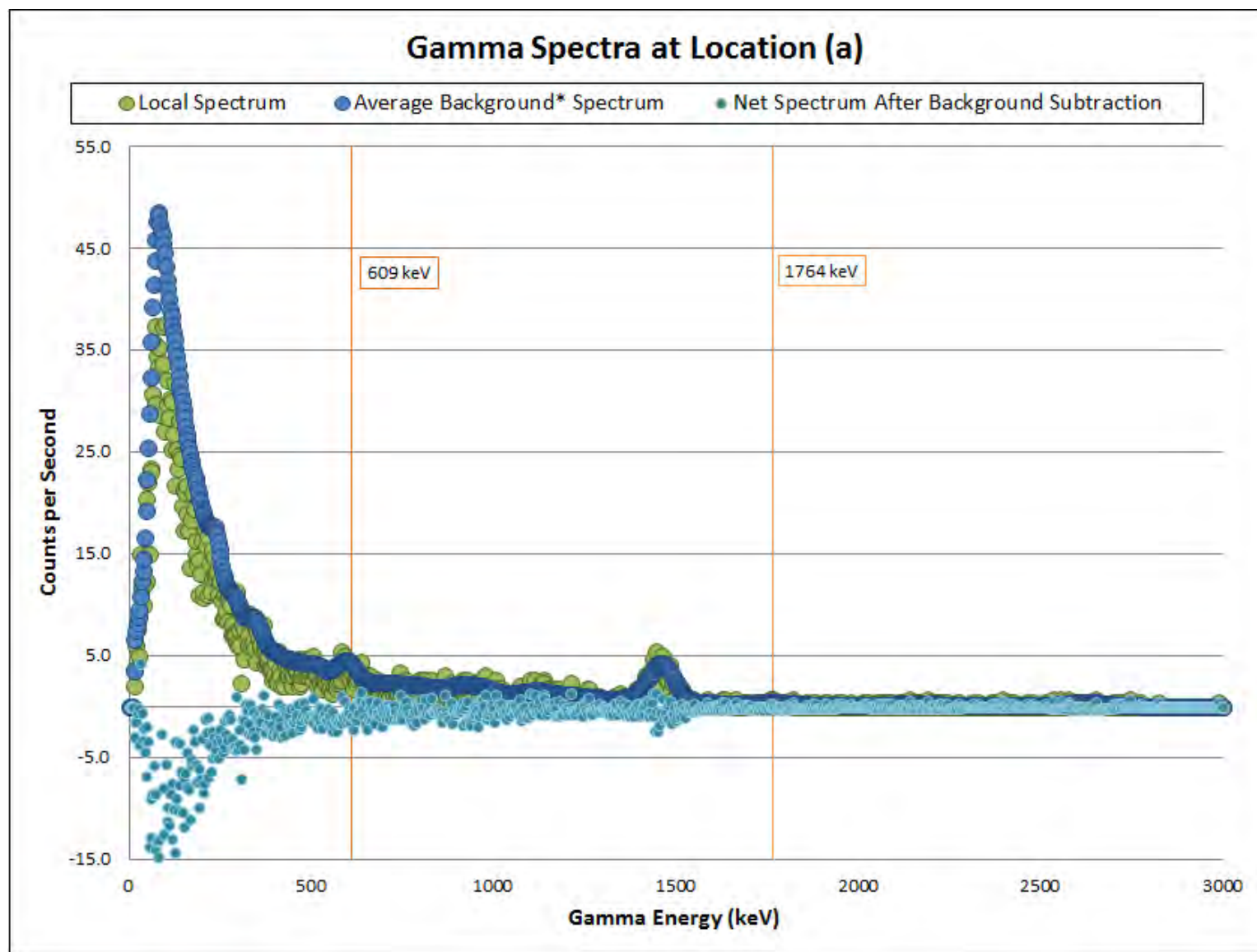
Histogram, North Point SU 2 vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

North Point SU 2	
<i>Bin</i>	<i>Frequency</i>
0.3	6
0.4	9
0.5	5
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



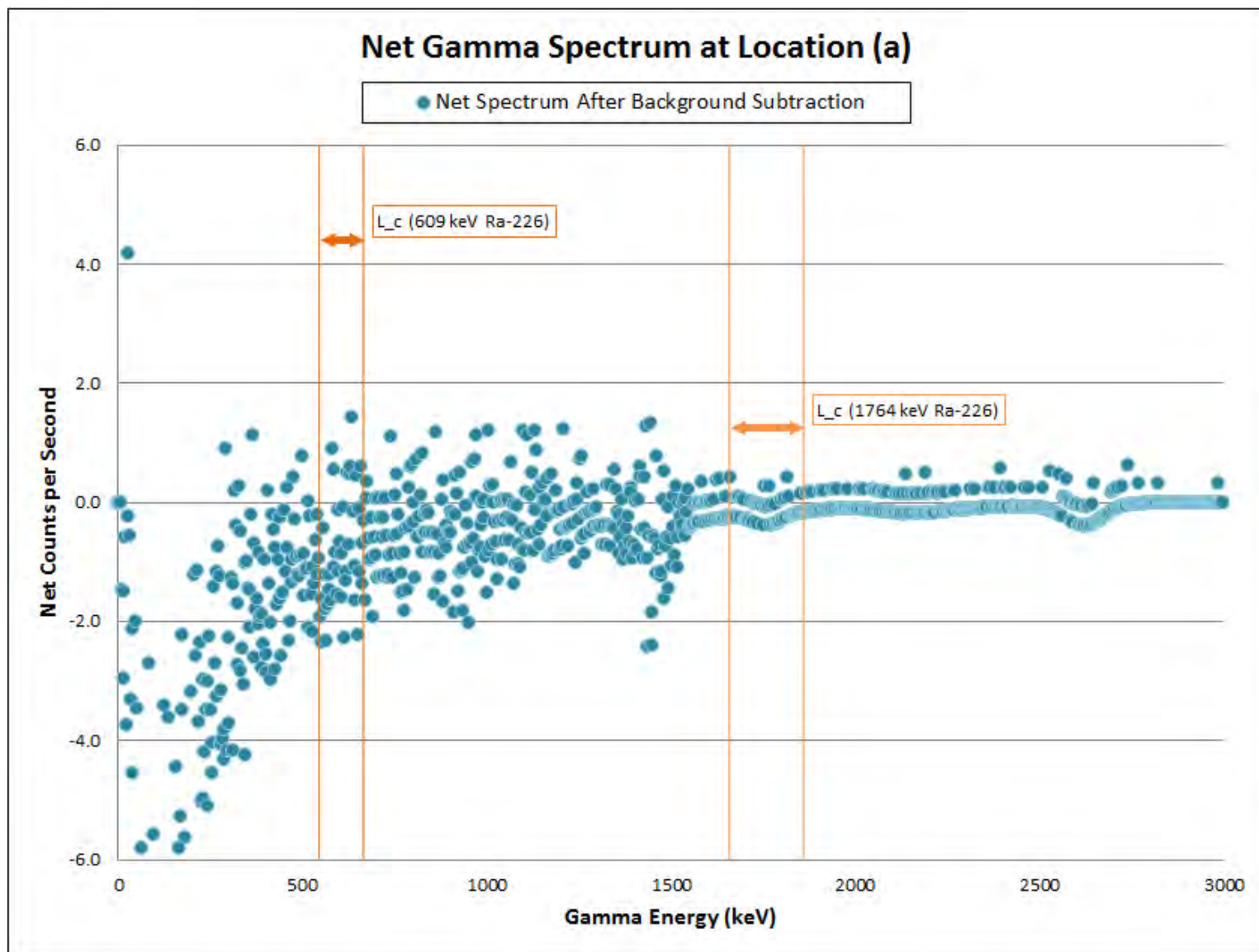
RSI Spectral Analysis Results: RSY 10 Use 2, Part 1 – **Gamma Spectra at Location (a)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (a)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 10 Use 2, Part 1 – **Net Gamma Spectrum at Location (a)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (a): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

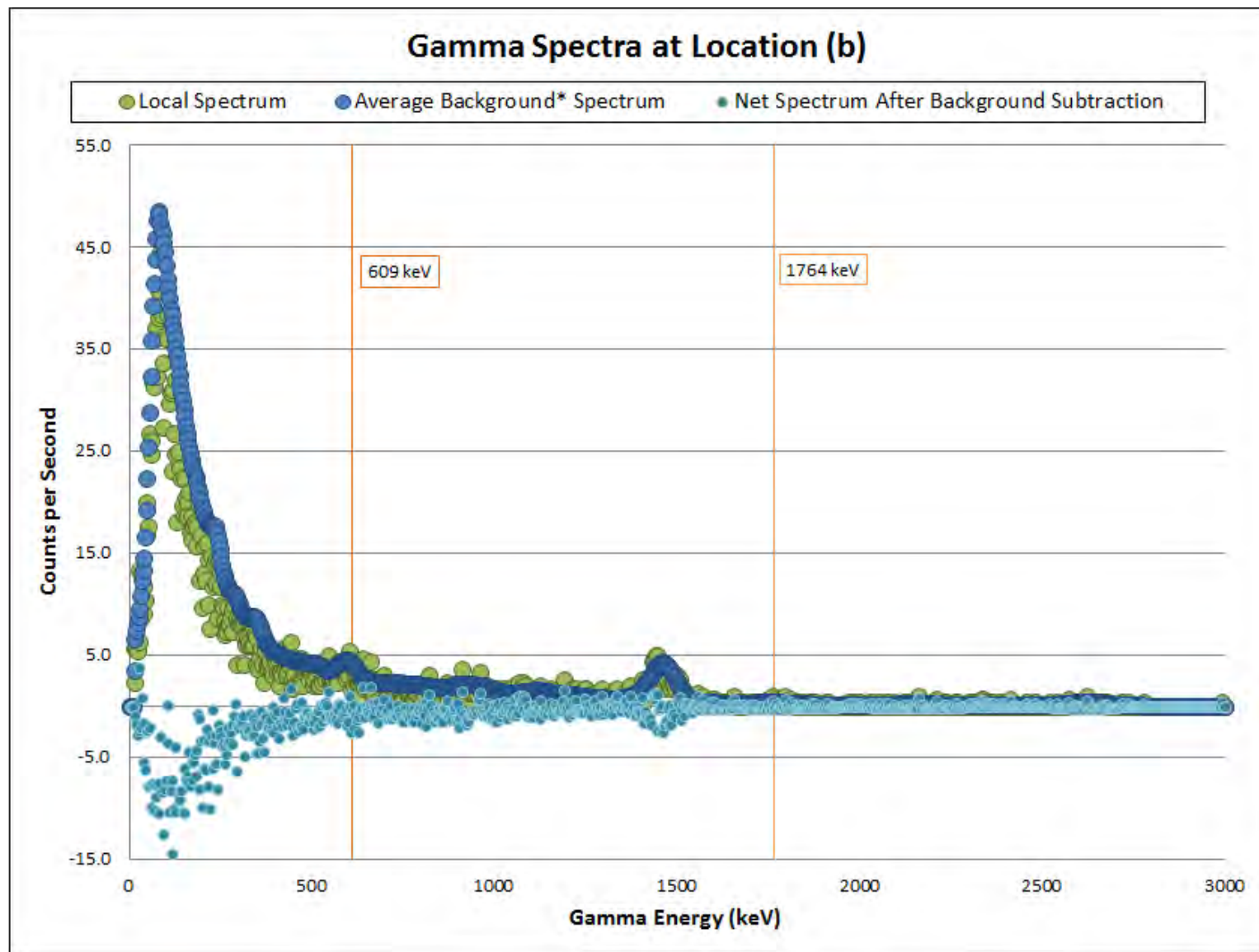
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ **B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

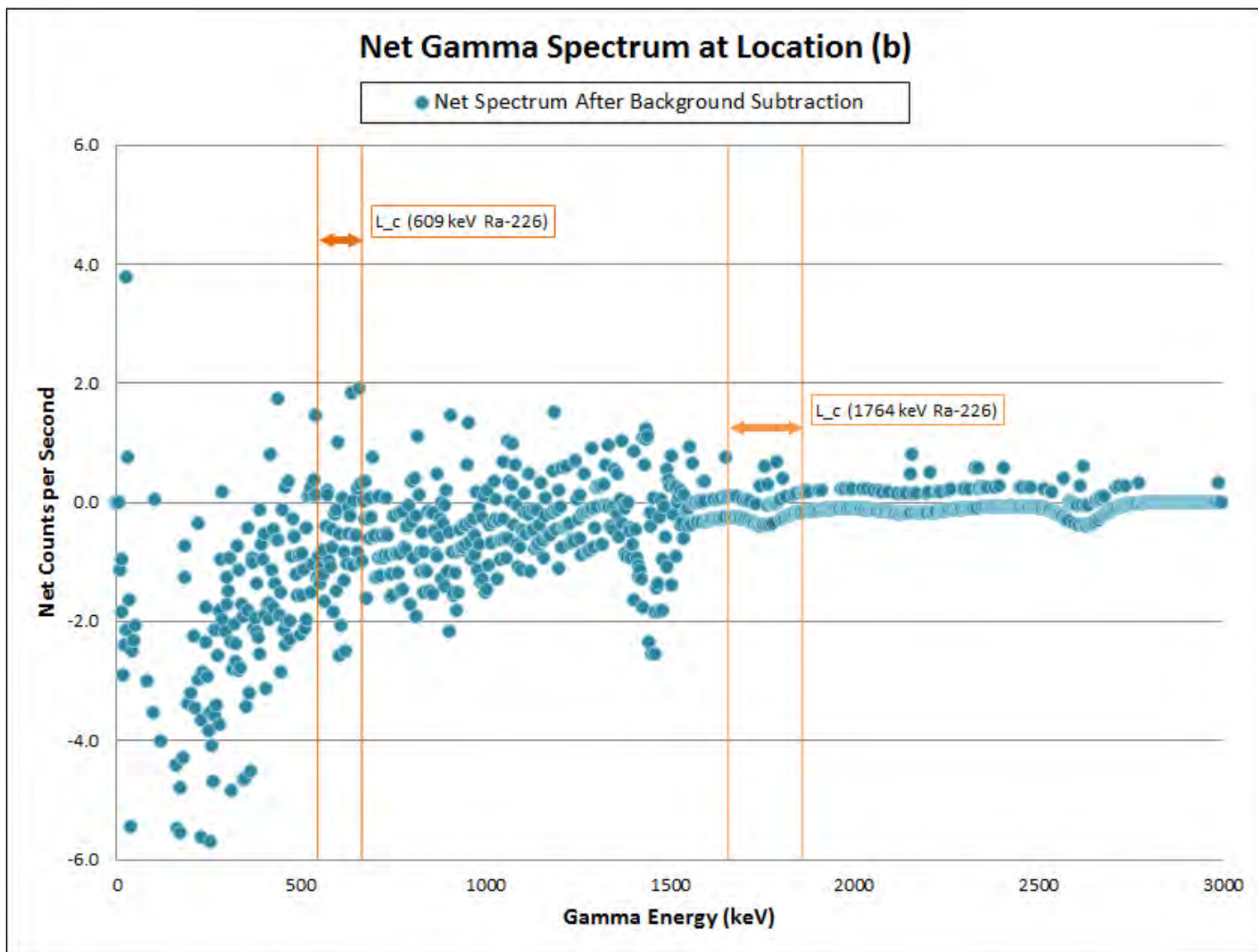
RSI Spectral Analysis Results: RSY 10 Use 2, Part 1 – **Gamma Spectra at Location (b)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (b)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 10 Use 2, Part 1 – **Net Gamma Spectrum at Location (b)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (b): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

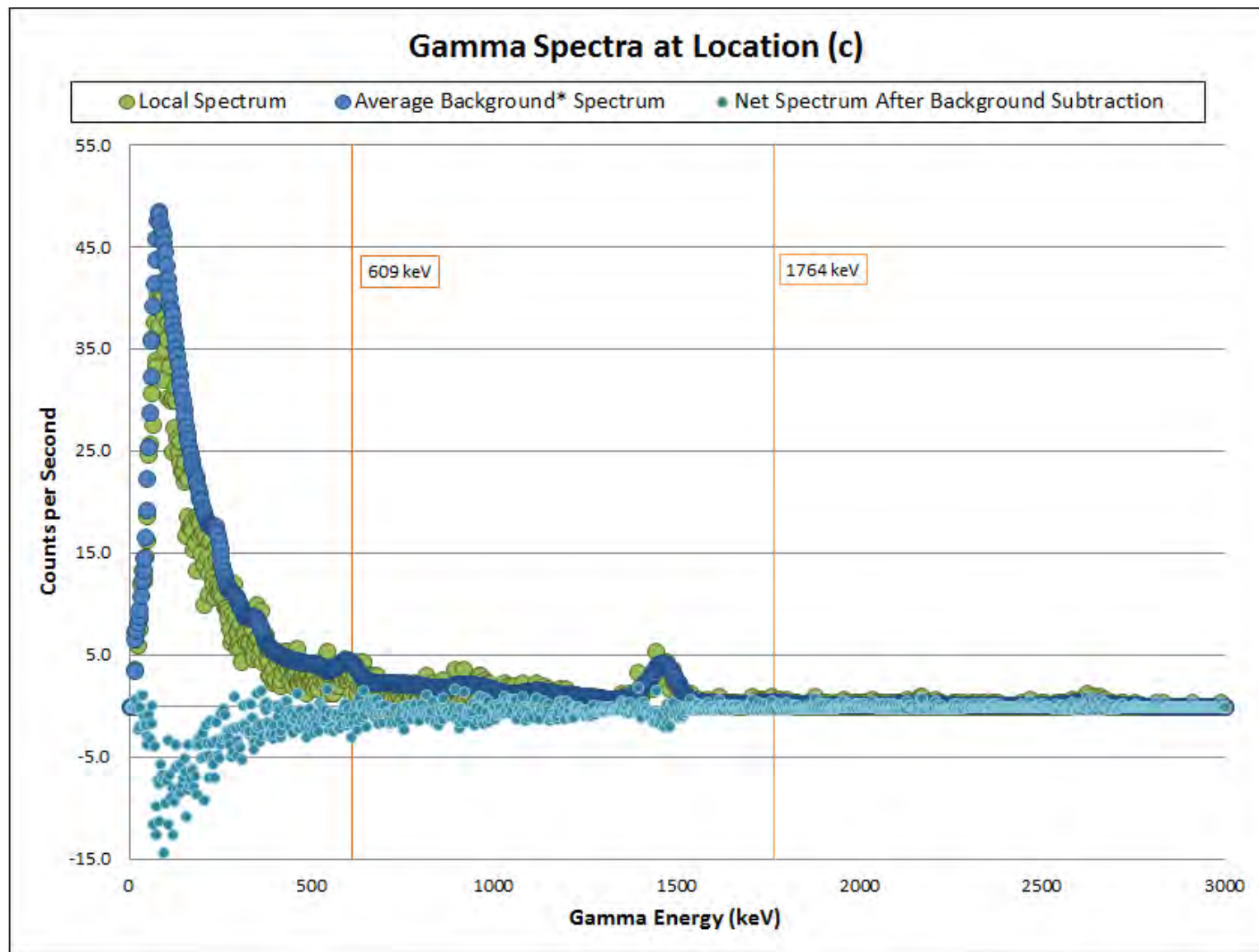
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ **B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

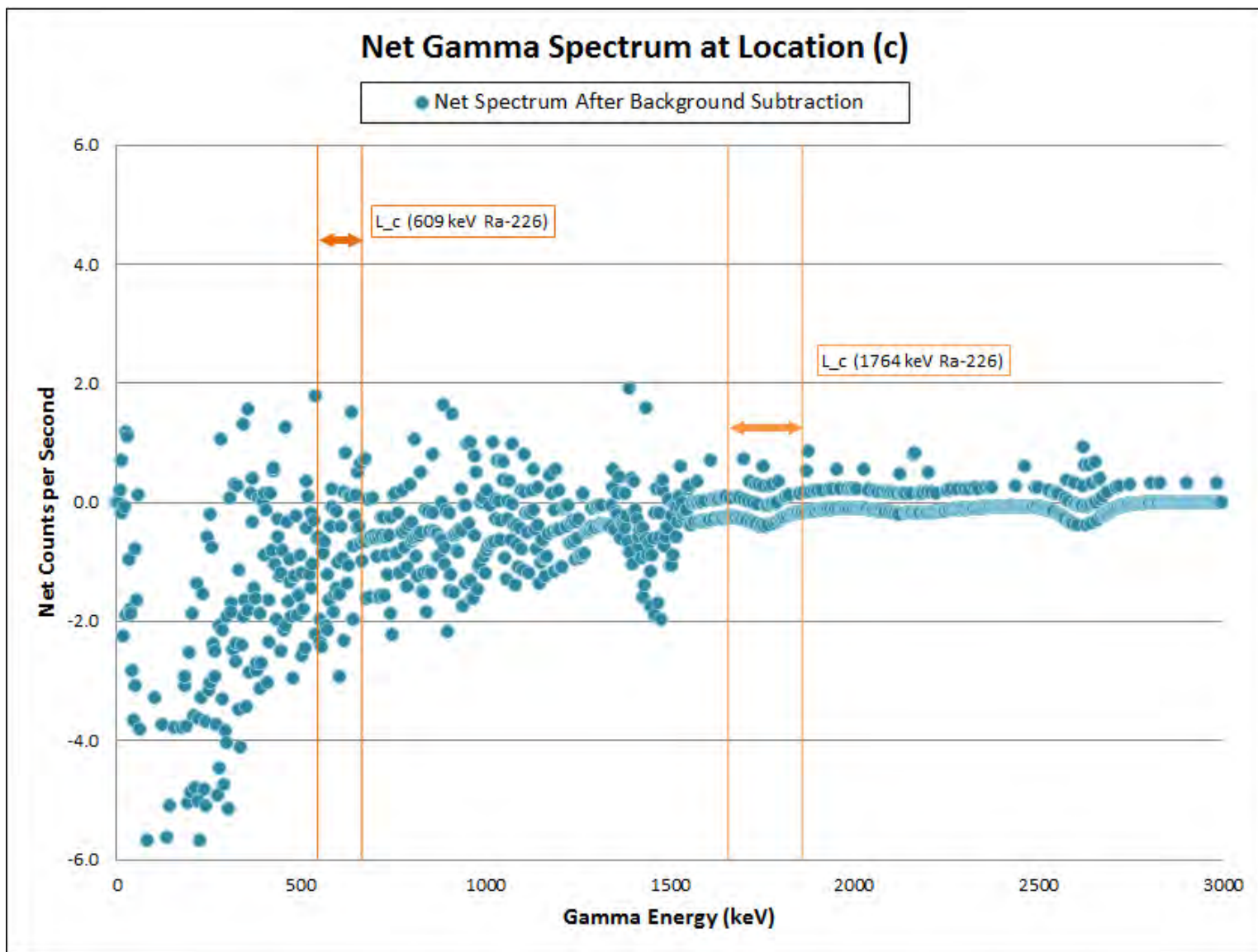
RSI Spectral Analysis Results: RSY 10 Use 2, Part 1 – **Gamma Spectra at Location (c)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (c)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 10 Use 2, Part 1 – **Net Gamma Spectrum at Location (c)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (c): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

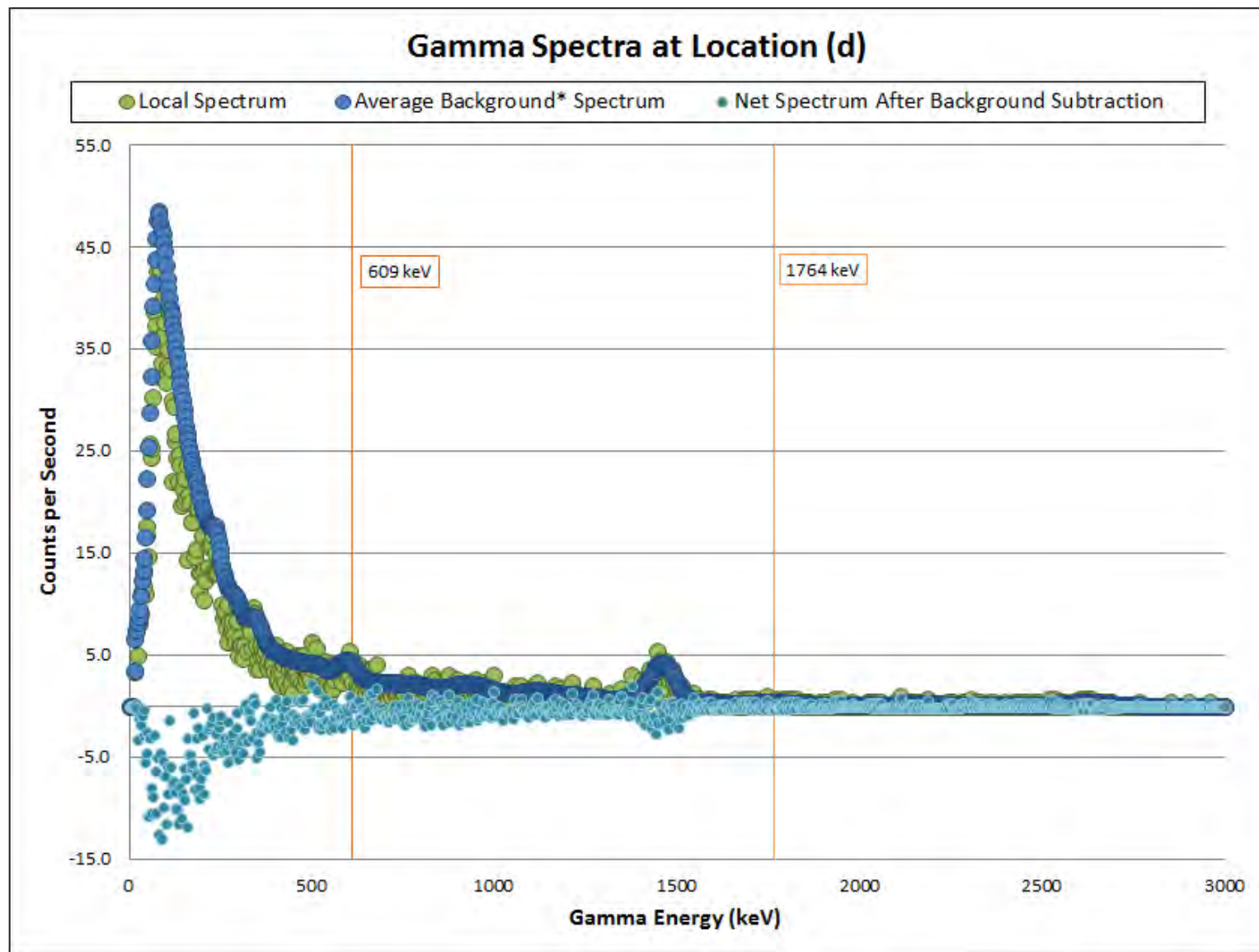
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

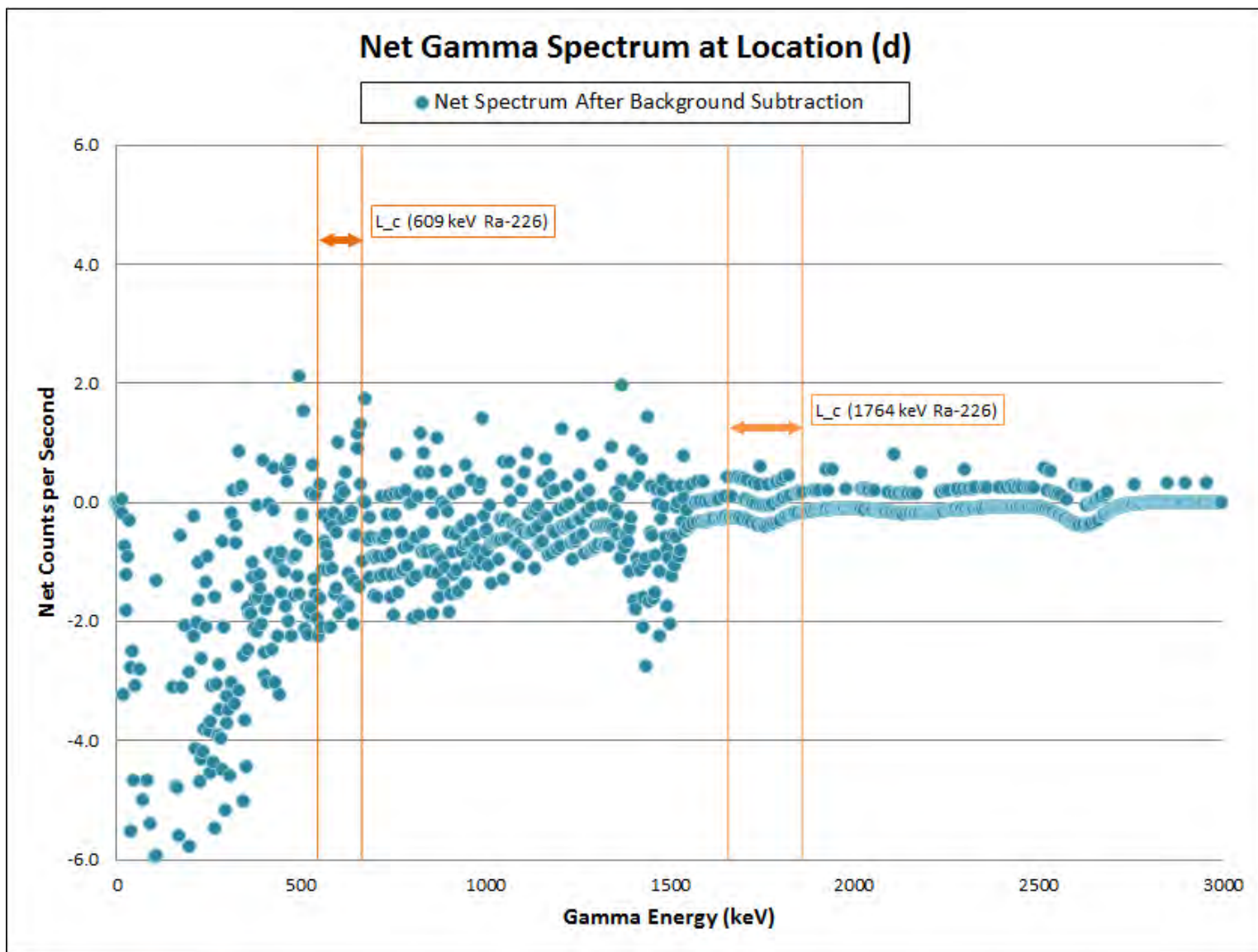
RSI Spectral Analysis Results: RSY 10 Use 2, Part 1 – **Gamma Spectra at Location (d)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for Location (d): local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 10 Use 2, Part 1 – **Net Gamma Spectrum at Location (d)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (d): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ **B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-15048-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
12/23/2015 5:16:38 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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QC Association Summary	24



Case Narrative

Page 20 of 41

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Job ID: 160-15048-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-15048-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 21 of 41

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Job ID: 160-15048-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 11/24/2015 8:30 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 19.9° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-RSY10_SU2-S001 (160-15048-1), TITO04-RSY10_SU2-S002 (160-15048-2), TITO04-RSY10_SU2-S003 (160-15048-3), TITO04-RSY10_SU2-S004 (160-15048-4), TITO04-RSY10_SU2-S005 (160-15048-5), TITO04-RSY10_SU2-S006 (160-15048-6), TITO04-RSY10_SU2-S007 (160-15048-7), TITO04-RSY10_SU2-S008 (160-15048-8), TITO04-RSY10_SU2-S009 (160-15048-9), TITO04-RSY10_SU2-S010 (160-15048-10), TITO04-RSY10_SU2-S011 (160-15048-11), TITO04-RSY10_SU2-S012 (160-15048-12), TITO04-RSY10_SU2-S013 (160-15048-13), TITO04-RSY10_SU2-S014 (160-15048-14), TITO04-RSY10_SU2-S015 (160-15048-15), TITO04-RSY10_SU2-S016 (160-15048-16), TITO04-RSY10_SU2-S017 (160-15048-17), TITO04-RSY10_SU2-S018 (160-15048-18), TITO04-RSY10_SU2-S019 (160-15048-19) and TITO04-RSY10_SU2-S020 (160-15048-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/24/2015, prepared on 11/30/2015 and analyzed on 12/21/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Shaw Environmental and Infrastructure Inc. (a CB&I company)
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_FSS_SU2_RSY10_147

Page 1 of 3

Project Number: **500060**

Project Name / Location: CTO-04 Phase III RSY10 FSS

SU2

Purchase Order #: 201455

(Name & phone #)

Project Manager: Ulrika Messer

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date: 11/23/2015

Waybill Number: 1289V4620199258648

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Sampler's Name(s): N. Morrison

Sample ID Number	Sample Description
TITO04-RSY10_SU2-S001	RSY10 FSS N.P. Survey Unit 2
TITO04-RSY10_SU2-S002	RSY10 FSS N.P. Survey Unit 2
TITO04-RSY10_SU2-S003	RSY10 FSS N.P. Survey Unit 2
TITO04-RSY10_SU2-S004	RSY10 FSS N.P. Survey Unit 2
TITO04-RSY10_SU2-S005	RSY10 FSS N.P. Survey Unit 2
TITO04-RSY10_SU2-S006	RSY10 FSS N.P. Survey Unit 2
TITO04-RSY10_SU2-S007	RSY10 FSS N.P. Survey Unit 2
TITO04-RSY10_SU2-S008	RSY10 FSS N.P. Survey Unit 2
TITO04-RSY10_SU2-S009	RSY10 FSS N.P. Survey Unit 2

Collection Information

Date	Time	Method
11/20/15	1022	G
11/20/15	1008	G
11/20/15	1043	G
11/20/15	1032	G
11/20/15	1027	G
11/20/15	1010	G
11/20/15	1037	G
11/20/15	1030	G
11/20/15	1014	G

Matrix

of containers

Preservative (water)

Preservative (soil)

Container Type

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

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16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

Standard TAT ☐

Project Specific:

☐ I ☐ II ☒ III

G = Grab

C = Composite

Relinquished By:

[Signature]

Date:

Time:

Relinquished By:

Time:

Date:

Time:

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening



160-15048 Chain of Custody



Shaw Environmental and Infrastructure Inc. (a C&I company)
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_FSS_SU2_RSY10_147

Page 2 of 3

Project Number: **500060**
CTO-04 Phase III RSY10 FSS
Project Name / Location: SU2
Purchase Order #: 201455

Shipment Date: 11/23/2015

Waybill Number: 1289V462019758648

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Patricia Flynn
Phone/Fax Number: 925-288-2037
Address: 4005 Port Chicago Hwy
City: Concord, CA, 94520

Sampler's Name(s): N. Morrison

Sample ID Number	Sample Description	Collection Information			Matrix	# of containers	Preservative (soil)		Gamma Scan	
		Date	Time	Method			Container Type	Volume		
TITO04-RSY10_SU2-S010	RSY10 FSS N.P. Survey Unit 2	11/20/15	1011	G	SO	1	16 oz Plastic	X		6
TITO04-RSY10_SU2-S011	RSY10 FSS N.P. Survey Unit 2	11/20/15	1051	G	SO	1	16 oz Plastic	X		6
TITO04-RSY10_SU2-S012	RSY10 FSS N.P. Survey Unit 2	11/20/15	1045	G	SO	1	16 oz Plastic	X		6
TITO04-RSY10_SU2-S013	RSY10 FSS N.P. Survey Unit 2	11/20/15	1022	G	SO	1	16 oz Plastic	X		6
TITO04-RSY10_SU2-S014	RSY10 FSS N.P. Survey Unit 2	11/20/15	1015	G	SO	1	16 oz Plastic	X		6
TITO04-RSY10_SU2-S015	RSY10 FSS N.P. Survey Unit 2	11/20/15	1040	G	SO	1	16 oz Plastic	X		6
TITO04-RSY10_SU2-S016	RSY10 FSS N.P. Survey Unit 2	11/20/15	1026	G	SO	1	16 oz Plastic	X		6
TITO04-RSY10_SU2-S017	RSY10 FSS N.P. Survey Unit 2	11/20/15	1018	G	SO	1	16 oz Plastic	X		6
TITO04-RSY10_SU2-S018	RSY10 FSS N.P. Survey Unit 2	11/20/15	1018	G	SO	1	16 oz Plastic	X		6

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day ☐ 7-day

Project Specific:

III

Relinquished By:

24

Date:

Time: 11-23-15

Received By:

Patricia Flynn

Date:

Time: 11-24-15

Relinquished By:

Patricia Flynn

Date:

Time: 11-23-15

Received By:

Patricia Flynn

Date:

Time: 11-24-15

G = Grab

C = Composite

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening



Ref. Document # TI_P3_FSS_SU2 RSY10 147

Page 3 of 3

Project Number: 500060

Project Name / Location: CTO-04 Phase III RSY10 ESS

C10
SU2

Purchase Order #: 201455

Project Manager: Ulrika Messer (Name & phone)

(Name & phone #)

Send Report To: *Patricia Flynn*

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date: 11/23/2015

Waybill Number: 1284V412099758148

Lab Destination: *Earth Toxics Inc To Test America*

Lab Contact Name / ph. #: Mike Dryden

Project Number: 500060 Project Name / Location: CTO-04 Phase III RSY10 FSS SU2 Purchase Order #: 201455										Shipments Date: 11/23/2015 Waybill Number: 1284V462099258648 Lab Destination: Earth Toxics Inc To Test America Lab Contact Name / ph. #: Mike Dryden									
Project Manager: Ulrika Messer (Name & phone #)										Send Report To: Patricia Flynn Phone/Fax Number: 925-288-2037 Address: 4005 Port Chicago Hwy City: Concord, CA, 94520									
Sampler's Name(s): N. Moviso										Collection Information									
Sample ID Number		Sample Description		Date		Time		Method		Matrix		# of containers		Preservative (water) Preservative (soil) Container Type		Gamma Scan		Dose Rate μ R/hr	
TITO04-RSY10_SU2-S019		RSY10 FSS N.P. Survey Unit 2		11/20/15		1035		G		SO		1		16 oz Plastic		X		6	
TITO04-RSY10_SU2-S020		RSY10 FSS N.P. Survey Unit 2		11/20/15		1035		G		SO		1		16 oz Plastic		X		6	
Special Instructions: 7 days ingrown draft and follow with 21 days final										Method Codes									
Level Of QC Required: <input type="checkbox"/> 24-hr <input type="checkbox"/> 3-day <input type="checkbox"/> 7-day										C = Composite G = Grab									
Standard TAT <input type="checkbox"/>										Matrix Codes									
Relinquished By: [Signature]										DW = Drinking Water GW = Ground Water WW = Waste Water									
Relinquished By: [Signature]										A = Air CP = Chip Samples									

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-15048-2

Login Number: 15048**List Source: TestAmerica St. Louis****List Number: 1****Creator: Clarke, Jill C**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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Sample Summary

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-15048-1	TITO04-RSY10_SU2-S001	Solid	11/20/15 10:22	11/24/15 08:30
160-15048-2	TITO04-RSY10_SU2-S002	Solid	11/20/15 10:08	11/24/15 08:30
160-15048-3	TITO04-RSY10_SU2-S003	Solid	11/20/15 10:43	11/24/15 08:30
160-15048-4	TITO04-RSY10_SU2-S004	Solid	11/20/15 10:32	11/24/15 08:30
160-15048-5	TITO04-RSY10_SU2-S005	Solid	11/20/15 10:27	11/24/15 08:30
160-15048-6	TITO04-RSY10_SU2-S006	Solid	11/20/15 10:10	11/24/15 08:30
160-15048-7	TITO04-RSY10_SU2-S007	Solid	11/20/15 10:37	11/24/15 08:30
160-15048-8	TITO04-RSY10_SU2-S008	Solid	11/20/15 10:30	11/24/15 08:30
160-15048-9	TITO04-RSY10_SU2-S009	Solid	11/20/15 10:14	11/24/15 08:30
160-15048-10	TITO04-RSY10_SU2-S010	Solid	11/20/15 10:11	11/24/15 08:30
160-15048-11	TITO04-RSY10_SU2-S011	Solid	11/20/15 10:51	11/24/15 08:30
160-15048-12	TITO04-RSY10_SU2-S012	Solid	11/20/15 10:45	11/24/15 08:30
160-15048-13	TITO04-RSY10_SU2-S013	Solid	11/20/15 10:22	11/24/15 08:30
160-15048-14	TITO04-RSY10_SU2-S014	Solid	11/20/15 10:15	11/24/15 08:30
160-15048-15	TITO04-RSY10_SU2-S015	Solid	11/20/15 10:40	11/24/15 08:30
160-15048-16	TITO04-RSY10_SU2-S016	Solid	11/20/15 10:26	11/24/15 08:30
160-15048-17	TITO04-RSY10_SU2-S017	Solid	11/20/15 10:18	11/24/15 08:30
160-15048-18	TITO04-RSY10_SU2-S018	Solid	11/20/15 10:18	11/24/15 08:30
160-15048-19	TITO04-RSY10_SU2-S019	Solid	11/20/15 10:35	11/24/15 08:30
160-15048-20	TITO04-RSY10_SU2-S020	Solid	11/20/15 10:35	11/24/15 08:30

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S001

Lab Sample ID: 160-15048-1

Date Collected: 11/20/15 10:22

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.416		0.133	0.140		0.0786	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Actinium-227	-0.312	U	0.574	0.575		0.963	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Bismuth-212	0.350	U	0.402	0.403		0.648	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Bismuth-214	0.268		0.109	0.112		0.122	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Cesium-137	0.00354	U	0.0373	0.0373		0.0682	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-210	-0.0386	U	1.25	1.25		2.17	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-212	0.303		0.0990	0.107		0.106	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-214	0.355		0.0910	0.0982		0.0917	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Potassium-40	10.6		1.34	1.72		0.560	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Protactinium-231	0.135	U	0.518	0.518		1.33	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Radium-226	0.268		0.109	0.112	0.500	0.122	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Radium-228	0.416		0.133	0.140		0.0786	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thallium-208	0.123		0.0446	0.0463		0.0444	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-228	0.303		0.0990	0.107		0.106	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-232	0.416		0.133	0.140		0.0786	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-234	0.418	U	0.410	0.412		1.45	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Uranium-235	0.0525	U	0.131	0.131		0.226	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Uranium-238	0.418	U	0.410	0.412		1.45	pCi/g	11/30/15 13:55	12/21/15 15:00	1

Client Sample ID: TITO04-RSY10_SU2-S002

Lab Sample ID: 160-15048-2

Date Collected: 11/20/15 10:08

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.233		0.110	0.113		0.232	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Actinium-227	-0.122	U	0.431	0.432		0.743	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Bismuth-212	0.171	U	0.421	0.421		0.739	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Bismuth-214	0.117	U	0.110	0.110		0.168	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Cesium-137	0.00838	U	0.0331	0.0331		0.0599	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-210	0.544	U	0.964	0.966		1.72	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-212	0.306		0.0769	0.0865		0.0868	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-214	0.356		0.106	0.112		0.124	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Potassium-40	10.2		1.33	1.69		0.763	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Protactinium-231	0.219	U	0.395	0.396		1.51	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Radium-226	0.117	U	0.110	0.110	0.500	0.168	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Radium-228	0.233		0.110	0.113		0.232	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thallium-208	0.0606		0.0444	0.0448		0.0547	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-228	0.306		0.0769	0.0865		0.0868	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-232	0.233		0.110	0.113		0.232	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-234	0.102	U	0.254	0.254		1.46	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Uranium-235	0.107	U	0.181	0.182		0.296	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Uranium-238	0.102	U	0.254	0.254		1.46	pCi/g	11/30/15 13:55	12/21/15 15:03	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S003

Lab Sample ID: 160-15048-3

Date Collected: 11/20/15 10:43

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.465		0.140	0.148		0.122	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Actinium-227	0.150	U	0.211	0.212		0.522	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Bismuth-212	0.0587	U	0.413	0.413		0.795	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Bismuth-214	0.438		0.111	0.120		0.0955	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Cesium-137	-0.00279	U	0.0370	0.0370		0.0682	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-210	0.515	U	1.03	1.03		1.73	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-212	0.346		0.0935	0.104		0.101	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-214	0.478		0.0989	0.111		0.0936	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Potassium-40	10.2		1.41	1.75		0.744	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Protactinium-231	0.263	U	0.360	0.361		1.62	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Radium-226	0.438		0.111	0.120	0.500	0.0955	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Radium-228	0.465		0.140	0.148		0.122	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thallium-208	0.145		0.0532	0.0553		0.0542	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-228	0.346		0.0935	0.104		0.101	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-232	0.465		0.140	0.148		0.122	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-234	0.544	U	0.794	0.796		1.43	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Uranium-235	-0.0161	U	0.413	0.413		0.341	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Uranium-238	0.544	U	0.794	0.796		1.43	pCi/g	11/30/15 13:55	12/21/15 14:23	1

Client Sample ID: TITO04-RSY10_SU2-S004

Lab Sample ID: 160-15048-4

Date Collected: 11/20/15 10:32

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.293		0.121	0.124		0.181	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Actinium-227	-0.0973	U	0.531	0.531		0.915	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-212	0.359	U	0.437	0.439		0.710	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-214	0.173		0.106	0.107		0.146	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Cesium-137	0.00341	U	0.0432	0.0432		0.0848	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-210	0.483	U	0.963	0.965		1.63	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-212	0.372		0.0916	0.103		0.0947	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-214	0.296		0.0931	0.0981		0.123	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Potassium-40	10.1		1.47	1.80		0.539	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Protactinium-231	0.230	U	0.281	0.282		1.57	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-226	0.173		0.106	0.107	0.500	0.146	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-228	0.293		0.121	0.124		0.181	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thallium-208	0.133		0.0472	0.0492		0.0429	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-228	0.372		0.0916	0.103		0.0947	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-232	0.293		0.121	0.124		0.181	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-234	0.789	U	0.549	0.555		1.41	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-235	0.0288	U	0.0599	0.0599		0.368	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-238	0.789	U	0.549	0.555		1.41	pCi/g	11/30/15 13:55	12/21/15 14:28	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S005

Lab Sample ID: 160-15048-5

Date Collected: 11/20/15 10:27

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.189	U	0.0980	0.0999		0.239	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Actinium-227	0.0381	U	0.363	0.363		0.637	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-212	0.227	U	0.392	0.393		0.672	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-214	0.274		0.0784	0.0835		0.0664	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Cesium-137	0.00383	U	0.0298	0.0298		0.0559	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-210	0.0105	U	0.746	0.746		1.42	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-212	0.347		0.0728	0.0855		0.0710	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-214	0.303		0.0804	0.0863		0.0725	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Potassium-40	9.78		1.40	1.72		0.577	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Protactinium-231	0.265	U	0.370	0.372		1.24	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-226	0.274		0.0784	0.0835	0.500	0.0664	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-228	0.189	U	0.0980	0.0999		0.239	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thallium-208	0.144		0.0486	0.0508		0.0449	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-228	0.347		0.0728	0.0855		0.0710	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-232	0.189	U	0.0980	0.0999		0.239	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-234	0.256	U	0.337	0.338		1.08	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-235	-0.0195	U	0.0743	0.0743		0.258	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-238	0.256	U	0.337	0.338		1.08	pCi/g	11/30/15 13:55	12/21/15 14:28	1

Client Sample ID: TITO04-RSY10_SU2-S006

Lab Sample ID: 160-15048-6

Date Collected: 11/20/15 10:10

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.133	U	0.163	0.163		0.282	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Actinium-227	-0.0336	U	0.0517	0.0518		0.842	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Bismuth-212	0.394	U	0.571	0.572		0.955	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Bismuth-214	0.339		0.110	0.116		0.133	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Cesium-137	-0.0160	U	0.493	0.493		0.108	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Lead-210	0.638	U	1.18	1.18		1.76	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Lead-212	0.284		0.0779	0.0861		0.0807	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Lead-214	0.360		0.122	0.128		0.132	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Potassium-40	10.3		1.64	1.95		0.481	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Protactinium-231	0.249	U	0.675	0.676		1.47	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Radium-226	0.339		0.110	0.116	0.500	0.133	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Radium-228	0.133	U	0.163	0.163		0.282	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Thallium-208	0.134		0.0602	0.0618		0.0538	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Thorium-228	0.284		0.0779	0.0861		0.0807	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Thorium-232	0.133	U	0.163	0.163		0.282	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Thorium-234	0.371	U	0.374	0.376		1.39	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Uranium-235	0.0703	U	0.134	0.134		0.343	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Uranium-238	0.371	U	0.374	0.376		1.39	pCi/g	11/30/15 13:55	12/21/15 14:26	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S007

Lab Sample ID: 160-15048-7

Date Collected: 11/20/15 10:37

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.295		0.148	0.151		0.218	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Actinium-227	-0.00527	U	0.0114	0.0114		0.699	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-212	0.188	U	0.417	0.417		0.725	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-214	0.416		0.111	0.119		0.115	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Cesium-137	-0.0000147	U	0.0304	0.0304		0.0576	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-210	0.994	U	1.19	1.19		1.62	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-212	0.283		0.0944	0.101		0.111	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-214	0.404		0.0963	0.105		0.138	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Potassium-40	8.55		1.29	1.56		1.10	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Protactinium-231	0.220	U	0.323	0.324		1.42	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-226	0.416		0.111	0.119	0.500	0.115	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-228	0.295		0.148	0.151		0.218	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thallium-208	0.136		0.0584	0.0601		0.0611	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-228	0.283		0.0944	0.101		0.111	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-232	0.295		0.148	0.151		0.218	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-234	0.196	U	0.330	0.331		1.31	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-235	0.0141	U	0.0291	0.0292		0.295	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-238	0.196	U	0.330	0.331		1.31	pCi/g	11/30/15 13:55	12/21/15 14:28	1

Client Sample ID: TITO04-RSY10_SU2-S008

Lab Sample ID: 160-15048-8

Date Collected: 11/20/15 10:30

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.371		0.172	0.176		0.273	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Actinium-227	0.120	U	0.247	0.247		0.611	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Bismuth-212	0.178	U	0.621	0.622		1.11	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Bismuth-214	0.391		0.132	0.138		0.149	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Cesium-137	-0.00553	U	0.0770	0.0770		0.0895	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Lead-210	0.575	U	0.851	0.854		1.55	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Lead-212	0.329		0.0987	0.107		0.106	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Lead-214	0.408		0.116	0.123		0.138	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Potassium-40	11.4		1.71	2.07		0.473	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Protactinium-231	0.383	U	0.302	0.304		1.99	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Radium-226	0.391		0.132	0.138	0.500	0.149	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Radium-228	0.371		0.172	0.176		0.273	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Thallium-208	0.119		0.0605	0.0617		0.0797	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Thorium-228	0.329		0.0987	0.107		0.106	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Thorium-232	0.371		0.172	0.176		0.273	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Thorium-234	0.452	U	0.428	0.430		1.13	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Uranium-235	0.000333	U	0.00141	0.00141		0.380	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Uranium-238	0.452	U	0.428	0.430		1.13	pCi/g	11/30/15 13:55	12/21/15 15:02	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S009

Lab Sample ID: 160-15048-9

Date Collected: 11/20/15 10:14

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.190	U	0.124	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Actinium-227	0.179	U	0.205	0.206		0.554	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Bismuth-212	0.284	U	0.407	0.409		0.680	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Bismuth-214	0.319		0.0985	0.104		0.0914	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Cesium-137	0.0126	U	0.0330	0.0331		0.0585	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-210	0.381	U	0.806	0.807		1.24	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-212	0.335		0.0748	0.0865		0.0723	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-214	0.340		0.0833	0.0905		0.0975	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Potassium-40	9.56		1.34	1.66		0.548	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Protactinium-231	0.120	U	0.133	0.133		1.49	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Radium-226	0.319		0.0985	0.104	0.500	0.0914	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Radium-228	0.190	U	0.124	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thallium-208	0.0510	U	0.0412	0.0415		0.0662	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-228	0.335		0.0748	0.0865		0.0723	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-232	0.190	U	0.124	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-234	0.275	U	0.263	0.264		1.14	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Uranium-235	0.0926	U	0.151	0.152		0.254	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Uranium-238	0.275	U	0.263	0.264		1.14	pCi/g	11/30/15 13:55	12/21/15 15:03	1

Client Sample ID: TITO04-RSY10_SU2-S010

Lab Sample ID: 160-15048-10

Date Collected: 11/20/15 10:11

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.396		0.135	0.141		0.215	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Actinium-227	0.0578	U	0.141	0.141		0.901	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Bismuth-212	0.263	U	0.405	0.406		0.685	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Bismuth-214	0.418		0.104	0.113		0.0922	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Cesium-137	-0.0170	U	0.358	0.358		0.0856	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Lead-210	0.165	U	1.04	1.04		1.81	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Lead-212	0.377		0.109	0.119		0.108	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Lead-214	0.301		0.0889	0.0942		0.0974	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Potassium-40	9.76		1.45	1.76		0.541	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Protactinium-231	0.362	U	0.682	0.683		1.50	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Radium-226	0.418		0.104	0.113	0.500	0.0922	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Radium-228	0.396		0.135	0.141		0.215	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Thallium-208	0.167		0.0521	0.0549		0.0440	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Thorium-228	0.377		0.109	0.119		0.108	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Thorium-232	0.396		0.135	0.141		0.215	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Thorium-234	0.191	U	0.499	0.499		1.70	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Uranium-235	0.00874	U	0.194	0.194		0.347	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Uranium-238	0.191	U	0.499	0.499		1.70	pCi/g	11/30/15 13:55	12/21/15 15:06	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S011

Lab Sample ID: 160-15048-11

Date Collected: 11/20/15 10:51

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.329		0.124	0.128		0.171	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Actinium-227	-0.0437	U	0.369	0.369		0.645	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Bismuth-212	0.296	U	0.348	0.349		0.563	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Bismuth-214	0.319		0.0985	0.104		0.102	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Cesium-137	-0.00232	U	0.0288	0.0288		0.0532	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-210	0.225	U	0.703	0.703		1.21	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-212	0.393		0.0840	0.0981		0.0737	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-214	0.327		0.0821	0.0888		0.0744	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Potassium-40	11.2		1.27	1.71		0.591	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Protactinium-231	0.000	U	0.837	0.837		1.51	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Radium-226	0.319		0.0985	0.104	0.500	0.102	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Radium-228	0.329		0.124	0.128		0.171	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thallium-208	0.201		0.0507	0.0548		0.0339	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-228	0.393		0.0840	0.0981		0.0737	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-232	0.329		0.124	0.128		0.171	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-234	-0.439	U	0.857	0.858		1.44	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Uranium-235	0.0655	U	0.126	0.126		0.330	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Uranium-238	-0.439	U	0.857	0.858		1.44	pCi/g	11/30/15 13:55	12/21/15 15:33	1

Client Sample ID: TITO04-RSY10_SU2-S012

Lab Sample ID: 160-15048-12

Date Collected: 11/20/15 10:45

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.206	U	0.128	0.130		0.293	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Actinium-227	0.122	U	0.496	0.496		0.857	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Bismuth-212	0.315	U	0.555	0.556		0.943	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Bismuth-214	0.480		0.119	0.129		0.102	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Cesium-137	0.00190	U	0.0439	0.0439		0.0805	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-210	0.291	U	1.34	1.34		2.15	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-212	0.429		0.0974	0.112		0.104	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-214	0.467		0.117	0.126		0.137	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Potassium-40	11.9		1.51	1.94		0.613	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Protactinium-231	0.154	U	0.227	0.228		1.74	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Radium-226	0.480		0.119	0.129	0.500	0.102	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Radium-228	0.206	U	0.128	0.130		0.293	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thallium-208	0.184		0.0578	0.0608		0.0584	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-228	0.429		0.0974	0.112		0.104	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-232	0.206	U	0.128	0.130		0.293	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-234	0.152	U	1.01	1.01		1.85	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Uranium-235	0.165	U	0.197	0.198		0.324	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Uranium-238	0.152	U	1.01	1.01		1.85	pCi/g	11/30/15 13:55	12/21/15 15:00	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S013

Lab Sample ID: 160-15048-13

Date Collected: 11/20/15 10:22

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.302		0.161	0.164		0.212	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Actinium-227	0.0377	U	0.121	0.122		0.628	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Bismuth-212	0.316	U	0.436	0.437		0.724	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Bismuth-214	0.351		0.118	0.124		0.123	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Cesium-137	-0.000384	U	0.0296	0.0296		0.0568	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Lead-210	0.826	U	0.719	0.725		1.18	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Lead-212	0.269		0.0772	0.0847		0.102	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Lead-214	0.494		0.109	0.121		0.0842	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Potassium-40	9.39		1.33	1.64		0.534	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Protactinium-231	0.297	U	0.483	0.484		1.24	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Radium-226	0.351		0.118	0.124	0.500	0.123	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Radium-228	0.302		0.161	0.164		0.212	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Thallium-208	0.123		0.0590	0.0604		0.0603	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Thorium-228	0.269		0.0772	0.0847		0.102	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Thorium-232	0.302		0.161	0.164		0.212	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Thorium-234	0.810	U	0.463	0.470		1.24	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Uranium-235	0.0495	U	0.180	0.180		0.310	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Uranium-238	0.810	U	0.463	0.470		1.24	pCi/g	11/30/15 13:55	12/21/15 14:59	1

Client Sample ID: TITO04-RSY10_SU2-S014

Lab Sample ID: 160-15048-14

Date Collected: 11/20/15 10:15

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.516		0.154	0.163		0.122	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Actinium-227	0.136	U	0.427	0.427		0.737	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Bismuth-212	0.0653	U	0.502	0.502		0.945	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Bismuth-214	0.314		0.141	0.145		0.157	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Cesium-137	-0.0239	U	0.0469	0.0469		0.0802	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Lead-210	0.398	U	1.06	1.06		1.83	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Lead-212	0.343		0.0915	0.102		0.103	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Lead-214	0.472		0.110	0.120		0.0979	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Potassium-40	10.4		1.39	1.75		0.595	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Protactinium-231	-0.0702	U	0.172	0.172		1.77	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Radium-226	0.314		0.141	0.145	0.500	0.157	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Radium-228	0.516		0.154	0.163		0.122	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Thallium-208	0.135		0.0476	0.0496		0.0489	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Thorium-228	0.343		0.0915	0.102		0.103	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Thorium-232	0.516		0.154	0.163		0.122	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Thorium-234	0.121	U	0.520	0.520		1.76	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Uranium-235	0.0804	U	0.0992	0.0995		0.431	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Uranium-238	0.121	U	0.520	0.520		1.76	pCi/g	11/30/15 13:55	12/21/15 15:01	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S015

Lab Sample ID: 160-15048-15

Date Collected: 11/20/15 10:40

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.235		0.123	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Actinium-227	-0.104	U	0.417	0.417		0.720	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-212	0.394	U	0.452	0.454		0.731	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-214	0.252		0.103	0.106		0.147	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Cesium-137	-0.0156	U	0.0433	0.0433		0.0755	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-210	0.810	U	1.24	1.24		1.73	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-212	0.298		0.0803	0.0891		0.0937	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-214	0.401		0.105	0.113		0.113	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Potassium-40	8.23		1.70	1.90		1.51	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Protactinium-231	0.554	U	0.818	0.821		1.37	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-226	0.252		0.103	0.106	0.500	0.147	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-228	0.235		0.123	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thallium-208	0.130		0.0486	0.0504		0.0505	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-228	0.298		0.0803	0.0891		0.0937	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-232	0.235		0.123	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-234	0.802	U	0.475	0.482		1.31	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-235	0.00860	U	0.187	0.187		0.328	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-238	0.802	U	0.475	0.482		1.31	pCi/g	11/30/15 13:55	12/21/15 15:39	1

Client Sample ID: TITO04-RSY10_SU2-S016

Lab Sample ID: 160-15048-16

Date Collected: 11/20/15 10:26

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.604		0.199	0.208		0.120	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Actinium-227	0.0781	U	0.335	0.335		0.595	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Bismuth-212	0.276	U	0.511	0.512		0.884	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Bismuth-214	0.429		0.141	0.148		0.155	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Cesium-137	-0.0200	U	0.802	0.802		0.0782	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Lead-210	1.58	U	1.27	1.28		1.73	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Lead-212	0.389		0.0907	0.104		0.0830	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Lead-214	0.416		0.130	0.137		0.165	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Potassium-40	12.0		1.78	2.16		0.487	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Protactinium-231	0.173	U	0.254	0.254		1.74	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Radium-226	0.429		0.141	0.148	0.500	0.155	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Radium-228	0.604		0.199	0.208		0.120	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Thallium-208	0.163		0.0713	0.0733		0.0628	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Thorium-228	0.389		0.0907	0.104		0.0830	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Thorium-232	0.604		0.199	0.208		0.120	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Thorium-234	0.886	U	0.947	0.952		1.61	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Uranium-235	0.113	U	0.162	0.162		0.270	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Uranium-238	0.886	U	0.947	0.952		1.61	pCi/g	11/30/15 13:55	12/21/15 15:36	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S017

Lab Sample ID: 160-15048-17

Date Collected: 11/20/15 10:18

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.413		0.131	0.137		0.0827	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Actinium-227	0.0305	U	0.191	0.191		0.745	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-212	0.245	U	0.315	0.316		0.514	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-214	0.341		0.0920	0.0986		0.0781	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Cesium-137	0.00837	U	0.0362	0.0362		0.0652	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-210	0.248	U	0.721	0.722		1.34	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-212	0.350		0.0786	0.0907		0.0798	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-214	0.399		0.0879	0.0972		0.0931	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Potassium-40	8.22		1.34	1.58		0.997	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Protactinium-231	0.559	U	0.459	0.463		0.869	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-226	0.341		0.0920	0.0986	0.500	0.0781	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-228	0.413		0.131	0.137		0.0827	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thallium-208	0.0715		0.0460	0.0466		0.0614	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-228	0.350		0.0786	0.0907		0.0798	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-232	0.413		0.131	0.137		0.0827	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-234	0.358	U	0.283	0.285		1.07	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-235	0.0886	U	0.133	0.133		0.266	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-238	0.358	U	0.283	0.285		1.07	pCi/g	11/30/15 13:55	12/21/15 15:39	1

Client Sample ID: TITO04-RSY10_SU2-S018

Lab Sample ID: 160-15048-18

Date Collected: 11/20/15 10:18

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.283		0.140	0.143		0.217	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Actinium-227	-0.00789	U	0.0227	0.0227		0.827	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-212	-0.117	U	0.490	0.490		0.886	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-214	0.299		0.0968	0.102		0.104	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Cesium-137	-0.0214	U	0.858	0.858		0.0945	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-210	0.462	U	1.02	1.02		1.74	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-212	0.339		0.0915	0.102		0.0981	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-214	0.369		0.115	0.122		0.121	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Potassium-40	10.7		1.53	1.88		0.544	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Protactinium-231	0.323	U	0.472	0.473		1.64	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-226	0.299		0.0968	0.102	0.500	0.104	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-228	0.283		0.140	0.143		0.217	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thallium-208	0.0978		0.0585	0.0593		0.0765	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-228	0.339		0.0915	0.102		0.0981	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-232	0.283		0.140	0.143		0.217	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-234	0.359	U	0.434	0.436		1.52	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-235	0.0810	U	0.214	0.214		0.371	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-238	0.359	U	0.434	0.436		1.52	pCi/g	11/30/15 13:55	12/21/15 15:39	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S019

Lab Sample ID: 160-15048-19

Date Collected: 11/20/15 10:35

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.497		0.156	0.164		0.152	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Actinium-227	0.0744	U	0.122	0.122		0.729	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Bismuth-212	0.457	U	0.497	0.499		0.798	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Bismuth-214	0.385		0.151	0.156		0.151	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Cesium-137	0.00163	U	0.0333	0.0333		0.0625	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-210	0.765	U	1.25	1.25		1.91	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-212	0.347		0.0981	0.108		0.108	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-214	0.372		0.0953	0.103		0.110	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Potassium-40	11.6		1.44	1.87		0.582	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Protactinium-231	0.216	U	0.634	0.635		1.45	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Radium-226	0.385		0.151	0.156	0.500	0.151	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Radium-228	0.497		0.156	0.164		0.152	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thallium-208	0.101		0.0543	0.0553		0.0650	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-228	0.347		0.0981	0.108		0.108	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-232	0.497		0.156	0.164		0.152	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-234	0.524	U	0.433	0.437		1.51	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Uranium-235	0.0448	U	0.153	0.153		0.348	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Uranium-238	0.524	U	0.433	0.437		1.51	pCi/g	11/30/15 13:55	12/21/15 15:33	1

Client Sample ID: TITO04-RSY10_SU2-S020

Lab Sample ID: 160-15048-20

Date Collected: 11/20/15 10:35

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.183	U	0.104	0.106		0.227	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Actinium-227	0.0909	U	0.308	0.308		0.754	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Bismuth-212	0.215	U	0.408	0.409		0.701	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Bismuth-214	0.337		0.0975	0.104		0.100	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Cesium-137	-0.000454	U	0.0344	0.0344		0.0636	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Lead-210	1.98		1.21	1.23		1.57	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Lead-212	0.336		0.0827	0.0934		0.0897	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Lead-214	0.396		0.0886	0.0977		0.0925	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Potassium-40	8.72		1.23	1.52		0.857	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Protactinium-231	0.110	U	0.373	0.373		1.29	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Radium-226	0.337		0.0975	0.104	0.500	0.100	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Radium-228	0.183	U	0.104	0.106		0.227	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Thallium-208	0.152		0.0464	0.0491		0.0418	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Thorium-228	0.336		0.0827	0.0934		0.0897	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Thorium-232	0.183	U	0.104	0.106		0.227	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Thorium-234	0.313	U	0.344	0.345		1.70	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Uranium-235	0.0854	U	0.119	0.119		0.390	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Uranium-238	0.313	U	0.344	0.345		1.70	pCi/g	11/30/15 13:55	12/21/15 15:34	1

QC Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-224921/1-A

Matrix: Solid

Analysis Batch: 228553

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 224921

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.09532	U	2.59	2.59		0.322	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Actinium-227	0.03646	U	0.206	0.206		0.502	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Bismuth-212	-0.3696	U	0.699	0.700		1.20	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Bismuth-214	-0.06582	U	2.63	2.63		0.192	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Cesium-137	0.0000	U	0.0351	0.0351		0.0646	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-210	1.470	U	1.22	1.23		2.05	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-212	-0.04688	U	0.709	0.709		0.120	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-214	-0.08155	U	3.26	3.26		0.221	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Potassium-40	-0.2464	U	2.66	2.66		1.03	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Protactinium-231	0.2444	U	0.794	0.795		1.43	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Radium-226	-0.06582	U	2.63	2.63	0.500	0.192	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Radium-228	-0.09532	U	2.59	2.59		0.322	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thallium-208	-0.01617	U	0.141	0.141		0.0869	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-228	-0.04688	U	0.709	0.709		0.120	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-232	-0.09532	U	2.59	2.59		0.322	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-234	-0.2567	U	1.10	1.10		1.67	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Uranium-235	0.04293	U	0.117	0.117		0.263	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Uranium-238	-0.2567	U	1.10	1.10		1.67	pCi/g	11/30/15 13:55	12/21/15 14:23	1

Lab Sample ID: LCS 160-224921/2-A

Matrix: Solid

Analysis Batch: 228551

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 224921

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.2	96.52		10.1		1.16	pCi/g	99	87 - 116
Cesium-137	30.0	29.39		3.13		0.263	pCi/g	98	87 - 120
Cobalt-60	18.2	17.67		1.83		0.185	pCi/g	97	87 - 115

Lab Sample ID: 160-15048-1 DU

Matrix: Solid

Analysis Batch: 228556

Client Sample ID: TITO04-RSY10_SU2-S001

Prep Type: Total/NA

Prep Batch: 224921

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.416		0.2047	U	0.127		0.255	pCi/g	0.79	1
Actinium-227	-0.312	U	0.1920	U	0.405		0.688	pCi/g	0.51	1
Bismuth-212	0.350	U	-0.04000	U	0.523		0.964	pCi/g	0.42	1
Bismuth-214	0.268		0.3022		0.101		0.102	pCi/g	0.16	1
Cesium-137	0.00354	U	0.008364	U	0.0365		0.0667	pCi/g	0.07	1
Lead-210	-0.0386	U	0.1771	U	0.850		1.60	pCi/g	0.10	1
Lead-212	0.303		0.3131		0.0973		0.0982	pCi/g	0.05	1
Lead-214	0.355		0.2753		0.0825		0.113	pCi/g	0.44	1
Potassium-40	10.6		9.924		1.77		0.602	pCi/g	0.18	1
Protactinium-231	0.135	U	0.6273	U	0.545		1.41	pCi/g	0.46	1
Radium-226	0.268		0.3022		0.101	0.500	0.102	pCi/g	0.16	1
Radium-228	0.416		0.2047	U	0.127		0.255	pCi/g	0.79	1

QC Sample Results

Page 40 of 41

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-15048-1 DU

Matrix: Solid

Analysis Batch: 228556

Client Sample ID: TITO04-RSY10_SU2-S001

Prep Type: Total/NA

Prep Batch: 224921

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.123		0.1254		0.0438		0.0381	pCi/g	0.03	1
Thorium-228	0.303		0.3131		0.0973		0.0982	pCi/g	0.05	1
Thorium-232	0.416		0.2047	U	0.127		0.255	pCi/g	0.79	1
Thorium-234	0.418	U	0.3020	U	0.346		1.45	pCi/g	0.15	1
Uranium-235	0.0525	U	0.1232	U	0.172		0.285	pCi/g	0.23	1
Uranium-238	0.418	U	0.3020	U	0.346		1.45	pCi/g	0.15	1

QC Association Summary

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Rad

Leach Batch: 224064

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-15048-1	TITO04-RSY10_SU2-S001	Total/NA	Solid	Dry and Grind	
160-15048-1 DU	TITO04-RSY10_SU2-S001	Total/NA	Solid	Dry and Grind	
160-15048-2	TITO04-RSY10_SU2-S002	Total/NA	Solid	Dry and Grind	
160-15048-3	TITO04-RSY10_SU2-S003	Total/NA	Solid	Dry and Grind	
160-15048-4	TITO04-RSY10_SU2-S004	Total/NA	Solid	Dry and Grind	
160-15048-5	TITO04-RSY10_SU2-S005	Total/NA	Solid	Dry and Grind	
160-15048-6	TITO04-RSY10_SU2-S006	Total/NA	Solid	Dry and Grind	
160-15048-7	TITO04-RSY10_SU2-S007	Total/NA	Solid	Dry and Grind	
160-15048-8	TITO04-RSY10_SU2-S008	Total/NA	Solid	Dry and Grind	
160-15048-9	TITO04-RSY10_SU2-S009	Total/NA	Solid	Dry and Grind	
160-15048-10	TITO04-RSY10_SU2-S010	Total/NA	Solid	Dry and Grind	
160-15048-11	TITO04-RSY10_SU2-S011	Total/NA	Solid	Dry and Grind	
160-15048-12	TITO04-RSY10_SU2-S012	Total/NA	Solid	Dry and Grind	
160-15048-13	TITO04-RSY10_SU2-S013	Total/NA	Solid	Dry and Grind	
160-15048-14	TITO04-RSY10_SU2-S014	Total/NA	Solid	Dry and Grind	
160-15048-15	TITO04-RSY10_SU2-S015	Total/NA	Solid	Dry and Grind	
160-15048-16	TITO04-RSY10_SU2-S016	Total/NA	Solid	Dry and Grind	
160-15048-17	TITO04-RSY10_SU2-S017	Total/NA	Solid	Dry and Grind	
160-15048-18	TITO04-RSY10_SU2-S018	Total/NA	Solid	Dry and Grind	
160-15048-19	TITO04-RSY10_SU2-S019	Total/NA	Solid	Dry and Grind	
160-15048-20	TITO04-RSY10_SU2-S020	Total/NA	Solid	Dry and Grind	

Prep Batch: 224921

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-15048-1	TITO04-RSY10_SU2-S001	Total/NA	Solid	Fill_Geo-21	224064
160-15048-1 DU	TITO04-RSY10_SU2-S001	Total/NA	Solid	Fill_Geo-21	224064
160-15048-2	TITO04-RSY10_SU2-S002	Total/NA	Solid	Fill_Geo-21	224064
160-15048-3	TITO04-RSY10_SU2-S003	Total/NA	Solid	Fill_Geo-21	224064
160-15048-4	TITO04-RSY10_SU2-S004	Total/NA	Solid	Fill_Geo-21	224064
160-15048-5	TITO04-RSY10_SU2-S005	Total/NA	Solid	Fill_Geo-21	224064
160-15048-6	TITO04-RSY10_SU2-S006	Total/NA	Solid	Fill_Geo-21	224064
160-15048-7	TITO04-RSY10_SU2-S007	Total/NA	Solid	Fill_Geo-21	224064
160-15048-8	TITO04-RSY10_SU2-S008	Total/NA	Solid	Fill_Geo-21	224064
160-15048-9	TITO04-RSY10_SU2-S009	Total/NA	Solid	Fill_Geo-21	224064
160-15048-10	TITO04-RSY10_SU2-S010	Total/NA	Solid	Fill_Geo-21	224064
160-15048-11	TITO04-RSY10_SU2-S011	Total/NA	Solid	Fill_Geo-21	224064
160-15048-12	TITO04-RSY10_SU2-S012	Total/NA	Solid	Fill_Geo-21	224064
160-15048-13	TITO04-RSY10_SU2-S013	Total/NA	Solid	Fill_Geo-21	224064
160-15048-14	TITO04-RSY10_SU2-S014	Total/NA	Solid	Fill_Geo-21	224064
160-15048-15	TITO04-RSY10_SU2-S015	Total/NA	Solid	Fill_Geo-21	224064
160-15048-16	TITO04-RSY10_SU2-S016	Total/NA	Solid	Fill_Geo-21	224064
160-15048-17	TITO04-RSY10_SU2-S017	Total/NA	Solid	Fill_Geo-21	224064
160-15048-18	TITO04-RSY10_SU2-S018	Total/NA	Solid	Fill_Geo-21	224064
160-15048-19	TITO04-RSY10_SU2-S019	Total/NA	Solid	Fill_Geo-21	224064
160-15048-20	TITO04-RSY10_SU2-S020	Total/NA	Solid	Fill_Geo-21	224064
LCS 160-224921/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-224921/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

From: [Sevcik, Joseph T CIV SEA 04 04N](#)
To: [Guillory, Jeffrey](#)
Cc: [Edwards, Zachary L CIV SEA 04 04N](#); [Yantos, Christopher N CIV NAVFAC SW, BRAC](#); [Messer, Ulrika](#); [Hackett, John R](#); [Schul, Raymond](#); [Coffey, Lisa M](#); [Morrison, Dennis](#); [Bohannon, Derek](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 10 (Use 5 Part 1)
Date: Monday, June 27, 2016 11:21:26 AM

Mr. Guillory,

I concur with designating RSY 10 (Use 5 Part 1) soil as non-LLRW.

v/r,

Joe Sevcik
Environmental Protection Manager
NAVSEADET RASO
160 Main Road
Building 1959
NWS Yorktown, VA 23691
Office: (757) 887-4483
DSN: 953-4483
Fax: (757) 887-4900

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederalservices.com>]
Sent: Friday, May 27, 2016 11:42 AM
To: Sevcik, Joseph T CIV SEA 04 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Coffey, Lisa M; Morrison, Dennis; Bohannon, Derek
Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 10 (Use 5 Part 1)

Mr. Sevcik,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Jeffrey Guillory

Scientist 3

Federal Services

Tel: +1 415 398 6547 ext 238

Cell: +1 979 422 5534

jeffrey.guillory@cbifederalservices.com <<mailto:jeffrey.guillory@cbifederalservices.com>>

CB&I

950 Avenue M - Treasure Island

San Francisco, CA 94130

United States of America

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Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY #10	RSY Unit Use Number: USE 5, Part 1	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Lisa Coffey/Tina Piquet/Jeff Guillory		Data Report Submittal Date: 05/27/2016

Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static 2221 Meter Serial Number	One Minute Static Reading (CPM)	Static Count Over Static Mean + 3σ	²²⁶ Ra Final Analytical Results
TI-TO04-NP-R-FSSSU4-S401	1	Systematic	149942	11,306	No	0.324
TI-TO04-NP-R-FSSSU4-S402	2	Systematic	149942	11,038	No	0.337
TI-TO04-NP-R-FSSSU4-S403	3	Systematic	149942	11,402	No	0.326
TI-TO04-NP-R-FSSSU4-S404	4	Systematic	149942	10,903	No	0.284
TI-TO04-NP-R-FSSSU4-S405	5	Systematic	149942	10,686	No	0.350
TI-TO04-NP-R-FSSSU4-S406	6	Systematic	149942	10,811	No	0.337
TI-TO04-NP-R-FSSSU4-S407	7	Systematic	149942	10,984	No	0.429
TI-TO04-NP-R-FSSSU4-S408	8	Systematic	149942	11,033	No	0.307
TI-TO04-NP-R-FSSSU4-S409	9	Systematic	149942	11,081	No	0.279
TI-TO04-NP-R-FSSSU4-S410	10	Systematic	149942	10,699	No	0.377
TI-TO04-NP-R-FSSSU4-S411	11	Systematic	149942	10,841	No	0.397
TI-TO04-NP-R-FSSSU4-S412	12	Systematic	149942	10,952	No	0.275
TI-TO04-NP-R-FSSSU4-S413	13	Systematic	149942	10,953	No	0.351
TI-TO04-NP-R-FSSSU4-S414	14	Systematic	149942	10,684	No	0.305
TI-TO04-NP-R-FSSSU4-S415	15	Systematic	149942	10,842	No	0.435
TI-TO04-NP-R-FSSSU4-S416	16	Systematic	149942	10,950	No	0.309
TI-TO04-NP-R-FSSSU4-S417	17	Systematic	149942	10,925	No	0.304
TI-TO04-NP-R-FSSSU4-S418	18	Systematic	149942	11,096	No	0.226
TI-TO04-NP-R-FSSSU4-S419	19	Systematic	149942	11,162	No	0.361
TI-TO04-NP-R-FSSSU4-S420	20	Systematic	149942	10,960	No	0.431

Instrument Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Static Background (CPM)	Static Background Plus 3σ (CPM)	Scan Background	Scan Background Plus 3σ	Range
General Area Exposure Rate Survey	TIRS-03242016-12P3-JSS-2289	3/24/2016 – 3/28/2016	19	11/4/2016	267085	N/A	N/A	N/A	N/A	5 – 7 μR/hr
Gamma Scan Walkover Survey	TIRS-03312016-12P3-ROV-2045	3/31/2016	RS-701/RSX-1	N/A	Console: 7236 / Detectors: 5447, 5448	N/A	N/A	7,595 CPS	8,275 CPS	4,426 – 5,635 CPS
Follow-up Static Investigation Survey	TIRS-04012016-12P3-JSS-2059	4/1/2016	2221	2221	2/10/2017	149942	15,437	17,659	N/A	11,018 – 14,741 CPM
Systematic Sampling Survey	TIRS-04042016-12P3-JSS-2067	4/4/2016 – 4/5/2016	2221	2/10/2017	149942	15,437	17,659	N/A	N/A	10,684 – 11,402 CPM

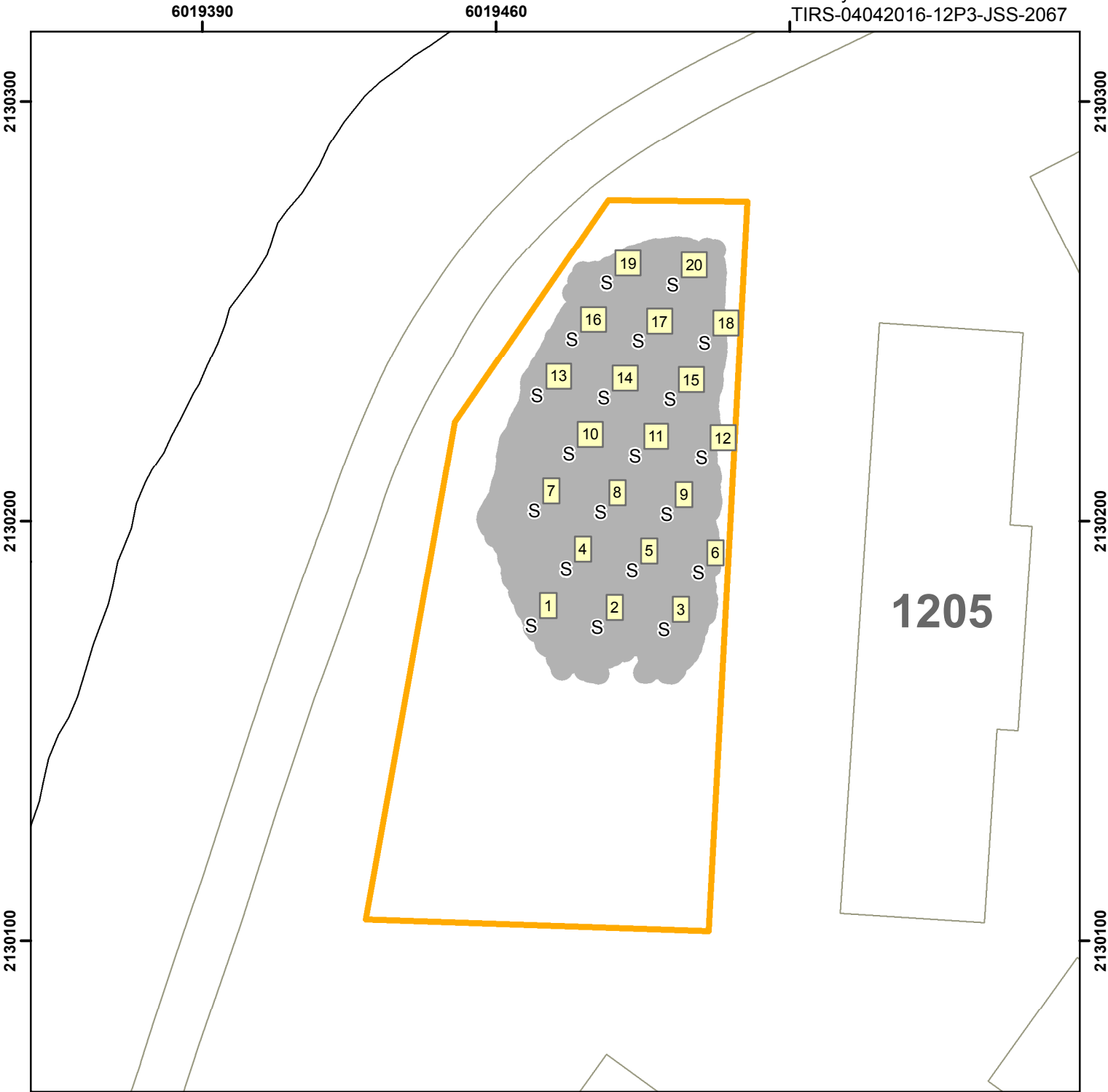
CPM = Counts Per Minute

CPS = Counts Per Second

Summary
1) General area survey performed of staged soil piles prior to soil being spread to the 9-inch screening layer.
2) Initial RSI gamma scan and data review—upon review of initial scan data, follow-up static investigations were deemed necessary, and investigation locations were identified as per the RSI Data Evaluation Process (pages 4-5). Gamma scan coverage shown on Systematic Sample Survey map (page 3). Contour maps of initial scan data are shown on RSI Data Plots (page 6). Data review results are summarized on RSI Review Summary (page 7).
3) Follow-up static survey—9 locations identified during the data review process were investigated, resulting in all locations < static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 8).
<p>4) Twenty systematic soil samples (401-420) obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with all readings < static IL. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 19-42).</p> <p><u>Note:</u> The bottom of the excavation at SWDA North Point Survey Unit (SU) 4 was inaccessible for in situ FSS operations due to water infiltration, therefore a 6" layer of FSS material spanning the entire underwater portion of the excavation bottom was over-excavated and surveyed ex situ on RSY Pad 10 (Use 5, Part 1) and RSY Pad 11 (Use 1, Part 3).</p>
<p>Conclusions:</p> <p>All locations with elevated Z-scores identified by the initial RSI gamma scan were deemed comparable to background. 9 follow-up static locations were investigated, with readings < static IL at all locations.</p> <p>Additional locations (a-h, page 6) with elevated Z-scores that did not meet the criteria for a follow-up investigation were evaluated by spectral analysis of the RSI gamma scan data, which did not indicate the presence of ²²⁶Ra above background levels (pages 11-18).</p> <p>Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 9-10. These statistical tools were utilized to verify the appropriate level of reasonable effort.</p> <p>RSY 10 (Use 5, Part 1) contains soil from the final 6-inch over excavation of North Point SU 4.</p> <p>Note: Soil on RSY Pad 10 (Use 5, Part 1) was removed from the final depth of the excavation at North Point SU 4, and no visible debris or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.</p> <p>CB&I requests RASO concurrence to release this soil as Non-LLRW.</p> <p>Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.</p>

Bayside RSY 10 Use 5 (Part 1)

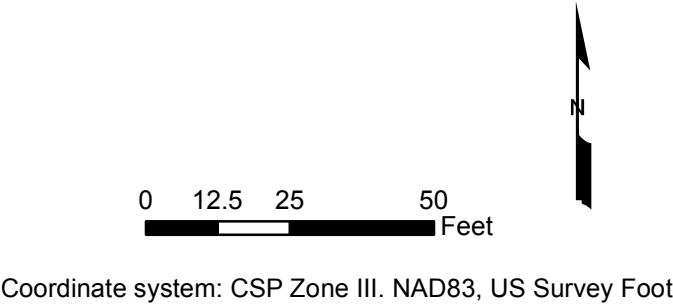
Survey Number:
TIRS-04042016-12P3-JSS-2067



Instrument # 149942

- S Systematic Sample Locations
- RSI Coverage
- RSY Pad Boundaries

CB&I Federal Services, LLC



RS-700 Mobile Radiation Monitoring System

- Self-contained gamma-ray radiation detection and monitoring system
- Built-in GPS receiver
- (2) RSX-1 4-liter NaI(Tl) gamma detectors oriented perpendicular to the direction of travel (VD1 denotes both detectors summed; VD3 refers to the left detector; and VD4 refers to the right detector)
- Multi-Channel Analyzer, allowing for monitoring of energy-specific regions of interest (ROIs)
- RadAssist survey software for control, monitoring, and recording

Ten ROIs have been established for radium and progeny as well as other naturally-occurring or anthropogenic gamma-emitting radionuclides that may be of interest:

ROI	Description	Energy Range (keV)	Primary Peak (keV)
1	Total counts	411 – 2811	N/A
2	Potassium	1371 – 1569	1460
3	U/Ra-226	1659 – 1860	1764 (Bi-214)
4	Thorium	2409 – 2811	2614 (Tl-208)
5	Annihilation	456 – 570	511
6	Ra-226	546 – 666	609 (Bi-214)
7	Cs-137	549 – 741	662
8	Pb-214/Ra-226	327 – 399	351
9	Range	45 – 1980	N/A
10	Gross Counts	3 – 3072	N/A

A tiered approach is used during data review to identify follow-up locations. Raw data are exported to a comma delimited format using RadAssist and imported into an Excel spreadsheet for review and analysis. Count rate data are compared with ROI- and material-specific investigation levels (ILs). In addition, the following review steps are completed to determine if additional follow-up measurements are necessary:

- **Playback Review:** The data file is replayed in RadAssist and reviewed for elevated count rates in ROIs 1, 3, 6, and 10 for virtual detector (VD) 1 (both detectors summed). The scan screen is also monitored for elevated count rates and alarms.
- **Count Rate Time Series Review:** The count rates for ROIs 1, 3, 6, and 10 for VDs 1, 3 (detector 1), and 4 (detector 2) are plotted in a time series and reviewed for additional peaks in count rate.
- **All ROIs:**
 - **Z-Scores:** The Z-Scores are calculated for each location in all ROIs for VDs 1, 3, and 4. Any location with four or more ROIs having a Z-Score greater than three ($Z > 3$) is marked for follow-up.
 - **Local Z-Scores:** Local Z-Scores are calculated using a moving average for each data point in all ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with four or more ROIs having a local $Z > 3$ is marked for follow-up.
 - **Semi-local Z-Scores:** Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with four or more ROIs having a semi-local $Z > 3$ is marked for follow-up.

- **ROIs 3, 6, 8, and 10 (radium-specific ROIs):**
 - Z-Scores: The Z-Scores are calculated for each location in the radium-specific ROIs for VDs 1, 3, and 4. Any location with three or more radium-specific ROIs having a $Z > 3$ is marked for follow-up.
 - Local Z-Scores: Local Z-Scores are calculated using a moving average for each data point in the radium-specific ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a local $Z > 3$ is marked for follow-up.
 - Semi-local Z-Scores: Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a semi-local $Z > 3$ is marked for follow-up.
- **Z-Score Time Series Review:** The three types of Z-Scores for ROIs 1, 3, 6, and 10 for VDs 1, 3, and 4 are plotted in a time series and reviewed for additional peaks in Z-Scores.

Follow-up locations will be plotted on contour maps depicting all locations with any radium-specific ROI $Z > 3$. Any location selected for follow-up, or any location with a radium-specific ROI $Z > 3$ will undergo spectral analysis to determine if it is statistically likely that there is radium present at that location in quantities greater than the background.

A background spectrum, obtained from NSTI Reference Area 7, is subtracted from the local spectral data for a given location, and the resulting net spectrum is plotted. Critical levels, as defined in Section 6.7.1 of the Multi Agency Radiation Survey and Site Investigation Manual are calculated and plotted based on background levels. The critical level is the level, in counts, at which there is a statistical probability (with a predetermined confidence) of incorrectly identifying a measurement system background value as greater than background. Any response above this level is considered to be greater than background. The critical level is calculated for ROIs 3, 6, and 8 according to the equation shown below:

$$L_C = 2.33\sqrt{B}$$

Where:

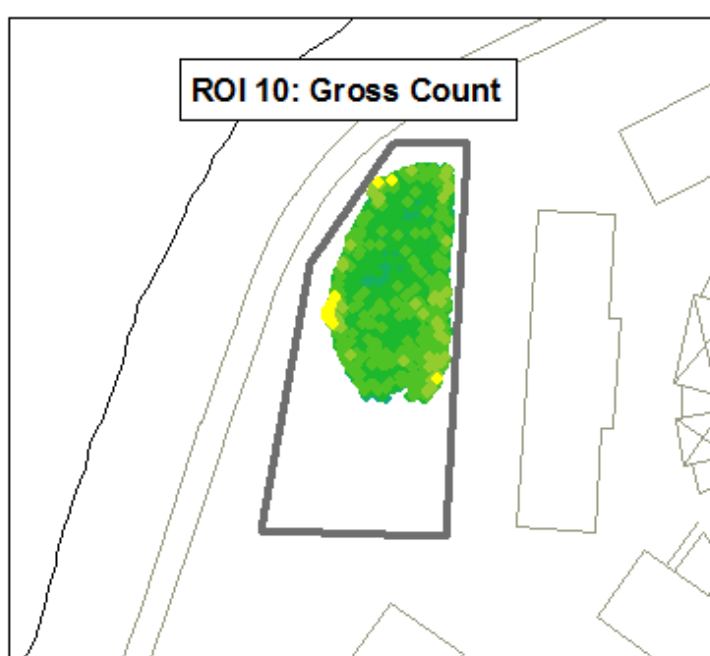
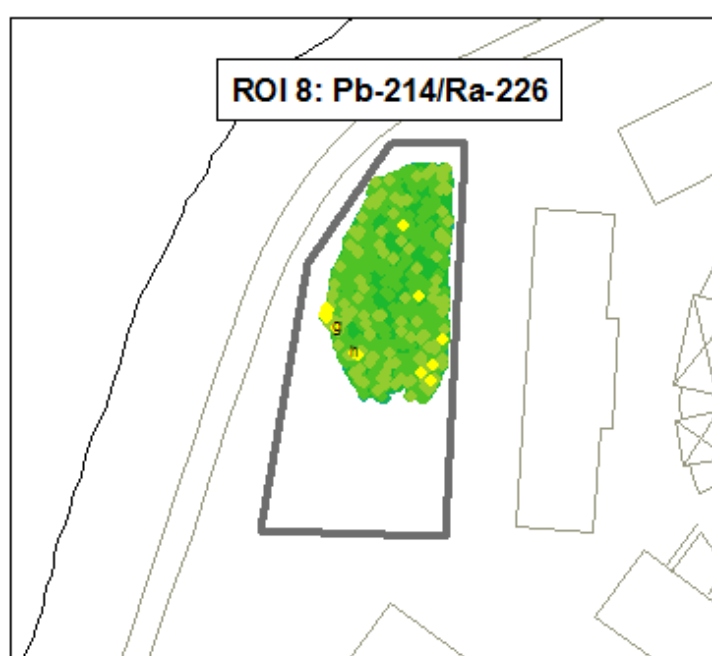
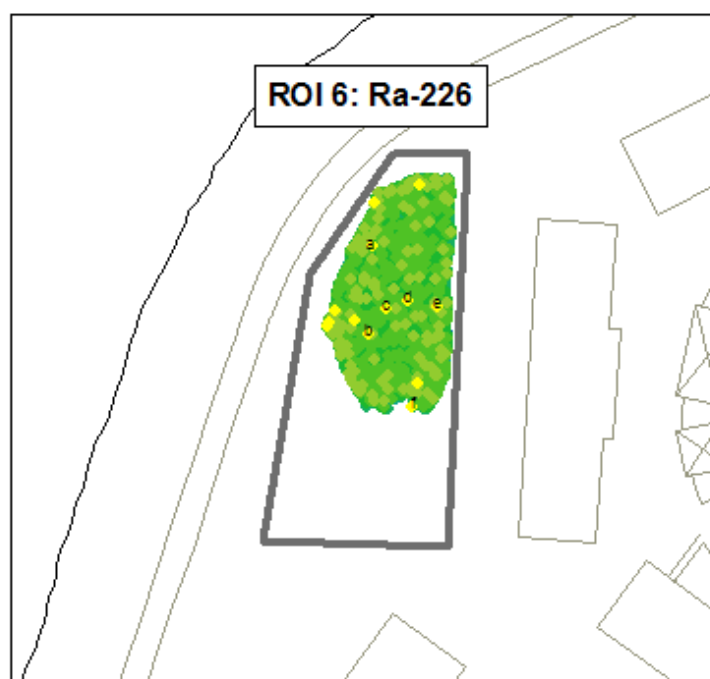
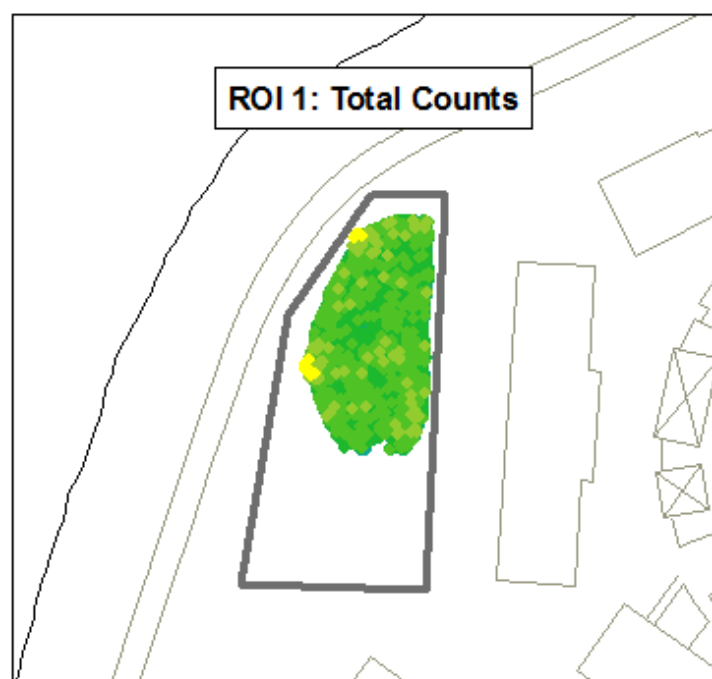
LC	=	critical level (counts)
B	=	average background in the ROI

The ROI ranges for ROIs 3, 6, and 8 are then plotted on the net spectrum graph with their respective critical levels. When count rates in the net gamma spectrum at a given location do not exceed critical levels for any radium-specific energy ranges, it is unlikely that radium exists at that location above background.

Any data point that is both above the critical level and within the energy range of a given ROI is considered above background for that radionuclide and will be flagged for further investigation in the field.

RSI DATA PLOT

Bayside RSY 10 Use 5 (Part 1)



RSI Walkover Survey (VD1)

● $> \mu + 3\sigma$

● $> \mu + 2\sigma$

● $> \mu + 1\sigma$

● $> \mu$

● $> \mu - 3\sigma$

● $> \mu - 2\sigma$

● $> \mu - 1\sigma$

● $< \mu - 3\sigma$

□ RSY PAD Boundaries

RSI Review Summary

Summary:

9 locations were selected for follow-up investigation. Locations were identified by elevated peaks noted in the count rate ratio review, playback review and/or time series charts, and by using the Z-Score, Local Z-Score, and Semi-Local Z-Score reviews as described in the RSI Data Evaluation Process on pages 4-5. The table below details the reasons for each investigation by location.

Locations denoted (a-h) on RSI Data Plots (see previous page) did not meet the evaluation criteria for further investigation. Elevated Z-scores at these locations were identified only in specific ROIs, including: six locations exclusive to ROI 6 (a-f), and two locations exclusive to ROI 8 (g-h). Gross count rates greater than three standard deviations of the mean were not identified at any of the denoted locations (a-h), and a review of the data did not reveal any additional indicators warranting a follow-up investigation. Furthermore, spectral analyses performed on gamma scan data did not indicate the presence of Radium-226 above background; figures are provided on pages 11-18.

RSY 10 Use 5 (Part 1) Investigation								Follow-up			
Location	Longitude	Latitude	Details	Maximum Result (Ra/Tot)				Meter SN	Static Count	Static IL (cpm)	Comments
1	-122.3774623	37.8303755	3-7 ROIs Z>3 (Ra/Tot)	3	10	3.79	Normal	149942	11,956	17,659	< IL
2	-122.3774571	37.8303564	>4 ROIs local Z>3 (all ROIs)					149942	11,018	17,659	< IL
3	-122.3774414	37.8303788	>4 ROIs Z>3 (all ROIs)					149942	11,786	17,659	< IL
4	-122.3774103	37.8303899	>4 ROIs local Z>3 (all ROIs)					149942	11,656	17,659	< IL
5	-122.3774014	37.8302284	>4 ROIs local Z>3 (all ROIs), time series peak					149942	11,647	17,659	< IL
6	-122.3773714	37.8301552	>4 ROIs local Z>3 (all ROIs), time series peak, elevated spectral analysis					149942	11,341	17,659	< IL
7	-122.3773801	37.8301377	Highest local Z-score (Ra/Tot)	1	3	4.77	Local	149942	11,444	17,659	< IL
8	-122.3775370	37.8302148	Highest Z-Score (Ra/Tot), 3-7 ROIs Z>3, 3-4 ROIs Z>3 (Ra/Tot), >4 ROIs normal/local Z>3 (all ROIs), time series peaks, elevated spectral analysis	4	10	6.34	Normal	149942	11,841	17,659	< IL
9	-122.3774821	37.8301801	elevated spectral analysis					149942	14,741	17,659	< IL

Bayside RSY 10 Use 5 (Part 1)Survey Number:
TIRS-04012016-12P3-JSS-2059**Instrument # 149942**

- Investigation Points
- Data Points Not Requiring Further Investigation
- RSY Pad Boundaries
- Investigation points ID

CB&I Federal Services, LLC

Data Processed In Treasure Island Office

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 10-5(P.1)
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11.5	S
0.70	R	0.7	32	0	11.5	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.324	S	-0.158939192	9	9	21	R
0.337	S	-0.145939192	11.5	11.5	22	R
0.326	S	-0.156939192	10	10	23	R
0.284	S	-0.198939192	4	4	24	R
0.350	S	-0.132939192	13	13	25	R
0.337	S	-0.145939192	11.5	11.5	26	R
0.429	S	-0.053939192	18	18	27.5	R
0.307	S	-0.175939192	7	7	27.5	R
0.279	S	-0.203939192	3	3	29.5	R
0.377	S	-0.105939192	16	16	29.5	R
0.397	S	-0.085939192	17	17	31	R
0.275	S	-0.207939192	2	2	32	R
0.351	S	-0.131939192	14	14	33	R
0.305	S	-0.177939192	6	6	34	R
0.435	S	-0.047939192	20	20	35.5	R
0.309	S	-0.173939192	8	8	35.5	R
0.304	S	-0.178939192	5	5	37	R
0.226	S	-0.256939192	1	1	38	R
0.361	S	-0.121939192	15	15	39	R
0.431	S	-0.051939192	19	19	40	R
Sum =			820	210		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 *n*
 # of S: 20 *m*
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For *m* or *n* greater than 20, the critical value (*k*) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

z = 97.5% percentile of standard normal distribution = 1.960

k = 482.5

$\alpha_w = \alpha/2 = 0.025$

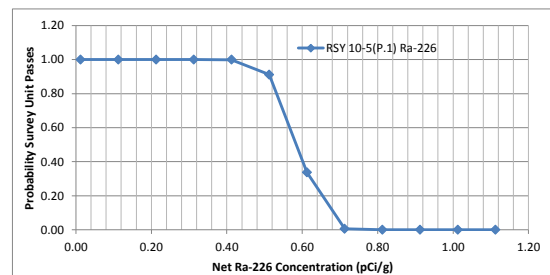
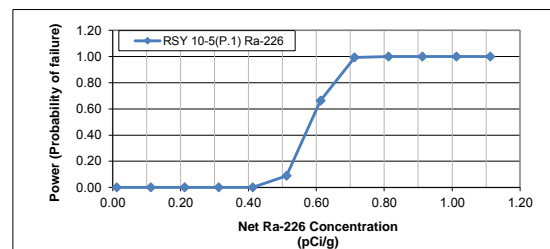
$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.056
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count 20 *m*
 SD 0.056
 Median 0.332
 Ref Stats
 Count 20 *n*
 SD 0.161
 Critical Value 482.5

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	6.7788	43.18647	6.5716411	40.3521	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	15.42	120.9048	10.995672	23.3308	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	45.8664	438.8427	20.948572	10.7927	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	87.3352	846.8185	29.100146	6.3444	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	155.4596	1282.524	35.812351	3.25303	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	222.4924	1345.121	36.675894	1.34873	0.09	0.91
1.3	0.61	0.8	0.71420	0.57447	285.6784	1060.423	32.564133	-0.42133	0.66	0.34
1.4	0.71	1.4	0.83890	0.74170	335.5604	630.7938	25.115608	-2.53238	0.99	0.01
1.5	0.81	2.0	0.92135	0.86577	368.54	285.5796	16.8991	-5.71521	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	388.7524	81.69222	9.0383749	-12.922	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	396.0752	21.5749	4.6448794	-26.7213	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	399.0644	3.510254	1.8735671	-67.8418	1.00	0.00

**QUANTILE TEST**

From NUREG 1505, Table A.7c Values of *r* and *k* for the Quantile Test When α is Approximately 0.05

20 *n* (number of survey unit measurements)
 20 *m* (number of reference area measurements)

Use:
m = 20
n = 20
 4 *r*
 4 *k*
 0.053 α

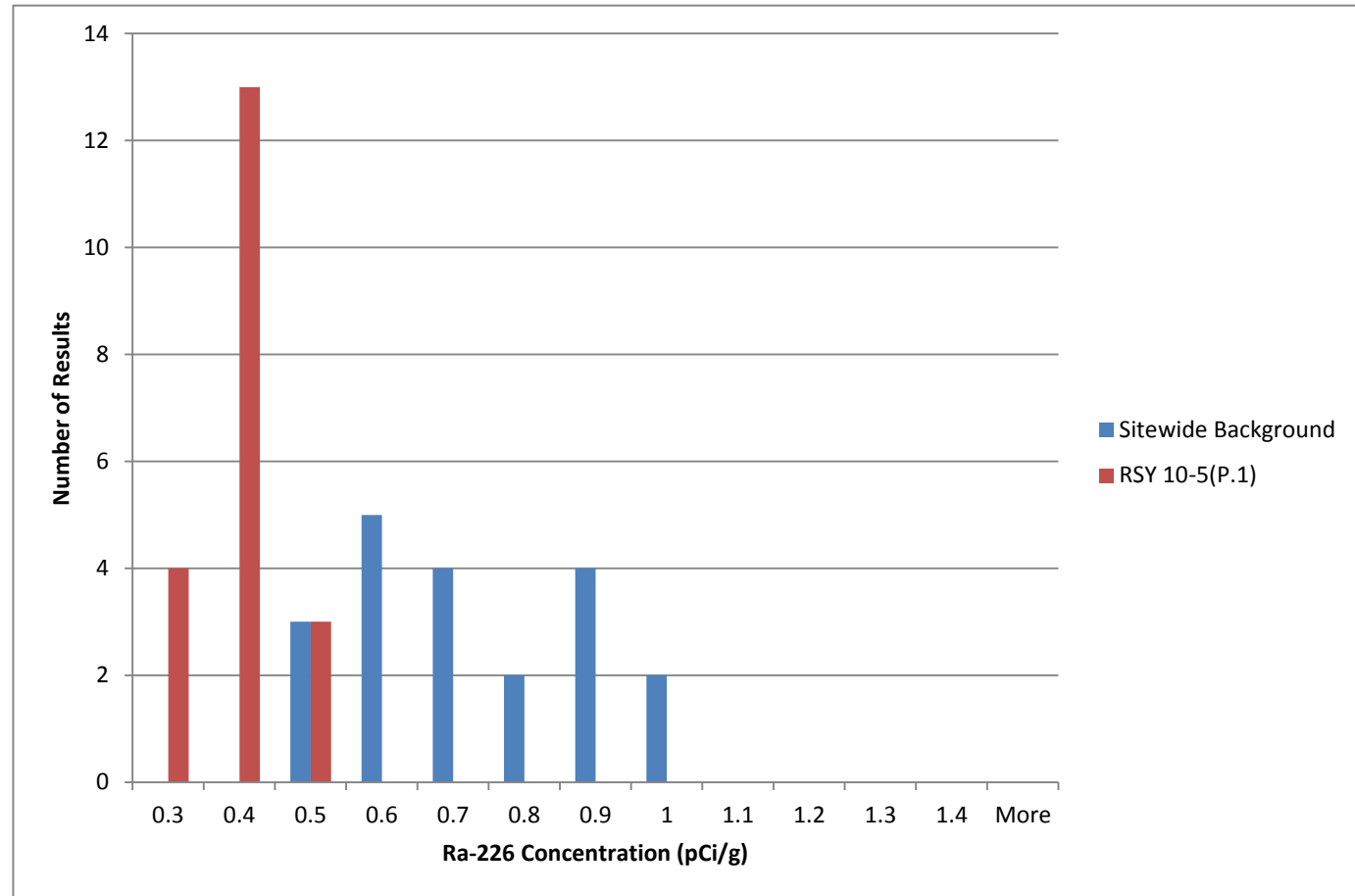
If *k* or more of the *r* largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S. The null hypothesis is accepted.

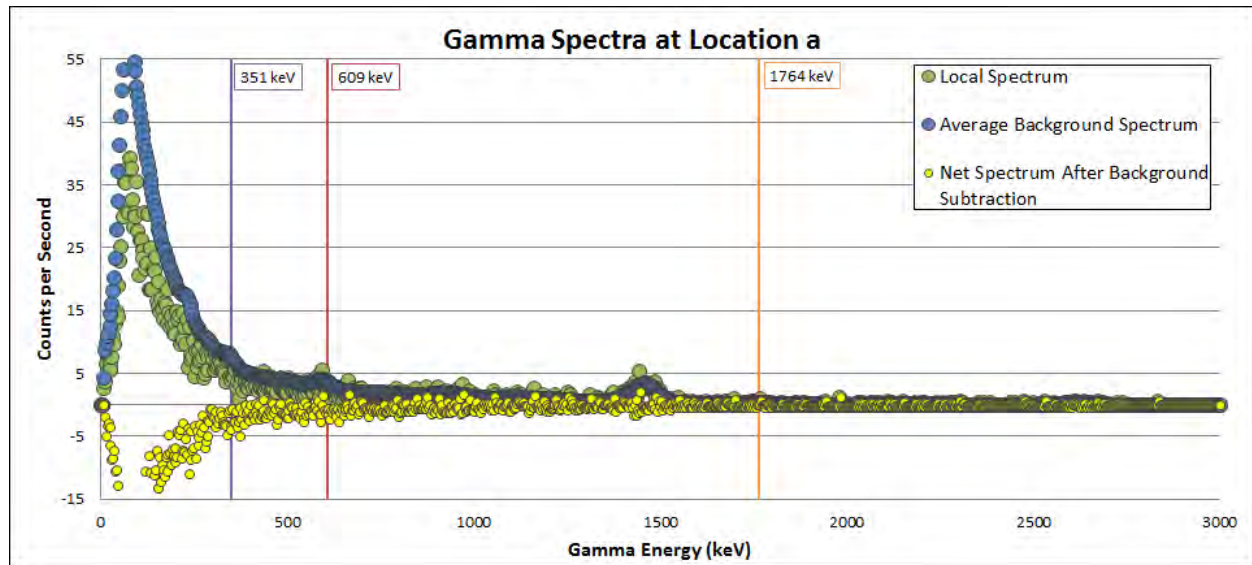
Histogram, RSY 10 Use 5 (Part 1) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 10-5(P.1)	
<i>Bin</i>	<i>Frequency</i>
0.3	4
0.4	13
0.5	3
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0

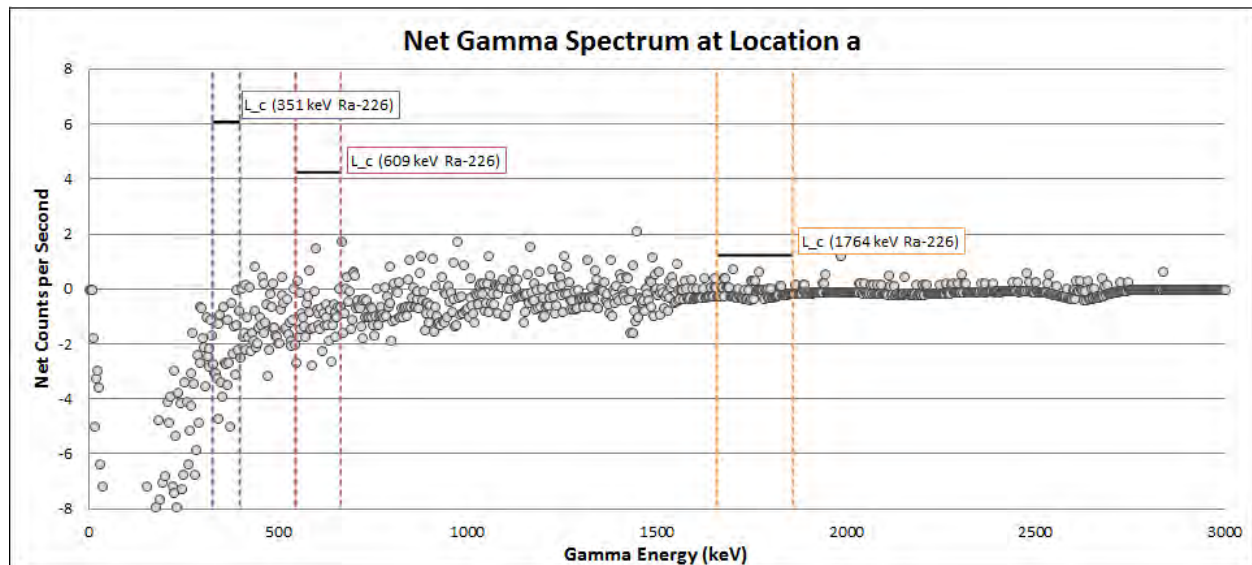


RSI Spectral Analysis Results: RSY 10 Use 5 (Part 1) – **Gamma Spectra at Location (a)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (a)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (a): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

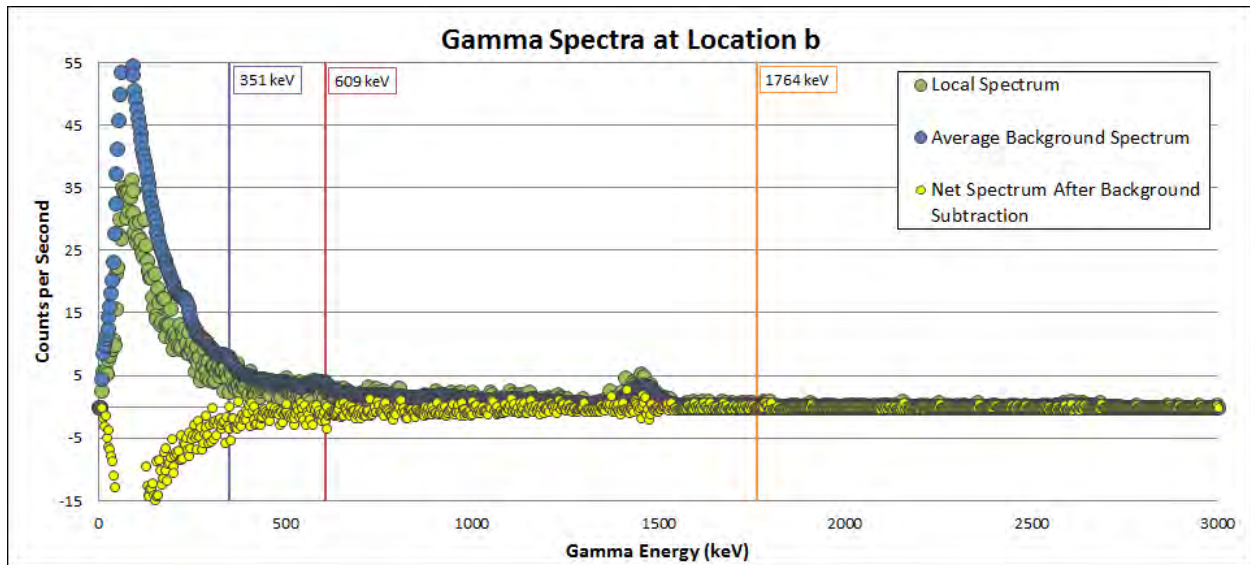
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

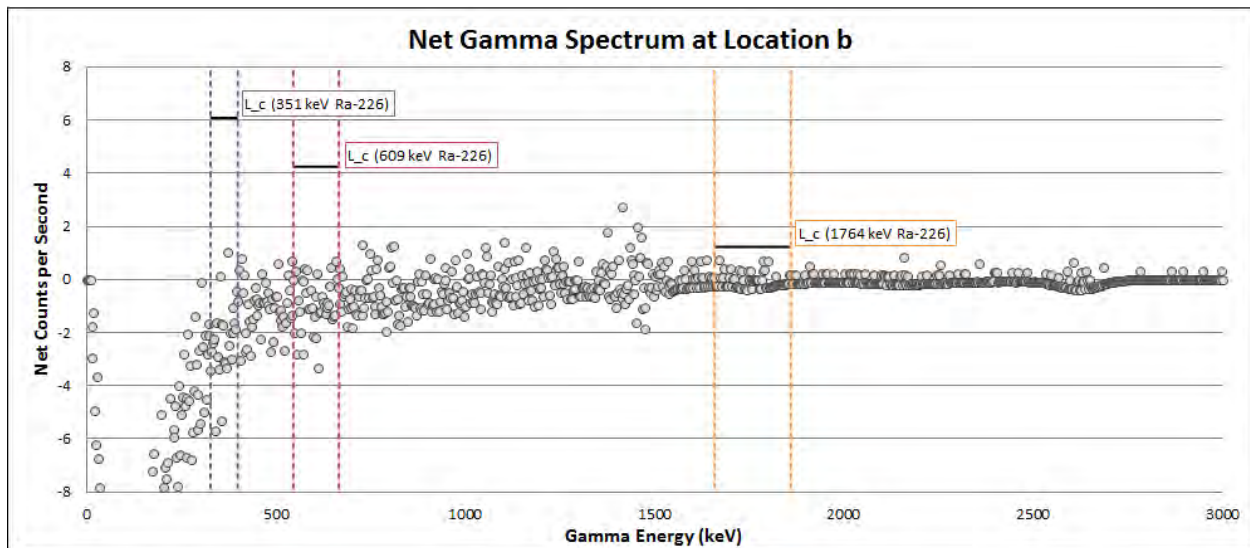
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 Use 5 (Part 1) – **Gamma Spectra at Location (b)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (b)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (b): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

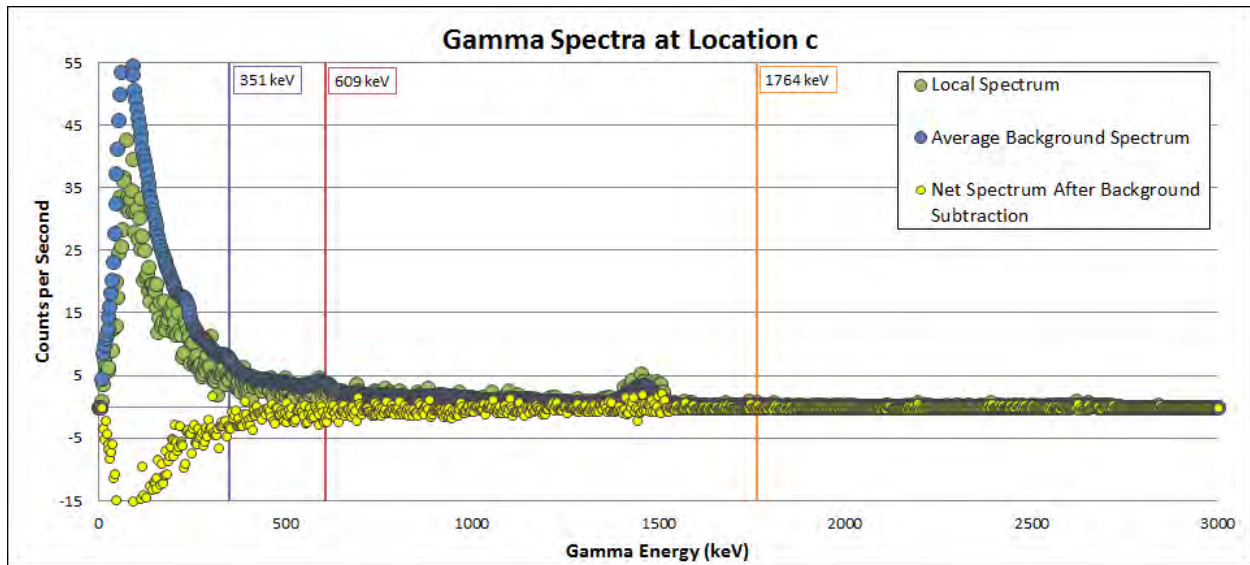
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

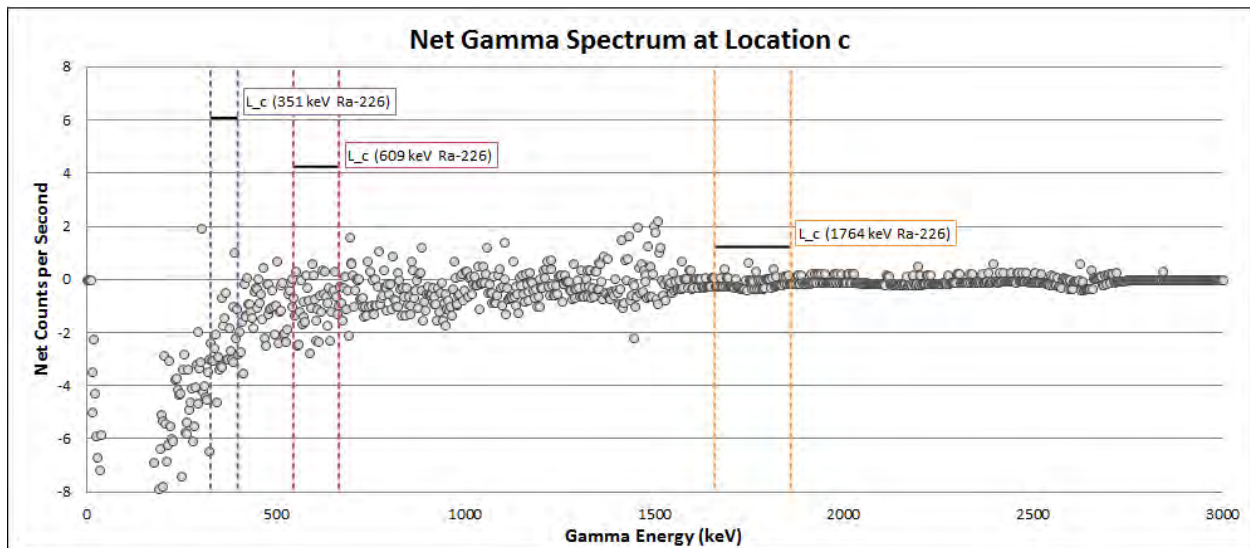
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 Use 5 (Part 1) – **Gamma Spectra at Location (c)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (c)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (c): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

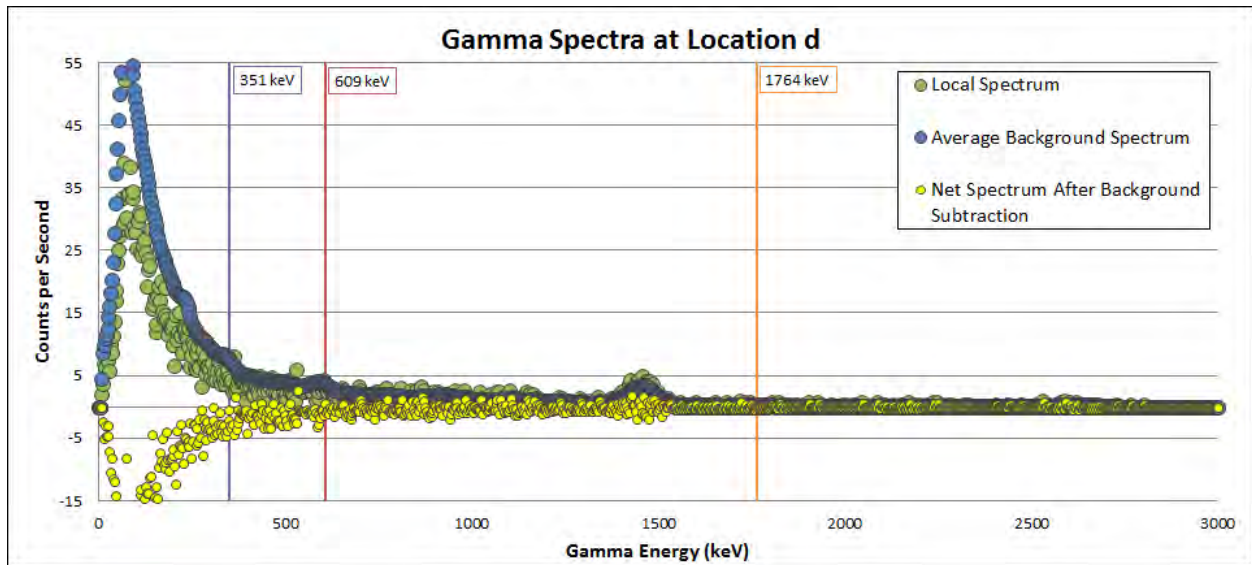
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

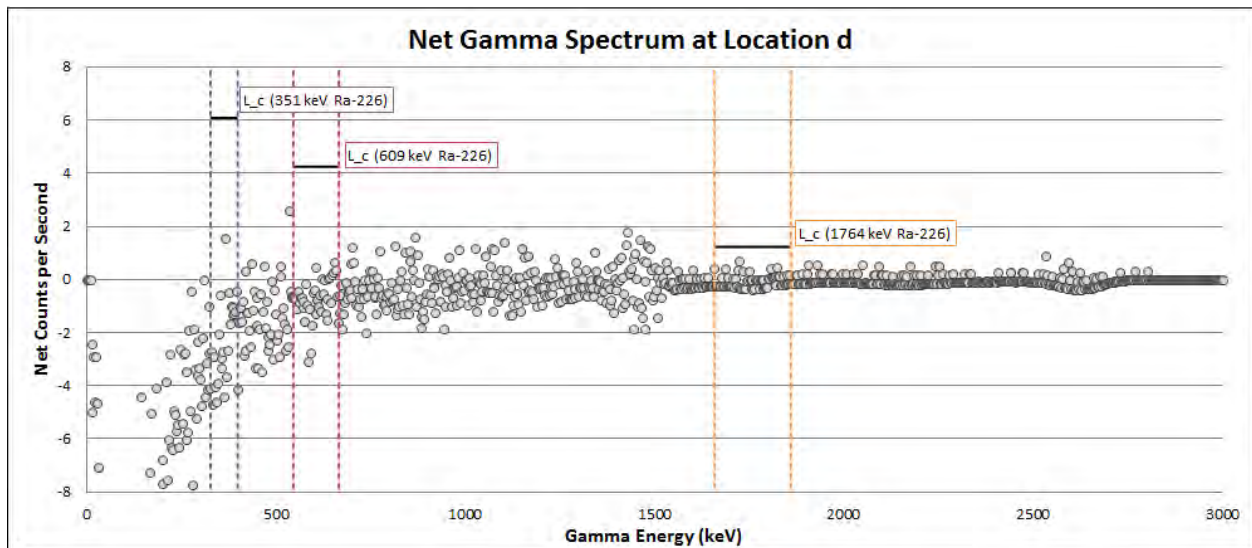
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 Use 5 (Part 1) – **Gamma Spectra at Location (d)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (d)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (d): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

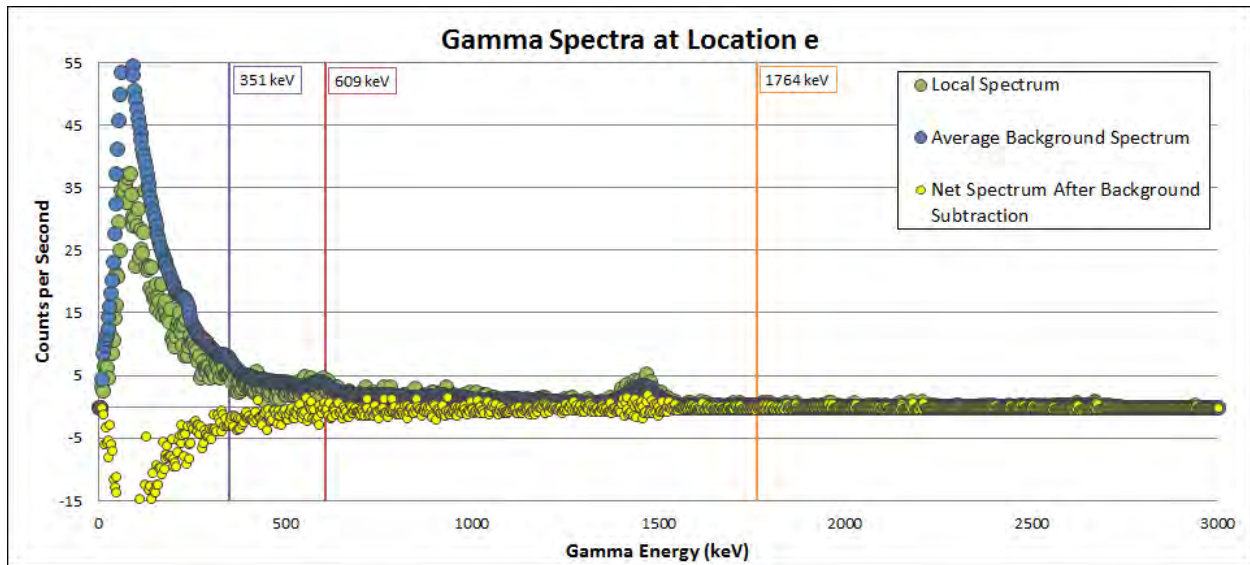
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

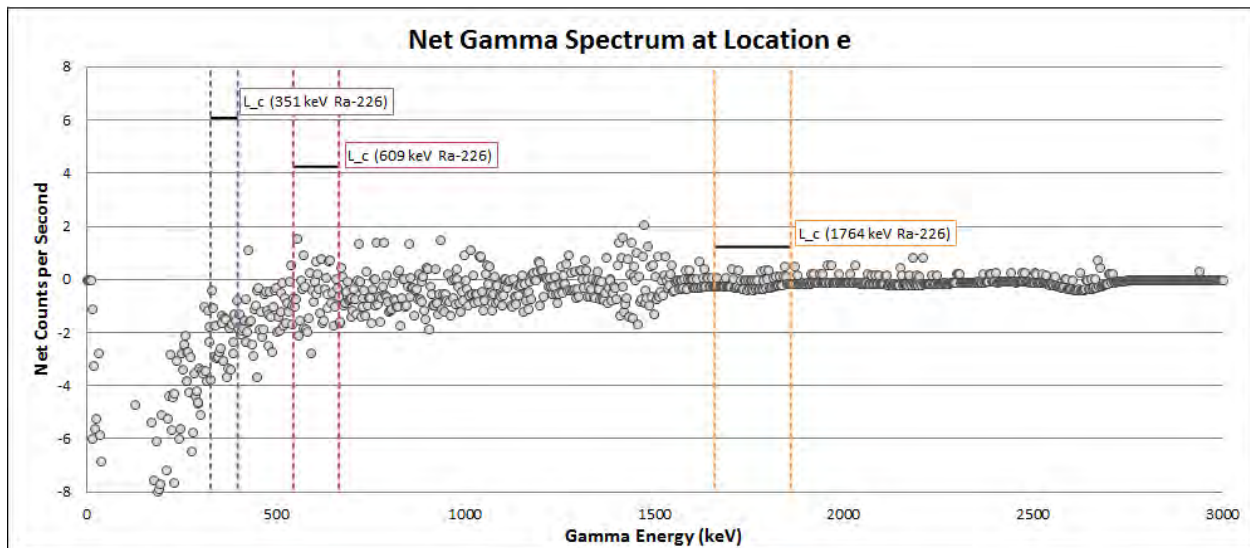
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 Use 5 (Part 1) – **Gamma Spectra at Location (e)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (e)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (e): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

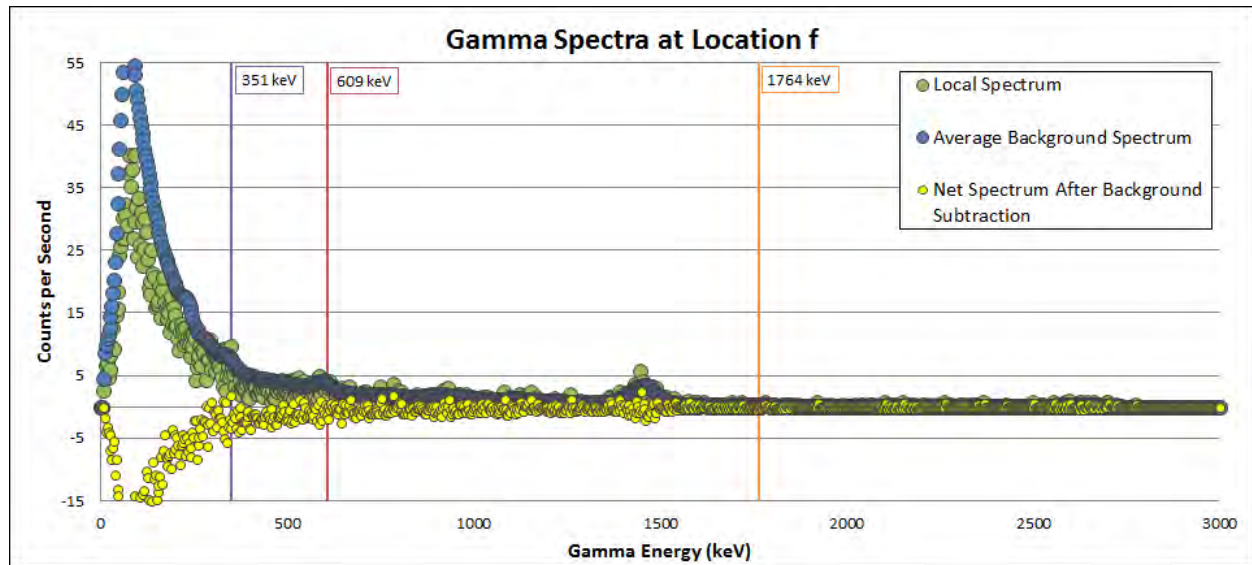
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

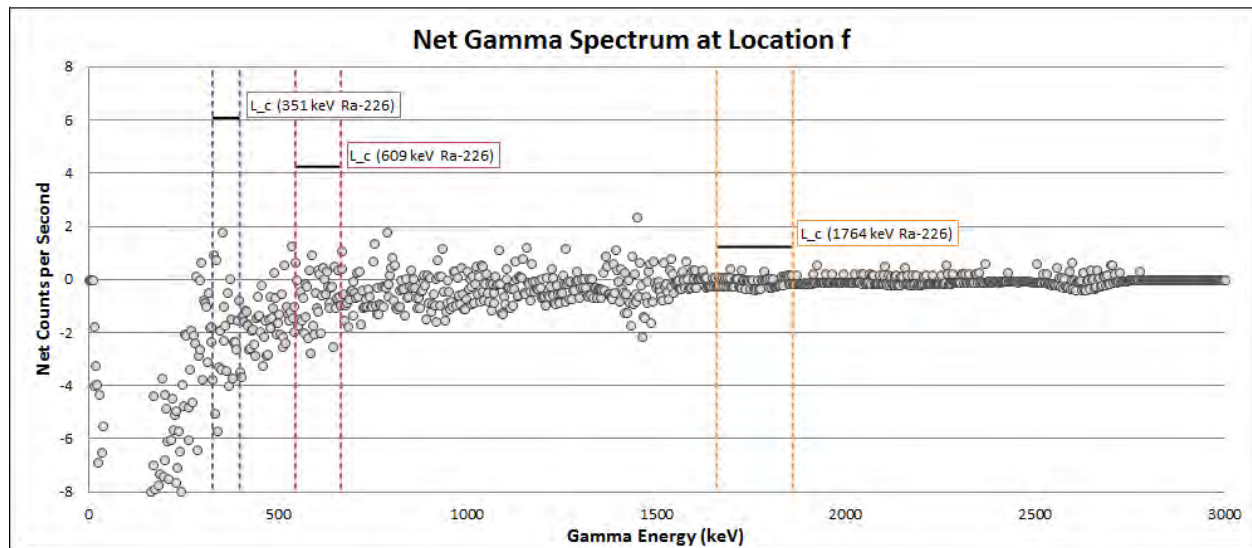
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 Use 5 (Part 1) – **Gamma Spectra at Location (f)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (f)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (f): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

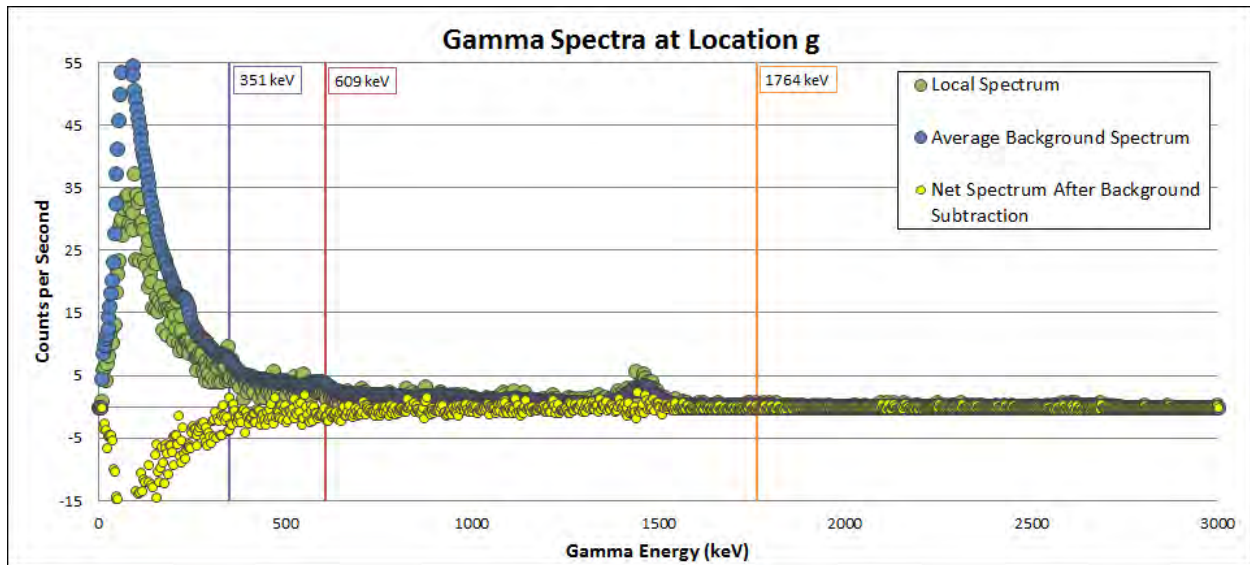
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

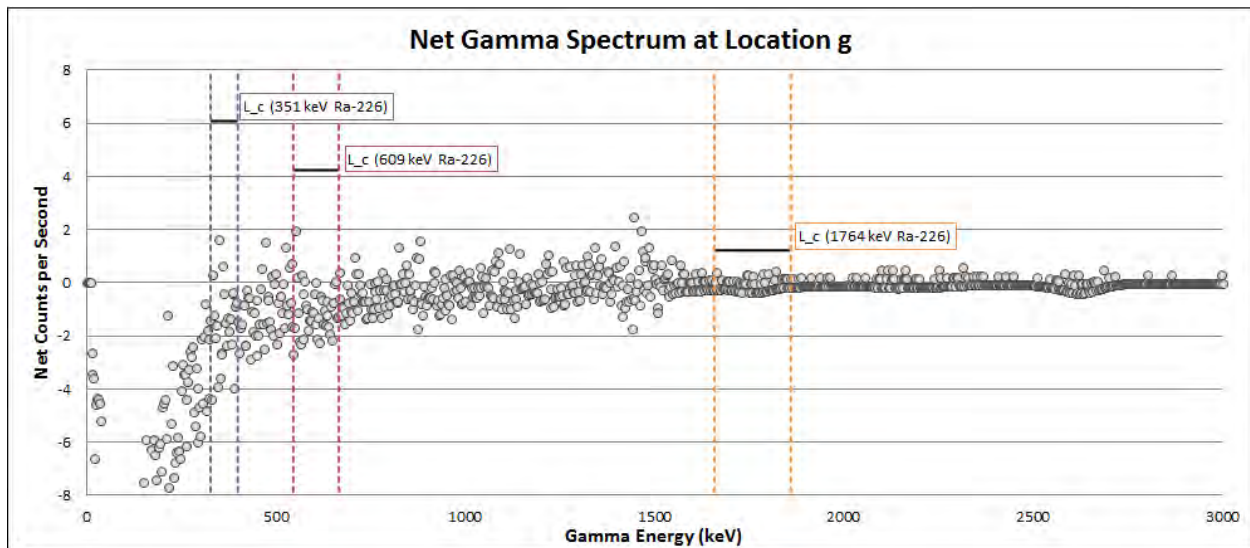
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 Use 5 (Part 1) – **Gamma Spectra at Location (g)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (g)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (g): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

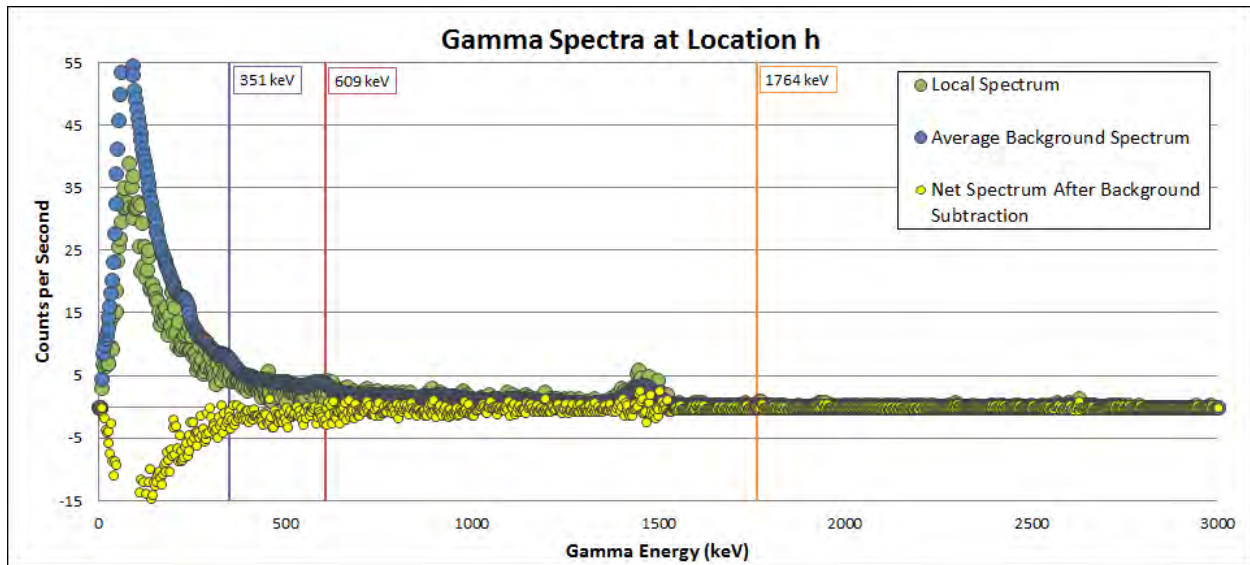
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

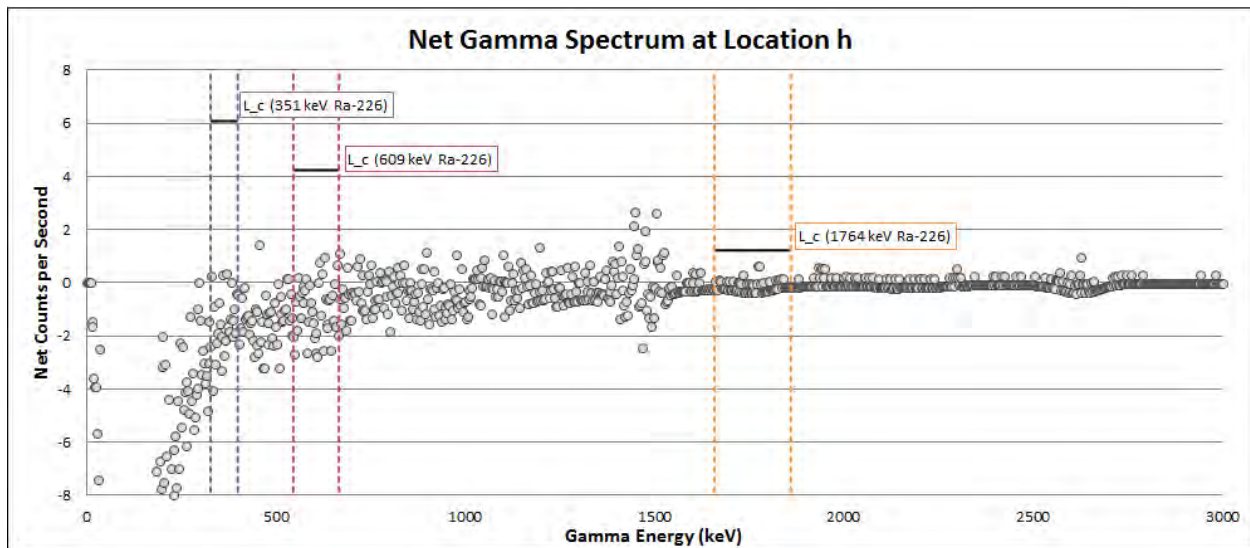
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 Use 5 (Part 1) – **Gamma Spectra at Location (h)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (h)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (h): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-16804-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn

Micha Korinhizer

Authorized for release by:

5/2/2016 3:22:09 PM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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QC Association Summary	24

Case Narrative

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Job ID: 160-16804-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-16804-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 22 of 42

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Job ID: 160-16804-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 04/06/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 19.3° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-NP-R-FSSSU4-S401 (160-16804-1), TI-TO04-NP-R-FSSSU4-S402 (160-16804-2), TI-TO04-NP-R-FSSSU4-S403 (160-16804-3), TI-TO04-NP-R-FSSSU4-S404 (160-16804-4), TI-TO04-NP-R-FSSSU4-S405 (160-16804-5), TI-TO04-NP-R-FSSSU4-S406 (160-16804-6), TI-TO04-NP-R-FSSSU4-S407 (160-16804-7), TI-TO04-NP-R-FSSSU4-S408 (160-16804-8), TI-TO04-NP-R-FSSSU4-S409 (160-16804-9), TI-TO04-NP-R-FSSSU4-S410 (160-16804-10), TI-TO04-NP-R-FSSSU4-S411 (160-16804-11), TI-TO04-NP-R-FSSSU4-S412 (160-16804-12), TI-TO04-NP-R-FSSSU4-S413 (160-16804-13), TI-TO04-NP-R-FSSSU4-S414 (160-16804-14), TI-TO04-NP-R-FSSSU4-S415 (160-16804-15), TI-TO04-NP-R-FSSSU4-S416 (160-16804-16), TI-TO04-NP-R-FSSSU4-S417 (160-16804-17), TI-TO04-NP-R-FSSSU4-S418 (160-16804-18), TI-TO04-NP-R-FSSSU4-S419 (160-16804-19) and TI-TO04-NP-R-FSSSU4-S420 (160-16804-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 04/06/2016, prepared on 04/07/2016 and analyzed on 04/28/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Shaw Environmental and Infrastructure Inc. (S CB&I company)
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL P3 NP FSS SU4 210
Page 1 of 2

Project Number: 600060

Project Name / Location: CTO-04 Phase III NP FSS

Purchase Order #: 201455

Project Manager: **Unika Mösser**

(Print & phone #)

Send Report To: **Patricia Flynn**

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA 94520

Shipment Date: 4/6/2016

Waybill Number: **12 88044201 9735 9181**

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Sample ID Number	Sample Description	Collection Information			# of containers	Preservative (water)		Container Type	Analyses Requested	Dose Rate MWh
		Date	Time	Method		Preservative (water)	Preservative (soil)			
TL-T004-NP-R-FSSSU4-S401	North Point RSY 10 USE 3 Part 1 FSS SU4 Systematic	04/04/16	1215	G	SO	1	10 oz Plastic	X		
TL-T004-NP-R-FSSSU4-S402	North Point RSY 10 USE 3 Part 1 FSS SU4 Systematic	04/04/16	1218	G	SO	1	16 oz Plastic	X		
TL-T004-NP-R-FSSSU4-S403	North Point RSY 10 USE 3 Part 1 FSS SU4 Systematic	04/04/16	1222	G	SO	1	16 oz Plastic	X		
TL-T004-NP-R-FSSSU4-S404	North Point RSY 10 USE 3 Part 1 FSS SU4 Systematic	04/04/16	1225	G	SO	1	16 oz Plastic	X		
TL-T004-NP-R-FSSSU4-S405	North Point RSY 10 USE 3 Part 1 FSS SU4 Systematic	04/04/16	1229	G	SO	1	16 oz Plastic	X		
TL-T004-NP-R-FSSSU4-S406	North Point RSY 10 USE 3 Part 1 FSS SU4 Systematic	04/04/16	1232	G	SO	1	16 oz Plastic	X		
TL-T004-NP-R-FSSSU4-S407	North Point RSY 10 USE 3 Part 1 FSS SU4 Systematic	04/04/16	1234	G	SO	1	16 oz Plastic	X		
TL-T004-NP-R-FSSSU4-S408	North Point RSY 10 USE 3 Part 1 FSS SU4 Systematic	04/04/16	1237	G	SO	1	16 oz Plastic	X		
TL-T004-NP-R-FSSSU4-S409	North Point RSY 10 USE 3 Part 1 FSS SU4 Systematic	04/04/16	1240	G	SO	1	16 oz Plastic	X		
TL-T004-NP-R-FSSSU4-S410	North Point RSY 10 USE 3 Part 1 FSS SU4 Systematic	04/04/16	1244	G	SO	1	16 oz Plastic	X		

160-16804 Chain of Custody

Special Instructions: 7 days ingrown draft and follow with 21 days final			
Standard TAT <input type="checkbox"/> 24-hr <input type="checkbox"/> 3 day <input type="checkbox"/> 14 day	Level O/QC Required: <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III		
Relinquished By: Bryon Rogers	Date: 4/20/16	Received By: Unika Mösser	Date: 04/20/16
Relinquished By:	Date:	Received By:	Date:

Method Codes		Matrix Codes	
<input type="checkbox"/> G = Grab	<input type="checkbox"/> C = Composite	<input type="checkbox"/> DW = Drinking Water	<input type="checkbox"/> SO = Soil
		<input type="checkbox"/> GW = Ground Water	<input type="checkbox"/> SI = Sledge
		<input type="checkbox"/> WW = Waste Water	<input type="checkbox"/> CP = Chip Samples
		<input type="checkbox"/> A = Air	<input type="checkbox"/> ABS = Ashes/los, PO = Pipe Opening



Shaw Environmental and Infrastructure Inc. (a CB&I company)
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL-P3 NP-FSS-SU4-210
Page 2 of 2

Project Number: 500060
CTO-04 Phase III NP FSS
Project Name / Location: SU4 RSY TO USE Part 1
Purchase Order #: 201455

Shipment Date: 4/5/2016
Waybill Number: 1289246201945 9141
Lab Destination: Each Toxics Inc To Test America
Lab Contact Name / ph. #: Mike Dayden

Project Manager: Ulrika Messer
Send Report To: Patricia Flynn
Phone/Fax Number: 925-288-2037
Address: 4005 Port Chicago Hwy
City: Concord, CA 94520

Sample ID Number	Sample Description	Sampler's Name(s)	Collection Information			Matrix	# of Containers	Preservative (water)		Gamma Scan	Analyse Requested			
			Date	Time	Method			Preservative (soil)	Container Type					
TL-T004-NP-R-FSSSU4-S411	North Point RSY TO USE 5 Part 1 FSS SU4 Systematic	TW	04/04/16	1247	G	SO	1	16 oz Plastic						
TL-T004-NP-R-FSSSU4-S412	North Point RSY TO USE 5 Part 1 FSS SU4 Systematic		04/04/16	1300	G	SO	1	16 oz Plastic						
TL-T004-NP-R-FSSSU4-S413	North Point RSY TO USE 5 Part 1 FSS SU4 Systematic		04/04/16	1305	G	SO	1	16 oz Plastic						
TL-T004-NP-R-FSSSU4-S414	North Point RSY TO USE 5 Part 1 FSS SU4 Systematic		04/04/16	1307	G	SO	1	16 oz Plastic						
TL-T004-NP-R-FSSSU4-S415	North Point RSY TO USE 5 Part 1 FSS SU4 Systematic		04/04/16	1309	G	SO	1	16 oz Plastic						
TL-T004-NP-R-FSSSU4-S416	North Point RSY TO USE 5 Part 1 FSS SU4 Systematic		04/04/16	1314	G	SO	1	16 oz Plastic						
TL-T004-NP-R-FSSSU4-S417	North Point RSY TO USE 5 Part 1 FSS SU4 Systematic		04/04/16	1318	G	SO	1	16 oz Plastic						
TL-T004-NP-R-FSSSU4-S418	North Point RSY TO USE 5 Part 1 FSS SU4 Systematic		04/04/16	1322	G	SO	1	16 oz Plastic						
TL-T004-NP-R-FSSSU4-S419	North Point RSY TO USE 5 Part 1 FSS SU4 Systematic		04/04/16	1325	G	SO	1	16 oz Plastic						
TL-T004-NP-R-FSSSU4-S420	North Point RSY TO USE 5 Part 1 FSS SU4 Systematic		04/04/16	1328	G	SO	1	16 oz Plastic						

Special Instructions:				7 days ingrown draft and follow with 21 days final			
Standard TAT <input type="checkbox"/> 24-hr <input type="checkbox"/> 3-day <input type="checkbox"/> 7-day				Level Of QC Required:			
Relinquished By: Byron Rogers				Project Specific:			
Relinquished By:				Date: 04/06/16			
				Time: 0835			
				Date:			
				Time:			
				Matrix Codes			
				C = Composite			
				SO = Soil			
				SL = Sludge			
				GP = Chip Samples			
				ABS = Asbestos, PO = Pipe Opening			
				A = Air			

Form FRM-TI-03-3
Sample Shipment Checklist

Project Name <u>Treasure Island</u>	Project Number <u>500060</u>
Address <u>950 Avenue M Building 570</u>	Date <u>4-9-2016</u> Time <u>1230</u>
City, State, Zip <u>San Francisco, CA 94130</u>	
UPS Tracking No. <u>1Z89V46201 9925 9141</u>	

Sample Checklist	Yes	No	Comments
Sample lids are tight and custody seals in place?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are all sample numbers, dates, times, and other label information legible and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have all sample numbers, dates, times, and sampling data been logged into the sample log book?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Do sample numbers and sample descriptions on the labels match those on the COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have the COCs been filled out completely and correctly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Does the analytical specified on the COC match the analytical specified in the scope of work?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have the COCs been properly signed in the transfer section?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Packaging Checklist	Yes	No	Comments
Has each sample been placed into an individually plastic bag?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the drain plug of the cooler been taped closed with water proof tape from the inside?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>no drain plug</u>
Have all the samples been placed into the cooler in an upright position?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is there adequate spacing of samples so that they will not touch during shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the cooler been filled with additional cushioning material?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the COC been placed in a Ziploc® bag and taped to the inside of the lid of the cooler?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have custody seals been placed onto the lid?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the cooler been labeled "This Side Up"?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
If required, has the cooler been labeled with the DOT proper shipping name, UN number, and label?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>UN 2910</u>
Has the laboratory performing the analyses been notified of the shipment of samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Review Checklist	Yes	No	Comments
Has smear data been verified?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has survey data been reviewed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Problems/Resolutions:			
Prepared by: <u>N Morrison</u>			
Reviewed by: <u>Takesh Banki</u> <u>J. [Signature]</u>			

COC#:

Survey #:

TI-P3-NP-FSS-544-210

TIRS-04042016-1212-S&S-2067

TI-P3-B5-FSS-546-211

TIRS-04042016-1213-S&S-2068

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-16804-2

Login Number: 16804**List Source: TestAmerica St. Louis****List Number: 1****Creator: McKinney, Gerrod E**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:
DOE = U.S. Department of Energy

Laboratory References:
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-16804-1	TI-TO04-NP-R-FSSSU4-S401	Solid	04/04/16 12:15	04/06/16 08:35
160-16804-2	TI-TO04-NP-R-FSSSU4-S402	Solid	04/04/16 12:18	04/06/16 08:35
160-16804-3	TI-TO04-NP-R-FSSSU4-S403	Solid	04/04/16 12:22	04/06/16 08:35
160-16804-4	TI-TO04-NP-R-FSSSU4-S404	Solid	04/04/16 12:25	04/06/16 08:35
160-16804-5	TI-TO04-NP-R-FSSSU4-S405	Solid	04/04/16 12:29	04/06/16 08:35
160-16804-6	TI-TO04-NP-R-FSSSU4-S406	Solid	04/04/16 12:32	04/06/16 08:35
160-16804-7	TI-TO04-NP-R-FSSSU4-S407	Solid	04/04/16 12:34	04/06/16 08:35
160-16804-8	TI-TO04-NP-R-FSSSU4-S408	Solid	04/04/16 12:37	04/06/16 08:35
160-16804-9	TI-TO04-NP-R-FSSSU4-S409	Solid	04/04/16 12:40	04/06/16 08:35
160-16804-10	TI-TO04-NP-R-FSSSU4-S410	Solid	04/04/16 12:44	04/06/16 08:35
160-16804-11	TI-TO04-NP-R-FSSSU4-S411	Solid	04/04/16 12:47	04/06/16 08:35
160-16804-12	TI-TO04-NP-R-FSSSU4-S412	Solid	04/04/16 13:00	04/06/16 08:35
160-16804-13	TI-TO04-NP-R-FSSSU4-S413	Solid	04/04/16 13:05	04/06/16 08:35
160-16804-14	TI-TO04-NP-R-FSSSU4-S414	Solid	04/04/16 13:07	04/06/16 08:35
160-16804-15	TI-TO04-NP-R-FSSSU4-S415	Solid	04/04/16 13:09	04/06/16 08:35
160-16804-16	TI-TO04-NP-R-FSSSU4-S416	Solid	04/04/16 13:14	04/06/16 08:35
160-16804-17	TI-TO04-NP-R-FSSSU4-S417	Solid	04/04/16 13:18	04/06/16 08:35
160-16804-18	TI-TO04-NP-R-FSSSU4-S418	Solid	04/04/16 13:22	04/06/16 08:35
160-16804-19	TI-TO04-NP-R-FSSSU4-S419	Solid	04/04/16 13:25	04/06/16 08:35
160-16804-20	TI-TO04-NP-R-FSSSU4-S420	Solid	04/04/16 13:28	04/06/16 08:35

Client Sample Results

Page 30 of 42

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S401

Lab Sample ID: 160-16804-1

Date Collected: 04/04/16 12:15

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.182	U	0.126	0.127		0.330	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Actinium-227	0.287	U	0.393	0.394		0.652	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Bismuth-212	0.000	U	0.585	0.585		1.16	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Bismuth-214	0.324		0.129	0.134		0.140	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Cesium-137	-0.00693	U	0.0994	0.0994		0.106	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Lead-210	0.792	U	0.996	1.00		1.78	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Lead-212	0.369		0.114	0.123		0.119	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Lead-214	0.274		0.102	0.105		0.128	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Potassium-40	8.58		1.71	1.92		1.35	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Protactinium-231	0.0694	U	0.707	0.707		2.05	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Radium-226	0.324		0.129	0.134	0.500	0.140	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Radium-228	0.182	U	0.126	0.127		0.330	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Thallium-208	0.129		0.0470	0.0489		0.0314	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Thorium-228	0.369		0.114	0.123		0.119	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Thorium-232	0.182	U	0.126	0.127		0.330	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Thorium-234	0.0609	U	0.447	0.447		1.47	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Uranium-235	0.150	U	0.228	0.228		0.349	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Uranium-238	0.0609	U	0.447	0.447		1.47	pCi/g	04/07/16 12:21	04/28/16 16:01	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S402

Lab Sample ID: 160-16804-2

Date Collected: 04/04/16 12:18

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.198	U	0.143	0.144		0.252	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Actinium-227	0.0979	U	0.179	0.180		0.611	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Bismuth-212	0.386	U	0.419	0.421		0.668	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Bismuth-214	0.337		0.0850	0.0920		0.0380	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Cesium-137	-0.0103	U	0.0425	0.0425		0.0757	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Lead-210	0.582	U	0.910	0.913		1.59	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Lead-212	0.297		0.0886	0.0966		0.0917	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Lead-214	0.355		0.0778	0.0861		0.0839	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Potassium-40	9.67		1.39	1.70		0.491	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Protactinium-231	0.332	U	0.260	0.263		1.40	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Radium-226	0.337		0.0850	0.0920	0.500	0.0380	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Radium-228	0.198	U	0.143	0.144		0.252	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Thallium-208	0.125		0.0477	0.0494		0.0407	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Thorium-228	0.297		0.0886	0.0966		0.0917	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Thorium-232	0.198	U	0.143	0.144		0.252	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Thorium-234	0.590	U	0.651	0.654		1.13	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Uranium-235	0.00250	U	0.151	0.151		0.271	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Uranium-238	0.590	U	0.651	0.654		1.13	pCi/g	04/07/16 12:21	04/28/16 15:59	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S403

Lab Sample ID: 160-16804-3

Date Collected: 04/04/16 12:22

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.287		0.126	0.129		0.241	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Actinium-227	0.0381	U	0.469	0.469		0.824	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Bismuth-212	0.222	U	0.499	0.500		0.875	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Bismuth-214	0.326		0.128	0.133		0.148	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Cesium-137	-0.00587	U	0.0721	0.0721		0.0821	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Lead-210	0.000	U	0.714	0.714		1.76	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Lead-212	0.408		0.103	0.116		0.0976	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Lead-214	0.334		0.0956	0.102		0.0712	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Potassium-40	11.9		1.65	2.05		0.566	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Protactinium-231	-0.166	U	0.865	0.865		1.54	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Radium-226	0.326		0.128	0.133	0.500	0.148	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Radium-228	0.287		0.126	0.129		0.241	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Thallium-208	0.128		0.0495	0.0512		0.0475	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Thorium-228	0.408		0.103	0.116		0.0976	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Thorium-232	0.287		0.126	0.129		0.241	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Thorium-234	0.219	U	0.471	0.472		1.73	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Uranium-235	0.186	U	0.184	0.185		0.258	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Uranium-238	0.219	U	0.471	0.472		1.73	pCi/g	04/07/16 12:21	04/28/16 15:57	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S404

Lab Sample ID: 160-16804-4

Date Collected: 04/04/16 12:25

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.165	U	0.0998	0.101		0.195	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Actinium-227	0.000	U	0.289	0.289		0.716	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Bismuth-212	0.350	U	0.361	0.362		0.572	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Bismuth-214	0.284		0.0882	0.0930		0.0632	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Cesium-137	0.00492	U	0.0219	0.0219		0.0408	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Lead-210	0.783	U	0.618	0.625		0.958	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Lead-212	0.317		0.0687	0.0800		0.0661	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Lead-214	0.465		0.110	0.120		0.0809	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Potassium-40	10.6		1.23	1.64		0.417	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Protactinium-231	0.195	U	0.518	0.519		1.45	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Radium-226	0.284		0.0882	0.0930	0.500	0.0632	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Radium-228	0.165	U	0.0998	0.101		0.195	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Thallium-208	0.110		0.0377	0.0394		0.0314	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Thorium-228	0.317		0.0687	0.0800		0.0661	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Thorium-232	0.165	U	0.0998	0.101		0.195	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Thorium-234	0.448	U	0.650	0.651		1.08	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Uranium-235	0.0848	U	0.137	0.138		0.193	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Uranium-238	0.448	U	0.650	0.651		1.08	pCi/g	04/07/16 12:21	04/28/16 16:06	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S405

Lab Sample ID: 160-16804-5

Date Collected: 04/04/16 12:29

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.346		0.123	0.128		0.205	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Actinium-227	-0.172	U	0.427	0.427		0.728	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Bismuth-212	0.000	U	0.434	0.434		1.07	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Bismuth-214	0.350		0.104	0.110		0.0851	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Cesium-137	-0.00952	U	0.0396	0.0396		0.0712	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Lead-210	-0.0320	U	0.961	0.961		1.67	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Lead-212	0.298		0.0952	0.103		0.109	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Lead-214	0.349		0.0928	0.0997		0.0858	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Potassium-40	10.9		1.46	1.84		0.559	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Protactinium-231	0.0249	U	0.692	0.692		1.27	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Radium-226	0.350		0.104	0.110	0.500	0.0851	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Radium-228	0.346		0.123	0.128		0.205	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Thallium-208	0.155		0.0493	0.0519		0.0465	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Thorium-228	0.298		0.0952	0.103		0.109	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Thorium-232	0.346		0.123	0.128		0.205	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Thorium-234	0.131	U	0.291	0.292		1.39	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Uranium-235	0.127	U	0.169	0.170		0.304	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Uranium-238	0.131	U	0.291	0.292		1.39	pCi/g	04/07/16 12:21	04/28/16 15:55	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S406

Lab Sample ID: 160-16804-6

Date Collected: 04/04/16 12:32

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.303		0.111	0.115		0.105	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Actinium-227	0.0171	U	0.104	0.104		0.749	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Bismuth-212	0.550	U	0.466	0.470		0.714	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Bismuth-214	0.337		0.109	0.115		0.114	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Cesium-137	0.000	U	0.00792	0.00792		0.0845	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Lead-210	0.718	U	0.950	0.954		1.60	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Lead-212	0.287		0.0903	0.0976		0.0996	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Lead-214	0.353		0.0947	0.102		0.120	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Potassium-40	11.3		1.37	1.80		0.507	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Protactinium-231	0.438	U	0.299	0.303		1.47	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Radium-226	0.337		0.109	0.115	0.500	0.114	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Radium-228	0.303		0.111	0.115		0.105	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Thallium-208	0.0932		0.0487	0.0497		0.0721	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Thorium-228	0.287		0.0903	0.0976		0.0996	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Thorium-232	0.303		0.111	0.115		0.105	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Thorium-234	0.946	U	0.417	0.429		1.35	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Uranium-235	0.125	U	0.161	0.162		0.289	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Uranium-238	0.946	U	0.417	0.429		1.35	pCi/g	04/07/16 12:21	04/28/16 15:56	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S407

Lab Sample ID: 160-16804-7

Date Collected: 04/04/16 12:34

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.265		0.135	0.138		0.206	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Actinium-227	-0.223	U	0.464	0.465		0.784	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Bismuth-212	0.194	U	0.416	0.417		0.725	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Bismuth-214	0.429		0.118	0.126		0.113	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Cesium-137	-0.00645	U	0.0385	0.0385		0.0696	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Lead-210	1.15	U	0.937	0.947		1.54	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Lead-212	0.406		0.0850	0.0999		0.0877	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Lead-214	0.458		0.102	0.113		0.133	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Potassium-40	13.7		1.58	2.11		0.981	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Protactinium-231	0.561	U	0.928	0.930		1.56	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Radium-226	0.429		0.118	0.126	0.500	0.113	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Radium-228	0.265		0.135	0.138		0.206	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Thallium-208	0.0603	U	0.0473	0.0477		0.0755	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Thorium-228	0.406		0.0850	0.0999		0.0877	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Thorium-232	0.265		0.135	0.138		0.206	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Thorium-234	0.0967	U	0.381	0.381		1.62	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Uranium-235	0.245	U	0.182	0.184		0.307	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Uranium-238	0.0967	U	0.381	0.381		1.62	pCi/g	04/07/16 12:21	04/28/16 16:05	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S408

Lab Sample ID: 160-16804-8

Date Collected: 04/04/16 12:37

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.374		0.137	0.143		0.149	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Actinium-227	0.156	U	0.350	0.350		0.599	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Bismuth-212	0.244	U	0.424	0.425		0.724	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Bismuth-214	0.307		0.0922	0.0976		0.103	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Cesium-137	0.000336	U	0.0370	0.0370		0.0688	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Lead-210	0.593	U	1.02	1.02		1.56	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Lead-212	0.287		0.0891	0.0965		0.0993	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Lead-214	0.415		0.115	0.123		0.116	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Potassium-40	10.4		1.36	1.73		0.743	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Protactinium-231	0.247	U	0.438	0.439		1.41	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Radium-226	0.307		0.0922	0.0976	0.500	0.103	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Radium-228	0.374		0.137	0.143		0.149	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Thallium-208	0.137		0.0506	0.0526		0.0512	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Thorium-228	0.287		0.0891	0.0965		0.0993	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Thorium-232	0.374		0.137	0.143		0.149	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Thorium-234	0.432	U	0.362	0.364		1.25	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Uranium-235	0.115	U	0.168	0.168		0.295	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Uranium-238	0.432	U	0.362	0.364		1.25	pCi/g	04/07/16 12:21	04/28/16 16:34	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S409

Lab Sample ID: 160-16804-9

Date Collected: 04/04/16 12:40

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.485		0.156	0.164		0.186	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Actinium-227	0.158	U	0.267	0.268		0.695	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Bismuth-212	-0.0225	U	0.387	0.387		0.724	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Bismuth-214	0.279		0.119	0.122		0.145	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Cesium-137	-0.000412	U	0.0356	0.0356		0.0663	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-210	-0.281	U	1.81	1.81		1.71	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-212	0.334		0.0981	0.107		0.105	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-214	0.362		0.0897	0.0972		0.0966	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Potassium-40	7.37		1.17	1.39		0.865	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Protactinium-231	0.255	U	0.513	0.514		1.47	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Radium-226	0.279		0.119	0.122	0.500	0.145	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Radium-228	0.485		0.156	0.164		0.186	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thallium-208	0.199		0.0552	0.0590		0.0473	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-228	0.334		0.0981	0.107		0.105	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-232	0.485		0.156	0.164		0.186	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-234	0.144	U	0.196	0.197		1.37	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Uranium-235	0.133	U	0.176	0.177		0.276	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Uranium-238	0.144	U	0.196	0.197		1.37	pCi/g	04/07/16 12:21	04/28/16 18:36	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S410

Lab Sample ID: 160-16804-10

Date Collected: 04/04/16 12:44

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.159	U	0.117	0.118		0.236	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Actinium-227	0.0285	U	0.0639	0.0640		0.691	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Bismuth-212	0.382	U	0.383	0.385		0.604	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Bismuth-214	0.377		0.117	0.123		0.106	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Cesium-137	0.00813	U	0.0314	0.0314		0.0564	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-210	0.605	U	0.846	0.849		1.40	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-212	0.341		0.0840	0.0948		0.0790	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-214	0.381		0.0925	0.101		0.0722	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Potassium-40	11.3		1.38	1.80		0.758	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Protactinium-231	0.164	U	0.589	0.589		1.05	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Radium-226	0.377		0.117	0.123	0.500	0.106	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Radium-228	0.159	U	0.117	0.118		0.236	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thallium-208	0.0725		0.0495	0.0501		0.0664	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-228	0.341		0.0840	0.0948		0.0790	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-232	0.159	U	0.117	0.118		0.236	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-234	0.348	U	0.408	0.409		1.35	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Uranium-235	0.146	U	0.158	0.159		0.257	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Uranium-238	0.348	U	0.408	0.409		1.35	pCi/g	04/07/16 12:21	04/28/16 18:36	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S411

Lab Sample ID: 160-16804-11

Date Collected: 04/04/16 12:47

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.317		0.137	0.141		0.111	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Actinium-227	0.145	U	0.294	0.295		0.675	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Bismuth-212	0.0457	U	0.391	0.391		0.722	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Bismuth-214	0.397		0.100	0.108		0.0885	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Cesium-137	-0.0122	U	0.0369	0.0370		0.0652	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Lead-210	0.277	U	0.795	0.796		1.37	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Lead-212	0.306		0.0893	0.0976		0.0931	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Lead-214	0.447		0.0871	0.0987		0.0791	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Potassium-40	10.9		1.35	1.75		0.686	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Protactinium-231	0.384	U	0.410	0.413		1.40	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Radium-226	0.397		0.100	0.108	0.500	0.0885	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Radium-228	0.317		0.137	0.141		0.111	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Thallium-208	0.0505	U	0.0386	0.0389		0.0640	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Thorium-228	0.306		0.0893	0.0976		0.0931	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Thorium-232	0.317		0.137	0.141		0.111	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Thorium-234	0.365	U	0.709	0.710		1.20	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Uranium-235	-0.0205	U	0.165	0.165		0.290	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Uranium-238	0.365	U	0.709	0.710		1.20	pCi/g	04/07/16 12:21	04/28/16 16:32	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S412

Lab Sample ID: 160-16804-12

Date Collected: 04/04/16 13:00

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.252		0.125	0.127		0.220	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Actinium-227	-0.243	U	0.500	0.501		0.845	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Bismuth-212	0.140	U	0.405	0.405		0.721	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Bismuth-214	0.275		0.0934	0.0977		0.0911	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Cesium-137	0.0141	U	0.0357	0.0357		0.0628	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Lead-210	0.900	U	1.35	1.35		1.86	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Lead-212	0.330		0.102	0.111		0.109	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Lead-214	0.454		0.0971	0.108		0.122	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Potassium-40	10.5		1.41	1.77		0.695	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Protactinium-231	1.13		0.525	0.539		0.918	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Radium-226	0.275		0.0934	0.0977	0.500	0.0911	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Radium-228	0.252		0.125	0.127		0.220	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Thallium-208	0.0391	U	0.0379	0.0381		0.0650	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Thorium-228	0.330		0.102	0.111		0.109	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Thorium-232	0.252		0.125	0.127		0.220	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Thorium-234	0.217	U	0.145	0.146		1.61	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Uranium-235	0.0570	U	0.108	0.108		0.307	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Uranium-238	0.217	U	0.145	0.146		1.61	pCi/g	04/07/16 12:21	04/28/16 16:36	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S413

Lab Sample ID: 160-16804-13

Date Collected: 04/04/16 13:05

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.251		0.112	0.114		0.143	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Actinium-227	0.0317	U	0.135	0.135		0.623	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-212	0.769		0.296	0.306		0.210	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-214	0.351		0.0855	0.0930		0.0536	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Cesium-137	-0.00514	U	0.0320	0.0320		0.0578	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-210	0.198	U	0.787	0.787		1.36	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-212	0.254		0.0841	0.0903		0.0861	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-214	0.361		0.0787	0.0872		0.0533	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Potassium-40	9.76		1.22	1.58		0.563	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Protactinium-231	0.310	U	0.604	0.605		1.27	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-226	0.351		0.0855	0.0930	0.500	0.0536	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-228	0.251		0.112	0.114		0.143	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thallium-208	0.115		0.0450	0.0466		0.0365	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-228	0.254		0.0841	0.0903		0.0861	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-232	0.251		0.112	0.114		0.143	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-234	0.420	U	0.341	0.344		1.10	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-235	0.127	U	0.150	0.150		0.263	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-238	0.420	U	0.341	0.344		1.10	pCi/g	04/07/16 12:21	04/28/16 16:41	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S414

Lab Sample ID: 160-16804-14

Date Collected: 04/04/16 13:07

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.136	U	0.0963	0.0973		0.325	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Actinium-227	0.0287	U	0.132	0.132		0.876	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-212	0.250	U	0.499	0.500		0.863	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-214	0.305		0.115	0.120		0.123	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Cesium-137	-0.000589	U	0.0432	0.0432		0.0803	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-210	0.600	U	1.26	1.26		1.80	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-212	0.241		0.102	0.106		0.114	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-214	0.383		0.108	0.115		0.102	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Potassium-40	10.5		1.55	1.89		0.920	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Protactinium-231	0.0325	U	0.108	0.108		1.48	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-226	0.305		0.115	0.120	0.500	0.123	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-228	0.136	U	0.0963	0.0973		0.325	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thallium-208	0.126		0.0433	0.0452		0.0426	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-228	0.241		0.102	0.106		0.114	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-232	0.136	U	0.0963	0.0973		0.325	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-234	0.597	U	0.460	0.464		1.41	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-235	0.0855	U	0.171	0.171		0.283	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-238	0.597	U	0.460	0.464		1.41	pCi/g	04/07/16 12:21	04/28/16 16:41	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S415

Lab Sample ID: 160-16804-15

Date Collected: 04/04/16 13:09

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.471		0.169	0.176		0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Actinium-227	0.110	U	0.183	0.183		0.823	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-212	0.372	U	0.549	0.550		0.917	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-214	0.435		0.130	0.138		0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Cesium-137	0.00918	U	0.0405	0.0405		0.0726	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-210	-0.480	U	1.96	1.96		2.03	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-212	0.256		0.0752	0.0822		0.0923	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-214	0.360		0.109	0.115		0.126	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Potassium-40	10.1		1.40	1.74		0.881	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Protactinium-231	0.350	U	0.320	0.322		1.69	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-226	0.435		0.130	0.138	0.500	0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-228	0.471		0.169	0.176		0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thallium-208	0.0550	U	0.0604	0.0607		0.0840	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-228	0.256		0.0752	0.0822		0.0923	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-232	0.471		0.169	0.176		0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-234	0.973	U	1.22	1.23		1.60	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-235	0.160	U	0.180	0.180		0.329	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-238	0.973	U	1.22	1.23		1.60	pCi/g	04/07/16 12:21	04/28/16 16:41	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S416

Lab Sample ID: 160-16804-16

Date Collected: 04/04/16 13:14

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.345		0.109	0.114		0.0634	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Actinium-227	0.191	U	0.287	0.288		0.480	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Bismuth-212	0.152	U	0.306	0.306		0.532	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Bismuth-214	0.309		0.0829	0.0890		0.0709	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Cesium-137	0.00287	U	0.0307	0.0307		0.0561	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Lead-210	-0.253	U	0.763	0.763		1.31	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Lead-212	0.243		0.0780	0.0841		0.0808	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Lead-214	0.354		0.0692	0.0784		0.0757	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Potassium-40	11.7		1.28	1.75		0.575	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Protactinium-231	0.331	U	0.444	0.445		1.04	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Radium-226	0.309		0.0829	0.0890	0.500	0.0709	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Radium-228	0.345		0.109	0.114		0.0634	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Thallium-208	0.112		0.0353	0.0372		0.0309	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Thorium-228	0.243		0.0780	0.0841		0.0808	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Thorium-232	0.345		0.109	0.114		0.0634	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Thorium-234	0.198	U	0.718	0.719		1.23	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Uranium-235	-0.0709	U	0.194	0.194		0.329	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Uranium-238	0.198	U	0.718	0.719		1.23	pCi/g	04/07/16 12:21	04/28/16 18:04	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S417

Lab Sample ID: 160-16804-17

Date Collected: 04/04/16 13:18

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.293		0.135	0.138		0.116	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Actinium-227	-0.000588	U	0.00218	0.00218		0.750	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Bismuth-212	0.116	U	0.389	0.389		0.699	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Bismuth-214	0.304		0.0928	0.0980		0.0962	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Cesium-137	-0.0151	U	0.0392	0.0392		0.0685	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Lead-210	0.763	U	0.999	1.00		1.66	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Lead-212	0.345		0.0852	0.0962		0.0859	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Lead-214	0.290		0.0832	0.0885		0.0952	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Potassium-40	10.7		1.34	1.73		0.511	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Protactinium-231	0.0735	U	0.151	0.152		1.45	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Radium-226	0.304		0.0928	0.0980	0.500	0.0962	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Radium-228	0.293		0.135	0.138		0.116	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Thallium-208	0.0731		0.0442	0.0448		0.0615	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Thorium-228	0.345		0.0852	0.0962		0.0859	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Thorium-232	0.293		0.135	0.138		0.116	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Thorium-234	0.334	U	0.371	0.373		1.46	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Uranium-235	0.0646	U	0.117	0.117		0.312	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Uranium-238	0.334	U	0.371	0.373		1.46	pCi/g	04/07/16 12:21	04/28/16 18:05	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S418

Lab Sample ID: 160-16804-18

Date Collected: 04/04/16 13:22

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.327		0.109	0.114		0.0670	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Actinium-227	-0.0158	U	0.0509	0.0509		0.719	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Bismuth-212	0.227	U	0.381	0.382		0.647	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Bismuth-214	0.226		0.0778	0.0812		0.0878	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Cesium-137	0.00951	U	0.0289	0.0289		0.0515	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-210	0.585	U	0.836	0.839		1.39	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-212	0.261		0.0703	0.0780		0.0781	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-214	0.400		0.0872	0.0966		0.0604	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Potassium-40	9.53		1.20	1.55		0.624	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Protactinium-231	0.0858	U	0.128	0.129		1.21	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Radium-226	0.226		0.0778	0.0812	0.500	0.0878	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Radium-228	0.327		0.109	0.114		0.0670	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thallium-208	0.136		0.0406	0.0430		0.0263	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-228	0.261		0.0703	0.0780		0.0781	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-232	0.327		0.109	0.114		0.0670	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-234	0.0304	U	0.743	0.743		1.29	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Uranium-235	0.0817	U	0.150	0.150		0.253	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Uranium-238	0.0304	U	0.743	0.743		1.29	pCi/g	04/07/16 12:21	04/28/16 18:06	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S419

Lab Sample ID: 160-16804-19

Date Collected: 04/04/16 13:25

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.241		0.130	0.132		0.230	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Actinium-227	-0.000577	U	0.00327	0.00327		0.671	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Bismuth-212	0.0678	U	0.467	0.467		0.861	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Bismuth-214	0.361		0.0982	0.105		0.0749	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Cesium-137	-0.00136	U	0.0340	0.0340		0.0647	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-210	-0.101	U	0.982	0.982		1.52	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-212	0.200		0.0908	0.0944		0.103	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-214	0.325		0.0957	0.102		0.0966	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Potassium-40	11.3		1.54	1.92		0.602	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Protactinium-231	0.281	U	0.326	0.328		1.58	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Radium-226	0.361		0.0982	0.105	0.500	0.0749	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Radium-228	0.241		0.130	0.132		0.230	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thallium-208	0.135		0.0432	0.0454		0.0418	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-228	0.200		0.0908	0.0944		0.103	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-232	0.241		0.130	0.132		0.230	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-234	0.217	U	0.251	0.252		1.39	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Uranium-235	-0.00617	U	0.160	0.160		0.285	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Uranium-238	0.217	U	0.251	0.252		1.39	pCi/g	04/07/16 12:21	04/28/16 18:06	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S420

Lab Sample ID: 160-16804-20

Date Collected: 04/04/16 13:28

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.184	U	0.124	0.126		0.265	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Actinium-227	0.220	U	0.280	0.281		0.757	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Bismuth-212	0.000	U	0.417	0.417		1.02	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Bismuth-214	0.431		0.121	0.129		0.116	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Cesium-137	0.0166	U	0.0417	0.0417		0.0727	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Lead-210	0.528	U	1.02	1.03		1.91	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Lead-212	0.373		0.111	0.121		0.121	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Lead-214	0.408		0.0951	0.104		0.109	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Potassium-40	11.6		1.43	1.86		0.767	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Protactinium-231	0.340	U	0.429	0.431		1.66	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Radium-226	0.431		0.121	0.129	0.500	0.116	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Radium-228	0.184	U	0.124	0.126		0.265	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Thallium-208	0.0771	U	0.0601	0.0606		0.0822	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Thorium-228	0.373		0.111	0.121		0.121	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Thorium-232	0.184	U	0.124	0.126		0.265	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Thorium-234	0.695	U	0.522	0.527		1.29	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Uranium-235	0.113	U	0.205	0.206		0.380	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Uranium-238	0.695	U	0.522	0.527		1.29	pCi/g	04/07/16 12:21	04/28/16 18:07	1

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-244938/1-A

Matrix: Solid

Analysis Batch: 248193

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 244938

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.002582	U	0.0352	0.0352		0.288	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Actinium-227	0.03405	U	0.147	0.147		0.672	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Bismuth-212	0.1864	U	0.531	0.531		0.959	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Bismuth-214	0.01585	U	0.0794	0.0794		0.159	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Cesium-137	-0.007261	U	0.0385	0.0385		0.0729	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Lead-210	-1.099	U	44.0	44.0		1.90	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Lead-212	0.009090	U	0.0491	0.0491		0.0981	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Lead-214	-0.01062	U	0.149	0.149		0.151	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Potassium-40	-0.2586	U	10.3	10.3		0.818	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Protactinium-231	-0.01416	U	0.119	0.119		1.56	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Radium-226	0.01585	U	0.0794	0.0794	0.500	0.159	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Radium-228	0.002582	U	0.0352	0.0352		0.288	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Thallium-208	-0.009743	U	0.0659	0.0659		0.0761	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Thorium-228	0.009090	U	0.0491	0.0491		0.0981	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Thorium-232	0.002582	U	0.0352	0.0352		0.288	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Thorium-234	-0.1034	U	0.786	0.786		1.22	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Uranium-235	0.1002	U	0.131	0.131		0.256	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Uranium-238	-0.1034	U	0.786	0.786		1.22	pCi/g	04/07/16 12:21	04/28/16 15:23	1

Lab Sample ID: LCS 160-244938/2-A

Matrix: Solid

Analysis Batch: 248183

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 244938

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	101.7		10.7		1.10	pCi/g	105	87 - 116
Cesium-137	29.7	29.83		3.18		0.259	pCi/g	100	87 - 120
Cobalt-60	17.4	16.98		1.76		0.162	pCi/g	98	87 - 115

Lab Sample ID: 160-16804-1 DU

Matrix: Solid

Analysis Batch: 248183

Client Sample ID: TI-TO04-NP-R-FSSSU4-S401

Prep Type: Total/NA

Prep Batch: 244938

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.182	U	0.2315	U	0.156		0.312	pCi/g	0.17	1
Actinium-227	0.287	U	-0.01991	U	0.0341		0.767	pCi/g	0.72	1
Bismuth-212	0.000	U	0.4416	U	0.453		0.711	pCi/g	0.43	1
Bismuth-214	0.324		0.2841		0.0969		0.110	pCi/g	0.17	1
Cesium-137	-0.00693	U	-0.00929	U	0.0421		0.0754	pCi/g	0.02	1
Lead-210	0.792	U	1.609	U	1.22		1.65	pCi/g	0.37	1
Lead-212	0.369		0.2828		0.0935		0.102	pCi/g	0.40	1
Lead-214	0.274		0.2268		0.0916		0.125	pCi/g	0.24	1
Potassium-40	8.58		11.14		1.84		0.791	pCi/g	0.68	1
Protactinium-231	0.0694	U	0.1791	U	0.274		1.60	pCi/g	0.11	1
Radium-226	0.324		0.2841		0.0969	0.500	0.110	pCi/g	0.17	1
Radium-228	0.182	U	0.2315	U	0.156		0.312	pCi/g	0.17	1

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-16804-1 DU

Matrix: Solid

Analysis Batch: 248183

Client Sample ID: TI-TO04-NP-R-FSSSU4-S401

Prep Type: Total/NA

Prep Batch: 244938

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.129		0.1031		0.0516		0.0698	pCi/g	0.25	1
Thorium-228	0.369		0.2828		0.0935		0.102	pCi/g	0.40	1
Thorium-232	0.182	U	0.2315	U	0.156		0.312	pCi/g	0.17	1
Thorium-234	0.0609	U	0.4316	U	0.450		1.39	pCi/g	0.41	1
Uranium-235	0.150	U	-0.01712	U	0.0875		0.320	pCi/g	0.53	1
Uranium-238	0.0609	U	0.4316	U	0.450		1.39	pCi/g	0.41	1

QC Association Summary

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Rad

Leach Batch: 244636

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16804-1	TI-TO04-NP-R-FSSSU4-S401	Total/NA	Solid	Dry and Grind	
160-16804-1 DU	TI-TO04-NP-R-FSSSU4-S401	Total/NA	Solid	Dry and Grind	
160-16804-2	TI-TO04-NP-R-FSSSU4-S402	Total/NA	Solid	Dry and Grind	
160-16804-3	TI-TO04-NP-R-FSSSU4-S403	Total/NA	Solid	Dry and Grind	
160-16804-4	TI-TO04-NP-R-FSSSU4-S404	Total/NA	Solid	Dry and Grind	
160-16804-5	TI-TO04-NP-R-FSSSU4-S405	Total/NA	Solid	Dry and Grind	
160-16804-6	TI-TO04-NP-R-FSSSU4-S406	Total/NA	Solid	Dry and Grind	
160-16804-7	TI-TO04-NP-R-FSSSU4-S407	Total/NA	Solid	Dry and Grind	
160-16804-8	TI-TO04-NP-R-FSSSU4-S408	Total/NA	Solid	Dry and Grind	
160-16804-9	TI-TO04-NP-R-FSSSU4-S409	Total/NA	Solid	Dry and Grind	
160-16804-10	TI-TO04-NP-R-FSSSU4-S410	Total/NA	Solid	Dry and Grind	
160-16804-11	TI-TO04-NP-R-FSSSU4-S411	Total/NA	Solid	Dry and Grind	
160-16804-12	TI-TO04-NP-R-FSSSU4-S412	Total/NA	Solid	Dry and Grind	
160-16804-13	TI-TO04-NP-R-FSSSU4-S413	Total/NA	Solid	Dry and Grind	
160-16804-14	TI-TO04-NP-R-FSSSU4-S414	Total/NA	Solid	Dry and Grind	
160-16804-15	TI-TO04-NP-R-FSSSU4-S415	Total/NA	Solid	Dry and Grind	
160-16804-16	TI-TO04-NP-R-FSSSU4-S416	Total/NA	Solid	Dry and Grind	
160-16804-17	TI-TO04-NP-R-FSSSU4-S417	Total/NA	Solid	Dry and Grind	
160-16804-18	TI-TO04-NP-R-FSSSU4-S418	Total/NA	Solid	Dry and Grind	
160-16804-19	TI-TO04-NP-R-FSSSU4-S419	Total/NA	Solid	Dry and Grind	
160-16804-20	TI-TO04-NP-R-FSSSU4-S420	Total/NA	Solid	Dry and Grind	

Prep Batch: 244938

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16804-1	TI-TO04-NP-R-FSSSU4-S401	Total/NA	Solid	Fill_Geo-21	244636
160-16804-1 DU	TI-TO04-NP-R-FSSSU4-S401	Total/NA	Solid	Fill_Geo-21	244636
160-16804-2	TI-TO04-NP-R-FSSSU4-S402	Total/NA	Solid	Fill_Geo-21	244636
160-16804-3	TI-TO04-NP-R-FSSSU4-S403	Total/NA	Solid	Fill_Geo-21	244636
160-16804-4	TI-TO04-NP-R-FSSSU4-S404	Total/NA	Solid	Fill_Geo-21	244636
160-16804-5	TI-TO04-NP-R-FSSSU4-S405	Total/NA	Solid	Fill_Geo-21	244636
160-16804-6	TI-TO04-NP-R-FSSSU4-S406	Total/NA	Solid	Fill_Geo-21	244636
160-16804-7	TI-TO04-NP-R-FSSSU4-S407	Total/NA	Solid	Fill_Geo-21	244636
160-16804-8	TI-TO04-NP-R-FSSSU4-S408	Total/NA	Solid	Fill_Geo-21	244636
160-16804-9	TI-TO04-NP-R-FSSSU4-S409	Total/NA	Solid	Fill_Geo-21	244636
160-16804-10	TI-TO04-NP-R-FSSSU4-S410	Total/NA	Solid	Fill_Geo-21	244636
160-16804-11	TI-TO04-NP-R-FSSSU4-S411	Total/NA	Solid	Fill_Geo-21	244636
160-16804-12	TI-TO04-NP-R-FSSSU4-S412	Total/NA	Solid	Fill_Geo-21	244636
160-16804-13	TI-TO04-NP-R-FSSSU4-S413	Total/NA	Solid	Fill_Geo-21	244636
160-16804-14	TI-TO04-NP-R-FSSSU4-S414	Total/NA	Solid	Fill_Geo-21	244636
160-16804-15	TI-TO04-NP-R-FSSSU4-S415	Total/NA	Solid	Fill_Geo-21	244636
160-16804-16	TI-TO04-NP-R-FSSSU4-S416	Total/NA	Solid	Fill_Geo-21	244636
160-16804-17	TI-TO04-NP-R-FSSSU4-S417	Total/NA	Solid	Fill_Geo-21	244636
160-16804-18	TI-TO04-NP-R-FSSSU4-S418	Total/NA	Solid	Fill_Geo-21	244636
160-16804-19	TI-TO04-NP-R-FSSSU4-S419	Total/NA	Solid	Fill_Geo-21	244636
160-16804-20	TI-TO04-NP-R-FSSSU4-S420	Total/NA	Solid	Fill_Geo-21	244636
LCS 160-244938/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-244938/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

From: [Weyant, David B CIV NAVSEA 04, 04N](#)
To: [Guillory, Jeffrey](#)
Cc: [Edwards, Zachary L CIV SEA 04 04N](#); [Yantos, Christopher N CIV NAVFAC SW, BRAC](#); [Messer, Ulrika](#); [Hackett, John R](#); [Schul, Raymond](#); [Morrison, Dennis](#); [Bohannon, Derek](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 10 (Use 7)
Date: Monday, December 19, 2016 9:54:30 AM

Jeff,

I concur to designating the Revised RSY-10 (Use 7) soil as Non-LLRW soil.

VR

David Weyant
Health Physicist/Environmental Protection Manager
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-----Original Message-----

From: Weyant, David B CIV NAVSEA 04, 04N
Sent: Monday, December 19, 2016 10:52 AM
To: 'Guillory, Jeffrey'
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: RE: NSTI RSY Soil Release Request - RSY 10 (Use 7)

Jeff,

For Part 1) n and Part 2) b, I see an unusually spike for K-40 (1460.8 Kev).

Do you recall if there was visible gravel here?

VR

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederalservices.com>]

Sent: Wednesday, December 14, 2016 2:50 PM

To: Weyant, David B CIV NAVSEA 04, 04N

Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek

Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 10 (Use 7)

Mr. Weyant,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Jeffrey Guillory

Scientist 3

Federal Services

Cell: +1 979 422 5534

jeffrey.guillory@cbifederalservices.com <<mailto:jeffrey.guillory@cbifederalservices.com>>

CB&I

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Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY 10	RSY Unit Use Number: USE 7	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 12/14/2016

Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static Survey Meter (Model 2221) Serial Number	One-Minute Static Reading (CPM)	Static Count Exceeds Reference Area IL?	²²⁶ Ra Final Analytical Results (pCi/g)
Upper limit of site reference background						1.69
TITO04-NP-FSS-SU3-BSRSY10-U7-S001	1	Systematic	262322	9,952	No	0.261
TITO04-NP-FSS-SU3-BSRSY10-U7-S002	2	Systematic	262322	10,003	No	0.438
TITO04-NP-FSS-SU3-BSRSY10-U7-S003	3	Systematic	262322	10,092	No	0.311
TITO04-NP-FSS-SU3-BSRSY10-U7-S004	4	Systematic	262322	9,685	No	0.324
TITO04-NP-FSS-SU3-BSRSY10-U7-S005	5	Systematic	262322	9,896	No	0.387
TITO04-NP-FSS-SU3-BSRSY10-U7-S006	6	Systematic	262322	10,098	No	0.336
TITO04-NP-FSS-SU3-BSRSY10-U7-S007	7	Systematic	262322	9,973	No	0.231
TITO04-NP-FSS-SU3-BSRSY10-U7-S008	8	Systematic	262322	10,058	No	0.460
TITO04-NP-FSS-SU3-BSRSY10-U7-S009	9	Systematic	262322	10,074	No	0.395
TITO04-NP-FSS-SU3-BSRSY10-U7-S010	10	Systematic	262322	9,936	No	0.287
TITO04-NP-FSS-SU3-BSRSY10-U7-S011	11	Systematic	262322	9,998	No	0.0975
TITO04-NP-FSS-SU3-BSRSY10-U7-S012	12	Systematic	262322	9,731	No	0.349
TITO04-NP-FSS-SU3-BSRSY10-U7-S013	13	Systematic	262322	9,802	No	0.430
TITO04-NP-FSS-SU3-BSRSY10-U7-S014	14	Systematic	262322	10,146	No	0.277
TITO04-NP-FSS-SU3-BSRSY10-U7-S015	15	Systematic	262322	10,044	No	0.301
TITO04-NP-FSS-SU3-BSRSY10-U7-S016	16	Systematic	262322	9,966	No	0.383
TITO04-NP-FSS-SU3-BSRSY10-U7-S017	17	Systematic	262322	10,476	No	0.425
TITO04-NP-FSS-SU3-BSRSY10-U7-S018	18	Systematic	262322	10,339	No	0.364
TITO04-NP-FSS-SU3-BSRSY10-U7-S019	19	Systematic	262322	10,510	No	0.331
TITO04-NP-FSS-SU3-BSRSY10-U7-S020	20	Systematic	262322	10,007	No	0.393

CPM Counts per minute
IL Investigation Level (based on Reference Area data set)
²²⁶Ra Radium-226
pCi/g Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd	Reference Area Static 3σ IL	Reference Area Scan Bkgd	Reference Area Scan 3σ IL	Range
RSI Gamma Walkover Survey (Part 1)	TIRS-10242016-12P3-ROV-2564 TIRS-10262016-12P3-ROV-2582	10/24/2016 – 10/26/2016	RS-701/RSX-1	N/A	Console: 7236 / Detectors: 5447, 5448	N/A	N/A	7,748 CPS	8,872 CPS	4,538 – 5,662 CPS
RSI Gamma Walkover Survey (Part 2)	TIRS-10242016-12P3-ROV-2565 TIRS-10262016-12P3-ROV-2583	10/24/2016 – 10/26/2016	RS-701/RSX-1	N/A	Console: 7236 / Detectors: 5447, 5448	N/A	N/A	7,748 CPS	8,872 CPS	4,461 – 5,511 CPS
Follow-up Static Survey (Part 1)	TIRS-10312016-12P3-JSS-2588	10/31/2016	2221	8/12/2017	262322	14,024	16,662	N/A	N/A	9,940 – 10,742 CPM
Follow-up Static Survey (Part 2)	TIRS-10312016-12P3-JSS-2589	10/31/2016	2221	8/12/2017	262322	14,024	16,662	N/A	N/A	9,828 – 10,713 CPM
Systematic Sampling Survey	TIRS-11012016-12P3-JSS-2592	11/1/2016	2221	8/12/2017	262322	14,024	16,662	N/A	N/A	9,685 – 10,510 CPM

3σ IL Investigation Level (established at 3σ above the mean of the Reference Area data set)
CPM Counts per minute
CPS Counts per second

Summary

1) RSI gamma walkover survey and data review (Part 1)—upon review of initial scan data, follow-up static investigations were deemed necessary, and investigation locations were identified as per the RSI Data Evaluation Process (pages 4-5). Gamma scan coverage for RSY 10 (Use 7, Parts 1 & 2) is shown on Systematic Sample Survey map (page 3). Contour maps of scan data for Part 1 are shown on RSI Data Plots (page 6). Data review results are summarized on RSI Review Summary – RSY 10 (Use 7, Part 1) (page 7).

2) RSI gamma walkover survey and data review (Part 2)—upon review of initial scan data, follow-up static investigations were deemed necessary, and investigation locations were identified as per the RSI Data Evaluation Process (pages 4-5). Gamma scan coverage for RSY 10 (Use 7, Parts 1 & 2) is shown on Systematic Sample Survey map (page 3). Contour maps of scan data for Part 2 are shown on RSI Data Plots (page 8). Data review results are summarized on RSI Review Summary – RSY 10 (Use 7, Part 2) (page 9).

3) Follow-up static survey (Part 1)—27 locations identified during the data review process were investigated, and readings from all locations were less than the Reference Area static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 10).

4) Follow-up static survey (Part 2)—22 locations identified during the data review process were investigated, and readings from all locations were less than the Reference Area static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 11).

5) Twenty systematic soil samples (001-020) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with static readings < Reference Area static IL for all sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 44-66).

Note: Due to operational constraints, soil from the final 6-inch over-excavation at North Point SU 3 was excavated in two parts and segregated on the RSY pad. Gamma walkover and follow-up static surveys for each part of the RSY pad were performed independently, however, systematic sampling and soil characterization are reported jointly for both parts of the RSY pad.

Conclusions:

All locations with elevated Z-scores identified by the RSI gamma walkover surveys were deemed comparable to background. Twenty-seven follow-up static locations were investigated on RSY 10 (Use 7, Part 1), and twenty-two follow-up static locations were investigated on RSY 10 (Use 7, Part 2); readings at all follow-up static locations were less than the Reference Area static IL.

Additional locations (a-n, page 6, and a-p, page 8) with elevated Z-scores that did not meet the criteria for a standard follow-up investigation were evaluated by spectral analysis of the RSI gamma scan data, which did not indicate the presence of ²²⁶Ra above background levels (pages 14-43).

Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 12-13. These statistical tools were utilized to verify the appropriate level of reasonable effort.

RSY 10 (Use 7) contains soil from the final 6-inch over excavation of FSS material from the bottom of the excavation at SWDA North Point SU 3.

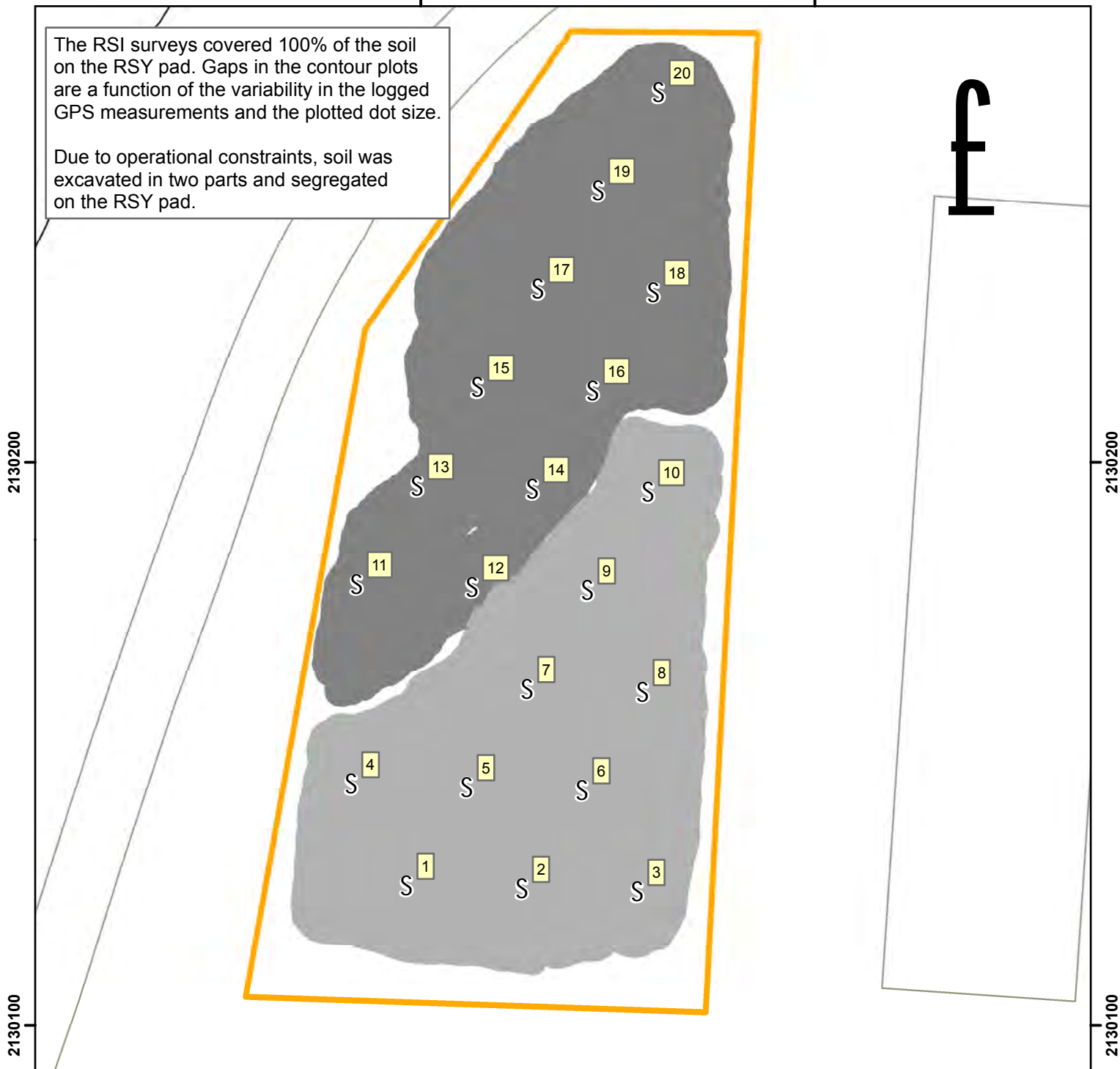
Note: Soil on RSY Pad 10 (Use 7) was over-excavated at the final depth from the bottom of the excavation at North Point SU 3, and no visible debris and/or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.

CB&I requests RASO concurrence to release this soil as Non-LLRW.

Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.

Survey Number:
TIRS-11012016-12P3-JSS-2592

6019460

**Instrument # 262322**

- S Systematic Sample Location
- RSI Gamma Scan Coverage (Part 1)
- RSI Gamma Scan Coverage (Part 2)
- RSY Boundaries

0 10 20 40
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

CB&I Federal Services, LLC

Data Processed In Treasure Island Office

RS-700 Mobile Radiation Monitoring System

- Self-contained gamma-ray radiation detection and monitoring system
- Built-in GPS receiver
- (2) RSX-1 4-liter NaI(Tl) gamma detectors oriented perpendicular to the direction of travel (VD1 denotes both detectors summed; VD3 refers to the left detector; and VD4 refers to the right detector)
- Multi-Channel Analyzer, allowing for monitoring of energy-specific regions of interest (ROIs)
- RadAssist survey software for control, monitoring, and recording

Ten ROIs have been established for radium and progeny as well as other naturally-occurring or anthropogenic gamma-emitting radionuclides that may be of interest:

ROI	Description	Energy Range (keV)	Primary Peak (keV)
1	Total counts	411 – 2811	N/A
2	Potassium	1371 – 1569	1460
3	U/Ra-226	1659 – 1860	1764 (Bi-214)
4	Thorium	2409 – 2811	2614 (Tl-208)
5	Annihilation	456 – 570	511
6	Ra-226	546 – 666	609 (Bi-214)
7	Cs-137	549 – 741	662
8	Pb-214/Ra-226	327 – 399	351
9	Range	45 – 1980	N/A
10	Gross Counts	3 – 3072	N/A

A tiered approach is used during data review to identify follow-up locations. Raw data are exported to a comma delimited format using RadAssist and imported into an Excel spreadsheet for review and analysis. Count rate data are compared with ROI- and material-specific investigation levels (ILs). In addition, the following review steps are completed to determine if additional follow-up measurements are necessary:

- **Playback Review:** The data file is replayed in RadAssist and reviewed for elevated count rates in ROIs 1, 3, 6, and 10 for virtual detector (VD) 1 (both detectors summed). The scan screen is also monitored for elevated count rates and alarms.
- **Count Rate Time Series Review:** The count rates for ROIs 1, 3, 6, and 10 for VDs 1, 3 (detector 1), and 4 (detector 2) are plotted in a time series and reviewed for additional peaks in count rate.
- **All ROIs:**
 - **Z-Scores:** The Z-Scores are calculated for each location in all ROIs for VDs 1, 3, and 4. Any location with four or more ROIs having a Z-Score greater than three ($Z > 3$) is marked for follow-up.
 - **Local Z-Scores:** Local Z-Scores are calculated using a moving average for each data point in all ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with four or more ROIs having a local $Z > 3$ is marked for follow-up.
 - **Semi-local Z-Scores:** Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with four or more ROIs having a semi-local $Z > 3$ is marked for follow-up.

- **ROIs 3, 6, 8, and 10 (radium-specific ROIs):**
 - Z-Scores: The Z-Scores are calculated for each location in the radium-specific ROIs for VDs 1, 3, and 4. Any location with three or more radium-specific ROIs having a $Z > 3$ is marked for follow-up.
 - Local Z-Scores: Local Z-Scores are calculated using a moving average for each data point in the radium-specific ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a local $Z > 3$ is marked for follow-up.
 - Semi-local Z-Scores: Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a semi-local $Z > 3$ is marked for follow-up.
- **Z-Score Time Series Review:** The three types of Z-Scores for ROIs 1, 3, 6, and 10 for VDs 1, 3, and 4 are plotted in a time series and reviewed for additional peaks in Z-Scores.

Follow-up locations will be plotted on contour maps depicting all locations with any radium-specific ROI $Z > 3$. Any location selected for follow-up, or any location with a radium-specific ROI $Z > 3$ will undergo spectral analysis to determine if it is statistically likely that there is radium present at that location in quantities greater than the background.

A background spectrum, obtained from NSTI Reference Area 7, is subtracted from the local spectral data for a given location, and the resulting net spectrum is plotted. Critical levels, as defined in Section 6.7.1 of the Multi Agency Radiation Survey and Site Investigation Manual are calculated and plotted based on background levels. The critical level is the level, in counts, at which there is a statistical probability (with a predetermined confidence) of incorrectly identifying a measurement system background value as greater than background. Any response above this level is considered to be greater than background. The critical level is calculated for ROIs 3, 6, and 8 according to the equation shown below:

$$L_C = 2.33\sqrt{B}$$

Where:

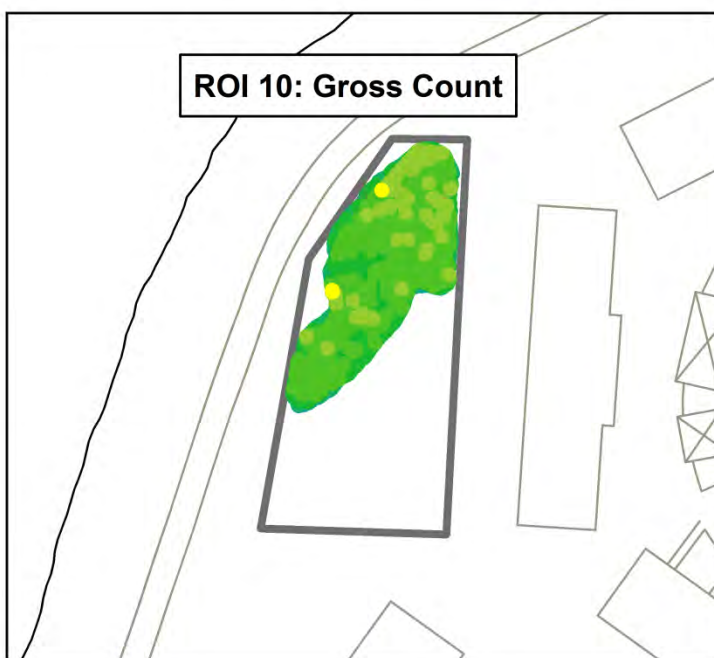
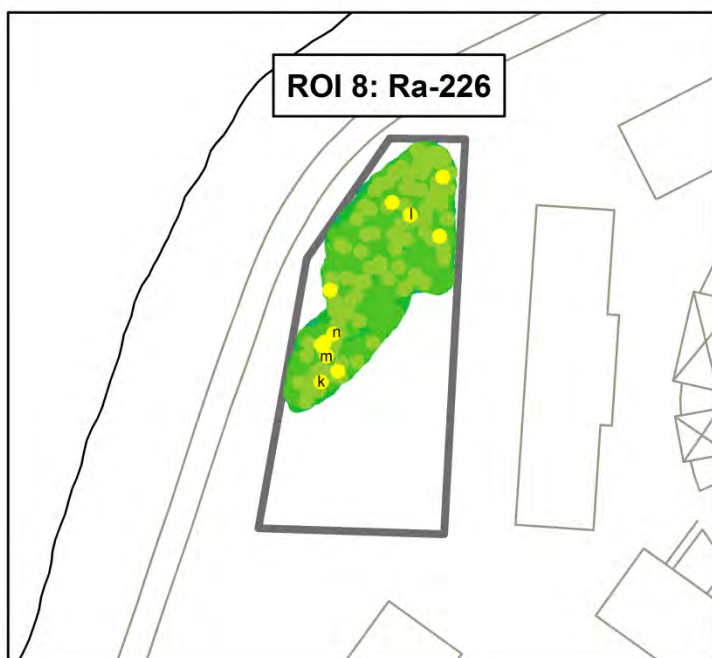
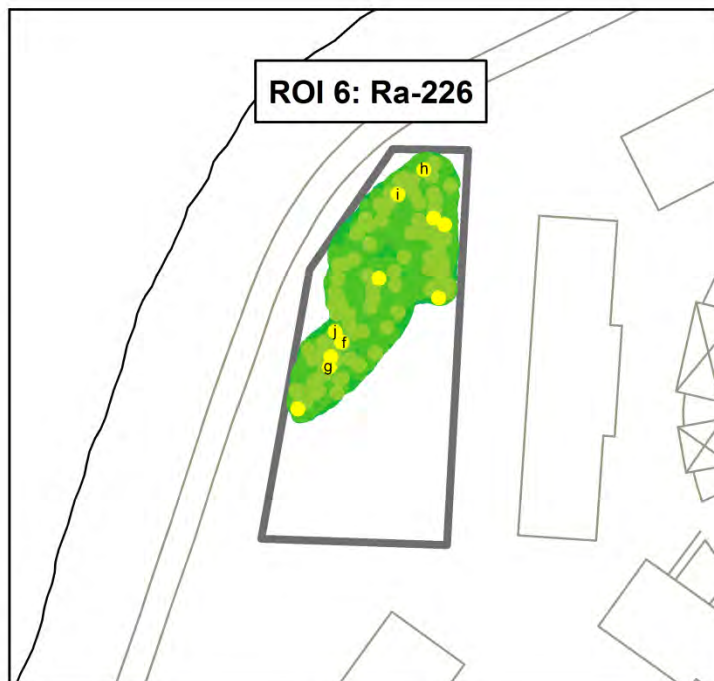
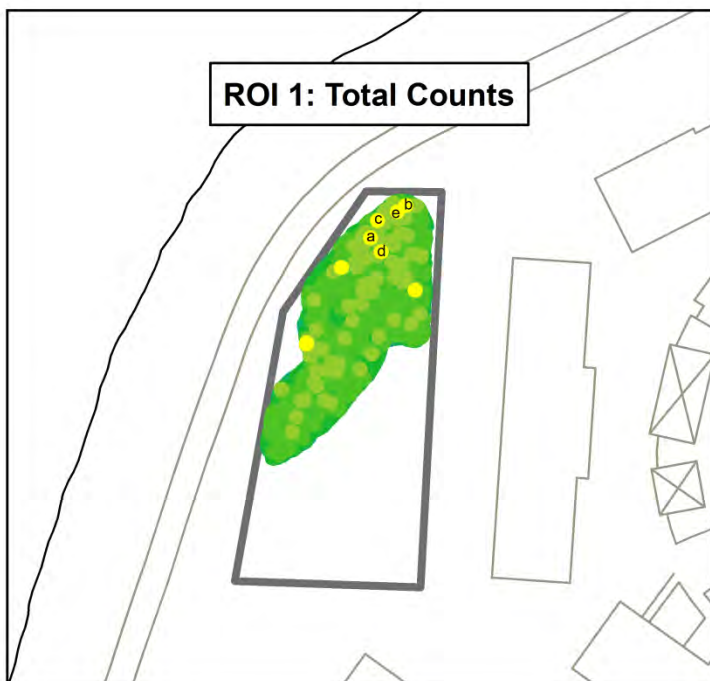
LC	=	critical level (counts)
B	=	average background in the ROI

The ROI ranges for ROIs 3, 6, and 8 are then plotted on the net spectrum graph with their respective critical levels. When count rates in the net gamma spectrum at a given location do not exceed critical levels for any radium-specific energy ranges, it is unlikely that radium exists at that location above background.

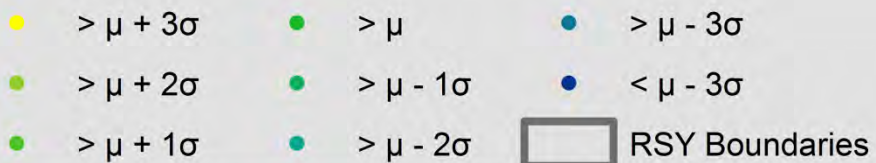
Any data point that is both above the critical level and within the energy range of a given ROI is considered above background for that radionuclide and will be flagged for further investigation in the field.

RSI DATA PLOTS

Bayside RSY 10 (Use 7, Part 1)



RSI Walkover Survey Data (VD1)



RSI Review Summary – RSY 10 (Use 7, Part 1)

Summary:

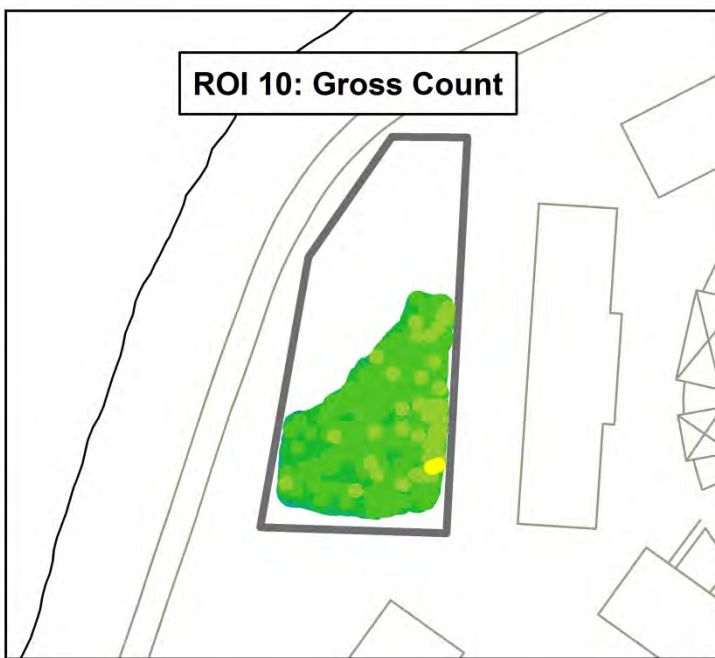
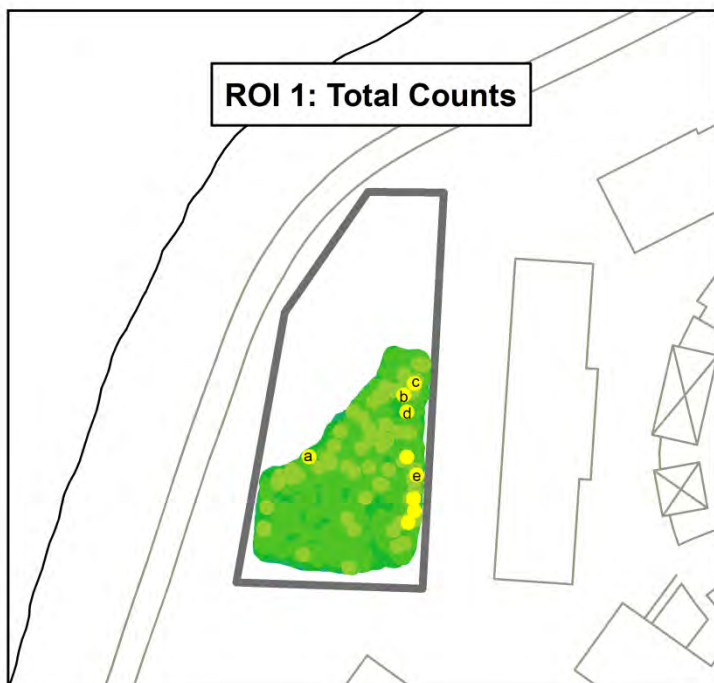
27 locations were selected for follow-up investigation on RSY Pad 10 (Use 7, Part 1). Locations were identified by using the Z-Score, Local Z-Score, and Semi-Local Z-Score, Playback, and Time Series reviews as described in the RSI Data Evaluation Process on pages 4-5. The table below details the reasons for each investigation by location.

Locations denoted (a-n) on RSI Data Plots (see previous page) did not meet the evaluation criteria for a standard follow-up investigation. Elevated Z-scores at these locations were identified only in specific ROIs, including: five locations exclusive to ROI 1 (a-e), five locations exclusive to ROI 6 (f-j), and four locations exclusive to ROI 8 (k-n). A review of the gamma scan data did not reveal any additional indicators warranting a standard follow-up investigation at any of the denoted locations, and spectral analyses performed on gamma scan data obtained from these locations did not indicate the presence of ^{226}Ra above background; figures are provided on pages 14-27.

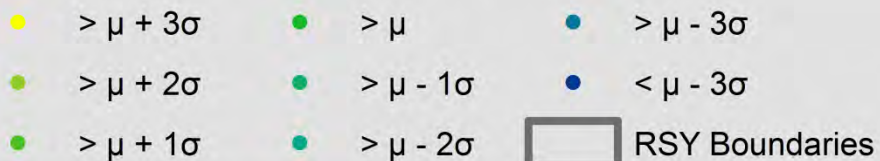
RSY 10 (Use 7, Part 1) Investigation								Follow-up			
Location	File ID	Longitude	Latitude	Details	Maximum Result (Ra/Tot)			Meter SN	Static Count (cpm)	Static IL(cpm)	Comments
					VD	ROI	Z-Score				
1	4506	122.37744	37.830235	Manual process	0	0	0	262322	10,170	16,662	<IL
2	1056	122.37754	37.830179	Manual process	0	0	0	262322	10,107	16,662	<IL
3	3049	122.37742	37.830304	Manual process	0	0	0	262322	10,263	16,662	<IL
4	464	122.37756	37.830176	Manual process	0	0	0	262322	10,362	16,662	<IL
5	911	122.37747	37.830333	Manual process	0	0	0	262322	10,571	16,662	<IL
6	3124	122.37747	37.830246	Manual process	0	0	0	262322	10,239	16,662	<IL
7	898	122.37745	37.830350	ALL ROIs	3	6	3.53	262322	10,316	16,662	<IL
8	2703	122.37746	37.830307	Manual process	1	7	3.18	262322	10,506	16,662	<IL
9	4472	122.37737	37.830319	Manual process	0	0	0	262322	10,322	16,662	<IL
10	1893	122.37745	37.830208	Manual process	0	0	0	262322	10,104	16,662	<IL
11	582	122.37747	37.830163	Manual process	0	0	0	262322	10,020	16,662	<IL
12	4000	122.37739	37.830246	Manual process	0	0	0	262322	10,215	16,662	<IL
13	746	122.37736	37.830333	Manual process	0	0	0	262322	10,257	16,662	<IL
14	4036	122.37751	37.830135	Manual process	0	0	0	262322	10,212	16,662	<IL
15	38	122.37736	37.830244	Manual process	0	0	0	262322	9,963	16,662	<IL
16	3033	122.37746	37.830266	ALL ROIs	1	7	3.58	262322	10,294	16,662	<IL
17	1225	122.37747	37.830206	ALL ROIs (Local Z-scores)	0	0	0	262322	9,996	16,662	<IL
18	1831	122.37748	37.830206	ALL ROIs (Local Z-scores)	0	0	0	262322	10,252	16,662	<IL
19	385	122.37752	37.830238	ALL ROIs	3	9	4.23	262322	10,742	16,662	<IL
20	2991	122.37746	37.830275	ALL ROIs	4	3	3.44	262322	10,068	16,662	<IL
21	2047	122.37736	37.830305	ALL ROIs	4	2	3.74	262322	10,631	16,662	<IL
22	3167	122.37741	37.830305	Manual process	0	0	0	262322	10,227	16,662	<IL
23	2261	122.37737	37.830380	Manual process	0	0	0	262322	10,477	16,662	<IL
24	515	122.37757	37.830106	Manual process	0	0	0	262322	9,940	16,662	<IL
25	396	122.37752	37.830231	ALL ROIs (Local Z-scores)	3	9	3.15	262322	10,543	16,662	<IL
26	2006	122.37737	37.830256	ALL ROIs (Local Z-scores)	3	3	3.87	262322	10,309	16,662	<IL
27	276	122.3775	37.83036	Manual process	0	0	0	262322	10,299	16,662	<IL

RSI DATA PLOTS

Bayside RSY 10 (Use 7, Part 2)



RSI Walkover Survey Data (VD1)



RSI Review Summary – RSY 10 (Use 7, Part 2)

Summary:

22 locations were selected for follow-up investigation on RSY Pad 10 (Use 7, Part 2). Locations were identified by using the Z-Score, Local Z-Score, and Semi-Local Z-Score, Playback, and Time Series reviews as described in the RSI Data Evaluation Process on pages 4-5. The table below details the reasons for each investigation by location.

Locations denoted (a-p) on RSI Data Plots (see previous page) did not meet the evaluation criteria for a standard follow-up investigation. Elevated Z-scores at these locations were identified only in specific ROIs, including: five locations exclusive to ROI 1 (a-e), five locations exclusive to ROI 6 (f-j), and six locations exclusive to ROI 8 (k-p). A review of the gamma scan data did not reveal any additional indicators warranting a standard follow-up investigation at any of the denoted locations, and spectral analyses performed on gamma scan data obtained from these locations did not indicate the presence of ^{226}Ra above background; figures are provided on pages 28-43.

RSY 10 (Use 7, Part 2) Investigation								Follow-up			
Location	File ID	Longitude	Latitude	Details	Maximum Result (Ra/Tot)			Meter SN	Static Count (cpm)	Static IL(cpm)	Comments
					VD	ROI	Z-Score				
1	1028	122.37741	37.829986	Manual process	0	0	0	262322	10,115	16,662	<IL
2	1323	122.37739	37.830015	Manual process	0	0	0	262322	10,304	16,662	<IL
3	1494	122.37737	37.830025	ALL ROIs	3	1	3.28	262322	10,525	16,662	<IL
4	256	122.37736	37.830028	ALL ROIs	4	9	3.05	262322	10,713	16,662	<IL
5	263	122.37736	37.830040	ALL ROIs	3	5	3.75	262322	10,555	16,662	<IL
6	1468	122.37741	37.830027	Manual process	0	0	0	262322	10,265	16,662	<IL
7	1305	122.37745	37.830015	Manual process	0	0	0	262322	10,155	16,662	<IL
8	1008	122.37748	37.829995	Manual process	0	0	0	262322	10,253	16,662	<IL
9	1234	122.37749	37.830014	Manual process	0	0	0	262322	9,864	16,662	<IL
10	1453	122.37746	37.830029	ALL ROIs (Local Z-scores)	4	9	3.03	262322	9,878	16,662	<IL
11	1445	122.37748	37.830031	Manual process	0	0	0	262322	9,980	16,662	<IL
12	1745	122.37748	37.830058	Manual process	0	0	0	262322	9,905	16,662	<IL
13	1908	122.37744	37.830066	Manual process	0	0	0	262322	10,090	16,662	<IL
14	2104	122.37745	37.830085	Manual process	0	0	0	262322	10,004	16,662	<IL
15	2088	122.37739	37.830082	Manual process	0	0	0	262322	10,026	16,662	<IL
16	2293	122.37737	37.830105	Manual process	0	0	0	262322	10,237	16,662	<IL
17	2442	122.37743	37.830126	Manual process	0	0	0	262322	10,210	16,662	<IL
18	2229	122.37748	37.830100	Manual process	0	0	0	262322	10,152	16,662	<IL
19	3276	122.37758	37.830074	Manual process	0	0	0	262322	9,828	16,662	<IL
20	91	122.37758	37.830040	Manual process	0	0	0	262322	9,887	16,662	<IL
21	2727	122.37743	37.830171	Manual process	0	0	0	262322	10,077	16,662	<IL
22	2852	122.37740	37.830200	Manual process	0	0	0	262322	10,258	16,662	<IL

Survey Number:
TIRS-10312016-12P3-JSS-2588

6019460

**Instrument # 262322**

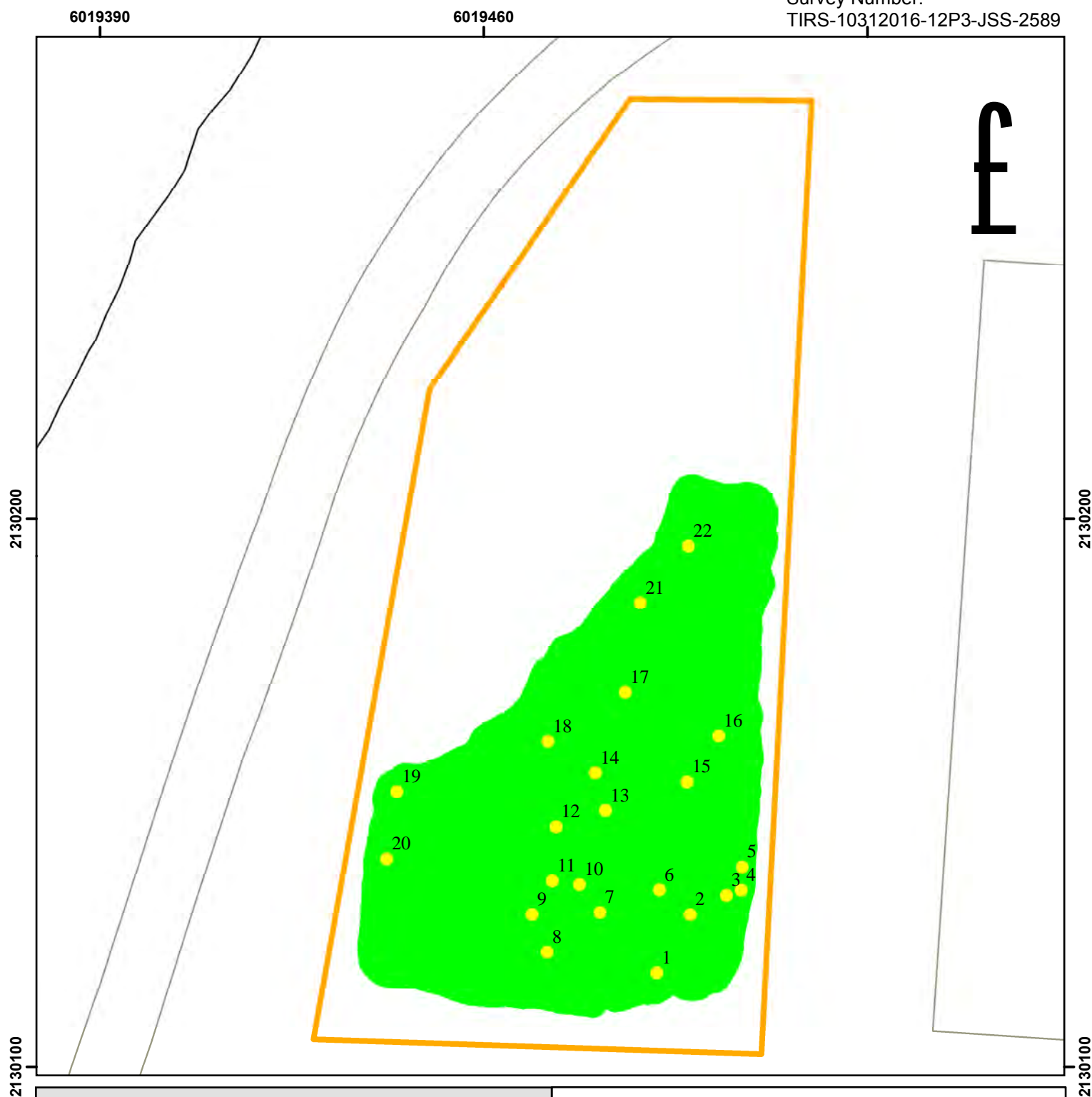
- Data Points Not Requiring Further Investigation
- Follow-up Locations
- RSY Boundaries




0 10 20 40
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

CB&I Federal Services, LLC

Data Processed In Treasure Island Office

Survey Number:
TIRS-10312016-12P3-JSS-2589**Instrument # 262322**

-  Data Points Not Requiring Further Investigation
-  Follow-up Locations
-  RSY Boundaries

0 10 20 40
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

CB&I Federal Services, LLC

Data Processed In Treasure Island Office

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 10-7
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.261	S	-0.221939192	3	3	21	R
0.438	S	-0.044939192	19	19	22	R
0.311	S	-0.171939192	7	7	23	R
0.324	S	-0.158939192	8	8	24	R
0.387	S	-0.095939192	14	14	25	R
0.336	S	-0.146939192	10	10	26	R
0.231	S	-0.251939192	2	2	27.5	R
0.460	S	-0.022939192	20	20	27.5	R
0.395	S	-0.087939192	16	16	29.5	R
0.287	S	-0.195939192	5	5	29.5	R
0.098	S	-0.385439192	1	1	31	R
0.349	S	-0.133939192	11	11	32	R
0.430	S	-0.052939192	18	18	33	R
0.277	S	-0.205939192	4	4	34	R
0.301	S	-0.181939192	6	6	35.5	R
0.383	S	-0.099939192	13	13	35.5	R
0.425	S	-0.057939192	17	17	37	R
0.364	S	-0.118939192	12	12	38	R
0.331	S	-0.151939192	9	9	39	R
0.393	S	-0.089939192	15	15	40	R
Sum =			820	210		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 *n*
 # of S: 20 *m*
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For *m* or *n* greater than 20, the critical value (*k*) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

z = 97.5% percentile of standard normal distribution = 1.960

k = 482.5

$\alpha_w = \alpha/2 = 0.025$

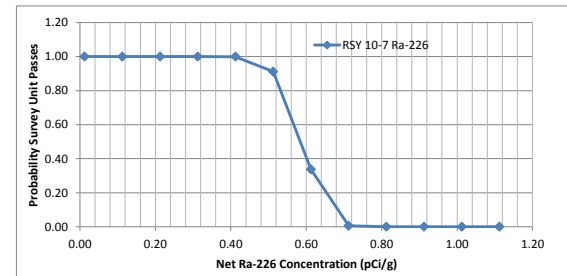
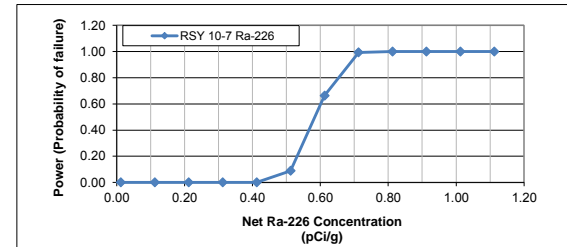
$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.085
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count 20 *m*
 SD 0.085
 Median 0.343
 Ref Stats
 Count 20 *n*
 SD 0.161
 Critical Value 482.5

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	6.7788	43.18647	6.5716411	40.3521	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	15.42	120.9048	10.995672	23.3308	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	45.8664	438.8427	20.948572	10.7927	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	87.3352	846.8185	29.100146	6.3444	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	155.4596	1282.524	35.812351	3.25303	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	222.4924	1345.121	36.675894	1.34873	0.09	0.91
1.3	0.61	0.8	0.71420	0.57447	285.6784	1060.423	32.564133	-0.42133	0.66	0.34
1.4	0.71	1.4	0.83890	0.74170	335.5604	630.7938	25.115608	-2.53238	0.99	0.01
1.5	0.81	2.0	0.92135	0.86577	368.54	285.5796	16.8991	-5.71521	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	388.7524	81.69222	9.0383749	-12.922	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	396.0752	21.5749	4.6448794	-26.7213	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	399.0644	3.510254	1.8735671	-67.8418	1.00	0.00

**QUANTILE TEST**

From NUREG 1505, Table A.7c Values of *r* and *k* for the Quantile Test When α is Approximately 0.05

20 *n* (number of survey unit measurements)
 20 *m* (number of reference area measurements)

Use:
m = 20
n = 20
 4 *r*
 4 *k*
 0.053 α

If *k* or more of the *r* largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

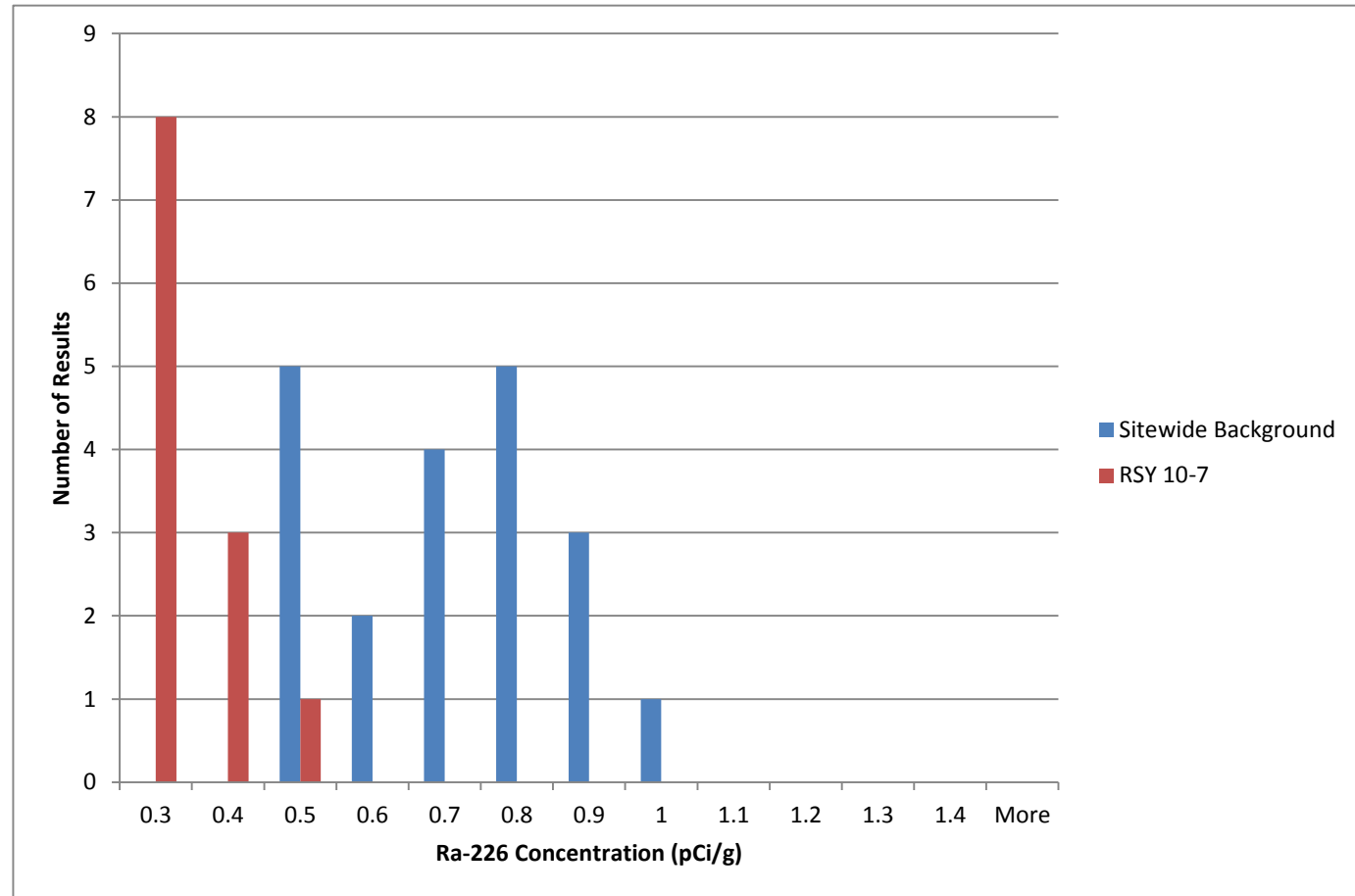
0 of the largest 4 adjusted measurements are from S.

The null hypothesis is accepted.

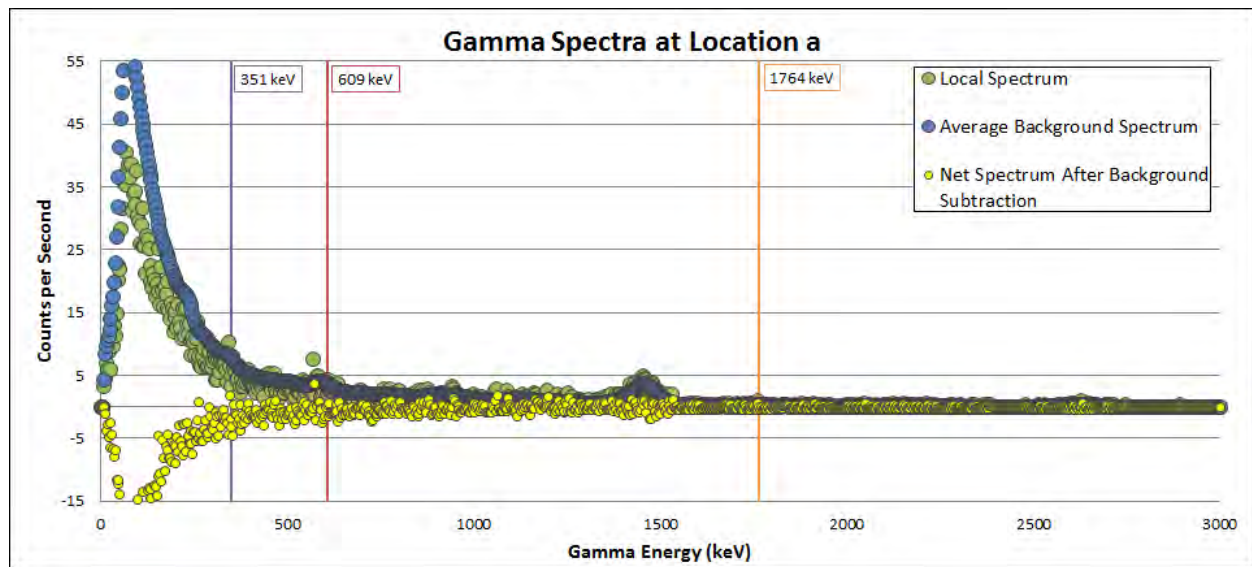
Histogram, RSY 10 (Use 7) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 10-7	
<i>Bin</i>	<i>Frequency</i>
0.3	8
0.4	3
0.5	1
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0

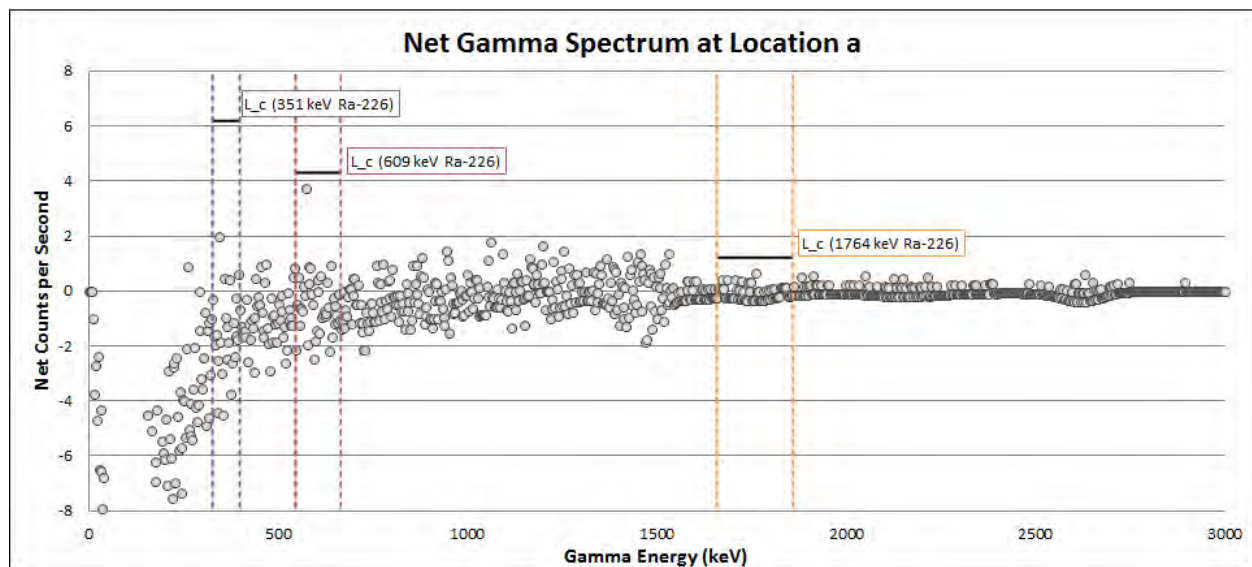


RSI Spectral Analysis Results: RSY 10 (Use 7, Part 1) – **Gamma Spectra at Location (a)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (a)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (a)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

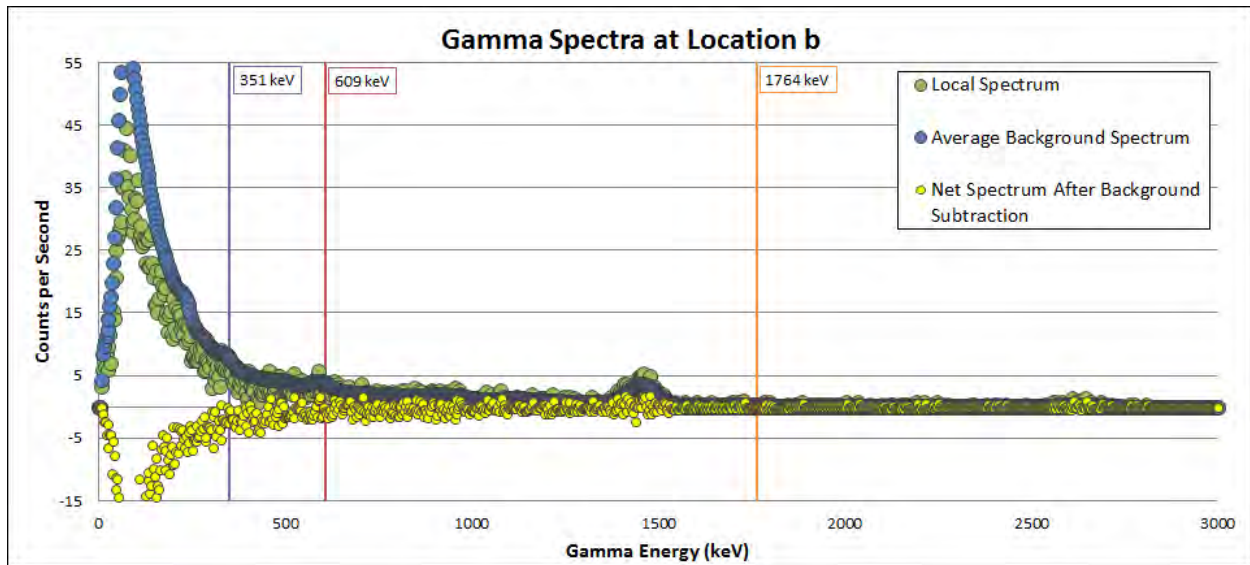
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

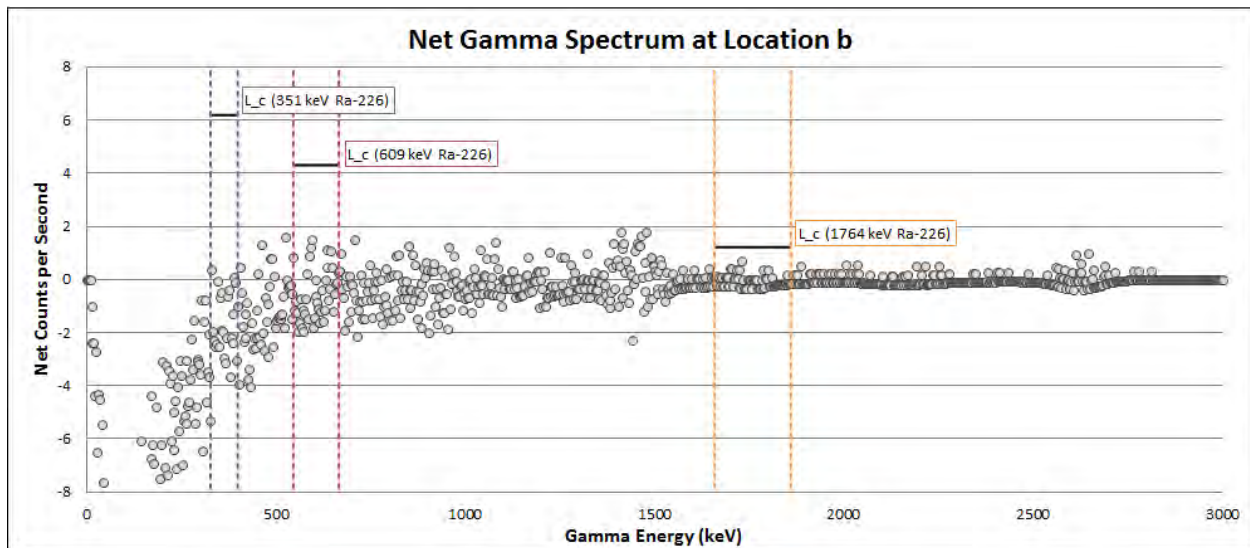
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 1) – **Gamma Spectra at Location (b)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (b)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (b)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

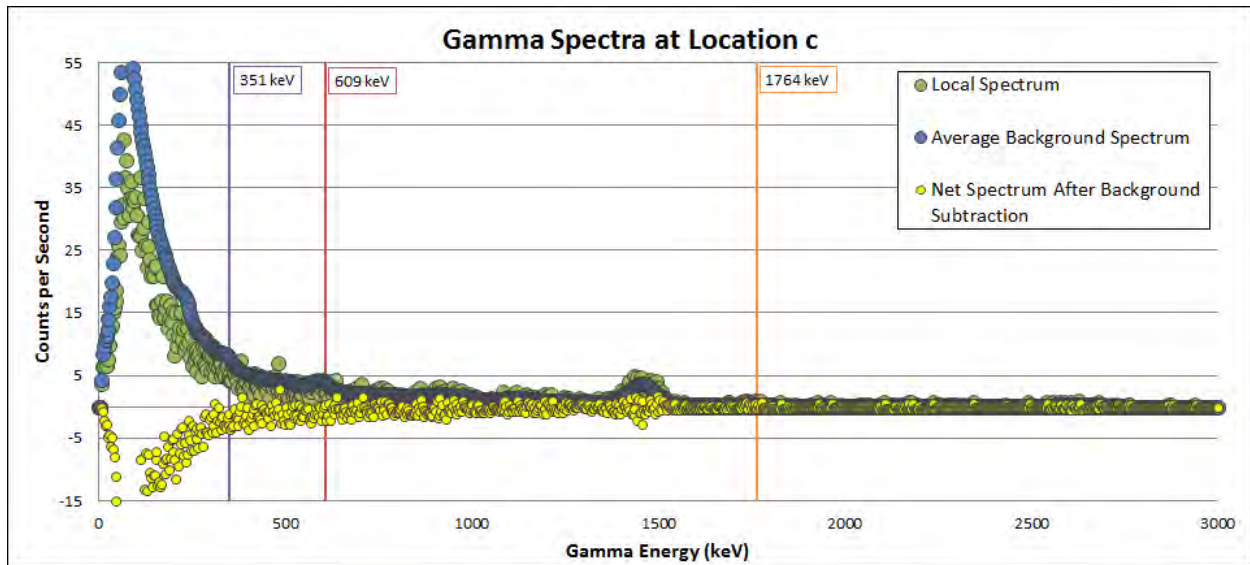
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

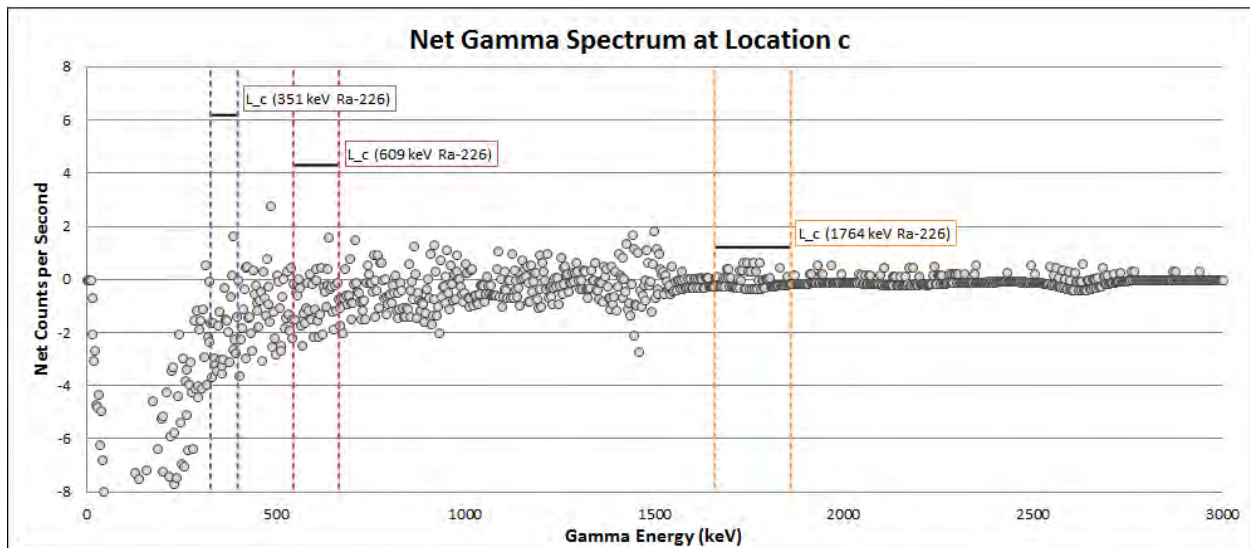
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 1) – **Gamma Spectra at Location (c)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (c)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (c)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

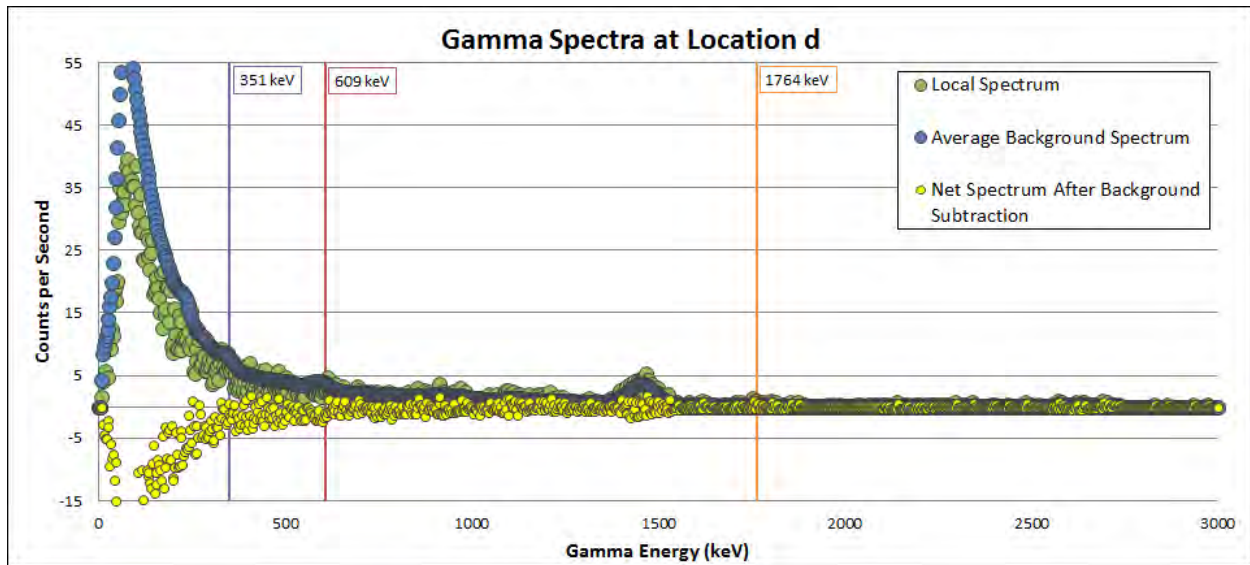
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

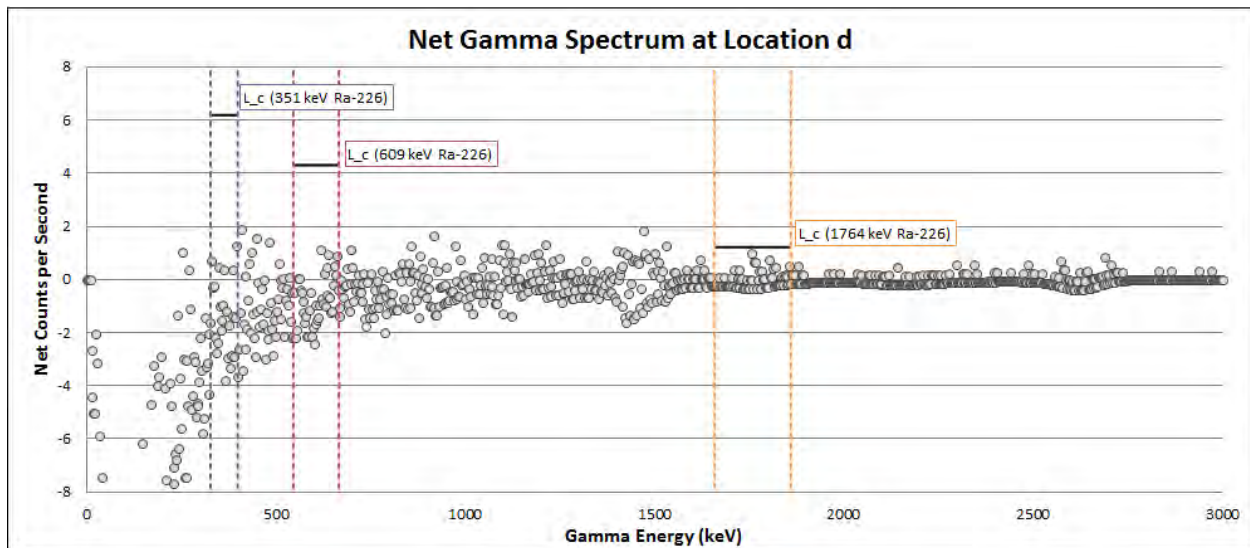
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 1) – **Gamma Spectra at Location (d)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (d)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (d)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

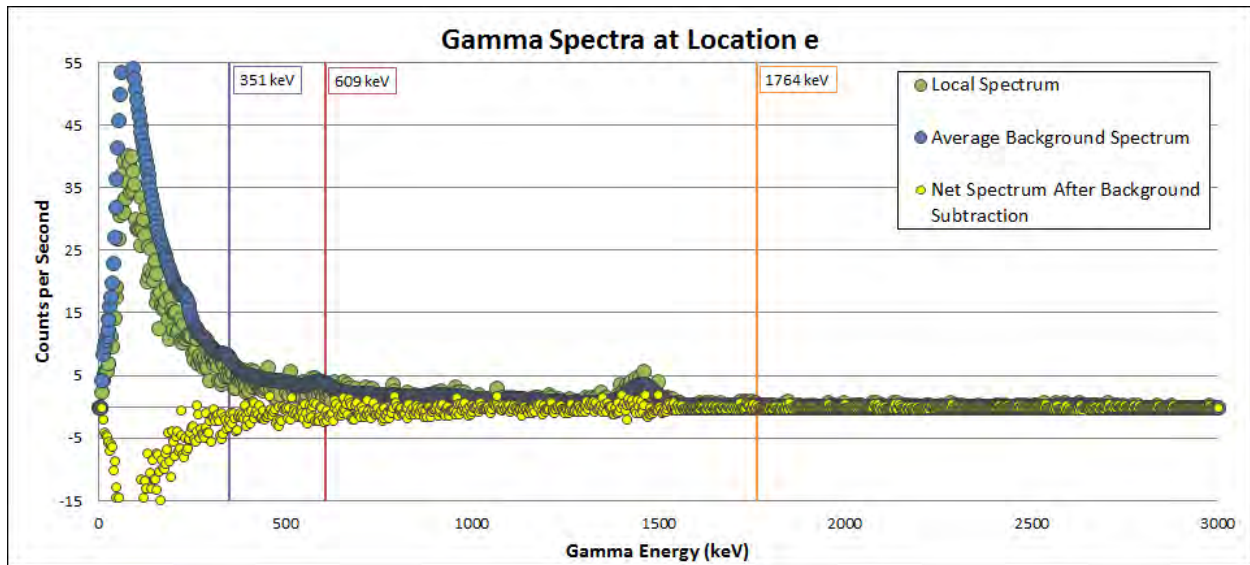
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

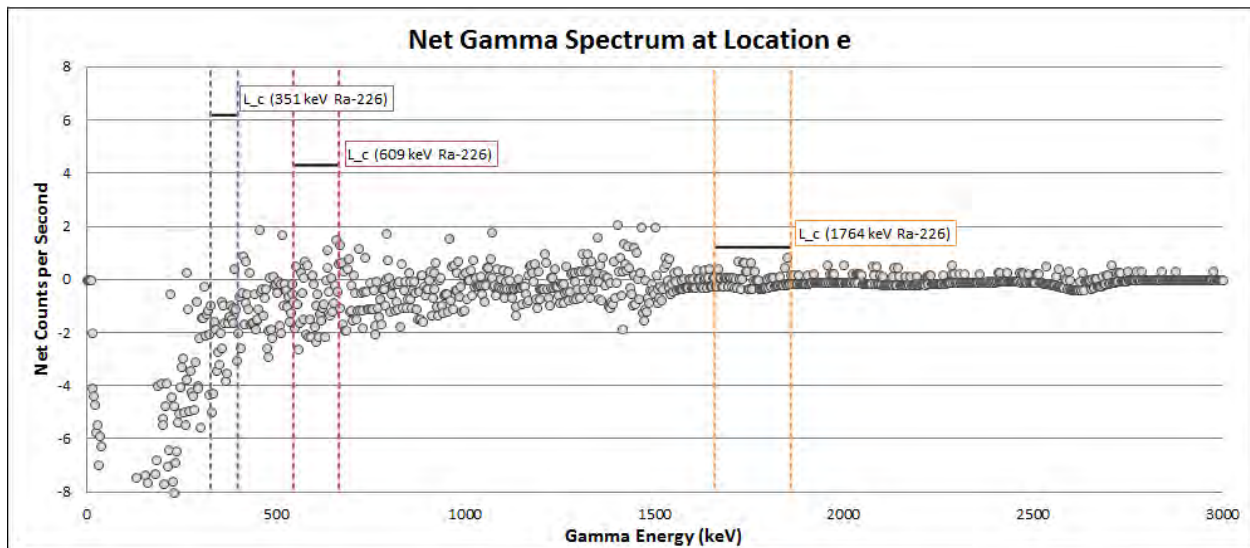
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 1) – **Gamma Spectra at Location (e)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (e)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (e)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

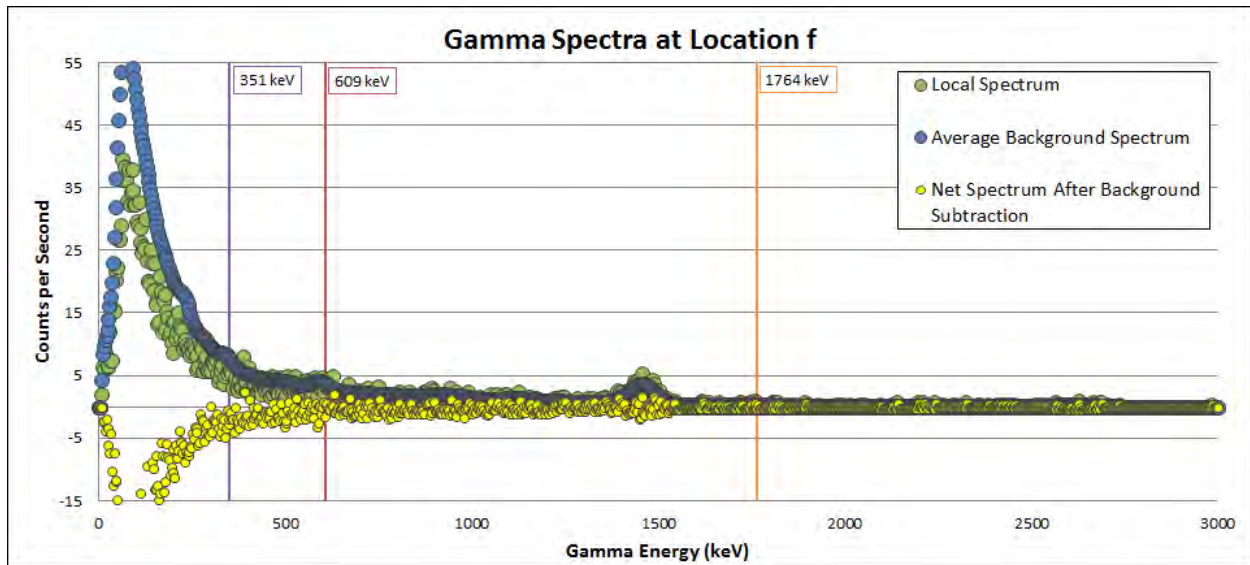
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

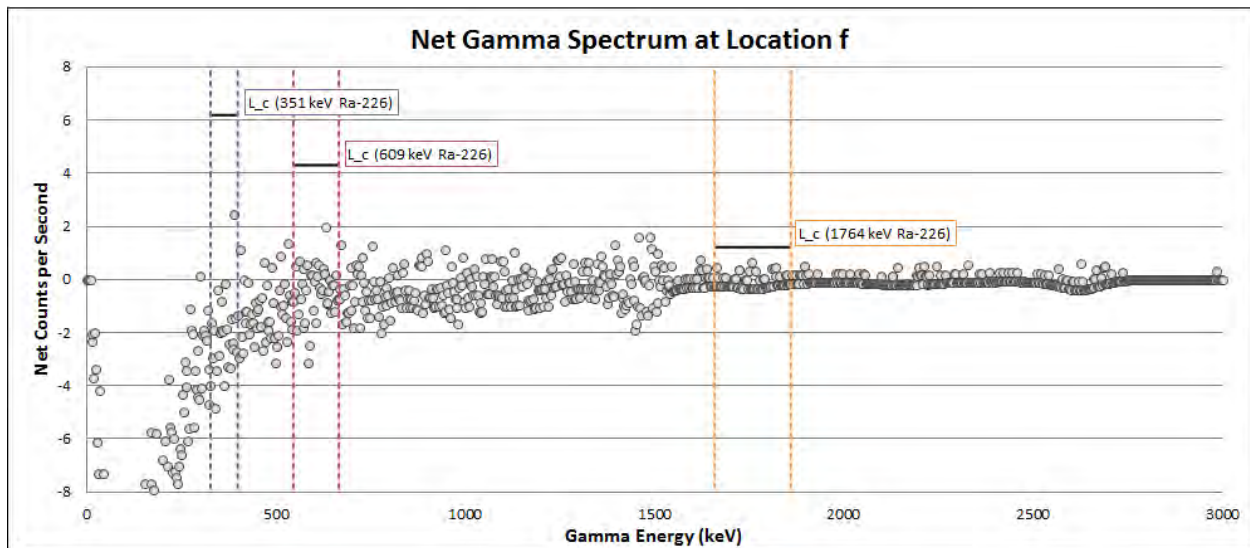
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 1) – **Gamma Spectra at Location (f)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (f)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (f)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

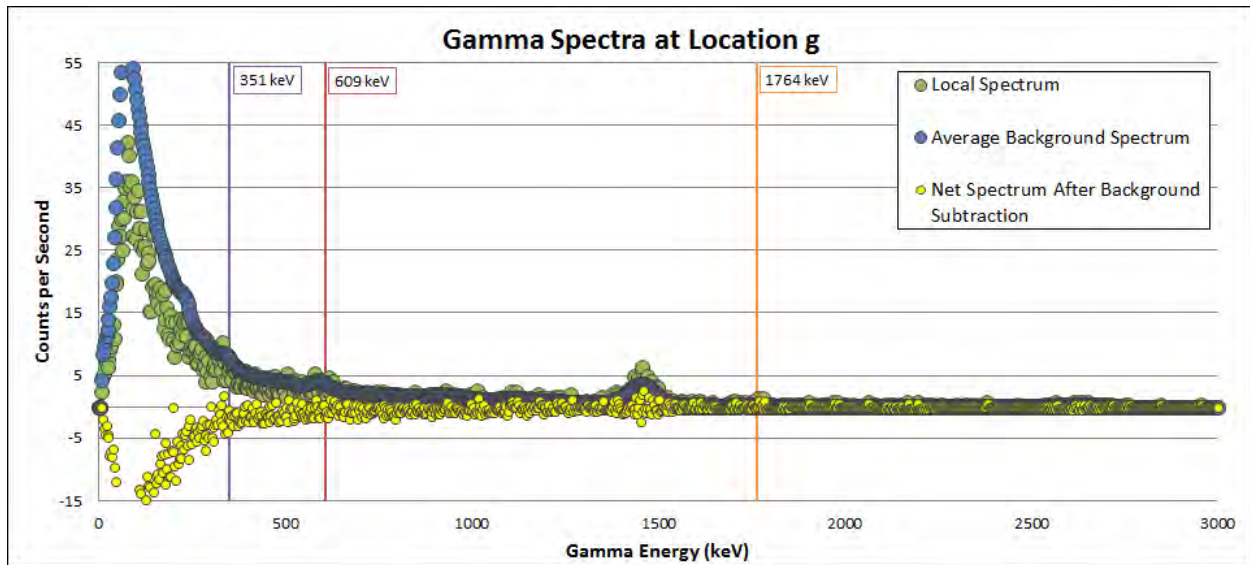
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

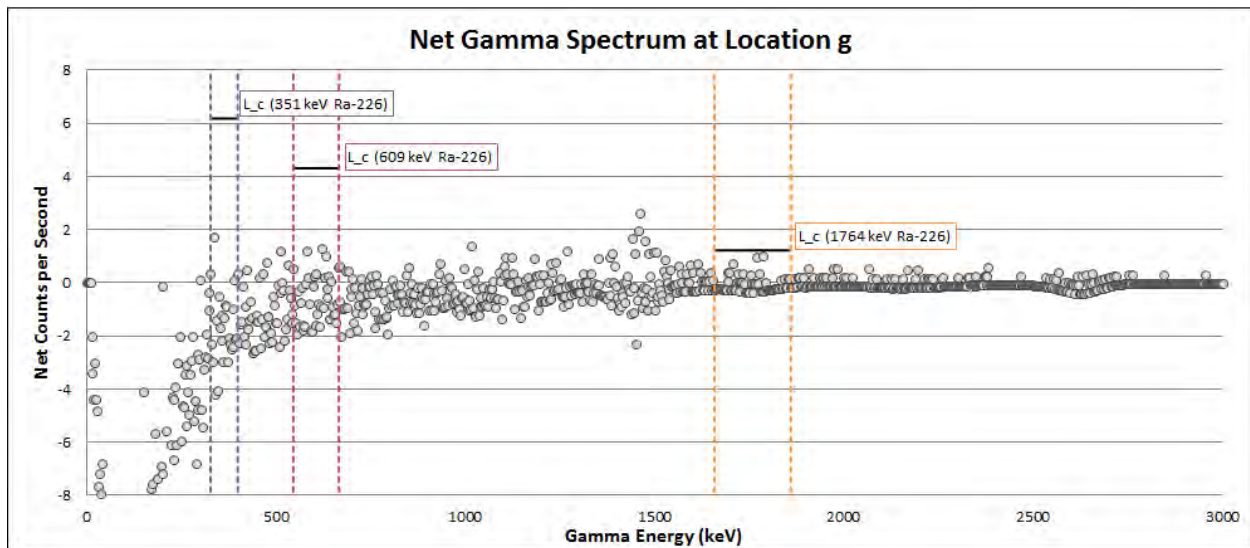
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 1) – **Gamma Spectra at Location (g)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (g)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (g)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

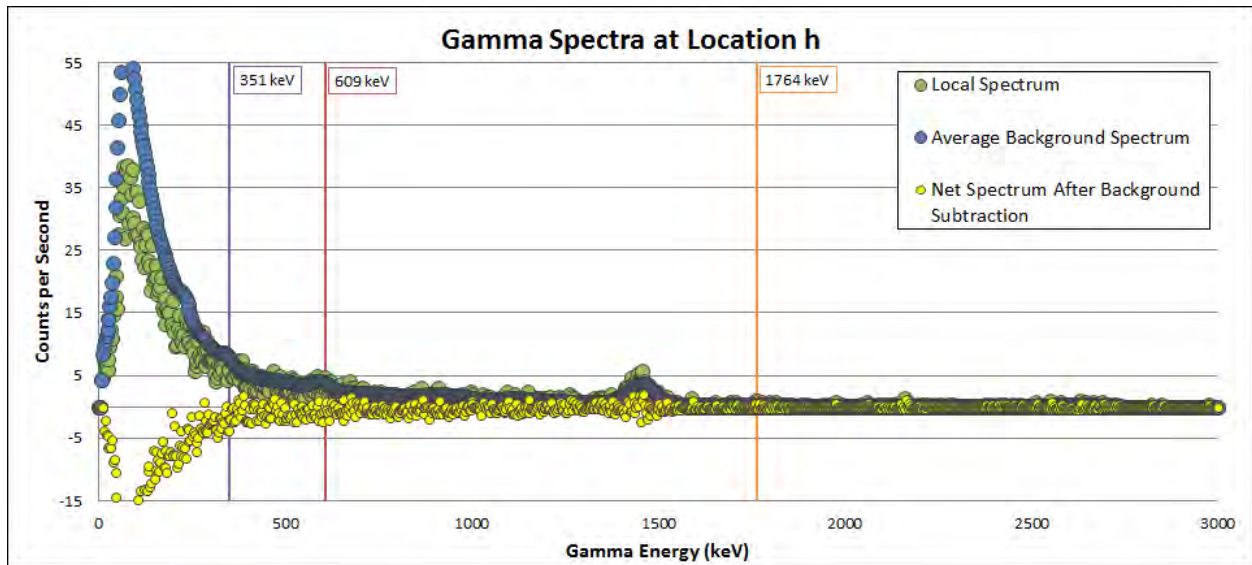
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

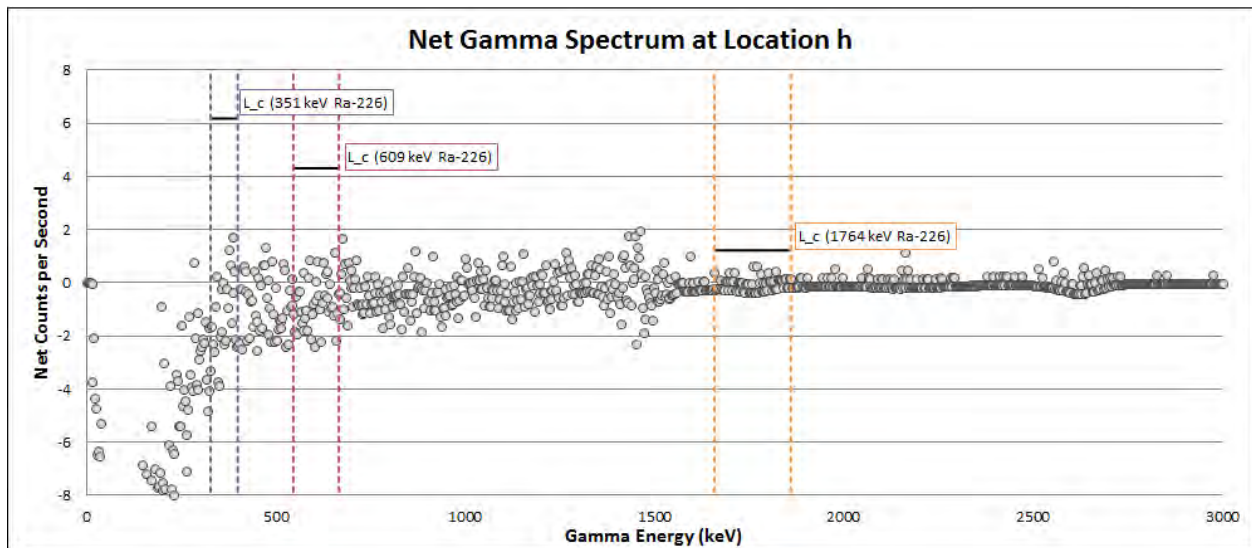
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 1) – **Gamma Spectra at Location (h)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (h)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (h)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

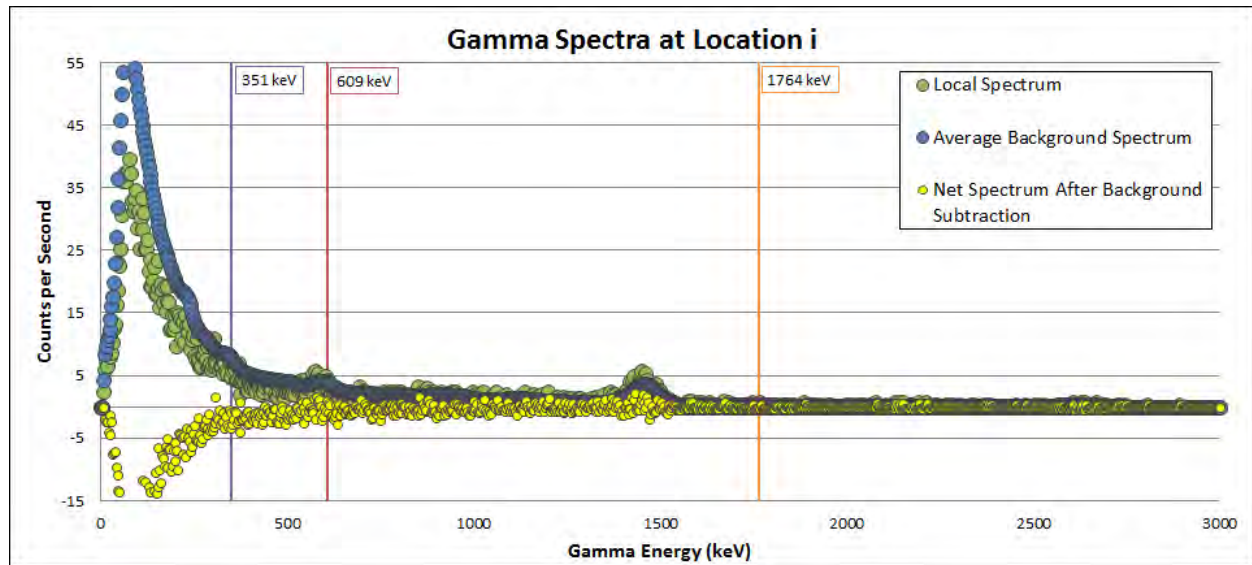
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

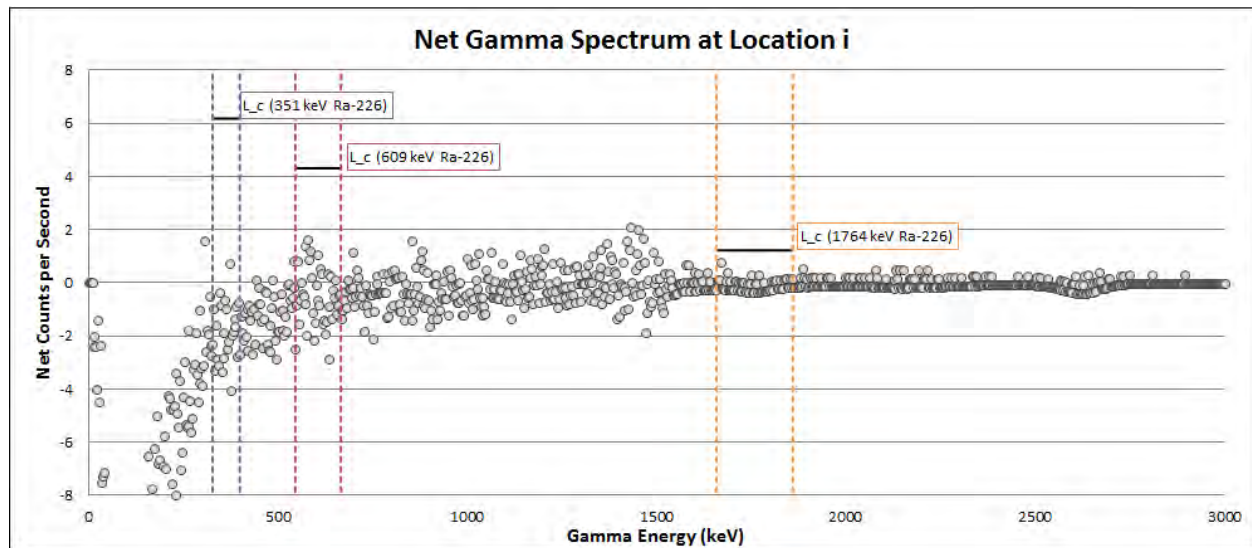
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 1) – **Gamma Spectra at Location (i)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (i)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (i)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

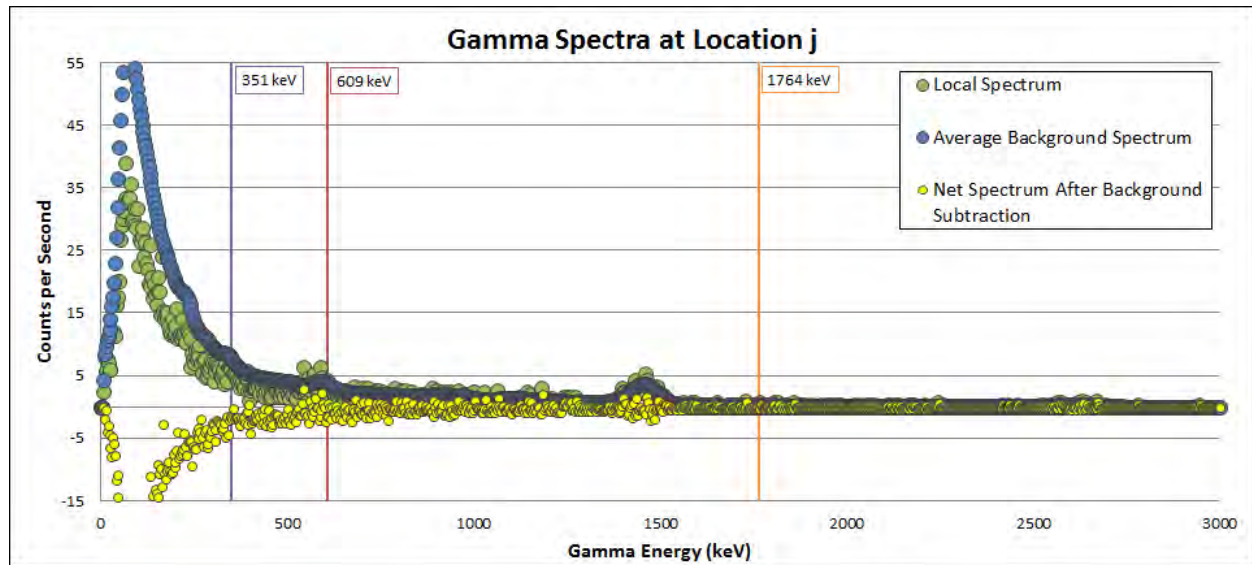
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

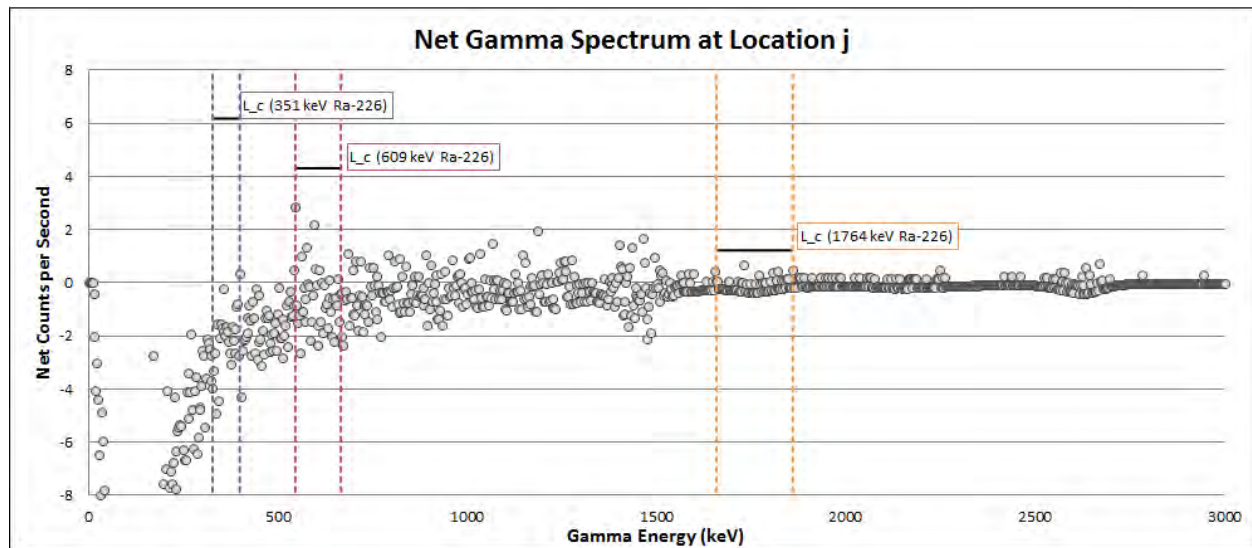
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 1) – **Gamma Spectra at Location (j)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (j)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (j)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

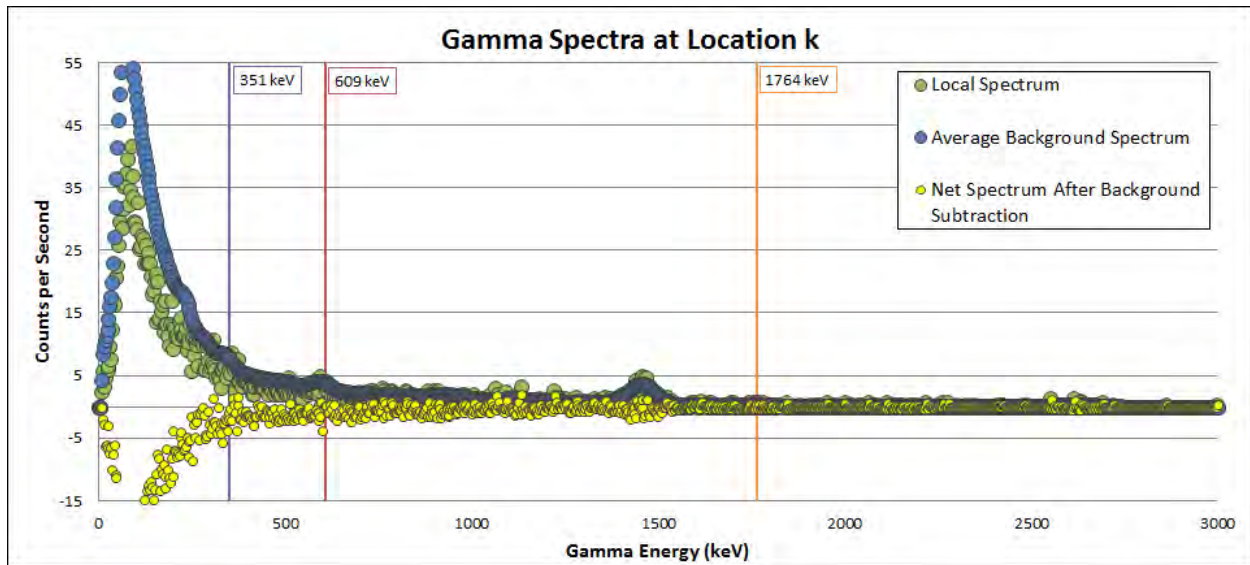
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

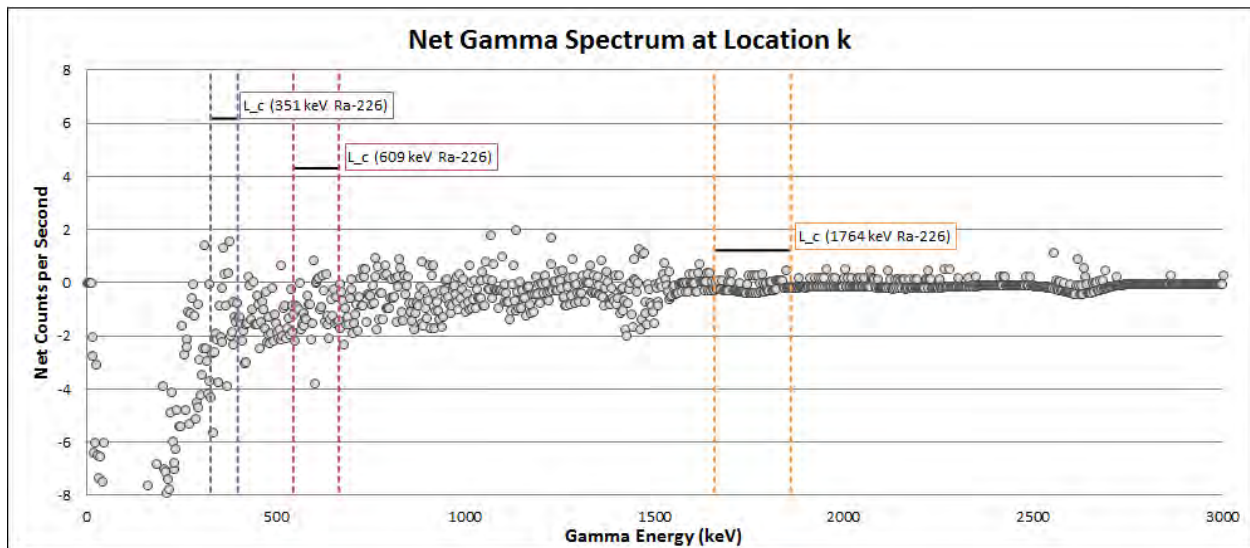
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 1) – **Gamma Spectra at Location (k)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (k)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (k)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

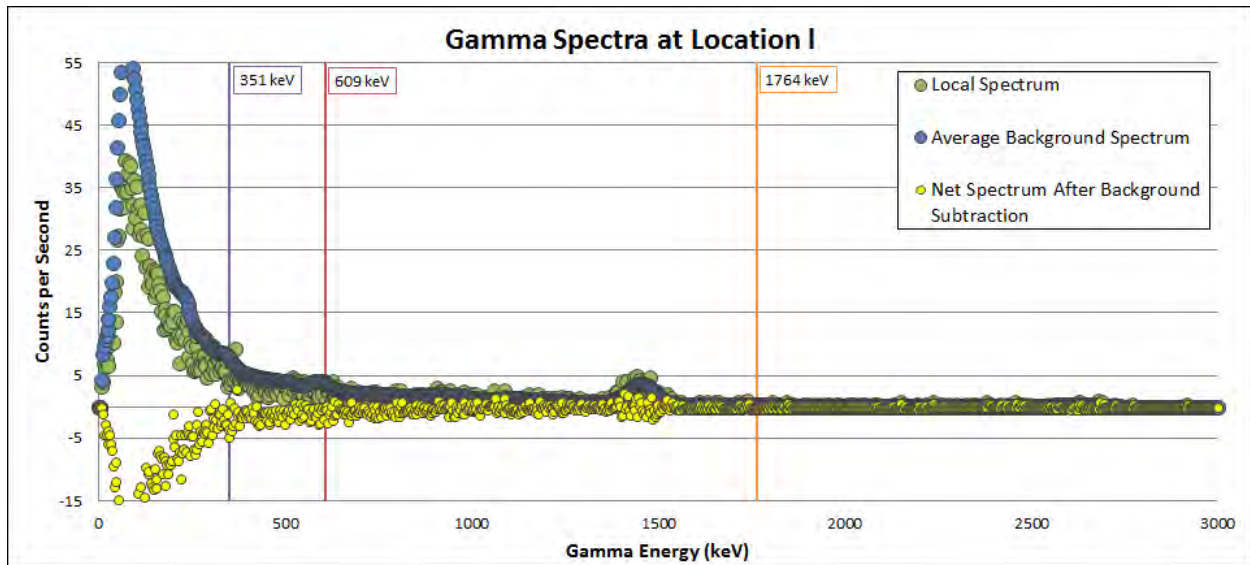
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

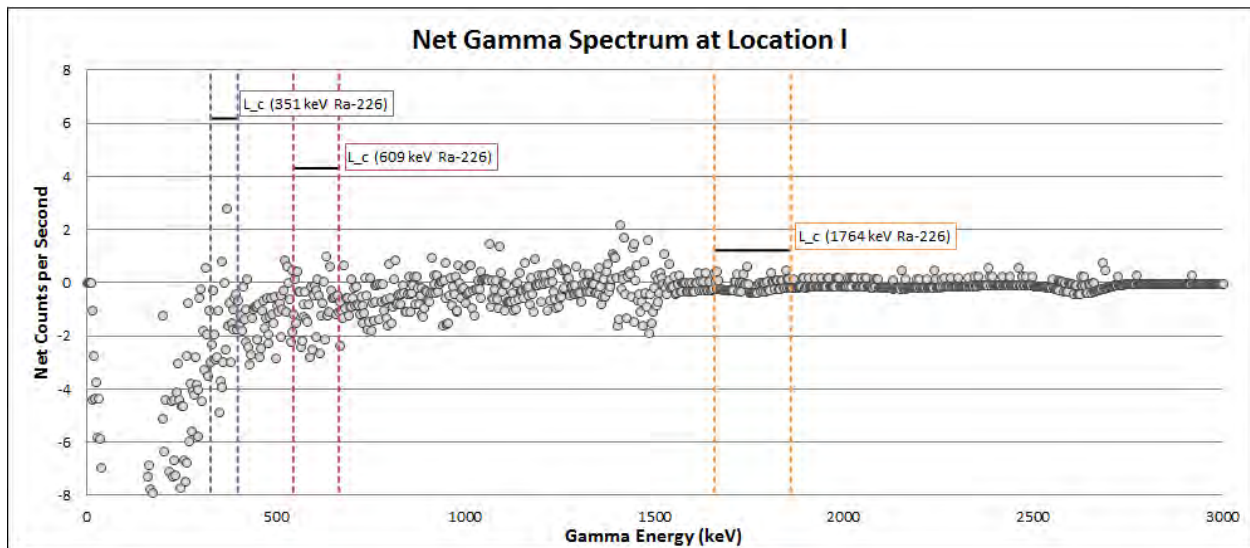
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 1) – **Gamma Spectra at Location (I)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (I)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (I)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

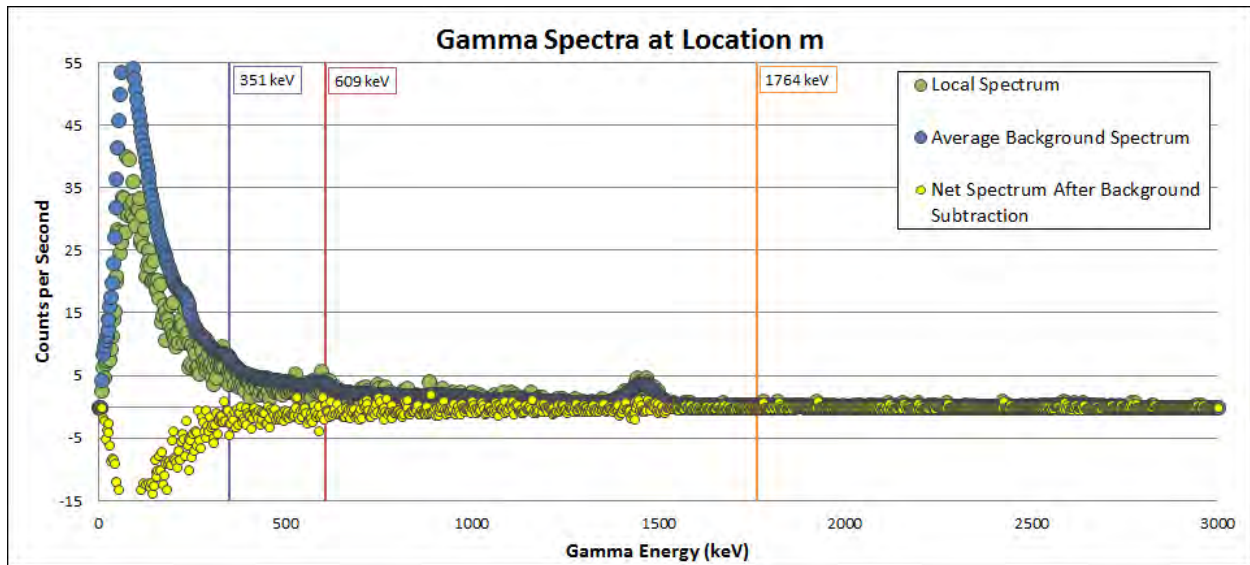
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

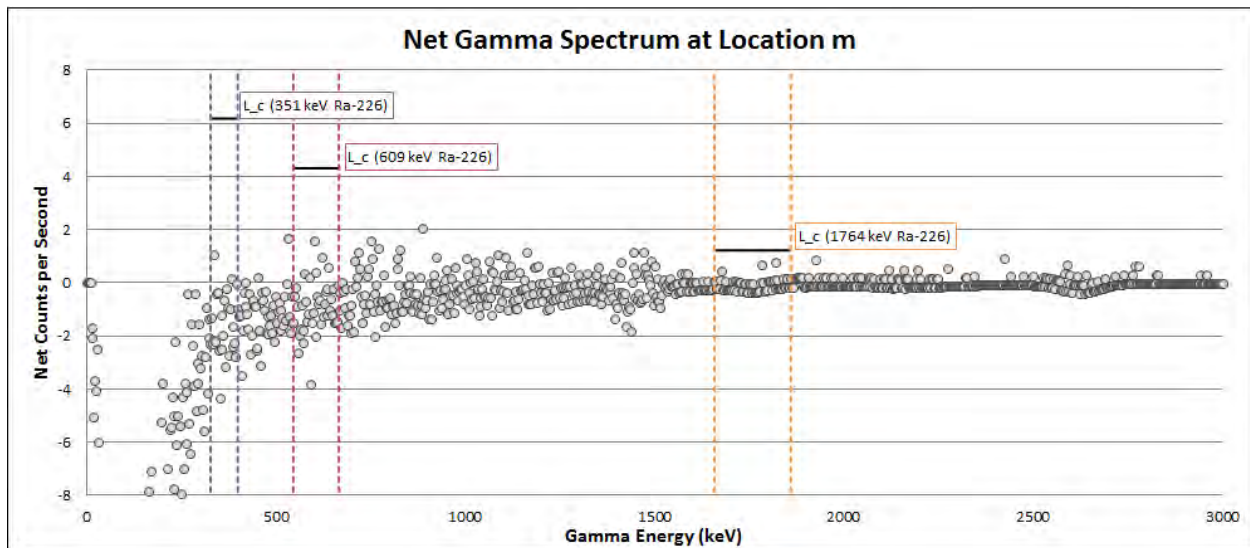
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 1) – **Gamma Spectra at Location (m)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (m)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (m)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

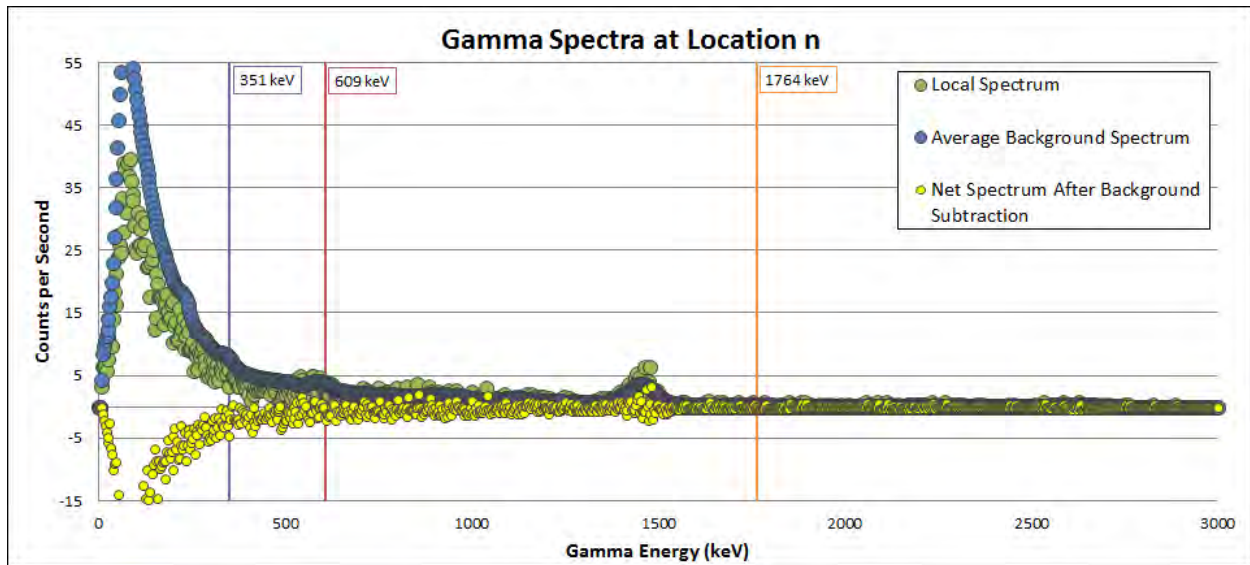
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

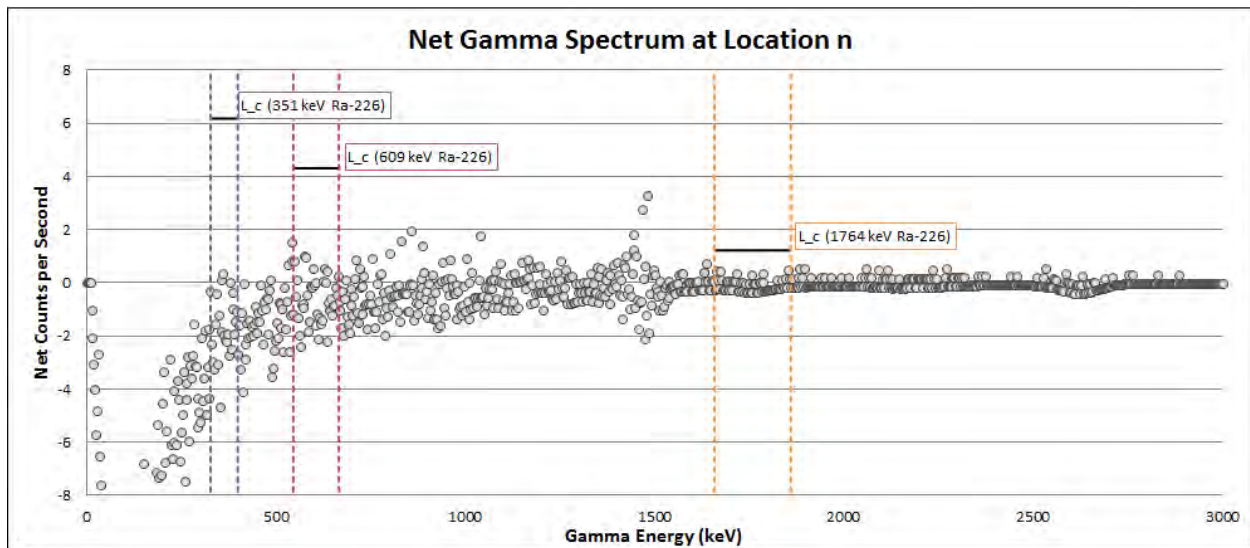
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 1) – **Gamma Spectra at Location (n)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (n)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (n)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

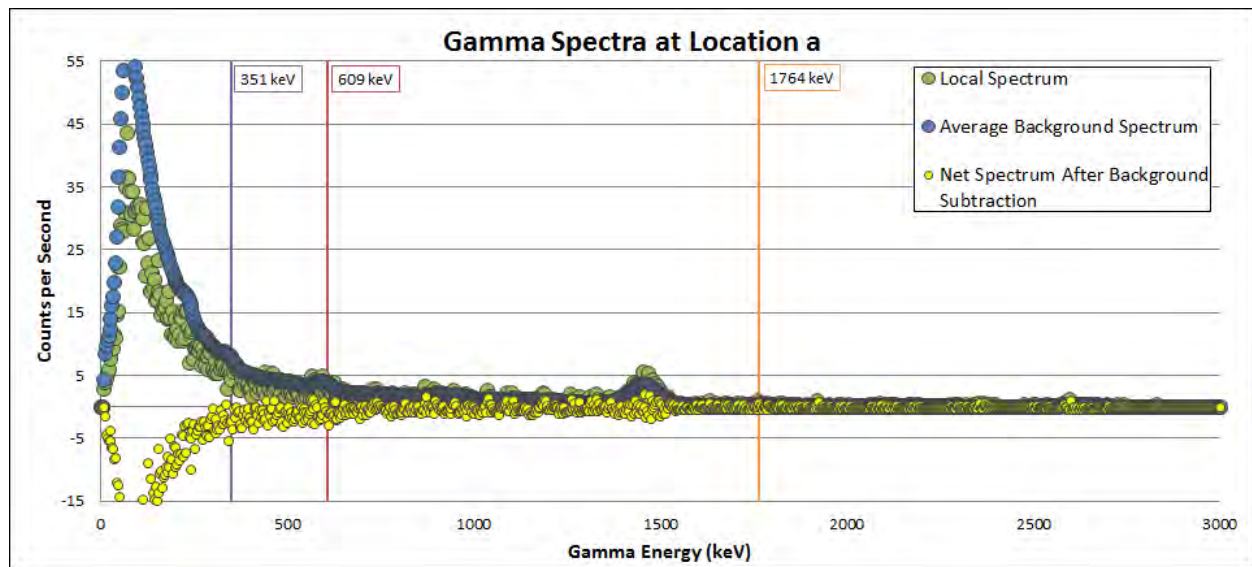
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

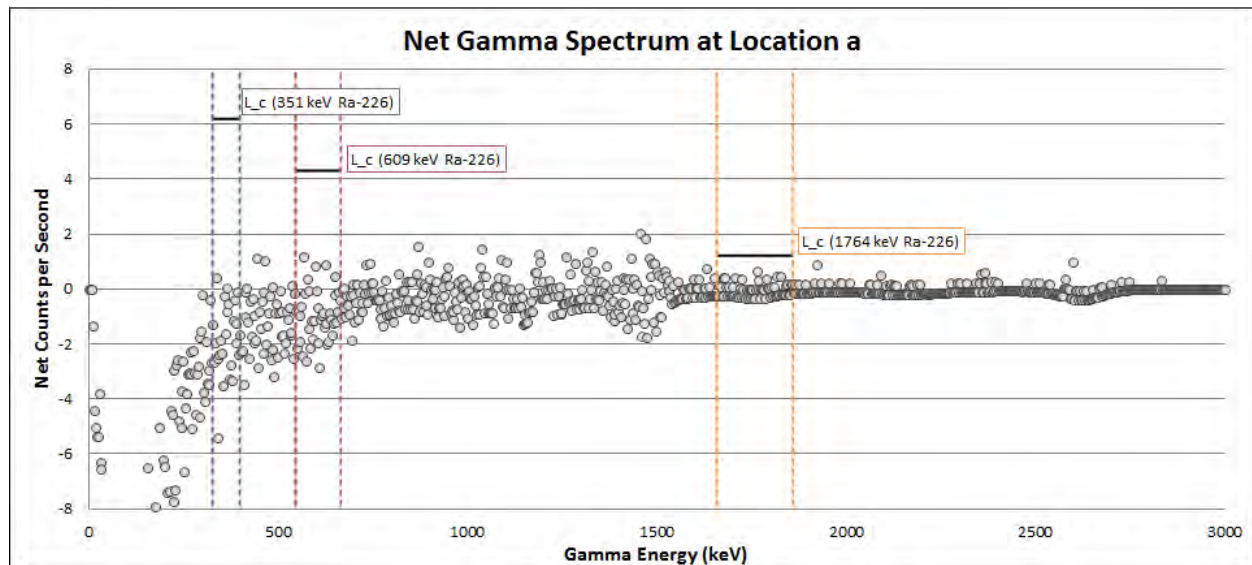
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (a)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (a)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (a): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

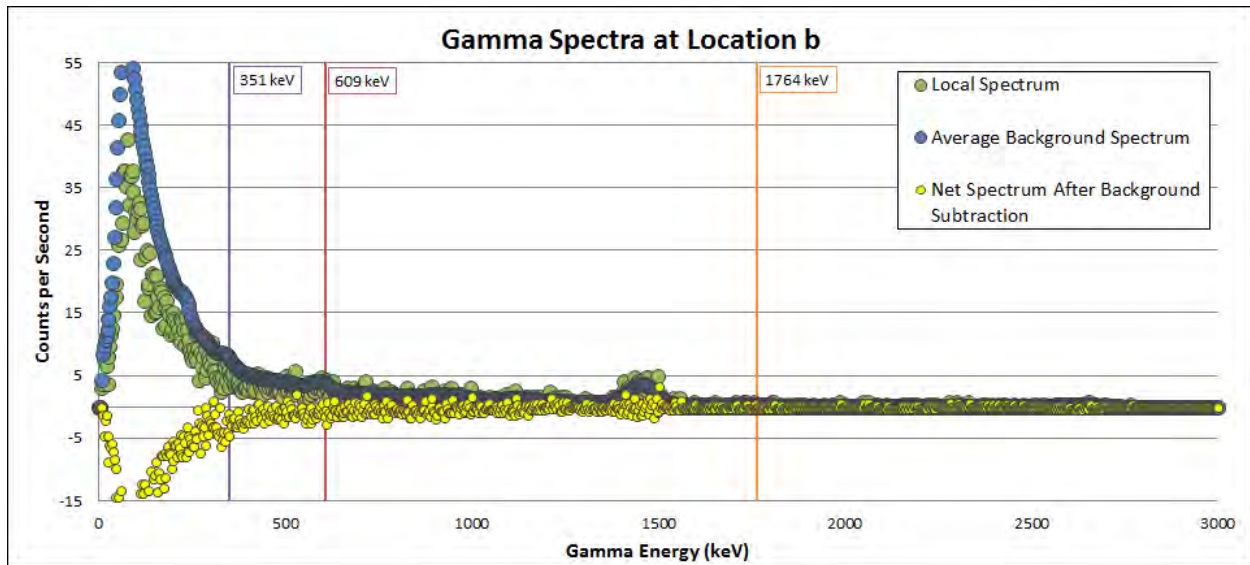
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

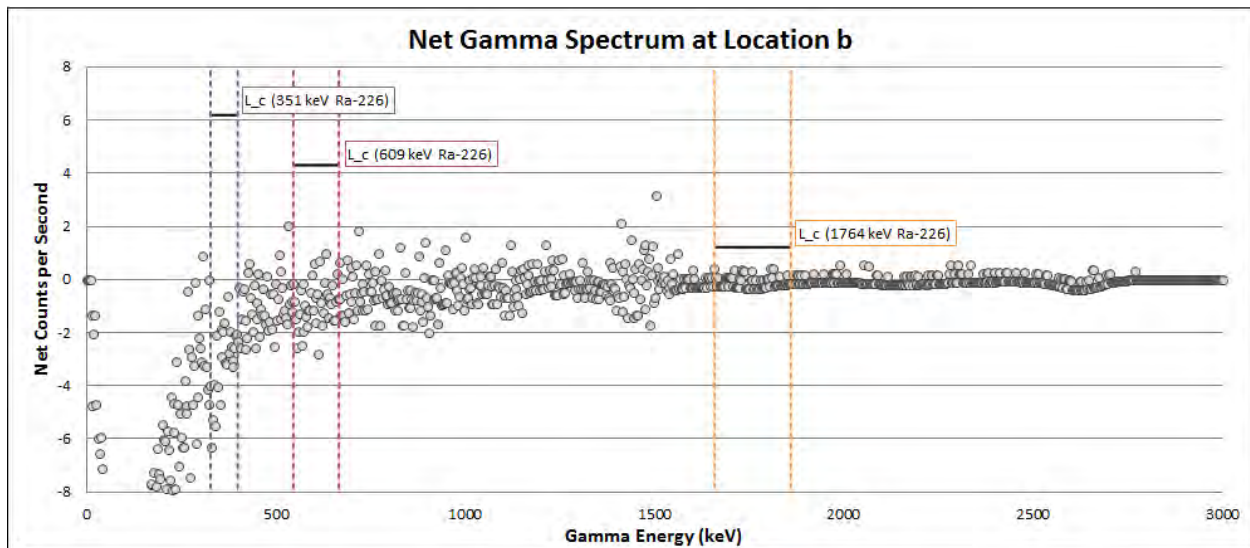
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (b)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (b)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (b)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

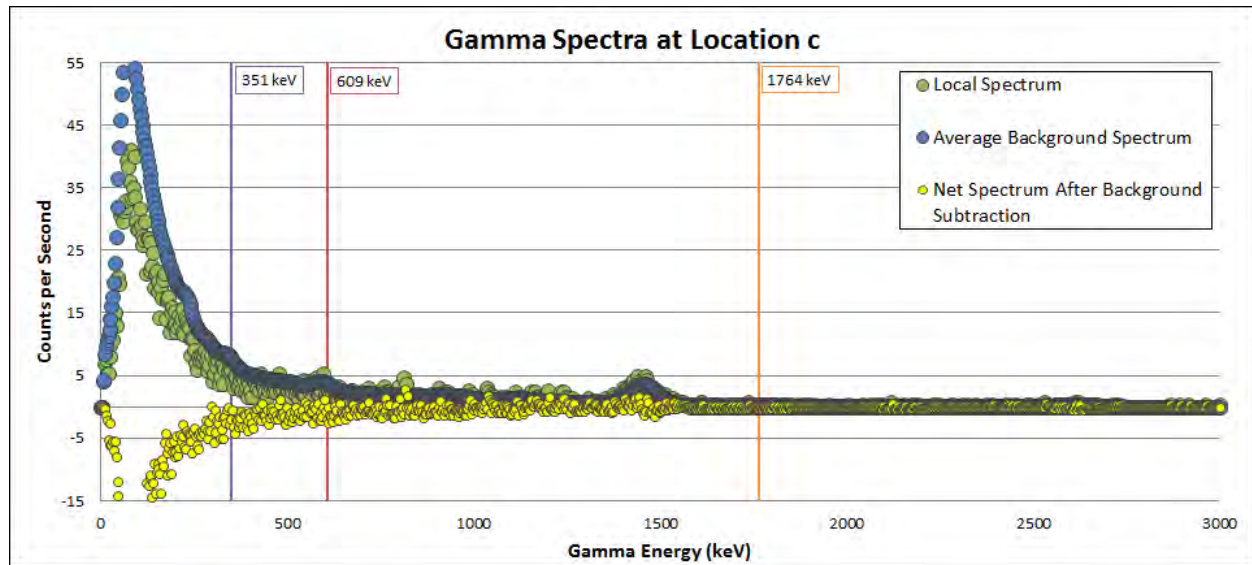
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

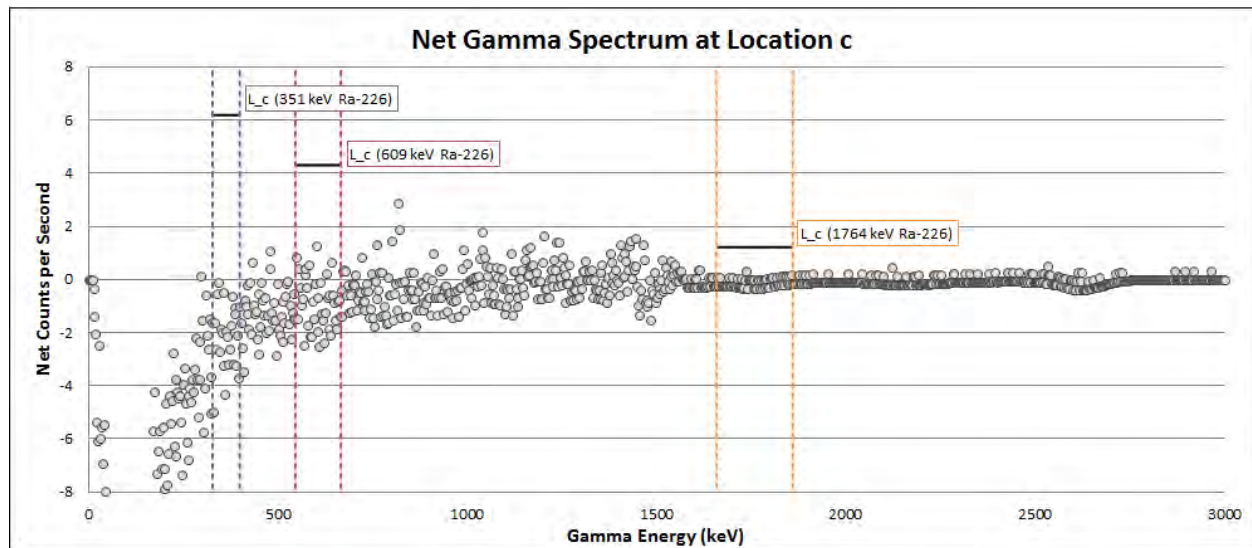
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (c)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (c)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (c)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

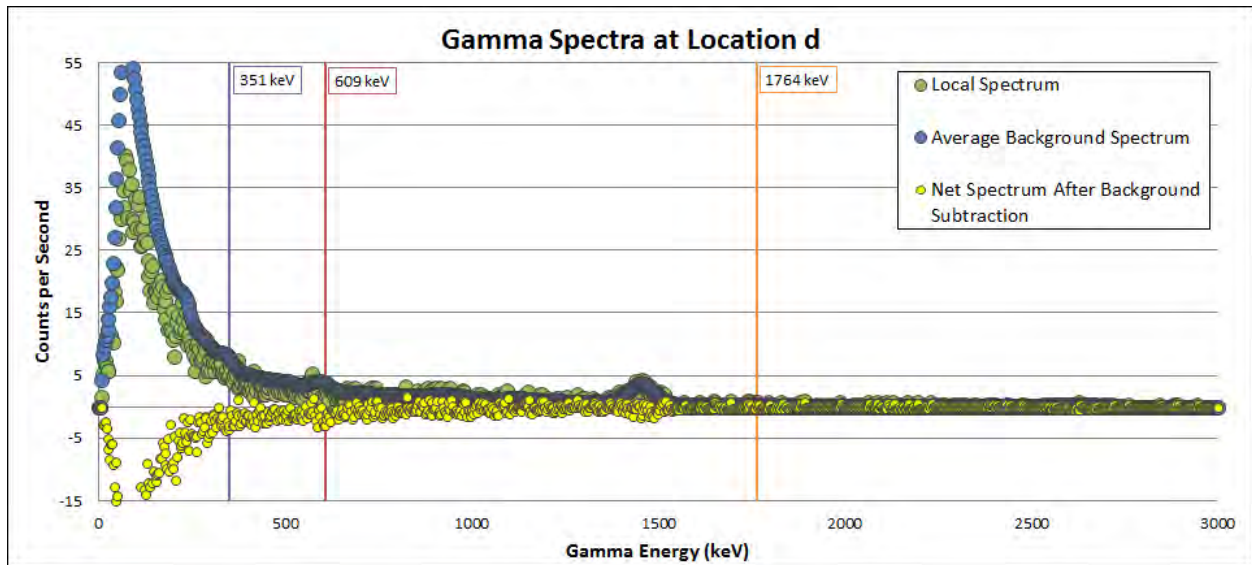
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

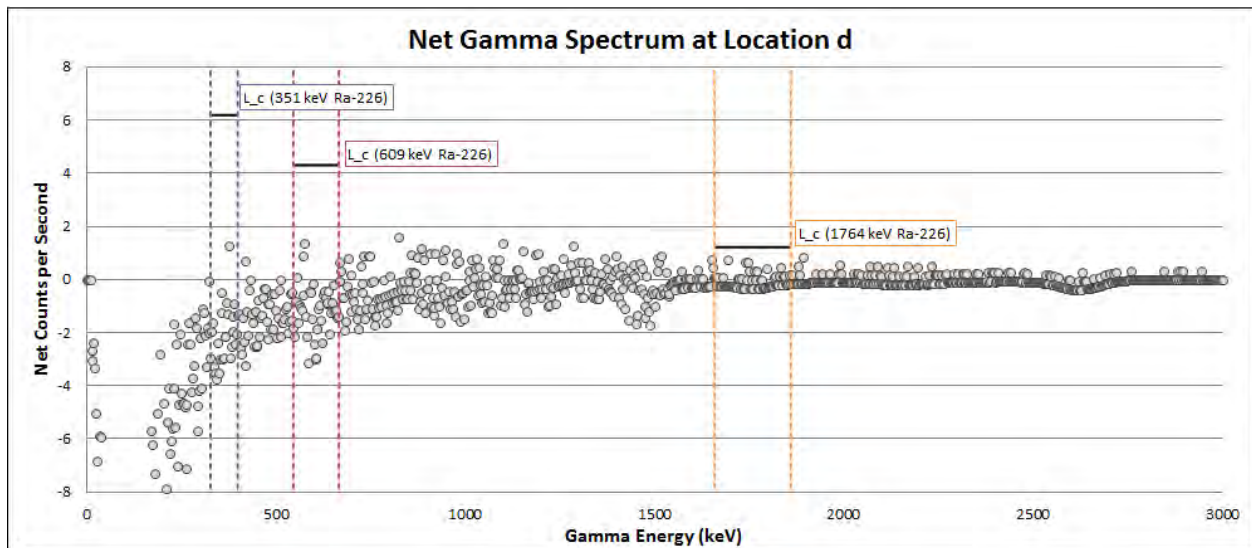
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (d)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (d)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (d)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

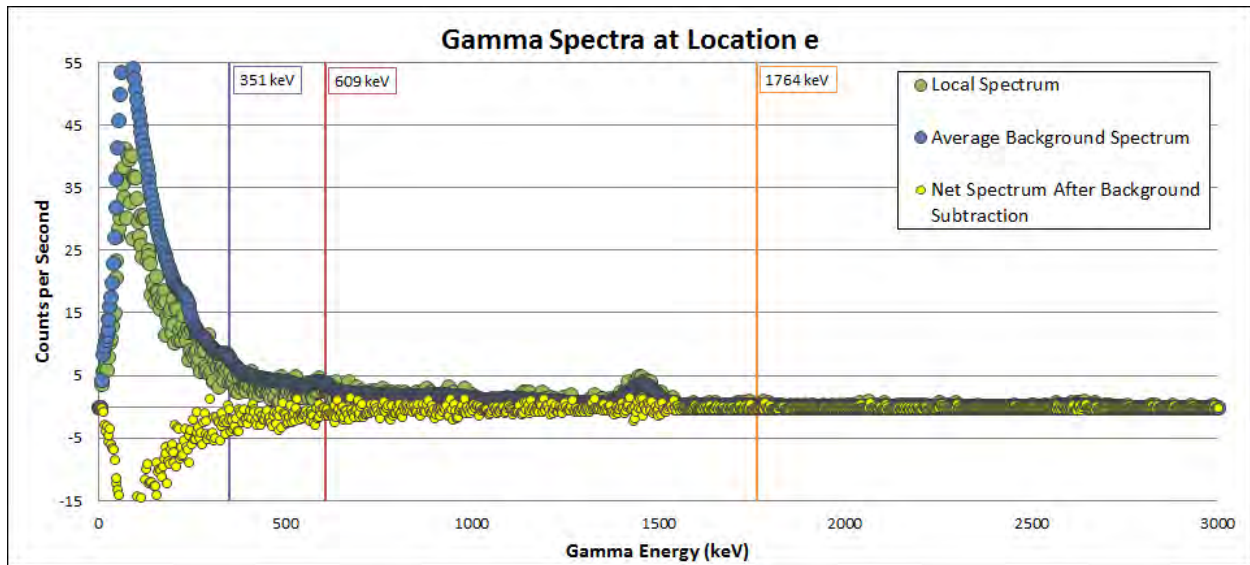
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

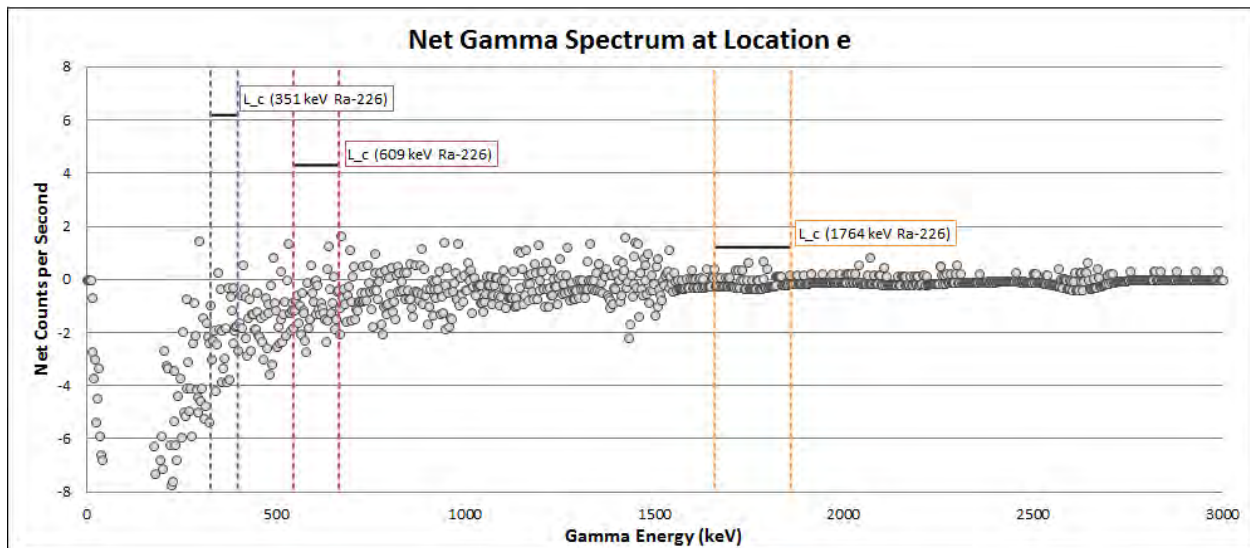
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (e)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (e)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (e)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

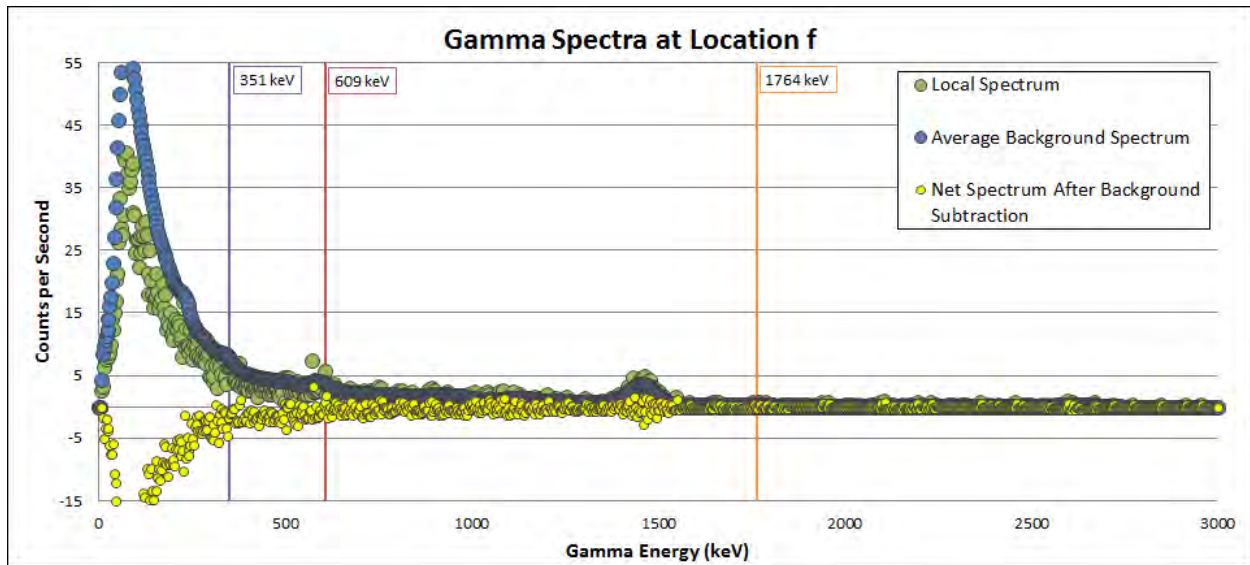
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

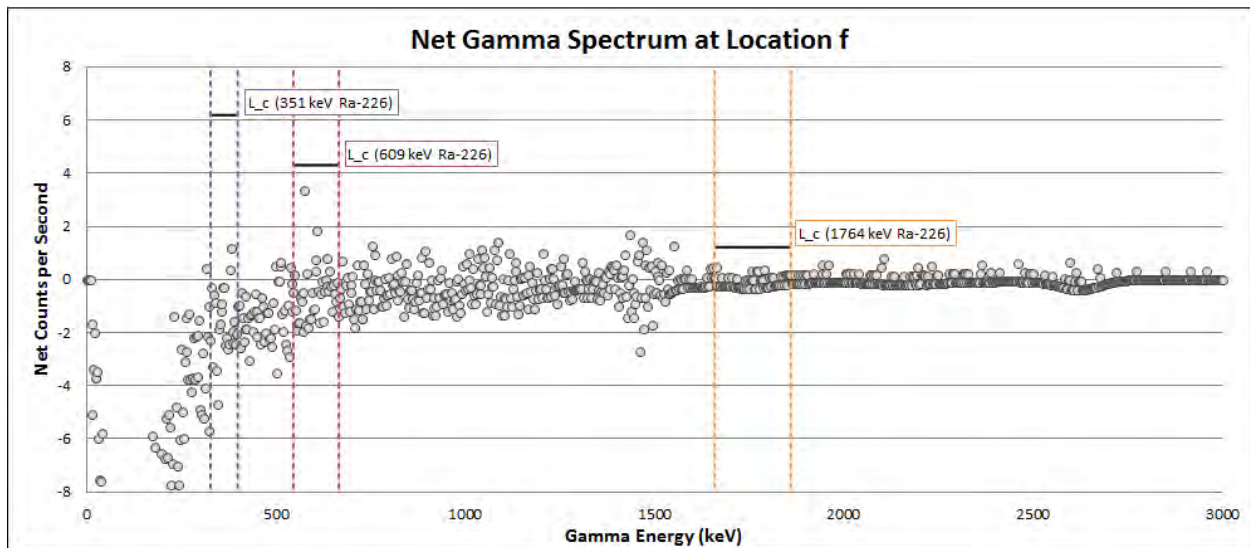
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (f)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (f)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (f)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

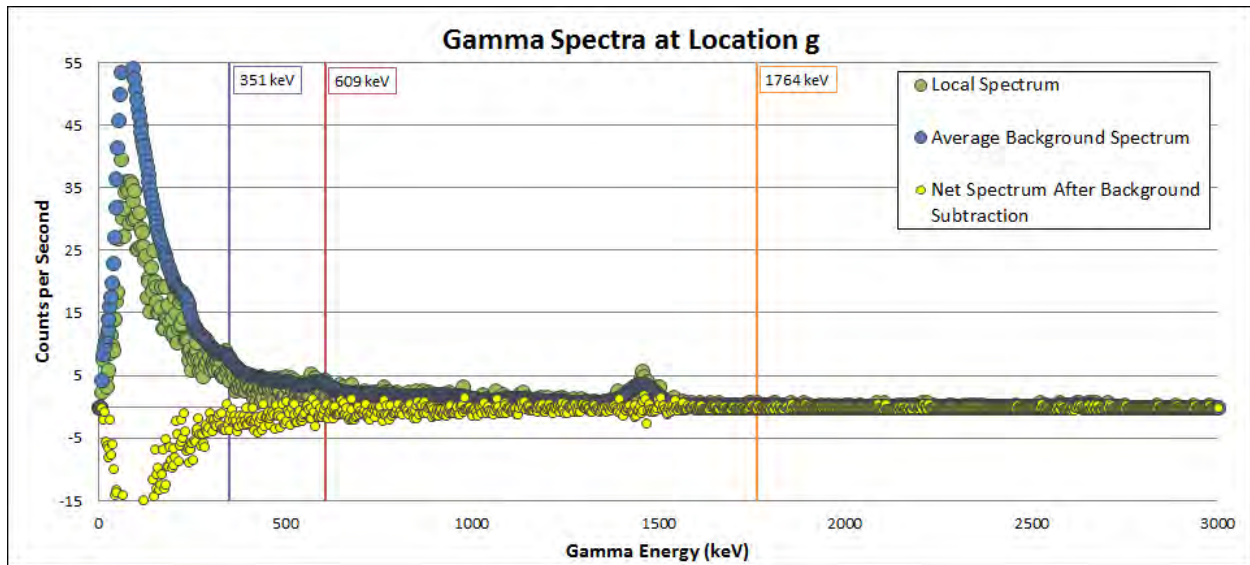
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

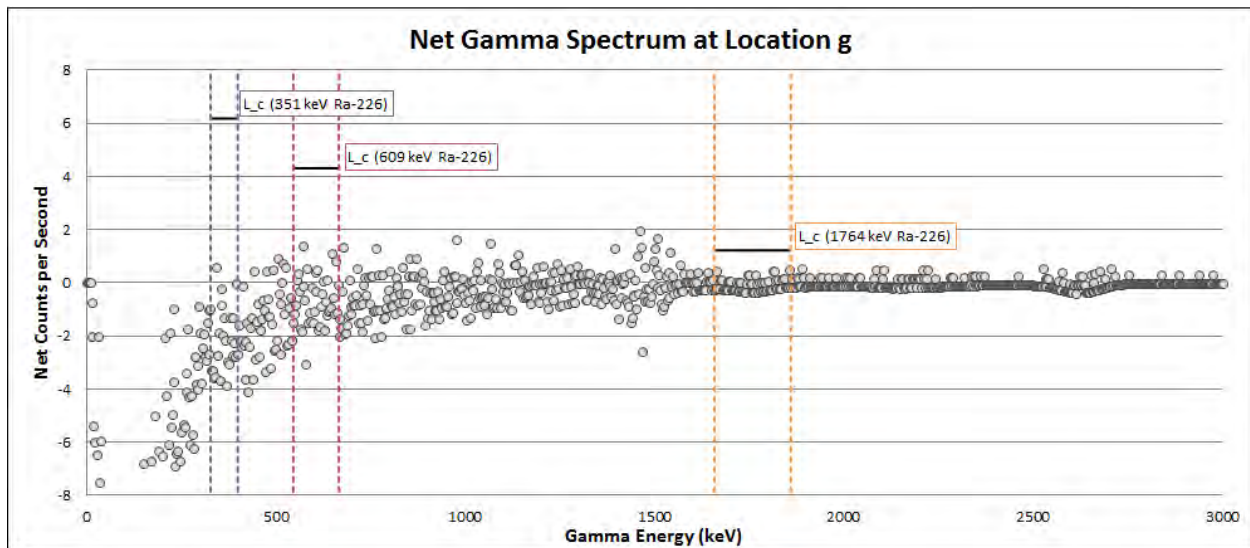
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (g)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (g)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (g)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

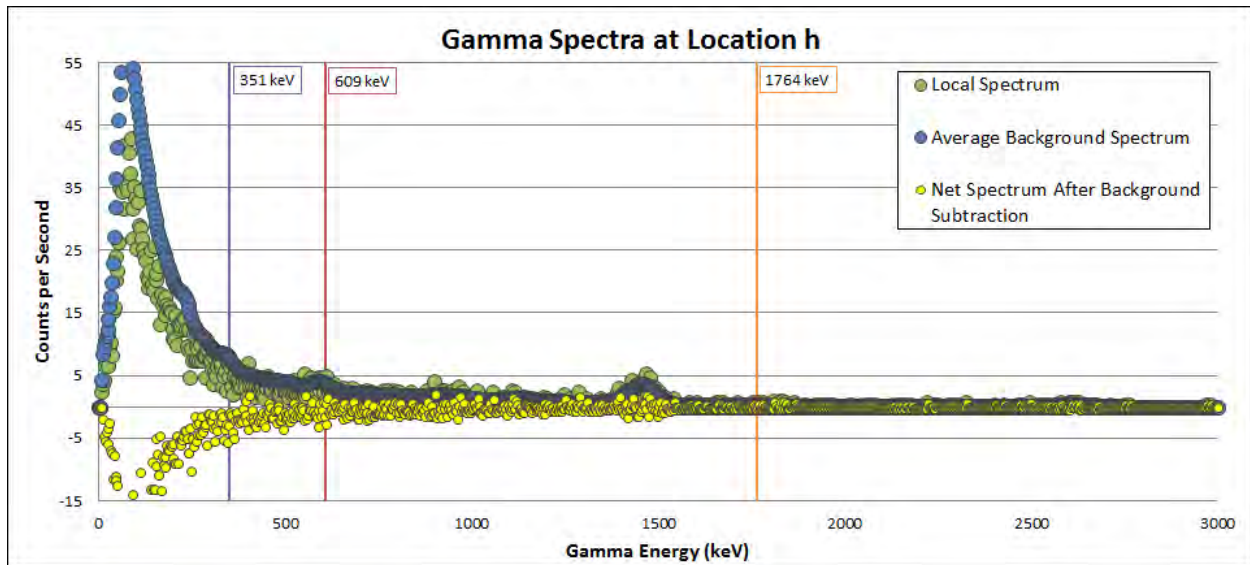
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

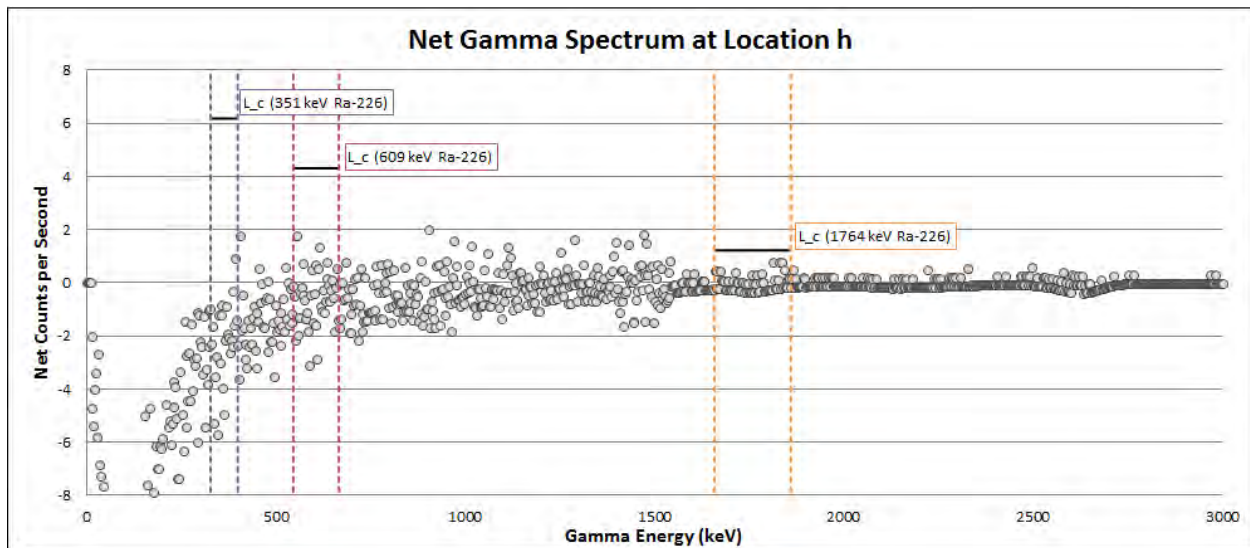
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (h)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (h)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (h)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

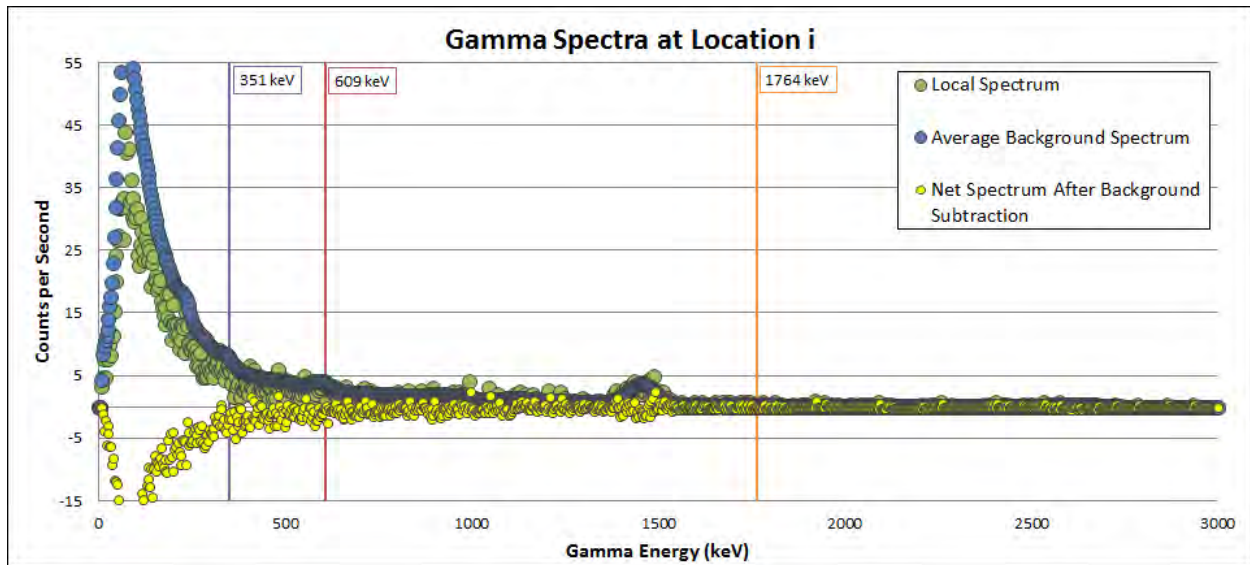
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

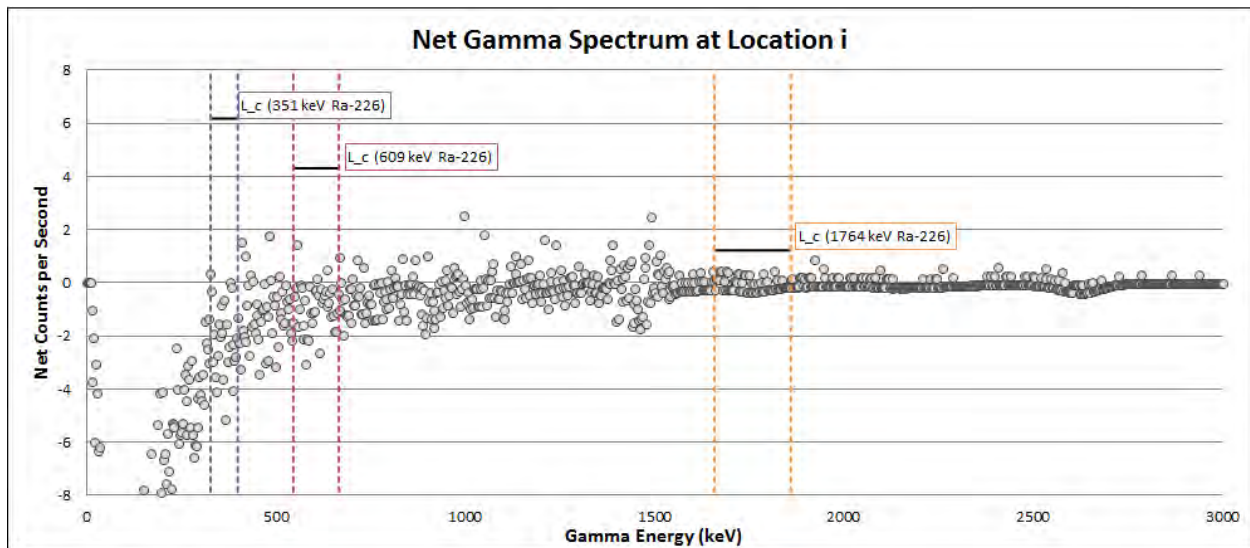
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (i)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (i)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (i)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

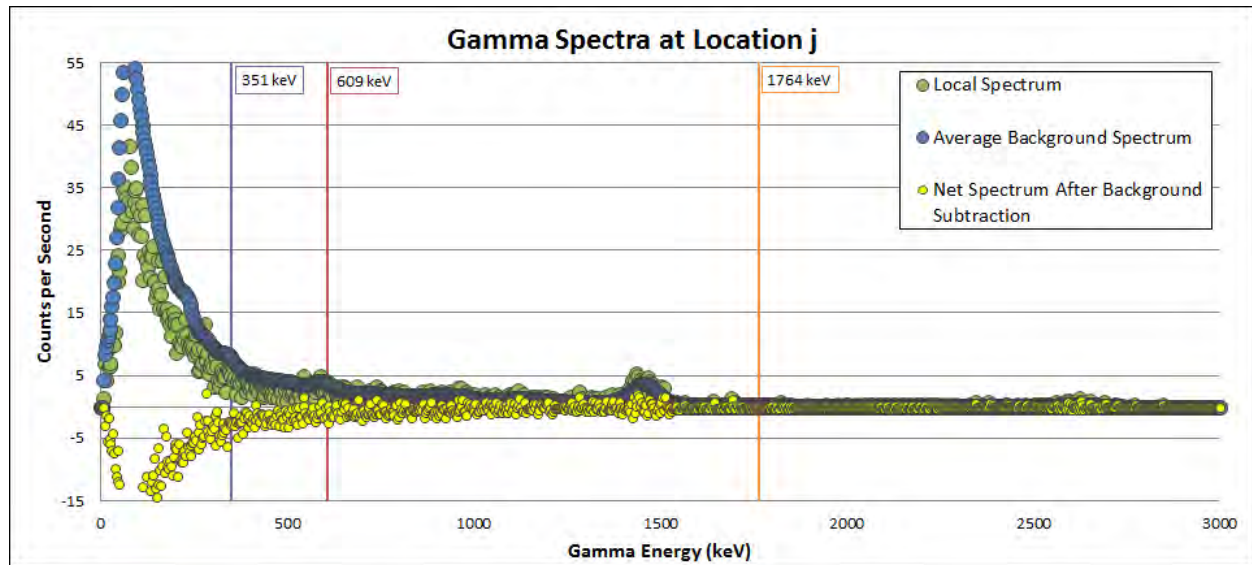
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

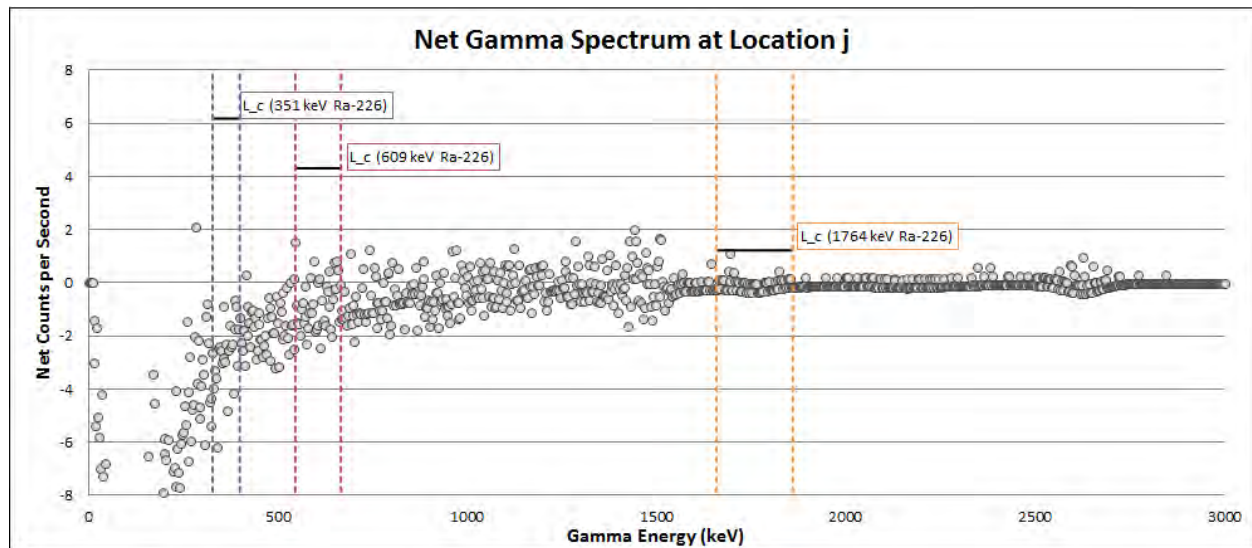
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (j)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (j)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (j)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

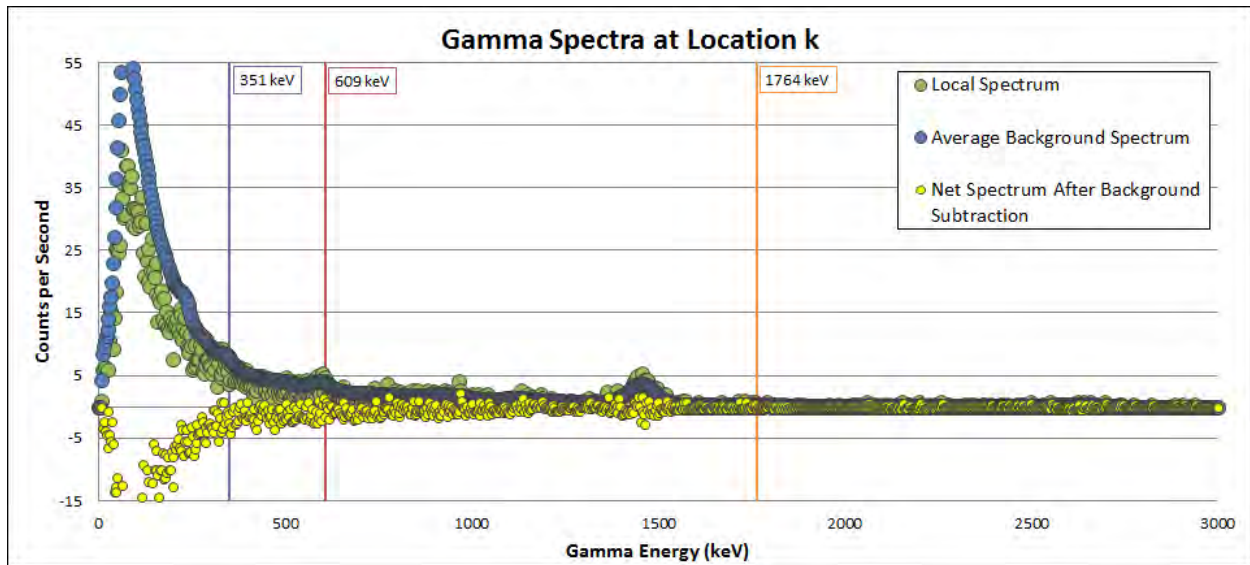
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

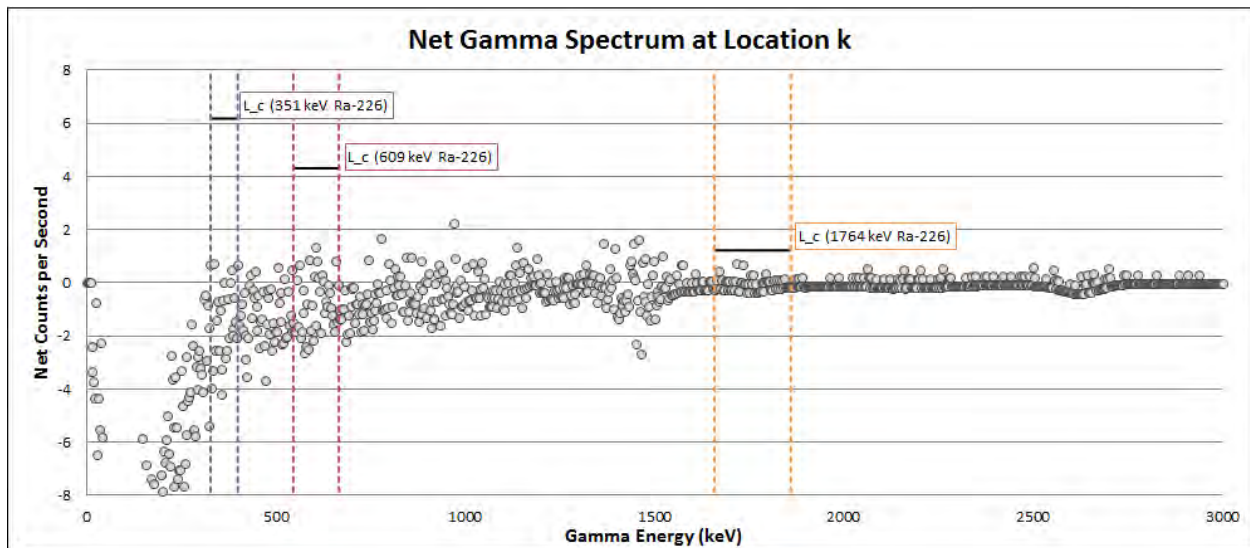
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (k)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (k)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (k)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

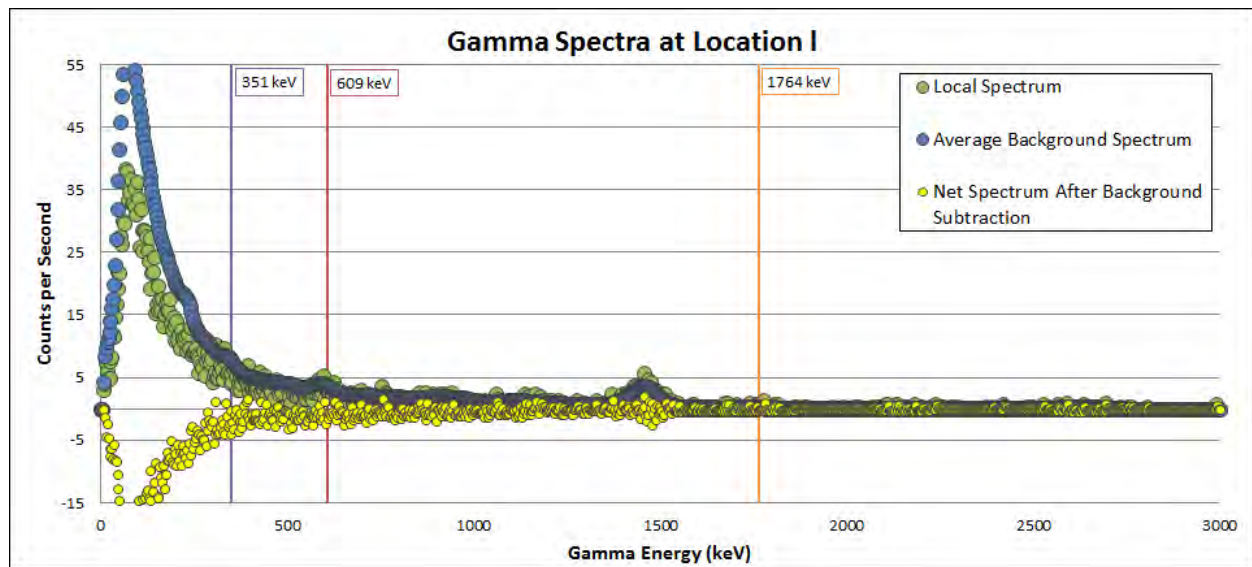
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

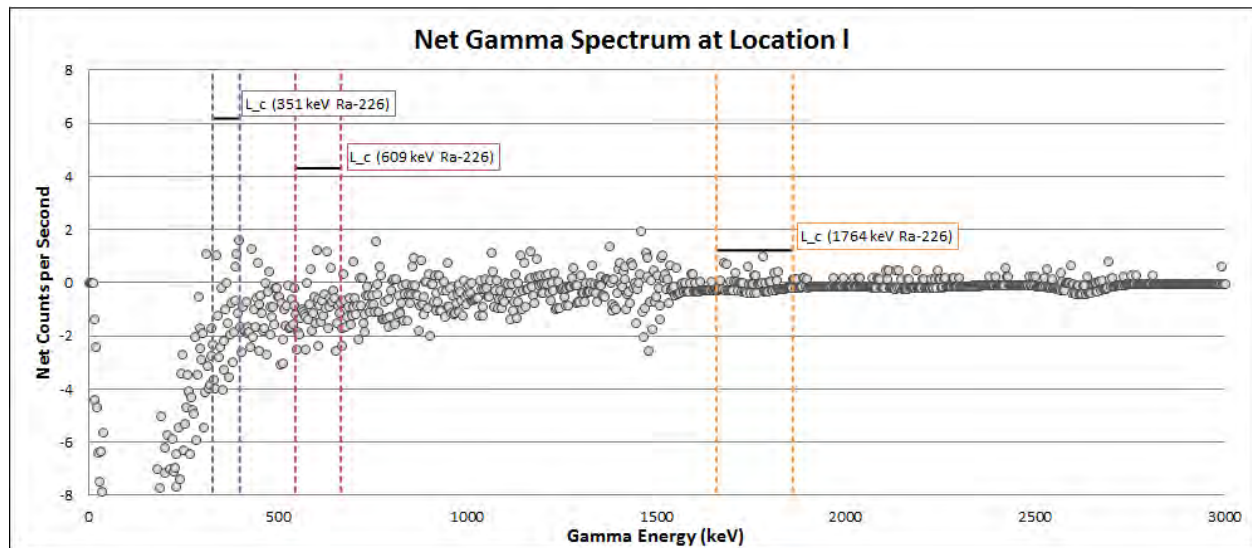
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (I)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (I)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (I)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

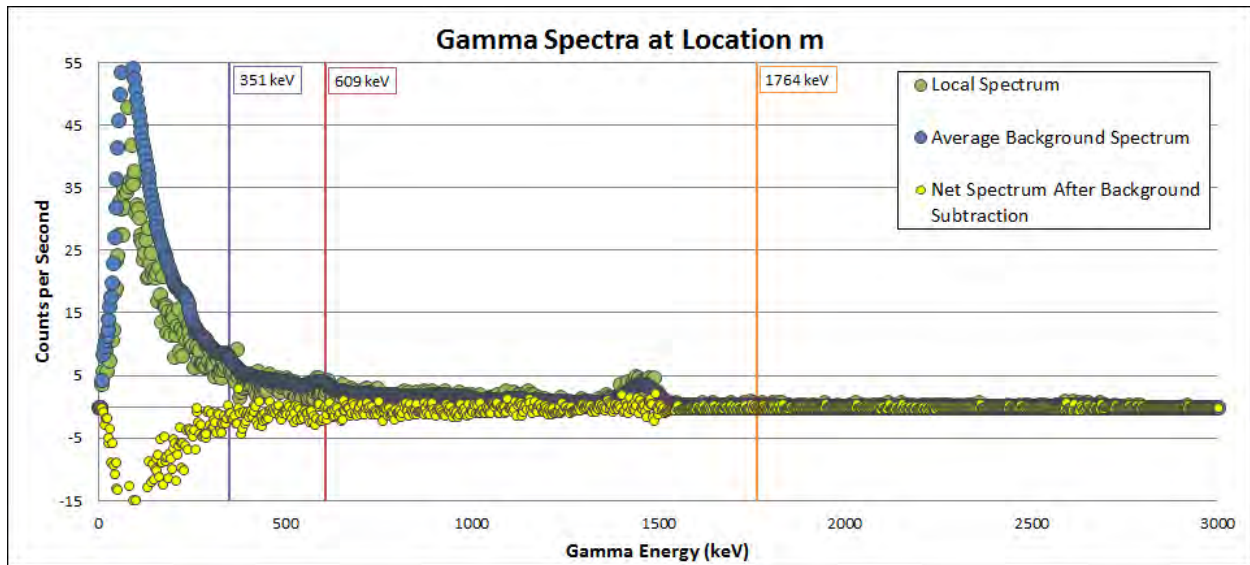
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

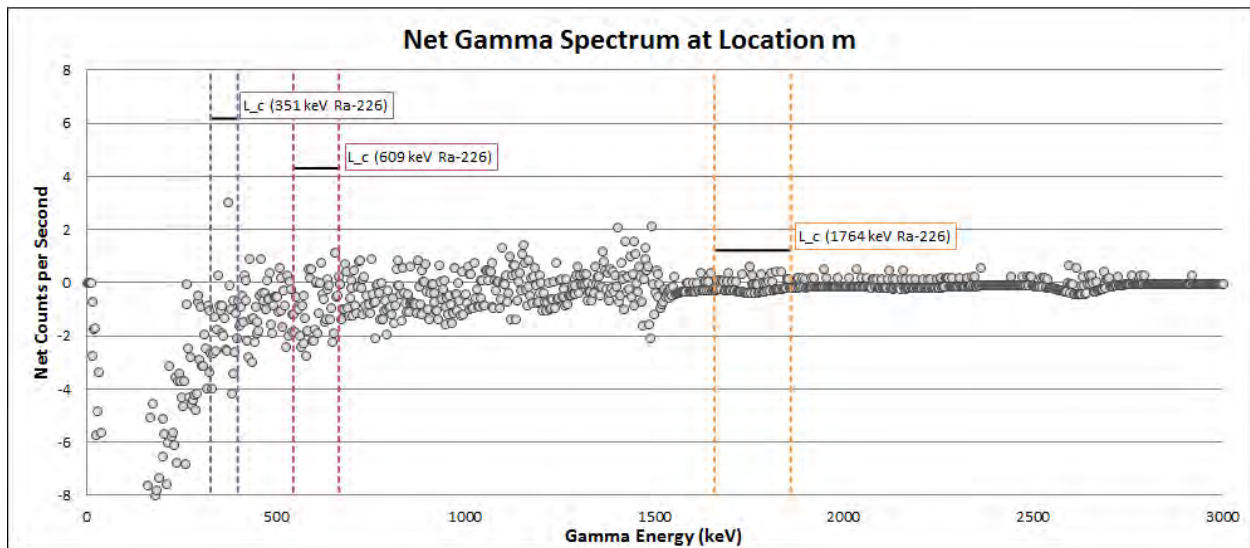
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (m)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (m)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (m)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

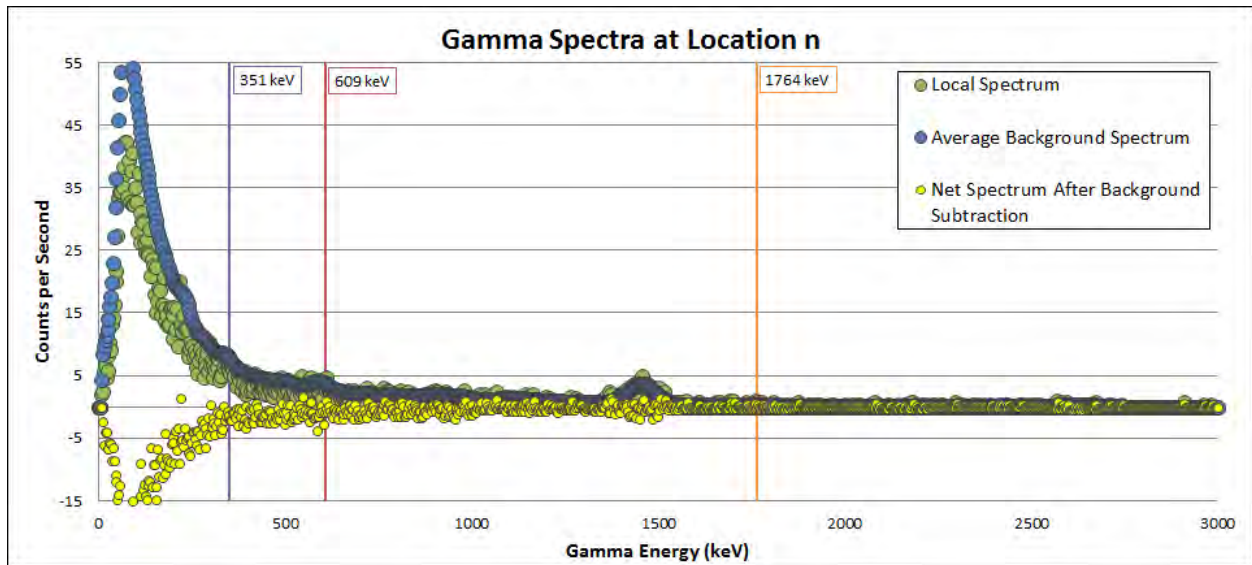
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

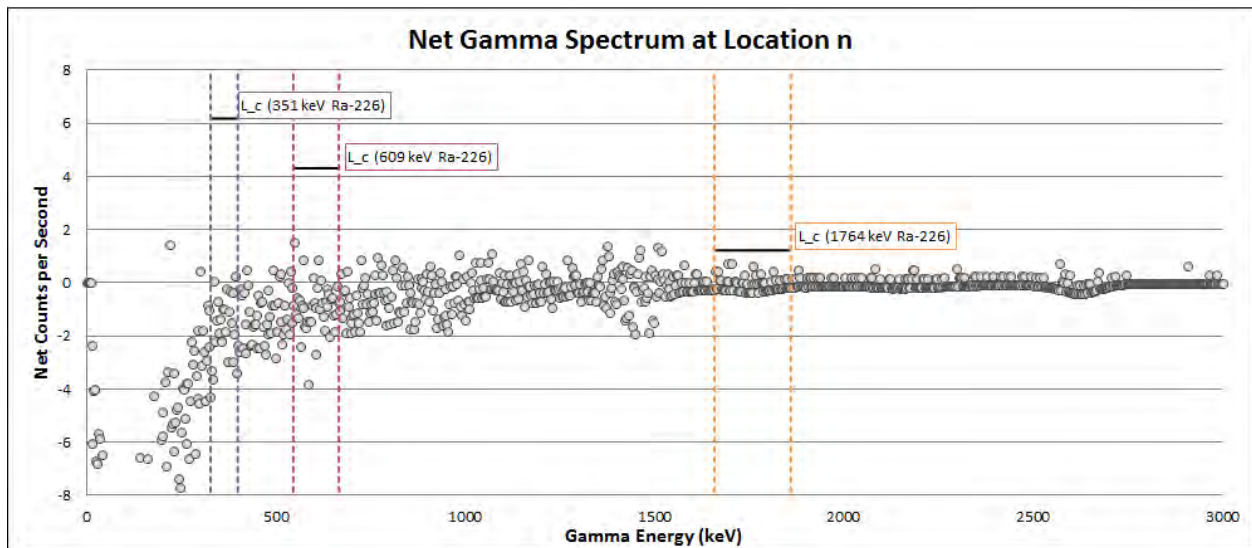
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (n)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (n)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (n)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

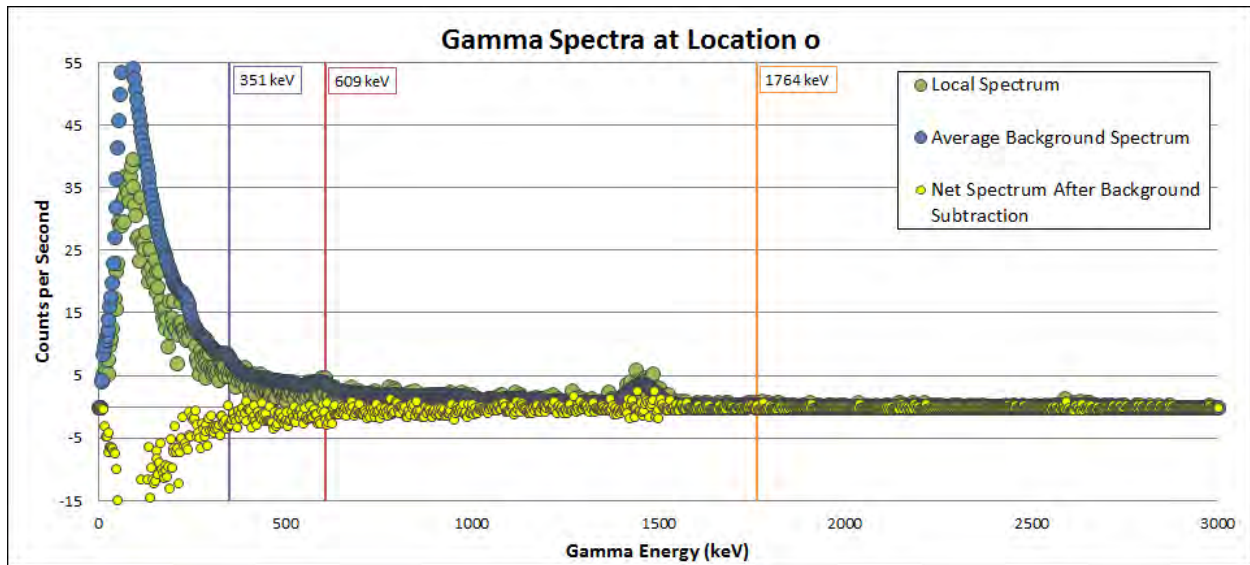
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

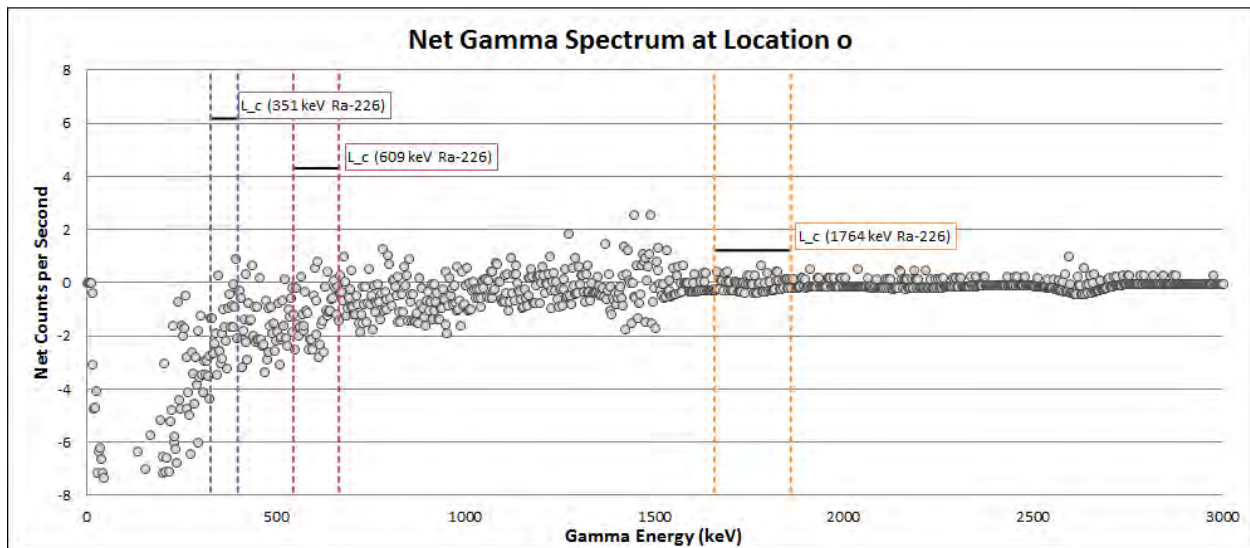
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (o)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (o)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (o)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

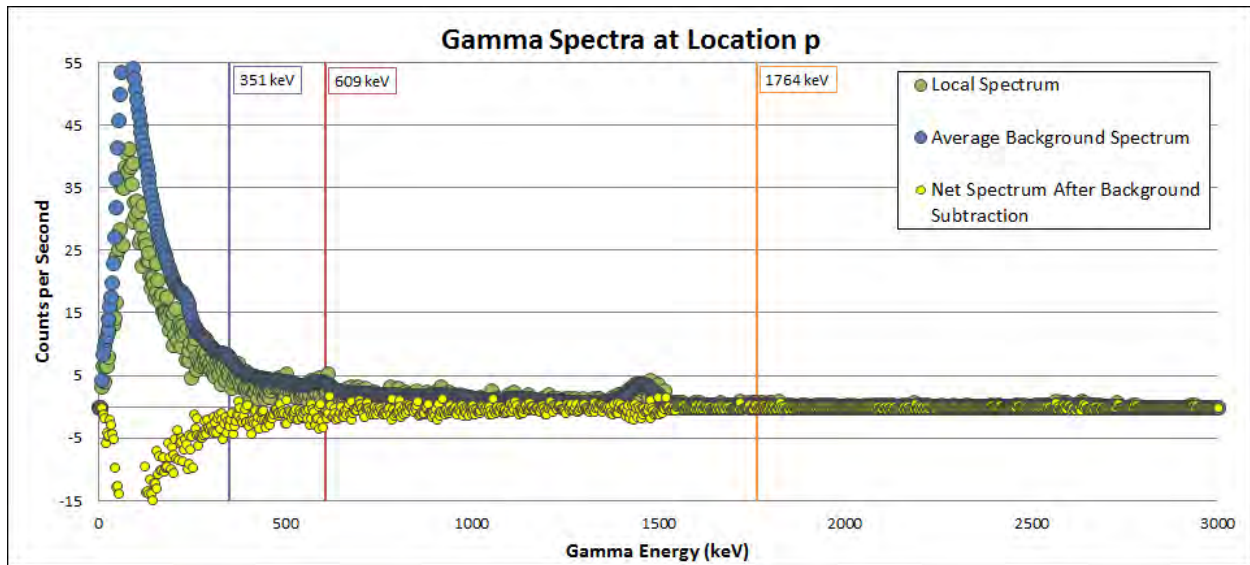
B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

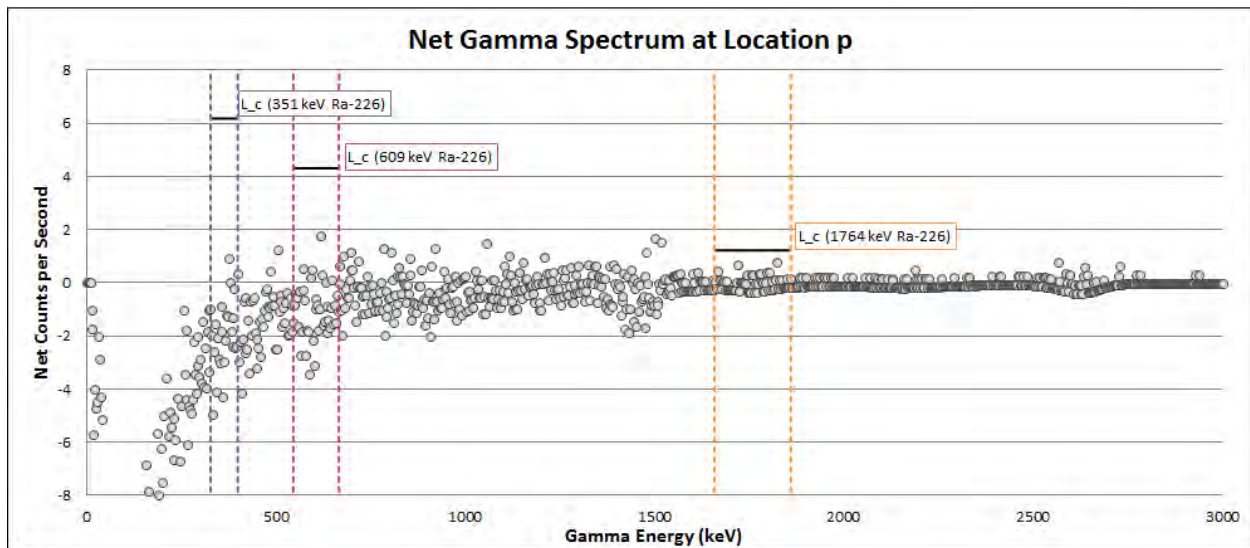
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 10 (Use 7, Part 2) – **Gamma Spectra at Location (p)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (p)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (p)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-19855-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

11/30/2016 9:10:31 AM

Micha Korinhizer, Project Management Assistant I
(314)298-8566

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Designee for

Erika Gish, Project Manager II
(314)298-8566

erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Job ID: 160-19855-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-19855-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 47 of 66

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Job ID: 160-19855-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

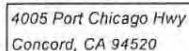
RECEIPT

The samples were received on 11/04/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 19.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-NP-FSS-SU3-BSRSY10-U7-S001 (160-19855-1), TITO04-NP-FSS-SU3-BSRSY10-U7-S002 (160-19855-2), TITO04-NP-FSS-SU3-BSRSY10-U7-S003 (160-19855-3), TITO04-NP-FSS-SU3-BSRSY10-U7-S004 (160-19855-4), TITO04-NP-FSS-SU3-BSRSY10-U7-S005 (160-19855-5), TITO04-NP-FSS-SU3-BSRSY10-U7-S006 (160-19855-6), TITO04-NP-FSS-SU3-BSRSY10-U7-S007 (160-19855-7), TITO04-NP-FSS-SU3-BSRSY10-U7-S008 (160-19855-8), TITO04-NP-FSS-SU3-BSRSY10-U7-S009 (160-19855-9), TITO04-NP-FSS-SU3-BSRSY10-U7-S010 (160-19855-10), TITO04-NP-FSS-SU3-BSRSY10-U7-S011 (160-19855-11), TITO04-NP-FSS-SU3-BSRSY10-U7-S012 (160-19855-12), TITO04-NP-FSS-SU3-BSRSY10-U7-S013 (160-19855-13), TITO04-NP-FSS-SU3-BSRSY10-U7-S014 (160-19855-14), TITO04-NP-FSS-SU3-BSRSY10-U7-S015 (160-19855-15), TITO04-NP-FSS-SU3-BSRSY10-U7-S016 (160-19855-16), TITO04-NP-FSS-SU3-BSRSY10-U7-S017 (160-19855-17), TITO04-NP-FSS-SU3-BSRSY10-U7-S018 (160-19855-18), TITO04-NP-FSS-SU3-BSRSY10-U7-S019 (160-19855-19) and TITO04-NP-FSS-SU3-BSRSY10-U7-S020 (160-19855-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/04/2016, prepared on 11/07/2016 and analyzed on 11/28/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Ref. Document # TI_P3_NP_FSS_SU3_RSY10_U7_#317

City:

Contact Name / ph. #: *Mike Dryden*

Container Type

Special Instructions:

☐ 24-hr

Level Of QC Required:

Standard TAT ☐

☐ 3-day☐ 7-day

1

II

Project Specific:

Relinquished By:

Date: / 1 - 2 - 1 6

Time: 1.3/6

Date: _____

Time:

Received By:

132

Received By:

1. *Journal of Management Studies*, 1997, 34, 1, 1-14.

Date: 11/4/16

Time: 0830

Date: _____

Time:

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

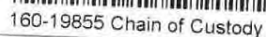
A = Air

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening



Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-19855-2

Login Number: 19855**List Source: TestAmerica St. Louis****List Number: 1****Creator: Clarke, Jill C**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:
DOE = U.S. Department of Energy

Laboratory References:
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-19855-1	TITO04-NP-FSS-SU3-BSRSY10-U7-S001	Solid	11/01/16 12:22	11/04/16 08:30
160-19855-2	TITO04-NP-FSS-SU3-BSRSY10-U7-S002	Solid	11/01/16 12:24	11/04/16 08:30
160-19855-3	TITO04-NP-FSS-SU3-BSRSY10-U7-S003	Solid	11/01/16 12:26	11/04/16 08:30
160-19855-4	TITO04-NP-FSS-SU3-BSRSY10-U7-S004	Solid	11/01/16 12:26	11/04/16 08:30
160-19855-5	TITO04-NP-FSS-SU3-BSRSY10-U7-S005	Solid	11/01/16 12:36	11/04/16 08:30
160-19855-6	TITO04-NP-FSS-SU3-BSRSY10-U7-S006	Solid	11/01/16 12:31	11/04/16 08:30
160-19855-7	TITO04-NP-FSS-SU3-BSRSY10-U7-S007	Solid	11/01/16 12:34	11/04/16 08:30
160-19855-8	TITO04-NP-FSS-SU3-BSRSY10-U7-S008	Solid	11/01/16 12:36	11/04/16 08:30
160-19855-9	TITO04-NP-FSS-SU3-BSRSY10-U7-S009	Solid	11/01/16 12:38	11/04/16 08:30
160-19855-10	TITO04-NP-FSS-SU3-BSRSY10-U7-S010	Solid	11/01/16 12:38	11/04/16 08:30
160-19855-11	TITO04-NP-FSS-SU3-BSRSY10-U7-S011	Solid	11/01/16 12:40	11/04/16 08:30
160-19855-12	TITO04-NP-FSS-SU3-BSRSY10-U7-S012	Solid	11/01/16 12:42	11/04/16 08:30
160-19855-13	TITO04-NP-FSS-SU3-BSRSY10-U7-S013	Solid	11/01/16 12:44	11/04/16 08:30
160-19855-14	TITO04-NP-FSS-SU3-BSRSY10-U7-S014	Solid	11/01/16 12:47	11/04/16 08:30
160-19855-15	TITO04-NP-FSS-SU3-BSRSY10-U7-S015	Solid	11/01/16 12:47	11/04/16 08:30
160-19855-16	TITO04-NP-FSS-SU3-BSRSY10-U7-S016	Solid	11/01/16 12:56	11/04/16 08:30
160-19855-17	TITO04-NP-FSS-SU3-BSRSY10-U7-S017	Solid	11/01/16 12:53	11/04/16 08:30
160-19855-18	TITO04-NP-FSS-SU3-BSRSY10-U7-S018	Solid	11/01/16 12:55	11/04/16 08:30
160-19855-19	TITO04-NP-FSS-SU3-BSRSY10-U7-S019	Solid	11/01/16 12:57	11/04/16 08:30
160-19855-20	TITO04-NP-FSS-SU3-BSRSY10-U7-S020	Solid	11/01/16 12:59	11/04/16 08:30

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S001

Lab Sample ID: 160-19855-1

Date Collected: 11/01/16 12:22

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.437		0.133	0.141		0.0750	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Actinium-227	0.253	U	0.665	0.665		1.12	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Bismuth-212	-0.0826	U	0.895	0.895		1.55	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Bismuth-214	0.261		0.0990	0.103		0.117	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Cesium-137	0.0279	U	0.0469	0.0470		0.0789	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Lead-210	1.37	U	1.29	1.30		1.71	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Lead-212	0.289		0.0743	0.0832		0.0887	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Lead-214	0.419		0.0923	0.102		0.0841	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Potassium-40	10.0		1.31	1.66		0.672	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Protactinium-231	0.269	U	1.08	1.08		3.49	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Radium-226	0.261		0.0990	0.103	0.500	0.117	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Radium-228	0.437		0.133	0.141		0.0750	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Thallium-208	0.108		0.0456	0.0469		0.0489	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Thorium-228	0.289		0.0743	0.0832		0.0887	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Thorium-232	0.437		0.133	0.141		0.0750	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Thorium-234	0.767	U	0.447	0.454		1.31	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Uranium-235	0.0805	U	0.216	0.216		0.822	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Uranium-238	0.767	U	0.447	0.454		1.31	pCi/g	11/07/16 15:28	11/28/16 11:28	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S002

Lab Sample ID: 160-19855-2

Date Collected: 11/01/16 12:24

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.370		0.179	0.183		0.229	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Actinium-227	-0.0371	U	0.239	0.239		0.931	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Bismuth-212	-0.327	U	0.724	0.725		1.24	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Bismuth-214	0.438		0.131	0.139		0.113	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Cesium-137	-0.0178	U	0.0625	0.0625		0.108	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-210	0.748	U	1.46	1.46		1.99	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-212	0.285		0.0774	0.0857		0.0924	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-214	0.499		0.105	0.117		0.127	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Potassium-40	11.3		1.46	1.86		0.669	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Protactinium-231	0.000	U	1.37	1.37		2.34	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Radium-226	0.438		0.131	0.139	0.500	0.113	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Radium-228	0.370		0.179	0.183		0.229	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thallium-208	0.0886		0.0606	0.0613		0.0718	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-228	0.285		0.0774	0.0857		0.0924	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-232	0.370		0.179	0.183		0.229	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-234	-0.636	U	1.13	1.13		1.99	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Uranium-235	-0.139	U	0.283	0.283		0.614	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Uranium-238	-0.636	U	1.13	1.13		1.99	pCi/g	11/07/16 15:28	11/28/16 11:31	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S003

Lab Sample ID: 160-19855-3

Date Collected: 11/01/16 12:26

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.182		0.151	0.152		0.171	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Actinium-227	0.230	U	0.496	0.497		1.19	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Bismuth-212	0.184	U	0.934	0.934		1.63	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Bismuth-214	0.311		0.119	0.123		0.0968	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Cesium-137	-0.0359	U	0.112	0.112		0.104	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-210	-0.785	U	1.71	1.71		2.86	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-212	0.365		0.0801	0.0931		0.0808	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-214	0.347		0.116	0.122		0.108	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Potassium-40	11.4		1.60	1.98		0.566	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Protactinium-231	0.0000000	U	2.38	2.38		4.07	pCi/g	11/07/16 15:28	11/28/16 11:31	1
	26									
Radium-226	0.311		0.119	0.123	0.500	0.0968	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Radium-228	0.182		0.151	0.152		0.171	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thallium-208	0.0800	U	0.0700	0.0705		0.0820	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-228	0.365		0.0801	0.0931		0.0808	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-232	0.182		0.151	0.152		0.171	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-234	-1.44	U	0.918	0.930		2.91	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Uranium-235	0.0827	U	0.219	0.219		0.916	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Uranium-238	-1.44	U	0.918	0.930		2.91	pCi/g	11/07/16 15:28	11/28/16 11:31	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S004

Lab Sample ID: 160-19855-4

Date Collected: 11/01/16 12:26

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.108	U	0.195	0.195		0.267	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Actinium-227	0.0816	U	0.518	0.518		0.715	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Bismuth-212	-0.585	U	0.940	0.942		1.57	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Bismuth-214	0.324		0.0832	0.0897		0.0583	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Cesium-137	-0.00758	U	0.0605	0.0605		0.106	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Lead-210	0.0210	U	1.12	1.12		1.93	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Lead-212	0.307		0.0674	0.0782		0.0730	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Lead-214	0.356		0.0773	0.0857		0.0898	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Potassium-40	9.22		1.34	1.64		0.535	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Protactinium-231	0.327	U	1.07	1.07		2.59	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Radium-226	0.324		0.0832	0.0897	0.500	0.0583	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Radium-228	0.108	U	0.195	0.195		0.267	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Thallium-208	0.103		0.0513	0.0524		0.0539	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Thorium-228	0.307		0.0674	0.0782		0.0730	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Thorium-232	0.108	U	0.195	0.195		0.267	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Thorium-234	0.510	U	0.874	0.876		1.21	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Uranium-235	-0.127	U	0.184	0.184		0.619	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Uranium-238	0.510	U	0.874	0.876		1.21	pCi/g	11/07/16 15:28	11/28/16 11:32	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S005

Lab Sample ID: 160-19855-5

Date Collected: 11/01/16 12:36

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.490		0.231	0.237		0.206	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Actinium-227	0.170	U	0.391	0.391		0.915	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Bismuth-212	-0.317	U	0.850	0.851		1.48	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Bismuth-214	0.387		0.183	0.187		0.187	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Cesium-137	-0.0229	U	0.0375	0.0376		0.159	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Lead-210	-0.0513	U	1.43	1.43		2.15	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Lead-212	0.189		0.0773	0.0811		0.104	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Lead-214	0.328		0.104	0.110		0.137	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Potassium-40	8.48		1.52	1.75		0.710	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Protactinium-231	0.408	U	1.20	1.21		3.40	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Radium-226	0.387		0.183	0.187	0.500	0.187	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Radium-228	0.490		0.231	0.237		0.206	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Thallium-208	0.0397	U	0.101	0.101		0.110	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Thorium-228	0.189		0.0773	0.0811		0.104	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Thorium-232	0.490		0.231	0.237		0.206	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Thorium-234	-0.305	U	1.03	1.03		1.81	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Uranium-235	-0.191	U	0.395	0.396		0.608	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Uranium-238	-0.305	U	1.03	1.03		1.81	pCi/g	11/07/16 15:28	11/28/16 11:34	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S006

Lab Sample ID: 160-19855-6

Date Collected: 11/01/16 12:31

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.310		0.107	0.112		0.0715	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Actinium-227	0.222	U	0.314	0.315		0.854	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Bismuth-212	0.219	U	0.407	0.408		0.695	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Bismuth-214	0.336		0.118	0.123		0.107	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Cesium-137	0.0137	U	0.0357	0.0358		0.0620	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-210	0.260	U	1.01	1.01		1.72	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-212	0.310		0.0578	0.0704		0.0490	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-214	0.332		0.0738	0.0814		0.0945	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Potassium-40	10.3		1.27	1.66		0.602	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Protactinium-231	0.266	U	0.929	0.929		3.00	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Radium-226	0.336		0.118	0.123	0.500	0.107	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Radium-228	0.310		0.107	0.112		0.0715	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thallium-208	0.117		0.0386	0.0405		0.0317	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-228	0.310		0.0578	0.0704		0.0490	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-232	0.310		0.107	0.112		0.0715	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-234	-0.501	U	1.05	1.05		1.75	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Uranium-235	0.0832	U	0.217	0.217		0.605	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Uranium-238	-0.501	U	1.05	1.05		1.75	pCi/g	11/07/16 15:28	11/28/16 12:08	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S007

Lab Sample ID: 160-19855-7

Date Collected: 11/01/16 12:34

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.241		0.172	0.173		0.189	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Actinium-227	0.137	U	0.278	0.279		1.23	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Bismuth-212	0.246	U	0.616	0.616		1.06	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Bismuth-214	0.231		0.0908	0.0939		0.106	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Cesium-137	0.0194	U	0.0504	0.0505		0.0870	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Lead-210	1.20	U	1.13	1.14		1.59	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Lead-212	0.285		0.0824	0.0903		0.106	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Lead-214	0.292		0.106	0.110		0.117	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Potassium-40	9.97		1.35	1.69		0.714	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Protactinium-231	0.373	U	1.13	1.13		3.66	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Radium-226	0.231		0.0908	0.0939	0.500	0.106	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Radium-228	0.241		0.172	0.173		0.189	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Thallium-208	0.0987		0.0565	0.0574		0.0583	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Thorium-228	0.285		0.0824	0.0903		0.106	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Thorium-232	0.241		0.172	0.173		0.189	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Thorium-234	1.54		1.08	1.09		1.36	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Uranium-235	0.0242	U	0.448	0.449		0.758	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Uranium-238	1.54		1.08	1.09		1.36	pCi/g	11/07/16 15:28	11/28/16 12:03	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S008

Lab Sample ID: 160-19855-8

Date Collected: 11/01/16 12:36

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.377		0.120	0.126		0.0836	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Actinium-227	-0.288	U	0.789	0.789		1.33	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Bismuth-212	-0.318	U	0.735	0.736		1.26	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Bismuth-214	0.460		0.116	0.125		0.102	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Cesium-137	0.0208	U	0.0527	0.0527		0.0909	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-210	2.11		1.06	1.09		1.26	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-212	0.288		0.0797	0.0880		0.0977	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-214	0.429		0.123	0.131		0.120	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Potassium-40	12.2		1.51	1.96		0.667	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Protactinium-231	0.000	U	0.354	0.354		2.98	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Radium-226	0.460		0.116	0.125	0.500	0.102	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Radium-228	0.377		0.120	0.126		0.0836	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thallium-208	0.106		0.0437	0.0451		0.0431	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-228	0.288		0.0797	0.0880		0.0977	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-232	0.377		0.120	0.126		0.0836	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-234	0.359	U	0.539	0.540		1.54	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Uranium-235	0.0544	U	0.293	0.293		0.498	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Uranium-238	0.359	U	0.539	0.540		1.54	pCi/g	11/07/16 15:28	11/28/16 12:08	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S009

Lab Sample ID: 160-19855-9

Date Collected: 11/01/16 12:38

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.141	U	0.206	0.206		0.359	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Actinium-227	0.115	U	0.563	0.563		1.34	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Bismuth-212	-0.409	U	0.861	0.862		1.47	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Bismuth-214	0.395		0.124	0.131		0.106	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Cesium-137	-0.00888	U	0.0498	0.0498		0.0933	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Lead-210	-0.878	U	1.91	1.91		3.20	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Lead-212	0.338		0.120	0.128		0.173	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Lead-214	0.444		0.110	0.119		0.111	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Potassium-40	11.7		1.67	2.06		0.602	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Protactinium-231	0.742	U	1.71	1.71		3.92	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Radium-226	0.395		0.124	0.131	0.500	0.106	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Radium-228	0.141	U	0.206	0.206		0.359	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Thallium-208	0.0613	U	0.0741	0.0744		0.0938	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Thorium-228	0.338		0.120	0.128		0.173	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Thorium-232	0.141	U	0.206	0.206		0.359	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Thorium-234	0.392	U	0.280	0.283		2.30	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Uranium-235	-0.0145	U	0.0781	0.0781		0.826	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Uranium-238	0.392	U	0.280	0.283		2.30	pCi/g	11/07/16 15:28	11/28/16 12:11	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S010

Lab Sample ID: 160-19855-10

Date Collected: 11/01/16 12:38

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0211	U	0.0495	0.0496		0.337	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Actinium-227	-0.278	U	0.666	0.666		0.897	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Bismuth-212	0.255	U	0.606	0.607		1.04	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Bismuth-214	0.287		0.0941	0.0987		0.0767	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Cesium-137	-0.0379	U	0.0635	0.0636		0.107	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Lead-210	0.0000946	U	1.12	1.12		1.94	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Lead-212	0.268		0.0605	0.0697		0.0620	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Lead-214	0.431		0.0790	0.0908		0.0722	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Potassium-40	9.91		1.38	1.71		0.529	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Protactinium-231	0.000	U	0.170	0.170		2.87	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Radium-226	0.287		0.0941	0.0987	0.500	0.0767	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Radium-228	0.0211	U	0.0495	0.0496		0.337	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Thallium-208	0.112		0.0416	0.0432		0.0344	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Thorium-228	0.268		0.0605	0.0697		0.0620	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Thorium-232	0.0211	U	0.0495	0.0496		0.337	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Thorium-234	-0.0634	U	0.740	0.740		1.29	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Uranium-235	0.0787	U	0.279	0.279		0.470	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Uranium-238	-0.0634	U	0.740	0.740		1.29	pCi/g	11/07/16 15:28	11/28/16 12:12	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S011

Lab Sample ID: 160-19855-11

Date Collected: 11/01/16 12:40

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0523	U	0.283	0.283		0.351	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Actinium-227	0.235	U	0.373	0.374		0.758	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Bismuth-212	-0.369	U	0.887	0.887		1.53	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Bismuth-214	0.0975	U	0.0779	0.0785		0.302	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Cesium-137	-0.0865	U	0.108	0.108		0.207	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Lead-210	-0.326	U	1.44	1.44		2.21	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Lead-212	0.236		0.0775	0.0833		0.0906	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Lead-214	0.288		0.115	0.119		0.131	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Potassium-40	10.1		1.73	2.02		0.766	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Protactinium-231	0.487	U	1.45	1.45		3.45	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Radium-226	0.0975	U	0.0779	0.0785	0.500	0.302	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Radium-228	0.0523	U	0.283	0.283		0.351	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Thallium-208	0.110		0.0479	0.0492		0.0454	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Thorium-228	0.236		0.0775	0.0833		0.0906	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Thorium-232	0.0523	U	0.283	0.283		0.351	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Thorium-234	0.779	U	0.508	0.515		1.39	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Uranium-235	0.0163	U	0.0771	0.0771		0.613	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Uranium-238	0.779	U	0.508	0.515		1.39	pCi/g	11/07/16 15:28	11/28/16 12:20	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S012

Lab Sample ID: 160-19855-12

Date Collected: 11/01/16 12:42

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.142	U	0.176	0.177		0.236	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Actinium-227	-0.231	U	0.586	0.587		0.989	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Bismuth-212	-0.230	U	0.647	0.647		1.11	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Bismuth-214	0.349		0.108	0.114		0.101	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Cesium-137	-0.0226	U	0.0459	0.0459		0.0781	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Lead-210	-0.296	U	1.10	1.10		1.87	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Lead-212	0.258		0.0706	0.0781		0.0893	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Lead-214	0.305		0.0904	0.0958		0.0838	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Potassium-40	10.8		1.28	1.69		0.561	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Protactinium-231	0.338	U	1.11	1.11		3.51	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Radium-226	0.349		0.108	0.114	0.500	0.101	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Radium-228	0.142	U	0.176	0.177		0.236	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Thallium-208	0.152		0.0496	0.0521		0.0382	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Thorium-228	0.258		0.0706	0.0781		0.0893	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Thorium-232	0.142	U	0.176	0.177		0.236	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Thorium-234	0.340	U	0.684	0.685		1.71	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Uranium-235	-0.157	U	0.278	0.279		0.724	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Uranium-238	0.340	U	0.684	0.685		1.71	pCi/g	11/07/16 15:28	11/28/16 12:38	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S013

Lab Sample ID: 160-19855-13

Date Collected: 11/01/16 12:44

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.262		0.193	0.194		0.218	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Actinium-227	-0.300	U	0.883	0.884		1.49	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Bismuth-212	-0.511	U	0.859	0.860		1.44	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Bismuth-214	0.430		0.126	0.134		0.113	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Cesium-137	0.0250	U	0.0565	0.0565		0.0969	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Lead-210	1.32	U	1.32	1.33		1.86	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Lead-212	0.270		0.0981	0.104		0.110	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Lead-214	0.332		0.133	0.137		0.189	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Potassium-40	9.74		1.42	1.73		0.656	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Protactinium-231	0.000	U	0.318	0.318		3.89	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Radium-226	0.430		0.126	0.134	0.500	0.113	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Radium-228	0.262		0.193	0.194		0.218	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Thallium-208	0.0681	U	0.0869	0.0872		0.100	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Thorium-228	0.270		0.0981	0.104		0.110	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Thorium-232	0.262		0.193	0.194		0.218	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Thorium-234	0.736	U	0.858	0.861		1.38	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Uranium-235	0.0911	U	0.289	0.289		0.491	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Uranium-238	0.736	U	0.858	0.861		1.38	pCi/g	11/07/16 15:28	11/28/16 12:39	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S014

Lab Sample ID: 160-19855-14

Date Collected: 11/01/16 12:47

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.107	U	0.150	0.150		0.309	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Actinium-227	0.273	U	0.737	0.737		1.24	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Bismuth-212	-0.482	U	0.568	0.570		1.43	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Bismuth-214	0.277		0.0927	0.0971		0.0948	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Cesium-137	0.0169	U	0.0416	0.0416		0.0722	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-210	0.915	U	1.37	1.37		1.80	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-212	0.267		0.0716	0.0795		0.0860	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-214	0.415		0.104	0.112		0.0861	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Potassium-40	10.6		1.32	1.71		0.489	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Protactinium-231	0.293	U	0.945	0.946		3.14	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Radium-226	0.277		0.0927	0.0971	0.500	0.0948	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Radium-228	0.107	U	0.150	0.150		0.309	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thallium-208	0.127		0.0431	0.0450		0.0413	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-228	0.267		0.0716	0.0795		0.0860	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-232	0.107	U	0.150	0.150		0.309	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-234	0.864	U	0.927	0.931		1.25	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Uranium-235	-0.0102	U	0.0566	0.0566		0.707	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Uranium-238	0.864	U	0.927	0.931		1.25	pCi/g	11/07/16 15:28	11/28/16 12:40	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S015

Lab Sample ID: 160-19855-15

Date Collected: 11/01/16 12:47

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.208		0.149	0.150		0.176	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Actinium-227	0.146	U	0.384	0.384		0.856	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Bismuth-212	-0.0131	U	0.437	0.437		0.789	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Bismuth-214	0.301		0.0878	0.0932		0.0844	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Cesium-137	-0.0206	U	0.0373	0.0374		0.0716	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Lead-210	0.504	U	0.920	0.921		1.54	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Lead-212	0.304		0.0616	0.0731		0.0649	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Lead-214	0.304		0.0824	0.0883		0.0784	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Potassium-40	9.85		1.14	1.52		0.409	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Protactinium-231	0.000	U	0.356	0.356		3.04	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Radium-226	0.301		0.0878	0.0932	0.500	0.0844	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Radium-228	0.208		0.149	0.150		0.176	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Thallium-208	0.0981		0.0424	0.0436		0.0407	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Thorium-228	0.304		0.0616	0.0731		0.0649	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Thorium-232	0.208		0.149	0.150		0.176	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Thorium-234	0.436	U	1.01	1.01		1.69	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Uranium-235	0.152	U	0.204	0.205		0.692	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Uranium-238	0.436	U	1.01	1.01		1.69	pCi/g	11/07/16 15:28	11/28/16 12:42	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S016

Lab Sample ID: 160-19855-16

Date Collected: 11/01/16 12:56

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.151	U	0.184	0.185		0.202	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Actinium-227	-0.275	U	0.744	0.745		1.25	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Bismuth-212	-0.422	U	0.798	0.799		1.34	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Bismuth-214	0.383		0.0966	0.105		0.0888	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Cesium-137	-0.00429	U	0.0462	0.0462		0.101	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-210	1.73		1.35	1.37		1.61	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-212	0.280		0.0754	0.0837		0.0949	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-214	0.336		0.0881	0.0948		0.104	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Potassium-40	10.1		1.28	1.64		0.642	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Protactinium-231	-0.565	U	2.35	2.35		3.95	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Radium-226	0.383		0.0966	0.105	0.500	0.0888	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Radium-228	0.151	U	0.184	0.185		0.202	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thallium-208	0.106		0.0509	0.0521		0.0501	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-228	0.280		0.0754	0.0837		0.0949	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-232	0.151	U	0.184	0.185		0.202	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-234	0.652	U	0.726	0.729		1.18	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Uranium-235	0.272		0.184	0.186		0.239	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Uranium-238	0.652	U	0.726	0.729		1.18	pCi/g	11/07/16 15:28	11/28/16 12:40	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S017

Lab Sample ID: 160-19855-17

Date Collected: 11/01/16 12:53

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.364		0.190	0.194		0.245	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Actinium-227	0.217	U	0.441	0.442		0.636	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Bismuth-212	0.776		0.394	0.402		0.359	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Bismuth-214	0.425		0.117	0.126		0.0969	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Cesium-137	-0.0297	U	0.0598	0.0599		0.102	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Lead-210	-0.993	U	1.27	1.27		2.04	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Lead-212	0.229		0.0710	0.0770		0.0896	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Lead-214	0.291		0.0861	0.0912		0.0997	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Potassium-40	10.7		1.38	1.76		0.631	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Protactinium-231	0.000	U	0.432	0.432		3.26	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Radium-226	0.425		0.117	0.126	0.500	0.0969	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Radium-228	0.364		0.190	0.194		0.245	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Thallium-208	0.127		0.0615	0.0629		0.0588	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Thorium-228	0.229		0.0710	0.0770		0.0896	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Thorium-232	0.364		0.190	0.194		0.245	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Thorium-234	0.385	U	0.359	0.362		1.33	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Uranium-235	-0.0533	U	0.111	0.111		0.499	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Uranium-238	0.385	U	0.359	0.362		1.33	pCi/g	11/07/16 15:28	11/28/16 12:44	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S018

Lab Sample ID: 160-19855-18

Date Collected: 11/01/16 12:55

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.108	U	0.233	0.233		0.318	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Actinium-227	-0.398	U	0.841	0.843		1.41	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Bismuth-212	-0.0148	U	0.703	0.703		1.28	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Bismuth-214	0.364		0.116	0.122		0.0990	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Cesium-137	-0.0531	U	0.0736	0.0738		0.119	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Lead-210	-0.817	U	1.78	1.78		2.98	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Lead-212	0.335		0.0842	0.0947		0.0958	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Lead-214	0.355		0.105	0.112		0.0956	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Potassium-40	11.1		1.72	2.06		0.904	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Protactinium-231	0.513	U	1.47	1.47		3.38	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Radium-226	0.364		0.116	0.122	0.500	0.0990	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Radium-228	0.108	U	0.233	0.233		0.318	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Thallium-208	0.0799	U	0.0751	0.0755		0.0853	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Thorium-228	0.335		0.0842	0.0947		0.0958	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Thorium-232	0.108	U	0.233	0.233		0.318	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Thorium-234	0.801	U	0.537	0.543		1.47	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Uranium-235	0.0621	U	0.168	0.168		0.713	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Uranium-238	0.801	U	0.537	0.543		1.47	pCi/g	11/07/16 15:28	11/28/16 12:45	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S019

Lab Sample ID: 160-19855-19

Date Collected: 11/01/16 12:57

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.372		0.123	0.129		0.152	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Actinium-227	-0.215	U	0.574	0.575		0.969	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Bismuth-212	0.227	U	0.583	0.583		1.01	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Bismuth-214	0.331		0.0991	0.105		0.0798	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Cesium-137	-0.0185	U	0.0533	0.0533		0.0922	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Lead-210	0.150	U	0.716	0.716		1.15	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Lead-212	0.309		0.0647	0.0760		0.0653	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Lead-214	0.337		0.0985	0.105		0.0896	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Potassium-40	10.8		1.44	1.82		0.532	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Protactinium-231	0.264	U	0.896	0.897		2.92	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Radium-226	0.331		0.0991	0.105	0.500	0.0798	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Radium-228	0.372		0.123	0.129		0.152	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Thallium-208	0.0754		0.0336	0.0345		0.0328	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Thorium-228	0.309		0.0647	0.0760		0.0653	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Thorium-232	0.372		0.123	0.129		0.152	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Thorium-234	-0.0449	U	0.933	0.933		1.32	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Uranium-235	0.0618	U	0.220	0.220		0.385	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Uranium-238	-0.0449	U	0.933	0.933		1.32	pCi/g	11/07/16 15:28	11/28/16 12:46	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S020

Lab Sample ID: 160-19855-20

Date Collected: 11/01/16 12:59

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.339		0.270	0.273		0.292	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Actinium-227	0.471	U	0.520	0.523		0.722	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Bismuth-212	-0.0730	U	0.967	0.967		1.73	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Bismuth-214	0.393		0.131	0.138		0.136	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Cesium-137	-0.0219	U	0.0656	0.0657		0.110	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Lead-210	0.842	U	0.941	0.946		1.39	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Lead-212	0.241		0.0829	0.0886		0.104	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Lead-214	0.376		0.112	0.119		0.191	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Potassium-40	12.4		1.89	2.28		0.757	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Protactinium-231	0.465	U	1.16	1.16		2.77	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Radium-226	0.393		0.131	0.138	0.500	0.136	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Radium-228	0.339		0.270	0.273		0.292	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Thallium-208	0.0749	U	0.0780	0.0784		0.0940	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Thorium-228	0.241		0.0829	0.0886		0.104	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Thorium-232	0.339		0.270	0.273		0.292	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Thorium-234	0.604	U	0.928	0.930		1.31	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Uranium-235	0.0519	U	0.278	0.278		0.479	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Uranium-238	0.604	U	0.928	0.930		1.31	pCi/g	11/07/16 15:28	11/28/16 12:52	1

QC Sample Results

Page 64 of 66

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-278070/1-A

Matrix: Solid

Analysis Batch: 281220

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 278070

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.06269	U	0.221	0.221		0.260	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Actinium-227	-0.03546	U	0.508	0.508		0.892	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Bismuth-212	-0.07865	U	0.498	0.498		0.910	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Bismuth-214	-0.07608	U	0.0981	0.0984		0.387	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Cesium-137	0.0000	U	0.00946	0.00946		0.0246	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Lead-210	-0.4900	U	0.929	0.931		1.57	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Lead-212	-0.06128	U	0.0595	0.0600		0.158	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Lead-214	-0.1147	U	0.0953	0.0960		0.223	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Potassium-40	0.06507	U	0.418	0.418		0.775	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Protactinium-231	0.0000	U	0.319	0.319		3.94	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Radium-226	-0.07608	U	0.0981	0.0984	0.500	0.387	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Radium-228	-0.06269	U	0.221	0.221		0.260	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Thallium-208	0.03048	U	0.0230	0.0233		0.0618	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Thorium-228	-0.06128	U	0.0595	0.0600		0.158	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Thorium-232	-0.06269	U	0.221	0.221		0.260	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Thorium-234	0.2602	U	0.694	0.695		1.19	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Uranium-235	0.1278	U	0.265	0.265		0.533	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Uranium-238	0.2602	U	0.694	0.695		1.19	pCi/g	11/07/16 15:28	11/28/16 12:04	1

Lab Sample ID: LCS 160-278070/2-A

Matrix: Solid

Analysis Batch: 281218

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 278070

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	101.4		10.7		1.18	pCi/g	104	87 - 116
Cesium-137	29.3	29.12		3.11		0.226	pCi/g	99	87 - 120
Cobalt-60	16.1	15.60		1.62		0.102	pCi/g	97	87 - 115

Lab Sample ID: 160-19855-1 DU

Matrix: Solid

Analysis Batch: 281219

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S001

Prep Type: Total/NA

Prep Batch: 278070

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.437		0.3150		0.113		0.259	pCi/g	0.48	1
Actinium-227	0.253	U	-0.3040	U	0.704		1.18	pCi/g	0.41	1
Bismuth-212	-0.0826	U	0.01476	U	0.689		1.22	pCi/g	0.06	1
Bismuth-214	0.261		0.3687		0.117		0.106	pCi/g	0.49	1
Cesium-137	0.0279	U	-0.03807	U	0.0660		0.110	pCi/g	0.58	1
Lead-210	1.37	U	-0.5408	U	1.39		2.43	pCi/g	0.71	1
Lead-212	0.289		0.2586		0.0809		0.0932	pCi/g	0.19	1
Lead-214	0.419		0.3790		0.0977		0.100	pCi/g	0.20	1
Potassium-40	10.0		11.05		1.75		0.477	pCi/g	0.30	1
Protactinium-231	0.269	U	-0.00000	U	1.72		2.95	pCi/g	0.1	1
			0005							
Radium-226	0.261		0.3687		0.117	0.500	0.106	pCi/g	0.49	1
Radium-228	0.437		0.3150		0.113		0.259	pCi/g	0.48	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-19855-1 DU

Matrix: Solid

Analysis Batch: 281219

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S001

Prep Type: Total/NA

Prep Batch: 278070

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2 σ +/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.108		0.1139		0.0567		0.0529	pCi/g	0.06	1
Thorium-228	0.289		0.2586		0.0809		0.0932	pCi/g	0.19	1
Thorium-232	0.437		0.3150		0.113		0.259	pCi/g	0.48	1
Thorium-234	0.767	U	-0.6604	U	1.10		2.19	pCi/g	0.92	1
Uranium-235	0.0805	U	-0.1602	U	0.509		0.850	pCi/g	0.33	1
Uranium-238	0.767	U	-0.6604	U	1.10		2.19	pCi/g	0.92	1

QC Association Summary

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Rad

Leach Batch: 277740

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19855-1	TITO04-NP-FSS-SU3-BSRSY10-U7-S001	Total/NA	Solid	Dry and Grind	
160-19855-2	TITO04-NP-FSS-SU3-BSRSY10-U7-S002	Total/NA	Solid	Dry and Grind	
160-19855-3	TITO04-NP-FSS-SU3-BSRSY10-U7-S003	Total/NA	Solid	Dry and Grind	
160-19855-4	TITO04-NP-FSS-SU3-BSRSY10-U7-S004	Total/NA	Solid	Dry and Grind	
160-19855-5	TITO04-NP-FSS-SU3-BSRSY10-U7-S005	Total/NA	Solid	Dry and Grind	
160-19855-6	TITO04-NP-FSS-SU3-BSRSY10-U7-S006	Total/NA	Solid	Dry and Grind	
160-19855-7	TITO04-NP-FSS-SU3-BSRSY10-U7-S007	Total/NA	Solid	Dry and Grind	
160-19855-8	TITO04-NP-FSS-SU3-BSRSY10-U7-S008	Total/NA	Solid	Dry and Grind	
160-19855-9	TITO04-NP-FSS-SU3-BSRSY10-U7-S009	Total/NA	Solid	Dry and Grind	
160-19855-10	TITO04-NP-FSS-SU3-BSRSY10-U7-S010	Total/NA	Solid	Dry and Grind	
160-19855-11	TITO04-NP-FSS-SU3-BSRSY10-U7-S011	Total/NA	Solid	Dry and Grind	
160-19855-12	TITO04-NP-FSS-SU3-BSRSY10-U7-S012	Total/NA	Solid	Dry and Grind	
160-19855-13	TITO04-NP-FSS-SU3-BSRSY10-U7-S013	Total/NA	Solid	Dry and Grind	
160-19855-14	TITO04-NP-FSS-SU3-BSRSY10-U7-S014	Total/NA	Solid	Dry and Grind	
160-19855-15	TITO04-NP-FSS-SU3-BSRSY10-U7-S015	Total/NA	Solid	Dry and Grind	
160-19855-16	TITO04-NP-FSS-SU3-BSRSY10-U7-S016	Total/NA	Solid	Dry and Grind	
160-19855-17	TITO04-NP-FSS-SU3-BSRSY10-U7-S017	Total/NA	Solid	Dry and Grind	
160-19855-18	TITO04-NP-FSS-SU3-BSRSY10-U7-S018	Total/NA	Solid	Dry and Grind	
160-19855-19	TITO04-NP-FSS-SU3-BSRSY10-U7-S019	Total/NA	Solid	Dry and Grind	
160-19855-20	TITO04-NP-FSS-SU3-BSRSY10-U7-S020	Total/NA	Solid	Dry and Grind	
160-19855-1 DU	TITO04-NP-FSS-SU3-BSRSY10-U7-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 278070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19855-1	TITO04-NP-FSS-SU3-BSRSY10-U7-S001	Total/NA	Solid	Fill_Geo-21	277740
160-19855-2	TITO04-NP-FSS-SU3-BSRSY10-U7-S002	Total/NA	Solid	Fill_Geo-21	277740
160-19855-3	TITO04-NP-FSS-SU3-BSRSY10-U7-S003	Total/NA	Solid	Fill_Geo-21	277740
160-19855-4	TITO04-NP-FSS-SU3-BSRSY10-U7-S004	Total/NA	Solid	Fill_Geo-21	277740
160-19855-5	TITO04-NP-FSS-SU3-BSRSY10-U7-S005	Total/NA	Solid	Fill_Geo-21	277740
160-19855-6	TITO04-NP-FSS-SU3-BSRSY10-U7-S006	Total/NA	Solid	Fill_Geo-21	277740
160-19855-7	TITO04-NP-FSS-SU3-BSRSY10-U7-S007	Total/NA	Solid	Fill_Geo-21	277740
160-19855-8	TITO04-NP-FSS-SU3-BSRSY10-U7-S008	Total/NA	Solid	Fill_Geo-21	277740
160-19855-9	TITO04-NP-FSS-SU3-BSRSY10-U7-S009	Total/NA	Solid	Fill_Geo-21	277740
160-19855-10	TITO04-NP-FSS-SU3-BSRSY10-U7-S010	Total/NA	Solid	Fill_Geo-21	277740
160-19855-11	TITO04-NP-FSS-SU3-BSRSY10-U7-S011	Total/NA	Solid	Fill_Geo-21	277740
160-19855-12	TITO04-NP-FSS-SU3-BSRSY10-U7-S012	Total/NA	Solid	Fill_Geo-21	277740
160-19855-13	TITO04-NP-FSS-SU3-BSRSY10-U7-S013	Total/NA	Solid	Fill_Geo-21	277740
160-19855-14	TITO04-NP-FSS-SU3-BSRSY10-U7-S014	Total/NA	Solid	Fill_Geo-21	277740
160-19855-15	TITO04-NP-FSS-SU3-BSRSY10-U7-S015	Total/NA	Solid	Fill_Geo-21	277740
160-19855-16	TITO04-NP-FSS-SU3-BSRSY10-U7-S016	Total/NA	Solid	Fill_Geo-21	277740
160-19855-17	TITO04-NP-FSS-SU3-BSRSY10-U7-S017	Total/NA	Solid	Fill_Geo-21	277740
160-19855-18	TITO04-NP-FSS-SU3-BSRSY10-U7-S018	Total/NA	Solid	Fill_Geo-21	277740
160-19855-19	TITO04-NP-FSS-SU3-BSRSY10-U7-S019	Total/NA	Solid	Fill_Geo-21	277740
160-19855-20	TITO04-NP-FSS-SU3-BSRSY10-U7-S020	Total/NA	Solid	Fill_Geo-21	277740
MB 160-278070/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-278070/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-19855-1 DU	TITO04-NP-FSS-SU3-BSRSY10-U7-S001	Total/NA	Solid	Fill_Geo-21	277740

From: [Weyant, David B CIV NAVSEA 04, 04N](#)
To: [Guillory, Jeffrey](#)
Cc: [Edwards, Zachary L CIV SEA 04 04N](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 10 (Use 8)
Date: Thursday, December 22, 2016 12:20:51 PM

Jeff,

I concur to designating the Revised RSY-10 (Use 8) soil as Non-LLRW soil.

VR

David Weyant
Health Physicist/Environmental Protection Manager
Environmental Protection Division
NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederalservices.com>]
Sent: Thursday, December 22, 2016 12:11 PM
To: Weyant, David B CIV NAVSEA 04, 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 10 (Use 8)

Mr. Weyant,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Jeffrey Guillory

Scientist 3

Federal Services

Cell: +1 979 422 5534

jeffrey.guillory@cbifederalservices.com <<mailto:jeffrey.guillory@cbifederalservices.com>>

CB&I

950 Avenue M - Treasure Island

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United States of America

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Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY 10	RSY Unit Use Number: USE 8	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 12/22/2016

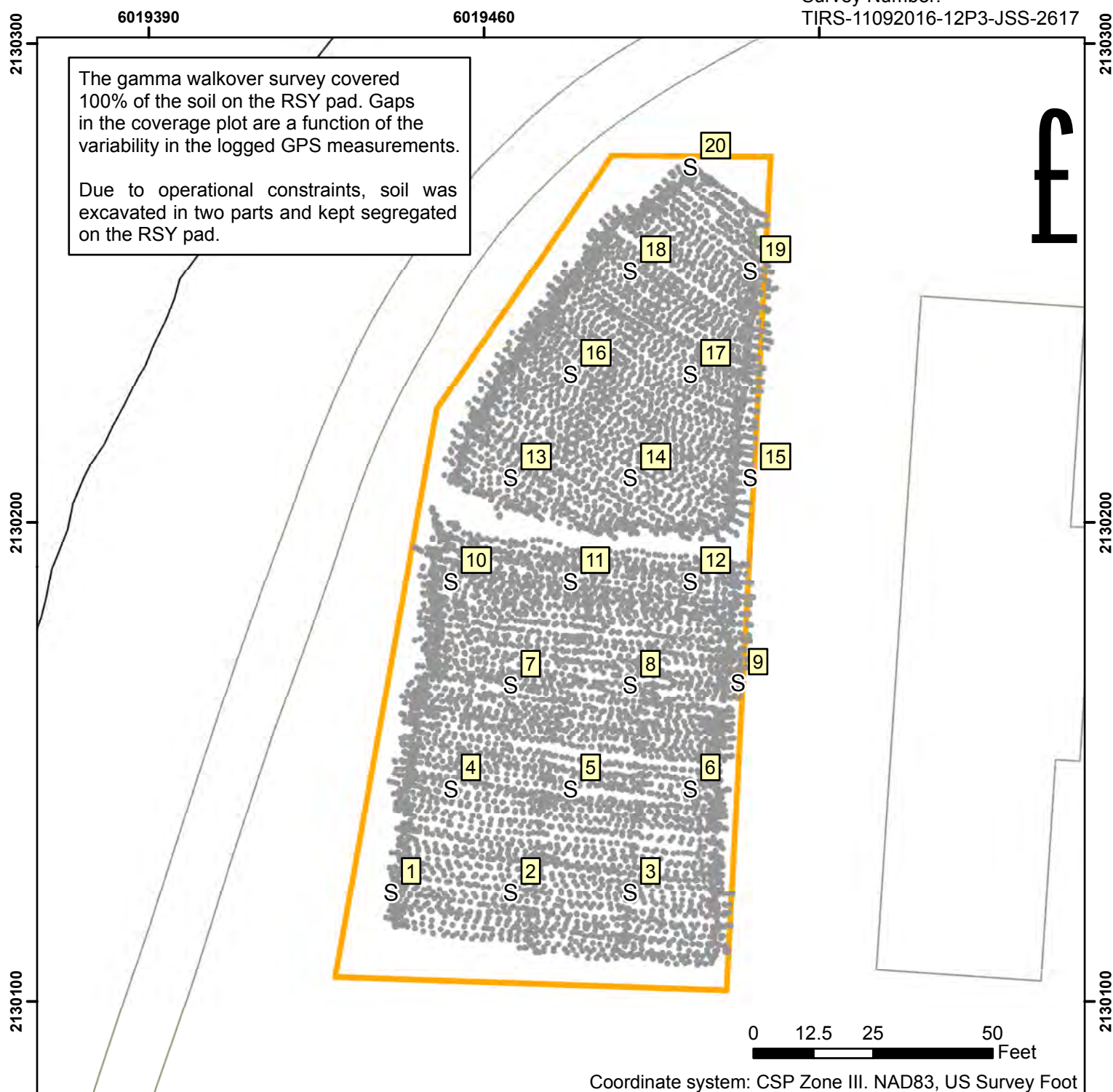
Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static Survey Meter (Model 2221) Serial Number	One-Minute Static Reading (CPM)	Static Count Exceeds Reference Area IL?	²²⁶ Ra Final Analytical Results (pCi/g)
Upper limit of site reference background						1.69
TITO04-BS-FSSSU4-RSY10-U8-S801	1	Systematic	262301	11,688	No	0.283
TITO04-BS-FSSSU4-RSY10-U8-S802	2	Systematic	262301	11,293	No	0.319
TITO04-BS-FSSSU4-RSY10-U8-S803	3	Systematic	262301	11,498	No	0.248
TITO04-BS-FSSSU4-RSY10-U8-S804	4	Systematic	262301	11,421	No	0.390
TITO04-BS-FSSSU4-RSY10-U8-S805	5	Systematic	262301	11,495	No	0.334
TITO04-BS-FSSSU4-RSY10-U8-S806	6	Systematic	262301	11,552	No	0.327
TITO04-BS-FSSSU4-RSY10-U8-S807	7	Systematic	262301	11,439	No	0.462
TITO04-BS-FSSSU4-RSY10-U8-S808	8	Systematic	262301	11,562	No	0.323
TITO04-BS-FSSSU4-RSY10-U8-S809	9	Systematic	262301	11,840	No	0.374
TITO04-BS-FSSSU4-RSY10-U8-S810	10	Systematic	262301	11,770	No	0.371
TITO04-BS-FSSSU4-RSY10-U8-S811	11	Systematic	262301	11,340	No	0.324
TITO04-BS-FSSSU4-RSY10-U8-S812	12	Systematic	262301	11,505	No	0.286
TITO04-BS-FSSSU4-RSY10-U8-S813	13	Systematic	262301	11,504	No	0.401
TITO04-BS-FSSSU4-RSY10-U8-S814	14	Systematic	262301	11,524	No	0.414
TITO04-BS-FSSSU4-RSY10-U8-S815	15	Systematic	262301	11,605	No	0.325
TITO04-BS-FSSSU4-RSY10-U8-S816	16	Systematic	262301	11,275	No	0.366
TITO04-BS-FSSSU4-RSY10-U8-S817	17	Systematic	262301	12,130	No	0.281
TITO04-BS-FSSSU4-RSY10-U8-S818	18	Systematic	262301	12,075	No	0.319
TITO04-BS-FSSSU4-RSY10-U8-S819	19	Systematic	262301	11,795	No	0.385
TITO04-BS-FSSSU4-RSY10-U8-S820	20	Systematic	262301	11,822	No	0.349

CPM Counts per minute
IL Investigation Level (based on Reference Area data set)
²²⁶Ra Radium-226
pCi/g Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd (CPM)	Reference Area Static 3σ IL (CPM)	Reference Area Scan Bkgd (CPM)	Reference Area Scan 3σ IL (CPM)	Range (CPM)
Gamma Walkover Survey (Part 1)	TIRS-110752016-12P3-GWS-2611	11/7/2016	2221	8/12/2017	117648	N/A	N/A	14,256	17,684	8,890 – 12,207
Gamma Walkover Survey (Part 2)	TIRS-110752016-12P3-GWS-2611	11/7/2016	2221	8/12/2017	117648	N/A	N/A	14,256	17,684	8,868 – 12,908
Follow-up Static Survey (Parts 1 & 2)	TIRS-11092016-12P3-JSS-2615	11/8/2016 – 12/20/2016	2221	8/12/2017	117648	N/A	N/A	14,256	17,684	11,186 – 14,602
Systematic Sampling Survey	TIRS-11092016-12P3-JSS-2617	11/9/2016	2221	1/12/2017	262301	16,866	18,654	N/A	N/A	11,275 – 12,130

3σ IL Investigation Level (established at 3σ above the mean of the Reference Area data set)
CPM Counts per minute

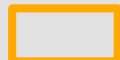
Summary
<p>1) Gamma walkover survey and data review (Part 1)—all locations surveyed in the northern half (Part 1) of RSY 10 (Use 8) were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the data set average for RSY 10 (Use 8, Part 1) were evaluated for follow-up investigation; 8 total data points clustered around 7 discrete locations were identified as exceeding three standard deviations of the data set average. Gamma scan coverage (Parts 1 & 2) is shown on the Systematic Sample Survey map (page 3). GWS count rate statistics for Part 1 are also provided (page 4).</p>
<p>2) Gamma walkover survey and data review (Part 2)—all locations surveyed in the southern half (Part 2) of RSY 10 (Use 8) were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the data set average for RSY 10 (Use 8, Part 2) were evaluated for follow-up investigation; 24 total data points clustered around 6 discrete locations were identified as exceeding three standard deviations of the data set average. Gamma scan coverage (Parts 1 & 2) is shown on the Systematic Sample Survey map (page 3). GWS count rate statistics for Part 2 are also provided (page 5).</p>
<p>3) Follow-up static survey—13 total locations (Parts 1 & 2) identified during the data review process as exceeding three standard deviations of the data set averages for Parts 1 & 2 of RSY 10 (Use 8) were investigated, resulting in all locations less than the Reference Area static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 6).</p>
<p>4) Twenty systematic soil samples (801-820) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with static readings < Reference Area static IL for all sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 9-31).</p>
<p><u>Note:</u> Due to operational constraints, soil from the final 6-inch over-excavation at Bayside SU 4 was excavated in two parts and kept segregated on the RSY pad. Gamma walkover surveys for each part of the RSY pad were performed independently, however, follow-up static and systematic sampling surveys were performed and are reported jointly for both parts of the RSY pad.</p>
<p>Conclusions:</p> <p>All count rates recorded during the gamma walkover surveys were less than the Reference Area scan IL. As an additional conservative characterization approach, all individual or clustered locations identified as exceeding three standard deviations of the data set means for Parts 1 & 2 of RSY 10 (Use 8) were investigated and deemed comparable to background. Thirteen total follow-up static locations were investigated for Parts 1 & 2 of RSY 10 (Use 8), with readings less than the Reference Area static IL at all locations.</p> <p>Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 7-8. These statistical tools were utilized to verify the appropriate level of reasonable effort.</p> <p>RSY 10 (Use 8) contains soil from the final 6-inch over excavation of FSS material from the bottom of the excavation at SWDA Bayside SU 4.</p> <p><u>Note:</u> Soil on RSY Pad 10 (Use 8) was over-excavated at the final depth from the bottom of the excavation at Bayside SU 4, and no visible debris and/or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.</p> <p>CB&I requests RASO concurrence to release this soil as Non-LLRW.</p> <p>Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.</p>

Survey Number:
TIRS-11092016-12P3-JSS-2617

Instrument # 262301

• GWS Coverage

S Systematic Sample Locations



RSY Boundaries



Survey/Sample Location ID

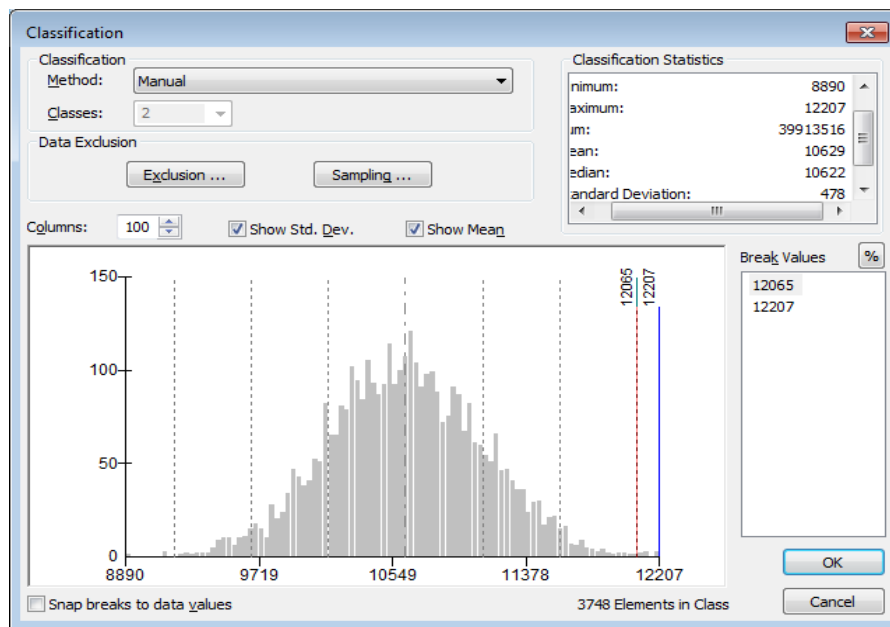
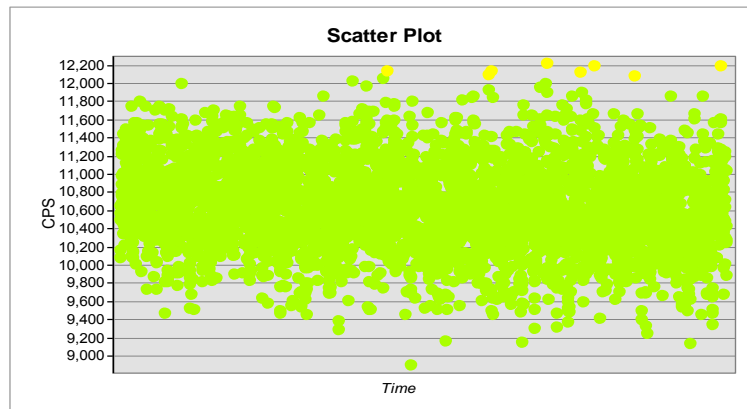
CB&I Federal Services, LLC

Data Processed In Treasure Island Office

TIRS-11072016-12P3-GWS-2611

GWS Count Rate Statistics
RSY Pad 10 (Use 8, Part 1)

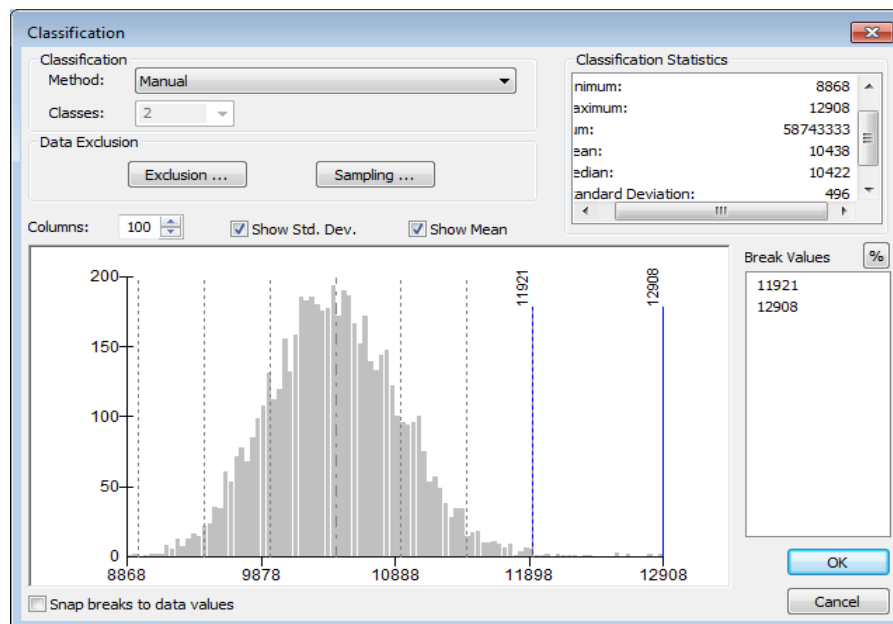
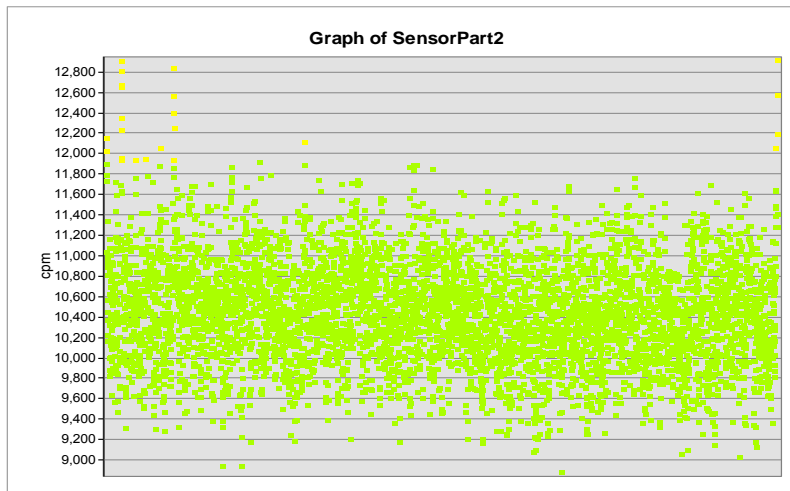
Frequency Table				
In the 8,000 (cpm)	In the 9,000 (cpm)	In the 10,000 (cpm)	In the 11,000 (cpm)	In the 12,000 (cpm)
1	338	2589	817	10



TIRS-11072016-12P3-GWS-2611

GWS Count Rate Statistics
RSY Pad 10 (Use 8, Part 2)

Frequency Table				
In the 8,000 (cpm)	In the 9,000 (cpm)	In the 10,000 (cpm)	In the 11,000 (cpm)	In the 12,000 (cpm)
3	1064	3831	711	19



Survey Number:
TIRS-11082016-12P3-JSS-2615**Instrument # 117648**

- ▲ Follow-up Static Locations
- Data Points Not Requiring Further Investigation
- ▭ RSY Boundaries

CB&I Federal Services, LLC

Data Processed In Treasure Island Office

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 10-8
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5.5	S
0.55	R	0.55	26	0	5.5	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.283	S	-0.199939192	3	3	21	R
0.319	S	-0.163939192	5.5	5.5	22	R
0.248	S	-0.234939192	1	1	23	R
0.390	S	-0.092939192	17	17	24	R
0.334	S	-0.148939192	11	11	25	R
0.327	S	-0.155939192	10	10	26	R
0.462	S	-0.020939192	20	20	27.5	R
0.323	S	-0.159939192	7	7	27.5	R
0.374	S	-0.108939192	15	15	29.5	R
0.371	S	-0.111939192	14	14	29.5	R
0.324	S	-0.158939192	8	8	31	R
0.286	S	-0.196939192	4	4	32	R
0.401	S	-0.081939192	18	18	33	R
0.414	S	-0.068939192	19	19	34	R
0.325	S	-0.157939192	9	9	35.5	R
0.366	S	-0.116939192	13	13	35.5	R
0.281	S	-0.201939192	2	2	37	R
0.319	S	-0.163939192	5.5	5.5	38	R
0.385	S	-0.097939192	16	16	39	R
0.349	S	-0.133939192	12	12	40	R
Sum =			820	210		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 *n*
 # of S: 20 *m*
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For *m* or *n* greater than 20, the critical value (*k*) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

z = 97.5% percentile of standard normal distribution = 1.960

k = 482.5

$\alpha_w = \alpha/2 = 0.025$

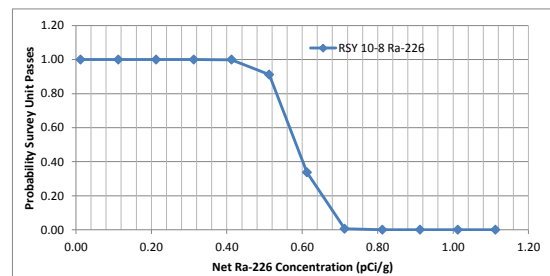
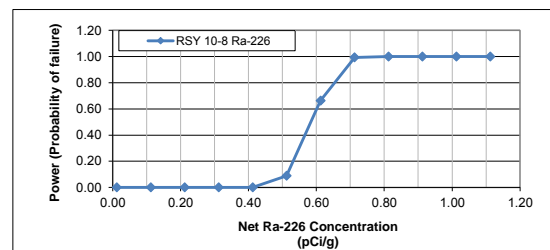
$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.052
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count 20 *m*
 SD 0.052
 Median 0.331
 Ref Stats
 Count 20 *n*
 SD 0.161
 Critical Value 482.5

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	6.7788	43.18647	6.5716411	40.3521	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	15.42	120.9048	10.995672	23.3308	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	45.8664	438.8427	20.948572	10.7927	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	87.3352	846.8185	29.100146	6.3444	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	155.4596	1282.524	35.812351	3.25303	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	222.4924	1345.121	36.675894	1.34873	0.09	0.91
1.3	0.61	0.8	0.71420	0.57447	285.6784	1060.423	32.564133	-0.42133	0.66	0.34
1.4	0.71	1.4	0.83890	0.74170	335.5604	630.7938	25.115608	-2.53238	0.99	0.01
1.5	0.81	2.0	0.92135	0.86577	368.54	285.5796	16.8991	-5.71521	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	388.7524	81.69222	9.0383749	-12.922	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	396.0752	21.5749	4.6448794	-26.7213	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	399.0644	3.510254	1.8735671	-67.8418	1.00	0.00

**QUANTILE TEST**

From NUREG 1505, Table A.7c Values of *r* and *k* for the Quantile Test When α is Approximately 0.05

20 *n* (number of survey unit measurements)
 20 *m* (number of reference area measurements)

Use:
m = 20
n = 20
 4 *r*
 4 *k*
 0.053 α

If *k* or more of the *r* largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

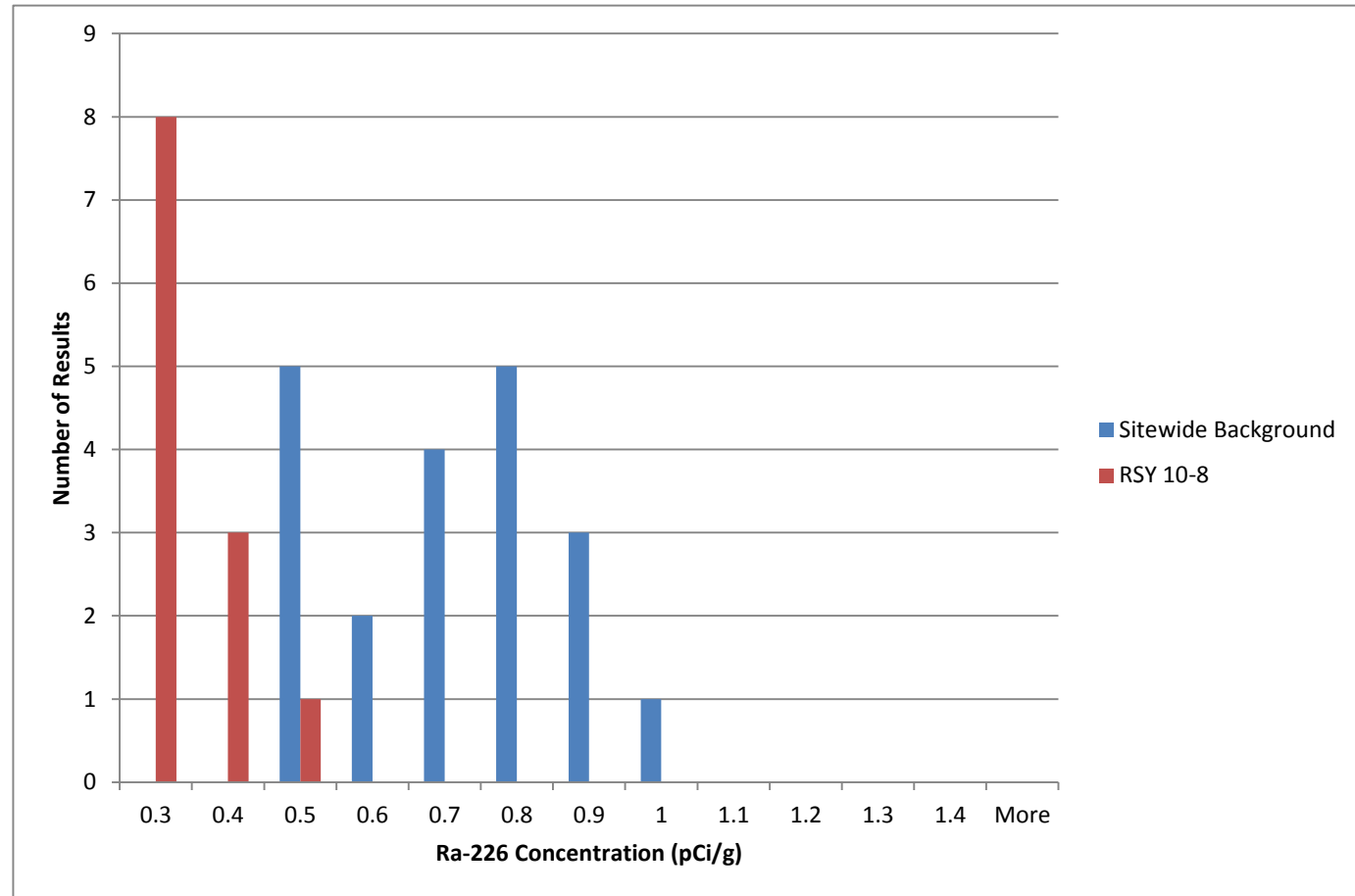
0 of the largest 4 adjusted measurements are from S.

The null hypothesis is accepted.

Histogram, RSY 10 (Use 8) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 10-8	
<i>Bin</i>	<i>Frequency</i>
0.3	8
0.4	3
0.5	1
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-19954-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

12/6/2016 12:05:59 PM

Micha Korinhizer, Project Management Assistant I
(314)298-8566

micha.korinhizer@testamericainc.com

Designee for

Erika Gish, Project Manager II
(314)298-8566

erika.gish@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

LINKS

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QC Association Summary	23

Case Narrative

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Job ID: 160-19954-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-19954-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 12 of 31

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Job ID: 160-19954-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

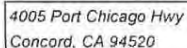
RECEIPT

The samples were received on 11/11/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 18.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSSSU4-RSY10-U8-S801 (160-19954-1), TITO04-BS-FSSSU4-RSY10-U8-S802 (160-19954-2), TITO04-BS-FSSSU4-RSY10-U8-S803 (160-19954-3), TITO04-BS-FSSSU4-RSY10-U8-S804 (160-19954-4), TITO04-BS-FSSSU4-RSY10-U8-S805 (160-19954-5), TITO04-BS-FSSSU4-RSY10-U8-S806 (160-19954-6), TITO04-BS-FSSSU4-RSY10-U8-S807 (160-19954-7), TITO04-BS-FSSSU4-RSY10-U8-S808 (160-19954-8), TITO04-BS-FSSSU4-RSY10-U8-S809 (160-19954-9), TITO04-BS-FSSSU4-RSY10-U8-S810 (160-19954-10), TITO04-BS-FSSSU4-RSY10-U8-S811 (160-19954-11), TITO04-BS-FSSSU4-RSY10-U8-S812 (160-19954-12), TITO04-BS-FSSSU4-RSY10-U8-S813 (160-19954-13), TITO04-BS-FSSSU4-RSY10-U8-S814 (160-19954-14), TITO04-BS-FSSSU4-RSY10-U8-S815 (160-19954-15), TITO04-BS-FSSSU4-RSY10-U8-S816 (160-19954-16), TITO04-BS-FSSSU4-RSY10-U8-S817 (160-19954-17), TITO04-BS-FSSSU4-RSY10-U8-S818 (160-19954-18), TITO04-BS-FSSSU4-RSY10-U8-S819 (160-19954-19) and TITO04-BS-FSSSU4-RSY10-U8-S820 (160-19954-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/11/2016, prepared on 11/14/2016 and analyzed on 12/05/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Page 1 of 2

City:

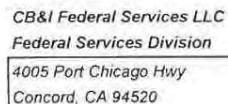
Contact Name / ph. #: *Mike Dryden*

D, Fields

160-19954 Chain of Custody

Time

ABS=Asbestos, PO=Pipe Opening



Ref. Document # T1 P3 BS FSS SU4 RSY10 U8 #325

Page 2 of 2

Page 14 of 31

Project Manager: Ulrika Messer
(Name & phone)

Send Report To: Lynn Caragan
Phone/Fax Number: 714-669-7022

Address: lynn.caragan@cbifederaleservices.com

Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside FSS
SU4 RSY10 USE 8 Systematic

Purchase Order #: 201455

Shipment Date: 11-10-16

Waybill Number: 1789V 462 01 9076 5131

Lab Destination: *Earth Toxics Inc To Test America*

Contact Name / ph. #: *Mike Dryden*

Sampler's Name(s): D. Fields

Collection Information

Sampler's Name(s): <u>D. fields</u>		Collection Information			Matrix	# of containers	Preservative (water)															
Sample ID Number	Sample Description	Date	Time	Method			Preservative (soil)	N/A														
							Container Type															
TITO04-BS-FSSSU4-RSY10-U8-S811	BAYSIDE FSS in Survey Unit 4 RSY 10 Use 8	11-9-16	1001 1004	G	SO	1	16 oz Plastic	X									5					
TITO04-BS-FSSSU4-RSY10-U8-S812	BAYSIDE FSS in Survey Unit 4 RSY 10 Use 8	11-9-16	1003 1001	G	SO	1	16 oz Plastic	X									5					
TITO04-BS-FSSSU4-RSY10-U8-S813	BAYSIDE FSS in Survey Unit 4 RSY 10 Use 8	11-9-16	1003 1003	G	SO	1	16 oz Plastic	X									6					
TITO04-BS-FSSSU4-RSY10-U8-S814	BAYSIDE FSS in Survey Unit 4 RSY 10 Use 8	11-9-16	1009 1005	G	SO	1	16 oz Plastic	X									6					
TITO04-BS-FSSSU4-RSY10-U8-S815	BAYSIDE FSS in Survey Unit 4 RSY 10 Use 8	11-9-16	1009 1009	G	SO	1	16 oz Plastic	X									4					
TITO04-BS-FSSSU4-RSY10-U8-S816	BAYSIDE FSS in Survey Unit 4 RSY 10 Use 8	11-9-16	1012 1011	G	SO	1	16 oz Plastic	X									4					
TITO04-BS-FSSSU4-RSY10-U8-S817	BAYSIDE FSS in Survey Unit 4 RSY 10 Use 8	11-9-16	1009 1012	G	SO	1	16 oz Plastic	X									5					
TITO04-BS-FSSSU4-RSY10-U8-S818	BAYSIDE FSS in Survey Unit 4 RSY 10 Use 8	11-9-16	1003 1006	G	SO	1	16 oz Plastic	X									5					
TITO04-BS-FSSSU4-RSY10-U8-S819	BAYSIDE FSS in Survey Unit 4 RSY 10 Use 8	11-9-16	1010 1008	G	SO	1	16 oz Plastic	X									4					
TITO04-BS-FSSSU4-RSY10-U8-S820	BAYSIDE FSS in Survey Unit 4 RSY 10 Use 8	11-9-16	1009	G	SO	1	16 oz Plastic	X									5					
Special Instructions: 7 days ingrown draft and follow with 21 days final																						
<input type="checkbox"/> 24-hr		Level Of QC Required:																				
<input type="checkbox"/> 3-day		I II III			Project Specific:																	
<input type="checkbox"/> 7-day																						
Standard TAT <input type="checkbox"/>																						
Reinquished By: <u>A. Owens</u>		Date: <u>11-10-16</u> Time: <u>1130</u>			Received By: <u>[Signature]</u>		Date: <u>11-11-16</u> Time: <u>0830</u>		DW = Drinking Water GW = Ground Water WW = Waste Water A = Air										SO = Soil SL = Sludge CP = Chip Samples ABS=Asbestos, PO=Pipe Opennin			
Reinquished By:		Date:			Received By:		Date:															
		Time:					Time:															

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12/6/2016

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-19954-2

Login Number: 19954**List Number: 1****Creator: Clarke, Jill C****List Source: TestAmerica St. Louis**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



Sample Summary

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-19954-1	TITO04-BS-FSSSU4-RSY10-U8-S801	Solid	11/09/16 09:33	11/11/16 08:30
160-19954-2	TITO04-BS-FSSSU4-RSY10-U8-S802	Solid	11/09/16 09:31	11/11/16 08:30
160-19954-3	TITO04-BS-FSSSU4-RSY10-U8-S803	Solid	11/09/16 09:36	11/11/16 08:30
160-19954-4	TITO04-BS-FSSSU4-RSY10-U8-S804	Solid	11/09/16 09:40	11/11/16 08:30
160-19954-5	TITO04-BS-FSSSU4-RSY10-U8-S805	Solid	11/09/16 09:44	11/11/16 08:30
160-19954-6	TITO04-BS-FSSSU4-RSY10-U8-S806	Solid	11/09/16 09:48	11/11/16 08:30
160-19954-7	TITO04-BS-FSSSU4-RSY10-U8-S807	Solid	11/09/16 09:58	11/11/16 08:30
160-19954-8	TITO04-BS-FSSSU4-RSY10-U8-S808	Solid	11/09/16 10:01	11/11/16 08:30
160-19954-9	TITO04-BS-FSSSU4-RSY10-U8-S809	Solid	11/09/16 10:04	11/11/16 08:30
160-19954-10	TITO04-BS-FSSSU4-RSY10-U8-S810	Solid	11/09/16 10:09	11/11/16 08:30
160-19954-11	TITO04-BS-FSSSU4-RSY10-U8-S811	Solid	11/09/16 10:01	11/11/16 08:30
160-19954-12	TITO04-BS-FSSSU4-RSY10-U8-S812	Solid	11/09/16 10:03	11/11/16 08:30
160-19954-13	TITO04-BS-FSSSU4-RSY10-U8-S813	Solid	11/09/16 10:03	11/11/16 08:30
160-19954-14	TITO04-BS-FSSSU4-RSY10-U8-S814	Solid	11/09/16 10:09	11/11/16 08:30
160-19954-15	TITO04-BS-FSSSU4-RSY10-U8-S815	Solid	11/09/16 10:11	11/11/16 08:30
160-19954-16	TITO04-BS-FSSSU4-RSY10-U8-S816	Solid	11/09/16 10:12	11/11/16 08:30
160-19954-17	TITO04-BS-FSSSU4-RSY10-U8-S817	Solid	11/09/16 10:06	11/11/16 08:30
160-19954-18	TITO04-BS-FSSSU4-RSY10-U8-S818	Solid	11/09/16 10:08	11/11/16 08:30
160-19954-19	TITO04-BS-FSSSU4-RSY10-U8-S819	Solid	11/09/16 10:10	11/11/16 08:30
160-19954-20	TITO04-BS-FSSSU4-RSY10-U8-S820	Solid	11/09/16 10:09	11/11/16 08:30

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S801

Lab Sample ID: 160-19954-1

Date Collected: 11/09/16 09:33

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.308		0.189	0.191		0.193	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Actinium-227	0.00953	U	0.533	0.533		0.917	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Bismuth-212	0.169	U	0.453	0.453		0.784	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Bismuth-214	0.283		0.0867	0.0916		0.0826	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Cesium-137	-0.0352	U	0.0543	0.0545		0.0907	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Lead-210	-0.533	U	0.990	0.992		1.66	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Lead-212	0.297		0.0608	0.0720		0.0639	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Lead-214	0.259		0.0750	0.0796		0.0780	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Potassium-40	9.78		1.14	1.52		0.470	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Protactinium-231	-0.196	U	1.78	1.78		3.01	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Radium-226	0.283		0.0867	0.0916	0.500	0.0826	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Radium-228	0.308		0.189	0.191		0.193	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Thallium-208	0.0660		0.0504	0.0509		0.0540	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Thorium-228	0.297		0.0608	0.0720		0.0639	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Thorium-232	0.308		0.189	0.191		0.193	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Thorium-234	0.433	U	0.919	0.920		1.54	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Uranium-235	0.176	U	0.314	0.314		0.703	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Uranium-238	0.433	U	0.919	0.920		1.54	pCi/g	11/14/16 10:15	12/05/16 13:44	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S802

Lab Sample ID: 160-19954-2

Date Collected: 11/09/16 09:31

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.499		0.179	0.186		0.197	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Actinium-227	-0.290	U	0.662	0.663		0.943	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Bismuth-212	-0.0248	U	0.722	0.722		1.29	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Bismuth-214	0.319		0.0986	0.104		0.0949	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Cesium-137	-0.0143	U	0.0418	0.0418		0.0736	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Lead-210	-0.371	U	1.23	1.23		1.87	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Lead-212	0.199		0.0822	0.0862		0.118	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Lead-214	0.407		0.0958	0.105		0.0795	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Potassium-40	9.86		1.39	1.72		0.634	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Protactinium-231	0.485	U	1.07	1.07		2.51	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Radium-226	0.319		0.0986	0.104	0.500	0.0949	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Radium-228	0.499		0.179	0.186		0.197	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Thallium-208	0.0770	U	0.0671	0.0675		0.0905	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Thorium-228	0.199		0.0822	0.0862		0.118	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Thorium-232	0.499		0.179	0.186		0.197	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Thorium-234	0.760	U	0.668	0.673		0.960	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Uranium-235	-0.143	U	0.207	0.207		0.573	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Uranium-238	0.760	U	0.668	0.673		0.960	pCi/g	11/14/16 10:15	12/05/16 13:41	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S803

Lab Sample ID: 160-19954-3

Date Collected: 11/09/16 09:36

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.413		0.111	0.119		0.0951	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Actinium-227	0.284	U	0.632	0.633		1.06	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Bismuth-212	0.217	U	0.455	0.456		0.794	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Bismuth-214	0.248		0.0981	0.101		0.101	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Cesium-137	-0.0106	U	0.0600	0.0600		0.106	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Lead-210	-0.248	U	1.39	1.39		2.40	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Lead-212	0.224		0.0713	0.0770		0.0887	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Lead-214	0.288		0.106	0.110		0.154	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Potassium-40	11.5		1.59	1.97		0.610	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Protactinium-231	0.000	U	0.259	0.259		3.20	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Radium-226	0.248		0.0981	0.101	0.500	0.101	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Radium-228	0.413		0.111	0.119		0.0951	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Thallium-208	0.104		0.0432	0.0445		0.0429	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Thorium-228	0.224		0.0713	0.0770		0.0887	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Thorium-232	0.413		0.111	0.119		0.0951	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Thorium-234	1.65		0.711	0.731		0.850	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Uranium-235	-0.00951	U	0.611	0.611		0.864	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Uranium-238	1.65		0.711	0.731		0.850	pCi/g	11/14/16 10:15	12/05/16 13:42	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S804

Lab Sample ID: 160-19954-4

Date Collected: 11/09/16 09:40

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.408		0.120	0.127		0.138	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Actinium-227	-0.369	U	0.900	0.901		1.51	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Bismuth-212	0.0171	U	0.733	0.733		1.30	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Bismuth-214	0.390		0.120	0.126		0.111	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Cesium-137	-0.0263	U	0.0564	0.0565		0.0961	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Lead-210	1.13	U	1.27	1.28		1.74	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Lead-212	0.264		0.0769	0.0841		0.0975	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Lead-214	0.381		0.106	0.113		0.102	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Potassium-40	9.84		1.33	1.67		0.760	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Protactinium-231	0.000	U	0.668	0.668		3.68	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Radium-226	0.390		0.120	0.126	0.500	0.111	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Radium-228	0.408		0.120	0.127		0.138	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Thallium-208	0.122		0.0527	0.0542		0.0551	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Thorium-228	0.264		0.0769	0.0841		0.0975	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Thorium-232	0.408		0.120	0.127		0.138	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Thorium-234	0.175	U	0.235	0.236		2.57	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Uranium-235	-0.0136	U	0.0257	0.0257		0.871	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Uranium-238	0.175	U	0.235	0.236		2.57	pCi/g	11/14/16 10:15	12/05/16 13:43	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S805

Lab Sample ID: 160-19954-5

Date Collected: 11/09/16 09:44

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.356		0.160	0.164		0.235	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Actinium-227	0.269	U	0.600	0.600		0.859	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Bismuth-212	0.000	U	0.283	0.283		1.20	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Bismuth-214	0.334		0.109	0.114		0.108	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Cesium-137	-0.0185	U	0.0431	0.0431		0.0919	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Lead-210	0.798	U	1.39	1.39		1.96	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Lead-212	0.331		0.0824	0.0929		0.0958	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Lead-214	0.395		0.109	0.117		0.117	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Potassium-40	12.3		1.53	1.98		0.675	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Protactinium-231	0.000	U	0.743	0.743		3.60	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Radium-226	0.334		0.109	0.114	0.500	0.108	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Radium-228	0.356		0.160	0.164		0.235	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Thallium-208	0.0784		0.0632	0.0637		0.0782	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Thorium-228	0.331		0.0824	0.0929		0.0958	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Thorium-232	0.356		0.160	0.164		0.235	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Thorium-234	-0.438	U	1.15	1.15		2.01	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Uranium-235	0.0358	U	0.102	0.102		0.602	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Uranium-238	-0.438	U	1.15	1.15		2.01	pCi/g	11/14/16 10:15	12/05/16 13:45	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S806

Lab Sample ID: 160-19954-6

Date Collected: 11/09/16 09:48

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.421		0.158	0.164		0.311	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Actinium-227	0.221	U	0.512	0.513		0.739	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Bismuth-212	0.425	U	0.862	0.863		1.47	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Bismuth-214	0.327		0.112	0.117		0.0993	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Cesium-137	-0.00601	U	0.0752	0.0753		0.133	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Lead-210	2.13		1.17	1.20		1.49	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Lead-212	0.177	U	0.123	0.125		0.194	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Lead-214	0.403		0.112	0.120		0.110	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Potassium-40	10.5		1.56	1.89		0.743	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Protactinium-231	0.485	U	1.32	1.32		2.94	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Radium-226	0.327		0.112	0.117	0.500	0.0993	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Radium-228	0.421		0.158	0.164		0.311	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Thallium-208	0.164		0.0475	0.0505		0.0241	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Thorium-228	0.177	U	0.123	0.125		0.194	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Thorium-232	0.421		0.158	0.164		0.311	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Thorium-234	-0.0660	U	1.24	1.24		2.12	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Uranium-235	0.0940	U	0.327	0.327		0.554	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Uranium-238	-0.0660	U	1.24	1.24		2.12	pCi/g	11/14/16 10:15	12/05/16 14:40	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S807

Lab Sample ID: 160-19954-7

Date Collected: 11/09/16 09:58

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.511		0.168	0.176		0.102	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Actinium-227	0.0743	U	0.208	0.209		1.24	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Bismuth-212	0.000	U	0.429	0.429		1.20	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Bismuth-214	0.462		0.130	0.139		0.110	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Cesium-137	0.0318	U	0.0572	0.0573		0.0972	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Lead-210	0.307	U	1.46	1.46		2.46	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Lead-212	0.236		0.0797	0.0854		0.104	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Lead-214	0.377		0.106	0.113		0.0945	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Potassium-40	10.5		1.57	1.90		0.653	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Protactinium-231	-0.867	U	2.79	2.79		4.69	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Radium-226	0.462		0.130	0.139	0.500	0.110	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Radium-228	0.511		0.168	0.176		0.102	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Thallium-208	0.145		0.0601	0.0619		0.0618	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Thorium-228	0.236		0.0797	0.0854		0.104	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Thorium-232	0.511		0.168	0.176		0.102	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Thorium-234	-0.861	U	0.797	0.802		2.74	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Uranium-235	0.163	U	0.280	0.281		0.460	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Uranium-238	-0.861	U	0.797	0.802		2.74	pCi/g	11/14/16 10:15	12/05/16 14:41	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S808

Lab Sample ID: 160-19954-8

Date Collected: 11/09/16 10:01

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.459		0.137	0.145		0.0752	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Actinium-227	-0.321	U	0.760	0.761		1.27	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Bismuth-212	0.256	U	0.421	0.422		0.714	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Bismuth-214	0.323		0.133	0.137		0.135	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Cesium-137	0.0217	U	0.0459	0.0459		0.0786	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Lead-210	1.01	U	1.32	1.32		1.79	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Lead-212	0.286		0.0754	0.0840		0.0917	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Lead-214	0.322		0.101	0.106		0.108	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Potassium-40	10.5		1.35	1.72		0.738	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Protactinium-231	0.646	U	1.43	1.43		3.28	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Radium-226	0.323		0.133	0.137	0.500	0.135	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Radium-228	0.459		0.137	0.145		0.0752	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Thallium-208	0.115		0.0528	0.0541		0.0582	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Thorium-228	0.286		0.0754	0.0840		0.0917	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Thorium-232	0.459		0.137	0.145		0.0752	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Thorium-234	-0.197	U	1.21	1.21		2.07	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Uranium-235	-0.181	U	0.500	0.500		0.835	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Uranium-238	-0.197	U	1.21	1.21		2.07	pCi/g	11/14/16 10:15	12/05/16 14:43	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S809

Lab Sample ID: 160-19954-9

Date Collected: 11/09/16 10:04

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.206	U	0.213	0.214		0.233	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Actinium-227	0.0807	U	0.605	0.605		0.885	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Bismuth-212	0.479	U	1.04	1.04		1.75	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Bismuth-214	0.374		0.125	0.131		0.109	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Cesium-137	0.0284	U	0.0511	0.0512		0.0866	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-210	-0.924	U	1.54	1.55		2.41	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-212	0.250		0.0780	0.0844		0.0998	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-214	0.331		0.0884	0.0948		0.0971	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Potassium-40	11.8		1.50	1.92		0.670	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Protactinium-231	0.000	U	0.330	0.330		3.21	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Radium-226	0.374		0.125	0.131	0.500	0.109	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Radium-228	0.206	U	0.213	0.214		0.233	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thallium-208	0.0876		0.0436	0.0445		0.0478	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-228	0.250		0.0780	0.0844		0.0998	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-232	0.206	U	0.213	0.214		0.233	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-234	-0.550	U	1.09	1.09		1.92	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Uranium-235	-0.216	U	0.327	0.328		0.661	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Uranium-238	-0.550	U	1.09	1.09		1.92	pCi/g	11/14/16 10:15	12/05/16 14:45	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S810

Lab Sample ID: 160-19954-10

Date Collected: 11/09/16 10:09

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.370		0.165	0.170		0.128	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Actinium-227	-0.387	U	0.678	0.679		1.18	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Bismuth-212	0.395	U	1.10	1.10		1.89	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Bismuth-214	0.371		0.123	0.129		0.121	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Cesium-137	0.00267	U	0.0761	0.0761		0.136	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-210	-0.140	U	1.43	1.43		2.17	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-212	0.310		0.0830	0.0922		0.0867	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-214	0.410		0.127	0.134		0.133	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Potassium-40	11.3		1.83	2.16		0.847	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Protactinium-231	0.000	U	0.278	0.278		4.06	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Radium-226	0.371		0.123	0.129	0.500	0.121	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Radium-228	0.370		0.165	0.170		0.128	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thallium-208	0.161		0.0575	0.0599		0.0464	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-228	0.310		0.0830	0.0922		0.0867	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-232	0.370		0.165	0.170		0.128	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-234	0.0144	U	1.03	1.03		1.79	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Uranium-235	0.139	U	0.292	0.292		0.523	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Uranium-238	0.0144	U	1.03	1.03		1.79	pCi/g	11/14/16 10:15	12/05/16 14:45	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S811

Lab Sample ID: 160-19954-11

Date Collected: 11/09/16 10:01

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.141	U	0.252	0.253		0.270	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Actinium-227	0.225	U	0.559	0.560		0.944	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Bismuth-212	0.0804	U	0.486	0.486		0.879	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Bismuth-214	0.324		0.0924	0.0984		0.0784	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Cesium-137	0.0294	U	0.0554	0.0555		0.0939	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Lead-210	-0.0597	U	1.11	1.11		1.92	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Lead-212	0.300		0.0686	0.0788		0.0764	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Lead-214	0.340		0.0754	0.0833		0.0916	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Potassium-40	12.0		1.53	1.96		0.541	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Protactinium-231	0.363	U	0.908	0.909		2.13	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Radium-226	0.324		0.0924	0.0984	0.500	0.0784	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Radium-228	0.141	U	0.252	0.253		0.270	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Thallium-208	0.127		0.0476	0.0494		0.0407	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Thorium-228	0.300		0.0686	0.0788		0.0764	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Thorium-232	0.141	U	0.252	0.253		0.270	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Thorium-234	1.40		0.860	0.873		1.06	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Uranium-235	0.147	U	0.110	0.111		0.158	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Uranium-238	1.40		0.860	0.873		1.06	pCi/g	11/14/16 10:15	12/05/16 14:48	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S812

Lab Sample ID: 160-19954-12

Date Collected: 11/09/16 10:03

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.271		0.217	0.219		0.234	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Actinium-227	0.288	U	0.628	0.629		1.06	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Bismuth-212	0.336	U	0.802	0.803		1.38	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Bismuth-214	0.286		0.106	0.110		0.108	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Cesium-137	-0.0231	U	0.0663	0.0663		0.123	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Lead-210	0.666	U	1.46	1.46		2.45	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Lead-212	0.374		0.0818	0.0951		0.0822	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Lead-214	0.334		0.0854	0.0922		0.117	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Potassium-40	12.1		1.67	2.08		0.607	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Protactinium-231	-0.785	U	2.68	2.69		4.52	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Radium-226	0.286		0.106	0.110	0.500	0.108	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Radium-228	0.271		0.217	0.219		0.234	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Thallium-208	0.0883	U	0.0820	0.0825		0.0982	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Thorium-228	0.374		0.0818	0.0951		0.0822	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Thorium-232	0.271		0.217	0.219		0.234	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Thorium-234	0.979	U	1.23	1.24		1.56	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Uranium-235	-0.141	U	0.175	0.176		0.761	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Uranium-238	0.979	U	1.23	1.24		1.56	pCi/g	11/14/16 10:15	12/05/16 14:50	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S813

Lab Sample ID: 160-19954-13

Date Collected: 11/09/16 10:03

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.107	U	0.207	0.207		0.382	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Actinium-227	-0.188	U	0.475	0.476		0.813	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Bismuth-212	-0.349	U	0.982	0.983		1.70	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Bismuth-214	0.401		0.136	0.143		0.138	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Cesium-137	-0.0482	U	0.0480	0.0482		0.141	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Lead-210	1.39		1.00	1.02		1.36	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Lead-212	0.312		0.0837	0.0930		0.0917	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Lead-214	0.364		0.126	0.131		0.128	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Potassium-40	11.2		1.77	2.11		0.804	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Protactinium-231	0.574	U	1.26	1.27		2.99	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Radium-226	0.401		0.136	0.143	0.500	0.138	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Radium-228	0.107	U	0.207	0.207		0.382	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Thallium-208	0.0875	U	0.0841	0.0846		0.0904	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Thorium-228	0.312		0.0837	0.0930		0.0917	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Thorium-232	0.107	U	0.207	0.207		0.382	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Thorium-234	1.58		1.04	1.06		1.29	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Uranium-235	0.00810	U	0.0139	0.0139		0.538	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Uranium-238	1.58		1.04	1.06		1.29	pCi/g	11/14/16 10:15	12/05/16 15:19	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S814

Lab Sample ID: 160-19954-14

Date Collected: 11/09/16 10:09

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.300		0.135	0.139		0.244	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Actinium-227	0.215	U	0.524	0.524		0.885	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Bismuth-212	0.265	U	0.640	0.640		1.10	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Bismuth-214	0.414		0.119	0.126		0.110	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Cesium-137	-0.0196	U	0.0530	0.0531		0.0918	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Lead-210	-0.809	U	0.928	0.932		2.49	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Lead-212	0.273		0.0736	0.0816		0.0920	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Lead-214	0.365		0.0874	0.0953		0.0779	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Potassium-40	9.75		1.41	1.73		0.556	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Protactinium-231	0.457	U	1.10	1.10		2.55	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Radium-226	0.414		0.119	0.126	0.500	0.110	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Radium-228	0.300		0.135	0.139		0.244	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Thallium-208	0.137		0.0520	0.0539		0.0482	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Thorium-228	0.273		0.0736	0.0816		0.0920	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Thorium-232	0.300		0.135	0.139		0.244	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Thorium-234	-0.0344	U	0.899	0.899		1.55	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Uranium-235	0.0868	U	0.275	0.275		0.463	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Uranium-238	-0.0344	U	0.899	0.899		1.55	pCi/g	11/14/16 10:15	12/05/16 15:21	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S815

Lab Sample ID: 160-19954-15

Date Collected: 11/09/16 10:11

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.103	U	0.229	0.229		0.349	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Actinium-227	0.354	U	0.746	0.747		1.25	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Bismuth-212	-0.726	U	1.16	1.16		1.93	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Bismuth-214	0.325		0.106	0.111		0.0934	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Cesium-137	-0.0166	U	0.0842	0.0842		0.151	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Lead-210	-0.581	U	1.47	1.47		2.48	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Lead-212	0.406		0.116	0.127		0.158	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Lead-214	0.284		0.101	0.105		0.103	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Potassium-40	10.6		1.57	1.91		0.609	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Protactinium-231	-0.888	U	2.81	2.81		4.72	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Radium-226	0.325		0.106	0.111	0.500	0.0934	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Radium-228	0.103	U	0.229	0.229		0.349	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Thallium-208	0.0407	U	0.0763	0.0764		0.0984	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Thorium-228	0.406		0.116	0.127		0.158	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Thorium-232	0.103	U	0.229	0.229		0.349	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Thorium-234	0.180	U	0.240	0.240		2.31	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Uranium-235	-0.0294	U	0.139	0.139		0.792	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Uranium-238	0.180	U	0.240	0.240		2.31	pCi/g	11/14/16 10:15	12/05/16 15:23	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S816

Lab Sample ID: 160-19954-16

Date Collected: 11/09/16 10:12

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.226		0.105	0.108		0.106	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Actinium-227	0.116	U	0.0911	0.0920		1.11	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Bismuth-212	0.000	U	0.441	0.441		1.11	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Bismuth-214	0.366		0.0940	0.101		0.0834	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Cesium-137	-0.0331	U	0.0544	0.0545		0.0911	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Lead-210	-0.670	U	1.30	1.30		2.17	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Lead-212	0.318		0.0664	0.0781		0.0694	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Lead-214	0.289		0.0859	0.0910		0.101	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Potassium-40	9.94		1.22	1.59		0.576	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Protactinium-231	0.493	U	1.30	1.30		2.96	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Radium-226	0.366		0.0940	0.101	0.500	0.0834	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Radium-228	0.226		0.105	0.108		0.106	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Thallium-208	0.127		0.0346	0.0371		0.0203	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Thorium-228	0.318		0.0664	0.0781		0.0694	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Thorium-232	0.226		0.105	0.108		0.106	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Thorium-234	0.443	U	0.954	0.956		1.60	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Uranium-235	-0.164	U	0.455	0.455		0.759	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Uranium-238	0.443	U	0.954	0.956		1.60	pCi/g	11/14/16 10:15	12/05/16 15:12	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S817

Lab Sample ID: 160-19954-17

Date Collected: 11/09/16 10:06

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.444		0.126	0.134		0.0639	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Actinium-227	0.000972	U	0.00226	0.00226		0.967	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Bismuth-212	0.220	U	0.489	0.490		0.840	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Bismuth-214	0.281		0.0882	0.0929		0.0895	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Cesium-137	0.0219	U	0.0396	0.0397		0.0672	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-210	0.539	U	1.17	1.17		1.96	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-212	0.338		0.0691	0.0818		0.0758	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-214	0.382		0.0796	0.0889		0.0977	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Potassium-40	11.6		1.28	1.75		0.505	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Protactinium-231	0.481	U	1.38	1.38		3.12	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Radium-226	0.281		0.0882	0.0929	0.500	0.0895	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Radium-228	0.444		0.126	0.134		0.0639	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thallium-208	0.122		0.0407	0.0426		0.0325	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-228	0.338		0.0691	0.0818		0.0758	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-232	0.444		0.126	0.134		0.0639	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-234	-0.567	U	1.30	1.30		2.17	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Uranium-235	0.0751	U	0.187	0.188		0.613	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Uranium-238	-0.567	U	1.30	1.30		2.17	pCi/g	11/14/16 10:15	12/05/16 15:15	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S818

Lab Sample ID: 160-19954-18

Date Collected: 11/09/16 10:08

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.289		0.205	0.207		0.216	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Actinium-227	-0.250	U	0.609	0.610		0.873	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Bismuth-212	-0.0136	U	0.616	0.616		1.12	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Bismuth-214	0.319		0.126	0.130		0.134	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Cesium-137	-0.0313	U	0.0579	0.0580		0.0983	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-210	0.365	U	1.20	1.20		1.78	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-212	0.172		0.0785	0.0816		0.113	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-214	0.280		0.0910	0.0955		0.122	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Potassium-40	9.68		1.45	1.76		0.695	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Protactinium-231	-0.104	U	2.00	2.00		3.42	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Radium-226	0.319		0.126	0.130	0.500	0.134	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Radium-228	0.289		0.205	0.207		0.216	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thallium-208	0.107		0.0486	0.0499		0.0454	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-228	0.172		0.0785	0.0816		0.113	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-232	0.289		0.205	0.207		0.216	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-234	0.413	U	1.13	1.13		1.63	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Uranium-235	0.0893	U	0.299	0.299		0.507	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Uranium-238	0.413	U	1.13	1.13		1.63	pCi/g	11/14/16 10:15	12/05/16 15:15	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S819

Lab Sample ID: 160-19954-19

Date Collected: 11/09/16 10:10

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.153	U	0.0769	0.0785		0.386	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Actinium-227	0.292	U	0.429	0.430		1.20	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Bismuth-212	0.000	U	0.231	0.231		1.41	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Bismuth-214	0.385		0.127	0.133		0.117	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Cesium-137	0.0180	U	0.0784	0.0785		0.137	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Lead-210	-0.269	U	1.43	1.43		2.48	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Lead-212	0.307		0.0905	0.0988		0.113	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Lead-214	0.375		0.114	0.120		0.142	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Potassium-40	12.2		1.76	2.16		0.702	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Protactinium-231	0.000	U	0.827	0.827		4.45	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Radium-226	0.385		0.127	0.133	0.500	0.117	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Radium-228	0.153	U	0.0769	0.0785		0.386	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Thallium-208	0.145		0.0491	0.0514		0.0400	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Thorium-228	0.307		0.0905	0.0988		0.113	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Thorium-232	0.153	U	0.0769	0.0785		0.386	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Thorium-234	0.634	U	0.479	0.484		1.41	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Uranium-235	-0.124	U	0.495	0.495		0.674	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Uranium-238	0.634	U	0.479	0.484		1.41	pCi/g	11/14/16 10:15	12/05/16 15:16	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S820

Lab Sample ID: 160-19954-20

Date Collected: 11/09/16 10:09

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.336		0.194	0.197		0.195	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Actinium-227	0.131	U	0.528	0.528		0.901	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Bismuth-212	0.332	U	0.559	0.560		0.941	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Bismuth-214	0.349		0.123	0.128		0.122	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Cesium-137	0.0230	U	0.0440	0.0440		0.0747	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Lead-210	0.416	U	1.21	1.21		2.05	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Lead-212	0.365		0.0704	0.0848		0.0701	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Lead-214	0.417		0.0954	0.105		0.0869	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Potassium-40	11.3		1.32	1.76		0.594	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Protactinium-231	0.000	U	0.734	0.734		3.70	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Radium-226	0.349		0.123	0.128	0.500	0.122	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Radium-228	0.336		0.194	0.197		0.195	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Thallium-208	0.0982		0.0726	0.0733		0.0591	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Thorium-228	0.365		0.0704	0.0848		0.0701	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Thorium-232	0.336		0.194	0.197		0.195	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Thorium-234	0.491	U	1.06	1.06		1.77	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Uranium-235	0.0671	U	0.316	0.316		0.596	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Uranium-238	0.491	U	1.06	1.06		1.77	pCi/g	11/14/16 10:15	12/05/16 15:56	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-279156/1-A
Matrix: Solid
Analysis Batch: 282663

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 279156

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-228	0.004589	U	0.00929	0.00931		0.320	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Actinium-227	-0.3669	U	0.854	0.855		1.44	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Bismuth-212	-0.2972	U	0.877	0.878		1.16	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Bismuth-214	-0.1118	U	0.142	0.142		0.415	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Cesium-137	0.01431	U	0.0605	0.0605		0.0783	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Lead-210	-0.9754	U	1.49	1.50		2.70	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Lead-212	-0.01496	U	0.0815	0.0815		0.146	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Lead-214	-0.08023	U	0.133	0.133		0.206	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Potassium-40	0.1885	U	0.736	0.736		0.965	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Protactinium-231	0.0000	U	0.261	0.261		3.34	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Radium-226	-0.1118	U	0.142	0.142	0.500	0.415	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Radium-228	0.004589	U	0.00929	0.00931		0.320	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Thallium-208	0.01250	U	0.0279	0.0279		0.0873	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Thorium-228	-0.01496	U	0.0815	0.0815		0.146	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Thorium-232	0.004589	U	0.00929	0.00931		0.320	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Thorium-234	-0.9265	U	1.26	1.26		2.17	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Uranium-235	-0.1801	U	0.353	0.353		0.655	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Uranium-238	-0.9265	U	1.26	1.26		2.17	pCi/g	11/14/16 10:15	12/06/16 02:58	1

Lab Sample ID: LCS 160-279156/2-A
Matrix: Solid
Analysis Batch: 282239

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 279156

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	99.46		10.4		1.09	pCi/g	102	87 - 116
Cesium-137	29.3	29.32		3.13		0.257	pCi/g	100	87 - 120
Cobalt-60	16.1	15.89		1.65		0.111	pCi/g	99	87 - 115

Lab Sample ID: 160-19954-1 DU
Matrix: Solid
Analysis Batch: 282236

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S801
Prep Type: Total/NA
Prep Batch: 279156

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium-228	0.308		0.03225	U	0.126		0.352	pCi/g	0.87	1
Actinium-227	0.00953	U	-0.2269	U	0.714		1.20	pCi/g	0.19	1
Bismuth-212	0.169	U	0.3915	U	0.650		1.09	pCi/g	0.20	1
Bismuth-214	0.283		0.3716		0.116		0.0931	pCi/g	0.43	1
Cesium-137	-0.0352	U	-0.00730	U	0.0515		0.0907	pCi/g	0.26	1
Lead-210	-0.533	U	0.7931	U	1.05		1.50	pCi/g	0.65	1
Lead-212	0.297		0.3435		0.0937		0.101	pCi/g	0.28	1
Lead-214	0.259		0.3518		0.0962		0.0986	pCi/g	0.53	1
Potassium-40	9.78		9.749		1.62		0.714	pCi/g	0.01	1
Protactinium-231	-0.196	U	0.5933	U	1.32		3.03	pCi/g	0.25	1
Radium-226	0.283		0.3716		0.116	0.500	0.0931	pCi/g	0.43	1
Radium-228	0.308		0.03225	U	0.126		0.352	pCi/g	0.87	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-19954-1 DU

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S801

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 282236

Prep Batch: 279156

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.0660		0.1360		0.0480		0.0468	pCi/g	0.71	1
Thorium-228	0.297		0.3435		0.0937		0.101	pCi/g	0.28	1
Thorium-232	0.308		0.03225	U	0.126		0.352	pCi/g	0.87	1
Thorium-234	0.433	U	0.2974	U	0.282		2.18	pCi/g	0.11	1
Uranium-235	0.176	U	0.0000	U	0.185		0.706	pCi/g	0.35	1
Uranium-238	0.433	U	0.2974	U	0.282		2.18	pCi/g	0.11	1

QC Association Summary

Page 31 of 31

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Rad

Leach Batch: 278921

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19954-1	TITO04-BS-FSSSU4-RSY10-U8-S801	Total/NA	Solid	Dry and Grind	
160-19954-2	TITO04-BS-FSSSU4-RSY10-U8-S802	Total/NA	Solid	Dry and Grind	
160-19954-3	TITO04-BS-FSSSU4-RSY10-U8-S803	Total/NA	Solid	Dry and Grind	
160-19954-4	TITO04-BS-FSSSU4-RSY10-U8-S804	Total/NA	Solid	Dry and Grind	
160-19954-5	TITO04-BS-FSSSU4-RSY10-U8-S805	Total/NA	Solid	Dry and Grind	
160-19954-6	TITO04-BS-FSSSU4-RSY10-U8-S806	Total/NA	Solid	Dry and Grind	
160-19954-7	TITO04-BS-FSSSU4-RSY10-U8-S807	Total/NA	Solid	Dry and Grind	
160-19954-8	TITO04-BS-FSSSU4-RSY10-U8-S808	Total/NA	Solid	Dry and Grind	
160-19954-9	TITO04-BS-FSSSU4-RSY10-U8-S809	Total/NA	Solid	Dry and Grind	
160-19954-10	TITO04-BS-FSSSU4-RSY10-U8-S810	Total/NA	Solid	Dry and Grind	
160-19954-11	TITO04-BS-FSSSU4-RSY10-U8-S811	Total/NA	Solid	Dry and Grind	
160-19954-12	TITO04-BS-FSSSU4-RSY10-U8-S812	Total/NA	Solid	Dry and Grind	
160-19954-13	TITO04-BS-FSSSU4-RSY10-U8-S813	Total/NA	Solid	Dry and Grind	
160-19954-14	TITO04-BS-FSSSU4-RSY10-U8-S814	Total/NA	Solid	Dry and Grind	
160-19954-15	TITO04-BS-FSSSU4-RSY10-U8-S815	Total/NA	Solid	Dry and Grind	
160-19954-16	TITO04-BS-FSSSU4-RSY10-U8-S816	Total/NA	Solid	Dry and Grind	
160-19954-17	TITO04-BS-FSSSU4-RSY10-U8-S817	Total/NA	Solid	Dry and Grind	
160-19954-18	TITO04-BS-FSSSU4-RSY10-U8-S818	Total/NA	Solid	Dry and Grind	
160-19954-19	TITO04-BS-FSSSU4-RSY10-U8-S819	Total/NA	Solid	Dry and Grind	
160-19954-20	TITO04-BS-FSSSU4-RSY10-U8-S820	Total/NA	Solid	Dry and Grind	
160-19954-1 DU	TITO04-BS-FSSSU4-RSY10-U8-S801	Total/NA	Solid	Dry and Grind	

Prep Batch: 279156

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19954-1	TITO04-BS-FSSSU4-RSY10-U8-S801	Total/NA	Solid	Fill_Geo-21	278921
160-19954-2	TITO04-BS-FSSSU4-RSY10-U8-S802	Total/NA	Solid	Fill_Geo-21	278921
160-19954-3	TITO04-BS-FSSSU4-RSY10-U8-S803	Total/NA	Solid	Fill_Geo-21	278921
160-19954-4	TITO04-BS-FSSSU4-RSY10-U8-S804	Total/NA	Solid	Fill_Geo-21	278921
160-19954-5	TITO04-BS-FSSSU4-RSY10-U8-S805	Total/NA	Solid	Fill_Geo-21	278921
160-19954-6	TITO04-BS-FSSSU4-RSY10-U8-S806	Total/NA	Solid	Fill_Geo-21	278921
160-19954-7	TITO04-BS-FSSSU4-RSY10-U8-S807	Total/NA	Solid	Fill_Geo-21	278921
160-19954-8	TITO04-BS-FSSSU4-RSY10-U8-S808	Total/NA	Solid	Fill_Geo-21	278921
160-19954-9	TITO04-BS-FSSSU4-RSY10-U8-S809	Total/NA	Solid	Fill_Geo-21	278921
160-19954-10	TITO04-BS-FSSSU4-RSY10-U8-S810	Total/NA	Solid	Fill_Geo-21	278921
160-19954-11	TITO04-BS-FSSSU4-RSY10-U8-S811	Total/NA	Solid	Fill_Geo-21	278921
160-19954-12	TITO04-BS-FSSSU4-RSY10-U8-S812	Total/NA	Solid	Fill_Geo-21	278921
160-19954-13	TITO04-BS-FSSSU4-RSY10-U8-S813	Total/NA	Solid	Fill_Geo-21	278921
160-19954-14	TITO04-BS-FSSSU4-RSY10-U8-S814	Total/NA	Solid	Fill_Geo-21	278921
160-19954-15	TITO04-BS-FSSSU4-RSY10-U8-S815	Total/NA	Solid	Fill_Geo-21	278921
160-19954-16	TITO04-BS-FSSSU4-RSY10-U8-S816	Total/NA	Solid	Fill_Geo-21	278921
160-19954-17	TITO04-BS-FSSSU4-RSY10-U8-S817	Total/NA	Solid	Fill_Geo-21	278921
160-19954-18	TITO04-BS-FSSSU4-RSY10-U8-S818	Total/NA	Solid	Fill_Geo-21	278921
160-19954-19	TITO04-BS-FSSSU4-RSY10-U8-S819	Total/NA	Solid	Fill_Geo-21	278921
160-19954-20	TITO04-BS-FSSSU4-RSY10-U8-S820	Total/NA	Solid	Fill_Geo-21	278921
MB 160-279156/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-279156/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-19954-1 DU	TITO04-BS-FSSSU4-RSY10-U8-S801	Total/NA	Solid	Fill_Geo-21	278921

From: [Weyant, David B CIV NAVSEA 04, 04N](#)
To: [Guillory, Jeffrey](#)
Cc: [Edwards, Zachary L CIV SEA 04 04N](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 10 (Use 9, Part 1)
Date: Thursday, December 22, 2016 11:31:17 AM

Jeff,

I concur to designating the Revised RSY-10 (Use 9, Part 1) soil as Non-LLRW soil.

VR

David Weyant
Health Physicist/Environmental Protection Manager
Environmental Protection Division
NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederalservices.com>]
Sent: Thursday, December 22, 2016 2:06 PM
To: Weyant, David B CIV NAVSEA 04, 04N
Subject: [Non-DoD Source] RE: NSTI RSY Soil Release Request - RSY 10 (Use 9, Part 1)

Dave,

The scatter plot (page 4) shows the scan data in yellow that exceeds the mean + 3 sigma. For this pad, none of the scan data exceeded the Reference Area IL.

Locations with scan data above the mean + 3 sigma were investigated with static measurements. All statics were less than the Reference Area static IL (10,908 - 12,083 cpm with an IL of 16,702 cpm).

-jeff-

-----Original Message-----

From: Weyant, David B CIV NAVSEA 04, 04N [<mailto:david.weyant@navy.mil>]
Sent: Thursday, December 22, 2016 11:03 AM
To: Guillory, Jeffrey
Subject: RE: NSTI RSY Soil Release Request - RSY 10 (Use 9, Part 1)

Jeff,

Does the histogram represent the statics or the instantaneous readings taken as they were scanned? I see some exceedances of the mean + 3 sigma. These were investigated?

VR

David Weyant
Health Physicist/Environmental Protection Manager Environmental Protection Division NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederaleservices.com>]

Sent: Thursday, December 22, 2016 12:17 PM

To: Weyant, David B CIV NAVSEA 04, 04N

Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek

Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 10 (Use 9, Part 1)

Mr. Weyant,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Jeffrey Guillory

Scientist 3

Federal Services

Cell: +1 979 422 5534

jeffrey.guillory@cbifederaleservices.com <<mailto:jeffrey.guillory@cbifederaleservices.com>>

CB&I

950 Avenue M - Treasure Island

San Francisco, CA 94130

United States of America

www.CBI.com <<http://www.cbi.com/>>



Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY 10	RSY Unit Use Number: USE 9, Part 1	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 12/22/2016

Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static Survey Meter (Model 2221) Serial Number	One-Minute Static Reading (CPM)	Static Count Exceeds Reference Area IL?	²²⁶ Ra Final Analytical Results (pCi/g)
Upper limit of site reference background						1.69
TITO04-BS-FSSSU4P1-RSY10-U9-S901	1	Systematic	117648	12,337	No	0.247
TITO04-BS-FSSSU4P1-RSY10-U9-S902	2	Systematic	117648	12,256	No	0.356
TITO04-BS-FSSSU4P1-RSY10-U9-S903	3	Systematic	117648	12,875	No	0.267
TITO04-BS-FSSSU4P1-RSY10-U9-S904	4	Systematic	117648	12,629	No	0.362
TITO04-BS-FSSSU4P1-RSY10-U9-S905	5	Systematic	117648	12,672	No	0.315
TITO04-BS-FSSSU4P1-RSY10-U9-S906	6	Systematic	117648	13,013	No	0.142
TITO04-BS-FSSSU4P1-RSY10-U9-S907	7	Systematic	117648	12,586	No	0.153
TITO04-BS-FSSSU4P1-RSY10-U9-S908	8	Systematic	117648	12,242	No	0.314
TITO04-BS-FSSSU4P1-RSY10-U9-S909	9	Systematic	117648	12,462	No	0.390
TITO04-BS-FSSSU4P1-RSY10-U9-S910	10	Systematic	117648	12,479	No	0.483
TITO04-BS-FSSSU4P1-RSY10-U9-S911	11	Systematic	117648	12,321	No	0.327
TITO04-BS-FSSSU4P1-RSY10-U9-S912	12	Systematic	117648	12,909	No	0.117

CPM Counts per minute
IL Investigation Level (based on Reference Area data set)
²²⁶Ra Radium-226
pCi/g Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd (CPM)	Reference Area Static 3σ IL (CPM)	Reference Area Scan Bkgd (CPM)	Reference Area Scan 3σ IL (CPM)	Range (CPM)
Gamma Walkover Survey	TIRS-11102016-12P3-GWS-2622	11/10/2016	2221	8/12/2017	117648	N/A	N/A	14,256	17,684	9,455 – 15,138
Follow-up Static Survey	TIRS-11112016-12P3-JSS-2626	11/11/2016 – 12/20/2016	2221	8/12/2017	117648	14,157	16,702	N/A	N/A	10,908 – 12,083
Systematic Sampling Survey	TIRS-11142016-12P3-JSS-2631	11/14/2016	2221	8/12/2017	117648	14,157	16,702	N/A	N/A	12,242 – 13,013

3σ IL Investigation Level (established at 3σ above the mean of the Reference Area data set)
CPM Counts per minute

Summary

1) Gamma walkover survey and data review—all locations surveyed on RSY 10 (Use 9, Part 1) were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the data set average for RSY 10 (Use 9, Part 1) were evaluated for follow-up investigation; 11 total data points clustered around 11 discrete locations were identified as exceeding three standard deviations of the data set average. Gamma scan coverage is shown on the Systematic Sample Survey map (page 3). GWS count rate statistics are also provided (page 4).

2) Follow-up static survey—11 locations identified during the data review process as exceeding three standard deviations of the data set average for RSY 10 (Use 9, Part 1) were investigated, resulting in all locations less than the Reference Area static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 5).

3) Twelve systematic soil samples (901-912) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with static readings < Reference Area static IL for all sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 8-26).

Conclusions:

All count rates recorded during the gamma walkover survey were less than the Reference Area scan IL. As an additional conservative characterization approach, all individual or clustered locations identified as exceeding three standard deviations of the data set mean for RSY 10 (Use 9, Part 1) were investigated and deemed comparable to background. Eleven total follow-up static locations were investigated, with readings less than the Reference Area static IL at all locations.

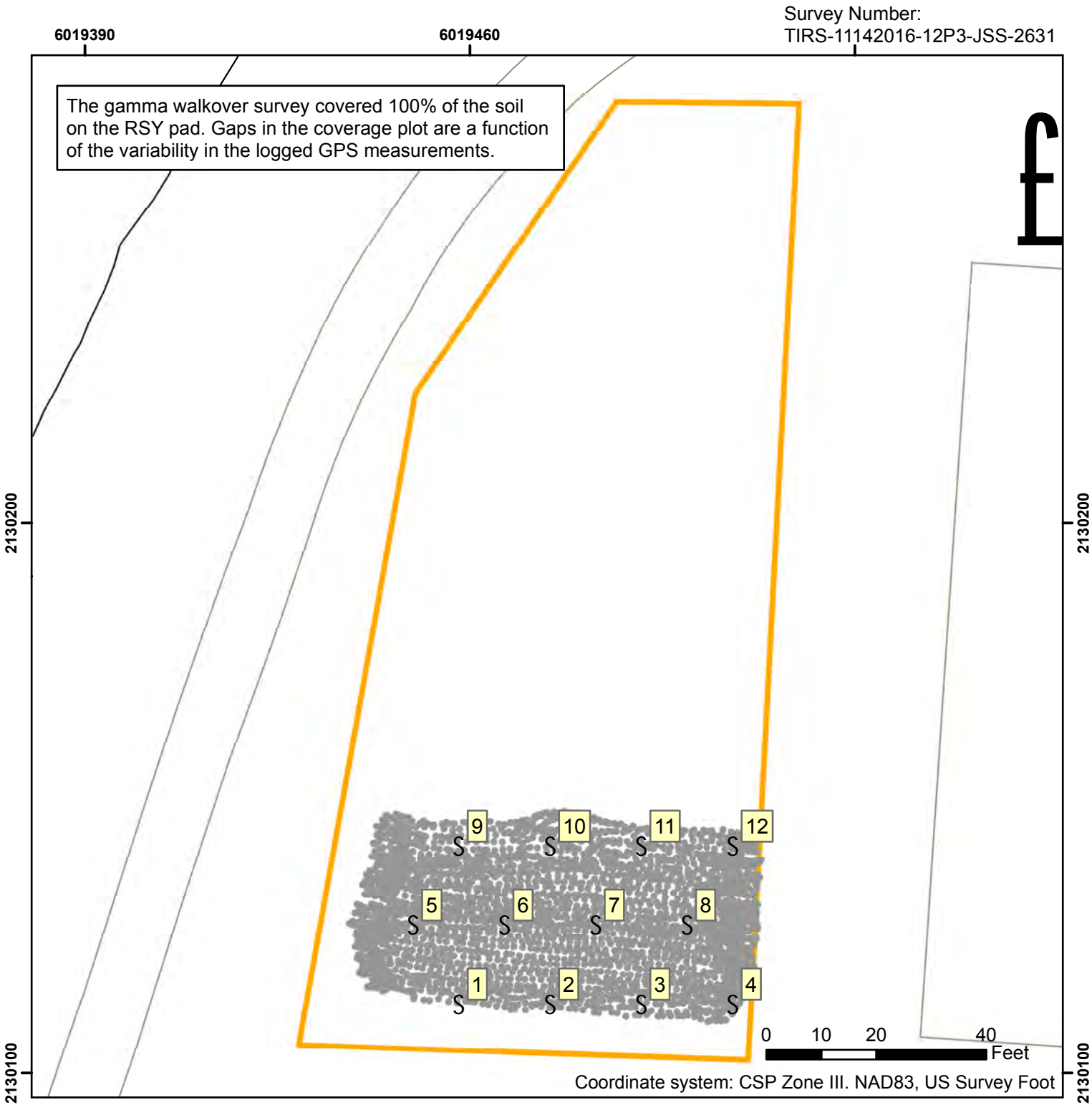
Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 6-7. These statistical tools were utilized to verify the appropriate level of reasonable effort.

RSY 10 (Use 9, Part 1) contains soil from the final 6-inch over excavation of FSS material from the bottom of the excavation at SWDA Bayside SU 4.

Note: Soil on RSY Pad 10 (Use 9, Part 1) was over-excavated at the final depth from the bottom of the excavation at Bayside SU 4, and no visible debris and/or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.

CB&I requests RASO concurrence to release this soil as Non-LLRW.

Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.



Instrument # 117648

S Systematic Sample Location

• GWS Coverage

RSY Boundaries

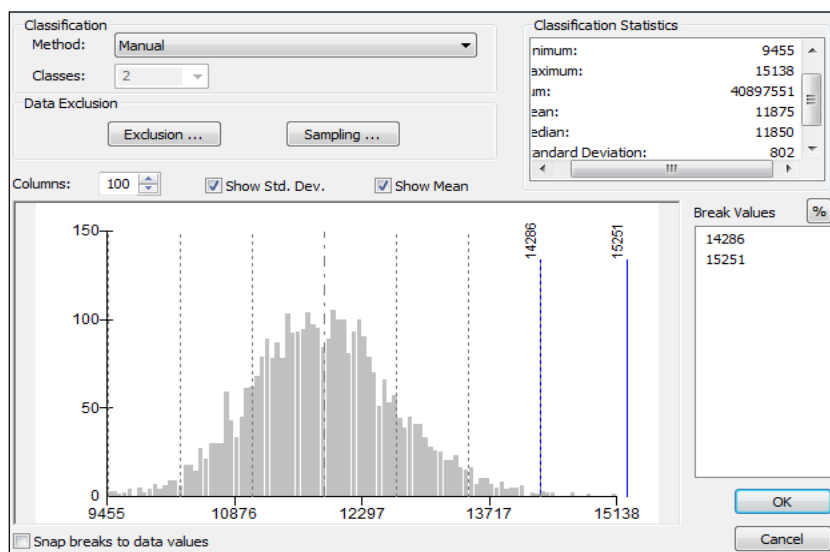
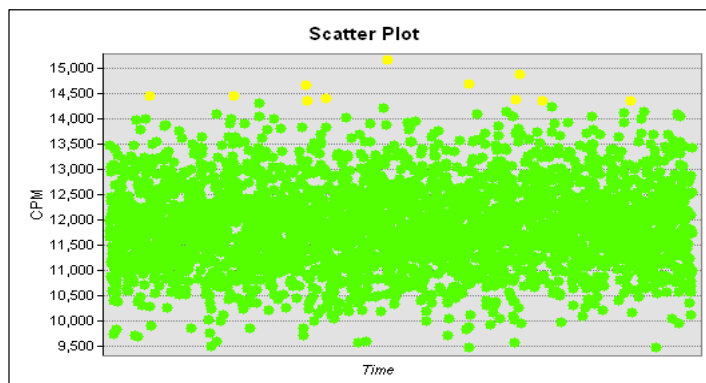
CB&I Federal Services, LLC

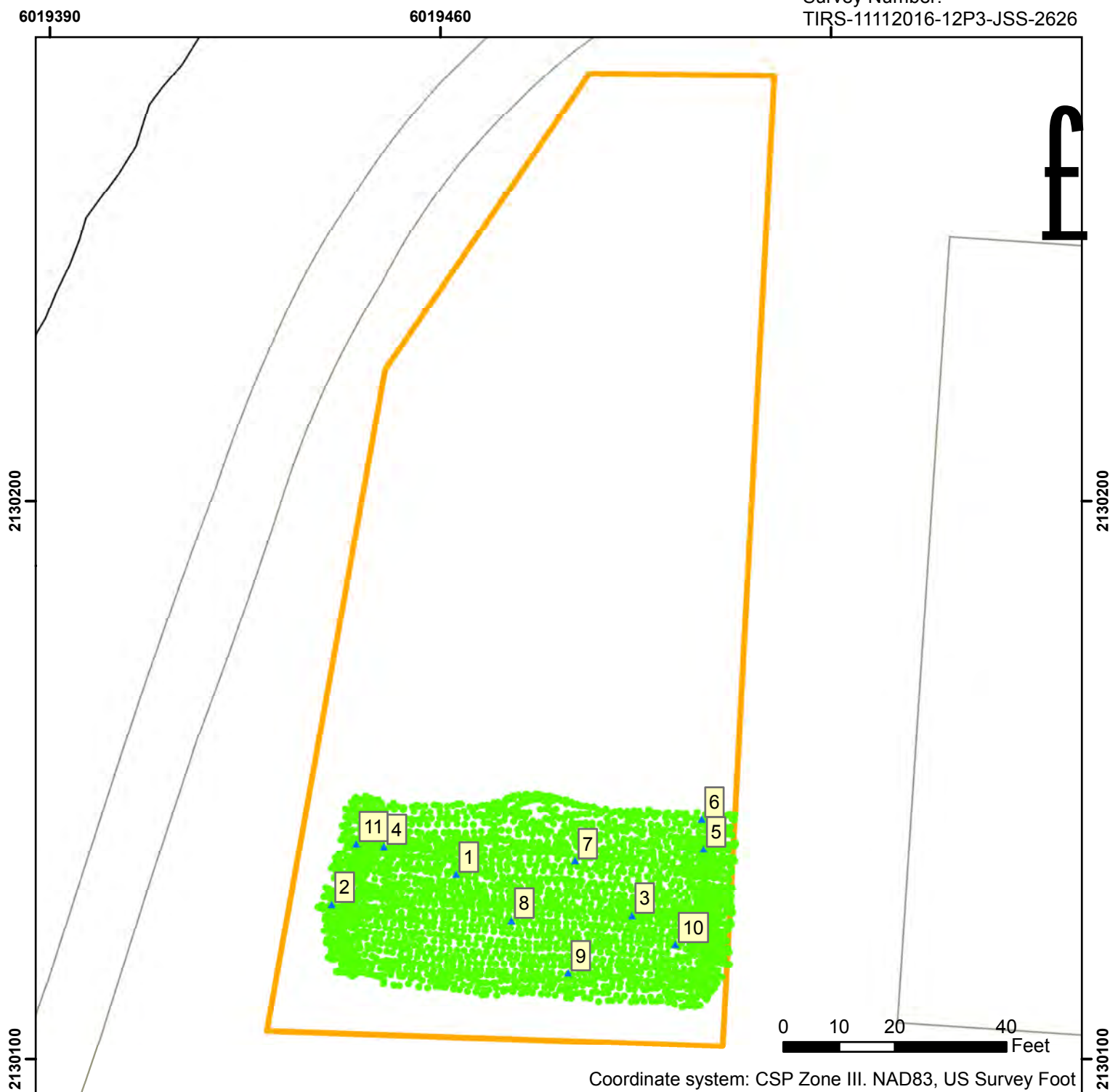
Data Processed In Treasure Island Office

TIRS-11102016-12P3-GWS-2622

RSY Pad 10 (Use 9, Part 1)

Frequency Table						
In the 9,000 (cpm)	In the 10,000 (cpm)	In the 11,000 (cpm)	In the 12,000 (cpm)	In the 13,000 (cpm)	In the 14,000 (cpm)	In the 15,000 (cpm)
27	422	1516	1184	270	24	1



Survey Number:
TIRS-11112016-12P3-JSS-2626**Instrument # 117648**

- ▲ Follow-up Static Locations
- Data Points Not Requiring Further Investigation
- RSY Boundaries

CB&I Federal Services, LLC

Data Processed In Treasure Island Office

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 10-9 (P.1)
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

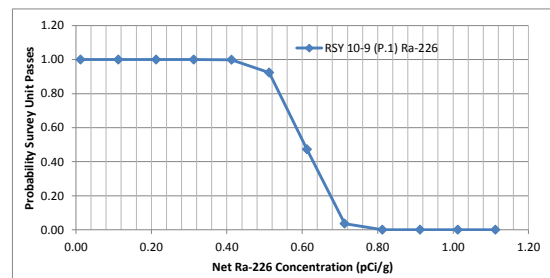
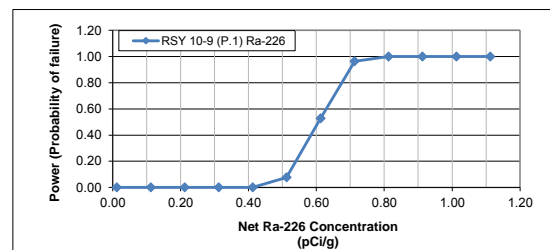
POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4	S
0.57	R	0.57	19.5	0	5	S
0.55	R	0.55	18	0	6	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.247	S	-0.235939192	4	4	21.5	R
0.356	S	-0.126939192	9	9	21.5	R
0.267	S	-0.215939192	5	5	23	R
0.362	S	-0.120939192	10	10	24	R
0.315	S	-0.167939192	7	7	25	R
0.142	S	-0.340939192	2	2	26	R
0.153	S	-0.329939192	3	3	27.5	R
0.314	S	-0.168939192	6	6	27.5	R
0.390	S	-0.092939192	11	11	29	R
0.483	S	6.0808E-05	12	12	30	R
0.327	S	-0.155939192	8	8	31	R
0.117	S	-0.365939192	1	1	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.110
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count	SU Stats	Concentration	Background (C)	SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
Count	12	0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
SD	0.110	0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
Median	0.315	0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
		1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
		1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
Count	20	1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
SD	0.161	1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
		1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
Critical Value	248.4	1.5	0.81	2.0	0.92135	0.86577	221.124	138.9359	11.787107	-4.34973	1.00	0.00
		1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
		1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
		1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_W = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 15$
 6 r
 5 k
 0.04 α

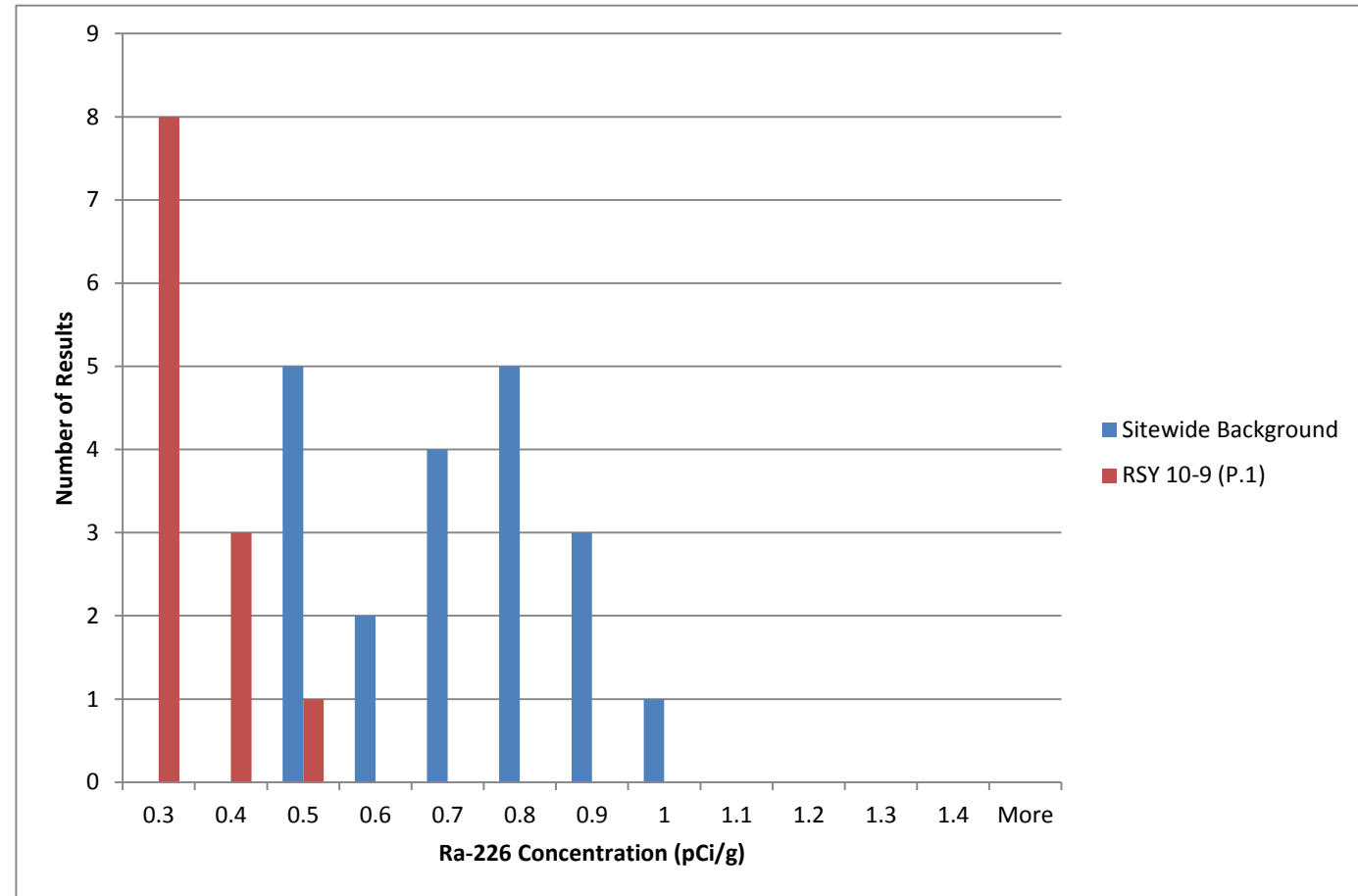
If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

Histogram, RSY 10 (Use 9, Part 1) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 10-9 (P.1)	
<i>Bin</i>	<i>Frequency</i>
0.3	8
0.4	3
0.5	1
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-20016-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Elizabeth M. Hoerchler

Authorized for release by:

12/12/2016 12:19:55 PM

Elizabeth Hoerchler, Project Mgmt. Assistant

elizabeth.hoerchler@testamericainc.com

Designee for

Erika Gish, Project Manager II

(314)298-8566

erika.gish@testamericainc.com

LINKS

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results through

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Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Page 10 of 26

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Job ID: 160-20016-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-20016-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 11 of 26

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Job ID: 160-20016-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 11/16/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 18.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSSSU4P1-RSY10-U9-S901 (160-20016-1), TITO04-BS-FSSSU4P1-RSY10-U9-S902 (160-20016-2), TITO04-BS-FSSSU4P1-RSY10-U9-S903 (160-20016-3), TITO04-BS-FSSSU4P1-RSY10-U9-S904 (160-20016-4), TITO04-BS-FSSSU4P1-RSY10-U9-S905 (160-20016-5), TITO04-BS-FSSSU4P1-RSY10-U9-S906 (160-20016-6), TITO04-BS-FSSSU4P1-RSY10-U9-S907 (160-20016-7), TITO04-BS-FSSSU4P1-RSY10-U9-S908 (160-20016-8), TITO04-BS-FSSSU4P1-RSY10-U9-S909 (160-20016-9), TITO04-BS-FSSSU4P1-RSY10-U9-S910 (160-20016-10), TITO04-BS-FSSSU4P1-RSY10-U9-S911 (160-20016-11) and TITO04-BS-FSSSU4P1-RSY10-U9-S912 (160-20016-12) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/16/2016, prepared on 11/17/2016 and analyzed on 12/08/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_BS_FSS_SU4_RSY10_U9_#332

Page 2 of 2

Page 13 of 26

Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside FSS SU4
RSY10 USE 9 Systematic Part 1

Purchase Order #: 201455

Shipment Date: 11-15-2016

Waybill Number: 138944620199732189

Lab Destination: Earth Toxics Inc To Test America

Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Lynn Caragan

Phone/Fax Number: 714-669-7022

Address: lynn.caragan@cbifederalservices.com

City:

Sampler's Name(s): D. Fields

Collection Information

Sample ID Number	Sample Description	Date	Time	Method	Matrix	# of containers	Container Type																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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Special Instructions:

7 days ingrown draft and follow with 21 days final

☐ 24-hr

Level Of QC Required:

I

II

III

Project Specific:

Standard TAT ☐

☐ 3-day

☐ 7-day

Relinquished By:

Date: 11-15-16

Time: 1135

Received By:

Date: 11-16-16

Time: 0830

Relinquished By:

Date:

Time:

Received By:

Date:

Time:

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

SO = Soil

GW = Ground Water

SL = Sludge

WW = Waste Water

CP = Chip Samples

A = Air

ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-20016-2

Login Number: 20016**List Number: 1****Creator: Clarke, Jill C****List Source: TestAmerica St. Louis**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-20016-1	TITO04-BS-FSSSU4P1-RSY10-U9-S901	Solid	11/14/16 10:33	11/16/16 08:30
160-20016-2	TITO04-BS-FSSSU4P1-RSY10-U9-S902	Solid	11/14/16 10:33	11/16/16 08:30
160-20016-3	TITO04-BS-FSSSU4P1-RSY10-U9-S903	Solid	11/14/16 10:36	11/16/16 08:30
160-20016-4	TITO04-BS-FSSSU4P1-RSY10-U9-S904	Solid	11/14/16 10:37	11/16/16 08:30
160-20016-5	TITO04-BS-FSSSU4P1-RSY10-U9-S905	Solid	11/14/16 10:37	11/16/16 08:30
160-20016-6	TITO04-BS-FSSSU4P1-RSY10-U9-S906	Solid	11/14/16 10:39	11/16/16 08:30
160-20016-7	TITO04-BS-FSSSU4P1-RSY10-U9-S907	Solid	11/14/16 10:39	11/16/16 08:30
160-20016-8	TITO04-BS-FSSSU4P1-RSY10-U9-S908	Solid	11/14/16 10:43	11/16/16 08:30
160-20016-9	TITO04-BS-FSSSU4P1-RSY10-U9-S909	Solid	11/14/16 10:43	11/16/16 08:30
160-20016-10	TITO04-BS-FSSSU4P1-RSY10-U9-S910	Solid	11/14/16 10:46	11/16/16 08:30
160-20016-11	TITO04-BS-FSSSU4P1-RSY10-U9-S911	Solid	11/14/16 10:48	11/16/16 08:30
160-20016-12	TITO04-BS-FSSSU4P1-RSY10-U9-S912	Solid	11/14/16 10:50	11/16/16 08:30

Client Sample Results

Page 18 of 26

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S901

Lab Sample ID: 160-20016-1

Date Collected: 11/14/16 10:33

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.346		0.109	0.115		0.0648	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Actinium-227	0.0471	U	0.584	0.584		1.00	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Bismuth-212	0.185	U	0.474	0.474		0.820	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Bismuth-214	0.247		0.0900	0.0936		0.0947	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Cesium-137	0.0164	U	0.0360	0.0361		0.0621	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Lead-210	-0.595	U	1.17	1.17		1.97	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Lead-212	0.298		0.0638	0.0746		0.0672	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Lead-214	0.348		0.0731	0.0816		0.0827	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Potassium-40	10.9		1.27	1.69		0.565	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Protactinium-231	0.000	U	0.336	0.336		3.30	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Radium-226	0.247		0.0900	0.0936	0.500	0.0947	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Radium-228	0.346		0.109	0.115		0.0648	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Thallium-208	0.0776		0.0476	0.0483		0.0514	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Thorium-228	0.298		0.0638	0.0746		0.0672	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Thorium-232	0.346		0.109	0.115		0.0648	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Thorium-234	-0.505	U	1.06	1.06		1.77	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Uranium-235	0.000	U	0.0998	0.0998		0.637	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Uranium-238	-0.505	U	1.06	1.06		1.77	pCi/g	11/17/16 14:27	12/08/16 11:29	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S902

Lab Sample ID: 160-20016-2

Date Collected: 11/14/16 10:33

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0963	U	0.176	0.176		0.204	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Actinium-227	0.0613	U	0.194	0.194		0.837	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Bismuth-212	0.273	U	0.635	0.635		1.09	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Bismuth-214	0.356		0.0947	0.102		0.0682	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Cesium-137	0.0214	U	0.0477	0.0477		0.0821	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Lead-210	0.175	U	0.642	0.642		1.05	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Lead-212	0.205		0.0564	0.0623		0.0621	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Lead-214	0.322		0.0648	0.0729		0.0881	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Potassium-40	4.22		0.946	1.04		0.553	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Protactinium-231	0.000	U	0.381	0.381		2.37	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Radium-226	0.356		0.0947	0.102	0.500	0.0682	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Radium-228	0.0963	U	0.176	0.176		0.204	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Thallium-208	0.102		0.0537	0.0547		0.0577	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Thorium-228	0.205		0.0564	0.0623		0.0621	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Thorium-232	0.0963	U	0.176	0.176		0.204	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Thorium-234	-0.160	U	0.879	0.879		1.53	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Uranium-235	-0.103	U	0.329	0.329		0.553	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Uranium-238	-0.160	U	0.879	0.879		1.53	pCi/g	11/17/16 14:27	12/08/16 08:16	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S903

Lab Sample ID: 160-20016-3

Date Collected: 11/14/16 10:36

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.147	U	0.230	0.231		0.335	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Actinium-227	-0.0224	U	0.107	0.107		0.713	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Bismuth-212	-0.284	U	0.871	0.871		1.52	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Bismuth-214	0.267		0.106	0.110		0.114	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Cesium-137	0.000389	U	0.0593	0.0593		0.108	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Lead-210	2.05		1.14	1.17		1.39	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Lead-212	0.262		0.0755	0.0828		0.0818	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Lead-214	0.419		0.124	0.132		0.142	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Potassium-40	4.28		1.13	1.21		0.797	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Protactinium-231	0.327	U	0.971	0.972		3.22	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Radium-226	0.267		0.106	0.110	0.500	0.114	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Radium-228	0.147	U	0.230	0.231		0.335	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Thallium-208	0.0897		0.0698	0.0704		0.0711	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Thorium-228	0.262		0.0755	0.0828		0.0818	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Thorium-232	0.147	U	0.230	0.231		0.335	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Thorium-234	-0.0472	U	0.845	0.845		1.49	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Uranium-235	0.128	U	0.248	0.248		0.518	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Uranium-238	-0.0472	U	0.845	0.845		1.49	pCi/g	11/17/16 14:27	12/08/16 08:17	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S904

Lab Sample ID: 160-20016-4

Date Collected: 11/14/16 10:37

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.498		0.160	0.168		0.0942	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Actinium-227	0.236	U	0.544	0.544		0.781	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Bismuth-212	-0.218	U	0.741	0.741		1.29	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Bismuth-214	0.362		0.114	0.120		0.108	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Cesium-137	0.0222	U	0.0449	0.0449		0.0773	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Lead-210	0.794	U	1.23	1.23		1.62	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Lead-212	0.318		0.0808	0.0906		0.0934	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Lead-214	0.249		0.108	0.111		0.148	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Potassium-40	10.3		1.49	1.83		0.696	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Protactinium-231	0.000	U	0.642	0.642		3.59	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Radium-226	0.362		0.114	0.120	0.500	0.108	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Radium-228	0.498		0.160	0.168		0.0942	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Thallium-208	0.169		0.0578	0.0604		0.0481	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Thorium-228	0.318		0.0808	0.0906		0.0934	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Thorium-232	0.498		0.160	0.168		0.0942	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Thorium-234	-0.0685	U	0.982	0.982		1.69	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Uranium-235	0.00240	U	0.00475	0.00475		0.547	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Uranium-238	-0.0685	U	0.982	0.982		1.69	pCi/g	11/17/16 14:27	12/08/16 09:01	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S905

Lab Sample ID: 160-20016-5

Date Collected: 11/14/16 10:37

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.403		0.125	0.132		0.104	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Actinium-227	-0.381	U	0.888	0.889		1.49	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Bismuth-212	-0.0299	U	0.672	0.672		1.22	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Bismuth-214	0.315		0.102	0.107		0.0915	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Cesium-137	-0.0227	U	0.0717	0.0717		0.124	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Lead-210	-1.71	U	1.15	1.17		2.92	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Lead-212	0.206		0.0849	0.0889		0.119	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Lead-214	0.328		0.111	0.117		0.104	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Potassium-40	10.7		1.61	1.95		0.668	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Protactinium-231	0.000	U	0.164	0.164		3.80	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Radium-226	0.315		0.102	0.107	0.500	0.0915	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Radium-228	0.403		0.125	0.132		0.104	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Thallium-208	0.129		0.0655	0.0668		0.0870	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Thorium-228	0.206		0.0849	0.0889		0.119	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Thorium-232	0.403		0.125	0.132		0.104	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Thorium-234	0.0232	U	1.31	1.31		2.24	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Uranium-235	-0.0104	U	0.277	0.277		0.987	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Uranium-238	0.0232	U	1.31	1.31		2.24	pCi/g	11/17/16 14:27	12/08/16 09:02	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S906

Lab Sample ID: 160-20016-6

Date Collected: 11/14/16 10:39

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.393		0.144	0.149		0.209	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Actinium-227	0.171	U	0.447	0.447		1.19	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Bismuth-212	-0.481	U	1.01	1.01		1.70	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Bismuth-214	0.142	U	0.0868	0.0881		0.272	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Cesium-137	0.000902	U	0.0477	0.0477		0.0858	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Lead-210	1.19	U	1.31	1.32		1.73	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Lead-212	0.271		0.0761	0.0837		0.0961	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Lead-214	0.177	U	0.0605	0.0632		0.228	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Potassium-40	10.7		1.35	1.74		0.730	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Protactinium-231	-0.422	U	1.92	1.93		3.26	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Radium-226	0.142	U	0.0868	0.0881	0.500	0.272	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Radium-228	0.393		0.144	0.149		0.209	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Thallium-208	0.158		0.0497	0.0524		0.0450	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Thorium-228	0.271		0.0761	0.0837		0.0961	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Thorium-232	0.393		0.144	0.149		0.209	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Thorium-234	1.38		0.898	0.909		1.17	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Uranium-235	-0.167	U	0.492	0.492		0.821	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Uranium-238	1.38		0.898	0.909		1.17	pCi/g	11/17/16 14:27	12/08/16 09:03	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S907

Lab Sample ID: 160-20016-7

Date Collected: 11/14/16 10:39

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.375		0.133	0.138		0.0846	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Actinium-227	-0.180	U	0.662	0.662		0.955	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Bismuth-212	0.260	U	0.609	0.610		1.05	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Bismuth-214	0.153	U	0.0971	0.0984		0.413	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Cesium-137	0.0198	U	0.0435	0.0436		0.0752	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Lead-210	0.0878	U	1.44	1.44		2.09	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Lead-212	0.328		0.0798	0.0904		0.0905	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Lead-214	0.385		0.100	0.108		0.127	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Potassium-40	11.7		1.49	1.91		0.666	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Protactinium-231	0.000	U	0.327	0.327		3.32	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Radium-226	0.153	U	0.0971	0.0984	0.500	0.413	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Radium-228	0.375		0.133	0.138		0.0846	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Thallium-208	0.170		0.0592	0.0618		0.0523	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Thorium-228	0.328		0.0798	0.0904		0.0905	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Thorium-232	0.375		0.133	0.138		0.0846	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Thorium-234	0.439	U	0.951	0.952		1.59	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Uranium-235	0.0415	U	0.279	0.279		0.443	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Uranium-238	0.439	U	0.951	0.952		1.59	pCi/g	11/17/16 14:27	12/08/16 09:29	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S908

Lab Sample ID: 160-20016-8

Date Collected: 11/14/16 10:43

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.322		0.160	0.164		0.261	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Actinium-227	0.302	U	0.657	0.658		1.10	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Bismuth-212	-0.288	U	0.820	0.820		1.41	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Bismuth-214	0.314		0.111	0.115		0.106	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Cesium-137	-0.0571	U	0.0482	0.0485		0.131	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Lead-210	-0.773	U	1.68	1.68		2.82	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Lead-212	0.341		0.0736	0.0858		0.0698	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Lead-214	0.183		0.111	0.112		0.166	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Potassium-40	11.1		1.55	1.92		0.570	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Protactinium-231	0.000	U	0.335	0.335		4.00	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Radium-226	0.314		0.111	0.115	0.500	0.106	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Radium-228	0.322		0.160	0.164		0.261	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Thallium-208	0.107		0.0455	0.0469		0.0461	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Thorium-228	0.341		0.0736	0.0858		0.0698	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Thorium-232	0.322		0.160	0.164		0.261	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Thorium-234	-1.40	U	0.734	0.748		2.49	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Uranium-235	-0.0367	U	0.350	0.350		0.600	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Uranium-238	-1.40	U	0.734	0.748		2.49	pCi/g	11/17/16 14:27	12/08/16 09:05	1

Client Sample Results

Page 22 of 26

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S909

Lab Sample ID: 160-20016-9

Date Collected: 11/14/16 10:43

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.533		0.157	0.166		0.0884	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Actinium-227	-0.256	U	0.669	0.669		1.13	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Bismuth-212	0.000	U	0.452	0.452		0.979	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Bismuth-214	0.390		0.0972	0.105		0.0699	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Cesium-137	0.0210	U	0.0430	0.0431		0.0741	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Lead-210	0.876	U	0.841	0.848		1.21	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Lead-212	0.276		0.0744	0.0825		0.0928	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Lead-214	0.380		0.0791	0.0884		0.0702	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Potassium-40	11.7		1.56	1.97		0.567	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Protactinium-231	0.000	U	0.411	0.411		2.86	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Radium-226	0.390		0.0972	0.105	0.500	0.0699	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Radium-228	0.533		0.157	0.166		0.0884	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Thallium-208	0.109		0.0411	0.0426		0.0379	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Thorium-228	0.276		0.0744	0.0825		0.0928	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Thorium-232	0.533		0.157	0.166		0.0884	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Thorium-234	-0.0843	U	0.858	0.858		1.49	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Uranium-235	0.145	U	0.281	0.281		0.576	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Uranium-238	-0.0843	U	0.858	0.858		1.49	pCi/g	11/17/16 14:27	12/08/16 09:06	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S910

Lab Sample ID: 160-20016-10

Date Collected: 11/14/16 10:46

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.401		0.180	0.185		0.212	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Actinium-227	0.0915	U	0.289	0.289		0.939	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Bismuth-212	0.217	U	0.900	0.900		1.59	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Bismuth-214	0.483		0.139	0.147		0.123	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Cesium-137	-0.0367	U	0.0879	0.0880		0.132	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Lead-210	0.829	U	1.29	1.30		1.79	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Lead-212	0.270		0.0918	0.0982		0.117	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Lead-214	0.345		0.111	0.117		0.150	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Potassium-40	12.6		1.94	2.33		0.862	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Protactinium-231	0.362	U	1.05	1.05		3.57	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Radium-226	0.483		0.139	0.147	0.500	0.123	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Radium-228	0.401		0.180	0.185		0.212	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Thallium-208	0.169		0.0579	0.0605		0.0472	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Thorium-228	0.270		0.0918	0.0982		0.117	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Thorium-232	0.401		0.180	0.185		0.212	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Thorium-234	-0.0283	U	0.0912	0.0912		1.91	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Uranium-235	0.0272	U	0.0654	0.0655		0.626	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Uranium-238	-0.0283	U	0.0912	0.0912		1.91	pCi/g	11/17/16 14:27	12/08/16 09:07	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S911

Lab Sample ID: 160-20016-11

Date Collected: 11/14/16 10:48

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.266		0.190	0.192		0.198	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Actinium-227	0.252	U	0.550	0.550		0.925	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Bismuth-212	-0.454	U	0.889	0.890		1.49	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Bismuth-214	0.327		0.0927	0.0988		0.0868	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Cesium-137	0.0135	U	0.0268	0.0268		0.0333	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Lead-210	0.532	U	1.18	1.18		1.99	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Lead-212	0.333		0.0733	0.0850		0.0832	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Lead-214	0.340		0.0805	0.0879		0.0787	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Potassium-40	10.7		1.30	1.69		0.602	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Protactinium-231	0.000	U	0.430	0.430		3.44	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Radium-226	0.327		0.0927	0.0988	0.500	0.0868	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Radium-228	0.266		0.190	0.192		0.198	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Thallium-208	0.139		0.0471	0.0493		0.0354	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Thorium-228	0.333		0.0733	0.0850		0.0832	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Thorium-232	0.266		0.190	0.192		0.198	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Thorium-234	0.455	U	0.986	0.987		1.65	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Uranium-235	-0.0200	U	0.0335	0.0336		0.714	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Uranium-238	0.455	U	0.986	0.987		1.65	pCi/g	11/17/16 14:27	12/08/16 09:32	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S912

Lab Sample ID: 160-20016-12

Date Collected: 11/14/16 10:50

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.162	U	0.199	0.199		0.276	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Actinium-227	0.242	U	0.741	0.741		1.25	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Bismuth-212	0.388	U	0.887	0.888		1.51	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Bismuth-214	0.117	U	0.0739	0.0749		0.426	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Cesium-137	-0.0521	U	0.0525	0.0528		0.114	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Lead-210	1.28	U	1.18	1.19		1.68	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Lead-212	0.318		0.0784	0.0886		0.0867	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Lead-214	0.396		0.110	0.117		0.129	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Potassium-40	11.1		1.42	1.82		0.337	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Protactinium-231	0.000	U	0.517	0.517		3.75	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Radium-226	0.117	U	0.0739	0.0749	0.500	0.426	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Radium-228	0.162	U	0.199	0.199		0.276	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Thallium-208	0.127		0.0525	0.0541		0.0522	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Thorium-228	0.318		0.0784	0.0886		0.0867	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Thorium-232	0.162	U	0.199	0.199		0.276	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Thorium-234	0.635	U	1.04	1.04		1.45	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Uranium-235	0.0710	U	0.209	0.209		0.545	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Uranium-238	0.635	U	1.04	1.04		1.45	pCi/g	11/17/16 14:27	12/08/16 09:33	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-279954/1-A
Matrix: Solid
Analysis Batch: 283015

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 279954

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.1458	U	0.215	0.215		0.215	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Actinium-227	-0.2960	U	0.922	0.922		1.57	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Bismuth-212	-0.008851	U	0.812	0.812		1.48	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Bismuth-214	-0.08691	U	0.108	0.108		0.247	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Cesium-137	-0.01070	U	0.0498	0.0498		0.0948	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Lead-210	0.7012	U	1.33	1.33		2.04	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Lead-212	0.1202	U	0.0918	0.0931		0.142	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Lead-214	-0.1269	U	0.116	0.117		0.205	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Potassium-40	0.4483	U	0.339	0.342		0.472	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Protactinium-231	0.6232	U	2.11	2.11		3.61	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Radium-226	-0.08691	U	0.108	0.108	0.500	0.247	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Radium-228	0.1458	U	0.215	0.215		0.215	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Thallium-208	0.01752	U	0.0257	0.0257		0.0945	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Thorium-228	0.1202	U	0.0918	0.0931		0.142	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Thorium-232	0.1458	U	0.215	0.215		0.215	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Thorium-234	0.4965	U	1.13	1.13		1.66	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Uranium-235	0.1218	U	0.285	0.286		0.485	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Uranium-238	0.4965	U	1.13	1.13		1.66	pCi/g	11/17/16 14:27	12/08/16 08:57	1

Lab Sample ID: LCS 160-279954/2-A
Matrix: Solid
Analysis Batch: 283016

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 279954

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	101.1		10.6		1.20	pCi/g	104	87 - 116
Cesium-137	29.3	29.29		3.12		0.256	pCi/g	100	87 - 120
Cobalt-60	16.0	15.57		1.62		0.139	pCi/g	97	87 - 115

Lab Sample ID: 160-20016-1 DU
Matrix: Solid
Analysis Batch: 283295

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S901
Prep Type: Total/NA
Prep Batch: 279954

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.346		0.3424		0.111		0.103	pCi/g	0.02	1
Actinium-227	0.0471	U	-0.3076	U	0.749		1.26	pCi/g	0.27	1
Bismuth-212	0.185	U	-0.03717	U	0.567		1.03	pCi/g	0.21	1
Bismuth-214	0.247		0.2541		0.111		0.113	pCi/g	0.03	1
Cesium-137	0.0164	U	0.01150	U	0.0315		0.0556	pCi/g	0.07	1
Lead-210	-0.595	U	0.4357	U	1.19		1.72	pCi/g	0.44	1
Lead-212	0.298		0.2711		0.0809		0.0889	pCi/g	0.17	1
Lead-214	0.348		0.2971		0.0917		0.0946	pCi/g	0.29	1
Potassium-40	10.9		11.39		1.79		0.471	pCi/g	0.13	1
Protactinium-231	0.000	U	0.000000	U	2.04		3.49	pCi/g	0	1
Radium-226	0.247		0.2541		0.111	0.500	0.113	pCi/g	0.03	1
Radium-228	0.346		0.3424		0.111		0.103	pCi/g	0.02	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-20016-1 DU

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S901

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 283295

Prep Batch: 279954

Analyte	Sample		DU		Total	LOQ	MDC	Unit	RER	
	Result	Qual	Result	Qual	Uncert. (2σ+/-)				RER	Limit
Thallium-208	0.0776		0.1235		0.0485		0.0448	pCi/g	0.47	1
Thorium-228	0.298		0.2711		0.0809		0.0889	pCi/g	0.17	1
Thorium-232	0.346		0.3424		0.111		0.103	pCi/g	0.02	1
Thorium-234	-0.505	U	0.4313	U	0.206		2.28	pCi/g	0.74	1
Uranium-235	0.000	U	-0.08736	U	0.235		0.864	pCi/g	0.26	1
Uranium-238	-0.505	U	0.4313	U	0.206		2.28	pCi/g	0.74	1

QC Association Summary

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Rad

Leach Batch: 279620

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20016-1	TITO04-BS-FSSSU4P1-RSY10-U9-S901	Total/NA	Solid	Dry and Grind	
160-20016-2	TITO04-BS-FSSSU4P1-RSY10-U9-S902	Total/NA	Solid	Dry and Grind	
160-20016-3	TITO04-BS-FSSSU4P1-RSY10-U9-S903	Total/NA	Solid	Dry and Grind	
160-20016-4	TITO04-BS-FSSSU4P1-RSY10-U9-S904	Total/NA	Solid	Dry and Grind	
160-20016-5	TITO04-BS-FSSSU4P1-RSY10-U9-S905	Total/NA	Solid	Dry and Grind	
160-20016-6	TITO04-BS-FSSSU4P1-RSY10-U9-S906	Total/NA	Solid	Dry and Grind	
160-20016-7	TITO04-BS-FSSSU4P1-RSY10-U9-S907	Total/NA	Solid	Dry and Grind	
160-20016-8	TITO04-BS-FSSSU4P1-RSY10-U9-S908	Total/NA	Solid	Dry and Grind	
160-20016-9	TITO04-BS-FSSSU4P1-RSY10-U9-S909	Total/NA	Solid	Dry and Grind	
160-20016-10	TITO04-BS-FSSSU4P1-RSY10-U9-S910	Total/NA	Solid	Dry and Grind	
160-20016-11	TITO04-BS-FSSSU4P1-RSY10-U9-S911	Total/NA	Solid	Dry and Grind	
160-20016-12	TITO04-BS-FSSSU4P1-RSY10-U9-S912	Total/NA	Solid	Dry and Grind	
160-20016-1 DU	TITO04-BS-FSSSU4P1-RSY10-U9-S901	Total/NA	Solid	Dry and Grind	

Prep Batch: 279954

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20016-1	TITO04-BS-FSSSU4P1-RSY10-U9-S901	Total/NA	Solid	Fill_Geo-21	279620
160-20016-2	TITO04-BS-FSSSU4P1-RSY10-U9-S902	Total/NA	Solid	Fill_Geo-21	279620
160-20016-3	TITO04-BS-FSSSU4P1-RSY10-U9-S903	Total/NA	Solid	Fill_Geo-21	279620
160-20016-4	TITO04-BS-FSSSU4P1-RSY10-U9-S904	Total/NA	Solid	Fill_Geo-21	279620
160-20016-5	TITO04-BS-FSSSU4P1-RSY10-U9-S905	Total/NA	Solid	Fill_Geo-21	279620
160-20016-6	TITO04-BS-FSSSU4P1-RSY10-U9-S906	Total/NA	Solid	Fill_Geo-21	279620
160-20016-7	TITO04-BS-FSSSU4P1-RSY10-U9-S907	Total/NA	Solid	Fill_Geo-21	279620
160-20016-8	TITO04-BS-FSSSU4P1-RSY10-U9-S908	Total/NA	Solid	Fill_Geo-21	279620
160-20016-9	TITO04-BS-FSSSU4P1-RSY10-U9-S909	Total/NA	Solid	Fill_Geo-21	279620
160-20016-10	TITO04-BS-FSSSU4P1-RSY10-U9-S910	Total/NA	Solid	Fill_Geo-21	279620
160-20016-11	TITO04-BS-FSSSU4P1-RSY10-U9-S911	Total/NA	Solid	Fill_Geo-21	279620
160-20016-12	TITO04-BS-FSSSU4P1-RSY10-U9-S912	Total/NA	Solid	Fill_Geo-21	279620
MB 160-279954/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-279954/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-20016-1 DU	TITO04-BS-FSSSU4P1-RSY10-U9-S901	Total/NA	Solid	Fill_Geo-21	279620

Guillory, Jeffrey

From: Weyant, David B CIV NAVSEA 04, 04N <david.weyant@navy.mil>
Sent: Thursday, December 22, 2016 12:28 PM
To: Guillory, Jeffrey
Cc: Edwards, Zachary L CIV SEA 04 04N
Subject: RE: NSTI RSY Soil Release Request - RSY 10 (Use 9, Part 2)

Jeff,

I concur to designating RSY-10 (Use 9, Part 2) soil as Non-LLRW soil, providing you clarify the below discussion in the report and send revision later to me.

VR

David Weyant
Health Physicist/Environmental Protection Manager
Environmental Protection Division
NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [mailto:jeffrey.guillory@cbifederaleservices.com]
Sent: Thursday, December 22, 2016 3:19 PM
To: Weyant, David B CIV NAVSEA 04, 04N
Subject: [Non-DoD Source] RE: NSTI RSY Soil Release Request - RSY 10 (Use 9, Part 2)

Dave,

Sorry, no, what I mean to say is that as a first step in our evaluation, we compare the data to the Reference Area scan IL. If nothing exceeds the scan IL, we then look at the data points that exceed the mean + 3 sigma.

In this case, we did have some readings (2 data points) that exceeded the scan IL. But because they were just barely above, and because we didn't feel that looking at only those two data points (which were co-located and would've meant only 1 follow-up location) was sufficient, we then took the next step of also considering the data points above the mean + 3 sigma mark.

Sorry for the confusion. These have been a bit of a challenge. Can't believe I would miss the RSI unit.

-jeff-

-----Original Message-----

From: Weyant, David B CIV NAVSEA 04, 04N [mailto:david.weyant@navy.mil]
Sent: Thursday, December 22, 2016 12:15 PM
To: Guillory, Jeffrey
Subject: RE: NSTI RSY Soil Release Request - RSY 10 (Use 9, Part 2)

Jeff,

When you say "all locations surveyed on RSY 10 (Use 9, Part 2) were evaluated against the Reference Area scan IL" do you mean they all exceeded it or they were elevated above the mean of the background reference area?

VR

David Weyant
Health Physicist/Environmental Protection Manager Environmental Protection Division NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Weyant, David B CIV NAVSEA 04, 04N
Sent: Thursday, December 22, 2016 2:18 PM
To: 'Guillory, Jeffrey'
Subject: RE: NSTI RSY Soil Release Request - RSY 10 (Use 9, Part 2)

Jeff,

Did you really mean to say in summary that all locations were elevated against the reference area IL?

VR

David Weyant
Health Physicist/Environmental Protection Manager Environmental Protection Division NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [mailto:jeffrey.guillory@cbifederalservices.com]

Sent: Thursday, December 22, 2016 12:32 PM

To: Weyant, David B CIV NAVSEA 04, 04N

Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek

Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 10 (Use 9, Part 2)

Mr. Weyant,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Jeffrey Guillory

Scientist 3

Federal Services

Cell: +1 979 422 5534

jeffrey.guillory@cbifederalservices.com <mailto:jeffrey.guillory@cbifederalservices.com>

CB&I

950 Avenue M - Treasure Island

San Francisco, CA 94130

United States of America

www.CBI.com <<http://www.cbi.com/>>



Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY 10	RSY Unit Use Number: USE 9, Part 2	First Submittal <input type="checkbox"/> Second Submittal <input checked="" type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 12/27/2016

Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static Survey Meter (Model 2221) Serial Number	One-Minute Static Reading (CPM)	Static Count Exceeds Reference Area IL?	²²⁶ Ra Final Analytical Results (pCi/g)
Upper limit of site reference background						1.69
TITO04-BS-FSSSU3P2-RSY10-U9-S901	1	Systematic	117648	10,688	No	0.290
TITO04-BS-FSSSU3P2-RSY10-U9-S902	2	Systematic	117648	10,449	No	0.112
TITO04-BS-FSSSU3P2-RSY10-U9-S903	3	Systematic	117648	10,569	No	0.416
TITO04-BS-FSSSU3P2-RSY10-U9-S904	4	Systematic	117648	10,357	No	0.0274
TITO04-BS-FSSSU3P2-RSY10-U9-S905	5	Systematic	117648	10,424	No	0.288
TITO04-BS-FSSSU3P2-RSY10-U9-S906	6	Systematic	117648	10,258	No	0.398
TITO04-BS-FSSSU3P2-RSY10-U9-S907	7	Systematic	117648	10,406	No	0.381
TITO04-BS-FSSSU3P2-RSY10-U9-S908	8	Systematic	117648	10,311	No	0.0347
TITO04-BS-FSSSU3P2-RSY10-U9-S909	9	Systematic	117648	9,998	No	0.408
TITO04-BS-FSSSU3P2-RSY10-U9-S910	10	Systematic	117648	10,327	No	0.0782
TITO04-BS-FSSSU3P2-RSY10-U9-S911	11	Systematic	117648	10,958	No	0.402
TITO04-BS-FSSSU3P2-RSY10-U9-S912	12	Systematic	117648	10,390	No	0.330
TITO04-BS-FSSSU3P2-RSY10-U9-S913	13	Systematic	117648	10,342	No	0.293
TITO04-BS-FSSSU3P2-RSY10-U9-S914	14	Systematic	117648	10,392	No	0.340
TITO04-BS-FSSSU3P2-RSY10-U9-S915	15	Systematic	117648	10,564	No	0.355

CPM Counts per minute
IL Investigation Level (based on Reference Area data set)
²²⁶Ra Radium-226
pCi/g Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd (CPM)	Reference Area Static 3σ IL (CPM)	Reference Area Scan Bkgd (CPM)	Reference Area Scan 3σ IL (CPM)	Range (CPM)
Gamma Walkover Survey	TIRS-11112016-12P3-GWS-2627	11/11/2016	2221	8/12/2017	117648	N/A	N/A	14,256	17,684	9,352 – 18,366*
Follow-up Static Survey	TIRS-11152016-12P3-JSS-2637	11/15/2016	2221	8/12/2017	117648	14,157	16,702	N/A	N/A	10,002 – 13,902
Systematic Sampling Survey	TIRS-11152016-12P3-JSS-2635	11/15/2016	2221	8/12/2017	117648	14,157	16,702	N/A	N/A	9,998 – 10,958

*Scan data elevated above the Reference Area IL is likely due to transient electrical interference—see [Note](#) in Summary (page 2) and GWS Count Rate Statistics (page 4) for more details.

3σ IL Investigation Level (established at 3σ above the mean of the Reference Area data set)
CPM Counts per minute

Summary

1) Gamma walkover survey and data review—2 data points clustered around a single location (in an area less than 1 m²) were identified as exceeding the Reference Area scan IL and flagged for a follow-up investigation; this location coincides with the third follow-up static investigation location. As a conservative measure, data points exceeding three standard deviations of the data set average for RSY 10 (Use 9, Part 2) were also identified and evaluated for follow-up investigation. 76 additional data points clustered around 10 distinct investigation locations were identified, resulting in 78 total investigative data points (2 above the Reference Area scan IL & 76 above 3 σ of the data set mean) clustered around 10 total investigation locations. Gamma scan coverage is shown on the Systematic Sample Survey map (page 3). GWS count rate statistics are also provided (page 4).

Note: Scan data exceeding the Reference Area IL coincides with an observed count rate peak, as illustrated in the scatter plot on the GWS Count Rate Statistics page (page 4). This count rate peak is likely due to transient electrical interference, and does not indicate a potential radiological object or contamination. Additional scan data collected from the same location as the count rate peak (identical GPS coordinates) show count rates consistent with the rest of the GWS scan data set. Furthermore, follow-up static measurements collected at this location (the third follow-up static location) did not exceed the Reference Area static IL, and were also consistent with static readings collected at other locations on the RSY pad.

2) Follow-up static survey— 10 locations identified during the data review process as exceeding three standard deviations of the data set average for RSY 10 (Use 9, Part 2) were investigated, resulting in all locations less than the Reference Area static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 5).

3) Fifteen systematic soil samples (901-915) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with static readings < Reference Area static IL for all sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 8-28).

Conclusions:

All locations identified as exceeding either the Reference Area scan IL or three standard deviations of the data set mean for RSY 10 (Use 9, Part 2) were investigated and deemed comparable to background. Ten follow-up static locations were investigated, with readings less than the Reference Area static IL at all locations.

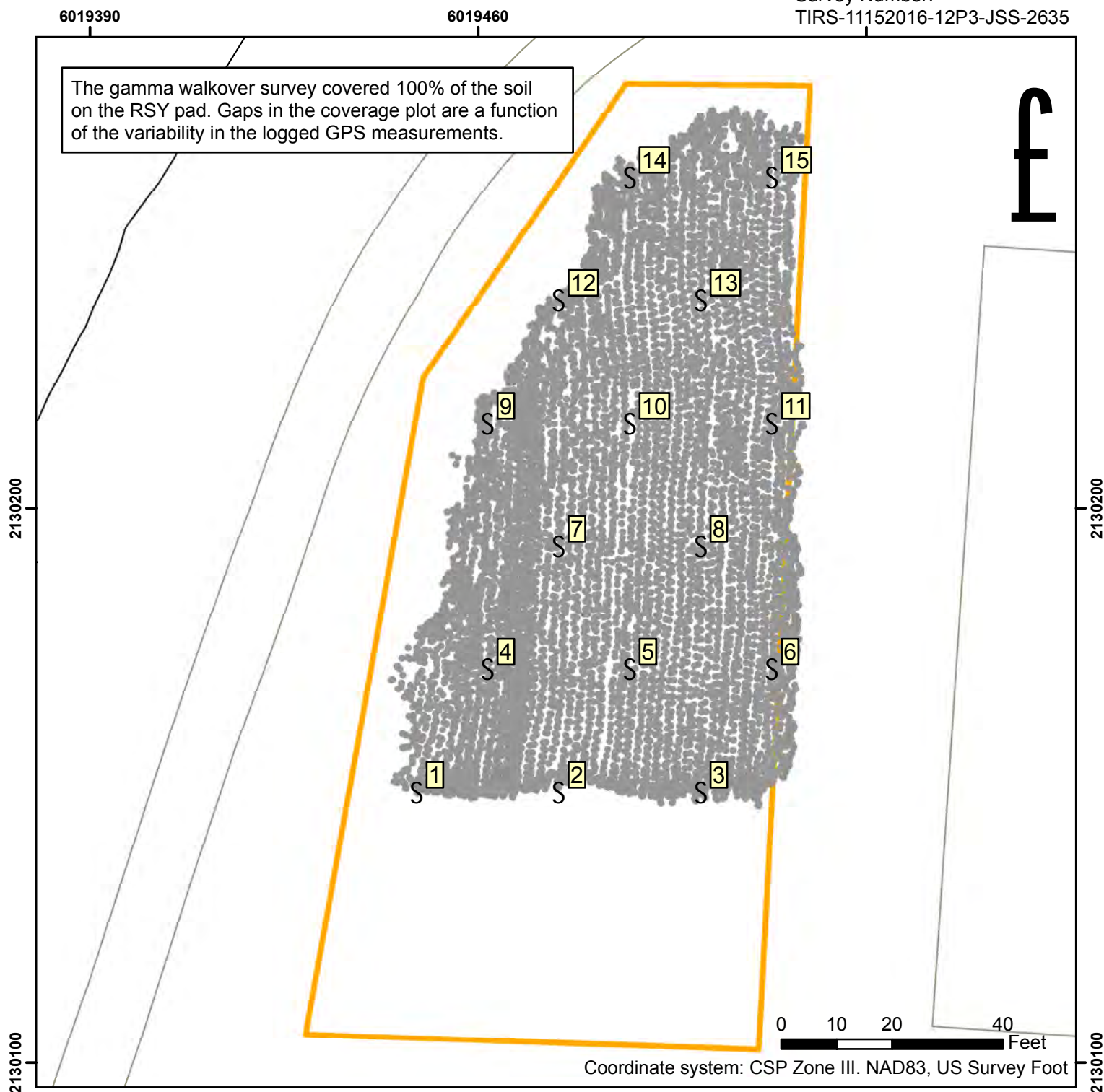
Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 6-7. These statistical tools were utilized to verify the appropriate level of reasonable effort.

RSY 10 (Use 9, Part 2) contains soil from the final 6-inch over excavation of FSS material from the bottom of the excavation at SWDA Bayside SU 3.

Note: Soil on RSY Pad 10 (Use 9, Part 2) was over-excavated at the final depth from the bottom of the excavation at Bayside SU 3, and no visible debris and/or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.

CB&I requests RASO concurrence to release this soil as Non-LLRW.

Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.

Survey Number:
TIRS-11152016-12P3-JSS-2635**Instrument # 117648**

S Systematic Sample Location

• GWS Coverage

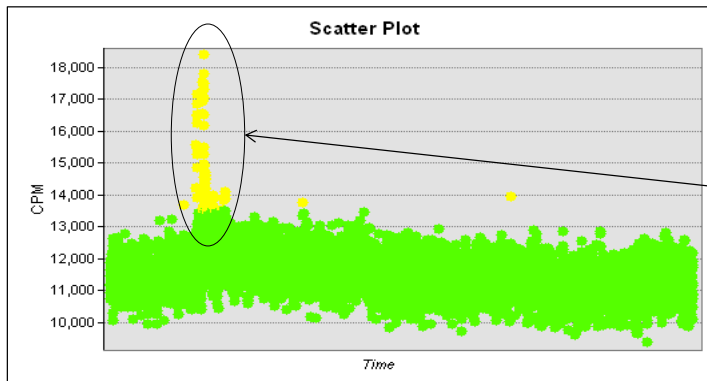
 RSY Boundaries**CB&I Federal Services, LLC**

Data Processed In Treasure Island Office

TIRS-11112016-12P3-GWS-2627

**GWS Count Rate Statistics
RSY Pad 10 (Use 9, Part 2)**

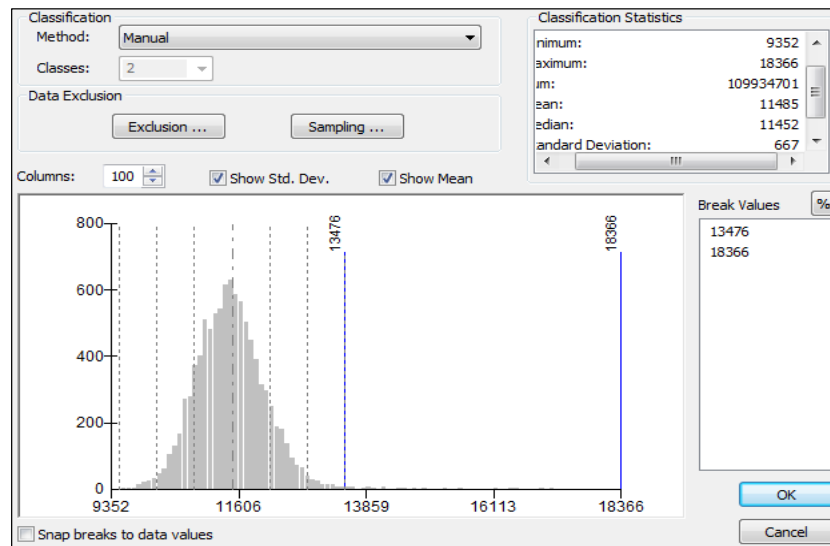
Frequency Table				
In the 9,000 (cpm)	In the 10,000 (cpm)	In the 11,000 (cpm)	In the 12,000 (cpm)	In the 13,000 (cpm)
46	2020	5799	1555	106
In the 14,000 (cpm)	In the 15,000 (cpm)	In the 16,000 (cpm)	In the 17,000 (cpm)	In the 18,000 (cpm)
21	6	8	10	1



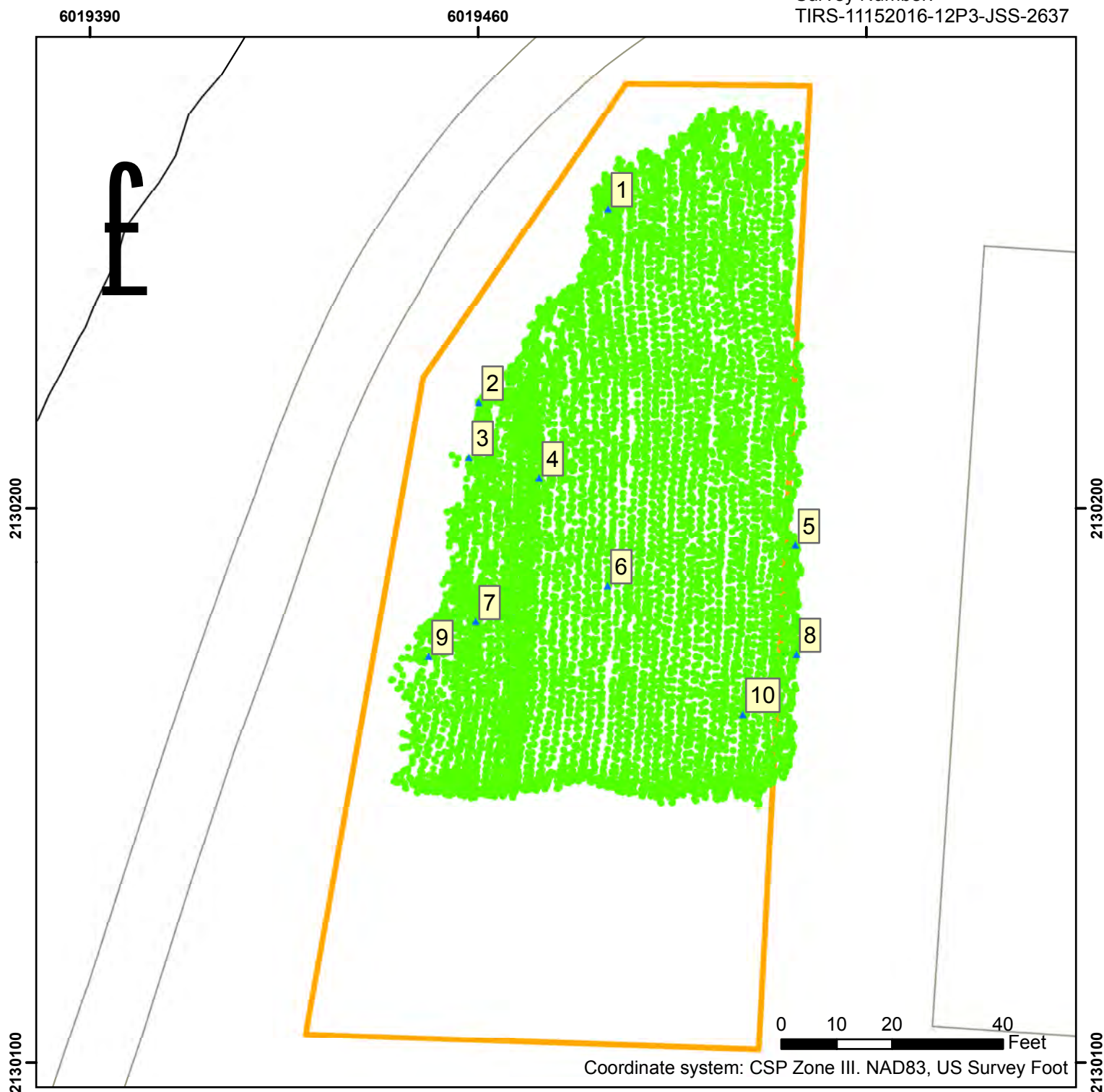
Count rate peak likely due to transient electrical interference.

Scan data collected at the location of this peak both before and after detection show count rates consistent with the rest of the GWS scan data set.

Static follow-up readings at this location did not exceed the Reference Area IL, and were also consistent with static readings collected at other locations on the RSY pad.



Survey Number:
TIRS-11152016-12P3-JSS-2637

**Instrument # 117648**

- ▲ Follow-up Static Locations
- Data Points Not Requiring Further Investigation
- RSY Boundaries

CB&I Federal Services, LLC

Data Processed In Treasure Island Office

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 10-9 (P.2)
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	17	0	1	S
0.98	R	0.98	35	0	2	S
0.83	R	0.83	30.5	0	3	S
0.54	R	0.54	20	0	4	S
0.57	R	0.57	22.5	0	5	S
0.55	R	0.55	21	0	6	S
0.57	R	0.57	22.5	0	7	S
0.46	R	0.46	16	0	8	S
0.50	R	0.5	18	0	9	S
0.66	R	0.66	24.5	0	10	S
0.75	R	0.75	28	0	11	S
0.70	R	0.7	27	0	12	S
0.86	R	0.86	32	0	13	S
0.51	R	0.51	19	0	14	S
0.91	R	0.91	34	0	15	S
0.83	R	0.83	30.5	0	16	R
0.79	R	0.79	29	0	17	R
0.90	R	0.9	33	0	18	R
0.66	R	0.66	24.5	0	19	R
0.69	R	0.69	26	0	20	R
0.290	S	-0.192939192	6	6	21	R
0.112	S	-0.370939192	4	4	22.5	R
0.416	S	-0.066939192	15	15	22.5	R
0.027	S	-0.455539192	1	1	24.5	R
0.288	S	-0.194939192	5	5	24.5	R
0.398	S	-0.084939192	12	12	26	R
0.381	S	-0.101939192	11	11	27	R
0.035	S	-0.448239192	2	2	28	R
0.408	S	-0.074939192	14	14	29	R
0.078	S	-0.404739192	3	3	30.5	R
0.402	S	-0.080939192	13	13	30.5	R
0.330	S	-0.152939192	8	8	32	R
0.293	S	-0.189939192	7	7	33	R
0.340	S	-0.142939192	9	9	34	R
0.355	S	-0.127939192	10	10	35	R
Sum =				630	120	

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 *n*
 # of S: 15 *m*
 Avg Rank R: 25.5
 Avg Rank S: 8

For *m* or *n* greater than 20, the critical value (*k*) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

z = 97.5% percentile of standard normal distribution = 1.960

k = 328.8

$\alpha_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of *r* and *k* for the Quantile Test When α is Approximately 0.05

15 *n* (number of survey unit measurements)
 20 *m* (number of reference area measurements)

Use:

m = 20

n = 15

6 *r*

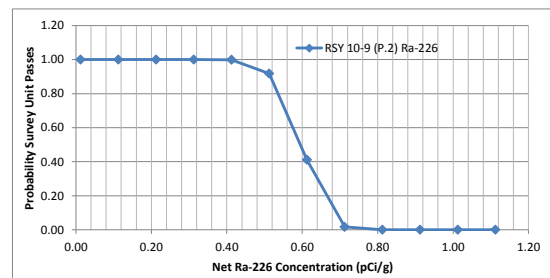
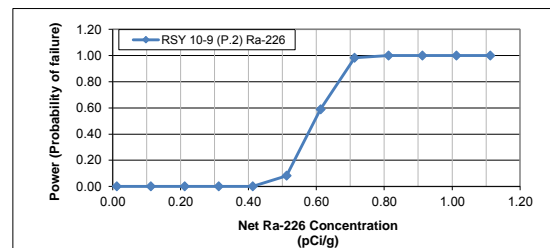
5 *k*

0.04 α

If *k* or more of the *r* largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

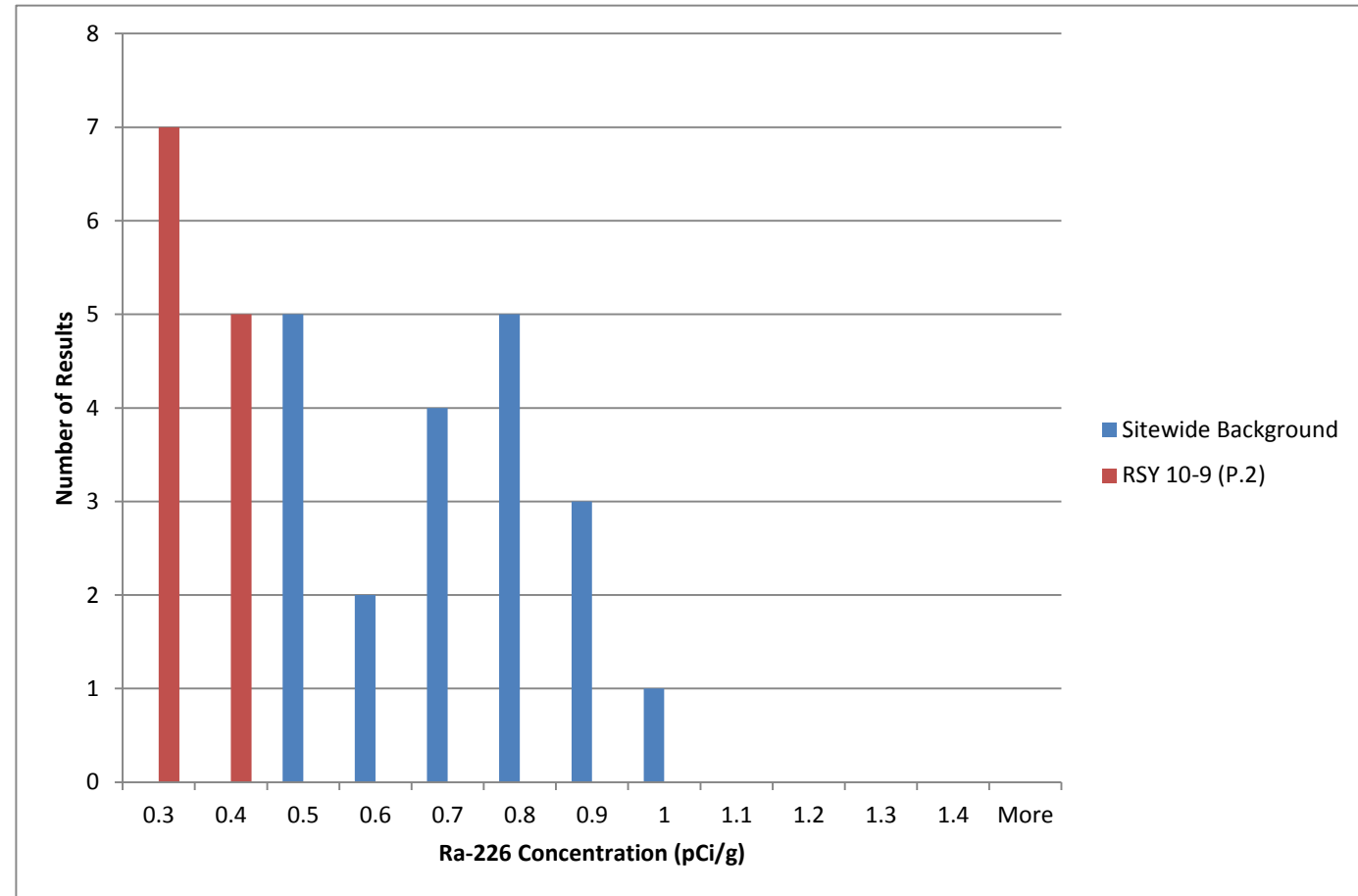
Concentration	Background (C)	SD	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	5.0841	28.78565	5.3652262	37.8765	0.00	1.00	
0.8	0.11	-2.3	0.03855	0.00847	11.565	80.21025	8.9560178	21.9668	0.00	1.00	
0.9	0.21	-1.7	0.11467	0.03935	34.3998	289.8324	17.024466	10.2147	0.00	1.00	
1.0	0.31	-1.1	0.21834	0.09889	65.5014	558.2831	23.628015	6.04361	0.00	1.00	
1.1	0.41	-0.4	0.38865	0.22917	116.5947	844.7074	29.063851	3.1553	0.00	1.00	
1.2	0.51	0.2	0.55623	0.39139	166.8693	885.8423	29.763102	1.39202	0.08	0.92	
1.3	0.61	0.8	0.71420	0.57447	214.2588	698.7275	26.433453	-0.22543	0.59	0.41	
1.4	0.71	1.4	0.83890	0.74170	251.6703	416.1806	20.400506	-2.12594	0.98	0.02	
1.5	0.81	2.0	0.92135	0.86577	276.405	188.8629	13.74274	-4.95571	1.00	0.00	
1.6	0.91	2.7	0.97188	0.94921	291.5643	54.28618	7.3679158	-11.3009	1.00	0.00	
1.7	1.01	3.3	0.99019	0.98164	297.0564	14.43559	3.7994199	-23.3605	1.00	0.00	
1.8	1.11	3.9	0.99766	0.99550	299.2983	2.378397	1.5422051	-59.0053	1.00	0.00	



Histogram, RSY 10 (Use 9, Part 2) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 10-9 (P.2)	
<i>Bin</i>	<i>Frequency</i>
0.3	7
0.4	5
0.5	0
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-20048-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Elizabeth M. Hoerchler

Authorized for release by:

12/12/2016 12:20:57 PM

Elizabeth Hoerchler, Project Mgmt. Assistant

elizabeth.hoerchler@testamericainc.com

Designee for

Erika Gish, Project Manager II

(314)298-8566

erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Page 10 of 28

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Job ID: 160-20048-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-20048-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 11 of 28

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Job ID: 160-20048-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 11/17/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 19.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSSSU3P2-RSY10-U9-S901 (160-20048-1), TITO04-BS-FSSSU3P2-RSY10-U9-S902 (160-20048-2), TITO04-BS-FSSSU3P2-RSY10-U9-S903 (160-20048-3), TITO04-BS-FSSSU3P2-RSY10-U9-S904 (160-20048-4), TITO04-BS-FSSSU3P2-RSY10-U9-S905 (160-20048-5), TITO04-BS-FSSSU3P2-RSY10-U9-S906 (160-20048-6), TITO04-BS-FSSSU3P2-RSY10-U9-S907 (160-20048-7), TITO04-BS-FSSSU3P2-RSY10-U9-S908 (160-20048-8), TITO04-BS-FSSSU3P2-RSY10-U9-S909 (160-20048-9), TITO04-BS-FSSSU3P2-RSY10-U9-S910 (160-20048-10), TITO04-BS-FSSSU3P2-RSY10-U9-S911 (160-20048-11), TITO04-BS-FSSSU3P2-RSY10-U9-S912 (160-20048-12), TITO04-BS-FSSSU3P2-RSY10-U9-S913 (160-20048-13), TITO04-BS-FSSSU3P2-RSY10-U9-S914 (160-20048-14) and TITO04-BS-FSSSU3P2-RSY10-U9-S915 (160-20048-15) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/17/2016, prepared on 11/18/2016 and analyzed on 12/09/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TI_P3_BS_FSS_SU3_RSY10_U9_#334

Page 1 of 2

Page 12 of 28

Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside FSS SU3
RSY10 USE 9 Systematic Part 2

Purchase Order #: 201455

Shipment Date: 11/16/16

Waybill Number: 12 89V 462 019761099

Lab Destination: Earth Toxics Inc To Test America

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Lynn Caragan

Phone/Fax Number: 714-669-7022

Address: lynn.caragan@cbifederalservices.com Contact Name / ph. #: Mike Dryden

City:

Sampler's Name(s): D. Fields

Collection Information

Sample ID Number	Sample Description	Collection Information			Matrix	# of containers	Preservative (soil)	147																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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TITO04-BS-FSSSU3P2-RSY10-U9-S901	Bayside FSS Survey Unit 3 RSY 10 Lift 9 Systematic Part 2	11/15/16	1245	G	CP	1	16 oz Plastic	X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	



160-20048 Chain of Custody

Special Instructions:

7 days ingrown draft and follow with 21 days final

☐ 24-hr

Level Of QC Required:

I

II

III

Project Specific:

Standard TAT ☐

☐ 3-day

☐ 7-day

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

SO = Soil

GW = Ground Water

SL = Sludge

WW = Waste Water

CP = Chip Samples

A = Air

ABS=Asbestos, PO=Pipe Opening

Relinquished By:

Date: 11/16/16

Received By:

Date: 11/17/16

Time: 1100

Time: 0830

Relinquished By:

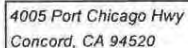
Date:

Received By:

Date:

Time:

Time:


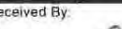


Ref. Document # T1 P3 BS FSS SU3 RSY10 U9 #334

City:

Lab Destination: *Earth Toxics Inc To Test America*

Collection Information

Special Instructions:		7 days ingrown draft and follow with 21 days final		Method Codes	
<input type="checkbox"/> 24-hr Standard TAT <input type="checkbox"/> <input type="checkbox"/> 3-day <input type="checkbox"/> 7-day		Level Of QC Required: I II III Project Specific:		C = Composite G = Grab	
Relinquished By: 		Date: 1/16/14 Time: 1:00		Matrix Codes DW = Drinking Water SO = Soil GW = Ground Water SL = Sludge WW = Waste Water CP = Chip Samples A = Air ABS=Asbestos, PO=Pipe Openning	
Relinquished By:		Received By: 		Date: 1/17/14 Time: 0830	
Date: Time:		Date: Time:		Date: Time:	

12/12/2016

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-20048-2

Login Number: 20048**List Source: TestAmerica St. Louis****List Number: 1****Creator: Daniels, Brian J**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-20048-1	TITO04-BS-FSSSU3P2-RSY10-U9-S901	Solid	11/15/16 12:45	11/17/16 08:30
160-20048-2	TITO04-BS-FSSSU3P2-RSY10-U9-S902	Solid	11/15/16 12:46	11/17/16 08:30
160-20048-3	TITO04-BS-FSSSU3P2-RSY10-U9-S903	Solid	11/15/16 12:48	11/17/16 08:30
160-20048-4	TITO04-BS-FSSSU3P2-RSY10-U9-S904	Solid	11/15/16 12:49	11/17/16 08:30
160-20048-5	TITO04-BS-FSSSU3P2-RSY10-U9-S905	Solid	11/15/16 12:56	11/17/16 08:30
160-20048-6	TITO04-BS-FSSSU3P2-RSY10-U9-S906	Solid	11/15/16 12:56	11/17/16 08:30
160-20048-7	TITO04-BS-FSSSU3P2-RSY10-U9-S907	Solid	11/15/16 12:57	11/17/16 08:30
160-20048-8	TITO04-BS-FSSSU3P2-RSY10-U9-S908	Solid	11/15/16 12:58	11/17/16 08:30
160-20048-9	TITO04-BS-FSSSU3P2-RSY10-U9-S909	Solid	11/15/16 13:01	11/17/16 08:30
160-20048-10	TITO04-BS-FSSSU3P2-RSY10-U9-S910	Solid	11/15/16 13:01	11/17/16 08:30
160-20048-11	TITO04-BS-FSSSU3P2-RSY10-U9-S911	Solid	11/15/16 12:59	11/17/16 08:30
160-20048-12	TITO04-BS-FSSSU3P2-RSY10-U9-S912	Solid	11/15/16 13:04	11/17/16 08:30
160-20048-13	TITO04-BS-FSSSU3P2-RSY10-U9-S913	Solid	11/15/16 13:03	11/17/16 08:30
160-20048-14	TITO04-BS-FSSSU3P2-RSY10-U9-S914	Solid	11/15/16 13:06	11/17/16 08:30
160-20048-15	TITO04-BS-FSSSU3P2-RSY10-U9-S915	Solid	11/15/16 13:06	11/17/16 08:30

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S901

Lab Sample ID: 160-20048-1

Date Collected: 11/15/16 12:45

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.320		0.130	0.134		0.131	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Actinium-227	-0.217	U	0.571	0.571		0.964	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Bismuth-212	-0.401	U	0.725	0.726		1.22	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Bismuth-214	0.290		0.0909	0.0957		0.0865	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Cesium-137	0.0132	U	0.0291	0.0292		0.0508	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Lead-210	0.288	U	0.981	0.982		1.68	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Lead-212	0.266		0.0614	0.0704		0.0647	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Lead-214	0.323		0.102	0.107		0.0997	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Potassium-40	10.3		1.26	1.65		0.591	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Protactinium-231	0.000	U	0.682	0.682		3.26	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Radium-226	0.290		0.0909	0.0957	0.500	0.0865	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Radium-228	0.320		0.130	0.134		0.131	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Thallium-208	0.0865		0.0668	0.0674		0.0679	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Thorium-228	0.266		0.0614	0.0704		0.0647	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Thorium-232	0.320		0.130	0.134		0.131	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Thorium-234	-0.0929	U	0.828	0.828		1.42	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Uranium-235	-0.145	U	0.402	0.403		0.673	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Uranium-238	-0.0929	U	0.828	0.828		1.42	pCi/g	11/18/16 13:40	12/09/16 16:13	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S902

Lab Sample ID: 160-20048-2

Date Collected: 11/15/16 12:46

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.417		0.173	0.178		0.140	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Actinium-227	0.253	U	0.763	0.763		1.29	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Bismuth-212	-0.352	U	0.876	0.877		1.50	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Bismuth-214	0.112	U	0.0742	0.0751		0.251	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Cesium-137	-0.0157	U	0.0581	0.0581		0.108	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-210	0.477	U	1.34	1.34		1.97	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-212	0.395		0.134	0.143		0.194	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-214	0.365		0.111	0.118		0.118	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Potassium-40	10.5		1.46	1.81		0.375	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Protactinium-231	0.583	U	1.46	1.46		3.37	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Radium-226	0.112	U	0.0742	0.0751	0.500	0.251	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Radium-228	0.417		0.173	0.178		0.140	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thallium-208	0.129		0.0476	0.0494		0.0476	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-228	0.395		0.134	0.143		0.194	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-232	0.417		0.173	0.178		0.140	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-234	0.799	U	1.05	1.05		1.50	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Uranium-235	-0.153	U	0.368	0.368		0.619	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Uranium-238	0.799	U	1.05	1.05		1.50	pCi/g	11/18/16 13:40	12/09/16 16:14	1

Client Sample Results

Page 19 of 28

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S903

Lab Sample ID: 160-20048-3

Date Collected: 11/15/16 12:48

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.378		0.123	0.129		0.204	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Actinium-227	-0.00901	U	0.696	0.696		1.20	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Bismuth-212	-0.0378	U	0.696	0.696		1.07	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Bismuth-214	0.416		0.125	0.133		0.115	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Cesium-137	0.0288	U	0.0566	0.0566		0.0958	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-210	-0.554	U	1.40	1.40		2.45	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-212	0.354		0.0788	0.0911		0.0885	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-214	0.247		0.0760	0.0802		0.0975	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Potassium-40	11.2		1.36	1.78		0.479	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Protactinium-231	0.165	U	0.976	0.976		3.15	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Radium-226	0.416		0.125	0.133	0.500	0.115	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Radium-228	0.378		0.123	0.129		0.204	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thallium-208	0.165		0.0441	0.0473		0.0328	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-228	0.354		0.0788	0.0911		0.0885	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-232	0.378		0.123	0.129		0.204	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-234	-0.180	U	1.36	1.36		2.32	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Uranium-235	0.0324	U	0.0749	0.0750		0.813	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Uranium-238	-0.180	U	1.36	1.36		2.32	pCi/g	11/18/16 13:40	12/09/16 16:15	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S904

Lab Sample ID: 160-20048-4

Date Collected: 11/15/16 12:49

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.188	U	0.107	0.108		0.223	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Actinium-227	-0.0633	U	0.695	0.696		1.18	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Bismuth-212	0.173	U	0.748	0.749		1.29	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Bismuth-214	0.0274	U	0.0997	0.0997		0.207	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Cesium-137	-0.0203	U	0.0555	0.0555		0.0948	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Lead-210	0.671	U	1.29	1.29		2.16	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Lead-212	0.258		0.0592	0.0680		0.0645	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Lead-214	0.340		0.0744	0.0824		0.0727	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Potassium-40	9.82		1.17	1.54		0.492	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Protactinium-231	-0.617	U	1.92	1.92		3.22	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Radium-226	0.0274	U	0.0997	0.0997	0.500	0.207	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Radium-228	0.188	U	0.107	0.108		0.223	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Thallium-208	0.118		0.0425	0.0442		0.0340	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Thorium-228	0.258		0.0592	0.0680		0.0645	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Thorium-232	0.188	U	0.107	0.108		0.223	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Thorium-234	0.336	U	0.984	0.984		1.66	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Uranium-235	0.0627	U	0.177	0.177		0.646	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Uranium-238	0.336	U	0.984	0.984		1.66	pCi/g	11/18/16 13:40	12/09/16 16:18	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S905

Lab Sample ID: 160-20048-5

Date Collected: 11/15/16 12:56

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.220	U	0.202	0.203		0.223	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Actinium-227	0.235	U	0.265	0.267		0.454	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Bismuth-212	0.155	U	0.963	0.963		1.68	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Bismuth-214	0.288		0.115	0.119		0.127	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Cesium-137	-0.0361	U	0.0670	0.0671		0.113	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-210	0.951	U	1.08	1.08		1.52	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-212	0.224		0.0784	0.0836		0.103	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-214	0.317		0.0940	0.0996		0.104	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Potassium-40	10.0		1.50	1.81		0.718	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Protactinium-231	0.385	U	1.12	1.12		2.99	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Radium-226	0.288		0.115	0.119	0.500	0.127	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Radium-228	0.220	U	0.202	0.203		0.223	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thallium-208	0.0758		0.0635	0.0640		0.0756	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-228	0.224		0.0784	0.0836		0.103	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-232	0.220	U	0.202	0.203		0.223	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-234	0.522	U	0.536	0.539		1.33	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Uranium-235	0.0894	U	0.286	0.286		0.485	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Uranium-238	0.522	U	0.536	0.539		1.33	pCi/g	11/18/16 13:40	12/09/16 16:14	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S906

Lab Sample ID: 160-20048-6

Date Collected: 11/15/16 12:56

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.130	U	0.218	0.218		0.325	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Actinium-227	-0.383	U	0.842	0.843		1.41	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Bismuth-212	0.000	U	0.506	0.506		1.38	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Bismuth-214	0.398		0.154	0.160		0.137	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Cesium-137	-0.0348	U	0.0903	0.0904		0.155	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-210	-0.301	U	1.53	1.53		2.66	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-212	0.254		0.0800	0.0865		0.0953	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-214	0.359		0.113	0.119		0.132	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Potassium-40	12.2		1.81	2.19		0.739	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Protactinium-231	0.690	U	1.53	1.53		3.56	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Radium-226	0.398		0.154	0.160	0.500	0.137	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Radium-228	0.130	U	0.218	0.218		0.325	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thallium-208	0.117		0.0590	0.0602		0.0565	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-228	0.254		0.0800	0.0865		0.0953	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-232	0.130	U	0.218	0.218		0.325	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-234	0.0628	U	1.43	1.43		2.45	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Uranium-235	-0.0583	U	0.497	0.497		0.839	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Uranium-238	0.0628	U	1.43	1.43		2.45	pCi/g	11/18/16 13:40	12/09/16 16:15	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S907

Lab Sample ID: 160-20048-7

Date Collected: 11/15/16 12:57

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.363		0.198	0.202		0.192	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Actinium-227	-0.371	U	0.807	0.808		1.35	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Bismuth-212	0.337	U	0.753	0.753		1.28	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Bismuth-214	0.381		0.120	0.127		0.115	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Cesium-137	0.0385	U	0.0723	0.0724		0.122	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Lead-210	1.70		1.06	1.08		1.35	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Lead-212	0.287		0.0776	0.0861		0.0937	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Lead-214	0.370		0.110	0.116		0.121	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Potassium-40	11.5		1.46	1.88		0.794	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Protactinium-231	0.000	U	0.197	0.197		3.70	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Radium-226	0.381		0.120	0.127	0.500	0.115	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Radium-228	0.363		0.198	0.202		0.192	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Thallium-208	0.148		0.0545	0.0567		0.0515	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Thorium-228	0.287		0.0776	0.0861		0.0937	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Thorium-232	0.363		0.198	0.202		0.192	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Thorium-234	-0.664	U	1.36	1.37		2.36	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Uranium-235	-0.172	U	0.518	0.518		0.865	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Uranium-238	-0.664	U	1.36	1.37		2.36	pCi/g	11/18/16 13:40	12/09/16 16:16	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S908

Lab Sample ID: 160-20048-8

Date Collected: 11/15/16 12:58

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.244		0.149	0.151		0.146	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Actinium-227	0.150	U	0.301	0.302		0.860	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Bismuth-212	0.000	U	0.420	0.420		1.19	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Bismuth-214	0.0347	U	0.268	0.268		0.364	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Cesium-137	0.0216	U	0.0499	0.0500		0.0622	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Lead-210	0.552	U	1.46	1.46		2.05	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Lead-212	0.332		0.0772	0.0884		0.0826	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Lead-214	0.347		0.0816	0.0892		0.106	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Potassium-40	11.8		1.49	1.92		0.663	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Protactinium-231	0.000	U	0.526	0.526		3.05	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Radium-226	0.0347	U	0.268	0.268	0.500	0.364	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Radium-228	0.244		0.149	0.151		0.146	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Thallium-208	0.110		0.0522	0.0535		0.0540	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Thorium-228	0.332		0.0772	0.0884		0.0826	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Thorium-232	0.244		0.149	0.151		0.146	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Thorium-234	-0.377	U	1.06	1.06		1.86	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Uranium-235	-0.201	U	0.284	0.284		0.578	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Uranium-238	-0.377	U	1.06	1.06		1.86	pCi/g	11/18/16 13:40	12/09/16 16:50	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S909

Lab Sample ID: 160-20048-9

Date Collected: 11/15/16 13:01

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.449		0.179	0.185		0.291	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Actinium-227	0.0331	U	0.0906	0.0907		0.867	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Bismuth-212	0.371	U	0.963	0.964		1.66	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Bismuth-214	0.408		0.126	0.133		0.117	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Cesium-137	0.00423	U	0.0605	0.0605		0.109	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Lead-210	0.784	U	1.14	1.15		1.64	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Lead-212	0.194		0.0752	0.0792		0.0967	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Lead-214	0.293		0.118	0.122		0.141	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Potassium-40	10.5		1.73	2.03		0.815	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Protactinium-231	0.582	U	1.41	1.41		3.30	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Radium-226	0.408		0.126	0.133	0.500	0.117	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Radium-228	0.449		0.179	0.185		0.291	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Thallium-208	0.0301	U	0.0817	0.0817		0.107	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Thorium-228	0.194		0.0752	0.0792		0.0967	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Thorium-232	0.449		0.179	0.185		0.291	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Thorium-234	0.609	U	0.743	0.746		1.21	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Uranium-235	-0.141	U	0.500	0.500		0.547	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Uranium-238	0.609	U	0.743	0.746		1.21	pCi/g	11/18/16 13:40	12/09/16 16:52	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S910

Lab Sample ID: 160-20048-10

Date Collected: 11/15/16 13:01

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.211	U	0.248	0.249		0.348	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Actinium-227	-0.401	U	0.820	0.821		1.37	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Bismuth-212	0.229	U	0.515	0.516		0.901	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Bismuth-214	0.0782	U	0.182	0.182		0.299	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Cesium-137	-0.0249	U	0.0633	0.0633		0.118	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Lead-210	-0.268	U	1.31	1.31		2.25	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Lead-212	0.321		0.0853	0.0949		0.102	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Lead-214	0.360		0.0875	0.0951		0.115	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Potassium-40	11.7		1.65	2.04		0.607	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Protactinium-231	0.000	U	0.391	0.391		4.11	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Radium-226	0.0782	U	0.182	0.182	0.500	0.299	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Radium-228	0.211	U	0.248	0.249		0.348	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Thallium-208	0.157		0.0496	0.0522		0.0399	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Thorium-228	0.321		0.0853	0.0949		0.102	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Thorium-232	0.211	U	0.248	0.249		0.348	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Thorium-234	1.20	U	1.06	1.07		1.35	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Uranium-235	0.0860	U	0.334	0.335		0.649	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Uranium-238	1.20	U	1.06	1.07		1.35	pCi/g	11/18/16 13:40	12/09/16 16:55	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S911

Lab Sample ID: 160-20048-11

Date Collected: 11/15/16 12:59

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.203	U	0.165	0.166		0.209	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Actinium-227	-0.0380	U	0.633	0.633		1.09	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Bismuth-212	-0.240	U	0.641	0.641		1.10	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Bismuth-214	0.402		0.113	0.120		0.111	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Cesium-137	0.000	U	0.0197	0.0197		0.0702	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Lead-210	-0.440	U	1.29	1.30		2.19	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Lead-212	0.256		0.0644	0.0724		0.0712	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Lead-214	0.306		0.0753	0.0817		0.0845	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Potassium-40	11.9		1.41	1.86		0.636	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Protactinium-231	0.000	U	0.218	0.218		3.58	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Radium-226	0.402		0.113	0.120	0.500	0.111	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Radium-228	0.203	U	0.165	0.166		0.209	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Thallium-208	0.0305	U	0.0658	0.0659		0.0773	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Thorium-228	0.256		0.0644	0.0724		0.0712	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Thorium-232	0.203	U	0.165	0.166		0.209	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Thorium-234	0.00996	U	0.0476	0.0476		2.14	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Uranium-235	0.128	U	0.372	0.373		0.625	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Uranium-238	0.00996	U	0.0476	0.0476		2.14	pCi/g	11/18/16 13:40	12/09/16 16:49	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S912

Lab Sample ID: 160-20048-12

Date Collected: 11/15/16 13:04

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.263		0.191	0.193		0.207	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Actinium-227	-0.334	U	0.889	0.889		1.49	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Bismuth-212	-0.179	U	0.227	0.228		1.20	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Bismuth-214	0.330		0.138	0.142		0.140	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Cesium-137	0.0184	U	0.0471	0.0471		0.0814	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-210	1.23	U	1.23	1.24		1.65	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-212	0.242		0.0723	0.0787		0.0900	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-214	0.305		0.0934	0.0987		0.0979	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Potassium-40	11.0		1.39	1.79		0.503	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Protactinium-231	0.000	U	0.807	0.807		3.48	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Radium-226	0.330		0.138	0.142	0.500	0.140	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Radium-228	0.263		0.191	0.193		0.207	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thallium-208	0.153		0.0487	0.0513		0.0429	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-228	0.242		0.0723	0.0787		0.0900	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-232	0.263		0.191	0.193		0.207	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-234	0.208	U	0.571	0.572		1.27	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Uranium-235	0.0710	U	0.0591	0.0595		0.727	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Uranium-238	0.208	U	0.571	0.572		1.27	pCi/g	11/18/16 13:40	12/09/16 16:51	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S913

Lab Sample ID: 160-20048-13

Date Collected: 11/15/16 13:03

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.263		0.149	0.151		0.208	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Actinium-227	0.352	U	0.207	0.211		0.762	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Bismuth-212	0.350	U	0.614	0.616		1.03	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Bismuth-214	0.293		0.0759	0.0818		0.0690	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Cesium-137	-0.0334	U	0.0519	0.0520		0.0867	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Lead-210	-0.357	U	1.13	1.13		1.92	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Lead-212	0.329		0.0723	0.0839		0.0615	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Lead-214	0.400		0.0781	0.0885		0.0391	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Potassium-40	10.4		1.22	1.61		0.505	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Protactinium-231	-0.0840	U	1.82	1.82		3.10	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Radium-226	0.293		0.0759	0.0818	0.500	0.0690	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Radium-228	0.263		0.149	0.151		0.208	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Thallium-208	0.145		0.0433	0.0459		0.0289	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Thorium-228	0.329		0.0723	0.0839		0.0615	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Thorium-232	0.263		0.149	0.151		0.208	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Thorium-234	0.458	U	0.972	0.973		1.63	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Uranium-235	0.0678	U	0.153	0.153		0.741	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Uranium-238	0.458	U	0.972	0.973		1.63	pCi/g	11/18/16 13:40	12/09/16 16:53	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S914

Lab Sample ID: 160-20048-14

Date Collected: 11/15/16 13:06

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.408		0.152	0.157		0.163	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Actinium-227	0.173	U	0.502	0.502		0.728	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Bismuth-212	-0.487	U	0.851	0.852		1.43	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Bismuth-214	0.340		0.106	0.111		0.107	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Cesium-137	-0.00503	U	0.0476	0.0476		0.0864	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-210	-0.303	U	1.33	1.33		2.02	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-212	0.323		0.0830	0.0929		0.0982	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-214	0.282		0.0904	0.0950		0.0916	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Potassium-40	10.3		1.49	1.83		0.695	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Protactinium-231	0.000	U	0.370	0.370		3.50	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Radium-226	0.340		0.106	0.111	0.500	0.107	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Radium-228	0.408		0.152	0.157		0.163	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thallium-208	0.121		0.0529	0.0544		0.0454	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-228	0.323		0.0830	0.0929		0.0982	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-232	0.408		0.152	0.157		0.163	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-234	-0.307	U	1.19	1.19		2.05	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Uranium-235	0.121	U	0.209	0.210		0.487	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Uranium-238	-0.307	U	1.19	1.19		2.05	pCi/g	11/18/16 13:40	12/09/16 16:51	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S915

Lab Sample ID: 160-20048-15

Date Collected: 11/15/16 13:06

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.177	U	0.303	0.304		0.365	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Actinium-227	-0.373	U	0.878	0.879		1.48	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Bismuth-212	-0.451	U	0.967	0.969		1.65	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Bismuth-214	0.355		0.164	0.168		0.163	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Cesium-137	-0.0423	U	0.0949	0.0950		0.111	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Lead-210	1.24	U	1.11	1.12		1.58	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Lead-212	0.246		0.0937	0.0989		0.129	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Lead-214	0.362		0.107	0.114		0.111	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Potassium-40	10.8		1.70	2.02		0.733	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Protactinium-231	0.559	U	1.36	1.36		3.17	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Radium-226	0.355		0.164	0.168	0.500	0.163	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Radium-228	0.177	U	0.303	0.304		0.365	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Thallium-208	0.170		0.0539	0.0567		0.0418	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Thorium-228	0.246		0.0937	0.0989		0.129	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Thorium-232	0.177	U	0.303	0.304		0.365	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Thorium-234	0.747	U	0.572	0.578		1.33	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Uranium-235	0.182	U	0.320	0.321		0.570	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Uranium-238	0.747	U	0.572	0.578		1.33	pCi/g	11/18/16 13:40	12/09/16 16:54	1

QC Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-280031/1-A
Matrix: Solid
Analysis Batch: 283304

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 280031

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.008784	U	0.0226	0.0226		0.326	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Actinium-227	0.07143	U	0.167	0.167		0.962	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Bismuth-212	0.0000	U	0.173	0.173		1.33	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Bismuth-214	-0.01755	U	0.155	0.155		0.281	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Cesium-137	-0.02815	U	0.0947	0.0948		0.174	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Lead-210	0.5215	U	0.988	0.990		1.68	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Lead-212	-0.08736	U	0.0718	0.0727		0.189	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Lead-214	-0.02185	U	0.0921	0.0921		0.172	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Potassium-40	0.3129	U	0.504	0.505		0.846	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Protactinium-231	-0.0000001	U	2.57	2.57		4.45	pCi/g	11/18/16 13:40	12/09/16 16:10	1
	50									
Radium-226	-0.01755	U	0.155	0.155	0.500	0.281	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Radium-228	-0.008784	U	0.0226	0.0226		0.326	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Thallium-208	-0.003788	U	0.0607	0.0607		0.0882	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Thorium-228	-0.08736	U	0.0718	0.0727		0.189	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Thorium-232	-0.008784	U	0.0226	0.0226		0.326	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Thorium-234	0.4338	U	0.451	0.453		1.41	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Uranium-235	-0.03221	U	0.0767	0.0768		0.605	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Uranium-238	0.4338	U	0.451	0.453		1.41	pCi/g	11/18/16 13:40	12/09/16 16:10	1

Lab Sample ID: LCS 160-280031/2-A
Matrix: Solid
Analysis Batch: 283303

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 280031

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	95.94		10.1		0.970	pCi/g	99	87 - 116
Cesium-137	29.3	27.54		2.94		0.237	pCi/g	94	87 - 120
Cobalt-60	16.0	15.20		1.58		0.109	pCi/g	95	87 - 115

Lab Sample ID: 160-20048-1 DU
Matrix: Solid
Analysis Batch: 283294

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S901
Prep Type: Total/NA
Prep Batch: 280031

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.320		0.1398	U	0.174		0.250	pCi/g	0.59	1
Actinium-227	-0.217	U	-0.3513	U	0.888		1.49	pCi/g	0.09	1
Bismuth-212	-0.401	U	0.2010	U	0.586		1.03	pCi/g	0.46	1
Bismuth-214	0.290		0.2956		0.100		0.103	pCi/g	0.03	1
Cesium-137	0.0132	U	0.008057	U	0.0479		0.0845	pCi/g	0.07	1
Lead-210	0.288	U	0.09255	U	1.05		1.72	pCi/g	0.1	1
Lead-212	0.266		0.2685		0.0875		0.0998	pCi/g	0.02	1
Lead-214	0.323		0.2960		0.0973		0.136	pCi/g	0.13	1
Potassium-40	10.3		9.211		1.62		0.346	pCi/g	0.34	1
Protactinium-231	0.000	U	0.3094	U	1.03		3.44	pCi/g	0.18	1
Radium-226	0.290		0.2956		0.100	0.500	0.103	pCi/g	0.03	1
Radium-228	0.320		0.1398	U	0.174		0.250	pCi/g	0.59	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-20048-1 DU

Matrix: Solid

Analysis Batch: 283294

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S901

Prep Type: Total/NA

Prep Batch: 280031

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2 σ +/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.0865		0.08611		0.0945		0.0815	pCi/g	0	1
Thorium-228	0.266		0.2685		0.0875		0.0998	pCi/g	0.02	1
Thorium-232	0.320		0.1398	U	0.174		0.250	pCi/g	0.59	1
Thorium-234	-0.0929	U	0.4284	U	1.09		1.56	pCi/g	0.27	1
Uranium-235	-0.145	U	0.1165	U	0.301		0.509	pCi/g	0.37	1
Uranium-238	-0.0929	U	0.4284	U	1.09		1.56	pCi/g	0.27	1

QC Association Summary

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Rad

Leach Batch: 279804

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20048-1	TITO04-BS-FSSSU3P2-RSY10-U9-S901	Total/NA	Solid	Dry and Grind	
160-20048-2	TITO04-BS-FSSSU3P2-RSY10-U9-S902	Total/NA	Solid	Dry and Grind	
160-20048-3	TITO04-BS-FSSSU3P2-RSY10-U9-S903	Total/NA	Solid	Dry and Grind	
160-20048-4	TITO04-BS-FSSSU3P2-RSY10-U9-S904	Total/NA	Solid	Dry and Grind	
160-20048-5	TITO04-BS-FSSSU3P2-RSY10-U9-S905	Total/NA	Solid	Dry and Grind	
160-20048-6	TITO04-BS-FSSSU3P2-RSY10-U9-S906	Total/NA	Solid	Dry and Grind	
160-20048-7	TITO04-BS-FSSSU3P2-RSY10-U9-S907	Total/NA	Solid	Dry and Grind	
160-20048-8	TITO04-BS-FSSSU3P2-RSY10-U9-S908	Total/NA	Solid	Dry and Grind	
160-20048-9	TITO04-BS-FSSSU3P2-RSY10-U9-S909	Total/NA	Solid	Dry and Grind	
160-20048-10	TITO04-BS-FSSSU3P2-RSY10-U9-S910	Total/NA	Solid	Dry and Grind	
160-20048-11	TITO04-BS-FSSSU3P2-RSY10-U9-S911	Total/NA	Solid	Dry and Grind	
160-20048-12	TITO04-BS-FSSSU3P2-RSY10-U9-S912	Total/NA	Solid	Dry and Grind	
160-20048-13	TITO04-BS-FSSSU3P2-RSY10-U9-S913	Total/NA	Solid	Dry and Grind	
160-20048-14	TITO04-BS-FSSSU3P2-RSY10-U9-S914	Total/NA	Solid	Dry and Grind	
160-20048-15	TITO04-BS-FSSSU3P2-RSY10-U9-S915	Total/NA	Solid	Dry and Grind	
160-20048-1 DU	TITO04-BS-FSSSU3P2-RSY10-U9-S901	Total/NA	Solid	Dry and Grind	

Prep Batch: 280031

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20048-1	TITO04-BS-FSSSU3P2-RSY10-U9-S901	Total/NA	Solid	Fill_Geo-21	279804
160-20048-2	TITO04-BS-FSSSU3P2-RSY10-U9-S902	Total/NA	Solid	Fill_Geo-21	279804
160-20048-3	TITO04-BS-FSSSU3P2-RSY10-U9-S903	Total/NA	Solid	Fill_Geo-21	279804
160-20048-4	TITO04-BS-FSSSU3P2-RSY10-U9-S904	Total/NA	Solid	Fill_Geo-21	279804
160-20048-5	TITO04-BS-FSSSU3P2-RSY10-U9-S905	Total/NA	Solid	Fill_Geo-21	279804
160-20048-6	TITO04-BS-FSSSU3P2-RSY10-U9-S906	Total/NA	Solid	Fill_Geo-21	279804
160-20048-7	TITO04-BS-FSSSU3P2-RSY10-U9-S907	Total/NA	Solid	Fill_Geo-21	279804
160-20048-8	TITO04-BS-FSSSU3P2-RSY10-U9-S908	Total/NA	Solid	Fill_Geo-21	279804
160-20048-9	TITO04-BS-FSSSU3P2-RSY10-U9-S909	Total/NA	Solid	Fill_Geo-21	279804
160-20048-10	TITO04-BS-FSSSU3P2-RSY10-U9-S910	Total/NA	Solid	Fill_Geo-21	279804
160-20048-11	TITO04-BS-FSSSU3P2-RSY10-U9-S911	Total/NA	Solid	Fill_Geo-21	279804
160-20048-12	TITO04-BS-FSSSU3P2-RSY10-U9-S912	Total/NA	Solid	Fill_Geo-21	279804
160-20048-13	TITO04-BS-FSSSU3P2-RSY10-U9-S913	Total/NA	Solid	Fill_Geo-21	279804
160-20048-14	TITO04-BS-FSSSU3P2-RSY10-U9-S914	Total/NA	Solid	Fill_Geo-21	279804
160-20048-15	TITO04-BS-FSSSU3P2-RSY10-U9-S915	Total/NA	Solid	Fill_Geo-21	279804
MB 160-280031/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-280031/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-20048-1 DU	TITO04-BS-FSSSU3P2-RSY10-U9-S901	Total/NA	Solid	Fill_Geo-21	279804

Guillory, Jeffrey

From: Weyant, David B CIV NAVSEA 04, 04N <david.weyant@navy.mil>
Sent: Wednesday, February 08, 2017 10:24 AM
To: Guillory, Jeffrey
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: RE: NSTI RSY Soil Release Request - RSY 10 (Use 11)

Jeff,

I concur to designating the Revised RSY-10 (Use 11) soil as Non-LLRW soil.

VR

David Weyant
Health Physicist/Environmental Protection Manager
Environmental Protection Division
NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [mailto:jeffrey.guillory@cbifederaleservices.com]
Sent: Tuesday, February 07, 2017 11:33 AM
To: Weyant, David B CIV NAVSEA 04, 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 10 (Use 11)

Mr. Weyant,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Jeffrey Guillory

Scientist 3

Federal Services

Cell: +1 979 422 5534

jeffrey.guillory@cbifederaleservices.com <<mailto:jeffrey.guillory@cbifederaleservices.com>>

CB&I

950 Avenue M - Treasure Island

San Francisco, CA 94130

United States of America

[www.CBI.com](http://www.cbi.com/) <<http://www.cbi.com/>>



Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY 10	RSY Unit Use Number: USE 11	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 2/7/2017

Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static Survey Meter (Model 2221) Serial Number	One-Minute Static Reading (CPM)	Static Count Exceeds Reference Area IL?	²²⁶ Ra Final Analytical Results (pCi/g)
Upper limit of site reference background						1.69
TITO04-BS-SU5P1-RSY10-U11-S001	1	Systematic	254783	11,232	No	0.521
TITO04-BS-SU5P1-RSY10-U11-S002	2	Systematic	254783	11,151	No	0.321
TITO04-BS-SU5P1-RSY10-U11-S003	3	Systematic	254783	10,377	No	0.400
TITO04-BS-SU5P1-RSY10-U11-S004	4	Systematic	254783	10,991	No	0.347
TITO04-BS-SU5P1-RSY10-U11-S005	5	Systematic	254783	10,327	No	0.442
TITO04-BS-SU5P1-RSY10-U11-S006	6	Systematic	254783	11,589	No	0.392
TITO04-BS-SU5P1-RSY10-U11-S007	7	Systematic	254783	11,765	No	0.453
TITO04-BS-SU5P1-RSY10-U11-S008	8	Systematic	254783	11,311	No	0.479
TITO04-BS-SU5P1-RSY10-U11-S009	9	Systematic	254783	12,010	No	0.335
TITO04-BS-SU5P1-RSY10-U11-S010	10	Systematic	254783	11,554	No	0.365
TITO04-BS-SU5P1-RSY10-U11-S011	11	Systematic	254783	10,500	No	0.477
TITO04-BS-SU5P1-RSY10-U11-S012	12	Systematic	254783	11,987	No	0.620

CPM Counts per minute
IL Investigation Level (based on Reference Area data set)
²²⁶Ra Radium-226
pCi/g Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd (CPM)	Reference Area Static 3σ IL (CPM)	Reference Area Scan Bkgd (CPM)	Reference Area Scan 3σ IL (CPM)	Range (CPM)
Gamma Walkover Survey	TIRS-12282016-12P3-GWS-2707	12/28/2016 – 12/30/2016	2221	10/31/2017	254783	N/A	N/A	14,633	18,077	8,123 – 15,278
Follow-up Static Survey	TIRS-01062017-12P3-JSS-2712	1/6/2017	2221	10/31/2017	254783	14,709	17,037	N/A	N/A	10,589 – 12,784
Systematic Sampling Survey	TIRS-01062017-12P3-JSS-2713	1/6/2017	2221	10/31/2017	254783	14,709	17,037	N/A	N/A	10,327 – 12,010

3σ IL Investigation Level (established at 3σ above the mean of the Reference Area data set)
CPM Counts per minute

Summary
<p>1) Gamma walkover survey and data review—all locations surveyed on RSY 10 (Use 11) were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the data set average for RSY 10 (Use 11) were evaluated for follow-up investigation; 26 total data points clustered around 10 discrete locations were identified as exceeding three standard deviations of the data set average. Gamma scan coverage is shown on the Systematic Sample Survey map (page 3). GWS count rate statistics are also provided (page 4).</p> <p>2) Follow-up static survey—10 clustered locations (26 GWS data points) identified during the data review process as exceeding three standard deviations of the data set average for RSY 10 (Use 11) were investigated, resulting in all locations less than the Reference Area static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 5).</p> <p>3) Twelve systematic soil samples (S001-S012) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with static readings < Reference Area static IL for all sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 8-26).</p> <p>Conclusions:</p> <p>All count rates recorded during the gamma walkover survey were less than the Reference Area scan IL. As an additional conservative characterization approach, clustered locations identified as exceeding three standard deviations of the data set mean for RSY 10 (Use 11) were investigated and deemed comparable to background. Ten total follow-up static locations were investigated, with readings less than the Reference Area static IL at all locations.</p> <p>Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 6-7. These statistical tools were utilized to verify the appropriate level of reasonable effort.</p> <p>RSY 10 (Use 11) contains soil from the final 6-inch over excavation of FSS material from the bottom of the excavation at SWDA Bayside SU 5.</p> <p>Note: Soil on RSY Pad 10 (Use 11) was over-excavated at the final depth from the bottom of the excavation at Bayside SU 5, and no visible debris and/or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.</p> <p>CB&I requests RASO concurrence to release this soil as Non-LLRW.</p> <p>Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.</p>

Survey Number:
TIRS-01062017-12P3-JSS-2713

6019390

6019460

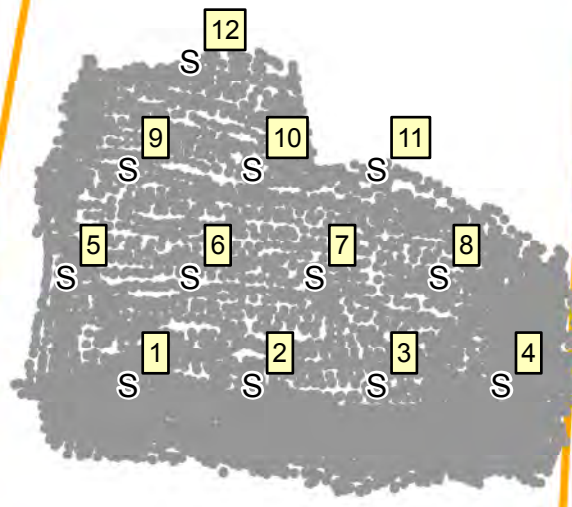
2130200

2130100

2130200

2130100

The gamma walkover survey covered 100% of the soil on the RSY pad. Gaps in the coverage plot are a function of the variability in the logged GPS measurements.

**Instrument # 254783**

S Systematic Sample Location

• GWS Coverage

 RSY Boundaries

0 10 20 40 Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot

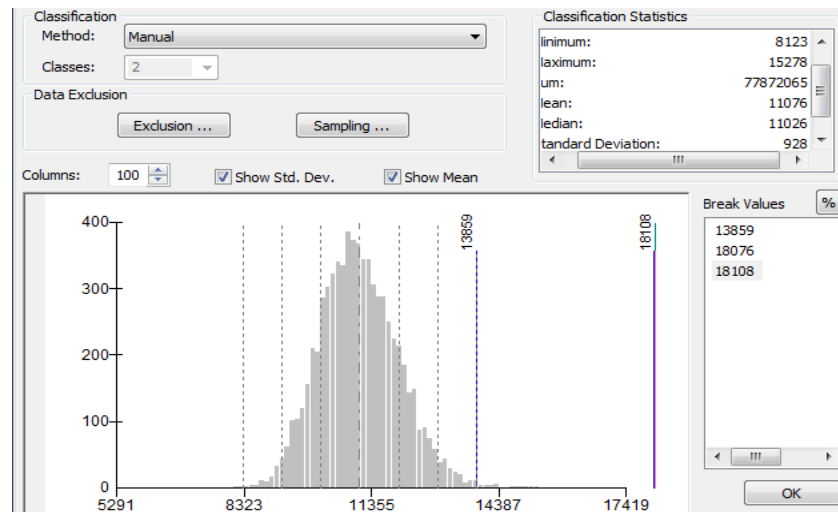
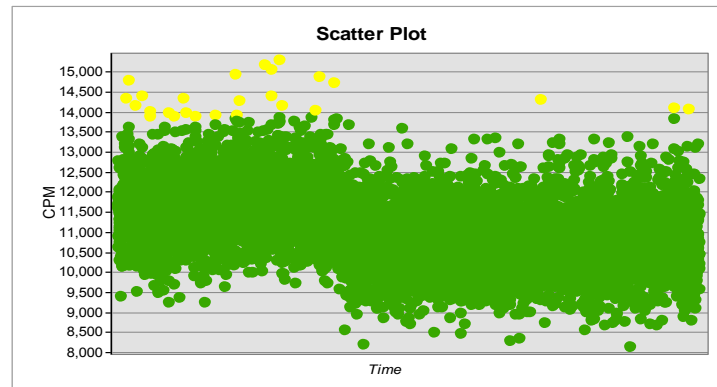
**CB&I Federal Services, LLC**

Data Processed In Treasure Island Office

Survey # TIRS-12282016-12P3-GWS-2707

GWS Count Rate Statistics
Bayside RSY 10 (Use 11)

Frequency Table				
In the 8,000	In the 9,000	In the 10,000	In the 11,000	In the 12,000
41	795	2606	2451	951
In the 13,000	In the 14,000	In the 15,000		
169	15	3		



Survey Number:
TIRS-01062017-12P3-JSS-2712

6019390

6019460

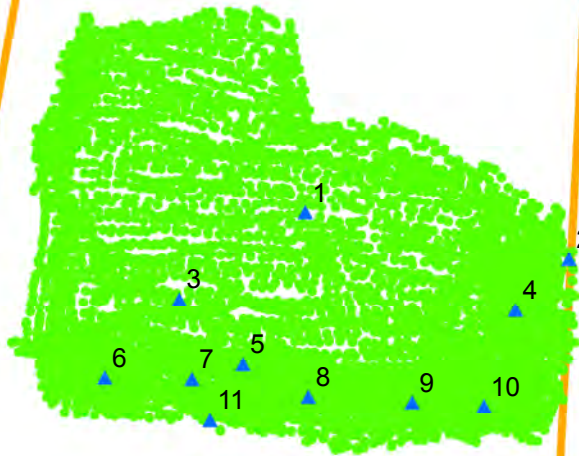
2130200




2130100

2130200

2130100

The gamma walkover survey covered 100% of the soil on the RSY pad. Gaps in the coverage plot are a function of the variability in the logged GPS measurements.

**Instrument # 254783**

-  Follow-up Static Location
-  Areas Not Requiring Further Investigation
-  RSY Boundaries

0 10 20 40
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

f**CB&I Federal Services, LLC**

Data Processed In Treasure Island Office

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 10-11
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

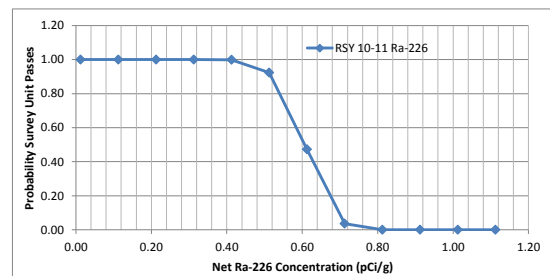
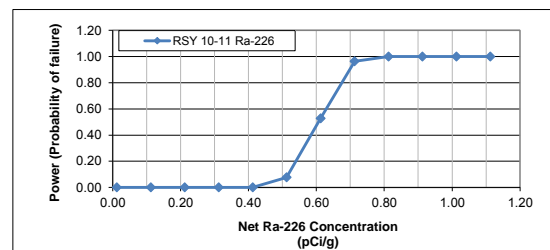
POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4	S
0.57	R	0.57	19.5	0	5	S
0.55	R	0.55	18	0	6	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.521	S	0.038060808	11	11	21.5	R
0.321	S	-0.161939192	1	1	21.5	R
0.400	S	-0.082939192	6	6	23	R
0.347	S	-0.135939192	3	3	24	R
0.442	S	-0.040939192	7	7	25	R
0.392	S	-0.090939192	5	5	26	R
0.453	S	-0.029939192	8	8	27.5	R
0.479	S	-0.003939192	10	10	27.5	R
0.335	S	-0.147939192	2	2	29	R
0.365	S	-0.117939192	4	4	30	R
0.477	S	-0.005939192	9	9	31	R
0.620	S	0.137060808	12	12	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.087
Z(1-alpha)	1.960
Z(1-beta)	1.645

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
1.5	0.81	2.0	0.92135	0.86577	221.124	138.9359	11.787107	-4.34973	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)
 Use:
 $m = 20$
 $n = 15$
 $6 r$
 $5 k$
 0.04 α

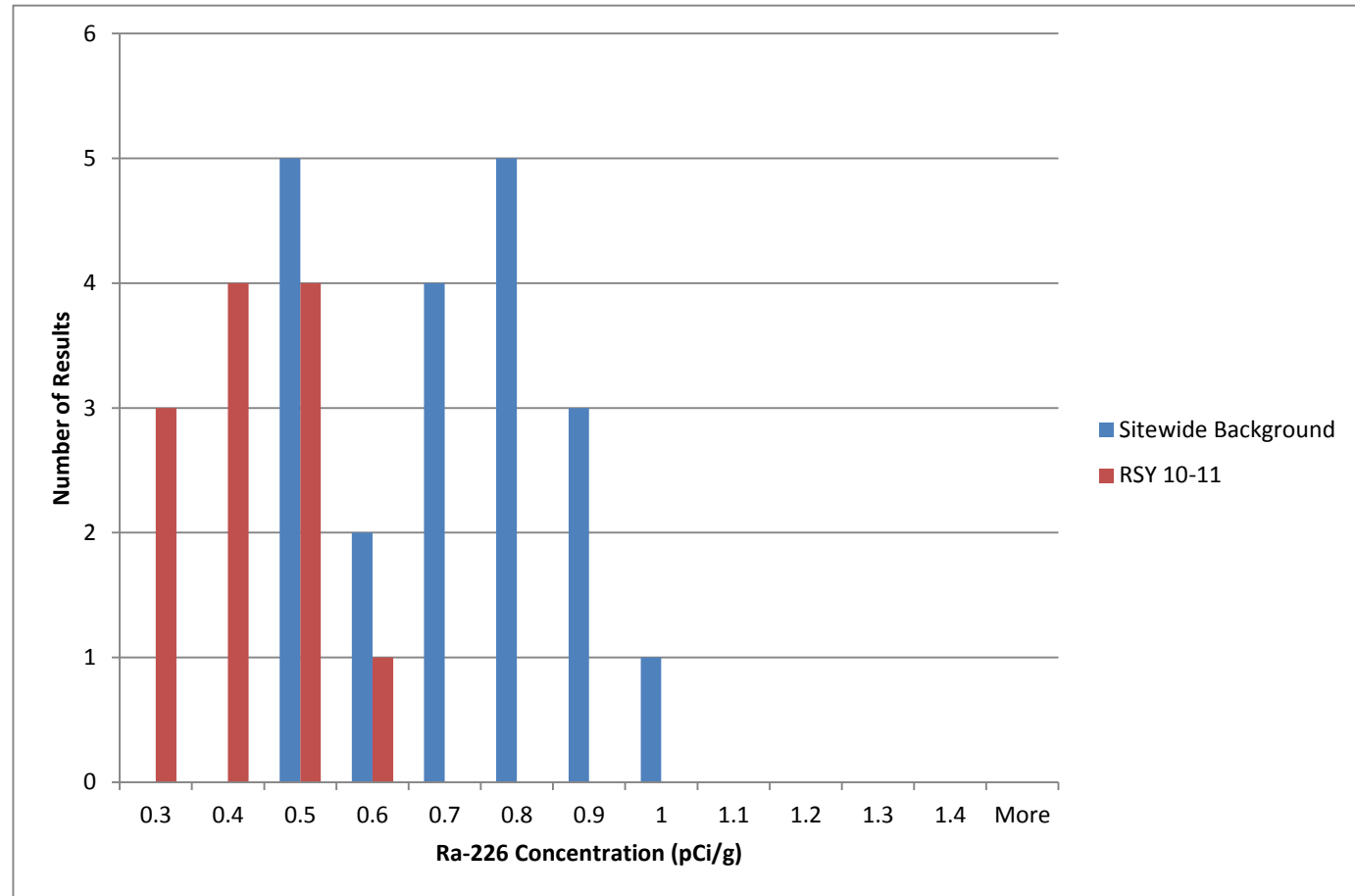
If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

Histogram, RSY 10 (Use 11) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 10-11	
<i>Bin</i>	<i>Frequency</i>
0.3	3
0.4	4
0.5	4
0.6	1
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-20643-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan



Authorized for release by:
2/2/2017 2:08:19 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

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results through

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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QC Association Summary	19



Case Narrative

Page 10 of 26

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Job ID: 160-20643-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-20643-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 11 of 26

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Job ID: 160-20643-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 1/10/2017 8:30 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 19.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-SU5P1-RSY10-U11-S001 (160-20643-1), TITO04-BS-SU5P1-RSY10-U11-S002 (160-20643-2), TITO04-BS-SU5P1-RSY10-U11-S003 (160-20643-3), TITO04-BS-SU5P1-RSY10-U11-S004 (160-20643-4), TITO04-BS-SU5P1-RSY10-U11-S005 (160-20643-5), TITO04-BS-SU5P1-RSY10-U11-S006 (160-20643-6), TITO04-BS-SU5P1-RSY10-U11-S007 (160-20643-7), TITO04-BS-SU5P1-RSY10-U11-S008 (160-20643-8), TITO04-BS-SU5P1-RSY10-U11-S009 (160-20643-9), TITO04-BS-SU5P1-RSY10-U11-S010 (160-20643-10), TITO04-BS-SU5P1-RSY10-U11-S011 (160-20643-11) and TITO04-BS-SU5P1-RSY10-U11-S012 (160-20643-12) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 01/10/2017, prepared on 01/11/2017 and analyzed on 02/01/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

CHAIN OF CUSTODY

Ref. Document # TI P3 BS SU5P1 RSY10 U11 #366

Page 1 of 2

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: *Lynn Caragan*

Phone/Fax Number: 714-669-7022

Address: lynn.caragan@cbifederaleservices.com

City:

Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside SU5
Part 1 RSY 10 Use 11
Systematic

Purchase Order #: 201455

Shipment Date: 1-9-17

Waybill Number: 1Z89V4620A0621976

Lab Destination: *Earth Toxics Inc To Test America*

b Contact Name / ph. #: Mike Dryden

Sampler's Name(s): A. Owens

Collection Information

Sample ID Number	Sample Description	Collection Information						Preservative (Yes)						
		Date	Time	Method	Matrix	# of containers	Container Type							
TITO04-BS-SU5P1-RSY10-U11-S001	Bayside Survey Unit 5 Part I RSY 10 Lift 11 Systematic	1-6-17	1000	G	CP	1	16 oz Plastic	X					5	
TITO04-BS-SU5P1-RSY10-U11-S002	Bayside Survey Unit 5 Part I RSY 10 Lift 11 Systematic	1-6-17	1002	G	CP	1	16 oz Plastic	X					5	
TITO04-BS-SU5P1-RSY10-U11-S003	Bayside Survey Unit 5 Part I RSY 10 Lift 11 Systematic	1-6-17	1003	G	CP	1	16 oz Plastic	X					5	
TITO04-BS-SU5P1-RSY10-U11-S004	Bayside Survey Unit 5 Part I RSY 10 Lift 11 Systematic	1-6-17	1006	G	CP	1	16 oz Plastic	X					5	
TITO04-BS-SU5P1-RSY10-U11-S005	Bayside Survey Unit 5 Part I RSY 10 Lift 11 Systematic	1-6-17	1007	G	CP	1	16 oz Plastic	X					5	
TITO04-BS-SU5P1-RSY10-U11-S006	Bayside Survey Unit 5 Part I RSY 10 Lift 11 Systematic	1-6-17	1009	G	CP	1	16 oz Plastic	X					5	
TITO04-BS-SU5P1-RSY10-U11-S007	Bayside Survey Unit 5 Part I RSY 10 Lift 11 Systematic	1-6-17	1011	G	CP	1	16 oz Plastic	X					5	
TITO04-BS-SU5P1-RSY10-U11-S008	Bayside Survey Unit 5 Part I RSY 10 Lift 11 Systematic	1-6-17	1015	G	CP	1	16 oz Plastic	X					5	

Special Instructions:

7 days ingrown draft and follow with 21 days final

☐ 24-hr

Level Of QC Required

Standard TAT ☐

by: A. Owens

Date: 1-9-17

Time: 1130

Received By:

Bill Clarke

Date: 1-10-17

Time: 08.30

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

SO = Soil

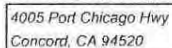
SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening

160-20643 Chain of Custody





Ref. Document # TI P3 BS SU6P1 RSY10 U11 #356

Page 2 of 2

Page 13 of 26

Send Report To: Lynn Caragan
Phone/Fax Number: 714-669-7022

Address: lynn.caragan@cbifederaleservices.com

Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside SU5
Part 1 RSY 10 Use 11
Systematic

Purchase Order #: 201455

Shipment Date: 1-9-17

Waybill Number: 1789V462014621476

Lab Destination: *Earth Toxics Inc To Test America*

Contact Name / ph. #: *Mike Dryden*

Sampler's Name(s): A. Owens

Collection Information

Preservative (water)

Preservative (soil)

Container Type

Gamma Scan

Dose Rate $\mu\text{R}/\text{Hr}$

Sample ID Number		Sample Description	Date	Time	Method	Matrix	# of containers	Container Type																					
TITO04-BS-SU5P1-RSY10-U11-S009		Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1014	G	CP	1	16 oz Plastic	X										S										
TITO04-BS-SU5P1-RSY10-U11-S010		Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1017	G	CP	1	16 oz Plastic	X										S										
TITO04-BS-SU5P1-RSY10-U11-S011		Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1020	G	CP	1	16 oz Plastic	X										S										
TITO04-BS-SU5P1-RSY10-U11-S012		Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1022	G	CP	1	16 oz Plastic	X										S										
Special Instructions:										7 days ingrown draft and follow with 21 days final																			
<input type="checkbox"/> 24-hr			Level Of QC Required:																	Method Codes									
Standard TAT <input type="checkbox"/>			<div>I<div>II</div><div>III</div></div> Project Specific																	C = CompositeG = Grab									
<input type="checkbox"/> 3-day <input type="checkbox"/> 7-day																				Matrix Codes									
Relinquished By: A. Owens			Date: 1-9-17																	Received By: Date: 1.10.17									
			Time: 1130																	Time: 0830									
Relinquished By:			Date:																	Date:									
			Time:																	Time:									
																				DW = Drinking WaterSO = Soil									
																				GW = Ground WaterSL = Sludge									
																				WW = Waste WaterCP = Chip Samples									
																				A = AirABS=Asbestos, PO=Pipe Opening									

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-20643-2

Login Number: 20643**List Source: TestAmerica St. Louis****List Number: 1****Creator: Clarke, Jill C**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:
DOE = U.S. Department of Energy

Laboratory References:
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-20643-1	TITO04-BS-SU5P1-RSY10-U11-S001	Solid	01/06/17 10:00	01/10/17 08:30
160-20643-2	TITO04-BS-SU5P1-RSY10-U11-S002	Solid	01/06/17 10:02	01/10/17 08:30
160-20643-3	TITO04-BS-SU5P1-RSY10-U11-S003	Solid	01/06/17 10:03	01/10/17 08:30
160-20643-4	TITO04-BS-SU5P1-RSY10-U11-S004	Solid	01/06/17 10:06	01/10/17 08:30
160-20643-5	TITO04-BS-SU5P1-RSY10-U11-S005	Solid	01/06/17 10:07	01/10/17 08:30
160-20643-6	TITO04-BS-SU5P1-RSY10-U11-S006	Solid	01/06/17 10:09	01/10/17 08:30
160-20643-7	TITO04-BS-SU5P1-RSY10-U11-S007	Solid	01/06/17 10:11	01/10/17 08:30
160-20643-8	TITO04-BS-SU5P1-RSY10-U11-S008	Solid	01/06/17 10:15	01/10/17 08:30
160-20643-9	TITO04-BS-SU5P1-RSY10-U11-S009	Solid	01/06/17 10:14	01/10/17 08:30
160-20643-10	TITO04-BS-SU5P1-RSY10-U11-S010	Solid	01/06/17 10:17	01/10/17 08:30
160-20643-11	TITO04-BS-SU5P1-RSY10-U11-S011	Solid	01/06/17 10:20	01/10/17 08:30
160-20643-12	TITO04-BS-SU5P1-RSY10-U11-S012	Solid	01/06/17 10:22	01/10/17 08:30

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S001

Lab Sample ID: 160-20643-1

Date Collected: 01/06/17 10:00

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.348		0.248	0.250		0.258	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Actinium-227	-0.318	U	0.818	0.819		1.37	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Bismuth-212	0.0644	U	0.569	0.569		1.01	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Bismuth-214	0.521		0.133	0.144		0.119	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Cesium-137	-0.0129	U	0.0549	0.0549		0.0956	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Lead-210	1.60	U	1.20	1.21		1.61	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Lead-212	0.371		0.0801	0.0934		0.0908	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Lead-214	0.479		0.0965	0.109		0.0867	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Potassium-40	12.3		1.40	1.89		0.455	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Protactinium-231	0.000	U	0.312	0.312		3.67	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Radium-226	0.521		0.133	0.144	0.500	0.119	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Radium-228	0.348		0.248	0.250		0.258	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thallium-208	0.136		0.0506	0.0526		0.0483	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thorium-228	0.371		0.0801	0.0934		0.0908	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thorium-232	0.348		0.248	0.250		0.258	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thorium-234	-0.172	U	1.47	1.47		2.51	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Uranium-235	0.0761	U	0.181	0.181		0.505	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Uranium-238	-0.172	U	1.47	1.47		2.51	pCi/g	01/11/17 12:34	02/01/17 07:19	1

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S002

Lab Sample ID: 160-20643-2

Date Collected: 01/06/17 10:02

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0802	U	0.204	0.205		0.330	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Actinium-227	0.178	U	0.531	0.531		0.767	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Bismuth-212	0.319	U	0.735	0.735		1.26	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Bismuth-214	0.321		0.115	0.119		0.118	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Cesium-137	-0.00872	U	0.0527	0.0527		0.0963	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Lead-210	0.199	U	0.745	0.745		1.22	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Lead-212	0.208		0.0972	0.101		0.146	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Lead-214	0.400		0.0964	0.105		0.104	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Potassium-40	10.7		1.46	1.83		0.656	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Protactinium-231	-0.0329	U	1.87	1.87		3.21	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Radium-226	0.321		0.115	0.119	0.500	0.118	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Radium-228	0.0802	U	0.204	0.205		0.330	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thallium-208	0.155		0.0415	0.0445		0.0208	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thorium-228	0.208		0.0972	0.101		0.146	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thorium-232	0.0802	U	0.204	0.205		0.330	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thorium-234	1.08		0.631	0.641		0.852	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Uranium-235	-0.0125	U	0.0186	0.0186		0.437	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Uranium-238	1.08		0.631	0.641		0.852	pCi/g	01/11/17 12:34	02/01/17 07:19	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S003

Lab Sample ID: 160-20643-3

Date Collected: 01/06/17 10:03

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.449		0.137	0.145		0.118	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Actinium-227	-0.303	U	0.774	0.775		1.30	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Bismuth-212	-0.447	U	0.760	0.762		1.28	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Bismuth-214	0.400		0.132	0.138		0.123	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Cesium-137	-0.00688	U	0.0478	0.0478		0.0863	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Lead-210	1.46	U	1.36	1.37		1.77	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Lead-212	0.249		0.0762	0.0828		0.0986	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Lead-214	0.420		0.109	0.118		0.115	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Potassium-40	12.2		1.45	1.91		0.741	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Protactinium-231	0.118	U	1.01	1.01		3.26	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Radium-226	0.400		0.132	0.138	0.500	0.123	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Radium-228	0.449		0.137	0.145		0.118	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Thallium-208	0.0676	U	0.0722	0.0725		0.0871	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Thorium-228	0.249		0.0762	0.0828		0.0986	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Thorium-232	0.449		0.137	0.145		0.118	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Thorium-234	-0.804	U	1.28	1.28		2.20	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Uranium-235	-0.137	U	0.267	0.267		0.951	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Uranium-238	-0.804	U	1.28	1.28		2.20	pCi/g	01/11/17 12:34	02/01/17 07:21	1

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S004

Lab Sample ID: 160-20643-4

Date Collected: 01/06/17 10:06

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.398		0.131	0.137		0.0793	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Actinium-227	0.181	U	0.380	0.381		0.881	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Bismuth-212	-0.256	U	0.616	0.617		1.06	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Bismuth-214	0.347		0.137	0.142		0.138	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Cesium-137	-0.0168	U	0.0582	0.0583		0.101	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Lead-210	0.619	U	1.14	1.14		1.68	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Lead-212	0.248		0.0707	0.0777		0.0853	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Lead-214	0.239		0.0991	0.102		0.110	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Potassium-40	9.36		1.30	1.61		0.644	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Protactinium-231	0.000	U	0.307	0.307		3.34	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Radium-226	0.347		0.137	0.142	0.500	0.138	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Radium-228	0.398		0.131	0.137		0.0793	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Thallium-208	0.0840		0.0352	0.0362		0.0372	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Thorium-228	0.248		0.0707	0.0777		0.0853	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Thorium-232	0.398		0.131	0.137		0.0793	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Thorium-234	0.0771	U	0.810	0.810		1.31	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Uranium-235	-0.170	U	0.421	0.422		0.530	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Uranium-238	0.0771	U	0.810	0.810		1.31	pCi/g	01/11/17 12:34	02/01/17 07:22	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S005

Lab Sample ID: 160-20643-5

Date Collected: 01/06/17 10:07

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.118	U	0.191	0.192		0.305	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Actinium-227	-0.233	U	0.697	0.698		1.18	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Bismuth-212	0.360	U	0.701	0.702		1.18	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Bismuth-214	0.442		0.128	0.136		0.119	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Cesium-137	-0.00169	U	0.0387	0.0387		0.0703	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Lead-210	1.20	U	1.13	1.14		1.49	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Lead-212	0.288		0.0672	0.0768		0.0738	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Lead-214	0.421		0.0885	0.0987		0.0977	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Potassium-40	9.27		1.19	1.52		0.434	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Protactinium-231	0.000	U	0.211	0.211		3.05	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Radium-226	0.442		0.128	0.136	0.500	0.119	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Radium-228	0.118	U	0.191	0.192		0.305	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Thallium-208	0.119		0.0421	0.0438		0.0366	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Thorium-228	0.288		0.0672	0.0768		0.0738	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Thorium-232	0.118	U	0.191	0.192		0.305	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Thorium-234	-0.505	U	0.915	0.917		2.26	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Uranium-235	0.0315	U	0.0838	0.0838		0.767	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Uranium-238	-0.505	U	0.915	0.917		2.26	pCi/g	01/11/17 12:34	02/01/17 08:08	1

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S006

Lab Sample ID: 160-20643-6

Date Collected: 01/06/17 10:09

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.333		0.135	0.140		0.0997	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Actinium-227	0.169	U	0.526	0.526		0.762	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Bismuth-212	-0.239	U	0.731	0.732		1.27	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Bismuth-214	0.392		0.138	0.144		0.125	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Cesium-137	-0.0750	U	0.0936	0.0940		0.143	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Lead-210	0.276	U	1.04	1.04		1.57	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Lead-212	0.142		0.0725	0.0747		0.106	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Lead-214	0.306		0.0925	0.0979		0.103	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Potassium-40	10.5		1.49	1.84		0.692	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Protactinium-231	0.481	U	1.07	1.07		2.51	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Radium-226	0.392		0.138	0.144	0.500	0.125	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Radium-228	0.333		0.135	0.140		0.0997	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thallium-208	0.0396	U	0.0734	0.0735		0.0915	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thorium-228	0.142		0.0725	0.0747		0.106	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thorium-232	0.333		0.135	0.140		0.0997	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thorium-234	-0.333	U	0.956	0.956		1.68	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Uranium-235	0.0822	U	0.275	0.276		0.492	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Uranium-238	-0.333	U	0.956	0.956		1.68	pCi/g	01/11/17 12:34	02/01/17 08:07	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S007

Lab Sample ID: 160-20643-7

Date Collected: 01/06/17 10:11

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.361		0.116	0.121		0.0683	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Actinium-227	0.102	U	0.208	0.208		1.08	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Bismuth-212	-0.329	U	0.697	0.697		1.18	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Bismuth-214	0.453		0.106	0.116		0.0825	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Cesium-137	-0.0296	U	0.0640	0.0641		0.116	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Lead-210	-0.891	U	1.39	1.40		2.43	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Lead-212	0.289		0.0733	0.0823		0.0897	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Lead-214	0.310		0.109	0.113		0.110	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Potassium-40	8.83		1.18	1.49		0.667	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Protactinium-231	0.0835	U	1.88	1.88		3.21	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Radium-226	0.453		0.106	0.116	0.500	0.0825	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Radium-228	0.361		0.116	0.121		0.0683	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thallium-208	0.131		0.0458	0.0478		0.0452	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thorium-228	0.289		0.0733	0.0823		0.0897	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thorium-232	0.361		0.116	0.121		0.0683	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thorium-234	0.815	U	0.724	0.729		1.16	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Uranium-235	0.0811	U	0.171	0.171		0.663	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Uranium-238	0.815	U	0.724	0.729		1.16	pCi/g	01/11/17 12:34	02/01/17 08:07	1

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S008

Lab Sample ID: 160-20643-8

Date Collected: 01/06/17 10:15

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.343		0.152	0.156		0.126	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Actinium-227	-0.0745	U	0.548	0.548		0.802	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Bismuth-212	0.236	U	0.472	0.473		0.813	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Bismuth-214	0.479		0.115	0.126		0.0925	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Cesium-137	-0.00238	U	0.0486	0.0486		0.0874	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Lead-210	1.74		1.12	1.14		1.40	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Lead-212	0.301		0.0741	0.0838		0.0842	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Lead-214	0.439		0.102	0.112		0.108	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Potassium-40	9.91		1.33	1.67		0.639	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Protactinium-231	0.481	U	1.08	1.08		2.52	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Radium-226	0.479		0.115	0.126	0.500	0.0925	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Radium-228	0.343		0.152	0.156		0.126	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Thallium-208	0.137		0.0458	0.0479		0.0433	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Thorium-228	0.301		0.0741	0.0838		0.0842	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Thorium-232	0.343		0.152	0.156		0.126	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Thorium-234	0.347	U	0.883	0.883		1.48	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Uranium-235	-0.179	U	0.292	0.292		0.590	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Uranium-238	0.347	U	0.883	0.883		1.48	pCi/g	01/11/17 12:34	02/01/17 08:14	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S009

Lab Sample ID: 160-20643-9

Date Collected: 01/06/17 10:14

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.378		0.138	0.144		0.225	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Actinium-227	0.204	U	0.473	0.474		0.683	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Bismuth-212	0.0134	U	0.626	0.626		1.14	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Bismuth-214	0.335		0.109	0.115		0.106	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Cesium-137	-0.0281	U	0.0493	0.0494		0.0955	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Lead-210	0.573	U	1.04	1.04		1.52	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Lead-212	0.190		0.0799	0.0836		0.113	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Lead-214	0.325		0.0991	0.105		0.0986	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Potassium-40	9.75		1.45	1.76		0.699	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Protactinium-231	0.000	U	0.650	0.650		3.00	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Radium-226	0.335		0.109	0.115	0.500	0.106	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Radium-228	0.378		0.138	0.144		0.225	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Thallium-208	0.107		0.0660	0.0669		0.0710	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Thorium-228	0.190		0.0799	0.0836		0.113	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Thorium-232	0.378		0.138	0.144		0.225	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Thorium-234	-0.0796	U	1.06	1.06		1.83	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Uranium-235	0.000	U	0.146	0.146		0.524	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Uranium-238	-0.0796	U	1.06	1.06		1.83	pCi/g	01/11/17 12:34	02/01/17 08:47	1

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S010

Lab Sample ID: 160-20643-10

Date Collected: 01/06/17 10:17

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.453		0.188	0.194		0.168	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Actinium-227	-0.321	U	0.688	0.689		1.15	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Bismuth-212	-0.483	U	0.767	0.769		1.28	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Bismuth-214	0.365		0.114	0.120		0.106	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Cesium-137	-0.0501	U	0.0661	0.0663		0.106	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Lead-210	-0.723	U	1.42	1.42		2.46	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Lead-212	0.297		0.0729	0.0824		0.0856	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Lead-214	0.346		0.0999	0.106		0.0997	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Potassium-40	8.35		1.18	1.45		0.693	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Protactinium-231	-0.803	U	2.43	2.43		4.07	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Radium-226	0.365		0.114	0.120	0.500	0.106	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Radium-228	0.453		0.188	0.194		0.168	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Thallium-208	0.114		0.0686	0.0696		0.0633	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Thorium-228	0.297		0.0729	0.0824		0.0856	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Thorium-232	0.453		0.188	0.194		0.168	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Thorium-234	0.601	U	0.500	0.504		1.11	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Uranium-235	-0.0154	U	0.293	0.293		0.673	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Uranium-238	0.601	U	0.500	0.504		1.11	pCi/g	01/11/17 12:34	02/01/17 08:50	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S011

Lab Sample ID: 160-20643-11

Date Collected: 01/06/17 10:20

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.198	U	0.116	0.117		0.289	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Actinium-227	-0.273	U	0.606	0.607		0.866	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Bismuth-212	0.206	U	0.636	0.636		1.10	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Bismuth-214	0.477		0.131	0.140		0.107	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Cesium-137	-0.00171	U	0.0622	0.0622		0.110	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Lead-210	0.927	U	1.18	1.19		1.68	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Lead-212	0.287		0.0739	0.0827		0.0868	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Lead-214	0.365		0.110	0.116		0.115	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Potassium-40	9.53		1.30	1.62		0.633	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Protactinium-231	0.531	U	1.54	1.55		2.62	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Radium-226	0.477		0.131	0.140	0.500	0.107	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Radium-228	0.198	U	0.116	0.117		0.289	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Thallium-208	0.122		0.0462	0.0479		0.0465	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Thorium-228	0.287		0.0739	0.0827		0.0868	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Thorium-232	0.198	U	0.116	0.117		0.289	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Thorium-234	1.34		0.719	0.733		0.966	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Uranium-235	-0.185	U	0.179	0.180		0.589	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Uranium-238	1.34		0.719	0.733		0.966	pCi/g	01/11/17 12:34	02/01/17 08:51	1

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S012

Lab Sample ID: 160-20643-12

Date Collected: 01/06/17 10:22

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.483		0.136	0.145		0.0895	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Actinium-227	-0.370	U	0.779	0.780		1.30	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Bismuth-212	-0.319	U	0.561	0.562		1.08	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Bismuth-214	0.620		0.135	0.149		0.0928	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Cesium-137	0.00538	U	0.0549	0.0549		0.0974	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Lead-210	-0.857	U	0.636	0.644		2.51	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Lead-212	0.263		0.0710	0.0787		0.0833	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Lead-214	0.621		0.128	0.143		0.101	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Potassium-40	9.93		1.43	1.75		0.561	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Protactinium-231	-0.544	U	2.38	2.38		4.01	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Radium-226	0.620		0.135	0.149	0.500	0.0928	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Radium-228	0.483		0.136	0.145		0.0895	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Thallium-208	0.109		0.0450	0.0464		0.0396	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Thorium-228	0.263		0.0710	0.0787		0.0833	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Thorium-232	0.483		0.136	0.145		0.0895	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Thorium-234	0.336	U	0.848	0.849		1.43	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Uranium-235	0.0150	U	0.0536	0.0537		0.859	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Uranium-238	0.336	U	0.848	0.849		1.43	pCi/g	01/11/17 12:34	02/01/17 08:53	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-287491/1-A
Matrix: Solid
Analysis Batch: 290563

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 287491

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.01254	U	0.126	0.126		0.165	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Actinium-227	0.03184	U	0.471	0.471		0.831	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Bismuth-212	-0.2161	U	0.754	0.755		1.31	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Bismuth-214	-0.05409	U	0.0833	0.0835		0.160	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Cesium-137	0.003221	U	0.0428	0.0428		0.0788	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Lead-210	-0.6325	U	1.41	1.41		2.38	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Lead-212	-0.02021	U	0.0769	0.0769		0.132	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Lead-214	-0.05381	U	0.103	0.103		0.163	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Potassium-40	-0.1859	U	0.889	0.889		1.13	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Protactinium-231	-0.8744	U	2.96	2.96		4.98	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Radium-226	-0.05409	U	0.0833	0.0835	0.500	0.160	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Radium-228	-0.01254	U	0.126	0.126		0.165	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Thallium-208	0.03739	U	0.0511	0.0513		0.0437	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Thorium-228	-0.02021	U	0.0769	0.0769		0.132	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Thorium-232	-0.01254	U	0.126	0.126		0.165	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Thorium-234	-0.4214	U	0.923	0.924		1.56	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Uranium-235	-0.006023	U	0.00923	0.00925		0.470	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Uranium-238	-0.4214	U	0.923	0.924		1.56	pCi/g	01/11/17 12:34	02/01/17 07:18	1

Lab Sample ID: LCS 160-287491/2-A
Matrix: Solid
Analysis Batch: 290567

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 287491

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.0	105.0		11.0		1.28	pCi/g	108	87 - 116
Cesium-137	29.2	28.93		3.10		0.256	pCi/g	99	87 - 120
Cobalt-60	15.7	15.97		1.67		0.0708	pCi/g	101	87 - 115

Lab Sample ID: 160-20643-1 DU
Matrix: Solid
Analysis Batch: 290563

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S001
Prep Type: Total/NA
Prep Batch: 287491

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.348		0.4473		0.166		0.117	pCi/g	0.24	1
Actinium-227	-0.318	U	0.2934	U	0.189		0.952	pCi/g	0.61	1
Bismuth-212	0.0644	U	0.3115	U	0.556		0.937	pCi/g	0.22	1
Bismuth-214	0.521		0.3914		0.103		0.0795	pCi/g	0.53	1
Cesium-137	-0.0129	U	-0.03194	U	0.0535		0.0895	pCi/g	0.18	1
Lead-210	1.60	U	0.3956	U	1.08		1.83	pCi/g	0.53	1
Lead-212	0.371		0.3036		0.0750		0.0678	pCi/g	0.40	1
Lead-214	0.479		0.4955		0.103		0.0882	pCi/g	0.08	1
Potassium-40	12.3		11.30		1.72		0.507	pCi/g	0.29	1
Protactinium-231	0.000	U	-0.7299	U	2.38		3.98	pCi/g	0.27	1
Radium-226	0.521		0.3914		0.103	0.500	0.0795	pCi/g	0.53	1
Radium-228	0.348		0.4473		0.166		0.117	pCi/g	0.24	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-20643-1 DU

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S001

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 290563

Prep Batch: 287491

Analyte	Sample		DU		Total	LOQ	MDC	Unit	RER	RER Limit
	Result	Qual	Result	Qual	Uncert. (2σ+/-)					
Thallium-208	0.136		0.09440		0.0567		0.0593	pCi/g	0.38	1
Thorium-228	0.371		0.3036		0.0750		0.0678	pCi/g	0.40	1
Thorium-232	0.348		0.4473		0.166		0.117	pCi/g	0.24	1
Thorium-234	-0.172	U	-0.5378	U	1.13		1.89	pCi/g	0.14	1
Uranium-235	0.0761	U	0.006711	U	0.0950		0.638	pCi/g	0.25	1
Uranium-238	-0.172	U	-0.5378	U	1.13		1.89	pCi/g	0.14	1

QC Association Summary

Page 26 of 26

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Rad

Leach Batch: 287161

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20643-1	TITO04-BS-SU5P1-RSY10-U11-S001	Total/NA	Solid	Dry and Grind	
160-20643-2	TITO04-BS-SU5P1-RSY10-U11-S002	Total/NA	Solid	Dry and Grind	
160-20643-3	TITO04-BS-SU5P1-RSY10-U11-S003	Total/NA	Solid	Dry and Grind	
160-20643-4	TITO04-BS-SU5P1-RSY10-U11-S004	Total/NA	Solid	Dry and Grind	
160-20643-5	TITO04-BS-SU5P1-RSY10-U11-S005	Total/NA	Solid	Dry and Grind	
160-20643-6	TITO04-BS-SU5P1-RSY10-U11-S006	Total/NA	Solid	Dry and Grind	
160-20643-7	TITO04-BS-SU5P1-RSY10-U11-S007	Total/NA	Solid	Dry and Grind	
160-20643-8	TITO04-BS-SU5P1-RSY10-U11-S008	Total/NA	Solid	Dry and Grind	
160-20643-9	TITO04-BS-SU5P1-RSY10-U11-S009	Total/NA	Solid	Dry and Grind	
160-20643-10	TITO04-BS-SU5P1-RSY10-U11-S010	Total/NA	Solid	Dry and Grind	
160-20643-11	TITO04-BS-SU5P1-RSY10-U11-S011	Total/NA	Solid	Dry and Grind	
160-20643-12	TITO04-BS-SU5P1-RSY10-U11-S012	Total/NA	Solid	Dry and Grind	
160-20643-1 DU	TITO04-BS-SU5P1-RSY10-U11-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 287491

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20643-1	TITO04-BS-SU5P1-RSY10-U11-S001	Total/NA	Solid	Fill_Geo-21	287161
160-20643-2	TITO04-BS-SU5P1-RSY10-U11-S002	Total/NA	Solid	Fill_Geo-21	287161
160-20643-3	TITO04-BS-SU5P1-RSY10-U11-S003	Total/NA	Solid	Fill_Geo-21	287161
160-20643-4	TITO04-BS-SU5P1-RSY10-U11-S004	Total/NA	Solid	Fill_Geo-21	287161
160-20643-5	TITO04-BS-SU5P1-RSY10-U11-S005	Total/NA	Solid	Fill_Geo-21	287161
160-20643-6	TITO04-BS-SU5P1-RSY10-U11-S006	Total/NA	Solid	Fill_Geo-21	287161
160-20643-7	TITO04-BS-SU5P1-RSY10-U11-S007	Total/NA	Solid	Fill_Geo-21	287161
160-20643-8	TITO04-BS-SU5P1-RSY10-U11-S008	Total/NA	Solid	Fill_Geo-21	287161
160-20643-9	TITO04-BS-SU5P1-RSY10-U11-S009	Total/NA	Solid	Fill_Geo-21	287161
160-20643-10	TITO04-BS-SU5P1-RSY10-U11-S010	Total/NA	Solid	Fill_Geo-21	287161
160-20643-11	TITO04-BS-SU5P1-RSY10-U11-S011	Total/NA	Solid	Fill_Geo-21	287161
160-20643-12	TITO04-BS-SU5P1-RSY10-U11-S012	Total/NA	Solid	Fill_Geo-21	287161
MB 160-287491/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-287491/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-20643-1 DU	TITO04-BS-SU5P1-RSY10-U11-S001	Total/NA	Solid	Fill_Geo-21	287161

From: [Weyant, David B CIV NAVSEA 04, 04N](#)
To: [Guillory, Jeffrey](#)
Cc: [Edwards, Zachary L CIV SEA 04 04N](#); [Yantos, Christopher N CIV NAVFAC SW, BRAC](#); [Messer, Ulrika](#); [Hackett, John R](#); [Schul, Raymond](#); [Morrison, Dennis](#); [Bohannon, Derek](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 11 (Use 1, Part 1)
Date: Wednesday, October 05, 2016 1:14:45 PM

Hello Jeff,

I concur to designating RSY-11 (Use 1 Part 1) soil as Non-LLRW soil.

VR

David Weyant
Health Physicist/Environmental Protection Manager
Environmental Protection Division
NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederaleservices.com>]
Sent: Monday, October 03, 2016 10:52 AM
To: Weyant, David B CIV NAVSEA 04, 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 11 (Use 1, Part 1)

Mr. Weyant,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Jeffrey Guillory

Scientist 3

Federal Services

Cell: +1 979 422 5534

jeffrey.guillory@cbifederalservices.com <<mailto:jeffrey.guillory@cbifederalservices.com>>

CB&I

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Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY #11	RSY Unit Use Number: USE 1, Part 1	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 10/3/2016

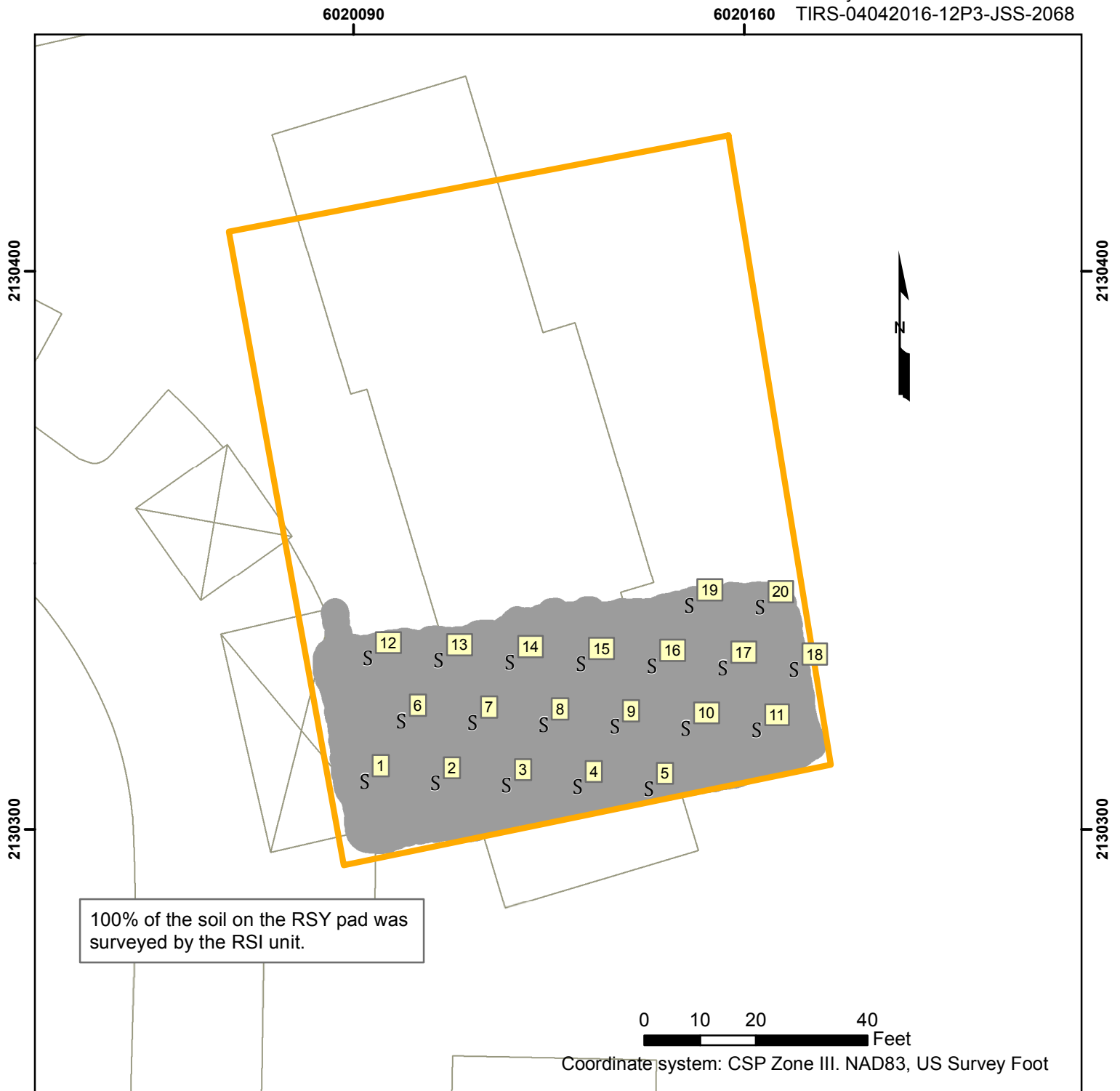
Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static 2221 Meter Serial Number	One Minute Static Reading (CPM)	Static Count Over Static Mean + 3σ	²²⁶ Ra Final Analytical Results
TI-TITO04-BS-R-FSSSU6-S601	1	Systematic	149942	14,136	No	0.472
TI-TITO04-BS-R-FSSSU6-S602	2	Systematic	149942	14,156	No	0.398
TI-TITO04-BS-R-FSSSU6-S603	3	Systematic	149942	14,257	No	0.490
TI-TITO04-BS-R-FSSSU6-S604	4	Systematic	149942	14,215	No	0.411
TI-TITO04-BS-R-FSSSU6-S605	5	Systematic	149942	13,904	No	0.399
TI-TITO04-BS-R-FSSSU6-S606	6	Systematic	149942	13,995	No	0.468
TI-TITO04-BS-R-FSSSU6-S607	7	Systematic	149942	14,179	No	0.398
TI-TITO04-BS-R-FSSSU6-S608	8	Systematic	149942	14,042	No	0.365
TI-TITO04-BS-R-FSSSU6-S609	9	Systematic	149942	14,062	No	0.390
TI-TITO04-BS-R-FSSSU6-S610	10	Systematic	149942	14,509	No	0.451
TI-TITO04-BS-R-FSSSU6-S611	11	Systematic	149942	14,040	No	0.484
TI-TITO04-BS-R-FSSSU6-S612	12	Systematic	149942	14,260	No	0.231
TI-TITO04-BS-R-FSSSU6-S613	13	Systematic	149942	14,331	No	0.387
TI-TITO04-BS-R-FSSSU6-S614	14	Systematic	149942	14,179	No	0.384
TI-TITO04-BS-R-FSSSU6-S615	15	Systematic	149942	14,222	No	0.459
TI-TITO04-BS-R-FSSSU6-S616	16	Systematic	149942	14,145	No	0.367
TI-TITO04-BS-R-FSSSU6-S617	17	Systematic	149942	14,125	No	0.422
TI-TITO04-BS-R-FSSSU6-S618	18	Systematic	149942	13,867	No	0.445
TI-TITO04-BS-R-FSSSU6-S619	19	Systematic	149942	14,121	No	0.396
TI-TITO04-BS-R-FSSSU6-S620	20	Systematic	149942	14,369	No	0.365

Survey and Instrument Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd	Reference Area Static 3σ IL	Reference Area Scan Bkgd	Reference Area Scan 3σ IL	Range
Gamma Scan Walkover Survey	TIRS-03312016-12P3-ROV-2015	3/31/2016	RS-701/RSX-1	N/A	Console: 7236 / Detectors: 5447, 5448	N/A	N/A	7,595 CPS	8,275 CPS	5,926 – 6,921 CPS
Follow-up Static Investigation Survey	TIRS-04012016-12P3-JSS-2060	4/1/2016	2221	2/10/2017	149942	15,437	17,659	N/A	N/A	13,796 – 14,917 CPM
Systematic Sampling Survey	TIRS-04042016-12P3-JSS-2068	4/4/2016 – 4/5/2016	2221	2/10/2017	149942	15,437	17,659	N/A	N/A	13,867 – 14,509 CPM
Follow-up Static Survey (RSI Unit)	TIRS-09282016-12P3-JSS-2489	9/28/2016	RS-701/RSX-1	N/A	Console: 7236 / Detectors: 5447, 5448	7,232 CPS	8,653 CPS	N/A	N/A	6,548 – 7,114 CPS

CPM = Counts Per Minute
CPS = Counts Per Second

Summary
<p>1) Initial RSI gamma scan and data review—upon review of initial scan data, follow-up static investigations were deemed necessary, and investigation locations were identified as per the RSI Data Evaluation Process (pages 4-5). Gamma scan coverage shown on Systematic Sample Survey map (page 3). Contour maps of initial scan data are shown on RSI Data Plots (page 6). Data review results are summarized on RSI Review Summary (page 7).</p>
<p>2) Follow-up static survey—10 locations identified during the data review process were investigated, resulting in all locations < static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 8).</p>
<p>3) Twenty systematic soil samples (601-620) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with all readings < static IL at all locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 22-45).</p>
<p><u>Note:</u> The bottom of the excavation at SWDA Bayside Survey Unit (SU) 6 was inaccessible for in situ FSS operations due to water infiltration, therefore a 6" layer of FSS material spanning the entire underwater portion of the excavation bottom was over-excavated and surveyed ex situ on RSY 11 (Use 1, Part 1).</p>
<p>4) Additional locations (a-j, page 6) with elevated Z-scores that did not meet the standard criteria for a follow-up investigation as described by the RSI Data Evaluation Process (pages 4-5) were identified during post-processing of the RSI gamma scan data. Spectral analysis of the gamma scan data at each of these locations was performed, and the results indicate ^{226}Ra activity levels comparable to background for locations a, c, d, e, f, g, h, i, and j (pages 12 & 14-21). However, spectral analysis results of scan data at location b indicated possible net activity above background in a Radium-specific energy range, so an additional static follow-up investigation was performed at this location with the RSI unit, as shown on the Follow-up Static Survey map (page 9). The static gamma spectra obtained during the RSI static follow-up survey indicate ^{226}Ra activity levels comparable to background (page 13), however, a prominent peak at 1460 keV (associated with ^{40}K) in the net static spectrum supports the characterization of elevated NORM (^{40}K) at this location.</p>
<p>Conclusions:</p> <p>All locations with elevated Z-scores identified by the initial RSI gamma scan were deemed comparable to background. 10 follow-up static locations were investigated, with readings < static IL at all locations.</p> <p>Additional locations (a-j, page 6) with elevated Z-scores that did not meet the criteria for a follow-up investigation were evaluated by spectral analysis of the RSI gamma scan data, the results of which indicate ^{226}Ra activity comparable to background for locations a, c, d, e, f, g, h, i, and j (pages 12 & 14-21). Spectral analysis of scan data at location b, however, indicated possible activity above background in a Radium-specific energy range, so an additional static follow-up was performed at this location with the RSI unit, and the resulting static spectra indicate ^{226}Ra activity comparable to background (page 13). A prominent peak at 1460 keV (associated with ^{40}K) in the net gamma static spectrum for location b (page 13) supports the characterization of elevated NORM (^{40}K) at this location.</p> <p>Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 10-11. These statistical tools were utilized to verify the appropriate level of reasonable effort.</p> <p>RSY 11 (Use 1, Part 1) contains soil from the final 6-inch over excavation of FSS material from the bottom of the excavation at SWDA Bayside SU 6.</p> <p><u>Note:</u> Soil on RSY Pad 11 (Use 1, Part 1) was over-excavated at the final depth from the bottom of the excavation at Bayside SU 6, and no visible debris and/or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.</p> <p>CB&I requests RASO concurrence to release this soil as Non-LLRW.</p> <p>Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.</p>

Survey Number:
TIRS-04042016-12P3-JSS-2068



Instrument # 149942

S Systematic Sample Locations

● RSI Coverage

RSY Boundary

Sample ID

CB&I Federal Services, LLC

Data Processed In Treasure Island Office

RSI Data Evaluation Process

RS-700 Mobile Radiation Monitoring System

- Self-contained gamma-ray radiation detection and monitoring system
- Built-in GPS receiver
- (2) RSX-1 4-liter NaI(Tl) gamma detectors oriented perpendicular to the direction of travel (VD1 denotes both detectors summed; VD3 refers to the left detector; and VD4 refers to the right detector)
- Multi-Channel Analyzer, allowing for monitoring of energy-specific regions of interest (ROIs)
- RadAssist survey software for control, monitoring, and recording

Ten ROIs have been established for radium and progeny as well as other naturally-occurring or anthropogenic gamma-emitting radionuclides that may be of interest:

ROI	Description	Energy Range (keV)	Primary Peak (keV)
1	Total counts	411 – 2811	N/A
2	Potassium	1371 – 1569	1460
3	U/Ra-226	1659 – 1860	1764 (Bi-214)
4	Thorium	2409 – 2811	2614 (Tl-208)
5	Annihilation	456 – 570	511
6	Ra-226	546 – 666	609 (Bi-214)
7	Cs-137	549 – 741	662
8	Pb-214/Ra-226	327 – 399	351
9	Range	45 – 1980	N/A
10	Gross Counts	3 – 3072	N/A

A tiered approach is used during data review to identify follow-up locations. Raw data are exported to a comma delimited format using RadAssist and imported into an Excel spreadsheet for review and analysis. Count rate data are compared with ROI- and material-specific investigation levels (ILs). In addition, the following review steps are completed to determine if additional follow-up measurements are necessary:

- **Playback Review:** The data file is replayed in RadAssist and reviewed for elevated count rates in ROIs 1, 3, 6, and 10 for virtual detector (VD) 1 (both detectors summed). The scan screen is also monitored for elevated count rates and alarms.
- **Count Rate Time Series Review:** The count rates for ROIs 1, 3, 6, and 10 for VDs 1, 3 (detector 1), and 4 (detector 2) are plotted in a time series and reviewed for additional peaks in count rate.
- **All ROIs:**
 - **Z-Scores:** The Z-Scores are calculated for each location in all ROIs for VDs 1, 3, and 4. Any location with four or more ROIs having a Z-Score greater than three ($Z > 3$) is marked for follow-up.
 - **Local Z-Scores:** Local Z-Scores are calculated using a moving average for each data point in all ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with four or more ROIs having a local $Z > 3$ is marked for follow-up.
 - **Semi-local Z-Scores:** Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with four or more ROIs having a semi-local $Z > 3$ is marked for follow-up.

RSI Data Evaluation Process

- **ROIs 3, 6, 8, and 10 (radium-specific ROIs):**
 - Z-Scores: The Z-Scores are calculated for each location in the radium-specific ROIs for VDs 1, 3, and 4. Any location with three or more radium-specific ROIs having a $Z > 3$ is marked for follow-up.
 - Local Z-Scores: Local Z-Scores are calculated using a moving average for each data point in the radium-specific ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a local $Z > 3$ is marked for follow-up.
 - Semi-local Z-Scores: Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a semi-local $Z > 3$ is marked for follow-up.
- **Z-Score Time Series Review:** The three types of Z-Scores for ROIs 1, 3, 6, and 10 for VDs 1, 3, and 4 are plotted in a time series and reviewed for additional peaks in Z-Scores.

Follow-up locations will be plotted on contour maps depicting all locations with any radium-specific ROI $Z > 3$. Any location selected for follow-up, or any location with a radium-specific ROI $Z > 3$ will undergo spectral analysis to determine if it is statistically likely that there is radium present at that location in quantities greater than the background.

A background spectrum, obtained from NSTI Reference Area 7, is subtracted from the local spectral data for a given location, and the resulting net spectrum is plotted. Critical levels, as defined in Section 6.7.1 of the Multi Agency Radiation Survey and Site Investigation Manual are calculated and plotted based on background levels. The critical level is the level, in counts, at which there is a statistical probability (with a predetermined confidence) of incorrectly identifying a measurement system background value as greater than background. Any response above this level is considered to be greater than background. The critical level is calculated for ROIs 3, 6, and 8 according to the equation shown below:

$$L_C = 2.33\sqrt{B}$$

Where:

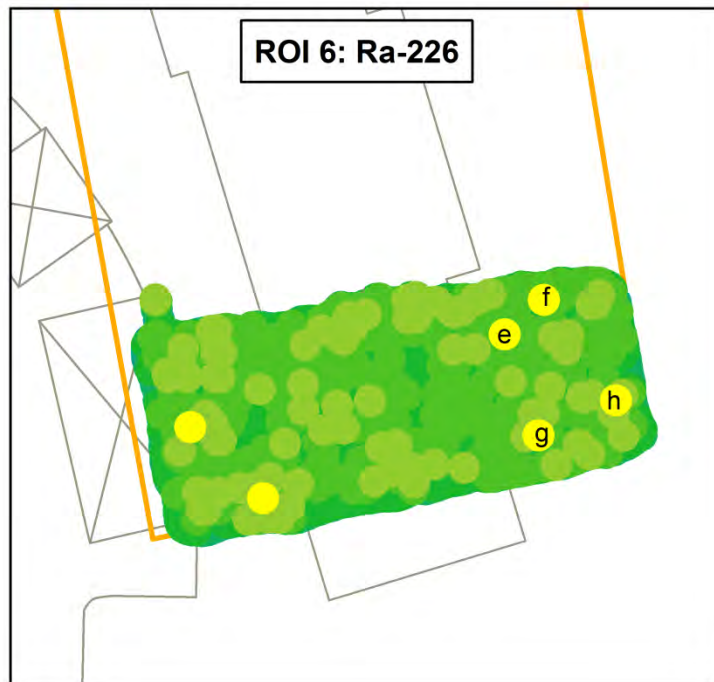
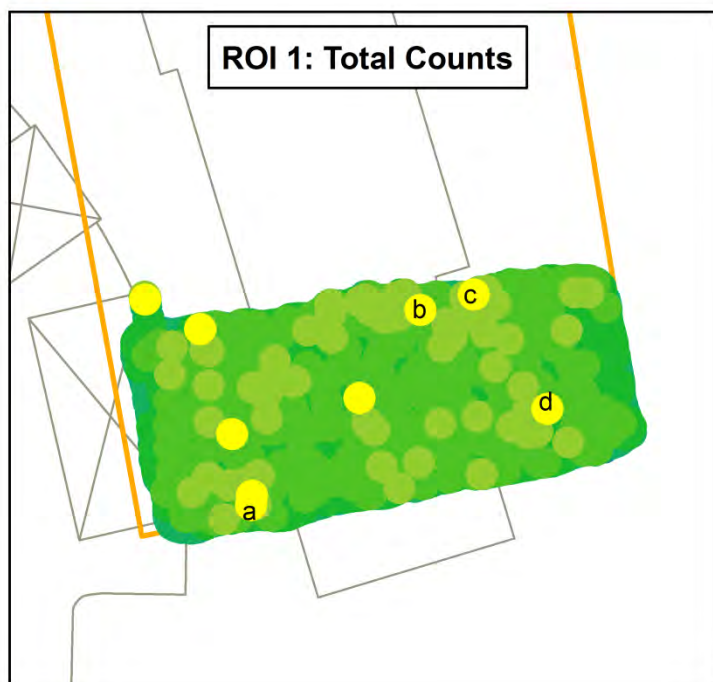
LC	=	critical level (counts)
B	=	average background in the ROI

The ROI ranges for ROIs 3, 6, and 8 are then plotted on the net spectrum graph with their respective critical levels. When count rates in the net gamma spectrum at a given location do not exceed critical levels for any radium-specific energy ranges, it is unlikely that radium exists at that location above background.

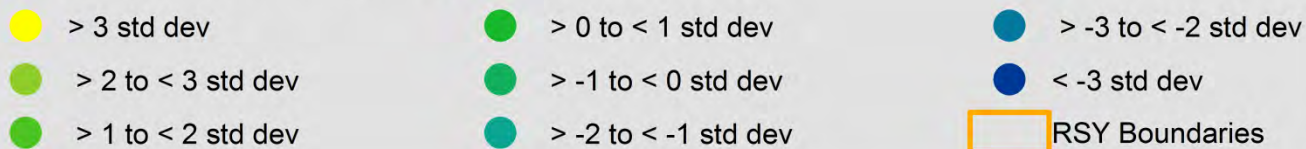
Any data point that is both above the critical level and within the energy range of a given ROI is considered above background for that radionuclide and will be flagged for further investigation in the field.

RSI DATA PLOT

RSY 11 (Use 1, Part 1)



RSI Walkover Survey Data (VD1)



RSI Review Summary

Summary:

10 locations were selected for follow-up investigation. Locations were identified by elevated peaks noted in the count rate ratio review, playback review and/or time series charts, and by using the Z-Score, Local Z-Score, and Semi-Local Z-Score reviews as described in the RSI Data Evaluation Process on pages 4-5. The table below details the reasons for each investigation by location.

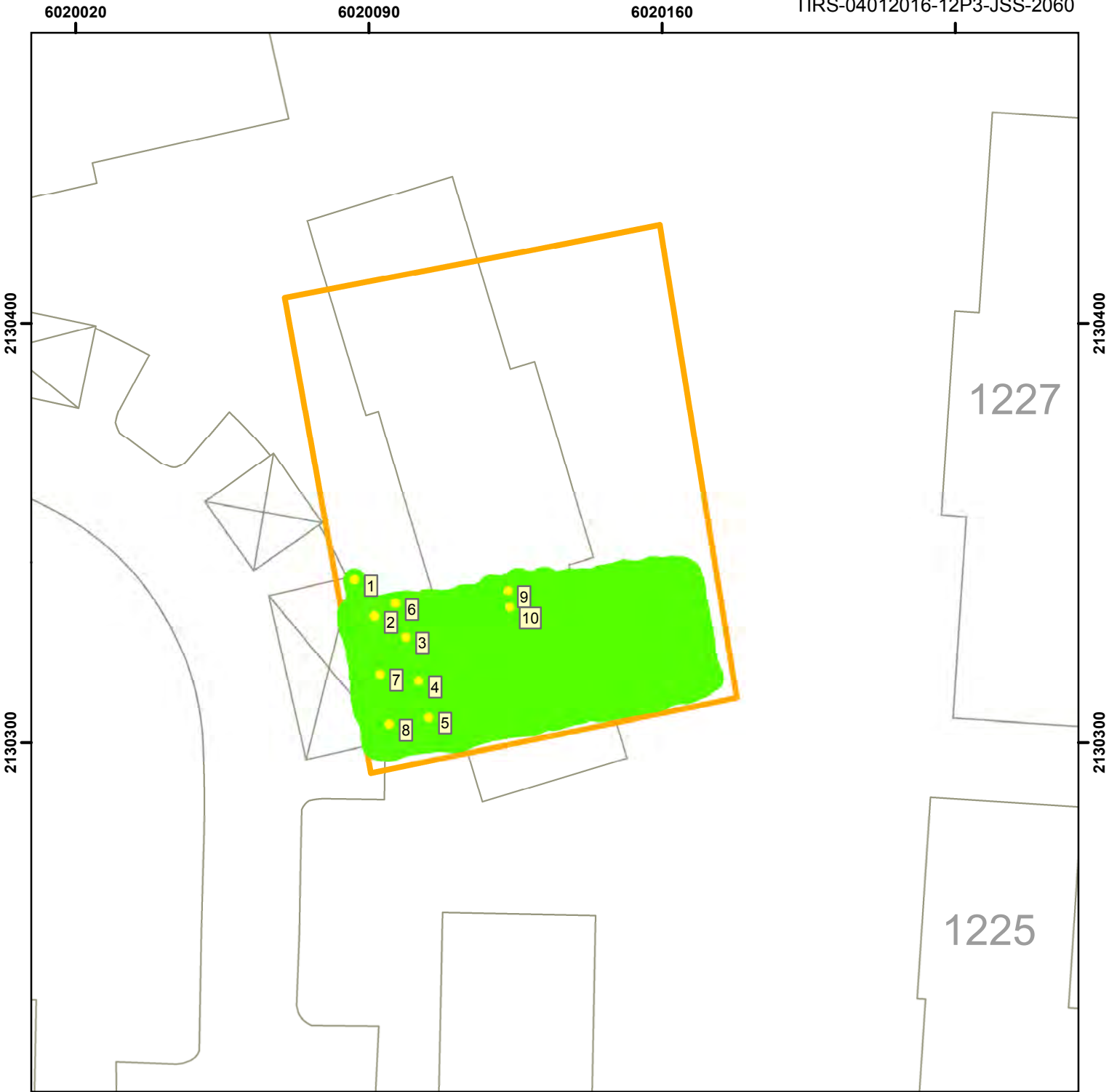
Locations denoted (a-j) on RSI Data Plots (see previous page) did not meet the evaluation criteria for further investigation. Elevated Z-scores at these locations were identified only in specific ROIs, including: four locations exclusive to ROI 1 (a-d), four locations exclusive to ROI 6 (e-h), one location exclusive to ROI 8 (i), and one location exclusive to ROI 10 (j). Elevated gross count rates were only identified at location j, and a review of the data did not reveal additional indicators warranting a follow-up investigation for any of the locations, except for location b (see below).

Spectral analysis of RSI gamma scan data at each of the denoted locations was performed for further verification, and the results do not indicate the presence of ^{226}Ra above background for locations a, c, d, e, f, g, h, i, or j (pages 12 & 14-21).

However, spectral analysis of RSI gamma scan data indicated possible net count rates above background in a Radium-specific energy range for location b, so an additional static follow-up was performed at this location with the RSI unit, as shown on the Follow-up Static Survey map (page 9). Results from spectral analysis of the RSI gamma static data do not indicate the presence of ^{226}Ra above background for location b, but do indicate the presence of elevated NORM (^{40}K) consistent with the characterization of elevated NORM (^{40}K) at this location (page 13).

RSY 11 (Use 1, Part 1) Investigation								Follow-up			
Location	Longitude	Latitude	Details	Maximum Result (Ra/Tot)				Meter SN	Static Count	Static IL (cpm)	Comments
				VD	ROI	Z-Score	Type:				
1	-122.3753701	37.8306275	>4 ROIs Z>3 (all ROIs), elevated spectral analysis					149942	14,917	17,659	< IL
2	-122.3753529	37.8306038	>4 ROIs local Z>3 (all ROIs)					149942	14,399	17,659	< IL
3	-122.3753266	37.8305906	Highest Local Z-Score	3	3	4.15	Local	149942	14,074	17,659	< IL
4	-122.3753153	37.8305620	>4 ROIs normal/local Z>3 (all ROIs)					149942	13,968	17,659	< IL
5	-122.3753065	37.8305384	Highest Z-Score, 3-4 ROIs Z>3, 3 ROIs local Z>3 (Ra/Tot), >4 ROIs normal/local Z>3 (all ROIs)	4	10	4.67	Normal	149942	13,978	17,659	< IL
6	-122.3753358	37.8306125	elevated spectral analysis					149942	14,210	17,659	< IL
7	-122.3753475	37.8305660	elevated spectral analysis					149942	13,943	17,659	< IL
8	-122.3753388	37.8305334	elevated spectral analysis					149942	13,796	17,659	< IL
9	-122.3752433	37.8306223	elevated spectral analysis					149942	14,483	17,659	< IL
10	-122.3752415	37.8306115	elevated spectral analysis					149942	14,103	17,659	< IL

Survey Number:
TIRS-04012016-12P3-JSS-2060



Instrument # 149942

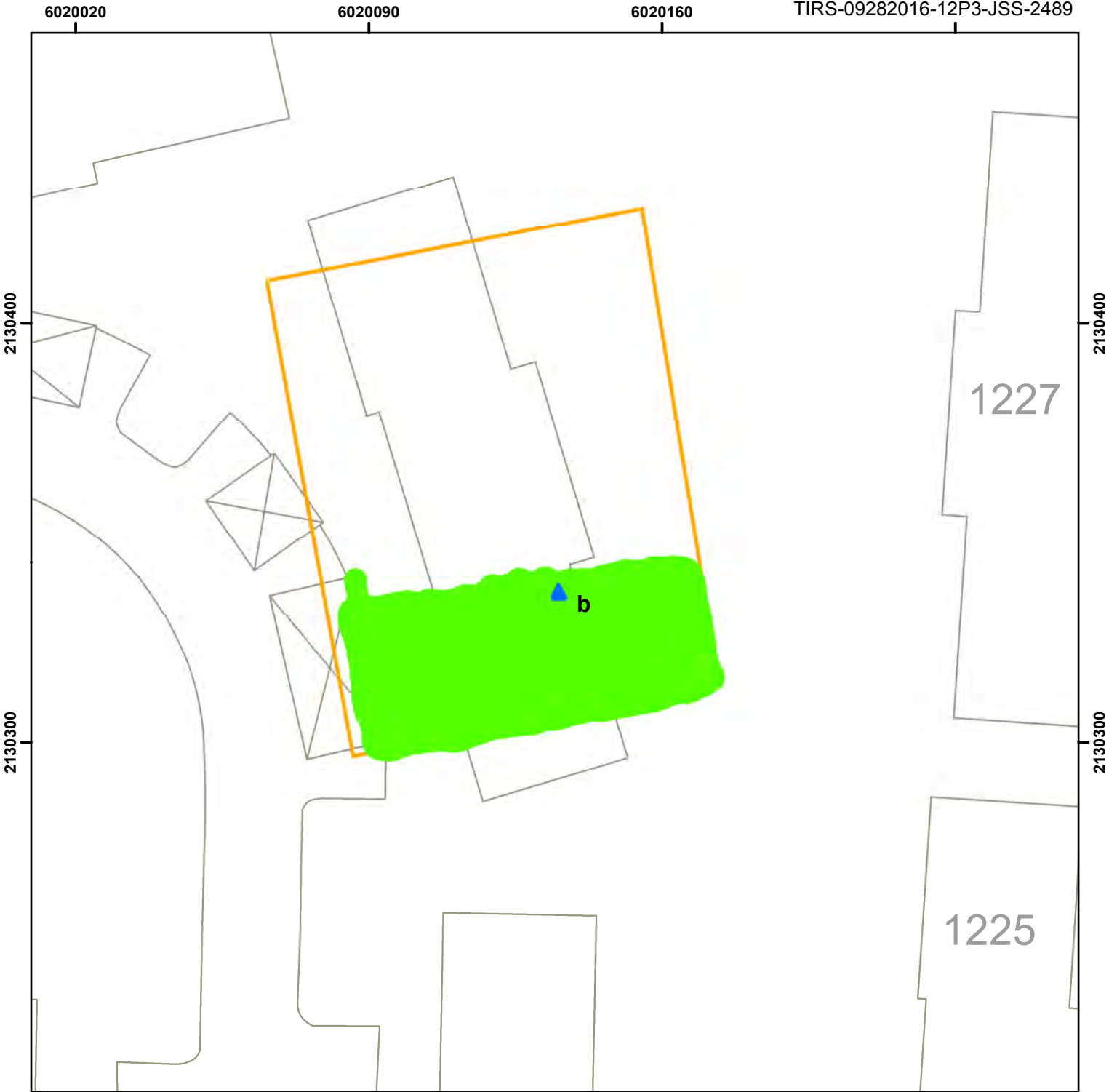
- Investigation Points
- Data Points Not Requiring Further Investigation
- ▭ RSYPAD Boundaries
- # Investigation Point ID

CB&I Federal Services, LLC




0 15 30 60 Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

Survey Number:
TIRS-09282016-12P3-JSS-2489



Instrument # RSI Unit

-  Follow-up Static Location
-  Data Points Not Requiring Further Investigation
-  RSY Boundaries

CB&I Federal Services, LLC

f

0 15 30 60 Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 11-1(P.1)
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

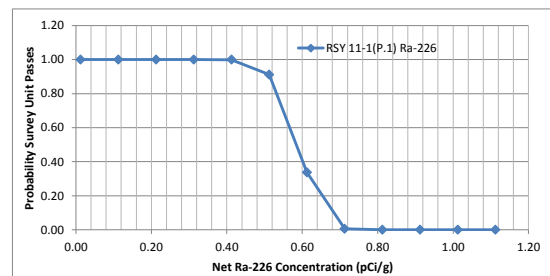
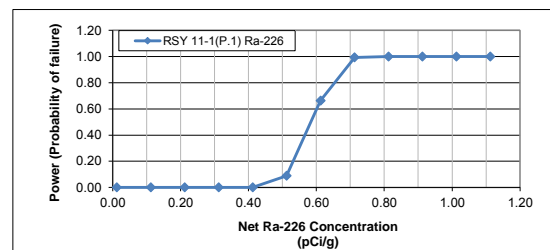
The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2.5	S
0.83	R	0.83	35.5	0	2.5	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9.5	S
0.66	R	0.66	29.5	0	9.5	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.472	S	-0.010939192	18	18	21	R
0.398	S	-0.084939192	9.5	9.5	22	R
0.490	S	0.007060808	20	20	23	R
0.411	S	-0.071939192	12	12	24	R
0.399	S	-0.083939192	11	11	25	R
0.468	S	-0.014939192	17	17	26	R
0.398	S	-0.084939192	9.5	9.5	27.5	R
0.365	S	-0.117939192	2.5	2.5	27.5	R
0.390	S	-0.092939192	7	7	29.5	R
0.451	S	-0.031939192	15	15	29.5	R
0.484	S	0.001060808	19	19	31	R
0.231	S	-0.251939192	1	1	32	R
0.387	S	-0.095939192	6	6	33	R
0.384	S	-0.098939192	5	5	34	R
0.459	S	-0.023939192	16	16	35.5	R
0.367	S	-0.115939192	4	4	35.5	R
0.422	S	-0.060939192	13	13	37	R
0.445	S	-0.037939192	14	14	38	R
0.396	S	-0.086939192	8	8	39	R
0.365	S	-0.117939192	2.5	2.5	40	R
Sum =			820	210		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.058
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count	20	m
SD	0.058	
Median	0.399	
Count	20	n
SD	0.161	
Critical Value	482.5	

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	6.7788	43.18647	6.5716411	40.3521	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	15.42	120.9048	10.995672	23.3308	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	45.8664	438.8427	20.948572	10.7927	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	87.3352	846.8185	29.100146	6.3444	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	155.4596	1282.524	35.812351	3.25303	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	222.4924	1345.121	36.675894	1.34873	0.09	0.91
1.3	0.61	0.8	0.71420	0.57447	285.6784	1060.423	32.564133	-0.42133	0.66	0.34
1.4	0.71	1.4	0.83890	0.74170	335.5604	630.7938	25.115608	-2.53238	0.99	0.01
1.5	0.81	2.0	0.92135	0.86577	368.54	285.5796	16.8991	-5.71521	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	388.7524	81.69222	9.0383749	-12.922	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	396.0752	21.5749	4.6448794	-26.7213	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	399.0644	3.510254	1.8735671	-67.8418	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 20 m
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 482.5$

$a_w = a/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

20 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 20$
 $r = 4$
 $k = 4$
 0.053 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

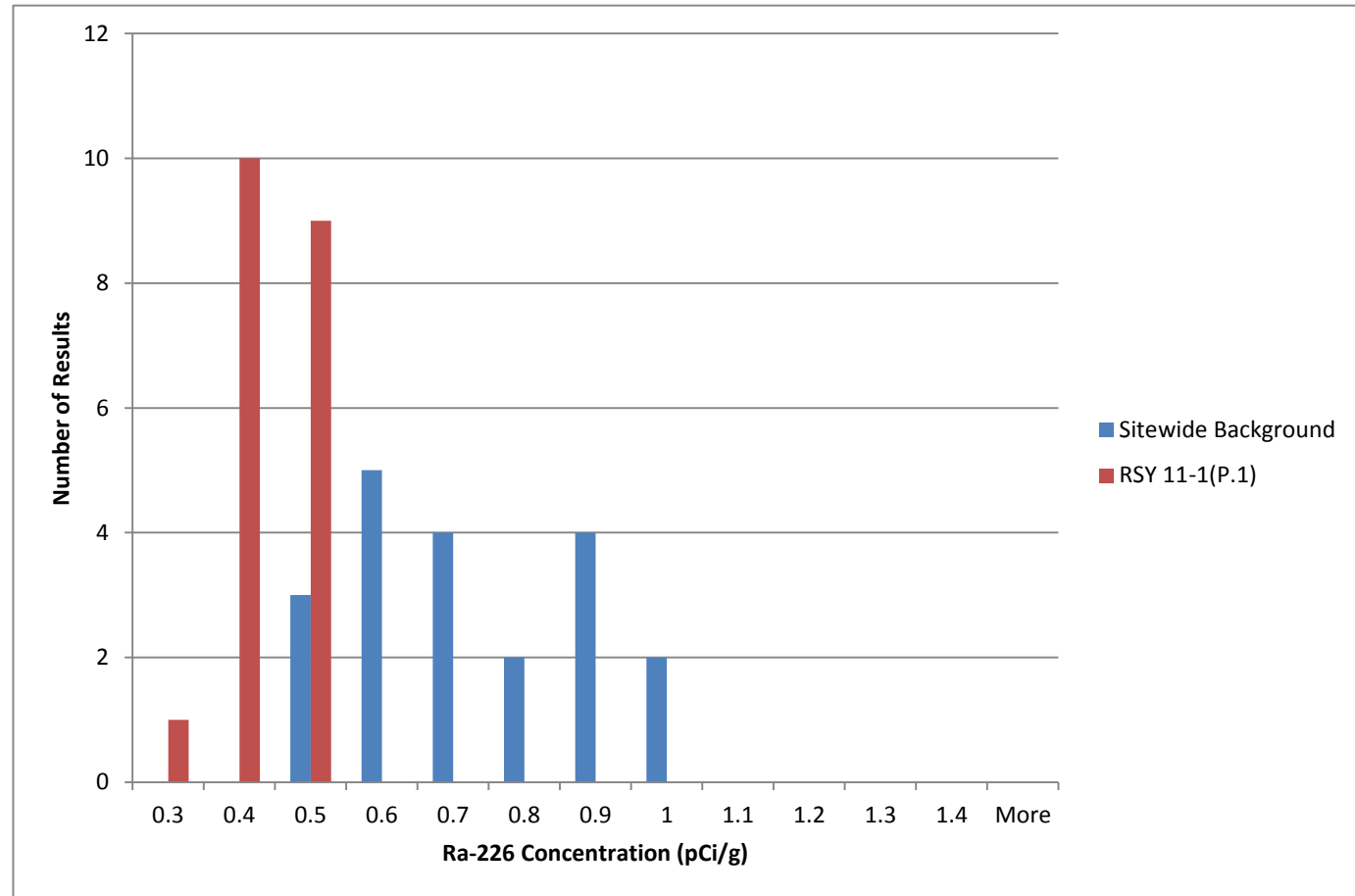
0 of the largest 4 adjusted measurements are from S.

The null hypothesis is accepted.

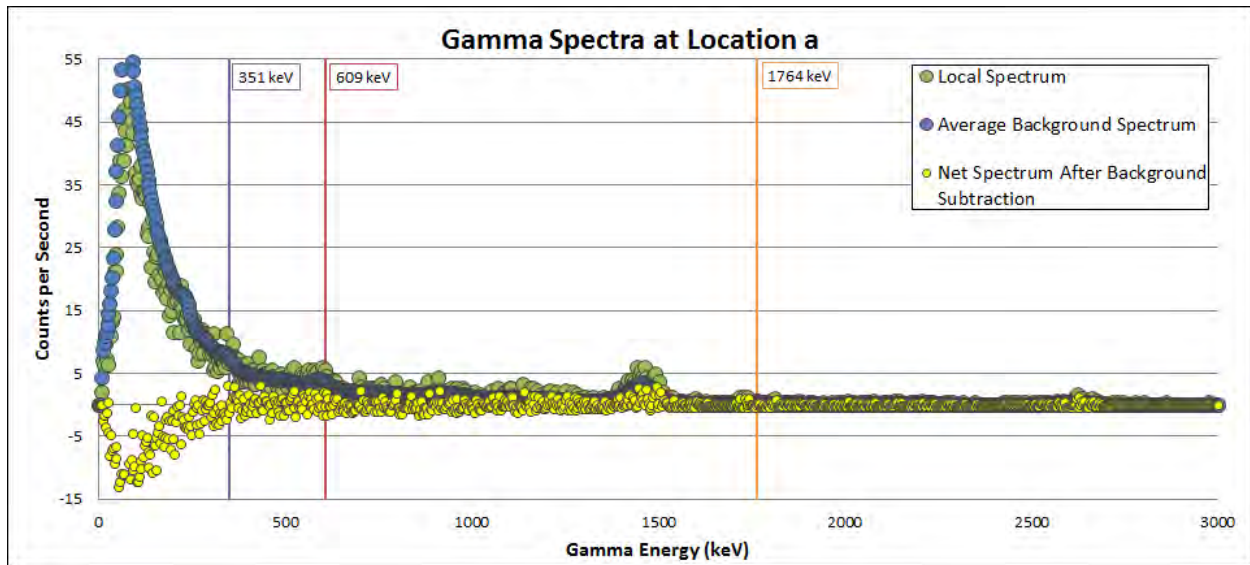
Histogram, RSY 11 Use 1 (Part 1) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 11-1(P.1)	
<i>Bin</i>	<i>Frequency</i>
0.3	1
0.4	10
0.5	9
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0

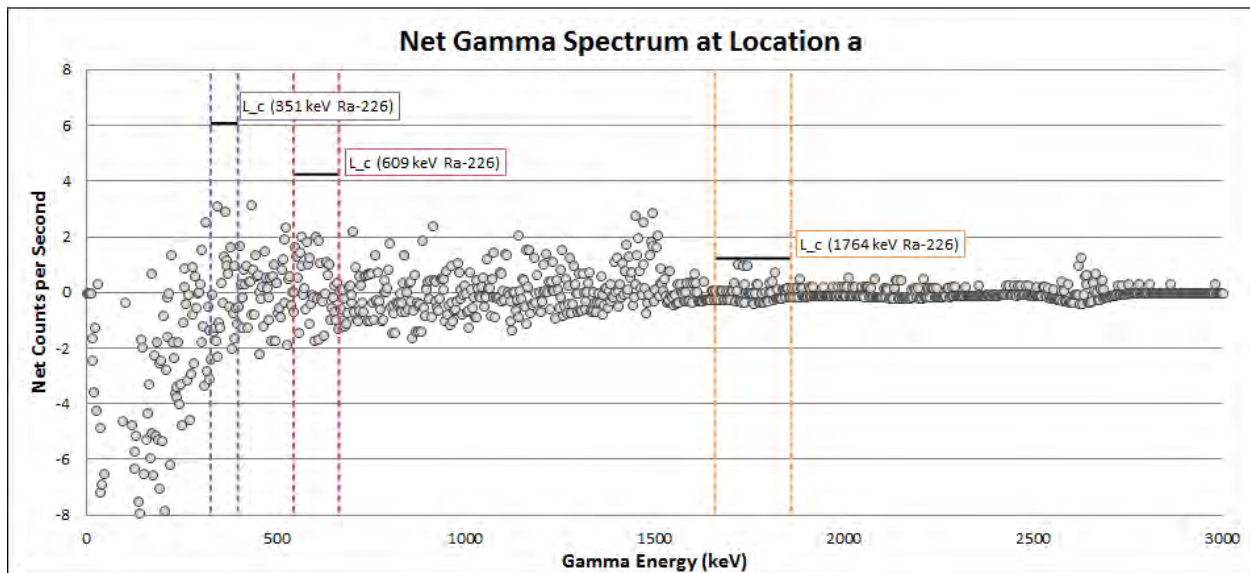


RSI Spectral Analysis Results: RSY 11 (Use 1, Part 1) – **Gamma Spectra at Location (a)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (a)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (a): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

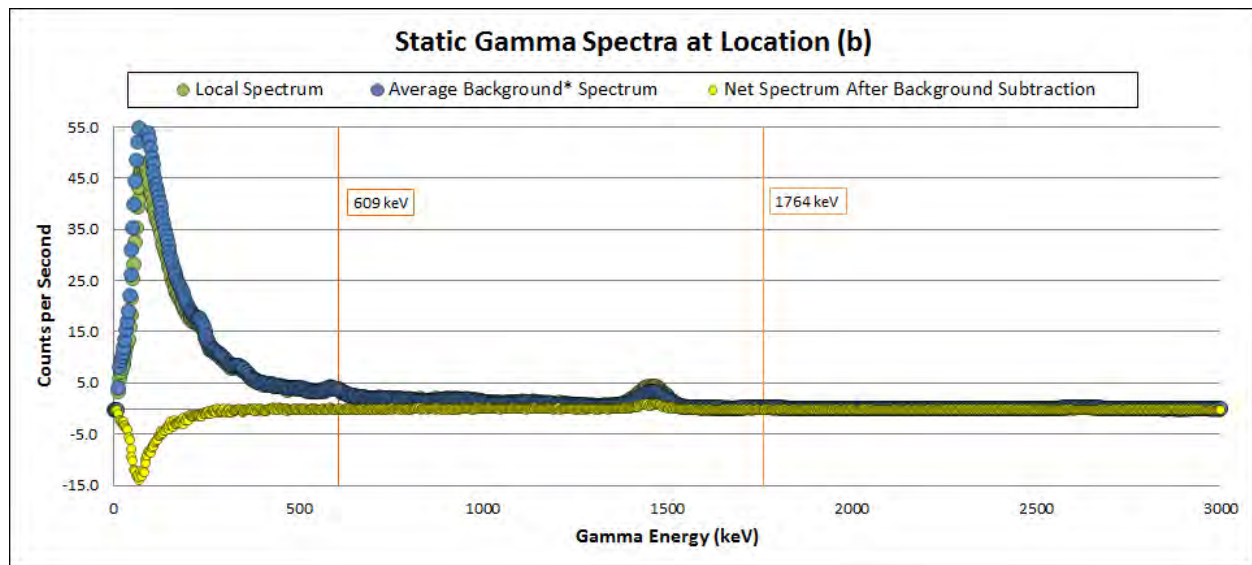
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

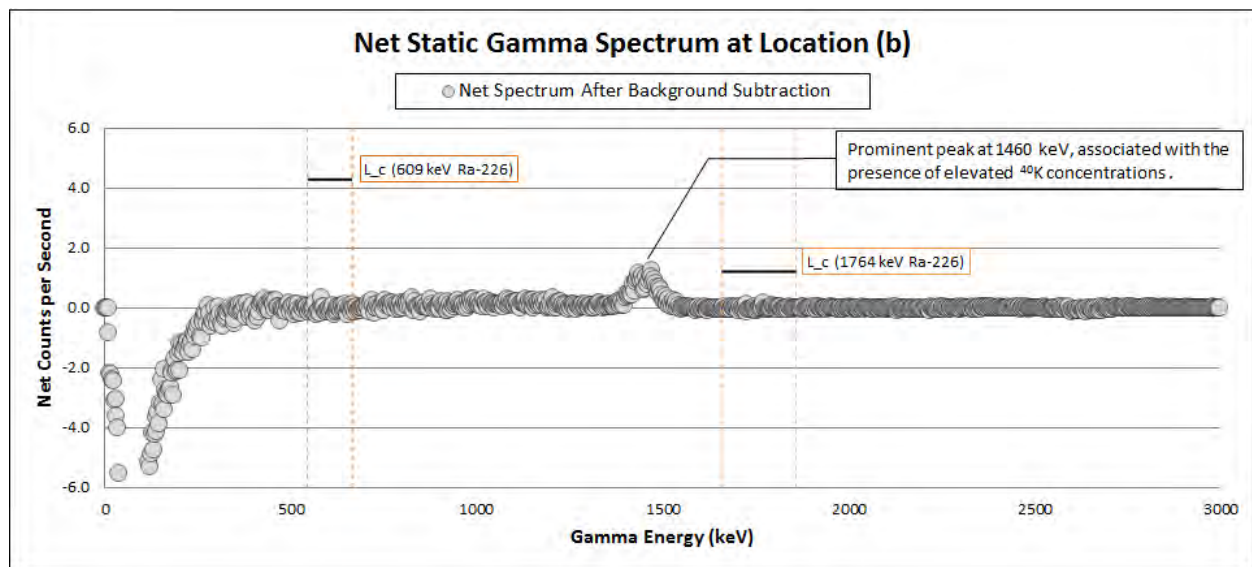
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 (Use 1, Part 1) – **Static Gamma Spectra at Location (b)**
(VD1 – Right and Left Detectors Summed)



Static Gamma spectra for **Location (b)**: local – background* = net

*Average background spectrum obtained from static gamma counts obtained at Reference Area 8.



Net static spectrum for **Location (b)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

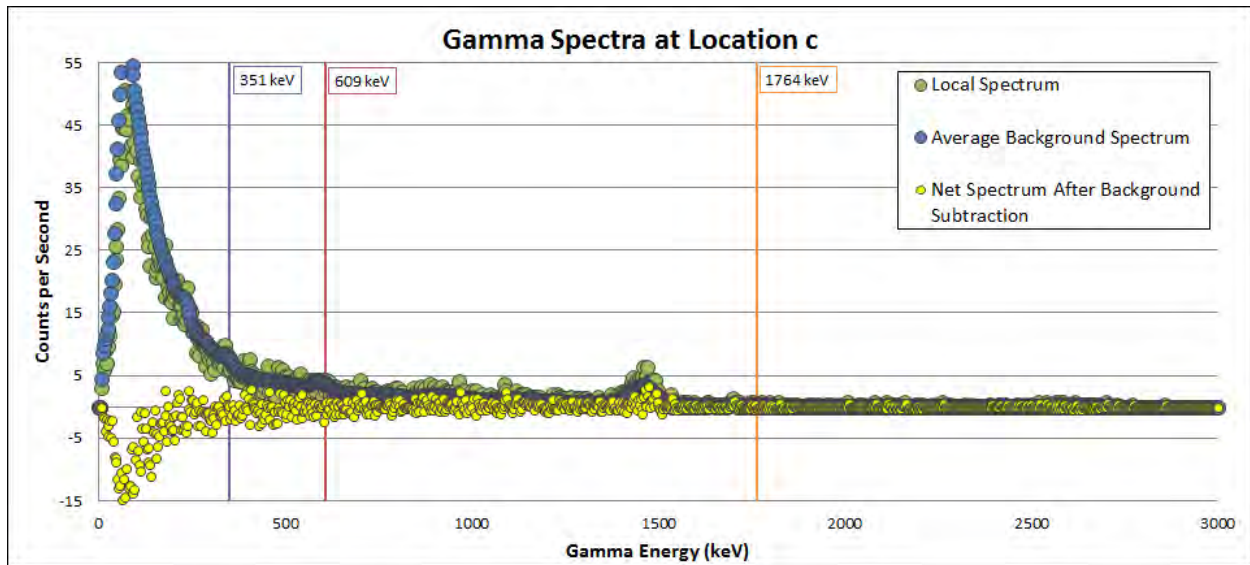
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

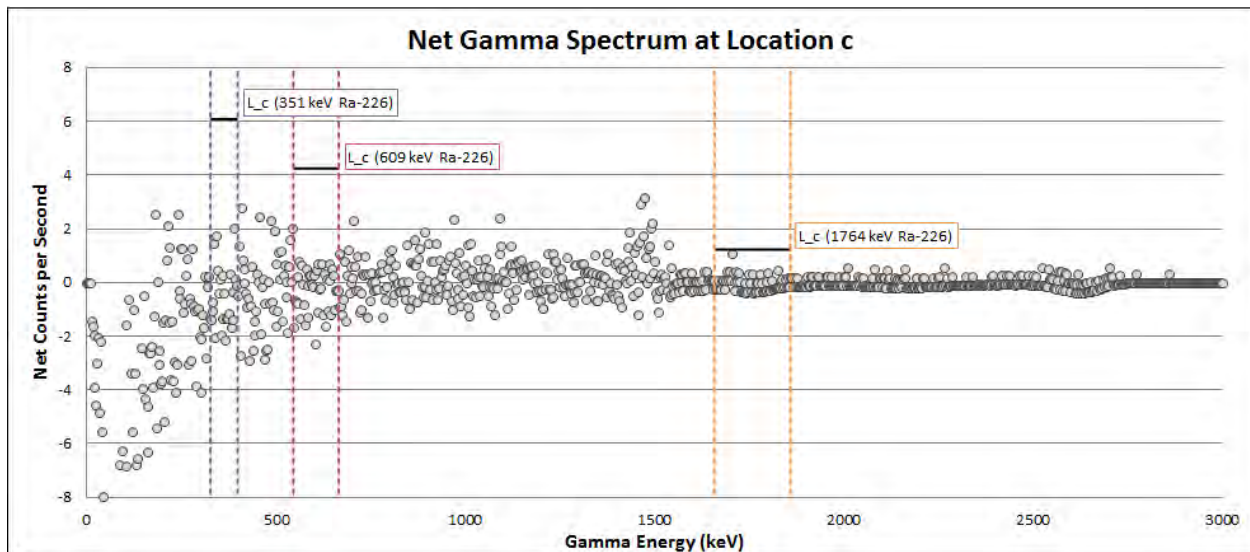
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 (Use 1, Part 1) – **Gamma Spectra at Location (c)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (c)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (c): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

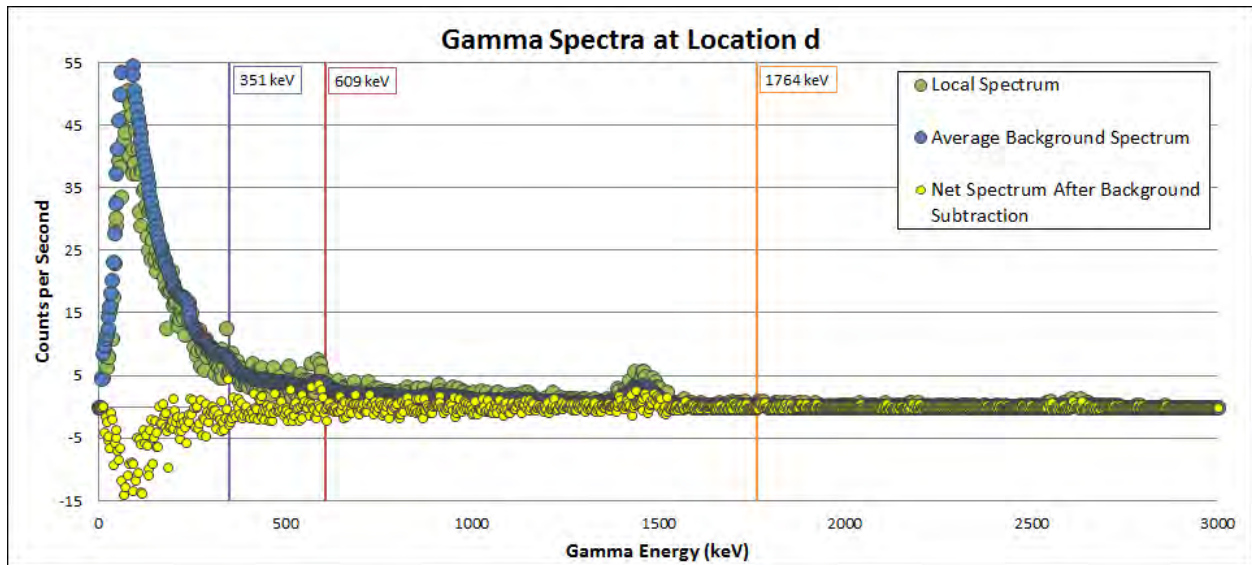
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

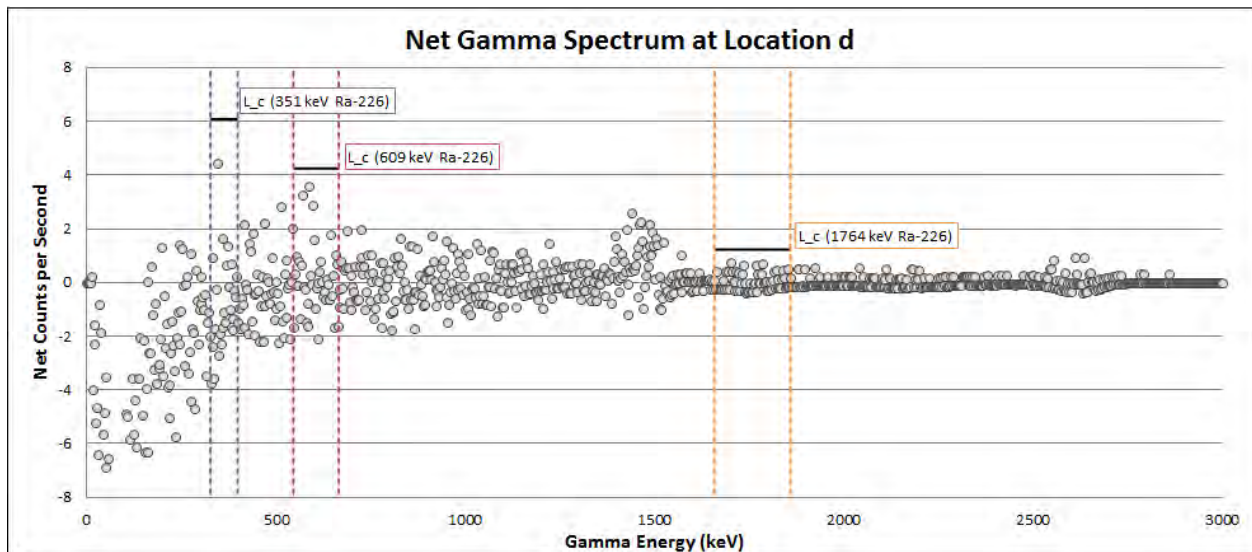
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 (Use 1, Part 1) – **Gamma Spectra at Location (d)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (d)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (d): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

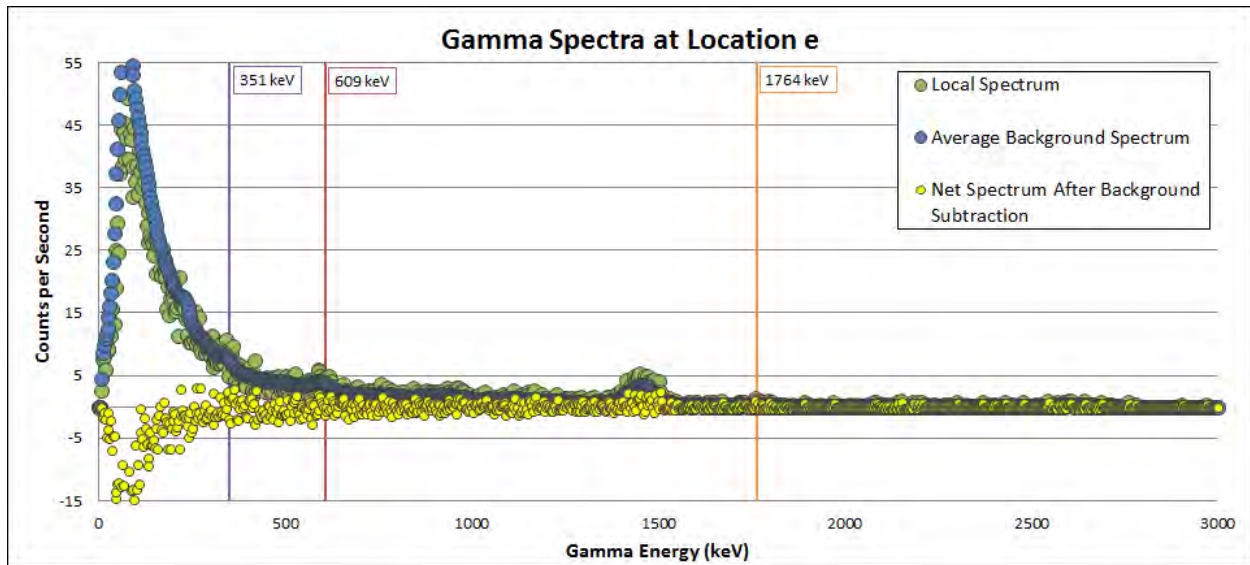
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

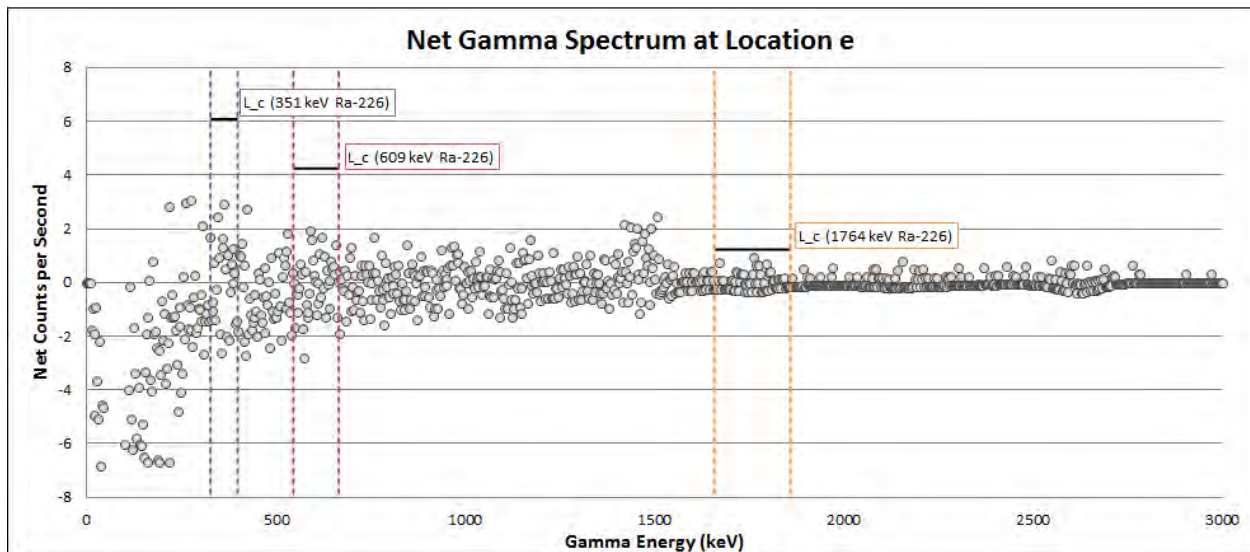
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 (Use 1, Part 1) – **Gamma Spectra at Location (e)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (e)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (e): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

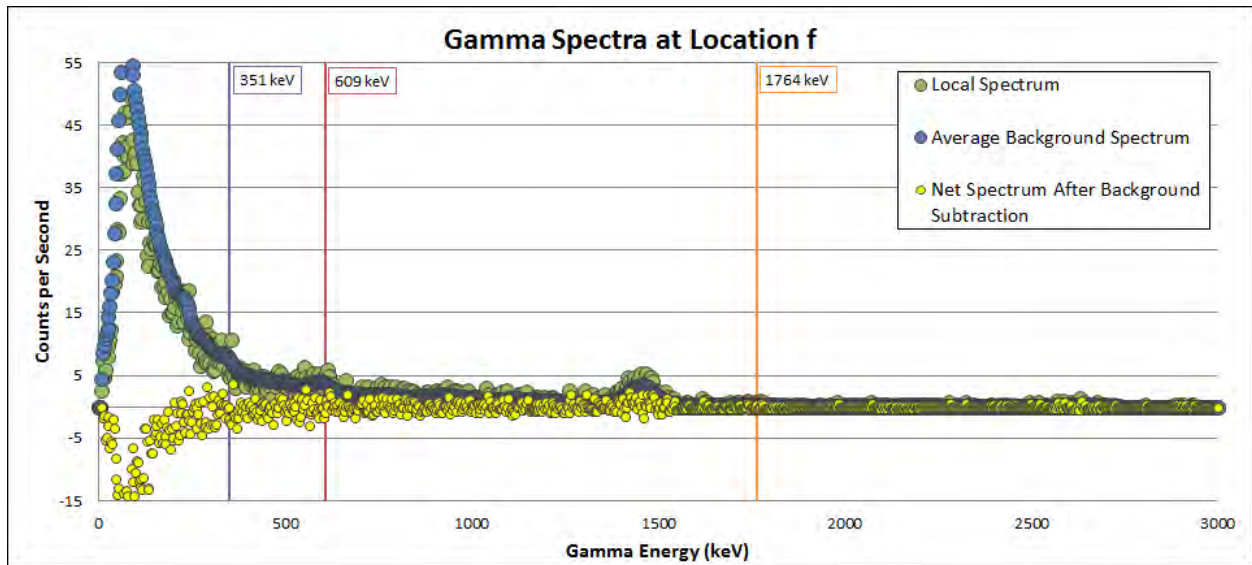
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

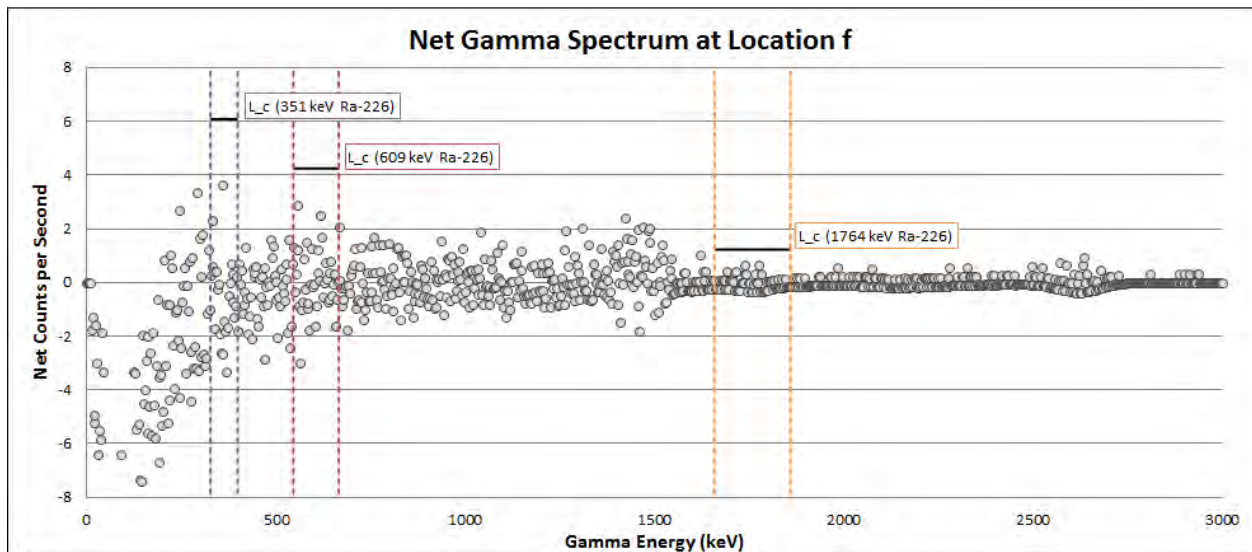
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 (Use 1, Part 1) – **Gamma Spectra at Location (f)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (f)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (f): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

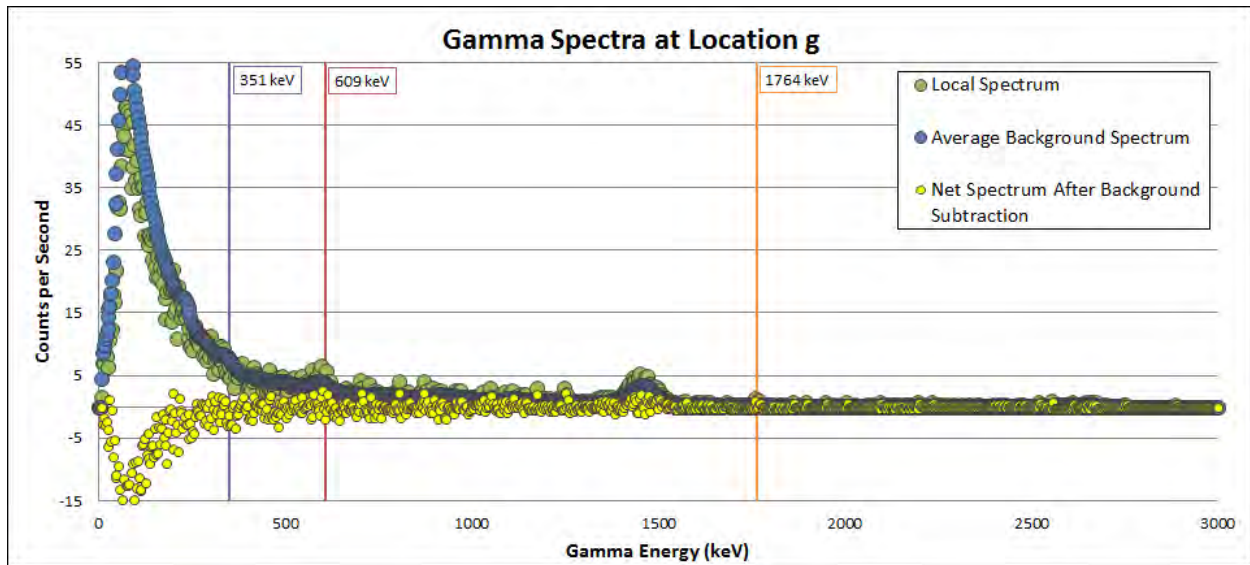
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

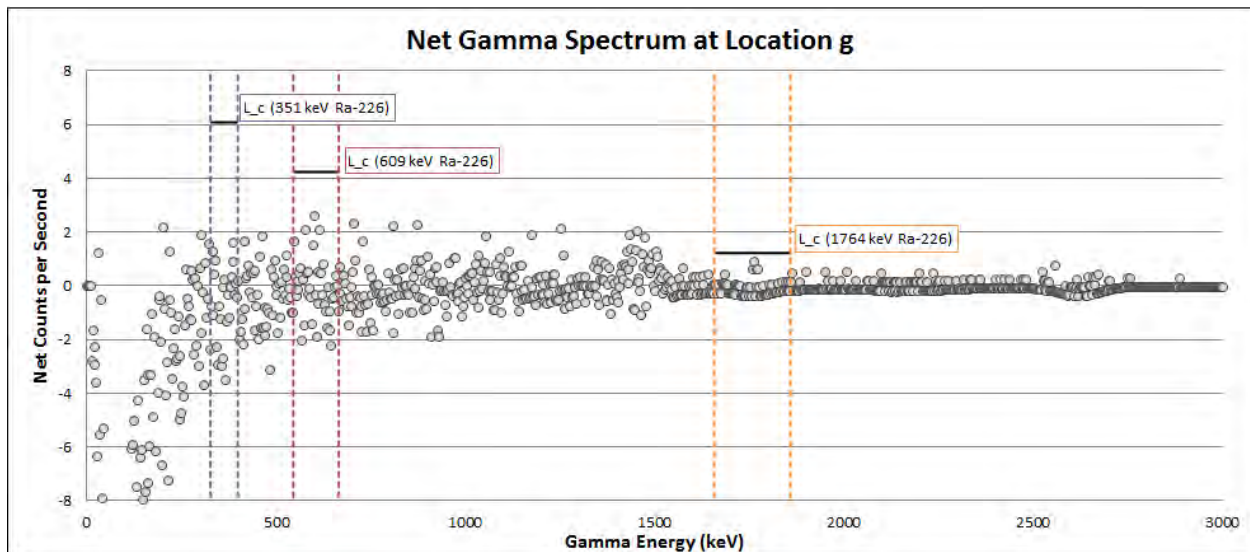
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 (Use 1, Part 1) – **Gamma Spectra at Location (g)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (g)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (g): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

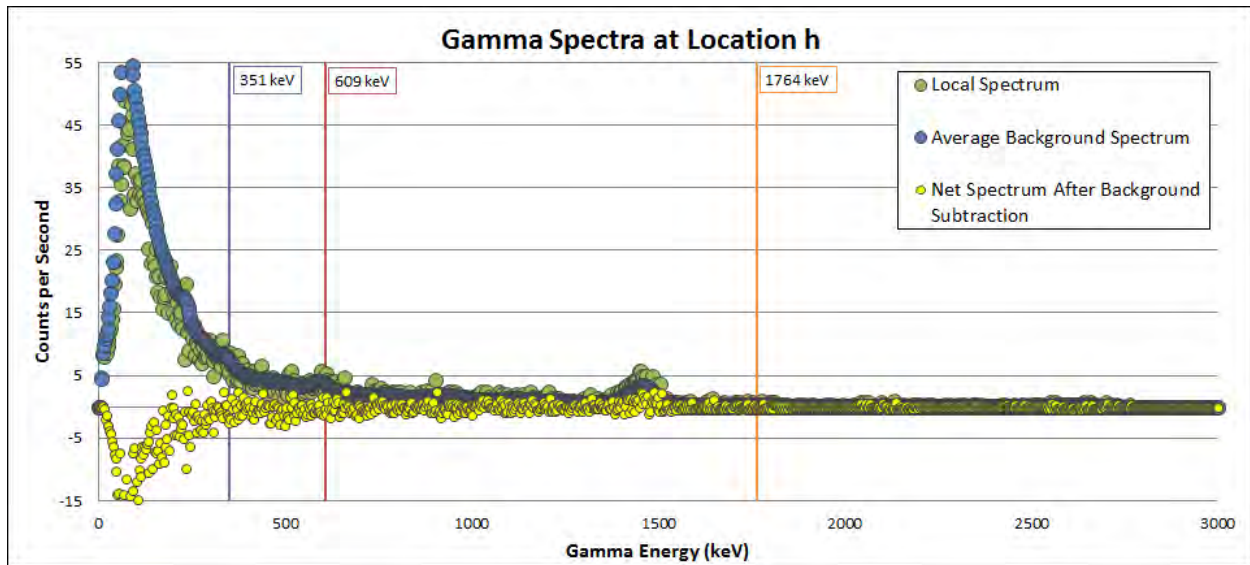
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

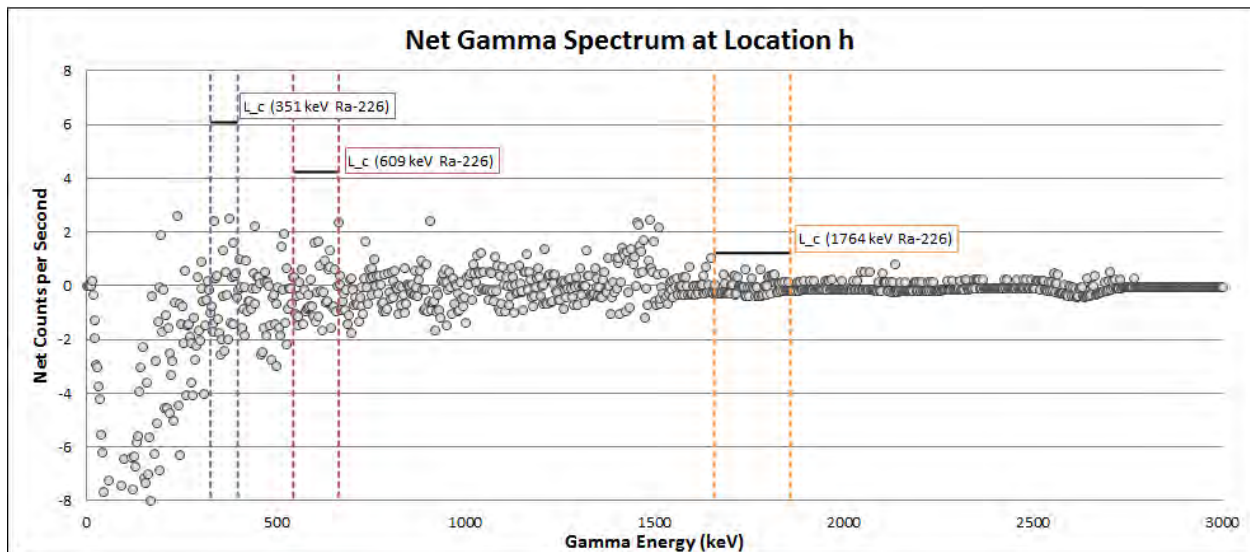
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 (Use 1, Part 1) – **Gamma Spectra at Location (h)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (h)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (h): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

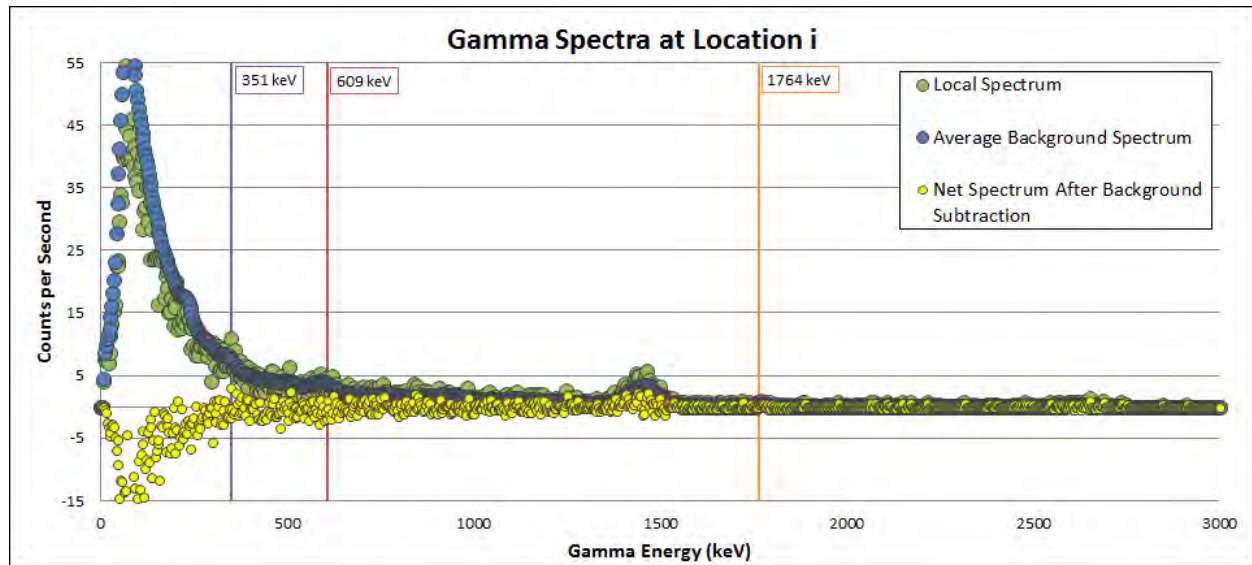
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

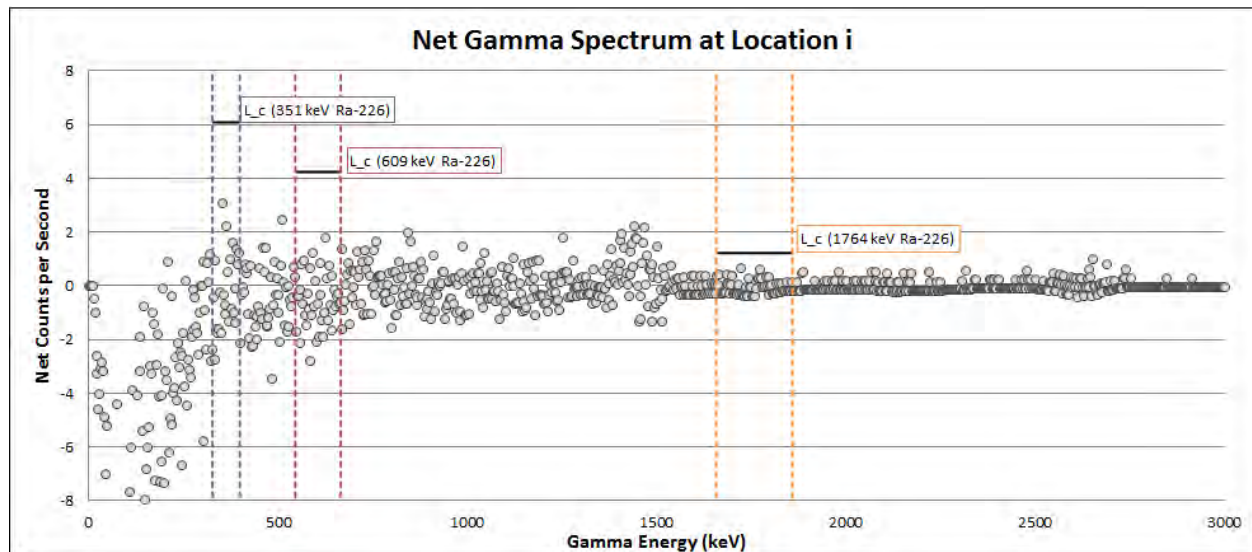
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 (Use 1, Part 1) – **Gamma Spectra at Location (i)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (i)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (i): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

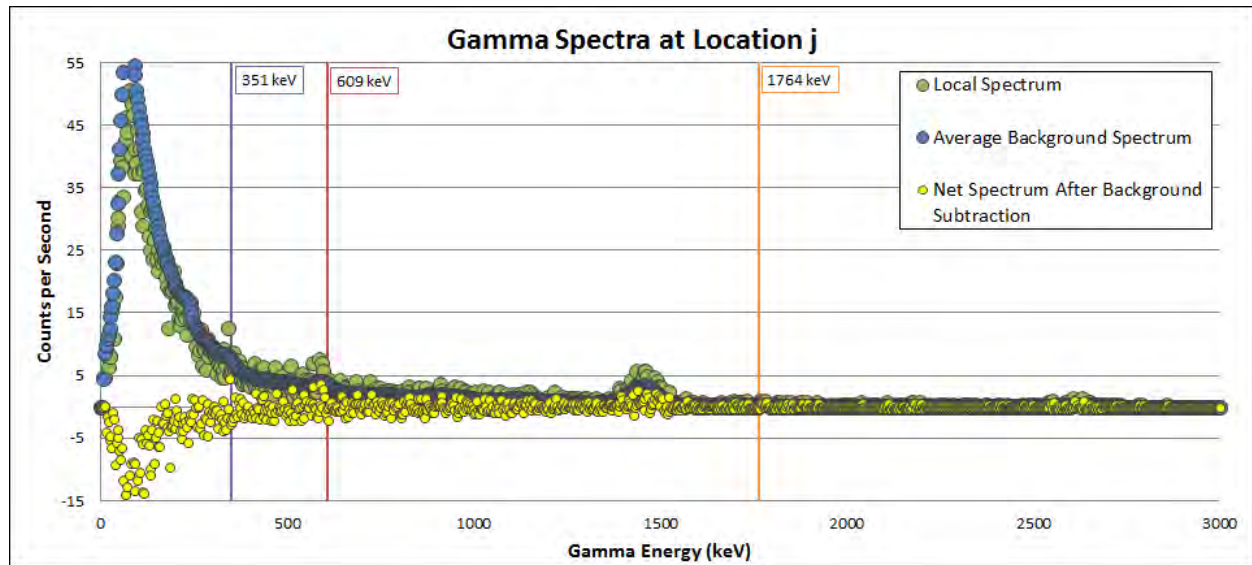
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

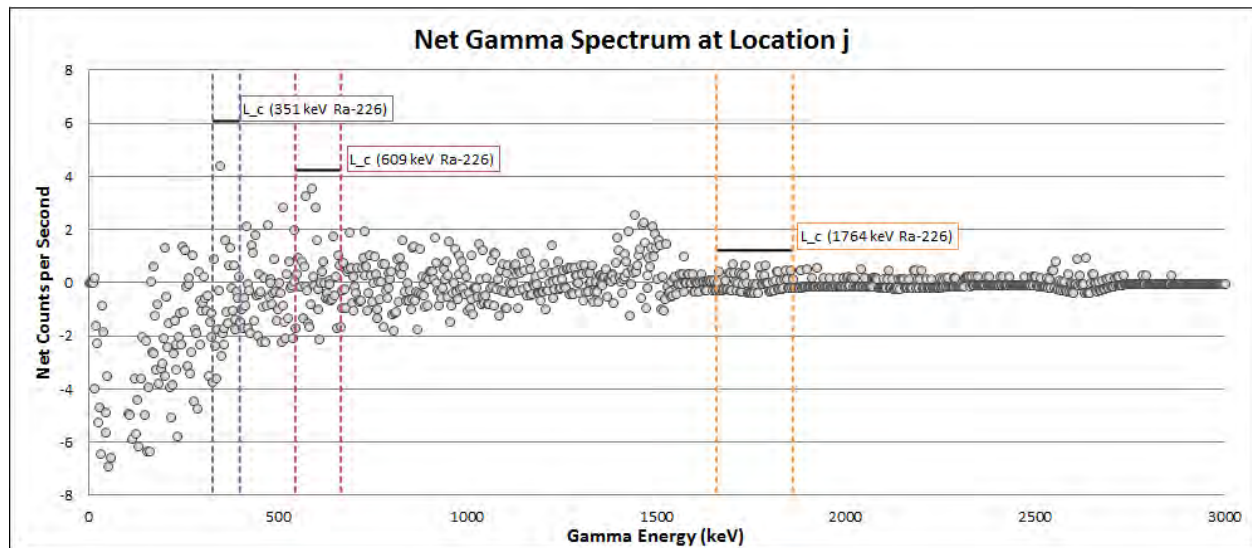
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 (Use 1, Part 1) – **Gamma Spectra at Location (j)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (j)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (j): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-16805-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn

Micha Korinhizer

Authorized for release by:

5/2/2016 3:41:13 PM

Micha Korinhizer, Project Management Assistant I
(314)298-8566

micha.korinhizer@testamericainc.com

Designee for

Erika Gish, Project Manager II
(314)298-8566

erika.gish@testamericainc.com

LINKS

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Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Job ID: 160-16805-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-16805-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 25 of 45

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Job ID: 160-16805-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 04/06/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 19.3 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TITO04-BS-R-FSSSU6-S601 (160-16805-1), TI-TITO04-BS-R-FSSSU6-S602 (160-16805-2), TI-TITO04-BS-R-FSSSU6-S603 (160-16805-3), TI-TITO04-BS-R-FSSSU6-S604 (160-16805-4), TI-TITO04-BS-R-FSSSU6-S605 (160-16805-5), TI-TITO04-BS-R-FSSSU6-S606 (160-16805-6), TI-TITO04-BS-R-FSSSU6-S607 (160-16805-7), TI-TITO04-BS-R-FSSSU6-S608 (160-16805-8), TI-TITO04-BS-R-FSSSU6-S609 (160-16805-9), TI-TITO04-BS-R-FSSSU6-S610 (160-16805-10), TI-TITO04-BS-R-FSSSU6-S611 (160-16805-11), TI-TITO04-BS-R-FSSSU6-S612 (160-16805-12), TI-TITO04-BS-R-FSSSU6-S613 (160-16805-13), TI-TITO04-BS-R-FSSSU6-S614 (160-16805-14), TI-TITO04-BS-R-FSSSU6-S615 (160-16805-15), TI-TITO04-BS-R-FSSSU6-S616 (160-16805-16), TI-TITO04-BS-R-FSSSU6-S617 (160-16805-17), TI-TITO04-BS-R-FSSSU6-S618 (160-16805-18), TI-TITO04-BS-R-FSSSU6-S619 (160-16805-19) and TI-TITO04-BS-R-FSSSU6-S620 (160-16805-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were leached on 04/06/2016, prepared on 04/07/2016 and analyzed on 04/28/2016.

Several analytes exceeded the RPD limit for the duplicate of sample TI-TITO04-BS-R-FSSSU6-S601DU (160-16805-1). Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Slaw Environmental and Infrastructure Inc. (a CBI company)
Federal Services Division
4005 Port Chicago Hwy
Corcoran, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL B3 B5 FSS SUB 211
Page 1 of 2

Project Number: 500080
CTO-04 Phase III BaySide
Project Name / Location: FSS SUB RSY11 U1 Part1
Purchase Order #: 201455

Project Manager: **Ulrika Masser**
(Name & phone #)

Send Report To: **Patricia Flynn**
Phone/Fax Number: 925-288-2037
Address: 4005 Port Chicago Hwy
City: Concord, CA, 94520

Shipment Date: 4/5/2016
Waybill Number: **12594 46201 925 9141**
Lab Destination: Earth Toxics Inc To Test America
Lab Contact Name / Pkts #: **Mika Dryden**

Sample ID Number	Sample Description	Collection Information		Matrix	# Containers	Preservative (water)		Container Type	Dose Rate (mR/hr)
		Date	Time			Preservative (soil)	Preservative (water)		
TI-TO04-B5-R-FSSSUB-5601	BaySide RSY11 USE 1 Part 1 FSS SUB Systematic	04/04/16	1430	SO	1			16 oz Plastic	X
TI-TO04-B5-R-FSSSUB-5602	BaySide RSY11 USE 1 Part 1 FSS SUB Systematic	04/04/16	1432	SO	1			16 oz Plastic	X
TI-TO04-B5-R-FSSSUB-5603	BaySide RSY11 USE 1 Part 1 FSS SUB Systematic	04/04/16	1433	SO	1			16 oz Plastic	X
TI-TO04-B5-R-FSSSUB-5604	BaySide RSY11 USE 1 Part 1 FSS SUB Systematic	04/04/16	1439	SO	1			16 oz Plastic	X
TI-TO04-B5-R-FSSSUB-5605	BaySide RSY11 USE 1 Part 1 FSS SUB Systematic	04/04/16	1442	SO	1			16 oz Plastic	X
TI-TO04-B5-R-FSSSUB-5606	BaySide RSY11 USE 1 Part 1 FSS SUB Systematic	04/04/16	1445	SO	1			16 oz Plastic	X
TI-TO04-B5-R-FSSSUB-5607	BaySide RSY11 USE 1 Part 1 FSS SUB Systematic	04/04/16	1449	SO	1			16 oz Plastic	X
TI-TO04-B5-R-FSSSUB-5608	BaySide RSY11 USE 1 Part 1 FSS SUB Systematic	04/04/16	1453	SO	1			16 oz Plastic	X
TI-TO04-B5-R-FSSSUB-5609	BaySide RSY11 USE 1 Part 1 FSS SUB Systematic	04/04/16	1501	SO	1			16 oz Plastic	X
TI-TO04-B5-R-FSSSUB-5610	BaySide RSY11 USE 1 Part 1 FSS SUB Systematic	04/04/16	1505	SO	1			16 oz Plastic	X

160-16805 Chain of Custody

Special Instructions: 7 days ingrown draft and follow with 21 days final		Level Of QC Required:	
Standard TAT <input type="checkbox"/> 24 hr	<input type="checkbox"/> 3 day	<input type="checkbox"/> 7 day	<input checked="" type="checkbox"/> 14 day
Relinquished By: Byron Rogers	Date: 4/5/2016	Received By: Patricia Flynn	Date: 04/06/16
Relinquished By:	Time: 1730	Received By:	Time: 0835
Matrix Codes: SO = Soil DW = Drinking Water GW = Ground Water WW = Wastewater		Method Codes: C = Composite A = Air	



Shaw Environmental and Infrastructure Inc. (a C&I company)
 Federal Services Division
 4005 Port Chicago Hwy
 Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL P3 BS FSS SUB 2/1
 Page 2 of 2

Project Number: 500060
 CTO-04 Phase III BaySide
 Project Name / Location: FSS SUB RSY11 UT Part I
 Purchase Order #: 201455

Shipment Date: 4/5/2016
 Waybill Number: 1281V46201 9435 9141
 Lab Destination: Earth Toxics Inc To Test Analytic
 Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer
 (Name & phone #)
 Send Report To: Patricia Flynn
 Phone/Fax Number: 925-288-2037
 Address: 4005 Port Chicago Hwy
 City: Concord, CA, 94520

Sampler's Name(s): TW

Sample ID Number	Sample Description	Date	Time	Method	Matrix	Preservative (water)	Preservative (soil)	Container Type	Dose Rate (R/hr)
TL-T004-BS-R-FSSSUB-S611	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1509	G	SO	1	16 oz Plastic	X	5
TL-T004-BS-R-FSSSUB-S612	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1511	G	SO	1	16 oz Plastic	X	5
TL-T004-BS-R-FSSSUB-S613	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1515	G	SO	1	16 oz Plastic	X	5
TL-T004-BS-R-FSSSUB-S614	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1519	G	SO	1	16 oz Plastic	X	5
TL-T004-BS-R-FSSSUB-S615	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1521	G	SO	1	16 oz Plastic	X	5
TL-T004-BS-R-FSSSUB-S616	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1525	G	SO	1	16 oz Plastic	X	5
TL-T004-BS-R-FSSSUB-S617	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1528	G	SO	1	16 oz Plastic	X	5
TL-T004-BS-R-FSSSUB-S618	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1532	G	SO	1	16 oz Plastic	X	5
TL-T004-BS-R-FSSSUB-S619	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1536	G	SO	1	16 oz Plastic	X	5
TL-T004-BS-R-FSSSUB-S620	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1540	G	SO	1	16 oz Plastic	X	5

Special Instructions: 7 days ingrown draft and follow with 21 days final

Level Of QC Required:

Standard TAT: ☐ 24-hr ☐ 3-day ☐ 7-day

Requisitioned By: Ryan Rogers
 Date: 4/5/2016
 Time: 1330
 Received By: [Signature]
 Date: 4/5/2016
 Time: 1330

Method Codes:

C = Composite

Matrix Codes:

DW = Drinking Water
 GW = Ground Water
 WW = Waste Water
 A = Air

SO = Grab

SO = Soil
 SL = Sludge
 CP = Chip Samples

ABS=Asbestos, PO=Pipe Operating

Form FRM-TI-03-3
Sample Shipment Checklist

Project Name <u>Treasure Island</u>	Project Number <u>500060</u>
Address <u>950 Avenue M Building 570</u>	Date <u>4-9-2016</u> Time <u>1230</u>
City, State, Zip <u>San Francisco, CA 94130</u>	
UPS Tracking No. <u>1Z89V46201 9425 9141</u>	

Sample Checklist	Yes	No	Comments
Sample lids are tight and custody seals in place?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are all sample numbers, dates, times, and other label information legible and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have all sample numbers, dates, times, and sampling data been logged into the sample log book?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Do sample numbers and sample descriptions on the labels match those on the COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have the COCs been filled out completely and correctly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Does the analytical specified on the COC match the analytical specified in the scope of work?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have the COCs been properly signed in the transfer section?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Packaging Checklist	Yes	No	Comments
Has each sample been placed into an individually plastic bag?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the drain plug of the cooler been taped closed with water proof tape from the inside?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>no drain plug</u>
Have all the samples been placed into the cooler in an upright position?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is there adequate spacing of samples so that they will not touch during shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the cooler been filled with additional cushioning material?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the COC been placed in a Ziploc® bag and taped to the inside of the lid of the cooler?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have custody seals been placed onto the lid?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the cooler been labeled "This Side Up"?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
If required, has the cooler been labeled with the DOT proper shipping name, UN number, and label?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>UN 2910</u>
Has the laboratory performing the analyses been notified of the shipment of samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Review Checklist	Yes	No	Comments
Has smear data been verified?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has survey data been reviewed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Problems/Resolutions: _____			
Prepared by: <u>N Morrison</u>			
Reviewed by: <u>Takeshi Imai</u> <u>Jarvis</u>			

COC#:

TI-P3-NP-FSS-544-210

Survey #:

TIAS-04042016-1212-SS-2067TI-P3-BS-FSS-546-211TIAS-04042016-1212-SS-2068

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-16805-2

Login Number: 16805**List Source: TestAmerica St. Louis****List Number: 1****Creator: McKinney, Gerrod E**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:
DOE = U.S. Department of Energy

Laboratory References:
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-16805-1	TI-TITO04-BS-R-FSSSU6-S601	Solid	04/04/16 14:30	04/06/16 08:35
160-16805-2	TI-TITO04-BS-R-FSSSU6-S602	Solid	04/04/16 14:32	04/06/16 08:35
160-16805-3	TI-TITO04-BS-R-FSSSU6-S603	Solid	04/04/16 14:36	04/06/16 08:35
160-16805-4	TI-TITO04-BS-R-FSSSU6-S604	Solid	04/04/16 14:39	04/06/16 08:35
160-16805-5	TI-TITO04-BS-R-FSSSU6-S605	Solid	04/04/16 14:42	04/06/16 08:35
160-16805-6	TI-TITO04-BS-R-FSSSU6-S606	Solid	04/04/16 14:45	04/06/16 08:35
160-16805-7	TI-TITO04-BS-R-FSSSU6-S607	Solid	04/04/16 14:49	04/06/16 08:35
160-16805-8	TI-TITO04-BS-R-FSSSU6-S608	Solid	04/04/16 14:55	04/06/16 08:35
160-16805-9	TI-TITO04-BS-R-FSSSU6-S609	Solid	04/04/16 15:01	04/06/16 08:35
160-16805-10	TI-TITO04-BS-R-FSSSU6-S610	Solid	04/04/16 15:05	04/06/16 08:35
160-16805-11	TI-TITO04-BS-R-FSSSU6-S611	Solid	04/04/16 15:09	04/06/16 08:35
160-16805-12	TI-TITO04-BS-R-FSSSU6-S612	Solid	04/04/16 15:11	04/06/16 08:35
160-16805-13	TI-TITO04-BS-R-FSSSU6-S613	Solid	04/04/16 15:15	04/06/16 08:35
160-16805-14	TI-TITO04-BS-R-FSSSU6-S614	Solid	04/04/16 15:18	04/06/16 08:35
160-16805-15	TI-TITO04-BS-R-FSSSU6-S615	Solid	04/04/16 15:21	04/06/16 08:35
160-16805-16	TI-TITO04-BS-R-FSSSU6-S616	Solid	04/04/16 15:25	04/06/16 08:35
160-16805-17	TI-TITO04-BS-R-FSSSU6-S617	Solid	04/04/16 15:28	04/06/16 08:35
160-16805-18	TI-TITO04-BS-R-FSSSU6-S618	Solid	04/04/16 15:32	04/06/16 08:35
160-16805-19	TI-TITO04-BS-R-FSSSU6-S619	Solid	04/04/16 15:36	04/06/16 08:35
160-16805-20	TI-TITO04-BS-R-FSSSU6-S620	Solid	04/04/16 15:40	04/06/16 08:35

Client Sample Results

Page 33 of 45

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S601

Lab Sample ID: 160-16805-1

Date Collected: 04/04/16 14:30

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.602		0.170	0.181		0.0887	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Actinium-227	-0.160	U	0.432	0.432		0.738	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Bismuth-212	0.0867	U	0.459	0.459		0.836	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Bismuth-214	0.472		0.130	0.139		0.108	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Cesium-137	-0.0000343	U	0.0301	0.0301		0.0582	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Lead-210	-0.577	U	6.21	6.21		1.66	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Lead-212	0.384		0.0955	0.108		0.102	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Lead-214	0.473		0.112	0.122		0.0928	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Potassium-40	10.4		1.50	1.84		0.760	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Protactinium-231	0.192	U	0.344	0.345		1.52	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Radium-226	0.472		0.130	0.139	0.500	0.108	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Radium-228	0.602		0.170	0.181		0.0887	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Thallium-208	0.153		0.0545	0.0568		0.0551	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Thorium-228	0.384		0.0955	0.108		0.102	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Thorium-232	0.602		0.170	0.181		0.0887	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Thorium-234	-0.0127	U	0.0208	0.0208		1.48	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Uranium-235	0.0854	U	0.181	0.181		0.212	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Uranium-238	-0.0127	U	0.0208	0.0208		1.48	pCi/g	04/07/16 12:29	04/28/16 18:39	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S602

Lab Sample ID: 160-16805-2

Date Collected: 04/04/16 14:32

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.501		0.146	0.154		0.0759	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Actinium-227	0.275	U	0.282	0.283		0.661	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Bismuth-212	-0.00673	U	0.469	0.469		0.862	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Bismuth-214	0.398		0.111	0.118		0.107	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Cesium-137	-0.00311	U	0.0408	0.0408		0.0740	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Lead-210	0.962	U	0.978	0.985		1.57	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Lead-212	0.372		0.0900	0.102		0.0981	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Lead-214	0.363		0.116	0.122		0.121	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Potassium-40	12.1		1.42	1.88		0.717	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Protactinium-231	0.222	U	0.475	0.475		2.03	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Radium-226	0.398		0.111	0.118	0.500	0.107	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Radium-228	0.501		0.146	0.154		0.0759	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Thallium-208	0.122		0.0508	0.0523		0.0583	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Thorium-228	0.372		0.0900	0.102		0.0981	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Thorium-232	0.501		0.146	0.154		0.0759	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Thorium-234	0.422	U	0.471	0.473		1.57	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Uranium-235	0.124	U	0.217	0.217		0.350	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Uranium-238	0.422	U	0.471	0.473		1.57	pCi/g	04/07/16 12:29	04/28/16 18:43	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S603

Lab Sample ID: 160-16805-3

Date Collected: 04/04/16 14:36

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.209	U	0.124	0.125		0.283	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Actinium-227	0.000	U	0.383	0.383		0.793	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Bismuth-212	0.257	U	0.437	0.438		0.743	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Bismuth-214	0.490		0.124	0.134		0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Cesium-137	0.00985	U	0.0329	0.0330		0.0590	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Lead-210	-0.224	U	1.74	1.74		1.84	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Lead-212	0.328		0.107	0.115		0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Lead-214	0.441		0.113	0.122		0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Potassium-40	11.9		1.42	1.87		0.715	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Protactinium-231	0.0105	U	0.631	0.631		1.16	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Radium-226	0.490		0.124	0.134	0.500	0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Radium-228	0.209	U	0.124	0.125		0.283	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Thallium-208	0.128		0.0412	0.0433		0.0418	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Thorium-228	0.328		0.107	0.115		0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Thorium-232	0.209	U	0.124	0.125		0.283	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Thorium-234	0.271	U	0.374	0.375		1.59	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Uranium-235	0.126	U	0.173	0.173		0.297	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Uranium-238	0.271	U	0.374	0.375		1.59	pCi/g	04/07/16 12:29	04/28/16 19:10	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S604

Lab Sample ID: 160-16805-4

Date Collected: 04/04/16 14:39

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.441		0.121	0.129		0.0629	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Actinium-227	0.000	U	0.128	0.128		0.646	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Bismuth-212	0.272	U	0.403	0.404		0.674	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Bismuth-214	0.411		0.102	0.111		0.0805	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Cesium-137	-0.0137	U	0.0359	0.0359		0.0623	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Lead-210	0.0406	U	0.724	0.724		1.27	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Lead-212	0.331		0.0744	0.0859		0.0673	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Lead-214	0.385		0.0952	0.103		0.0786	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Potassium-40	11.3		1.25	1.70		0.571	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Protactinium-231	0.0595	U	0.715	0.715		1.27	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Radium-226	0.411		0.102	0.111	0.500	0.0805	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Radium-228	0.441		0.121	0.129		0.0629	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Thallium-208	0.155		0.0433	0.0462		0.0340	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Thorium-228	0.331		0.0744	0.0859		0.0673	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Thorium-232	0.441		0.121	0.129		0.0629	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Thorium-234	0.518	U	0.351	0.355		1.20	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Uranium-235	0.0598	U	0.0994	0.0995		0.318	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Uranium-238	0.518	U	0.351	0.355		1.20	pCi/g	04/07/16 12:29	04/28/16 19:11	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S605

Lab Sample ID: 160-16805-5

Date Collected: 04/04/16 14:42

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.423		0.150	0.156		0.124	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Actinium-227	-0.135	U	0.347	0.348		0.593	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Bismuth-212	0.00536	U	0.344	0.344		0.639	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Bismuth-214	0.399		0.101	0.109		0.0747	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Cesium-137	0.000	U	0.00896	0.00896		0.0494	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Lead-210	0.742	U	0.670	0.676		1.07	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Lead-212	0.291		0.0676	0.0774		0.0697	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Lead-214	0.339		0.0873	0.0942		0.0683	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Potassium-40	12.2		1.28	1.79		0.394	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Protactinium-231	0.146	U	0.431	0.432		1.00	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Radium-226	0.399		0.101	0.109	0.500	0.0747	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Radium-228	0.423		0.150	0.156		0.124	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Thallium-208	0.158		0.0390	0.0423		0.0231	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Thorium-228	0.291		0.0676	0.0774		0.0697	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Thorium-232	0.423		0.150	0.156		0.124	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Thorium-234	0.693	U	0.337	0.345		1.33	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Uranium-235	-0.00506	U	0.0113	0.0113		0.325	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Uranium-238	0.693	U	0.337	0.345		1.33	pCi/g	04/07/16 12:29	04/28/16 19:12	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S606

Lab Sample ID: 160-16805-6

Date Collected: 04/04/16 14:45

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0997	U	0.0926	0.0931		0.351	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Actinium-227	0.167	U	0.466	0.466		0.795	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Bismuth-212	0.265	U	0.521	0.522		0.897	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Bismuth-214	0.468		0.124	0.133		0.105	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Cesium-137	0.000	U	0.00911	0.00911		0.117	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Lead-210	-0.809	U	43.2	43.2		2.14	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Lead-212	0.359		0.109	0.119		0.123	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Lead-214	0.389		0.0879	0.0967		0.125	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Potassium-40	13.6		1.64	2.15		0.572	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Protactinium-231	-0.0281	U	0.0677	0.0678		1.21	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Radium-226	0.468		0.124	0.133	0.500	0.105	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Radium-228	0.0997	U	0.0926	0.0931		0.351	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Thallium-208	0.145		0.0480	0.0503		0.0476	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Thorium-228	0.359		0.109	0.119		0.123	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Thorium-232	0.0997	U	0.0926	0.0931		0.351	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Thorium-234	0.367	U	0.477	0.478		1.51	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Uranium-235	0.0583	U	0.170	0.170		0.266	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Uranium-238	0.367	U	0.477	0.478		1.51	pCi/g	04/07/16 12:29	04/28/16 19:13	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S607

Lab Sample ID: 160-16805-7

Date Collected: 04/04/16 14:49

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.231	U	0.146	0.148		0.267	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Actinium-227	0.314	U	0.419	0.420		0.693	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Bismuth-212	0.330	U	0.457	0.458		0.759	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Bismuth-214	0.398		0.113	0.120		0.115	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Cesium-137	-0.00242	U	0.0390	0.0390		0.0713	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Lead-210	0.805	U	1.32	1.32		1.82	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Lead-212	0.378		0.100	0.112		0.109	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Lead-214	0.373		0.0955	0.103		0.0984	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Potassium-40	13.2		1.48	2.01		0.723	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Protactinium-231	0.133	U	0.218	0.219		1.85	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Radium-226	0.398		0.113	0.120	0.500	0.115	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Radium-228	0.231	U	0.146	0.148		0.267	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Thallium-208	0.159		0.0434	0.0464		0.0481	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Thorium-228	0.378		0.100	0.112		0.109	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Thorium-232	0.231	U	0.146	0.148		0.267	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Thorium-234	0.255	U	0.486	0.486		1.66	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Uranium-235	0.161	U	0.197	0.197		0.307	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Uranium-238	0.255	U	0.486	0.486		1.66	pCi/g	04/07/16 12:29	04/28/16 19:17	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S608

Lab Sample ID: 160-16805-8

Date Collected: 04/04/16 14:55

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.225	U	0.125	0.127		0.264	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Actinium-227	-0.0656	U	0.447	0.448		0.777	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Bismuth-212	0.390	U	0.454	0.456		0.738	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Bismuth-214	0.365		0.115	0.121		0.114	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Cesium-137	-0.00401	U	0.0334	0.0334		0.0615	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Lead-210	0.255	U	1.00	1.00		1.82	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Lead-212	0.378		0.0986	0.110		0.107	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Lead-214	0.387		0.122	0.129		0.120	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Potassium-40	13.0		1.48	1.99		0.715	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Protactinium-231	0.479	U	0.387	0.391		1.62	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Radium-226	0.365		0.115	0.121	0.500	0.114	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Radium-228	0.225	U	0.125	0.127		0.264	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Thallium-208	0.181		0.0529	0.0562		0.0463	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Thorium-228	0.378		0.0986	0.110		0.107	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Thorium-232	0.225	U	0.125	0.127		0.264	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Thorium-234	0.430	U	0.459	0.462		1.43	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Uranium-235	0.106	U	0.189	0.190		0.304	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Uranium-238	0.430	U	0.459	0.462		1.43	pCi/g	04/07/16 12:29	04/28/16 19:47	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S609

Lab Sample ID: 160-16805-9

Date Collected: 04/04/16 15:01

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.311		0.0959	0.101		0.227	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Actinium-227	0.0339	U	0.337	0.337		0.594	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Bismuth-212	0.184	U	0.369	0.369		0.637	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Bismuth-214	0.390		0.0950	0.103		0.0762	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Cesium-137	-0.0120	U	0.0399	0.0399		0.0698	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Lead-210	0.684	U	0.852	0.856		1.40	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Lead-212	0.396		0.105	0.117		0.0989	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Lead-214	0.446		0.101	0.111		0.0744	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Potassium-40	12.6		1.36	1.88		0.610	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Protactinium-231	0.366	U	0.471	0.473		1.10	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Radium-226	0.390		0.0950	0.103	0.500	0.0762	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Radium-228	0.311		0.0959	0.101		0.227	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Thallium-208	0.125		0.0381	0.0403		0.0331	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Thorium-228	0.396		0.105	0.117		0.0989	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Thorium-232	0.311		0.0959	0.101		0.227	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Thorium-234	0.649	U	0.437	0.443		1.34	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Uranium-235	0.0928	U	0.176	0.176		0.292	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Uranium-238	0.649	U	0.437	0.443		1.34	pCi/g	04/07/16 12:29	04/28/16 19:48	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S610

Lab Sample ID: 160-16805-10

Date Collected: 04/04/16 15:05

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.502		0.153	0.162		0.176	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Actinium-227	-0.0378	U	0.0924	0.0925		0.807	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Bismuth-212	0.214	U	0.405	0.406		0.697	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Bismuth-214	0.451		0.101	0.111		0.0871	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Cesium-137	-0.0114	U	0.0379	0.0380		0.0672	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-210	0.122	U	0.965	0.965		1.67	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-212	0.372		0.0906	0.103		0.0960	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-214	0.443		0.107	0.117		0.102	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Potassium-40	13.4		1.48	2.02		0.500	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Protactinium-231	0.150	U	0.281	0.281		1.33	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Radium-226	0.451		0.101	0.111	0.500	0.0871	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Radium-228	0.502		0.153	0.162		0.176	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thallium-208	0.134		0.0493	0.0512		0.0536	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-228	0.372		0.0906	0.103		0.0960	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-232	0.502		0.153	0.162		0.176	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-234	0.362	U	0.312	0.315		1.74	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Uranium-235	0.0737	U	0.213	0.213		0.365	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Uranium-238	0.362	U	0.312	0.315		1.74	pCi/g	04/07/16 12:29	04/28/16 19:49	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S611

Lab Sample ID: 160-16805-11

Date Collected: 04/04/16 15:09

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.658		0.154	0.168		0.0664	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Actinium-227	0.125	U	0.424	0.424		0.726	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Bismuth-212	0.242	U	0.419	0.419		0.711	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Bismuth-214	0.484		0.0899	0.103		0.0308	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Cesium-137	-0.00244	U	0.0311	0.0311		0.0571	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-210	0.561	U	0.820	0.823		1.36	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-212	0.412		0.0739	0.0911		0.0652	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-214	0.444		0.0821	0.0942		0.0692	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Potassium-40	12.3		1.33	1.83		0.422	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Protactinium-231	0.256	U	0.239	0.241		1.61	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Radium-226	0.484		0.0899	0.103	0.500	0.0308	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Radium-228	0.658		0.154	0.168		0.0664	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thallium-208	0.109		0.0443	0.0457		0.0574	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-228	0.412		0.0739	0.0911		0.0652	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-232	0.658		0.154	0.168		0.0664	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-234	0.0607	U	0.242	0.242		1.44	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Uranium-235	-0.00714	U	0.0141	0.0141		0.341	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Uranium-238	0.0607	U	0.242	0.242		1.44	pCi/g	04/07/16 12:29	04/28/16 19:49	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S612

Lab Sample ID: 160-16805-12

Date Collected: 04/04/16 15:11

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.710		0.145	0.162		0.0950	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Actinium-227	-0.0108	U	0.0292	0.0292		0.804	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Bismuth-212	0.410	U	0.514	0.515		0.841	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Bismuth-214	0.231		0.107	0.109		0.128	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Cesium-137	0.000	U	0.00958	0.00958		0.0810	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-210	0.821	U	0.978	0.983		1.57	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-212	0.493		0.116	0.132		0.119	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-214	0.435		0.112	0.121		0.0979	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Potassium-40	12.5		1.62	2.06		0.601	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Protactinium-231	0.184	U	0.308	0.309		1.40	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Radium-226	0.231		0.107	0.109	0.500	0.128	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Radium-228	0.710		0.145	0.162		0.0950	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thallium-208	0.139		0.0627	0.0643		0.0695	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-228	0.493		0.116	0.132		0.119	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-232	0.710		0.145	0.162		0.0950	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-234	0.299	U	0.476	0.477		1.50	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Uranium-235	0.0510	U	0.157	0.157		0.368	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Uranium-238	0.299	U	0.476	0.477		1.50	pCi/g	04/07/16 12:29	04/28/16 19:50	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S613

Lab Sample ID: 160-16805-13

Date Collected: 04/04/16 15:15

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.439		0.149	0.156		0.108	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Actinium-227	0.0708	U	0.411	0.411		0.712	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Bismuth-212	0.334	U	0.432	0.434		0.713	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Bismuth-214	0.387		0.0942	0.102		0.0871	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Cesium-137	0.000	U	0.0253	0.0253		0.0877	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-210	0.961	U	1.43	1.43		1.84	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-212	0.372		0.107	0.117		0.115	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-214	0.427		0.0986	0.108		0.117	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Potassium-40	12.3		1.38	1.86		0.670	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Protactinium-231	0.0696	U	0.122	0.122		1.29	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Radium-226	0.387		0.0942	0.102	0.500	0.0871	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Radium-228	0.439		0.149	0.156		0.108	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thallium-208	0.144		0.0575	0.0594		0.0641	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-228	0.372		0.107	0.117		0.115	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-232	0.439		0.149	0.156		0.108	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-234	0.474	U	0.425	0.428		1.43	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Uranium-235	0.0615	U	0.162	0.162		0.320	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Uranium-238	0.474	U	0.425	0.428		1.43	pCi/g	04/07/16 12:29	04/28/16 19:50	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S614

Lab Sample ID: 160-16805-14

Date Collected: 04/04/16 15:18

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.413		0.205	0.209		0.298	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Actinium-227	0.00154	U	0.413	0.413		0.732	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Bismuth-212	0.135	U	0.473	0.473		0.841	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Bismuth-214	0.384		0.121	0.127		0.128	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Cesium-137	0.0155	U	0.0404	0.0404		0.0707	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Lead-210	1.30	U	1.37	1.38		1.84	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Lead-212	0.433		0.109	0.122		0.114	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Lead-214	0.389		0.0951	0.103		0.0997	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Potassium-40	11.4		1.43	1.84		0.758	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Protactinium-231	0.0282	U	0.0609	0.0610		1.56	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Radium-226	0.384		0.121	0.127	0.500	0.128	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Radium-228	0.413		0.205	0.209		0.298	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Thallium-208	0.154		0.0678	0.0696		0.0653	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Thorium-228	0.433		0.109	0.122		0.114	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Thorium-232	0.413		0.205	0.209		0.298	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Thorium-234	0.574	U	0.374	0.379		1.64	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Uranium-235	0.0990	U	0.202	0.202		0.308	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Uranium-238	0.574	U	0.374	0.379		1.64	pCi/g	04/07/16 12:29	04/28/16 20:20	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S615

Lab Sample ID: 160-16805-15

Date Collected: 04/04/16 15:21

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.287		0.137	0.140		0.207	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Actinium-227	0.0448	U	0.125	0.125		0.548	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Bismuth-212	0.304	U	0.388	0.389		0.636	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Bismuth-214	0.459		0.107	0.117		0.0702	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Cesium-137	-0.0193	U	0.0419	0.0420		0.0723	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Lead-210	-0.195	U	2.18	2.18		1.66	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Lead-212	0.395		0.0876	0.101		0.0897	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Lead-214	0.442		0.0786	0.0910		0.0789	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Potassium-40	10.9		1.41	1.79		0.453	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Protactinium-231	0.659	U	0.385	0.392		1.49	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Radium-226	0.459		0.107	0.117	0.500	0.0702	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Radium-228	0.287		0.137	0.140		0.207	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Thallium-208	0.201		0.0513	0.0554		0.0315	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Thorium-228	0.395		0.0876	0.101		0.0897	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Thorium-232	0.287		0.137	0.140		0.207	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Thorium-234	0.288	U	0.291	0.292		1.34	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Uranium-235	0.0557	U	0.130	0.131		0.228	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Uranium-238	0.288	U	0.291	0.292		1.34	pCi/g	04/07/16 12:29	04/28/16 20:33	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S616

Lab Sample ID: 160-16805-16

Date Collected: 04/04/16 15:25

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.554		0.132	0.144		0.105	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Actinium-227	0.194	U	0.351	0.352		0.592	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Bismuth-212	0.295	U	0.366	0.368		0.600	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Bismuth-214	0.367		0.100	0.107		0.0939	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Cesium-137	0.00361	U	0.0300	0.0300		0.0548	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Lead-210	0.439	U	0.708	0.710		1.19	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Lead-212	0.324		0.0914	0.101		0.0905	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Lead-214	0.489		0.100	0.112		0.0837	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Potassium-40	10.8		1.24	1.66		0.584	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Protactinium-231	0.132	U	0.180	0.181		1.41	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Radium-226	0.367		0.100	0.107	0.500	0.0939	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Radium-228	0.554		0.132	0.144		0.105	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Thallium-208	0.118		0.0328	0.0351		0.0248	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Thorium-228	0.324		0.0914	0.101		0.0905	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Thorium-232	0.554		0.132	0.144		0.105	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Thorium-234	0.408	U	0.694	0.695		1.16	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Uranium-235	0.0197	U	0.0918	0.0918		0.355	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Uranium-238	0.408	U	0.694	0.695		1.16	pCi/g	04/07/16 12:29	04/28/16 20:23	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S617

Lab Sample ID: 160-16805-17

Date Collected: 04/04/16 15:28

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.603		0.163	0.174		0.0747	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Actinium-227	0.106	U	0.513	0.513		0.883	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Bismuth-212	0.155	U	0.518	0.518		0.909	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Bismuth-214	0.422		0.137	0.144		0.136	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Cesium-137	-0.00694	U	0.0365	0.0365		0.0658	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Lead-210	0.450	U	0.920	0.921		1.74	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Lead-212	0.359		0.110	0.119		0.121	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Lead-214	0.455		0.0991	0.110		0.124	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Potassium-40	12.9		1.44	1.96		0.491	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Protactinium-231	0.0882	U	0.390	0.390		1.42	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Radium-226	0.422		0.137	0.144	0.500	0.136	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Radium-228	0.603		0.163	0.174		0.0747	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Thallium-208	0.136		0.0516	0.0535		0.0527	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Thorium-228	0.359		0.110	0.119		0.121	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Thorium-232	0.603		0.163	0.174		0.0747	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Thorium-234	0.293	U	0.485	0.486		1.79	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Uranium-235	0.0442	U	0.178	0.178		0.380	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Uranium-238	0.293	U	0.485	0.486		1.79	pCi/g	04/07/16 12:29	04/28/16 20:24	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S618

Lab Sample ID: 160-16805-18

Date Collected: 04/04/16 15:32

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.458		0.148	0.155		0.155	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Actinium-227	0.0390	U	0.149	0.149		0.591	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Bismuth-212	0.182	U	0.390	0.391		0.674	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Bismuth-214	0.445		0.0899	0.101		0.0462	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Cesium-137	0.00896	U	0.0275	0.0276		0.0490	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-210	-0.206	U	0.897	0.897		1.54	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-212	0.395		0.0834	0.0978		0.0794	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-214	0.410		0.0871	0.0969		0.0649	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Potassium-40	12.6		1.30	1.83		0.394	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Protactinium-231	0.177	U	0.413	0.414		1.27	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Radium-226	0.445		0.0899	0.101	0.500	0.0462	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Radium-228	0.458		0.148	0.155		0.155	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thallium-208	0.0928		0.0391	0.0403		0.0511	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-228	0.395		0.0834	0.0978		0.0794	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-232	0.458		0.148	0.155		0.155	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-234	0.940	U	0.673	0.680		1.06	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Uranium-235	0.0493	U	0.114	0.115		0.329	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Uranium-238	0.940	U	0.673	0.680		1.06	pCi/g	04/07/16 12:29	04/28/16 20:25	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S619

Lab Sample ID: 160-16805-19

Date Collected: 04/04/16 15:36

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.226		0.139	0.141		0.221	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Actinium-227	0.120	U	0.248	0.249		0.655	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Bismuth-212	0.388	U	0.493	0.494		0.809	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Bismuth-214	0.396		0.134	0.141		0.134	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Cesium-137	0.00212	U	0.0402	0.0402		0.0744	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-210	0.924	U	0.994	0.999		1.48	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-212	0.260		0.0836	0.0902		0.116	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-214	0.356		0.115	0.121		0.135	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Potassium-40	11.7		1.53	1.94		0.576	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Protactinium-231	0.364	U	0.489	0.491		1.58	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Radium-226	0.396		0.134	0.141	0.500	0.134	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Radium-228	0.226		0.139	0.141		0.221	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thallium-208	0.106		0.0422	0.0436		0.0471	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-228	0.260		0.0836	0.0902		0.116	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-232	0.226		0.139	0.141		0.221	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-234	0.199	U	0.452	0.453		1.52	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Uranium-235	0.0801	U	0.139	0.140		0.276	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Uranium-238	0.199	U	0.452	0.453		1.52	pCi/g	04/07/16 12:29	04/28/16 20:25	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S620

Lab Sample ID: 160-16805-20

Date Collected: 04/04/16 15:40

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.608		0.161	0.173		0.122	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Actinium-227	0.221	U	0.286	0.287		0.620	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Bismuth-212	0.641	U	0.523	0.527		0.807	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Bismuth-214	0.365		0.108	0.114		0.106	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Cesium-137	0.00378	U	0.0394	0.0394		0.0711	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Lead-210	0.944	U	1.05	1.05		1.63	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Lead-212	0.467		0.0925	0.110		0.0975	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Lead-214	0.456		0.0995	0.110		0.0981	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Potassium-40	13.4		1.45	1.99		0.683	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Protactinium-231	0.672	U	0.669	0.673		1.69	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Radium-226	0.365		0.108	0.114	0.500	0.106	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Radium-228	0.608		0.161	0.173		0.122	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Thallium-208	0.103		0.0522	0.0533		0.0752	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Thorium-228	0.467		0.0925	0.110		0.0975	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Thorium-232	0.608		0.161	0.173		0.122	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Thorium-234	0.437	U	0.382	0.385		1.72	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Uranium-235	0.122	U	0.142	0.142		0.310	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Uranium-238	0.437	U	0.382	0.385		1.72	pCi/g	04/07/16 12:29	04/28/16 20:26	1

QC Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-244942/1-A

Matrix: Solid

Analysis Batch: 248185

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 244942

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.08056	U	0.0997	0.100		0.248	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Actinium-227	-0.1848	U	0.415	0.416		0.715	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Bismuth-212	-0.07975	U	0.364	0.364		0.691	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Bismuth-214	-0.01092	U	0.119	0.119		0.164	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Cesium-137	0.0000	U	0.0109	0.0109		0.0577	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Lead-210	0.2245	U	1.06	1.06		2.01	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Lead-212	-0.01125	U	0.0965	0.0965		0.114	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Lead-214	-0.03650	U	0.362	0.362		0.151	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Potassium-40	0.01145	U	0.419	0.419		0.939	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Protactinium-231	-0.07439	U	0.827	0.827		1.52	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Radium-226	-0.01092	U	0.119	0.119	0.500	0.164	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Radium-228	0.08056	U	0.0997	0.100		0.248	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Thallium-208	0.002905	U	0.0392	0.0392		0.0791	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Thorium-228	-0.01125	U	0.0965	0.0965		0.114	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Thorium-232	0.08056	U	0.0997	0.100		0.248	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Thorium-234	0.1666	U	0.381	0.382		1.47	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Uranium-235	0.06334	U	0.100	0.100		0.295	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Uranium-238	0.1666	U	0.381	0.382		1.47	pCi/g	04/07/16 12:29	04/28/16 18:37	1

Lab Sample ID: LCS 160-244942/2-A

Matrix: Solid

Analysis Batch: 248186

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 244942

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	95.78		10.1		1.05	pCi/g	99	87 - 116
Cesium-137	29.7	28.28		3.00		0.203	pCi/g	95	87 - 120
Cobalt-60	17.4	15.84		1.63		0.117	pCi/g	91	87 - 115

Lab Sample ID: 160-16805-1 DU

Matrix: Solid

Analysis Batch: 248185

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S601

Prep Type: Total/NA

Prep Batch: 244942

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.602		0.4122		0.161		0.178	pCi/g	0.56	1
Actinium-227	-0.160	U	0.01047	U	0.0292		0.792	pCi/g	0.37	1
Bismuth-212	0.0867	U	0.5386	U	0.419		0.618	pCi/g	0.51	1
Bismuth-214	0.472		0.4002		0.100		0.0723	pCi/g	0.30	1
Cesium-137	-0.00003	U	-0.01404	U	0.0414		0.0722	pCi/g	0.20	1
Lead-210	43 -0.577	U	0.7519	U	1.31		1.83	pCi/g	0.18	1
Lead-212	0.384		0.4324		0.104		0.0833	pCi/g	0.23	1
Lead-214	0.473		0.4382		0.113		0.0956	pCi/g	0.15	1
Potassium-40	10.4		11.55		1.79		0.479	pCi/g	0.31	1
Protactinium-231	0.192	U	0.1427	U	0.617		1.10	pCi/g	0.05	1
Radium-226	0.472		0.4002		0.100	0.500	0.0723	pCi/g	0.30	1
Radium-228	0.602		0.4122		0.161		0.178	pCi/g	0.56	1

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-16805-1 DU

Matrix: Solid

Analysis Batch: 248185

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S601

Prep Type: Total/NA

Prep Batch: 244942

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.153		0.1466		0.0471		0.0417	pCi/g	0.07	1
Thorium-228	0.384		0.4324		0.104		0.0833	pCi/g	0.23	1
Thorium-232	0.602		0.4122		0.161		0.178	pCi/g	0.56	1
Thorium-234	-0.0127	U	0.2002	U	0.465		1.47	pCi/g	0.44	1
Uranium-235	0.0854	U	-0.03081	U	1.70		0.355	pCi/g	0.06	1
Uranium-238	-0.0127	U	0.2002	U	0.465		1.47	pCi/g	0.44	1

QC Association Summary

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Rad

Leach Batch: 244636

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16805-1	TI-TITO04-BS-R-FSSSU6-S601	Total/NA	Solid	Dry and Grind	
160-16805-1 DU	TI-TITO04-BS-R-FSSSU6-S601	Total/NA	Solid	Dry and Grind	
160-16805-2	TI-TITO04-BS-R-FSSSU6-S602	Total/NA	Solid	Dry and Grind	
160-16805-3	TI-TITO04-BS-R-FSSSU6-S603	Total/NA	Solid	Dry and Grind	
160-16805-4	TI-TITO04-BS-R-FSSSU6-S604	Total/NA	Solid	Dry and Grind	
160-16805-5	TI-TITO04-BS-R-FSSSU6-S605	Total/NA	Solid	Dry and Grind	
160-16805-6	TI-TITO04-BS-R-FSSSU6-S606	Total/NA	Solid	Dry and Grind	
160-16805-7	TI-TITO04-BS-R-FSSSU6-S607	Total/NA	Solid	Dry and Grind	
160-16805-8	TI-TITO04-BS-R-FSSSU6-S608	Total/NA	Solid	Dry and Grind	
160-16805-9	TI-TITO04-BS-R-FSSSU6-S609	Total/NA	Solid	Dry and Grind	
160-16805-10	TI-TITO04-BS-R-FSSSU6-S610	Total/NA	Solid	Dry and Grind	
160-16805-11	TI-TITO04-BS-R-FSSSU6-S611	Total/NA	Solid	Dry and Grind	
160-16805-12	TI-TITO04-BS-R-FSSSU6-S612	Total/NA	Solid	Dry and Grind	
160-16805-13	TI-TITO04-BS-R-FSSSU6-S613	Total/NA	Solid	Dry and Grind	
160-16805-14	TI-TITO04-BS-R-FSSSU6-S614	Total/NA	Solid	Dry and Grind	
160-16805-15	TI-TITO04-BS-R-FSSSU6-S615	Total/NA	Solid	Dry and Grind	
160-16805-16	TI-TITO04-BS-R-FSSSU6-S616	Total/NA	Solid	Dry and Grind	
160-16805-17	TI-TITO04-BS-R-FSSSU6-S617	Total/NA	Solid	Dry and Grind	
160-16805-18	TI-TITO04-BS-R-FSSSU6-S618	Total/NA	Solid	Dry and Grind	
160-16805-19	TI-TITO04-BS-R-FSSSU6-S619	Total/NA	Solid	Dry and Grind	
160-16805-20	TI-TITO04-BS-R-FSSSU6-S620	Total/NA	Solid	Dry and Grind	

Prep Batch: 244942

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16805-1	TI-TITO04-BS-R-FSSSU6-S601	Total/NA	Solid	Fill_Geo-21	244636
160-16805-1 DU	TI-TITO04-BS-R-FSSSU6-S601	Total/NA	Solid	Fill_Geo-21	244636
160-16805-2	TI-TITO04-BS-R-FSSSU6-S602	Total/NA	Solid	Fill_Geo-21	244636
160-16805-3	TI-TITO04-BS-R-FSSSU6-S603	Total/NA	Solid	Fill_Geo-21	244636
160-16805-4	TI-TITO04-BS-R-FSSSU6-S604	Total/NA	Solid	Fill_Geo-21	244636
160-16805-5	TI-TITO04-BS-R-FSSSU6-S605	Total/NA	Solid	Fill_Geo-21	244636
160-16805-6	TI-TITO04-BS-R-FSSSU6-S606	Total/NA	Solid	Fill_Geo-21	244636
160-16805-7	TI-TITO04-BS-R-FSSSU6-S607	Total/NA	Solid	Fill_Geo-21	244636
160-16805-8	TI-TITO04-BS-R-FSSSU6-S608	Total/NA	Solid	Fill_Geo-21	244636
160-16805-9	TI-TITO04-BS-R-FSSSU6-S609	Total/NA	Solid	Fill_Geo-21	244636
160-16805-10	TI-TITO04-BS-R-FSSSU6-S610	Total/NA	Solid	Fill_Geo-21	244636
160-16805-11	TI-TITO04-BS-R-FSSSU6-S611	Total/NA	Solid	Fill_Geo-21	244636
160-16805-12	TI-TITO04-BS-R-FSSSU6-S612	Total/NA	Solid	Fill_Geo-21	244636
160-16805-13	TI-TITO04-BS-R-FSSSU6-S613	Total/NA	Solid	Fill_Geo-21	244636
160-16805-14	TI-TITO04-BS-R-FSSSU6-S614	Total/NA	Solid	Fill_Geo-21	244636
160-16805-15	TI-TITO04-BS-R-FSSSU6-S615	Total/NA	Solid	Fill_Geo-21	244636
160-16805-16	TI-TITO04-BS-R-FSSSU6-S616	Total/NA	Solid	Fill_Geo-21	244636
160-16805-17	TI-TITO04-BS-R-FSSSU6-S617	Total/NA	Solid	Fill_Geo-21	244636
160-16805-18	TI-TITO04-BS-R-FSSSU6-S618	Total/NA	Solid	Fill_Geo-21	244636
160-16805-19	TI-TITO04-BS-R-FSSSU6-S619	Total/NA	Solid	Fill_Geo-21	244636
160-16805-20	TI-TITO04-BS-R-FSSSU6-S620	Total/NA	Solid	Fill_Geo-21	244636
LCS 160-244942/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-244942/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

From: [Sevcik, Joseph T CIV SEA 04 04N](#)
To: [Guillory, Jeffrey](#)
Cc: [Edwards, Zachary L CIV SEA 04 04N](#); [Yantos, Christopher N CIV NAVFAC SW, BRAC](#); [Messer, Ulrika](#); [Hackett, John R](#); [Schul, Raymond](#); [Morrison, Dennis](#); [Bohannon, Derek](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 11 (Use 1 Part 2)
Date: Tuesday, July 05, 2016 10:06:51 AM

Mr. Guillory,

I concur with designating RSY 11 (Use 1 Part 2)soil as non-LLRW.

v/r,

Joe Sevcik
Environmental Protection Manager
NAVSEADET RASO
160 Main Road
Building 1959
NWS Yorktown, VA 23691
Office: (757) 887-4483
DSN: 953-4483
Fax: (757) 887-4900

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederaleservices.com>]
Sent: Tuesday, July 05, 2016 9:45 AM
To: Sevcik, Joseph T CIV SEA 04 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: [Non-DoD Source] RE: NSTI RSY Soil Release Request - RSY 11 (Use 1 Part 2)

Mr. Sevcik,

Attached is a revised copy of NSTI RSY Soil Release Request - RSY 11 (Use 1 Part 2). This report includes revisions to the Soil Sample Data table (page 1), WRS & Histogram figures (pages 9-10), and systematic soil sample Analytical Report from TestAmerica (pages 28-50) to address Ra-226 concentration results listed as "undetected" in the prior TestAmerica Analytical Report.

My apologies for the inconvenience. If you have any questions, please do not hesitate to contact me. Thank you for your time.

Jeffrey Guillory

Scientist 3

Federal Services

Tel: +1 415 398 6547 ext 238

Cell: +1 979 422 5534

jeffrey.guillory@cbifederalservices.com

CB&I

950 Avenue M - Treasure Island

San Francisco, CA 94130

United States of America

www.CBI.com <<http://www.cbi.com/>>

From: Guillory, Jeffrey

Sent: Friday, May 20, 2016 10:44 AM

To: 'Sevcik, Joseph T CIV SEA 04 04N'

Cc: zachary.edwards@navy.mil; Yantos, Christopher N CIV NAVFAC SW, BRAC (christopher.yantos@navy.mil); Messer, Ulrika; Hackett, John R; Schul, Raymond; Coffey, Lisa M; Morrison, Dennis; Bohannon, Derek

Subject: NSTI RSY Soil Release Request - RSY 11 (Use 1 Part 2)

Mr. Sevcik,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Jeffrey Guillory

Scientist 3

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jeffrey.guillory@cbifederalservices.com

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United States of America

www.CBI.com <<http://www.cbi.com/>>



Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY #11	RSY Unit Use Number: USE 1, Part 2	First Submittal <input type="checkbox"/> Second Submittal <input checked="" type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 7/5/2016

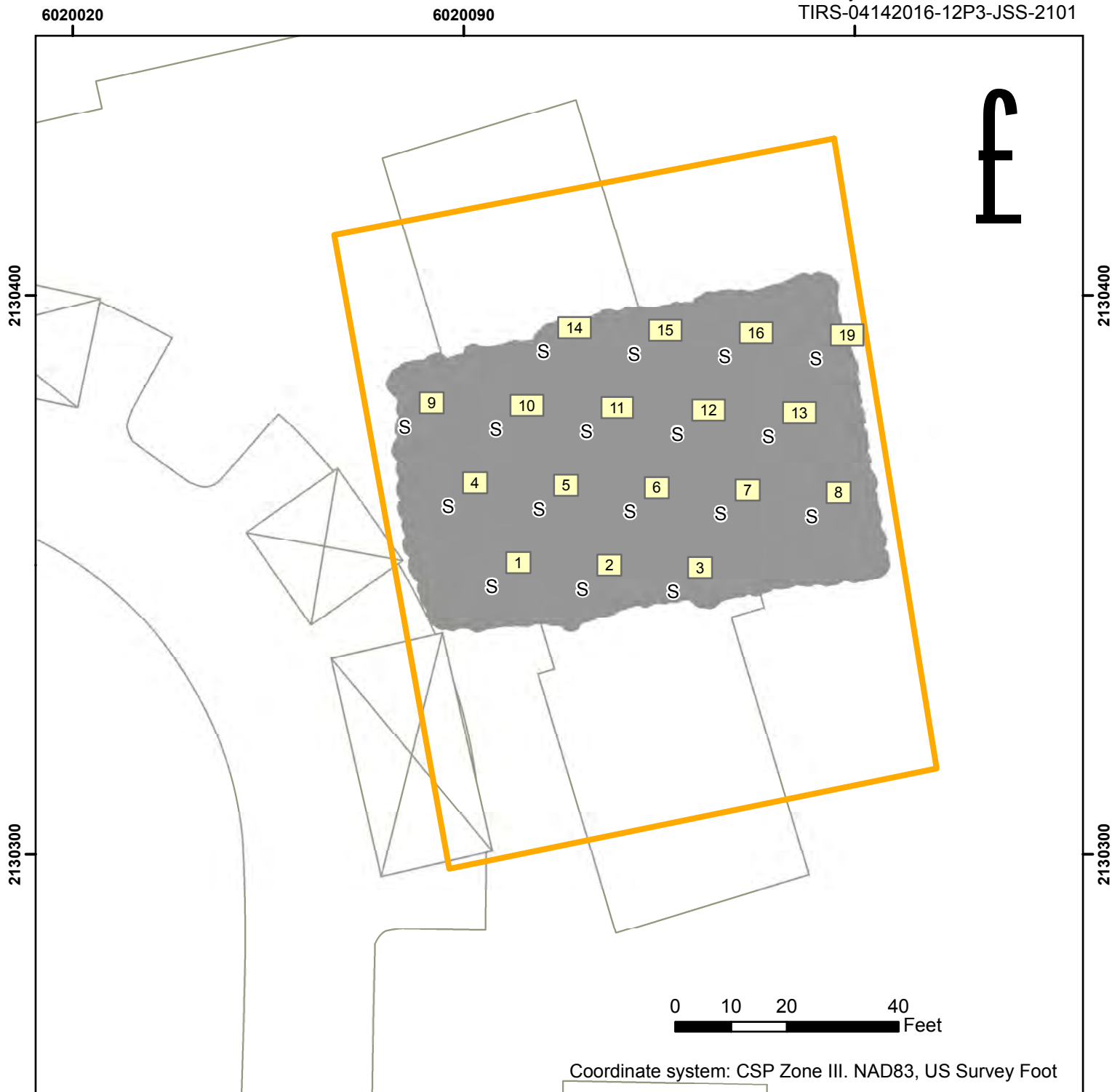
Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static 2221 Meter Serial Number	One Minute Static Reading (CPM)	Static Count Over Static Mean + 3σ	²²⁶ Ra Final Analytical Results
TI-TO04-BS-R-SU8-S001	1	Systematic	262301	13,733	No	0.336
TI-TO04-BS-R-SU8-S002	2	Systematic	262301	14,187	No	0.383
TI-TO04-BS-R-SU8-S003	3	Systematic	262301	13,785	No	0.391
TI-TO04-BS-R-SU8-S004	4	Systematic	262301	13,438	No	0.333
TI-TO04-BS-R-SU8-S005	5	Systematic	262301	13,785	No	0.351
TI-TO04-BS-R-SU8-S006	6	Systematic	262301	13,925	No	0.348
TI-TO04-BS-R-SU8-S007	7	Systematic	262301	13,532	No	0.252
TI-TO04-BS-R-SU8-S008	8	Systematic	262301	13,917	No	0.340
TI-TO04-BS-R-SU8-S009	9	Systematic	262301	13,481	No	0.358
TI-TO04-BS-R-SU8-S010	10	Systematic	262301	13,455	No	0.307
TI-TO04-BS-R-SU8-S011	11	Systematic	262301	13,738	No	0.463
TI-TO04-BS-R-SU8-S012	12	Systematic	262301	13,818	No	0.376
TI-TO04-BS-R-SU8-S013	13	Systematic	262301	13,537	No	0.354
TI-TO04-BS-R-SU8-S014	14	Systematic	262301	14,333	No	0.467
TI-TO04-BS-R-SU8-S015	15	Systematic	262301	13,348	No	0.354
TI-TO04-BS-R-SU8-S016	16	Systematic	262301	13,721	No	0.351
TI-TO04-BS-R-SU8-S019	19*	Systematic	262301	13,585	No	0.331

*A total of twenty-one systematic samples were collected from the bottom of the excavation at SWDA Bayside SU 8, of which seventeen (001-016 & 019) were collected ex situ on RSY Pad 11 (Use 1, Part 2) from the over-excavated layer of FSS material removed from the underwater portion of the SU. See [Note](#) (page 2) for more details.

Instrument Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Static Background (CPM)	Static Background Plus 3σ (CPM)	Scan Background	Scan Background Plus 3σ	Range
General Area Exposure Rate Survey	TIRS-04052016-12P3-JSS-2087	4/5/2015	19	7/16/2016	267078	N/A	N/A	N/A	N/A	5 – 6 μR/hr
Gamma Scan Walkover	TIRS-04132016-12P3-ROV-2092	4/13/2016	RS-701/RSX-1	N/A	Console: 7236 / Detectors: 5447, 5448	N/A	N/A	7,595 CPS	8,275 CPS	5,166 – 6,099 CPS
Follow-up Static Survey	TIRS-04142016-12P3-JSS-2100	4/14/2016	2221	1/12/2017	262301	16,866	18,654	N/A	N/A	13,353 – 13,927 CPM
One Minute Systematic Sampling Static Counts	TIRS-04142016-12P3-JSS-2101	4/14/2016	2221	1/12/2017	262301	16,866	18,654	N/A	N/A	13,348 – 14,333 CPM

CPM = Counts Per Minute
CPS = Counts Per Second

Summary
1) General area survey performed of staged soil piles prior to soil being spread to the 9-inch screening layer.
2) Initial RSI gamma scan and data review—upon review of initial scan data, follow-up static investigations were deemed necessary, and investigation locations were identified as per the RSI Data Evaluation Process (page 4). Gamma scan coverage shown on Systematic Sample Survey map (page 3). Contour maps of initial scan data are shown on RSI Data Plots (page 5). Data review results are summarized on RSI Review Summary (page 6).
3) Follow-up static survey—13 locations identified during the data review process were investigated, resulting in all locations < static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 7).
<p>4) Seventeen* systematic soil samples (001-016, 019) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with all readings < static IL. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 28-50).</p> <p><u>*Note:</u> A portion of the bottom of the excavation at SWDA Bayside Survey Unit (SU) 8 was inaccessible for in situ FSS operations due to water infiltration, therefore a 6" layer of FSS material spanning the entire underwater portion of the excavation bottom was over-excavated and surveyed ex situ on RSY 11 (Use 1, Part 2). Systematic sample locations 001-016 and 019 (included in this report) were re-plotted on the RSY pad following over-excavation, whereas systematic sample locations 017, 018, 020, and 021 were located on the above water portion of the excavation bottom and sampled in situ.</p>
<p>Conclusions:</p> <p>All locations with elevated Z-scores identified by the initial RSI gamma scan were deemed comparable to background. 13 follow-up static locations were investigated, with readings < static IL at all locations.</p> <p>Additional locations (a-q, page 5) with elevated Z-scores that did not meet the criteria for a follow-up investigation were evaluated by spectral analysis of the RSI gamma scan data, which did not indicate the presence of Ra-226 above background levels (pages 11-27).</p> <p>Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 9-10. These statistical tools were utilized to verify the appropriate level of reasonable effort.</p> <p>RSY 11 (Use 1, Part 2) contains soil from the final 6-inch over excavation of FSS material from the bottom of the excavation at SWDA Bayside SU 8.</p> <p><u>Note:</u> Soil on RSY Pad 11 (Use 1, Part 2) was over-excavated at the final depth from the bottom of the excavation at Bayside SU 8, and no visible debris and/or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.</p> <p>CB&I requests RASO concurrence to release this soil as Non-LLRW.</p> <p>Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.</p>

Survey Number:
TIRS-04142016-12P3-JSS-2101**Instrument # 262301**

S Systematic Sample Locations

● RSI Coverage

□ RSY Pad Boundaries

Sample ID

CB&I Federal Services, LLC

Data Processed In Treasure Island Office

RS-700 Mobile Radiation Monitoring System

- Self-contained gamma-ray radiation detection and monitoring system
- Built-in GPS receiver
- (2) RSX-1 4-liter NaI(Tl) gamma detectors oriented perpendicular to the direction of travel (VD1 denotes both detectors summed; VD3 refers to the left detector; and VD4 refers to the right detector)
- Multi-Channel Analyzer, allowing for monitoring of energy-specific regions of interest (ROIs)
- RadAssist survey software for control, monitoring, and recording

Ten ROIs have been established for radium and progeny as well as other naturally-occurring or anthropogenic gamma-emitting radionuclides that may be of interest:

ROI	Description	Energy Range (keV)	Primary Peak (keV)
1	Total counts	411 – 2811	N/A
2	Potassium	1371 – 1569	1460
3	U/Ra-226	1659 – 1860	1764 (Bi-214)
4	Thorium	2409 – 2811	2614 (Tl-208)
5	Annihilation	456 – 570	511
6	Ra-226	546 – 666	609 (Bi-214)
7	Cs-137	549 – 741	662
8	Pb-214/Ra-226	327 – 399	351
9	Range	45 – 1980	N/A
10	Gross Counts	3 – 3072	N/A

A tiered approach is used during data review to identify follow-up locations. Raw data are exported to a comma delimited format using RadAssist and imported into an Excel spreadsheet for review and analysis. Count rate data are compared with ROI- and material-specific investigation levels (ILs). In addition, the following review steps are completed to determine if additional follow-up measurements are necessary:

- **Playback Review:** The data file is replayed in RadAssist and reviewed for elevated count rates in ROIs 1, 3, 6, and 10 for virtual detector (VD) 1 (both detectors summed). The scan screen is also monitored for elevated count rates and alarms.
- **Count Rate Time Series Review:** The count rates for ROIs 1, 3, 6, and 10 for VDs 1, 3 (detector 1), and 4 (detector 2) are plotted in a time series and reviewed for additional peaks in count rate.
- **All ROIs:**
 - **Z-Scores:** The Z-Scores are calculated for each location in all ROIs for VDs 1, 3, and 4. Any location with four or more ROIs having a Z-Score greater than three ($Z > 3$) is marked for follow-up.
 - **Local Z-Scores:** Local Z-Scores are calculated using a moving average for each data point in all ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with four or more ROIs having a local $Z > 3$ is marked for follow-up.
 - **Semi-local Z-Scores:** Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with four or more ROIs having a semi-local $Z > 3$ is marked for follow-up.

- **ROIs 3, 6, 8, and 10 (radium-specific ROIs):**
 - Z-Scores: The Z-Scores are calculated for each location in the radium-specific ROIs for VDs 1, 3, and 4. Any location with three or more radium-specific ROIs having a $Z > 3$ is marked for follow-up.
 - Local Z-Scores: Local Z-Scores are calculated using a moving average for each data point in the radium-specific ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a local $Z > 3$ is marked for follow-up.
 - Semi-local Z-Scores: Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a semi-local $Z > 3$ is marked for follow-up.
- **Z-Score Time Series Review:** The three types of Z-Scores for ROIs 1, 3, 6, and 10 for VDs 1, 3, and 4 are plotted in a time series and reviewed for additional peaks in Z-Scores.

Follow-up locations will be plotted on contour maps depicting all locations with any radium-specific ROI $Z > 3$. Any location selected for follow-up, or any location with a radium-specific ROI $Z > 3$ will undergo spectral analysis to determine if it is statistically likely that there is radium present at that location in quantities greater than the background.

A background spectrum, obtained from NSTI Reference Area 7, is subtracted from the local spectral data for a given location, and the resulting net spectrum is plotted. Critical levels, as defined in Section 6.7.1 of the Multi Agency Radiation Survey and Site Investigation Manual are calculated and plotted based on background levels. The critical level is the level, in counts, at which there is a statistical probability (with a predetermined confidence) of incorrectly identifying a measurement system background value as greater than background. Any response above this level is considered to be greater than background. The critical level is calculated for ROIs 3, 6, and 8 according to the equation shown below:

$$L_C = 2.33\sqrt{B}$$

Where:

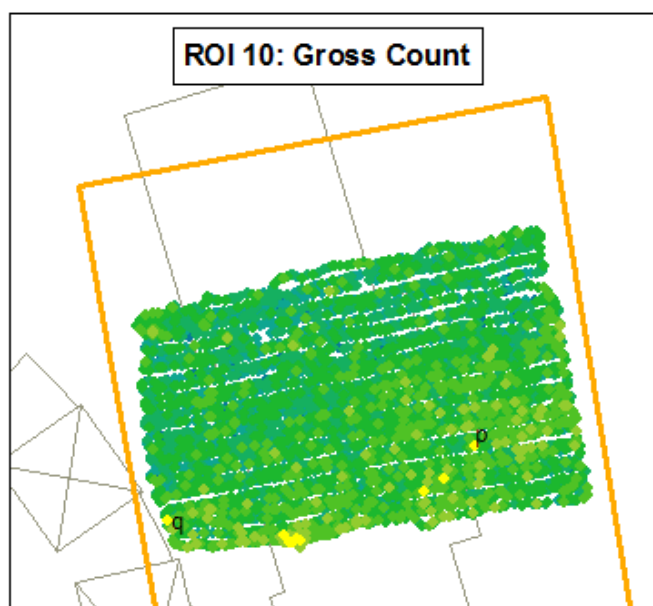
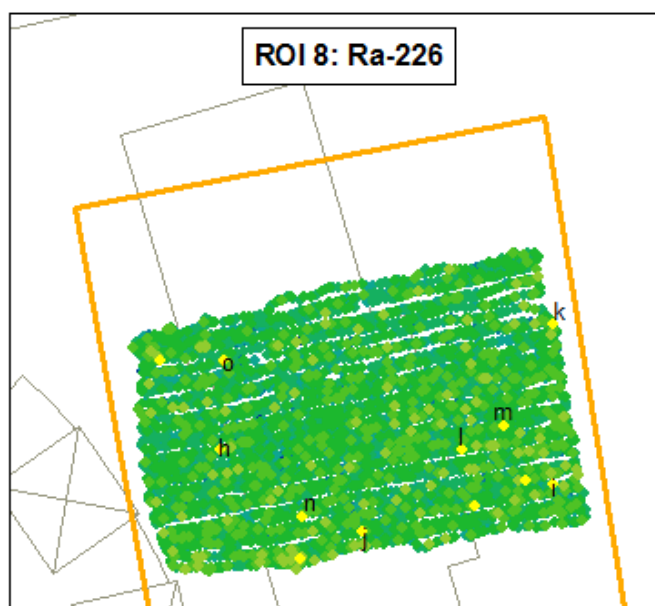
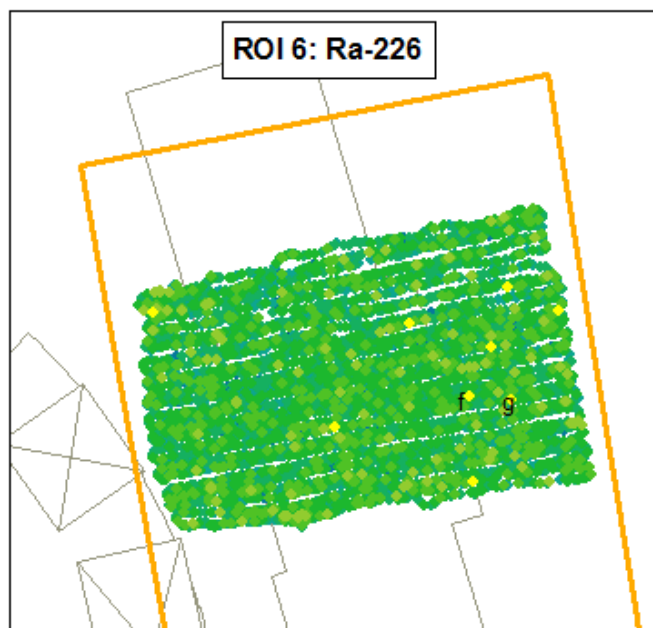
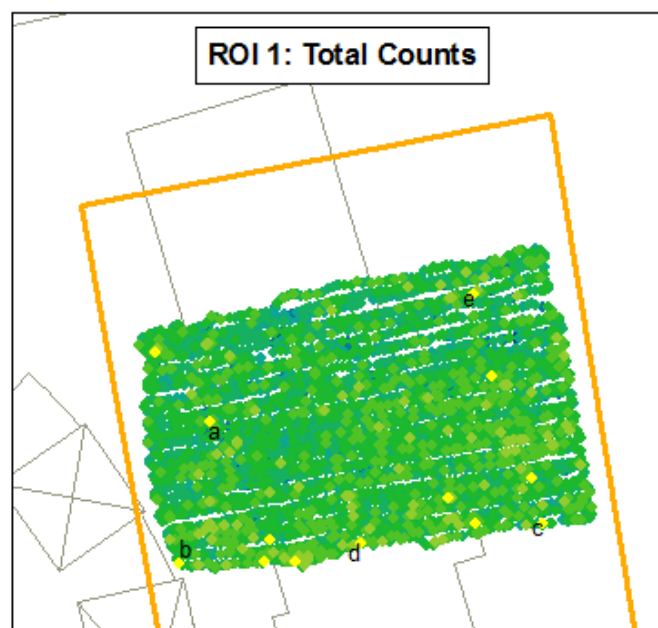
LC	=	critical level (counts)
B	=	average background in the ROI

The ROI ranges for ROIs 3, 6, and 8 are then plotted on the net spectrum graph with their respective critical levels. When count rates in the net gamma spectrum at a given location do not exceed critical levels for any radium-specific energy ranges, it is unlikely that radium exists at that location above background.

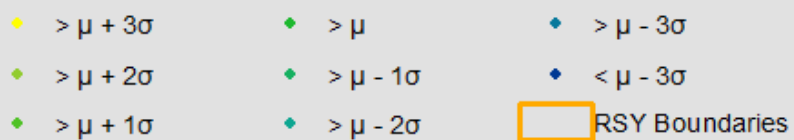
Any data point that is both above the critical level and within the energy range of a given ROI is considered above background for that radionuclide and will be flagged for further investigation in the field.

RSI DATA PLOT

RSY 11 Use 1 Part 2



RSI Walkover Survey Data (VD1)



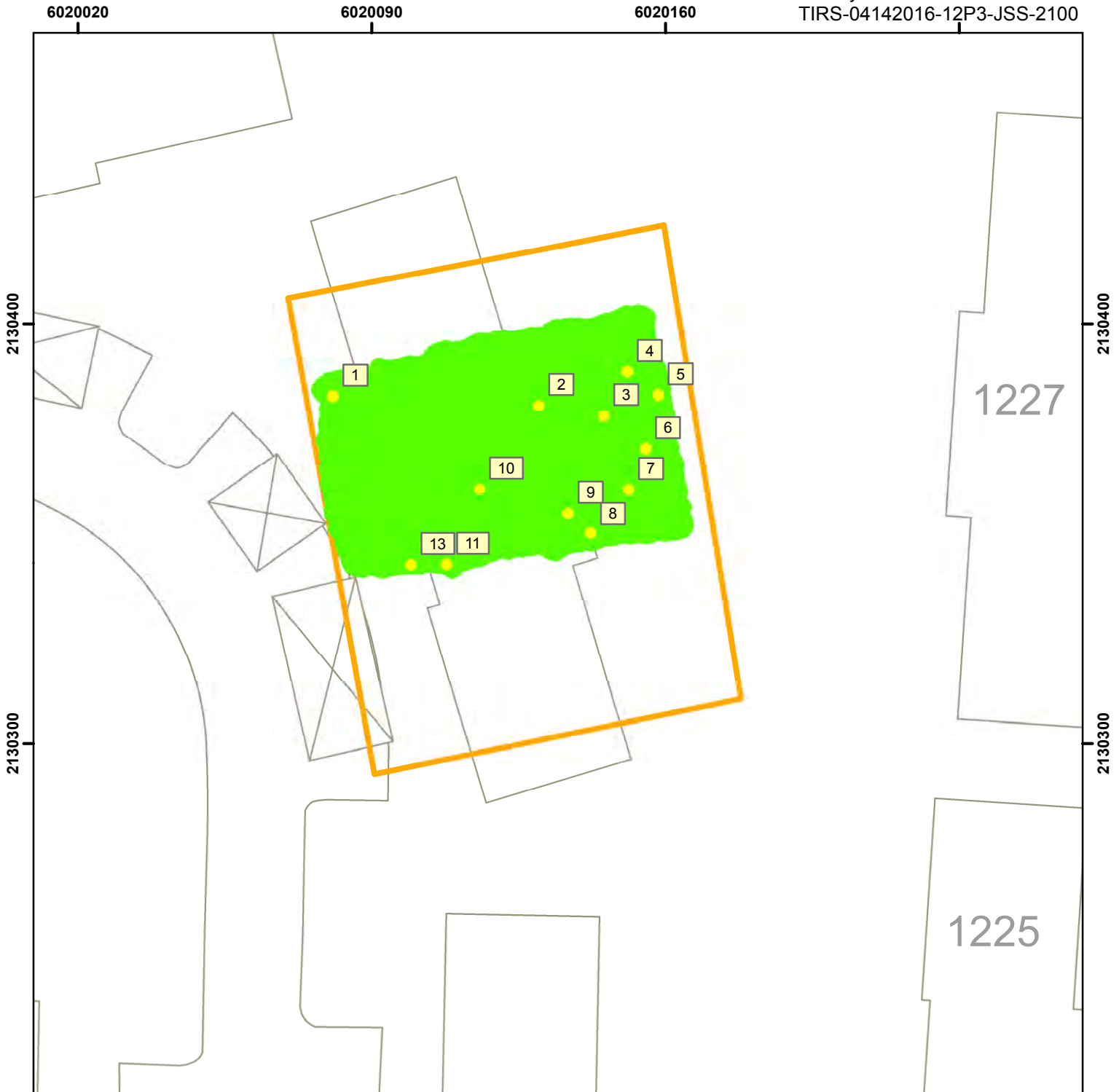
RSI Review Summary

Summary:

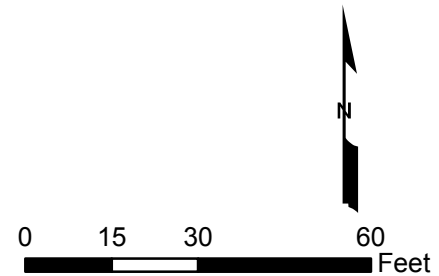
13 locations were selected for follow-up investigation. Locations were identified by elevated peaks noted in the count rate ratio review, playback review and/or time series charts, and by using the Z-Score, Local Z-Score, and Semi-Local Z-Score reviews as described in the RSI Data Evaluation Process on pages 4-5. The table below details the reasons for each investigation by location.

Locations denoted (a-q) on RSI Data Plots (see previous page) did not meet the evaluation criteria for further investigation. Elevated Z-scores at these locations were identified only in specific ROIs, including: five locations exclusive to ROI 1 (a-e), two locations exclusive to ROI 6 (f-g), eight locations exclusive to ROI 8 (h-o), and two locations exclusive to ROI 10 (p-q). Elevated gross count rates were only identified at locations p & q, and a review of the data did not reveal any additional indicators warranting a follow-up investigation. Furthermore, spectral analyses performed on gamma scan data obtained from these locations did not indicate the presence of Radium-226 above background; figures are provided on pages 11 - 27.

RSY 11 Use 1 (Part 2) Investigation								Follow-up			
Location	Longitude	Latitude	Details	Maximum Result (Ra/Tot)				Meter SN	Static Count	Static IL (cpm)	Comments
				VD	ROI	Z-Score	Type:				
1	-122.3753939	37.8307478	>4 ROIs normal/local Z>3 (all ROIs)					262301	13,378	18,654	< IL
2	-122.3752239	37.8307443	>4 ROIs Z>3 (all ROIs)					262301	13,353	18,654	< IL
3	-122.3751702	37.8307385	>4 ROIs normal/local Z>3 (all ROIs)					262301	13,483	18,654	< IL
4	-122.3751515	37.8307677	Highest Z-Scores	3	3	5.31	Normal	262301	13,436	18,654	< IL
5	-122.3751256	37.8307529	3 ROIs normal/local Z>3 (Ra/Tot), >4 ROIs normal/local Z>3 (all ROIs)	1	6	4.51	Normal	262301	13,899	18,654	< IL
6	-122.3751352	37.8307175	Elevated spectral analysis location					262301	13,711	18,654	< IL
7	-122.3751485	37.8306905	Time series peak					262301	13,921	18,654	< IL
8	-122.3751792	37.8306618	3 ROIs Z>3 (Ra/Tot), >4 ROIs Z>3 (all ROIs)	4	6	3.41	Normal	262301	13,545	18,654	< IL
9	-122.3751979	37.8306742	>4 ROIs Z>3 (all ROIs)					262301	13,574	18,654	< IL
10	-122.3752714	37.8306888	>4 ROIs Z>3 (all ROIs)					262301	13,452	18,654	< IL
11	-122.3752973	37.8306392	>4 ROIs Z>3 (all ROIs)					262301	13,794	18,654	< IL
12	-122.3753143	37.8306509	>4 ROIs normal/local Z>3 (all ROIs)					262301	13,513	18,654	< IL
13	-122.3753267	37.8306386	Elevated spectral analysis location					262301	13,565	18,654	< IL

Survey Number:
TIRS-04142016-12P3-JSS-2100**Instrument # 262301**

- Investigation Points
- Data Points Not Requiring Further Investigation
- RSYPAD Boundaries
- # Investigation Point ID

CB&I Federal Services, LLC

Coordinate system: CSP Zone III. NAD83, US Survey Foot

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 11-1 (P.2)
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	19	0	1	S
0.98	R	0.98	37	0	2	S
0.83	R	0.83	32.5	0	3	S
0.54	R	0.54	22	0	4	S
0.57	R	0.57	24.5	0	5	S
0.55	R	0.55	23	0	6	S
0.57	R	0.57	24.5	0	7	S
0.46	R	0.46	18	0	8.5	S
0.50	R	0.5	20	0	8.5	S
0.66	R	0.66	26.5	0	10.5	S
0.75	R	0.75	30	0	10.5	S
0.70	R	0.7	29	0	12	S
0.86	R	0.86	34	0	13	S
0.51	R	0.51	21	0	14	S
0.91	R	0.91	36	0	15	S
0.83	R	0.83	32.5	0	16	S
0.79	R	0.79	31	0	17	S
0.90	R	0.9	35	0	18	R
0.66	R	0.66	26.5	0	19	R
0.69	R	0.69	28	0	20	R
0.336	S	-0.146939192	5	5	21	R
0.383	S	-0.099939192	14	14	22	R
0.391	S	-0.091939192	15	15	23	R
0.333	S	-0.149939192	4	4	24.5	R
0.351	S	-0.131939192	8.5	8.5	24.5	R
0.348	S	-0.134939192	7	7	26.5	R
0.252	S	-0.230939192	1	1	26.5	R
0.340	S	-0.142939192	6	6	28	R
0.358	S	-0.124939192	12	12	29	R
0.307	S	-0.175939192	2	2	30	R
0.463	S	-0.019939192	16	16	31	R
0.376	S	-0.106939192	13	13	32.5	R
0.354	S	-0.128939192	10.5	10.5	32.5	R
0.467	S	-0.015939192	17	17	34	R
0.354	S	-0.128939192	10.5	10.5	35	R
0.351	S	-0.131939192	8.5	8.5	36	R
0.331	S	-0.151939192	3	3	37	R
Sum =				703	153	

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 *n*
 # of S: 17 *m*
 Avg Rank R: 27.5
 Avg Rank S: 9

For *m* or *n* greater than 20, the critical value (*k*) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

z = 97.5% percentile of standard normal distribution = 1.960

k = 387.3

$\alpha_w = \alpha/2 = 0.025$

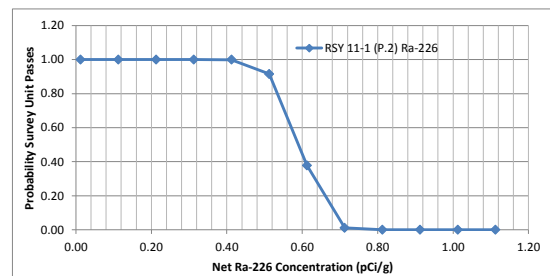
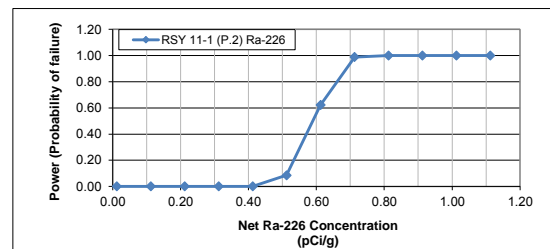
$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	17
SU σ	0.051
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count	17	<i>m</i>
SD	0.051	
Median	0.351	
Count	20	<i>n</i>
SD	0.161	
Critical Value	387.3	

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	5.76198	34.25764	5.8530028	38.963	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	13.107	95.65061	9.7801127	22.5668	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	38.98644	346.2926	18.608937	10.4695	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	74.23492	667.5508	25.837004	6.17633	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	132.1407	1010.459	31.787724	3.19847	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	189.1185	1059.714	32.553248	1.37296	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	242.8266	835.6784	28.908103	-0.31181	0.62	0.38
1.4	0.71	1.4	0.83890	0.74170	285.2263	497.4727	22.304096	-2.30512	0.99	0.01
1.5	0.81	2.0	0.92135	0.86577	313.259	225.5238	15.017451	-5.29027	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	330.4395	64.68996	8.0430069	-12.0138	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	336.6639	17.15167	4.1414574	-24.8345	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	339.2047	2.810796	1.6765428	-62.8627	1.00	0.00

**QUANTILE TEST**

From NUREG 1505, Table A.7c Values of *r* and *k* for the Quantile Test When α is Approximately 0.05

17 *n* (number of survey unit measurements)
 20 *m* (number of reference area measurements)

Use:
m = 20
n = 20
 4 *r*
 4 *k*
 0.053 α

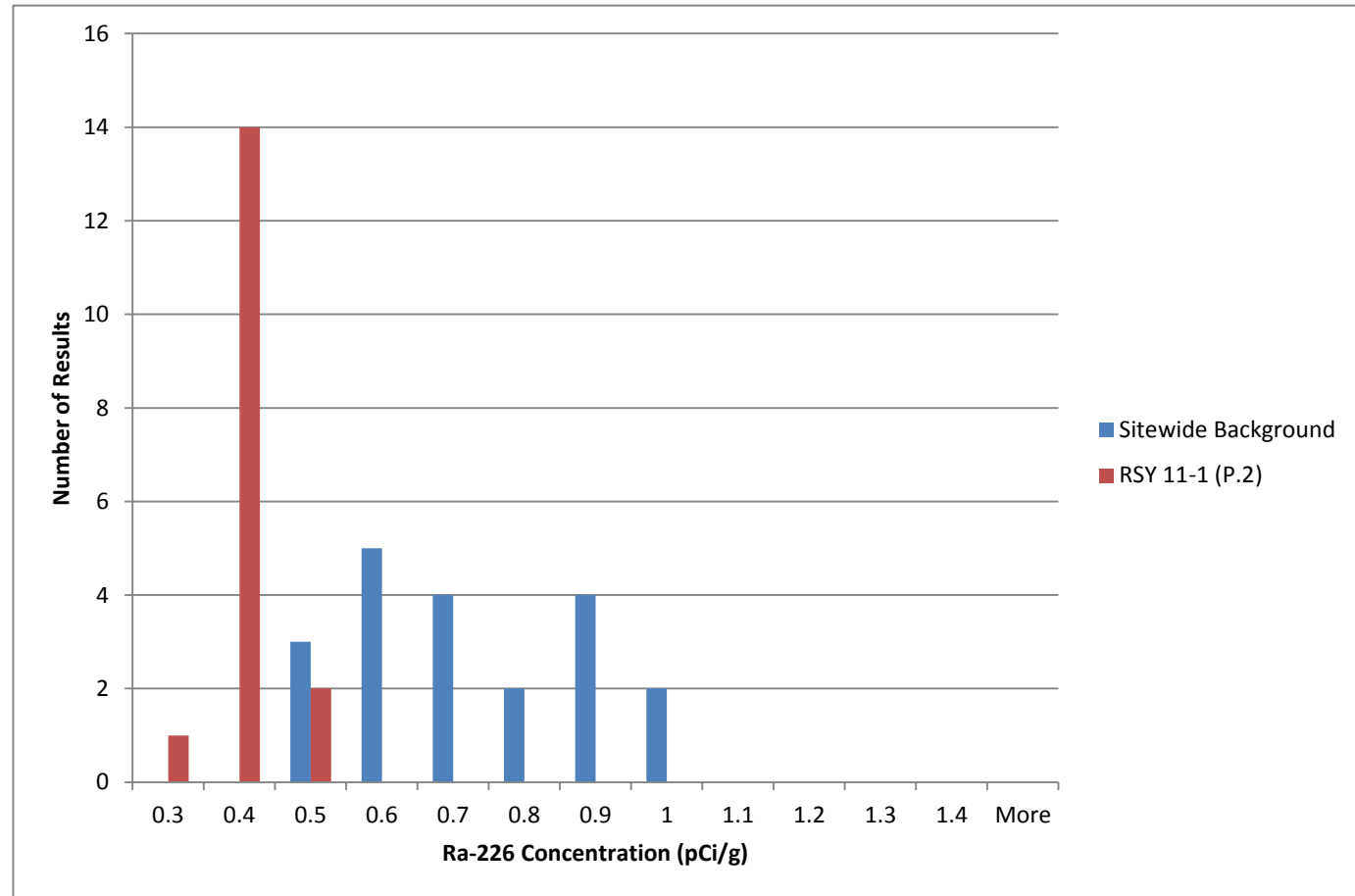
If *k* or more of the *r* largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S. The null hypothesis is accepted.

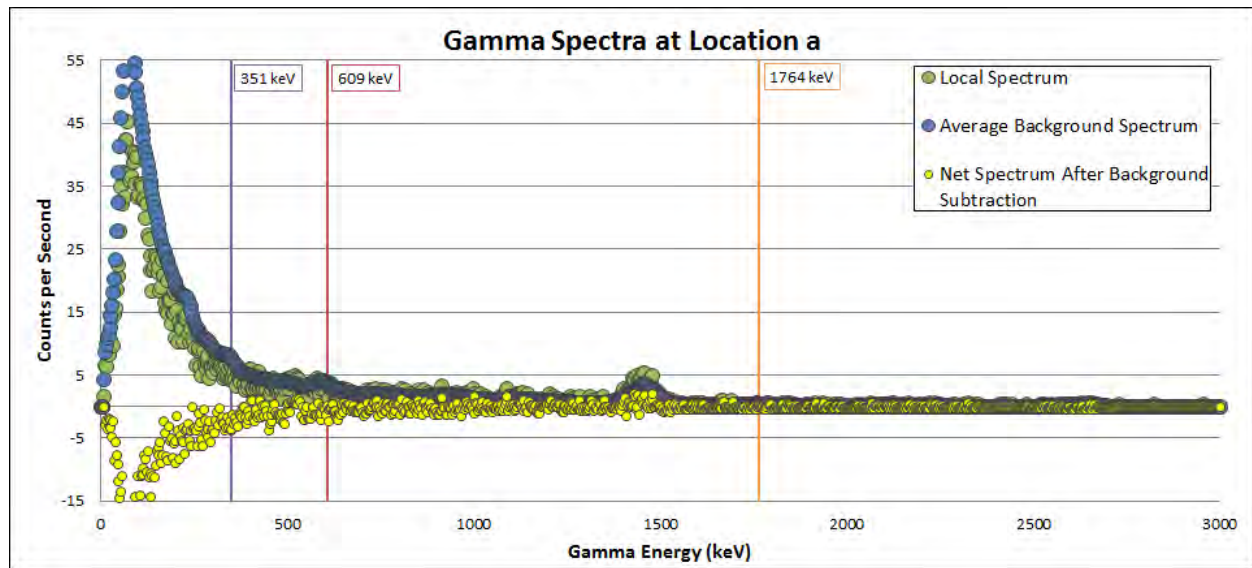
Histogram, RSY 11 Use 1 (Part 2) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 11-1 (P.2)	
<i>Bin</i>	<i>Frequency</i>
0.3	1
0.4	14
0.5	2
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0

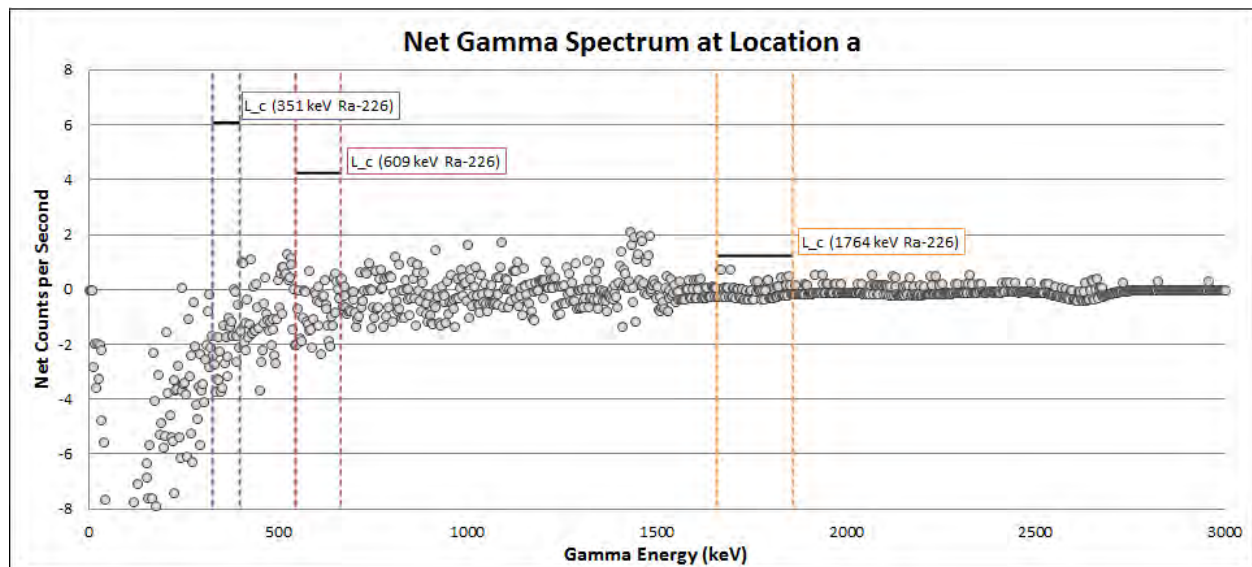


RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (a)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (a)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (a)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

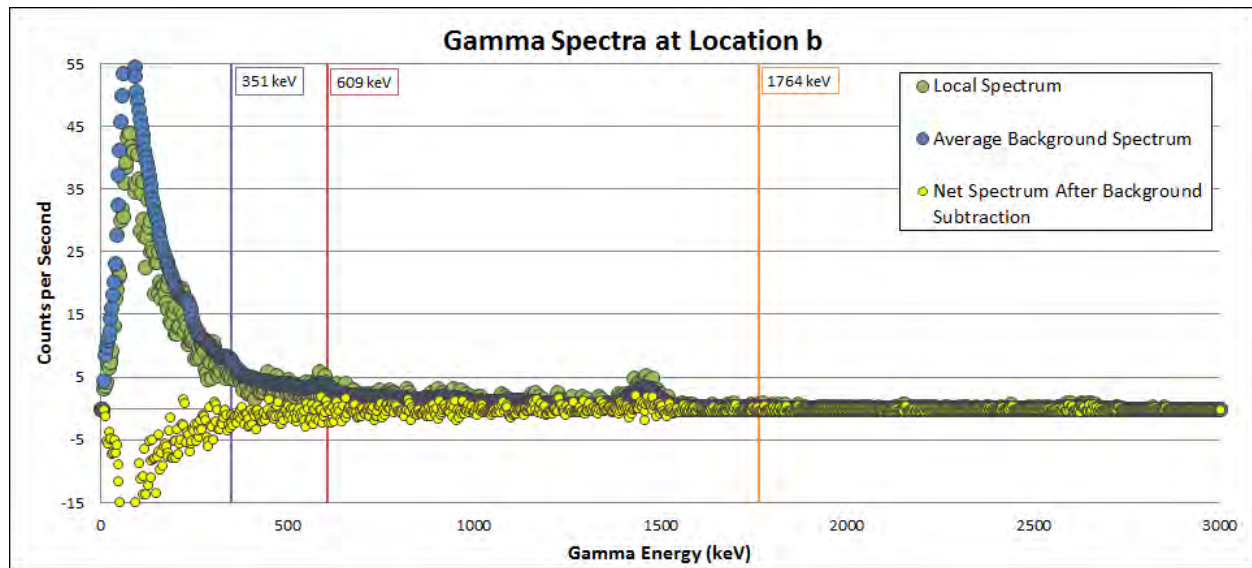
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

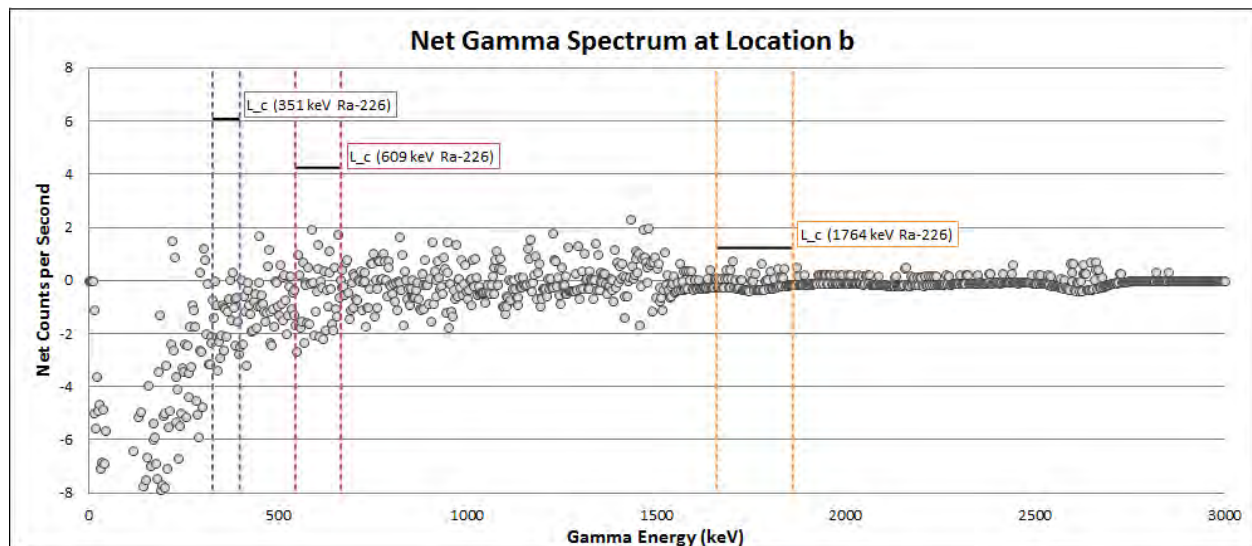
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (b)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (b)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (b): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

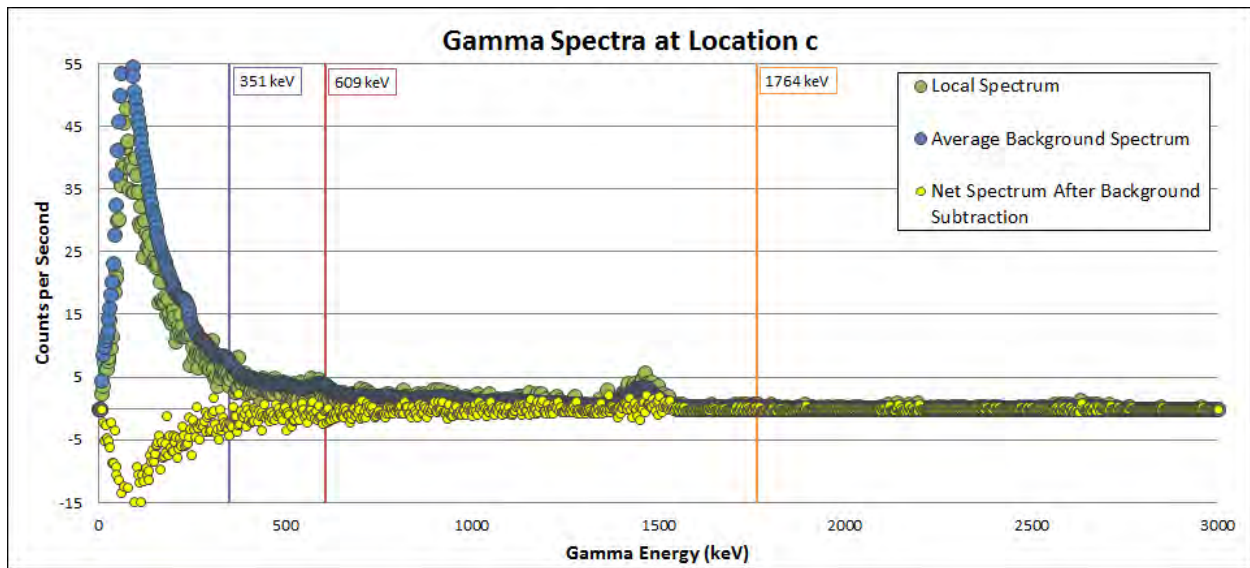
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

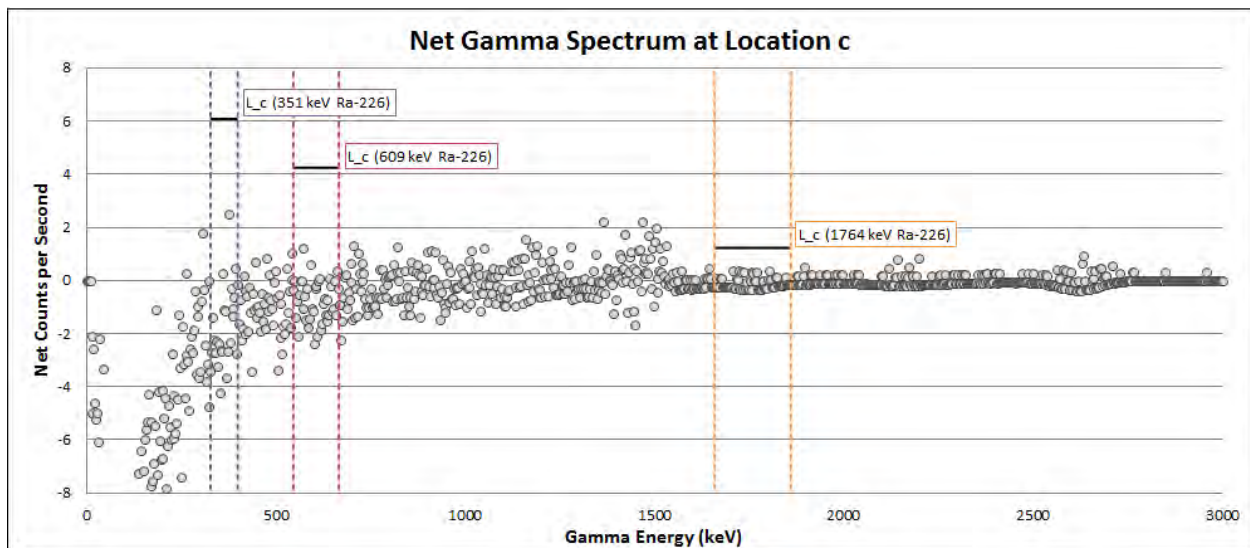
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (c)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (c)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (c): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

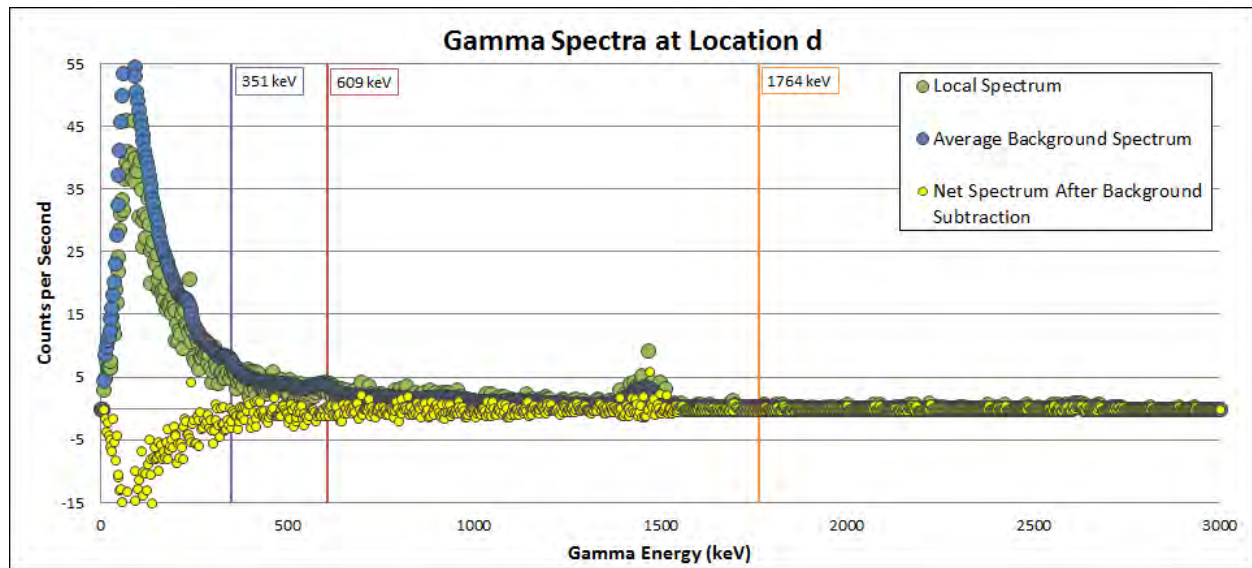
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

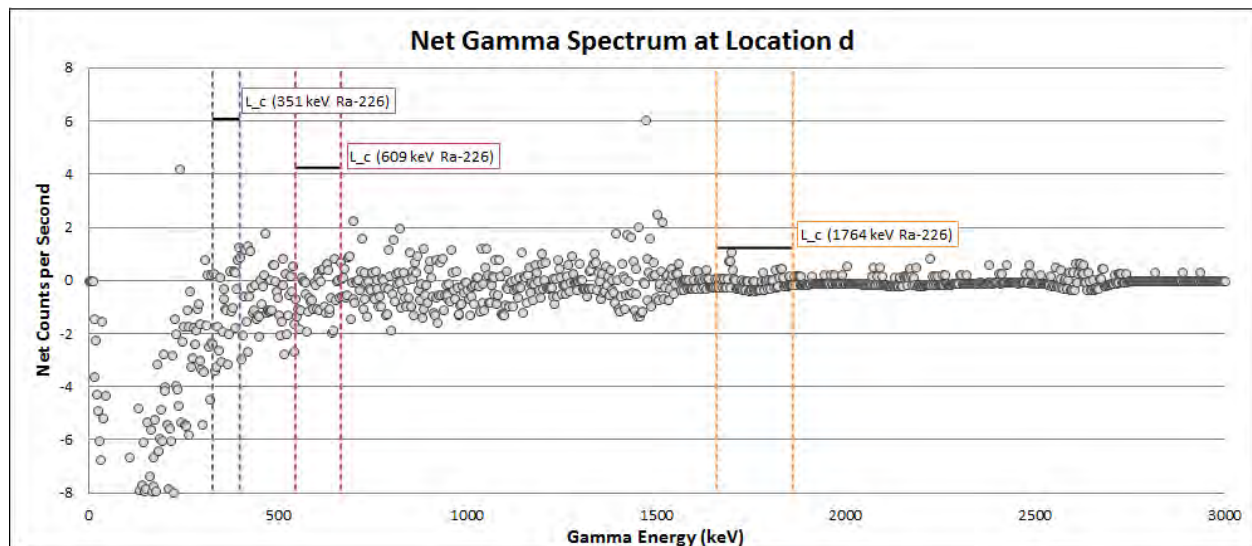
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (d)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (d)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (d): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

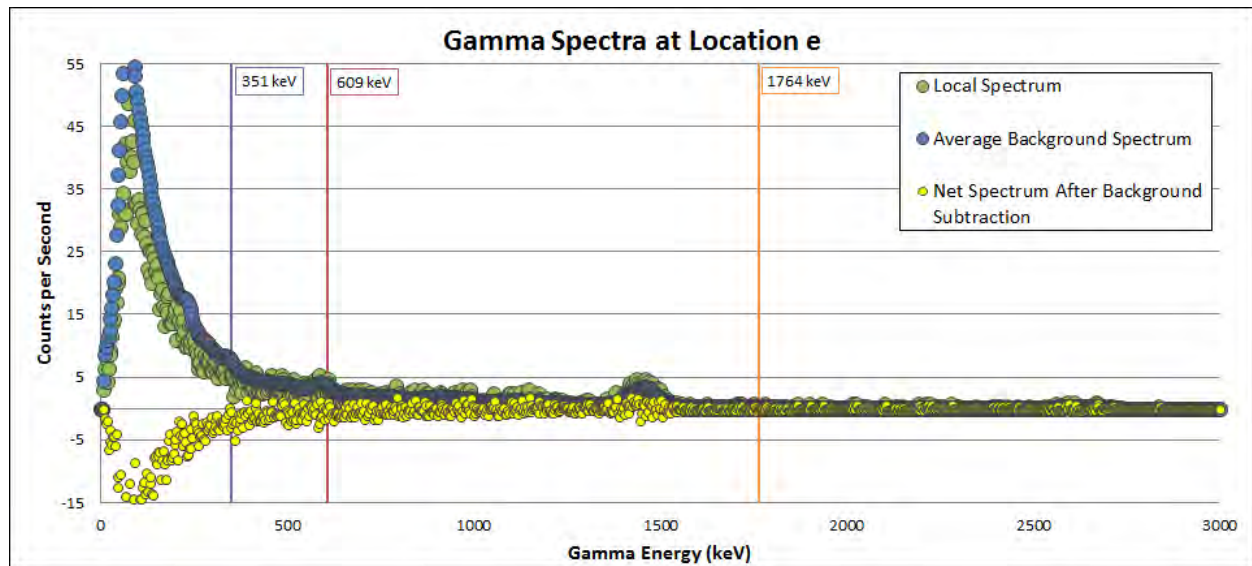
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

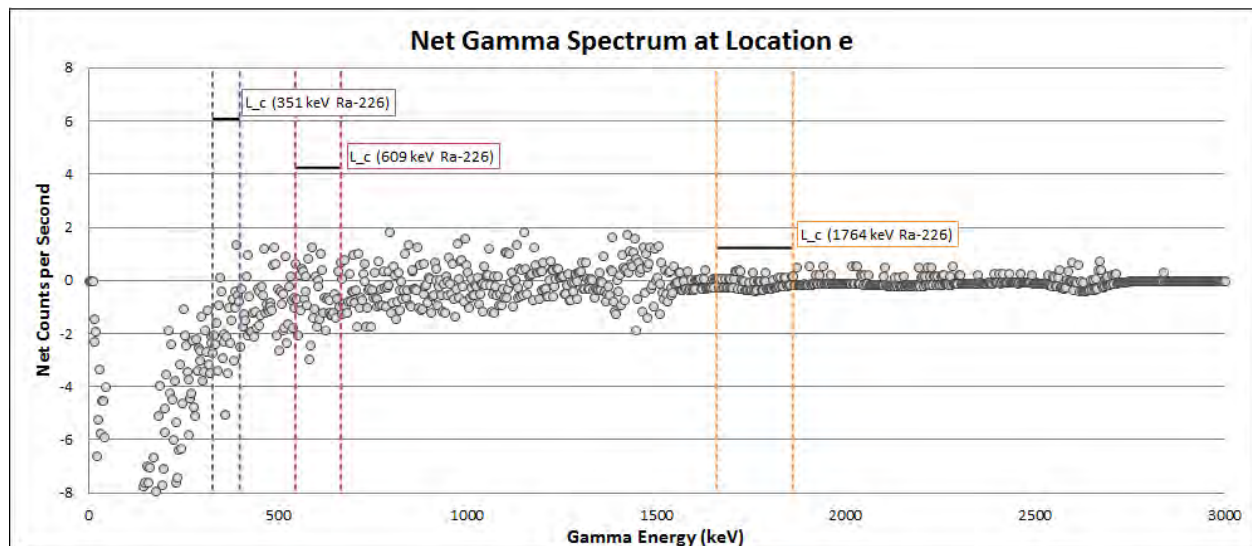
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (e)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (e)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (e): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

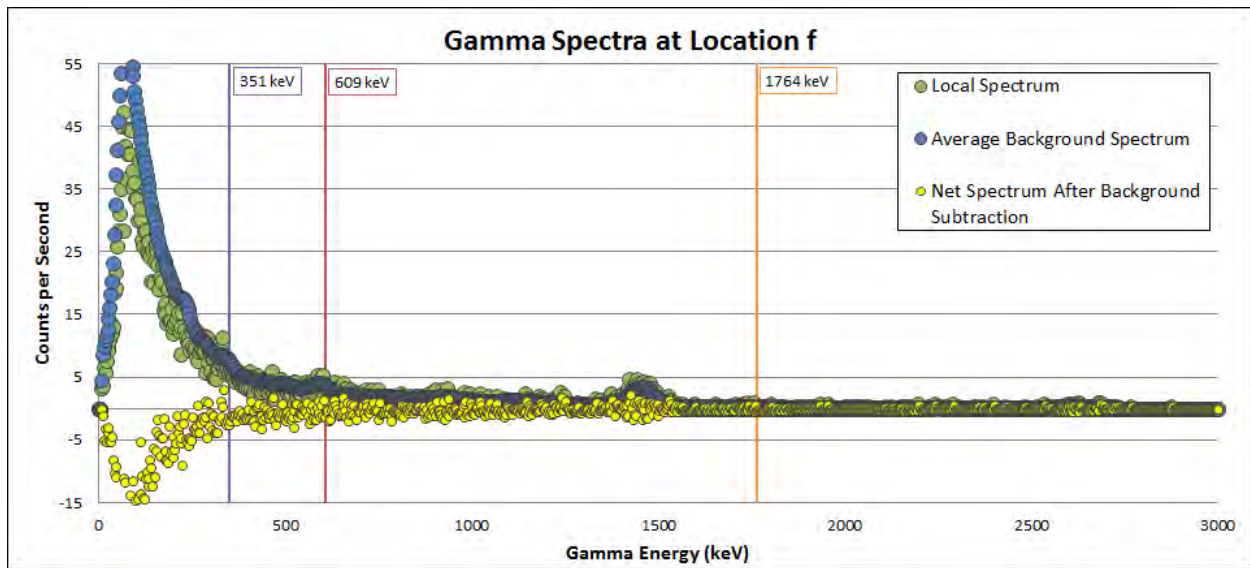
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

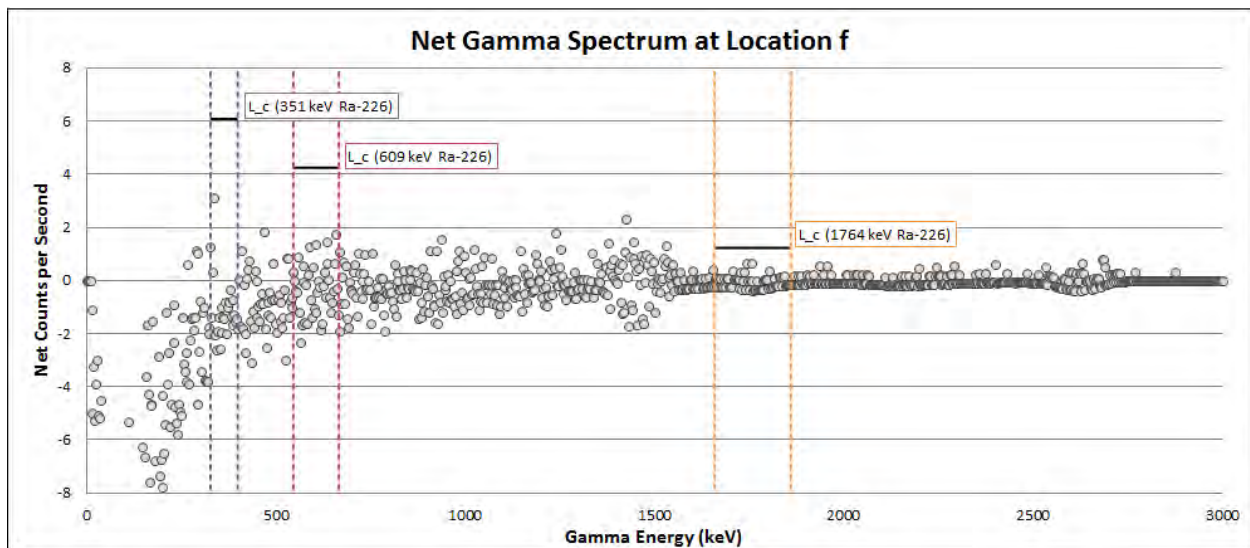
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (f)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (f)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (f): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

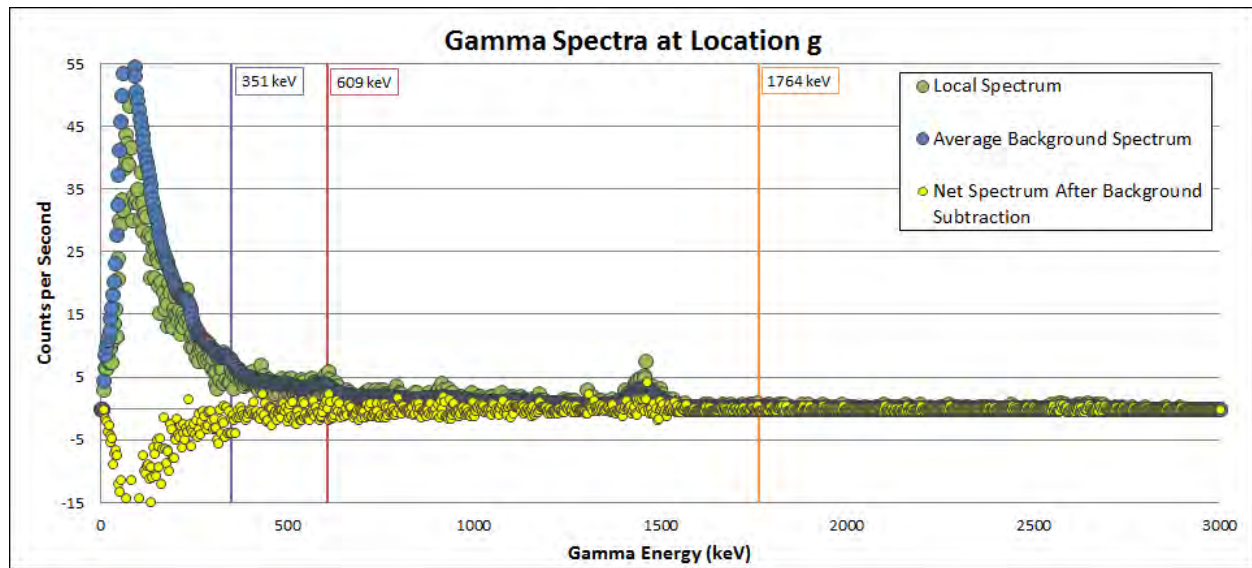
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

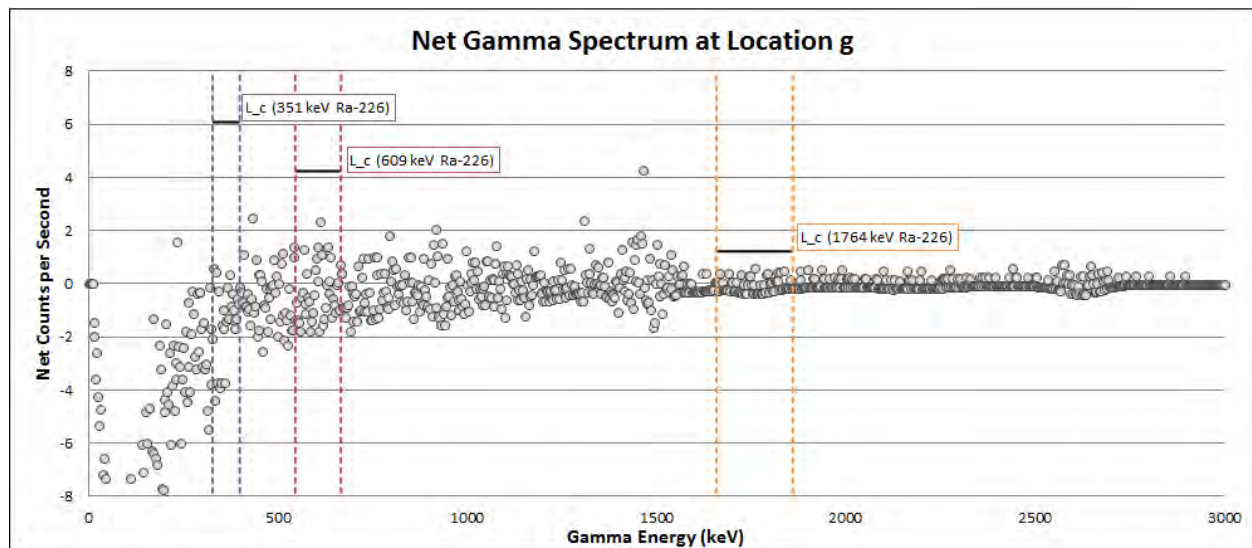
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (g)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (g)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (g): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

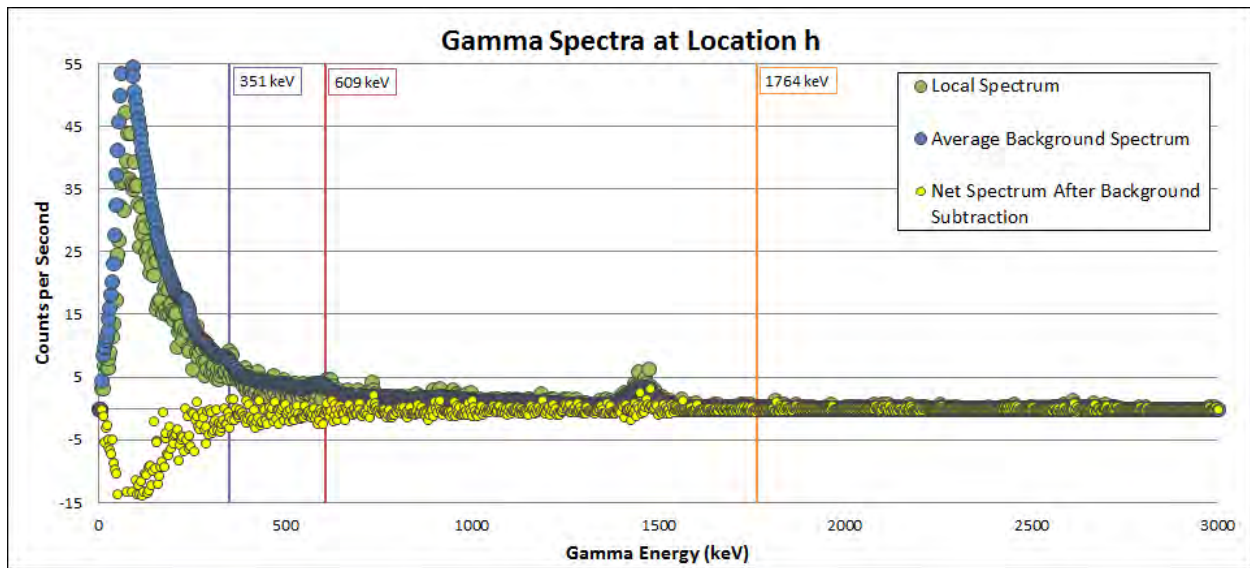
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

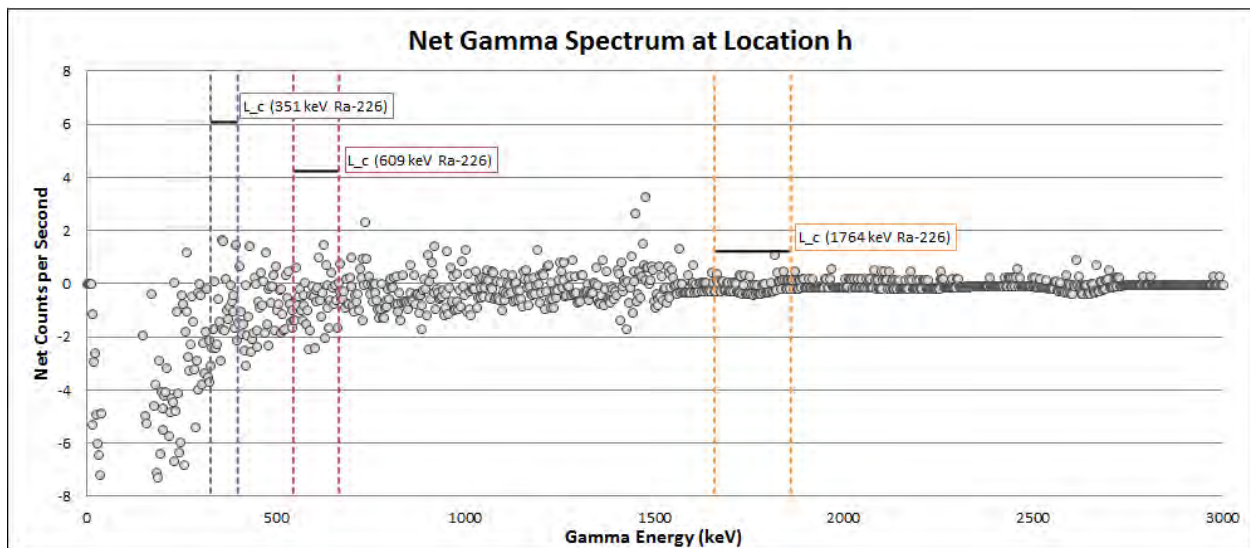
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (h)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (h)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (h): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

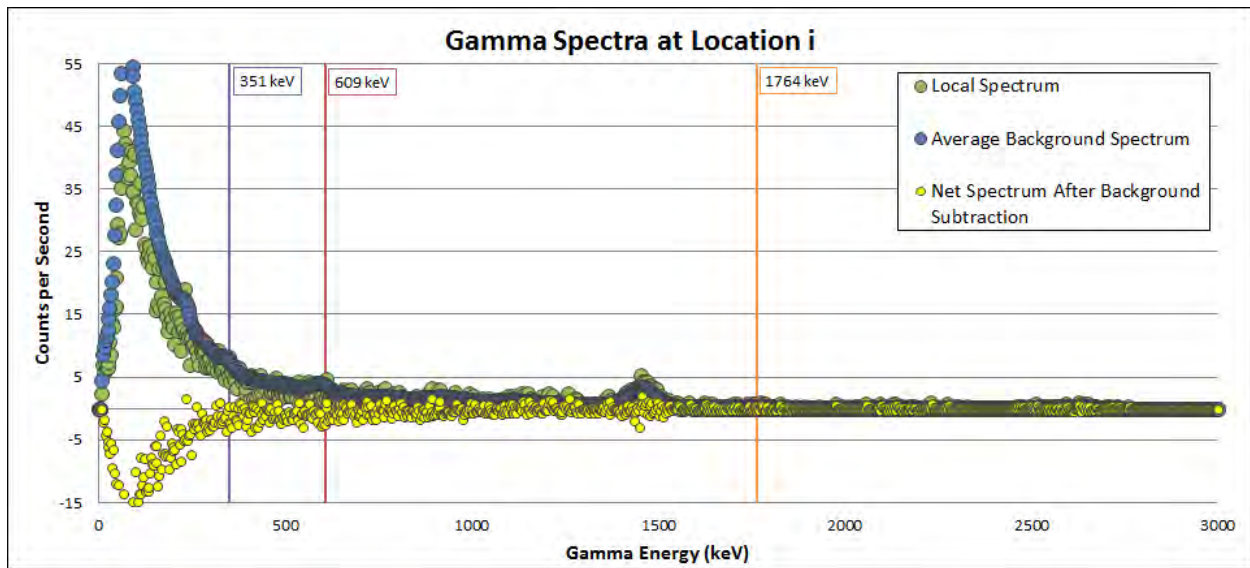
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

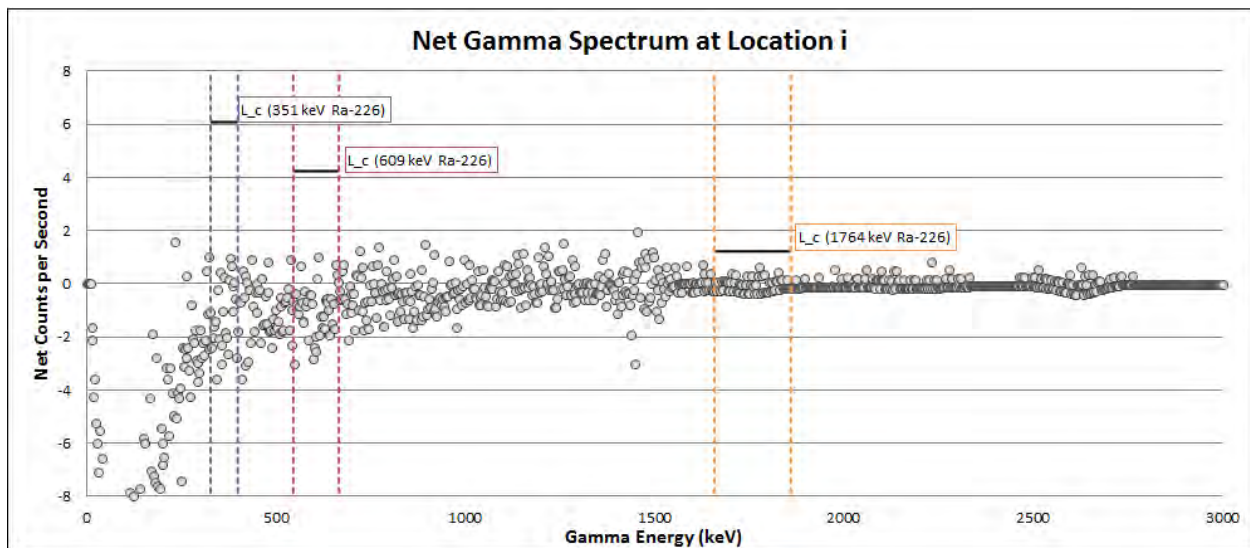
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (i)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for Location (i): local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (i): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

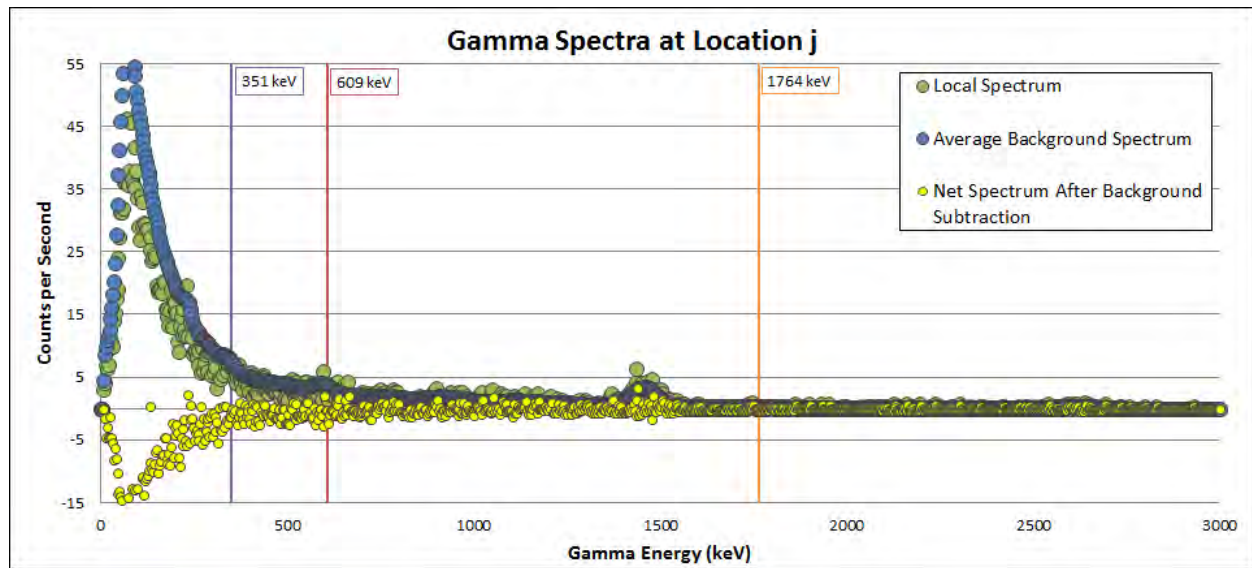
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

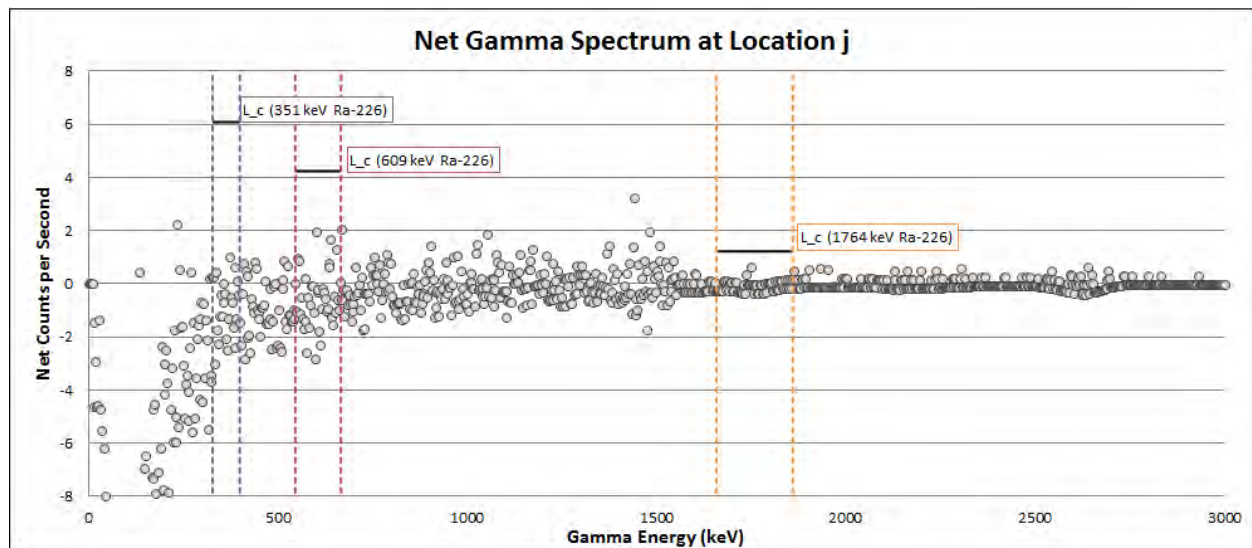
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (j)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for Location (j): local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (j): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

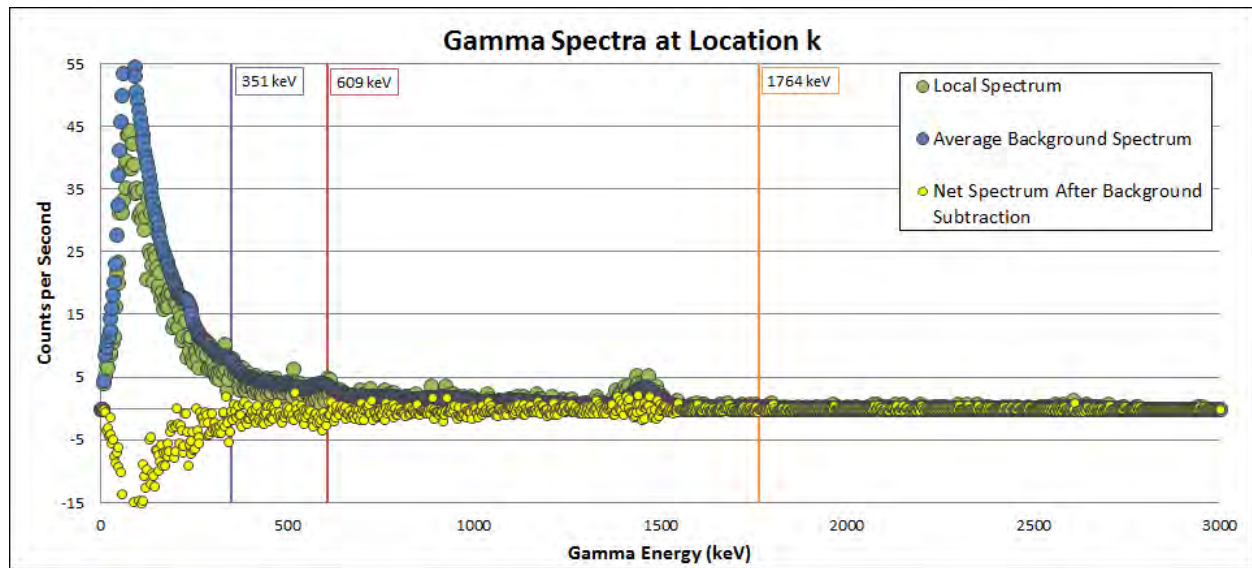
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

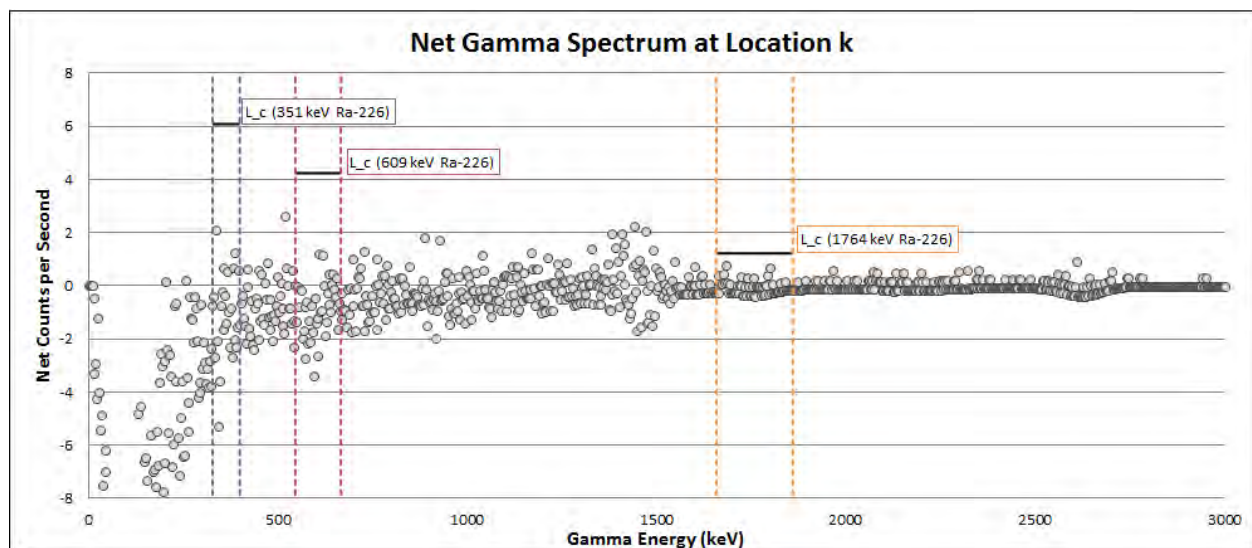
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (k)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (k)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (k): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

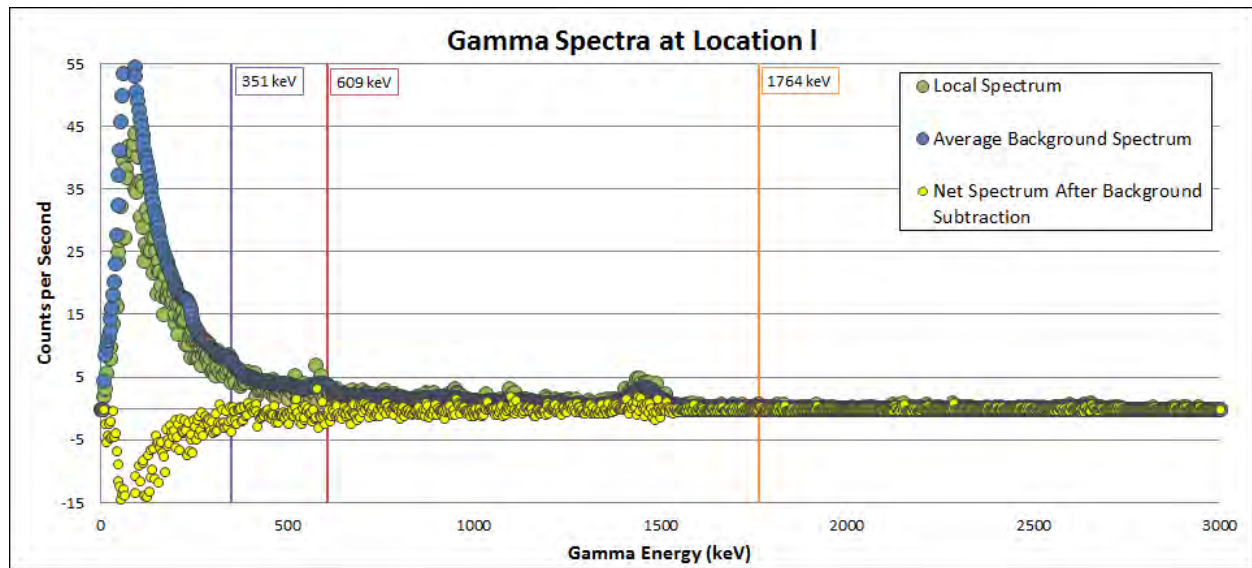
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

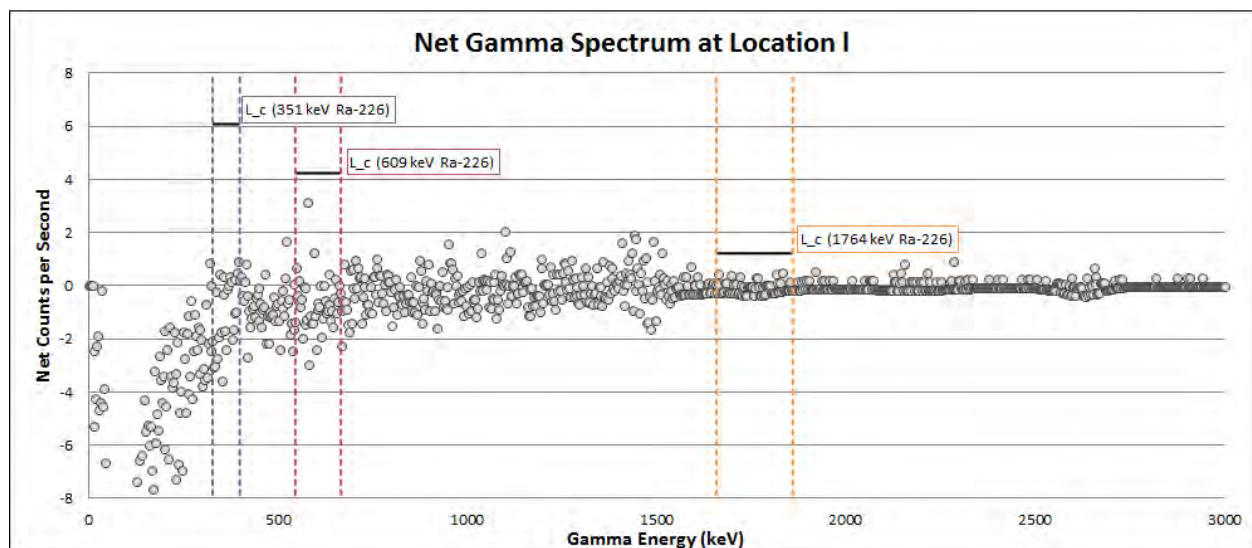
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (I)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (I)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (I): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

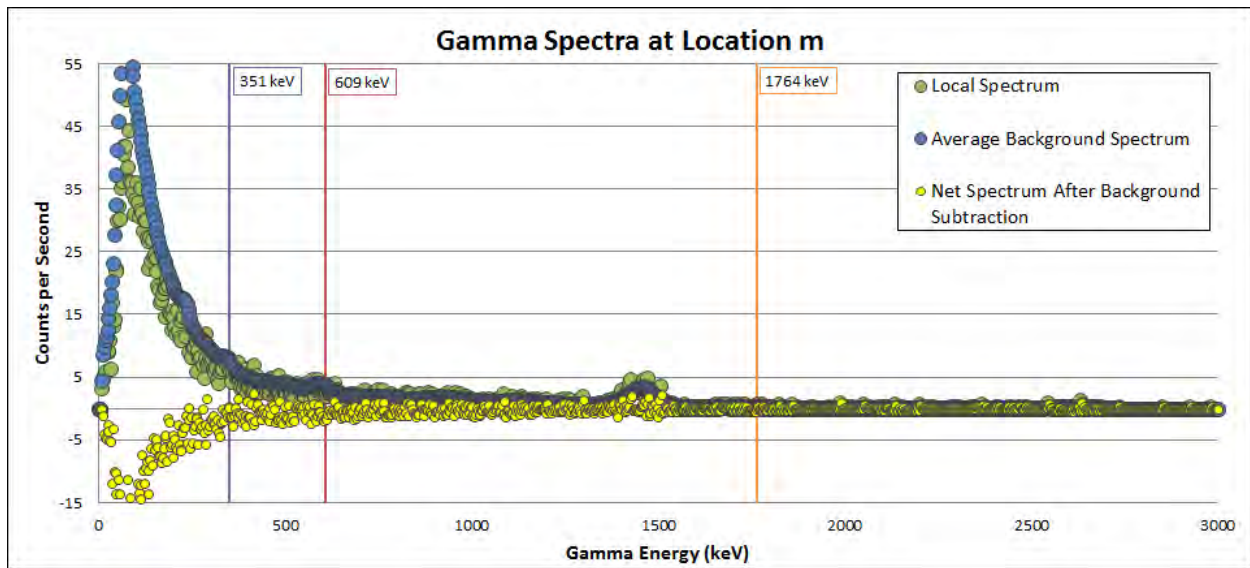
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

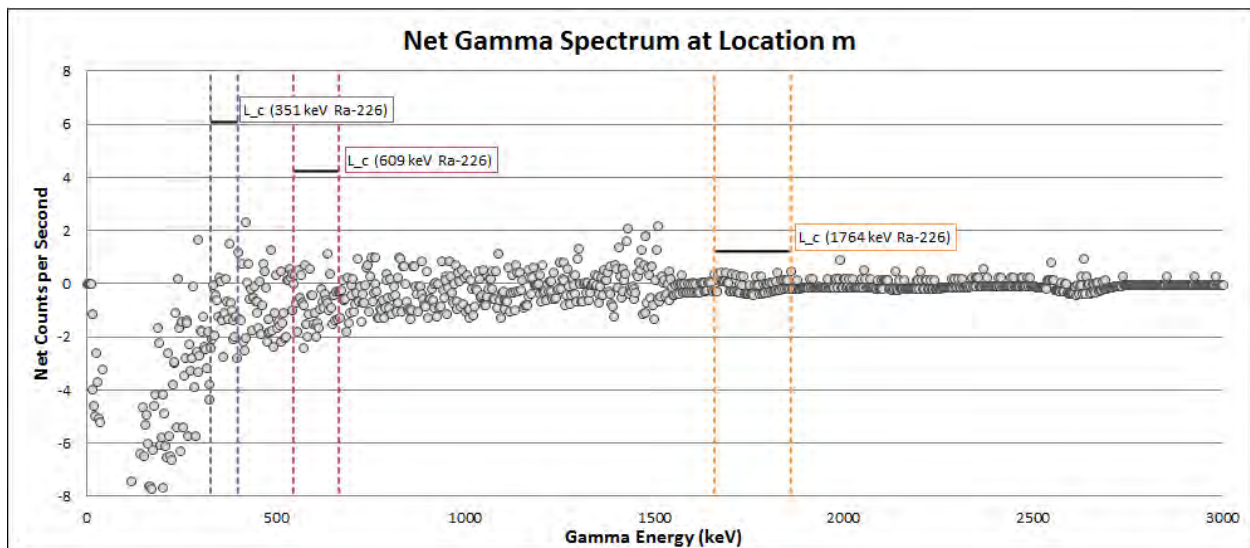
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (m)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (m)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for **Location (m)**: net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

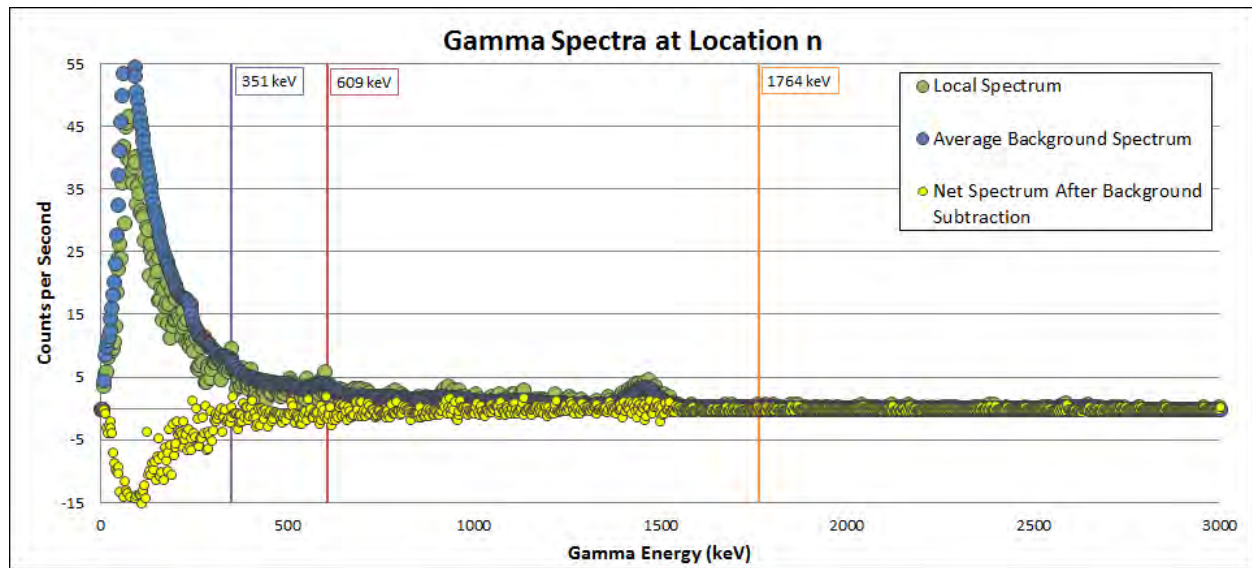
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

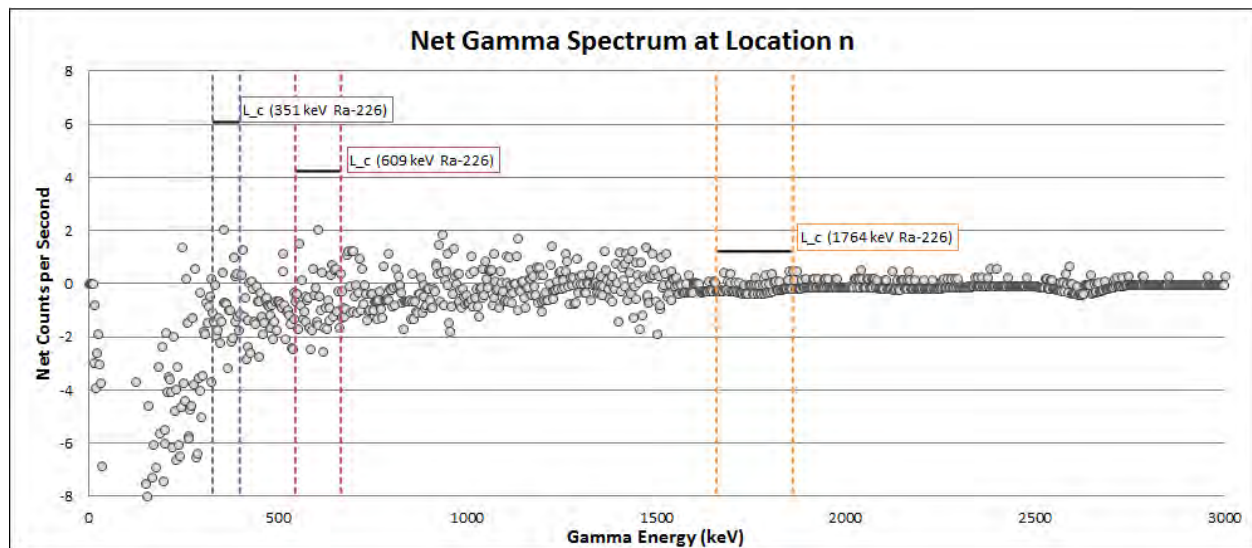
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (n)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (n)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (n): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

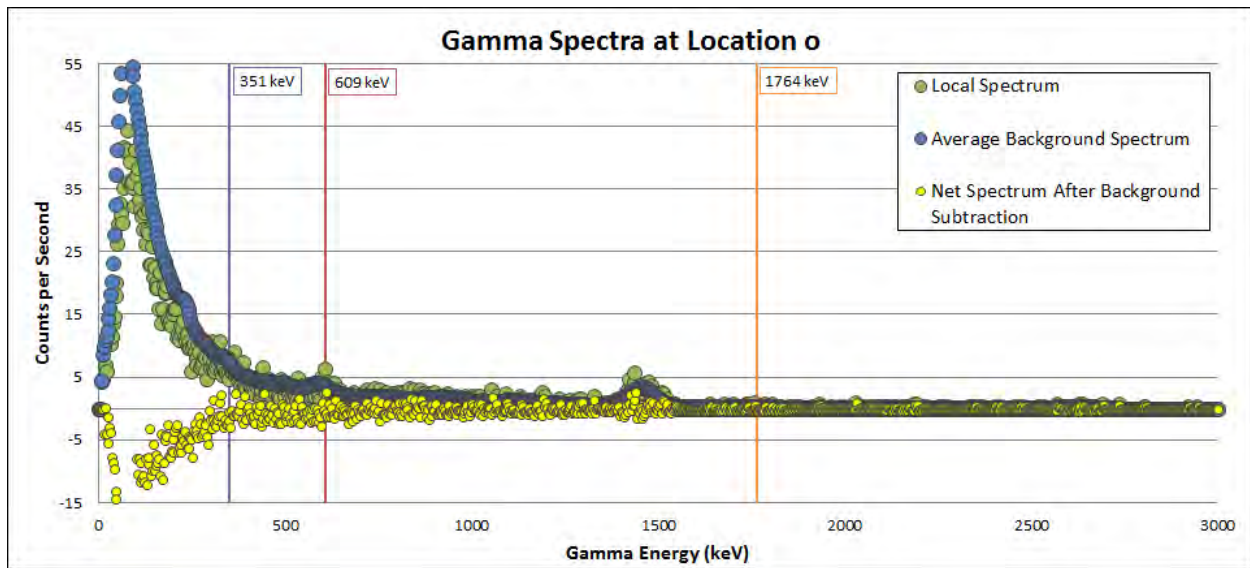
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

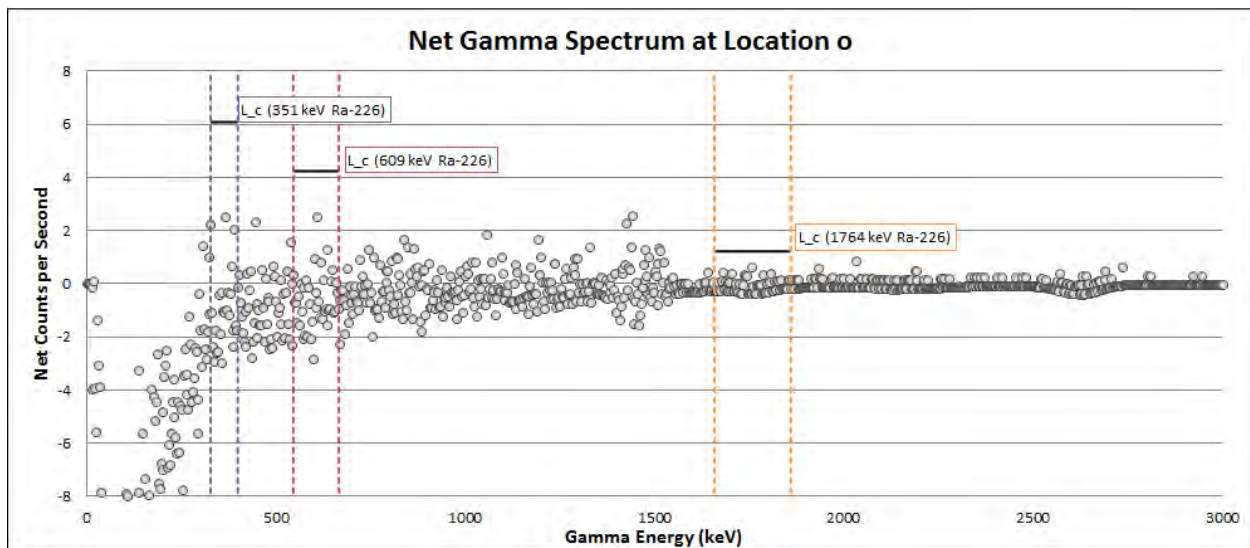
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (o)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (o)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (o): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

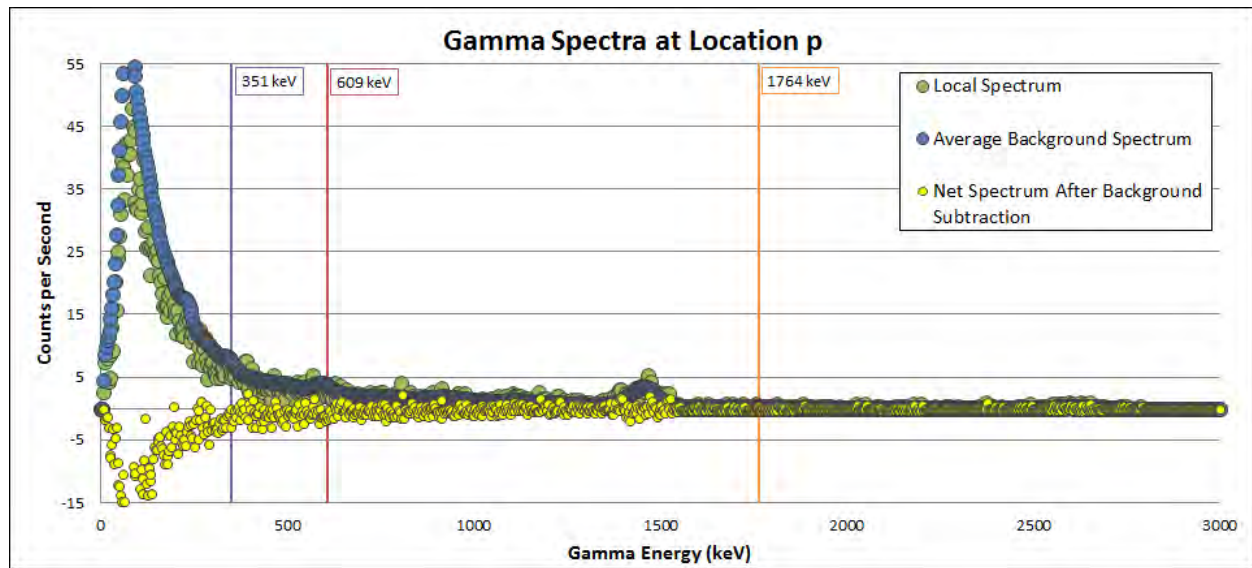
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

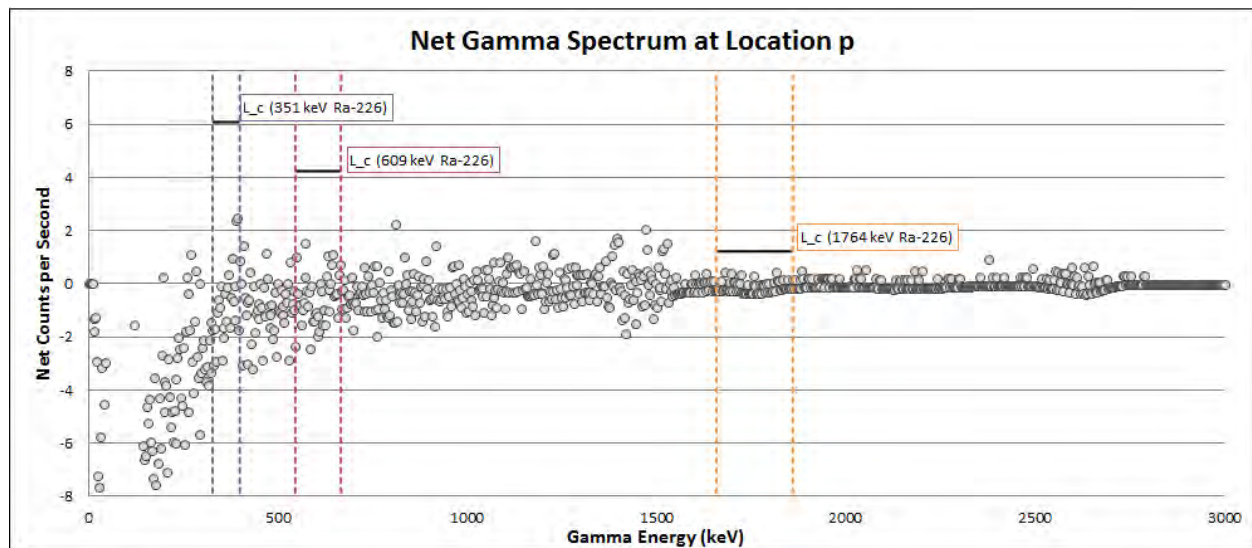
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (p)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (p)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (p): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

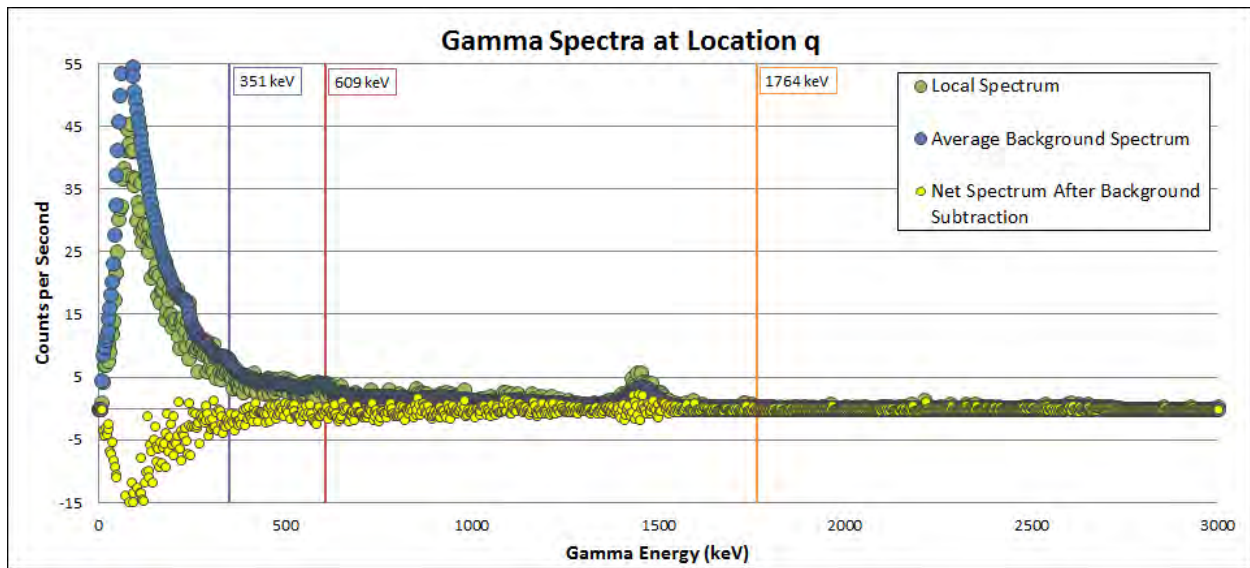
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

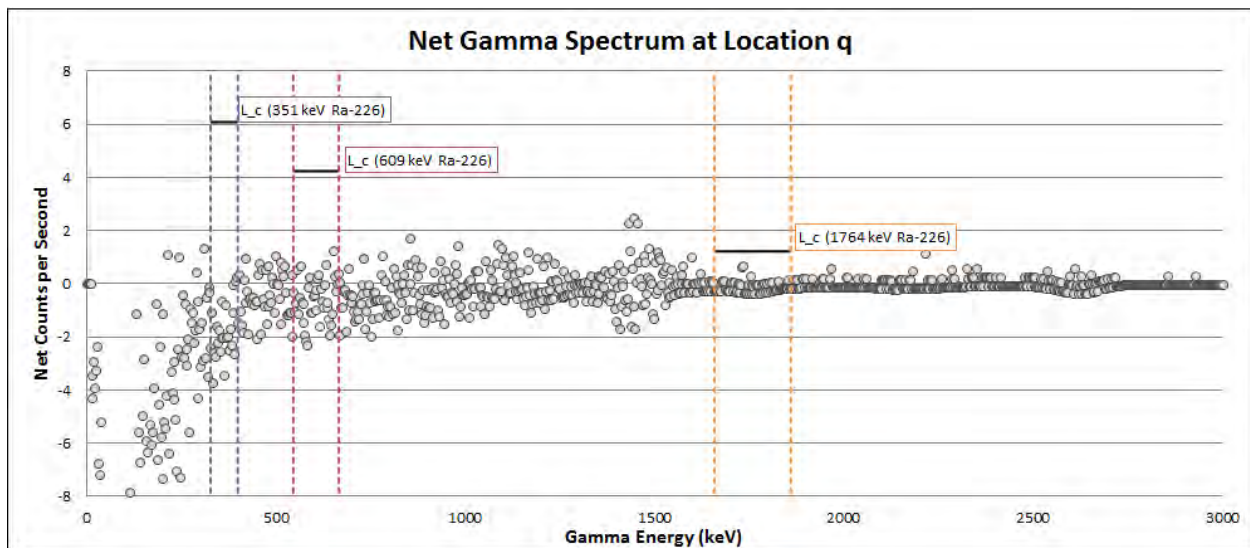
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1 (Part 2) – **Gamma Spectra at Location (q)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (q)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (q): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-17034-2

Client Project/Site: Treasure Island - 500060
Revision: 1

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
6/29/2016 1:50:07 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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QC Association Summary	23

Case Narrative

Page 30 of 50

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Job ID: 160-17034-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-17034-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 31 of 50

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Job ID: 160-17034-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

Revision 1: The report was revised to replace the original count data with a recount for samples: TI-TO04-BS-R-SU8-S002 (160-17034-2), TI-TO04-BS-R-SU8-S003 (160-17034-3). No other data was affected.

RECEIPT

The samples were received on 04/19/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-BS-R-SU8-S001 (160-17034-1), TI-TO04-BS-R-SU8-S002 (160-17034-2), TI-TO04-BS-R-SU8-S003 (160-17034-3), TI-TO04-BS-R-SU8-S004 (160-17034-4), TI-TO04-BS-R-SU8-S005 (160-17034-5), TI-TO04-BS-R-SU8-S006 (160-17034-6), TI-TO04-BS-R-SU8-S007 (160-17034-7), TI-TO04-BS-R-SU8-S008 (160-17034-8), TI-TO04-BS-R-SU8-S009 (160-17034-9), TI-TO04-BS-R-SU8-S010 (160-17034-10), TI-TO04-BS-R-SU8-S011 (160-17034-11), TI-TO04-BS-R-SU8-S012 (160-17034-12), TI-TO04-BS-R-SU8-S013 (160-17034-13), TI-TO04-BS-R-SU8-S014 (160-17034-14), TI-TO04-BS-R-SU8-S015 (160-17034-15), TI-TO04-BS-R-SU8-S016 (160-17034-16) and TI-TO04-BS-R-SU8-S019 (160-17034-17) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 04/19/2016, prepared on 04/21/2016 and analyzed on 05/13/2016 and 05/15/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CB&I Capital Services
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_FSS_SU8_BS_217

Page 1 of 2

Project Number: **500060**
Project Name / Location: **CTO-04 Phase III Bayside**
FSS SU8 RSY 11 U1 P2
Purchase Order #: **201455**

Project Manager: **Ulrika Messer**
(Name & phone #)

Send Report To: **Patricia Flynn**
Phone/Fax Number: **925-288-2037**
Address: **4005 Port Chicago Hwy**
City: **Concord, CA, 94520**

Shipment Date: **4/15/2016**
Waybill Number: **17 894 462 01 9713 1180**
Lab Destination: **Earth Toxics Inc To Test America**
Lab Contact Name / ph. #: **Mike Dryden**

Sampler's Name(s): **JR**

Sample ID Number	Sample Description	Collection Information		Matrix	# of containers	Preservative (water)		Container Type	Dose Rate $\mu\text{R/hr}$
		Date	Time			Preservative (soil)	Preservative (water)		
TI-TO04-BS-R-SU8-S001	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1430	G SO 1	1		N/A	16 oz Plastic	5
TI-TO04-BS-R-SU8-S002	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1420	G SO 1	1			16 oz Plastic	5
TI-TO04-BS-R-SU8-S003	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1425	G SO 1	1			16 oz Plastic	5
TI-TO04-BS-R-SU8-S004	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1422	G SO 1	1			16 oz Plastic	5
TI-TO04-BS-R-SU8-S005	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1426	G SO 1	1			16 oz Plastic	5
TI-TO04-BS-R-SU8-S006	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1429	G SO 1	1			16 oz Plastic	5
TI-TO04-BS-R-SU8-S007	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1439	G SO 1	1			16 oz Plastic	5
TI-TO04-BS-R-SU8-S008	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1448	G SO 1	1			16 oz Plastic	5
TI-TO04-BS-R-SU8-S009	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1433	G SO 1	1			16 oz Plastic	5



Special Instructions: **7 days ingrown draft and follow with 21 days final**

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

III

Standard TAT ☐

Relinquished By:

Date: **4/15/2016**

Time: **1200**

Relinquished By:

Date: **4/15/2016**

Time: **1200**

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening



CBI Capital Services
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TI_P3_FSS_SU8_BS_217

Page 2 of 2

Project Number: **500060**

Project Name / Location: CTO-04 Phase III Bayside

Purchase Order #: 201455

Shipment Date: 4/15/2016

Waybill Number: 17 894 462 51 9715 1130

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Sampler's Name(s): JR

Sample ID Number	Sample Description	Collection Information		Matrix	# of containers	Preservative (water)		Gamma Scan	Analyses Requested							Dose Rate μ R/h
		Date	Time	Method		Preservative (soil)	Container Type									
TI-TO04-BS-R-SU8-S010	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1423	G	SO 1		16 oz Plastic	X								5
TI-TO04-BS-R-SU8-S011	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1428	G	SO 1		16 oz Plastic	X								5
TI-TO04-BS-R-SU8-S012	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1433	G	SO 1		16 oz Plastic	X								5
TI-TO04-BS-R-SU8-S013	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1441	G	SO 1		16 oz Plastic	X								5
TI-TO04-BS-R-SU8-S014	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1435	G	SO 1		16 oz Plastic	X								5
TI-TO04-BS-R-SU8-S015	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1420	G	SO 1		16 oz Plastic	X								5
TI-TO04-BS-R-SU8-S016	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1437	G	SO 1		16 oz Plastic	X								5
TI-TO04-BS-R-SU8-S019	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2	04/14/16	1430	G	SO 1		16 oz Plastic	X								5

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

I

II

III

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

ABS=Asbestos, PO=Pipe Opening

Relinquished By:

[Signature]

Date:

Time:

Received By:

[Signature]

Date:

Time:

04/14/16

0840

Relinquished By:

[Signature]

Date:

Time:

Received By:

[Signature]

Date:

Time:

04/14/16

0840

UPS CampusShip: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.
2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
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THE UPS STORE
182 HOWARD ST
SAN FRANCISCO, CA 94105

FOLD HERE

BRYON ROGERS 4237857272 GVT- ALAMEDA 89V462 950 AVENUE M SAN FRANCISCO CA 94130		30 LBS 1 OF 1 DWT: 24.16.12	
SHIP TO: SAMPLE CONTROL 314.298.8566 TEST AMERICA LAB EARTH CITY 13715 RIDER TRAIL NORTH EARTH CITY MO 63045-1205			
		MO 630 9-63 	
UPS NEXT DAY AIR TRACKING #: 1Z 89V 462 01 9713 1180		1 	
BILLING: P/P			
Charge to Coding: 00701.500060.4701.04000109 Sender's Name: Bryon CS 18.1.1.1. WNTNV50 72.0A 01/2016			

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-17034-2

Login Number: 17034**List Source: TestAmerica St. Louis****List Number: 1****Creator: McKinney, Gerrod E**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Page 36 of 50

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-17034-1	TI-TO04-BS-R-SU8-S001	Solid	04/14/16 14:30	04/19/16 08:40
160-17034-2	TI-TO04-BS-R-SU8-S002	Solid	04/14/16 14:20	04/19/16 08:40
160-17034-3	TI-TO04-BS-R-SU8-S003	Solid	04/14/16 14:25	04/19/16 08:40
160-17034-4	TI-TO04-BS-R-SU8-S004	Solid	04/14/16 14:22	04/19/16 08:40
160-17034-5	TI-TO04-BS-R-SU8-S005	Solid	04/14/16 14:26	04/19/16 08:40
160-17034-6	TI-TO04-BS-R-SU8-S006	Solid	04/14/16 14:29	04/19/16 08:40
160-17034-7	TI-TO04-BS-R-SU8-S007	Solid	04/14/16 14:39	04/19/16 08:40
160-17034-8	TI-TO04-BS-R-SU8-S008	Solid	04/14/16 14:48	04/19/16 08:40
160-17034-9	TI-TO04-BS-R-SU8-S009	Solid	04/14/16 14:33	04/19/16 08:40
160-17034-10	TI-TO04-BS-R-SU8-S010	Solid	04/14/16 14:23	04/19/16 08:40
160-17034-11	TI-TO04-BS-R-SU8-S011	Solid	04/14/16 14:28	04/19/16 08:40
160-17034-12	TI-TO04-BS-R-SU8-S012	Solid	04/14/16 14:33	04/19/16 08:40
160-17034-13	TI-TO04-BS-R-SU8-S013	Solid	04/14/16 14:41	04/19/16 08:40
160-17034-14	TI-TO04-BS-R-SU8-S014	Solid	04/14/16 14:35	04/19/16 08:40
160-17034-15	TI-TO04-BS-R-SU8-S015	Solid	04/14/16 14:20	04/19/16 08:40
160-17034-16	TI-TO04-BS-R-SU8-S016	Solid	04/14/16 14:37	04/19/16 08:40
160-17034-17	TI-TO04-BS-R-SU8-S019	Solid	04/14/16 14:30	04/19/16 08:40

Client Sample Results

Page 39 of 50

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S001

Lab Sample ID: 160-17034-1

Date Collected: 04/14/16 14:30

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.140	U	0.208	0.208		0.303	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Actinium-227	0.149	U	0.284	0.284		1.40	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Bismuth-212	0.245	U	0.418	0.419		0.718	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Bismuth-214	0.336		0.104	0.110		0.0939	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Cesium-137	0.0234	U	0.0550	0.0551		0.0955	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Lead-210	-1.48	U	1.27	1.29		3.22	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Lead-212	0.391		0.0947	0.107		0.108	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Lead-214	0.449		0.132	0.140		0.112	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Potassium-40	11.4		1.66	2.03		0.443	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Protactinium-231	-0.636	U	2.75	2.75		4.64	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Radium-226	0.336		0.104	0.110	0.500	0.0939	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Radium-228	0.140	U	0.208	0.208		0.303	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Thallium-208	0.134		0.0625	0.0640		0.0666	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Thorium-228	0.391		0.0947	0.107		0.108	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Thorium-232	0.140	U	0.208	0.208		0.303	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Thorium-234	0.126	U	1.48	1.48		2.51	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Uranium-235	0.143	U	0.491	0.492		0.826	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Uranium-238	0.126	U	1.48	1.48		2.51	pCi/g	04/21/16 08:59	05/13/16 09:33	1

Client Sample ID: TI-TO04-BS-R-SU8-S002

Lab Sample ID: 160-17034-2

Date Collected: 04/14/16 14:20

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.442		0.147	0.154		0.106	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Actinium-227	0.220	U	0.332	0.333		0.892	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Bismuth-212	0.195	U	0.501	0.502		0.864	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Bismuth-214	0.383		0.0925	0.101		0.0782	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Cesium-137	-0.0436	U	0.0702	0.0703		0.117	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Lead-210	-0.146	U	1.16	1.16		2.15	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Lead-212	0.308		0.0722	0.0825		0.0891	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Lead-214	0.408		0.0825	0.0928		0.0823	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Potassium-40	10.7		1.22	1.64		0.489	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Protactinium-231	0.000	U	0.262	0.262		3.43	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Radium-226	0.383		0.0925	0.101	0.500	0.0782	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Radium-228	0.442		0.147	0.154		0.106	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thallium-208	0.101		0.0569	0.0579		0.0569	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thorium-228	0.308		0.0722	0.0825		0.0891	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thorium-232	0.442		0.147	0.154		0.106	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thorium-234	0.332	U	0.702	0.703		1.72	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Uranium-235	0.0833	U	0.163	0.163		0.625	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Uranium-238	0.332	U	0.702	0.703		1.72	pCi/g	04/21/16 08:59	06/21/16 20:48	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S003

Lab Sample ID: 160-17034-3

Date Collected: 04/14/16 14:25

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.405		0.126	0.133		0.214	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Actinium-227	-0.364	U	0.875	0.876		1.47	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Bismuth-212	0.304	U	0.629	0.630		1.07	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Bismuth-214	0.391		0.117	0.124		0.108	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Cesium-137	-0.0140	U	0.0706	0.0706		0.122	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Lead-210	0.853	U	1.03	1.03		1.55	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Lead-212	0.306		0.0736	0.0836		0.0834	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Lead-214	0.323		0.0835	0.0900		0.109	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Potassium-40	10.6		1.33	1.72		0.510	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Protactinium-231	0.560	U	1.31	1.31		3.00	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Radium-226	0.391		0.117	0.124	0.500	0.108	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Radium-228	0.405		0.126	0.133		0.214	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thallium-208	0.158		0.0478	0.0505		0.0393	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thorium-228	0.306		0.0736	0.0836		0.0834	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thorium-232	0.405		0.126	0.133		0.214	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thorium-234	1.04	U	0.988	0.994		1.33	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Uranium-235	-0.0852	U	0.280	0.280		0.863	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Uranium-238	1.04	U	0.988	0.994		1.33	pCi/g	04/21/16 08:59	06/21/16 20:48	1

Client Sample ID: TI-TO04-BS-R-SU8-S004

Lab Sample ID: 160-17034-4

Date Collected: 04/14/16 14:22

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.446		0.123	0.131		0.143	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Actinium-227	-0.0237	U	0.0396	0.0397		1.07	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Bismuth-212	0.000	U	0.406	0.406		1.09	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Bismuth-214	0.333		0.0927	0.0990		0.0803	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Cesium-137	0.000394	U	0.0531	0.0531		0.0938	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Lead-210	-0.528	U	1.15	1.15		1.93	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Lead-212	0.381		0.0669	0.0831		0.0581	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Lead-214	0.366		0.0839	0.0921		0.0955	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Potassium-40	10.5		1.30	1.69		0.670	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Protactinium-231	0.290	U	1.09	1.09		3.51	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Radium-226	0.333		0.0927	0.0990	0.500	0.0803	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Radium-228	0.446		0.123	0.131		0.143	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Thallium-208	0.126		0.0504	0.0521		0.0455	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Thorium-228	0.381		0.0669	0.0831		0.0581	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Thorium-232	0.446		0.123	0.131		0.143	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Thorium-234	0.318	U	1.00	1.01		1.70	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Uranium-235	-0.0315	U	0.0572	0.0572		0.701	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Uranium-238	0.318	U	1.00	1.01		1.70	pCi/g	04/21/16 08:59	05/15/16 15:18	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S005

Lab Sample ID: 160-17034-5

Date Collected: 04/14/16 14:26

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.484		0.181	0.188		0.289	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Actinium-227	0.0700	U	0.567	0.567		0.840	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Bismuth-212	-0.371	U	1.05	1.06		1.82	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Bismuth-214	0.351		0.118	0.123		0.120	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Cesium-137	-0.00399	U	0.0576	0.0576		0.106	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-210	0.269	U	0.939	0.940		1.51	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-212	0.388		0.0993	0.111		0.114	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-214	0.278		0.111	0.114		0.135	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Potassium-40	11.9		1.85	2.21		0.745	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Protactinium-231	0.000	U	0.336	0.336		4.58	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Radium-226	0.351		0.118	0.123	0.500	0.120	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Radium-228	0.484		0.181	0.188		0.289	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thallium-208	0.108		0.0599	0.0609		0.0602	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-228	0.388		0.0993	0.111		0.114	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-232	0.484		0.181	0.188		0.289	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-234	0.416	U	0.512	0.514		1.58	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Uranium-235	0.0321	U	0.138	0.138		0.667	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Uranium-238	0.416	U	0.512	0.514		1.58	pCi/g	04/21/16 08:59	05/13/16 09:42	1

Client Sample ID: TI-TO04-BS-R-SU8-S006

Lab Sample ID: 160-17034-6

Date Collected: 04/14/16 14:29

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.497		0.113	0.124		0.145	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Actinium-227	-0.0734	U	0.124	0.124		1.43	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Bismuth-212	0.238	U	0.636	0.636		1.10	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Bismuth-214	0.348		0.115	0.120		0.113	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Cesium-137	-0.0214	U	0.0381	0.0382		0.0941	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-210	1.02	U	1.13	1.13		1.59	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-212	0.400		0.0870	0.101		0.0974	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-214	0.398		0.106	0.114		0.109	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Potassium-40	11.5		1.47	1.88		0.766	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Protactinium-231	0.000	U	0.645	0.645		4.13	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Radium-226	0.348		0.115	0.120	0.500	0.113	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Radium-228	0.497		0.113	0.124		0.145	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thallium-208	0.101		0.0471	0.0482		0.0523	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-228	0.400		0.0870	0.101		0.0974	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-232	0.497		0.113	0.124		0.145	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-234	-0.0908	U	0.995	0.995		1.72	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Uranium-235	-0.0426	U	0.0786	0.0787		0.548	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Uranium-238	-0.0908	U	0.995	0.995		1.72	pCi/g	04/21/16 08:59	05/13/16 09:42	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S007

Lab Sample ID: 160-17034-7

Date Collected: 04/14/16 14:39

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.356		0.143	0.147		0.126	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Actinium-227	-0.312	U	0.764	0.764		1.28	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Bismuth-212	0.000	U	0.422	0.422		1.11	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Bismuth-214	0.252		0.0810	0.0851		0.0782	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Cesium-137	0.00987	U	0.0350	0.0350		0.0621	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Lead-210	0.404	U	0.984	0.985		1.50	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Lead-212	0.306		0.0754	0.0852		0.0913	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Lead-214	0.377		0.0887	0.0969		0.0988	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Potassium-40	9.52		1.22	1.56		0.498	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Protactinium-231	-0.478	U	2.17	2.17		3.66	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Radium-226	0.252		0.0810	0.0851	0.500	0.0782	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Radium-228	0.356		0.143	0.147		0.126	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Thallium-208	0.185		0.0447	0.0487		0.0341	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Thorium-228	0.306		0.0754	0.0852		0.0913	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Thorium-232	0.356		0.143	0.147		0.126	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Thorium-234	0.316	U	0.314	0.315		2.13	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Uranium-235	-0.0611	U	0.163	0.163		0.757	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Uranium-238	0.316	U	0.314	0.315		2.13	pCi/g	04/21/16 08:59	05/13/16 10:33	1

Client Sample ID: TI-TO04-BS-R-SU8-S008

Lab Sample ID: 160-17034-8

Date Collected: 04/14/16 14:48

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.364		0.127	0.132		0.325	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Actinium-227	-0.282	U	0.646	0.647		0.923	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Bismuth-212	0.283	U	0.522	0.523		0.894	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Bismuth-214	0.340		0.111	0.117		0.101	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Cesium-137	-0.0523	U	0.0963	0.0965		0.162	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Lead-210	0.966	U	1.04	1.05		1.51	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Lead-212	0.334		0.0809	0.0918		0.0899	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Lead-214	0.356		0.124	0.129		0.139	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Potassium-40	11.7		1.58	1.98		0.614	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Protactinium-231	0.0646	U	0.809	0.809		3.16	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Radium-226	0.340		0.111	0.117	0.500	0.101	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Radium-228	0.364		0.127	0.132		0.325	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Thallium-208	0.146		0.0494	0.0517		0.0358	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Thorium-228	0.334		0.0809	0.0918		0.0899	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Thorium-232	0.364		0.127	0.132		0.325	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Thorium-234	1.52		0.755	0.772		1.11	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Uranium-235	-0.155	U	0.357	0.358		0.571	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Uranium-238	1.52		0.755	0.772		1.11	pCi/g	04/21/16 08:59	05/15/16 14:13	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S009

Lab Sample ID: 160-17034-9

Date Collected: 04/14/16 14:33

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.520		0.137	0.147		0.133	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Actinium-227	0.130	U	0.540	0.541		0.786	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Bismuth-212	0.272	U	0.592	0.593		1.02	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Bismuth-214	0.358		0.119	0.124		0.110	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Cesium-137	0.0205	U	0.0554	0.0555		0.0961	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Lead-210	-0.332	U	1.32	1.32		2.01	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Lead-212	0.276		0.0894	0.0963		0.121	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Lead-214	0.337		0.109	0.115		0.110	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Potassium-40	10.4		1.46	1.81		0.589	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Protactinium-231	0.476	U	1.03	1.03		2.42	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Radium-226	0.358		0.119	0.124	0.500	0.110	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Radium-228	0.520		0.137	0.147		0.133	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Thallium-208	0.125		0.0450	0.0468		0.0378	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Thorium-228	0.276		0.0894	0.0963		0.121	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Thorium-232	0.520		0.137	0.147		0.133	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Thorium-234	-0.923	U	1.05	1.06		2.01	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Uranium-235	-0.0363	U	0.0567	0.0568		0.532	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Uranium-238	-0.923	U	1.05	1.06		2.01	pCi/g	04/21/16 08:59	05/13/16 10:35	1

Client Sample ID: TI-TO04-BS-R-SU8-S010

Lab Sample ID: 160-17034-10

Date Collected: 04/14/16 14:23

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.467		0.160	0.167		0.107	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Actinium-227	-0.221	U	0.781	0.782		1.32	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Bismuth-212	0.359	U	0.708	0.709		1.21	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Bismuth-214	0.307		0.127	0.131		0.140	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Cesium-137	0.00219	U	0.0733	0.0733		0.131	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Lead-210	0.517	U	1.11	1.11		1.60	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Lead-212	0.347		0.131	0.138		0.135	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Lead-214	0.310		0.130	0.134		0.201	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Potassium-40	10.7		1.59	1.93		0.438	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Protactinium-231	0.289	U	0.900	0.901		3.91	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Radium-226	0.307		0.127	0.131	0.500	0.140	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Radium-228	0.467		0.160	0.167		0.107	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Thallium-208	0.0506	U	0.0808	0.0809		0.108	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Thorium-228	0.347		0.131	0.138		0.135	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Thorium-232	0.467		0.160	0.167		0.107	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Thorium-234	-0.894	U	0.927	0.932		2.51	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Uranium-235	-0.219	U	0.305	0.306		1.06	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Uranium-238	-0.894	U	0.927	0.932		2.51	pCi/g	04/21/16 08:59	05/13/16 10:36	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S011

Lab Sample ID: 160-17034-11

Date Collected: 04/14/16 14:28

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.535		0.189	0.196		0.135	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Actinium-227	-0.0466	U	0.0761	0.0763		1.32	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Bismuth-212	-0.192	U	0.802	0.802		1.39	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Bismuth-214	0.463		0.115	0.125		0.0951	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Cesium-137	0.0170	U	0.0371	0.0372		0.0641	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Lead-210	0.691	U	1.49	1.49		1.85	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Lead-212	0.338		0.0825	0.0934		0.0989	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Lead-214	0.458		0.123	0.131		0.114	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Potassium-40	12.5		1.47	1.95		0.717	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Protactinium-231	-0.826	U	2.60	2.60		4.36	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Radium-226	0.463		0.115	0.125	0.500	0.0951	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Radium-228	0.535		0.189	0.196		0.135	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Thallium-208	0.209		0.0574	0.0614		0.0481	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Thorium-228	0.338		0.0825	0.0934		0.0989	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Thorium-232	0.535		0.189	0.196		0.135	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Thorium-234	-0.208	U	1.35	1.35		2.30	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Uranium-235	0.000	U	0.189	0.189		0.893	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Uranium-238	-0.208	U	1.35	1.35		2.30	pCi/g	04/21/16 08:59	05/13/16 10:37	1

Client Sample ID: TI-TO04-BS-R-SU8-S012

Lab Sample ID: 160-17034-12

Date Collected: 04/14/16 14:33

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.332		0.153	0.156		0.172	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Actinium-227	0.245	U	0.511	0.512		1.18	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Bismuth-212	-0.0225	U	0.798	0.798		1.43	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Bismuth-214	0.376		0.131	0.137		0.119	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Cesium-137	-0.0207	U	0.0574	0.0575		0.108	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Lead-210	-0.382	U	1.67	1.67		2.83	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Lead-212	0.427		0.0919	0.107		0.101	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Lead-214	0.375		0.106	0.113		0.127	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Potassium-40	9.84		1.51	1.81		0.669	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Protactinium-231	0.657	U	1.84	1.84		4.19	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Radium-226	0.376		0.131	0.137	0.500	0.119	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Radium-228	0.332		0.153	0.156		0.172	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Thallium-208	0.105		0.0800	0.0807		0.0901	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Thorium-228	0.427		0.0919	0.107		0.101	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Thorium-232	0.332		0.153	0.156		0.172	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Thorium-234	-0.160	U	1.46	1.46		2.49	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Uranium-235	-0.218	U	0.401	0.402		0.813	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Uranium-238	-0.160	U	1.46	1.46		2.49	pCi/g	04/21/16 08:59	05/13/16 11:51	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S013

Lab Sample ID: 160-17034-13

Date Collected: 04/14/16 14:41

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.445		0.175	0.181		0.193	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Actinium-227	0.197	U	0.317	0.317		0.891	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Bismuth-212	0.342	U	0.598	0.599		1.01	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Bismuth-214	0.354		0.117	0.123		0.0955	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Cesium-137	-0.00580	U	0.0576	0.0576		0.0892	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Lead-210	-0.0944	U	1.25	1.25		2.14	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Lead-212	0.361		0.0688	0.0831		0.0685	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Lead-214	0.376		0.0796	0.0887		0.0737	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Potassium-40	10.8		1.42	1.80		0.562	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Protactinium-231	-0.657	U	2.17	2.17		3.65	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Radium-226	0.354		0.117	0.123	0.500	0.0955	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Radium-228	0.445		0.175	0.181		0.193	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Thallium-208	0.181		0.0513	0.0546		0.0365	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Thorium-228	0.361		0.0688	0.0831		0.0685	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Thorium-232	0.445		0.175	0.181		0.193	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Thorium-234	-0.502	U	0.918	0.919		1.71	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Uranium-235	0.122	U	0.246	0.247		0.398	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Uranium-238	-0.502	U	0.918	0.919		1.71	pCi/g	04/21/16 08:59	05/13/16 11:52	1

Client Sample ID: TI-TO04-BS-R-SU8-S014

Lab Sample ID: 160-17034-14

Date Collected: 04/14/16 14:35

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.146	U	0.218	0.219		0.349	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Actinium-227	-0.305	U	0.671	0.671		0.962	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Bismuth-212	0.472	U	0.971	0.972		1.66	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Bismuth-214	0.467		0.165	0.172		0.145	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Cesium-137	-0.00367	U	0.0792	0.0792		0.142	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Lead-210	0.658	U	1.31	1.31		1.82	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Lead-212	0.389		0.0929	0.106		0.0946	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Lead-214	0.249		0.128	0.130		0.154	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Potassium-40	12.8		1.92	2.32		0.757	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Protactinium-231	0.356	U	1.05	1.05		3.56	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Radium-226	0.467		0.165	0.172	0.500	0.145	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Radium-228	0.146	U	0.218	0.219		0.349	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Thallium-208	0.159		0.0592	0.0614		0.0503	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Thorium-228	0.389		0.0929	0.106		0.0946	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Thorium-232	0.146	U	0.218	0.219		0.349	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Thorium-234	0.585	U	0.472	0.476		1.30	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Uranium-235	0.113	U	0.320	0.320		0.529	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Uranium-238	0.585	U	0.472	0.476		1.30	pCi/g	04/21/16 08:59	05/13/16 11:54	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S015

Lab Sample ID: 160-17034-15

Date Collected: 04/14/16 14:20

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.376		0.163	0.167		0.229	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Actinium-227	0.0377	U	0.702	0.702		1.20	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Bismuth-212	0.000	U	0.515	0.515		1.24	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Bismuth-214	0.354		0.122	0.128		0.118	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Cesium-137	0.0159	U	0.0453	0.0453		0.0789	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Lead-210	1.26	U	1.18	1.19		1.57	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Lead-212	0.331		0.0863	0.0964		0.107	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Lead-214	0.394		0.108	0.115		0.127	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Potassium-40	11.4		1.46	1.87		0.766	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Protactinium-231	0.271	U	1.02	1.02		3.31	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Radium-226	0.354		0.122	0.128	0.500	0.118	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Radium-228	0.376		0.163	0.167		0.229	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Thallium-208	0.128		0.0521	0.0538		0.0540	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Thorium-228	0.331		0.0863	0.0964		0.107	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Thorium-232	0.376		0.163	0.167		0.229	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Thorium-234	0.192	U	0.278	0.279		1.33	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Uranium-235	-0.196	U	0.226	0.227		0.548	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Uranium-238	0.192	U	0.278	0.279		1.33	pCi/g	04/21/16 08:59	05/13/16 10:41	1

Client Sample ID: TI-TO04-BS-R-SU8-S016

Lab Sample ID: 160-17034-16

Date Collected: 04/14/16 14:37

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.428		0.162	0.168		0.246	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Actinium-227	0.280	U	0.587	0.588		0.986	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Bismuth-212	-0.397	U	0.721	0.722		1.21	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Bismuth-214	0.351		0.114	0.119		0.110	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Cesium-137	-0.0272	U	0.0464	0.0465		0.0783	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Lead-210	-0.237	U	1.20	1.20		2.05	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Lead-212	0.369		0.0774	0.0910		0.0872	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Lead-214	0.330		0.0912	0.0975		0.0848	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Potassium-40	11.9		1.37	1.83		0.585	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Protactinium-231	0.000	U	0.613	0.613		3.68	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Radium-226	0.351		0.114	0.119	0.500	0.110	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Radium-228	0.428		0.162	0.168		0.246	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Thallium-208	0.118		0.0437	0.0454		0.0374	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Thorium-228	0.369		0.0774	0.0910		0.0872	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Thorium-232	0.428		0.162	0.168		0.246	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Thorium-234	0.0646	U	1.17	1.17		1.99	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Uranium-235	0.0839	U	0.151	0.151		0.858	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Uranium-238	0.0646	U	1.17	1.17		1.99	pCi/g	04/21/16 08:59	05/13/16 11:59	1

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S019

Lab Sample ID: 160-17034-17

Date Collected: 04/14/16 14:30

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.424		0.160	0.166		0.112	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Actinium-227	0.349	U	0.738	0.739		1.24	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Bismuth-212	0.254	U	0.774	0.774		1.35	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Bismuth-214	0.331		0.108	0.113		0.0972	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Cesium-137	0.00294	U	0.0707	0.0707		0.127	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Lead-210	-0.799	U	1.79	1.79		3.13	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Lead-212	0.333		0.0882	0.0981		0.0997	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Lead-214	0.226		0.0987	0.101		0.116	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Potassium-40	11.3		1.67	2.03		0.458	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Protactinium-231	-0.915	U	2.96	2.96		4.97	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Radium-226	0.331		0.108	0.113	0.500	0.0972	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Radium-228	0.424		0.160	0.166		0.112	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Thallium-208	0.142		0.0726	0.0741		0.0786	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Thorium-228	0.333		0.0882	0.0981		0.0997	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Thorium-232	0.424		0.160	0.166		0.112	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Thorium-234	1.34	U	1.09	1.10		1.42	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Uranium-235	0.00106	U	0.0161	0.0161		1.02	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Uranium-238	1.34	U	1.09	1.10		1.42	pCi/g	04/21/16 08:59	05/15/16 14:16	1

QC Sample Results

Page 48 of 50

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-247201/1-A

Matrix: Solid

Analysis Batch: 250931

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 247201

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.03202	U	0.0558	0.0559		0.258	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Actinium-227	-0.03707	U	0.535	0.535		0.934	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Bismuth-212	0.02583	U	0.447	0.447		0.835	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Bismuth-214	0.03295	U	0.0535	0.0536		0.229	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Cesium-137	0.02467	U	0.0501	0.0502		0.0858	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Lead-210	-0.5574	U	0.105	0.123		1.72	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Lead-212	-0.03982	U	0.0827	0.0828		0.140	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Lead-214	-0.005138	U	0.0750	0.0750		0.135	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Potassium-40	-0.2212	U	0.426	0.427		0.605	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Protactinium-231	0.4052	U	1.29	1.29		2.21	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Radium-226	0.03295	U	0.0535	0.0536	0.500	0.229	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Radium-228	0.03202	U	0.0558	0.0559		0.258	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Thallium-208	-0.03417	U	0.0381	0.0382		0.0744	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Thorium-228	-0.03982	U	0.0827	0.0828		0.140	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Thorium-232	0.03202	U	0.0558	0.0559		0.258	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Thorium-234	-0.07093	U	0.887	0.887		1.54	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Uranium-235	0.04444	U	0.264	0.264		0.455	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Uranium-238	-0.07093	U	0.887	0.887		1.54	pCi/g	04/21/16 08:59	05/13/16 09:30	1

Lab Sample ID: LCS 160-247201/2-A

Matrix: Solid

Analysis Batch: 250932

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 247201

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	96.28		10.1		1.12	pCi/g	99	87 - 116
Cesium-137	29.7	29.43		3.15		0.264	pCi/g	99	87 - 120
Cobalt-60	17.3	16.68		1.73		0.152	pCi/g	96	87 - 115

Lab Sample ID: 160-17034-1 DU

Matrix: Solid

Analysis Batch: 250929

Client Sample ID: TI-TO04-BS-R-SU8-S001

Prep Type: Total/NA

Prep Batch: 247201

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.140	U	0.3089		0.168		0.158	pCi/g	0.45	1
Actinium-227	0.149	U	0.1626	U	0.645		1.09	pCi/g	0.01	1
Bismuth-212	0.245	U	0.3655	U	0.559		0.933	pCi/g	0.12	1
Bismuth-214	0.336		0.4141		0.125		0.0984	pCi/g	0.33	1
Cesium-137	0.0234	U	0.01844	U	0.0350		0.0598	pCi/g	0.06	1
Lead-210	-1.48	U	-0.7197	U	1.59		2.65	pCi/g	0.26	1
Lead-212	0.391		0.3595		0.0850		0.0740	pCi/g	0.16	1
Lead-214	0.449		0.3249		0.0989		0.0850	pCi/g	0.52	1
Potassium-40	11.4		10.71		1.68		0.561	pCi/g	0.19	1
Protactinium-231	-0.636	U	-0.7658	U	2.38		3.98	pCi/g	0.03	1
Radium-226	0.336		0.4141		0.125	0.500	0.0984	pCi/g	0.33	1
Radium-228	0.140	U	0.3089		0.168		0.158	pCi/g	0.45	1

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-17034-1 DU

Matrix: Solid

Analysis Batch: 250929

Client Sample ID: TI-TO04-BS-R-SU8-S001

Prep Type: Total/NA

Prep Batch: 247201

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.134		0.1812		0.0515		0.0324	pCi/g	0.41	1
Thorium-228	0.391		0.3595		0.0850		0.0740	pCi/g	0.16	1
Thorium-232	0.140	U	0.3089		0.168		0.158	pCi/g	0.45	1
Thorium-234	0.126	U	0.0000	U	0.781		2.11	pCi/g	0.06	1
Uranium-235	0.143	U	-0.1381	U	0.391		0.654	pCi/g	0.32	1
Uranium-238	0.126	U	0.0000	U	0.781		2.11	pCi/g	0.06	1

QC Association Summary

Page 50 of 50

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Rad

Leach Batch: 246831

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17034-1	TI-TO04-BS-R-SU8-S001	Total/NA	Solid	Dry and Grind	
160-17034-1 DU	TI-TO04-BS-R-SU8-S001	Total/NA	Solid	Dry and Grind	
160-17034-2	TI-TO04-BS-R-SU8-S002	Total/NA	Solid	Dry and Grind	
160-17034-3	TI-TO04-BS-R-SU8-S003	Total/NA	Solid	Dry and Grind	
160-17034-4	TI-TO04-BS-R-SU8-S004	Total/NA	Solid	Dry and Grind	
160-17034-5	TI-TO04-BS-R-SU8-S005	Total/NA	Solid	Dry and Grind	
160-17034-6	TI-TO04-BS-R-SU8-S006	Total/NA	Solid	Dry and Grind	
160-17034-7	TI-TO04-BS-R-SU8-S007	Total/NA	Solid	Dry and Grind	
160-17034-8	TI-TO04-BS-R-SU8-S008	Total/NA	Solid	Dry and Grind	
160-17034-9	TI-TO04-BS-R-SU8-S009	Total/NA	Solid	Dry and Grind	
160-17034-10	TI-TO04-BS-R-SU8-S010	Total/NA	Solid	Dry and Grind	
160-17034-11	TI-TO04-BS-R-SU8-S011	Total/NA	Solid	Dry and Grind	
160-17034-12	TI-TO04-BS-R-SU8-S012	Total/NA	Solid	Dry and Grind	
160-17034-13	TI-TO04-BS-R-SU8-S013	Total/NA	Solid	Dry and Grind	
160-17034-14	TI-TO04-BS-R-SU8-S014	Total/NA	Solid	Dry and Grind	
160-17034-15	TI-TO04-BS-R-SU8-S015	Total/NA	Solid	Dry and Grind	
160-17034-16	TI-TO04-BS-R-SU8-S016	Total/NA	Solid	Dry and Grind	
160-17034-17	TI-TO04-BS-R-SU8-S019	Total/NA	Solid	Dry and Grind	

Prep Batch: 247201

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17034-1	TI-TO04-BS-R-SU8-S001	Total/NA	Solid	Fill_Geo-21	246831
160-17034-1 DU	TI-TO04-BS-R-SU8-S001	Total/NA	Solid	Fill_Geo-21	246831
160-17034-2	TI-TO04-BS-R-SU8-S002	Total/NA	Solid	Fill_Geo-21	246831
160-17034-3	TI-TO04-BS-R-SU8-S003	Total/NA	Solid	Fill_Geo-21	246831
160-17034-4	TI-TO04-BS-R-SU8-S004	Total/NA	Solid	Fill_Geo-21	246831
160-17034-5	TI-TO04-BS-R-SU8-S005	Total/NA	Solid	Fill_Geo-21	246831
160-17034-6	TI-TO04-BS-R-SU8-S006	Total/NA	Solid	Fill_Geo-21	246831
160-17034-7	TI-TO04-BS-R-SU8-S007	Total/NA	Solid	Fill_Geo-21	246831
160-17034-8	TI-TO04-BS-R-SU8-S008	Total/NA	Solid	Fill_Geo-21	246831
160-17034-9	TI-TO04-BS-R-SU8-S009	Total/NA	Solid	Fill_Geo-21	246831
160-17034-10	TI-TO04-BS-R-SU8-S010	Total/NA	Solid	Fill_Geo-21	246831
160-17034-11	TI-TO04-BS-R-SU8-S011	Total/NA	Solid	Fill_Geo-21	246831
160-17034-12	TI-TO04-BS-R-SU8-S012	Total/NA	Solid	Fill_Geo-21	246831
160-17034-13	TI-TO04-BS-R-SU8-S013	Total/NA	Solid	Fill_Geo-21	246831
160-17034-14	TI-TO04-BS-R-SU8-S014	Total/NA	Solid	Fill_Geo-21	246831
160-17034-15	TI-TO04-BS-R-SU8-S015	Total/NA	Solid	Fill_Geo-21	246831
160-17034-16	TI-TO04-BS-R-SU8-S016	Total/NA	Solid	Fill_Geo-21	246831
160-17034-17	TI-TO04-BS-R-SU8-S019	Total/NA	Solid	Fill_Geo-21	246831
LCS 160-247201/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-247201/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

From: [Weyant, David B CIV NAVSEA 04, 04N](#)
To: [Guillory, Jeffrey](#)
Cc: [Edwards, Zachary L CIV SEA 04 04N](#); [Yantos, Christopher N CIV NAVFAC SW, BRAC](#); [Messer, Ulrika](#); [Hackett, John R](#); [Schul, Raymond](#); [Morrison, Dennis](#); [Bohannon, Derek](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 11 (Use 1, Part 3)
Date: Thursday, September 29, 2016 1:25:40 PM

Hello Jeff,

I concur to designating RSY-11 (Use 1 Part 3) soil as Non-LLRW soil.

VR

David Weyant
Health Physicist/Environmental Protection Manager
Environmental Protection Division
NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederaleservices.com>]
Sent: Thursday, September 29, 2016 1:15 PM
To: Weyant, David B CIV NAVSEA 04, 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 11 (Use 1, Part 3)

Mr. Weyant,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Jeffrey Guillory

Scientist 3

Federal Services

Cell: +1 979 422 5534

jeffrey.guillory@cbifederalservices.com <<mailto:jeffrey.guillory@cbifederalservices.com>>

CB&I

950 Avenue M - Treasure Island

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United States of America

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Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY #11	RSY Unit Use Number: USE 1, Part 3	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 9/29/2016

Systematic Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static 2221 Meter Serial Number	One-Minute Static Reading (CPM)	Static Count Over Static Mean + 3σ	²²⁶ Ra Final Analytical Results
TITO04_NP-R-FSSSU4-S421	1	Systematic	97290	12,295	No	0.251
TITO04_NP-R-FSSSU4-S422	2	Systematic	97290	13,245	No	0.334
TITO04_NP-R-FSSSU4-S423	3	Systematic	97290	13,519	No	0.254
TITO04_NP-R-FSSSU4-S424	4	Systematic	97290	12,895	No	0.238
TITO04_NP-R-FSSSU4-S425	5	Systematic	97290	12,660	No	0.330
TITO04_NP-R-FSSSU4-S426	6	Systematic	97290	13,529	No	0.271
TITO04_NP-R-FSSSU4-S427	7	Systematic	97290	13,159	No	0.383
TITO04_NP-R-FSSSU4-S428	8	Systematic	97290	13,627	No	0.397
TITO04_NP-R-FSSSU4-S429	9	Systematic	97290	13,698	No	0.271
TITO04_NP-R-FSSSU4-S430	10	Systematic	97290	13,443	No	0.365
TITO04_NP-R-FSSSU4-S431	11	Systematic	97290	13,568	No	0.402
TITO04_NP-R-FSSSU4-S432	12	Systematic	97290	13,556	No	0.349

Instrument Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Static Background (CPM)	Static Background Plus 3σ (CPM)	Scan Background	Scan Background Plus 3σ	Range
Gamma Walkover Survey	TIRS-04212016-12P3-ROV-2132	4/21/2016	RS-701/RSX-1	N/A	Console: 7236 / Detectors: 5447, 5448	N/A	N/A	7,595 CPS	8,275 CPS	4,821 – 5,771 CPS
Follow-up Static Survey	TIRS-04252016-12P3-JSS-2145	4/25/2016	2221	4/28/2016	97290	18,301	20,154	N/A	N/A	12,888 – 13,501 CPM
Systematic Sampling Survey	TIRS-04252016-12P3-JSS-2149	4/25/2016 – 4/26/2016	2221	4/28/2016	97290	18,301	20,154	N/A	N/A	12,295 – 13,698 CPM

CPM = Counts Per Minute

CPS = Counts Per Second

Summary

1) Initial RSI gamma scan and data review—upon review of initial scan data, follow-up static investigations were deemed necessary, and investigation locations were identified as per the RSI Data Evaluation Process (pages 4-5). Gamma scan coverage shown on Systematic Sample Survey map (page 3). Contour maps of initial scan data are shown on RSI Data Plots (page 6). Data review results are summarized on RSI Review Summary (page 7).

2) Follow-up static survey—9 locations identified during the data review process were investigated, and all follow-up locations were < static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 8).

3) Twelve systematic soil samples (421-432) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 14-32).

Note: The bottom of the excavation at SWDA North Point Survey Unit (SU) 4 was inaccessible for in situ FSS operations due to water infiltration, therefore a 6" layer of FSS material spanning the entire underwater portion of the excavation bottom was over-excavated and surveyed ex situ on RSY Pad 11 (Use 1, Part 3) and RSY Pad 10 (Use 5, Part 1); twenty additional systematic soil samples (401-420) of the North Point SU 4 FSS material were collected on RSY Pad 10 (Use 5, Part 1).

Conclusions:

All locations with elevated Z-scores identified by the initial RSI gamma scan were deemed comparable to background. 9 follow-up static locations were investigated, with readings < static IL at follow-up locations.

Additional locations (a-c, page 6) with elevated Z-scores that did not meet the criteria for a follow-up investigation were evaluated by spectral analysis of the RSI gamma scan data, which did not indicate the presence of ²²⁶Ra above background levels (pages 11-13).

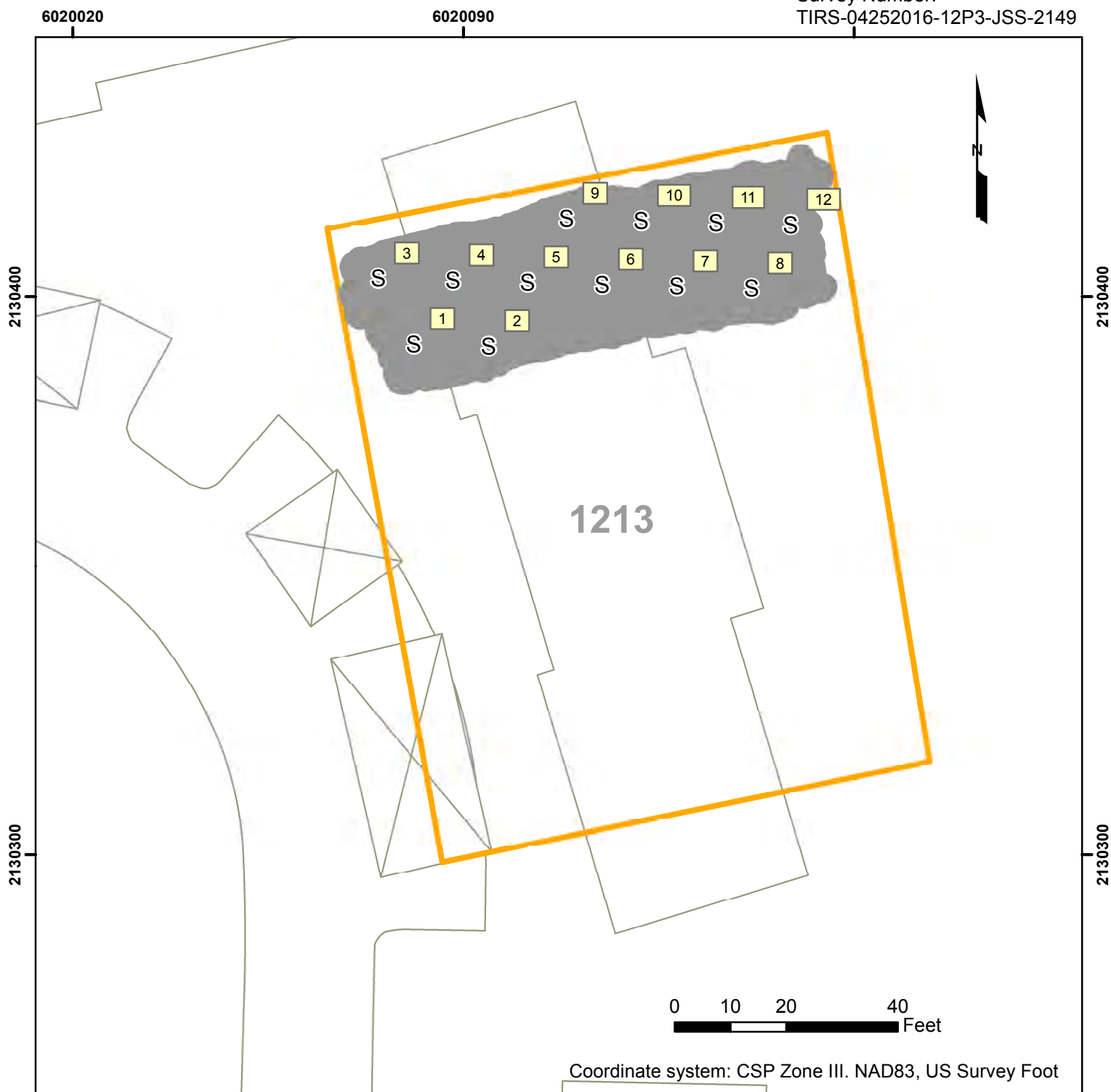
Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 9-10. These statistical tools were utilized to verify the appropriate level of reasonable effort.

RSY 11 (Use 1, Part 3) contains soil from the final 6-inch over excavation of North Point SU 4.

Note: Soil on RSY Pad 11 (Use 1, Part 3) was removed from the final depth of the excavation at North Point SU 4, and no visible debris or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.

CB&I requests RASO concurrence to release this soil as Non-LLRW.

Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.

Survey Number:
TIRS-04252016-12P3-JSS-2149

Instrument # 97290

S Systematic Sample Locations

● RSI Coverage

 RSY Pad Boundaries

Sample ID

CB&I Federal Services, LLC

Data Processed In Treasure Island Office

RSI Data Evaluation Process

RS-700 Mobile Radiation Monitoring System

- Self-contained gamma-ray radiation detection and monitoring system
- Built-in GPS receiver
- (2) RSX-1 4-liter NaI(Tl) gamma detectors oriented perpendicular to the direction of travel (VD1 denotes both detectors summed; VD3 refers to the left detector; and VD4 refers to the right detector)
- Multi-Channel Analyzer, allowing for monitoring of energy-specific regions of interest (ROIs)
- RadAssist survey software for control, monitoring, and recording

Ten ROIs have been established for radium and progeny as well as other naturally-occurring or anthropogenic gamma-emitting radionuclides that may be of interest:

ROI	Description	Energy Range (keV)	Primary Peak (keV)
1	Total counts	411 – 2811	N/A
2	Potassium	1371 – 1569	1460
3	U/Ra-226	1659 – 1860	1764 (Bi-214)
4	Thorium	2409 – 2811	2614 (Tl-208)
5	Annihilation	456 – 570	511
6	Ra-226	546 – 666	609 (Bi-214)
7	Cs-137	549 – 741	662
8	Pb-214/Ra-226	327 – 399	351
9	Range	45 – 1980	N/A
10	Gross Counts	3 – 3072	N/A

A tiered approach is used during data review to identify follow-up locations. Raw data are exported to a comma delimited format using RadAssist and imported into an Excel spreadsheet for review and analysis. Count rate data are compared with ROI- and material-specific investigation levels (ILs). In addition, the following review steps are completed to determine if additional follow-up measurements are necessary:

- **Playback Review:** The data file is replayed in RadAssist and reviewed for elevated count rates in ROIs 1, 3, 6, and 10 for virtual detector (VD) 1 (both detectors summed). The scan screen is also monitored for elevated count rates and alarms.
- **Count Rate Time Series Review:** The count rates for ROIs 1, 3, 6, and 10 for VDs 1, 3 (detector 1), and 4 (detector 2) are plotted in a time series and reviewed for additional peaks in count rate.
- **All ROIs:**
 - **Z-Scores:** The Z-Scores are calculated for each location in all ROIs for VDs 1, 3, and 4. Any location with four or more ROIs having a Z-Score greater than three ($Z > 3$) is marked for follow-up.
 - **Local Z-Scores:** Local Z-Scores are calculated using a moving average for each data point in all ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with four or more ROIs having a local $Z > 3$ is marked for follow-up.
 - **Semi-local Z-Scores:** Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with four or more ROIs having a semi-local $Z > 3$ is marked for follow-up.

RSI Data Evaluation Process

- **ROIs 3, 6, 8, and 10 (radium-specific ROIs):**
 - Z-Scores: The Z-Scores are calculated for each location in the radium-specific ROIs for VDs 1, 3, and 4. Any location with three or more radium-specific ROIs having a $Z > 3$ is marked for follow-up.
 - Local Z-Scores: Local Z-Scores are calculated using a moving average for each data point in the radium-specific ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a local $Z > 3$ is marked for follow-up.
 - Semi-local Z-Scores: Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a semi-local $Z > 3$ is marked for follow-up.
- **Z-Score Time Series Review:** The three types of Z-Scores for ROIs 1, 3, 6, and 10 for VDs 1, 3, and 4 are plotted in a time series and reviewed for additional peaks in Z-Scores.

Follow-up locations will be plotted on contour maps depicting all locations with any radium-specific ROI $Z > 3$. Any location selected for follow-up, or any location with a radium-specific ROI $Z > 3$ will undergo spectral analysis to determine if it is statistically likely that there is radium present at that location in quantities greater than the background.

A background spectrum, obtained from NSTI Reference Area 7, is subtracted from the local spectral data for a given location, and the resulting net spectrum is plotted. Critical levels, as defined in Section 6.7.1 of the Multi Agency Radiation Survey and Site Investigation Manual are calculated and plotted based on background levels. The critical level is the level, in counts, at which there is a statistical probability (with a predetermined confidence) of incorrectly identifying a measurement system background value as greater than background. Any response above this level is considered to be greater than background. The critical level is calculated for ROIs 3, 6, and 8 according to the equation shown below:

$$L_C = 2.33\sqrt{B}$$

Where:

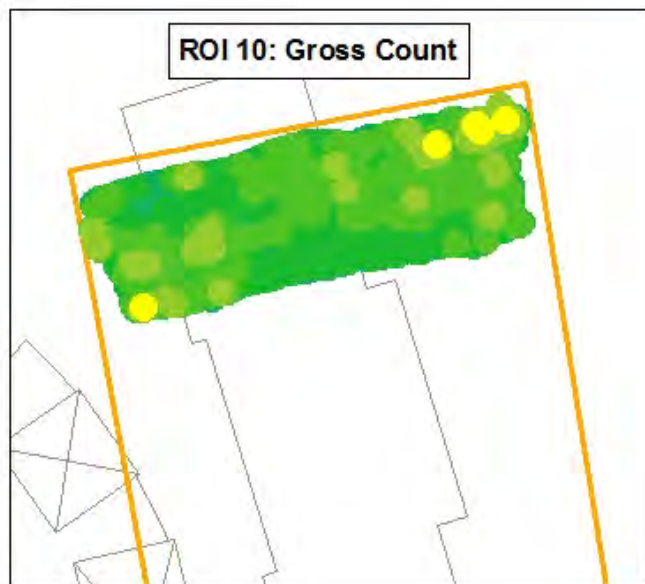
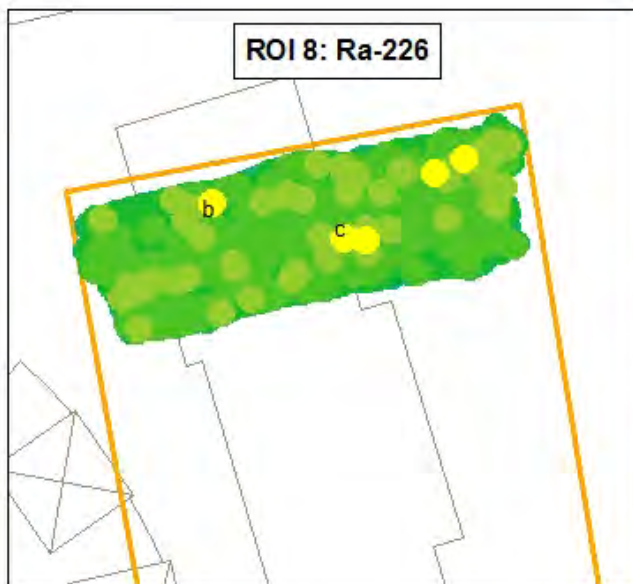
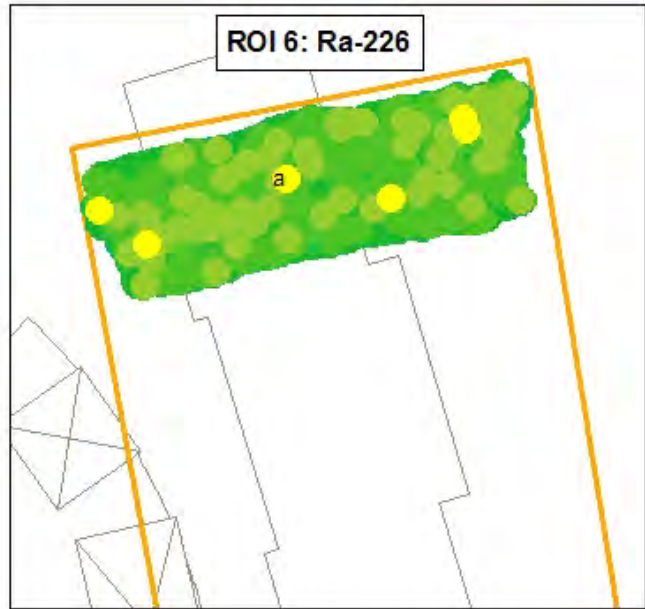
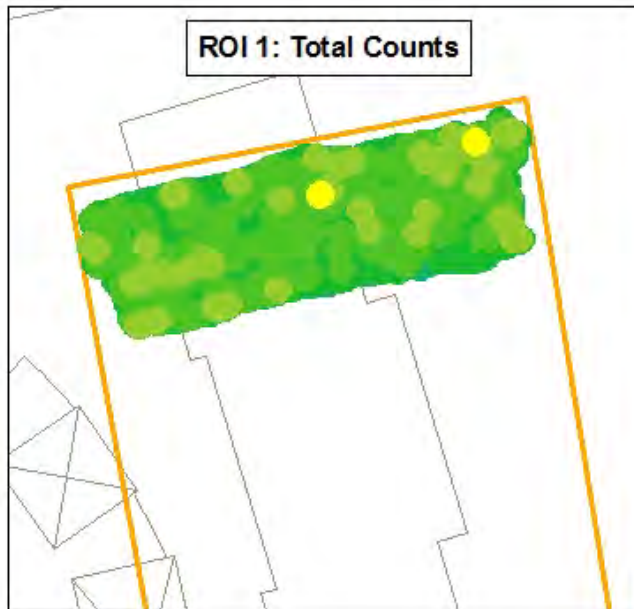
LC	=	critical level (counts)
B	=	average background in the ROI

The ROI ranges for ROIs 3, 6, and 8 are then plotted on the net spectrum graph with their respective critical levels. When count rates in the net gamma spectrum at a given location do not exceed critical levels for any radium-specific energy ranges, it is unlikely that radium exists at that location above background.

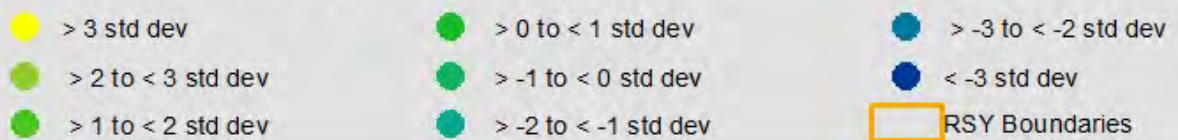
Any data point that is both above the critical level and within the energy range of a given ROI is considered above background for that radionuclide and will be flagged for further investigation in the field.

RSI DATA PLOT

RSY 11 Use 1 Part 3



RSI Walkover Survey Data (VD1)



RSI Review Summary

Summary:

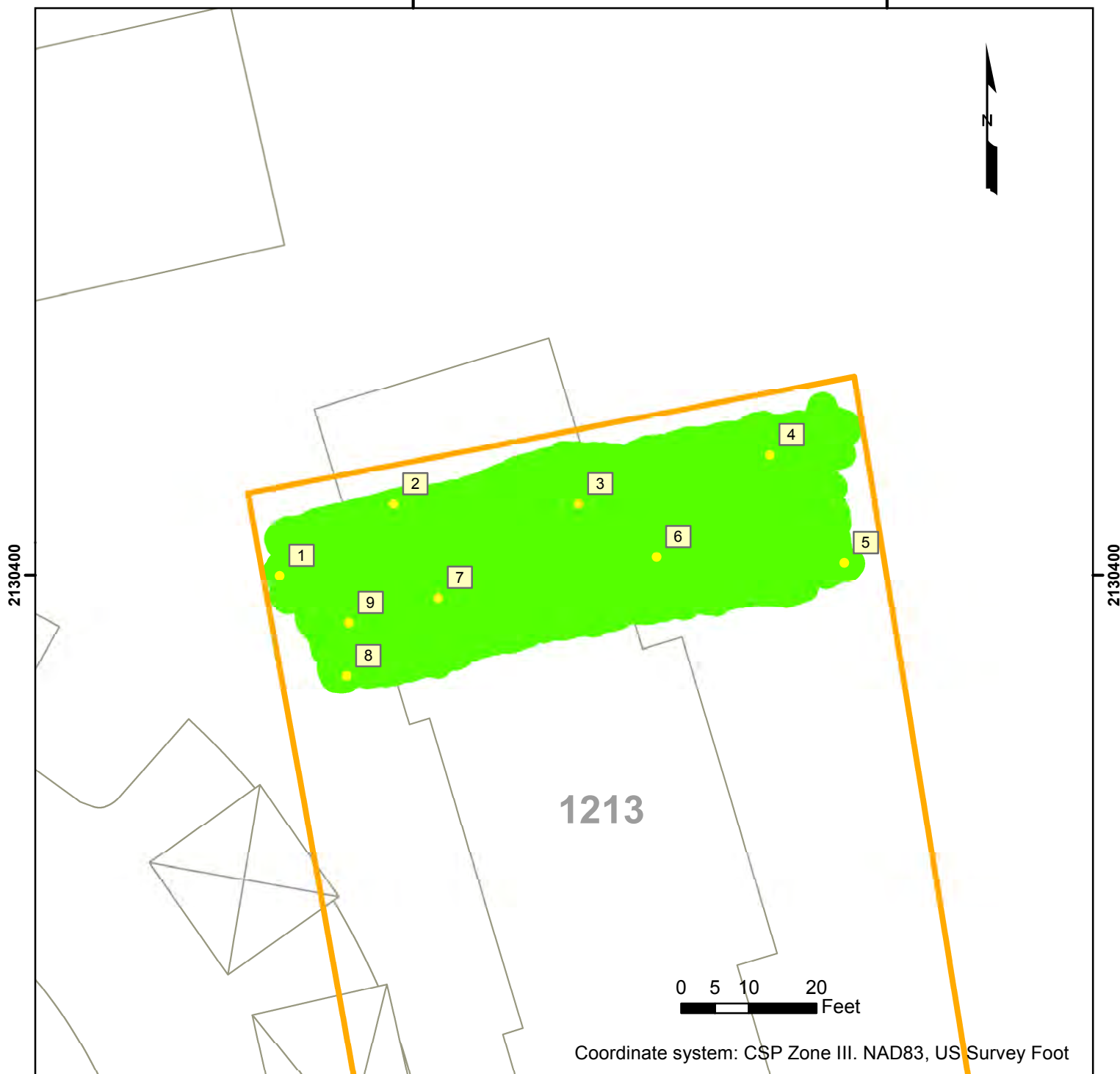
9 locations were selected for follow-up investigation. Locations were identified by elevated peaks noted in the count rate ratio review, playback review and/or time series charts, and by using the Z-Score, Local Z-Score, and Semi-Local Z-Score reviews as described in the RSI Data Evaluation Process on pages 4-5. The table below details the reasons for each investigation by location.

Locations denoted (a-c) on RSI Data Plots (see previous page) did not meet the evaluation criteria for further investigation. Elevated Z-scores at these locations were identified only in specific ROIs, including: one location exclusive to ROI 6 (a), and two locations exclusive to ROI 8 (b-c). Elevated gross count rates were not identified at any of the denoted locations, and a review of the gamma scan data did not reveal any additional indicators warranting a follow-up investigation. Furthermore, spectral analyses performed on gamma scan data obtained from these locations did not indicate the presence of Radium-226 above background; figures are provided on pages 11-13.

RSY 11 Use 1 Part 3 Investigation							Follow-up				
Location	Longitude	Latitude	Details	Maximum Result (Ra/Tot)				Meter SN	Static Count	Static IL (cpm)	Comments
				VD	ROI	Z-Score	Type:				
1	-122.3754312	37.8307944	Time Series Peak				97290	13,501	20,154	< IL	
2	-122.3753737	37.8308244	3 ROIs Z>3 (Ra/Tot)	1	3	4.96	Normal	97290	13,462	20,154	< IL
3	-122.3752791	37.8308260	Time Series Peak				97290	13,381	20,154	< IL	
4	-122.3751818	37.8308475	Time Series Peak, >4 ROIs normal/local Z>3 (all ROIs)				97290	13,332	20,154	< IL	
	-122.3751726	37.8308559									
5	-122.3751427	37.8308042	Time Series Peak				97290	13,304	20,154	< IL	
6	-122.3752387	37.8308051	Highest Z-Scores (Ra/Tot)	3	3	5.01	Local	97290	13,259	20,154	< IL
7	-122.3753500	37.8307868	>4 ROIs Z>3 (all ROIs)				97290	13,018	20,154	< IL	
8	-122.3753960	37.8307543	Time Series Peak				97290	13,009	20,154	< IL	
9	-122.3753954	37.8307759	>4 ROIs normal/local Z>3 (all ROIs)				97290	12,888	20,154	< IL	

Survey Number:
TIRS-04252016-12P3-JSS-2045

6020090

**Instrument # 97290**

- Investigation Points
- Data Points Not Requiring Further Investigation
- RSY Pad Boundaries
- Investigation points ID

CB&I Federal Services, LLC

Data Processed In Treasure Island Office

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 11-1(P.3)
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

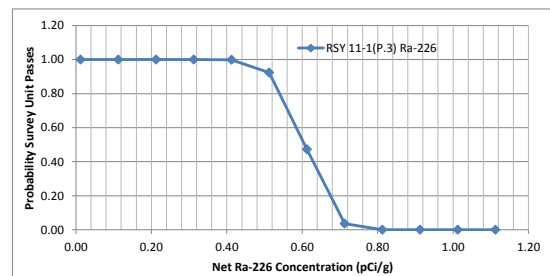
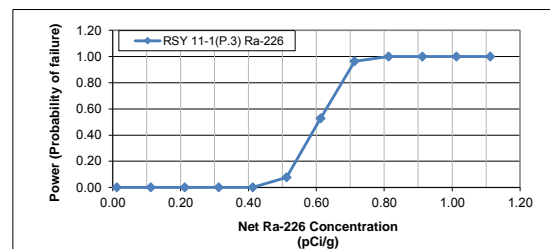
The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4.5	S
0.57	R	0.57	19.5	0	4.5	S
0.55	R	0.55	18	0	6	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.251	S	-0.231939192	2	2	21.5	R
0.334	S	-0.148939192	7	7	21.5	R
0.254	S	-0.228939192	3	3	23	R
0.238	S	-0.244939192	1	1	24	R
0.330	S	-0.152939192	6	6	25	R
0.271	S	-0.211939192	4.5	4.5	26	R
0.383	S	-0.099939192	10	10	27.5	R
0.397	S	-0.085939192	11	11	27.5	R
0.271	S	-0.211939192	4.5	4.5	29	R
0.365	S	-0.117939192	9	9	30	R
0.402	S	-0.080939192	12	12	31	R
0.349	S	-0.133939192	8	8	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.061
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count	12	m
SD	0.061	
Median	0.332	
Count	20	n
SD	0.161	
Critical Value	248.4	

Concentration	Background (C)	SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
1.5	0.81	2.0	0.92135	0.86577	221.124	138.9359	11.787107	-4.34973	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)
 Use:
 $m = 20$
 $n = 15$
 $6 r$
 $5 k$
 0.04 α

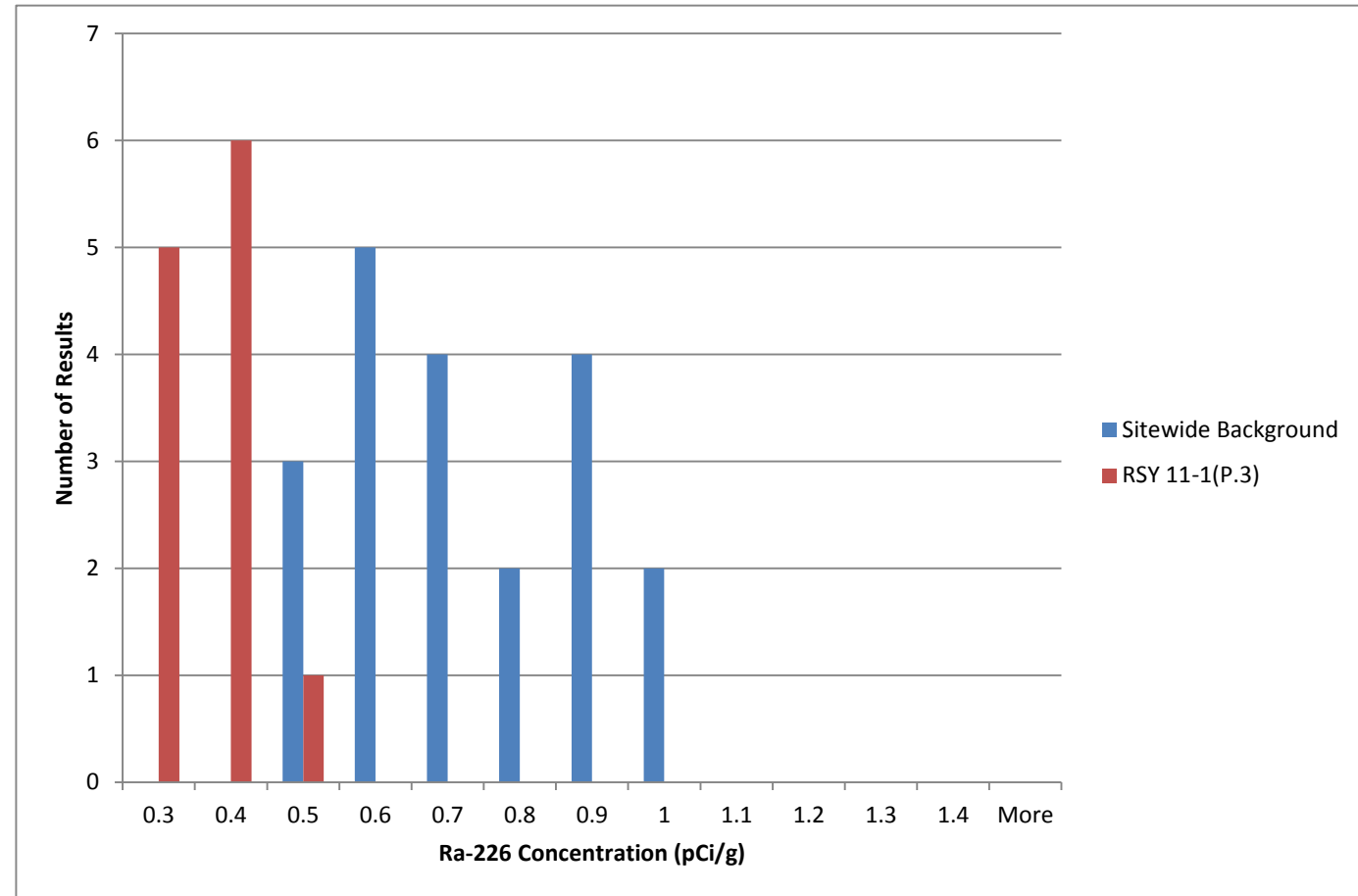
If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

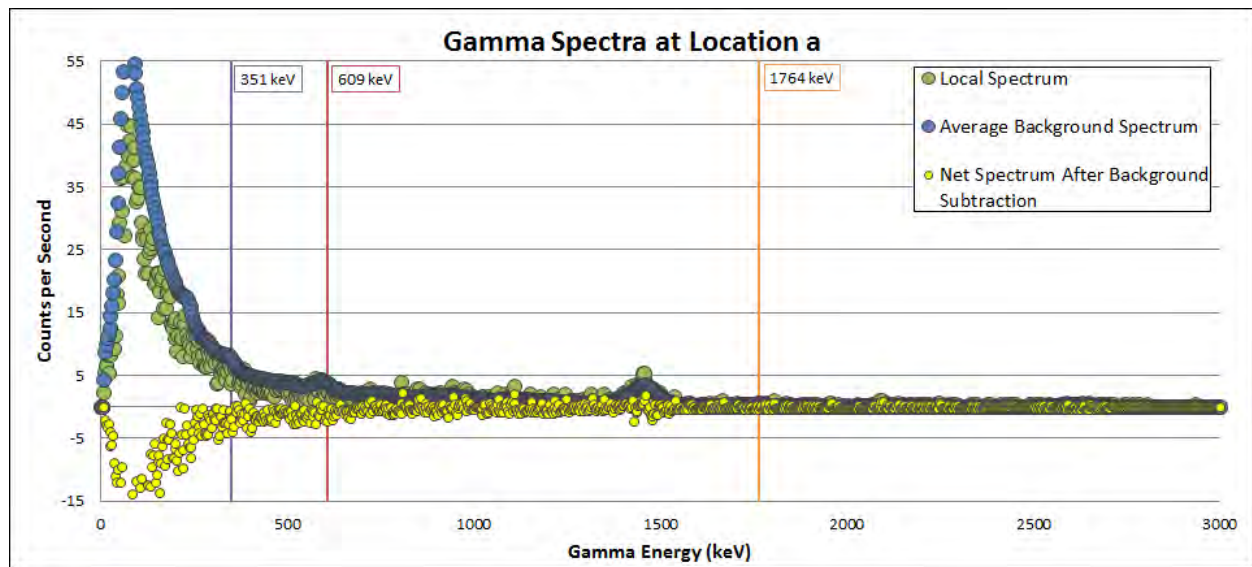
Histogram, RSY 11 (Use 1, Part 3) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 11-1(P.3)	
<i>Bin</i>	<i>Frequency</i>
0.3	5
0.4	6
0.5	1
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0

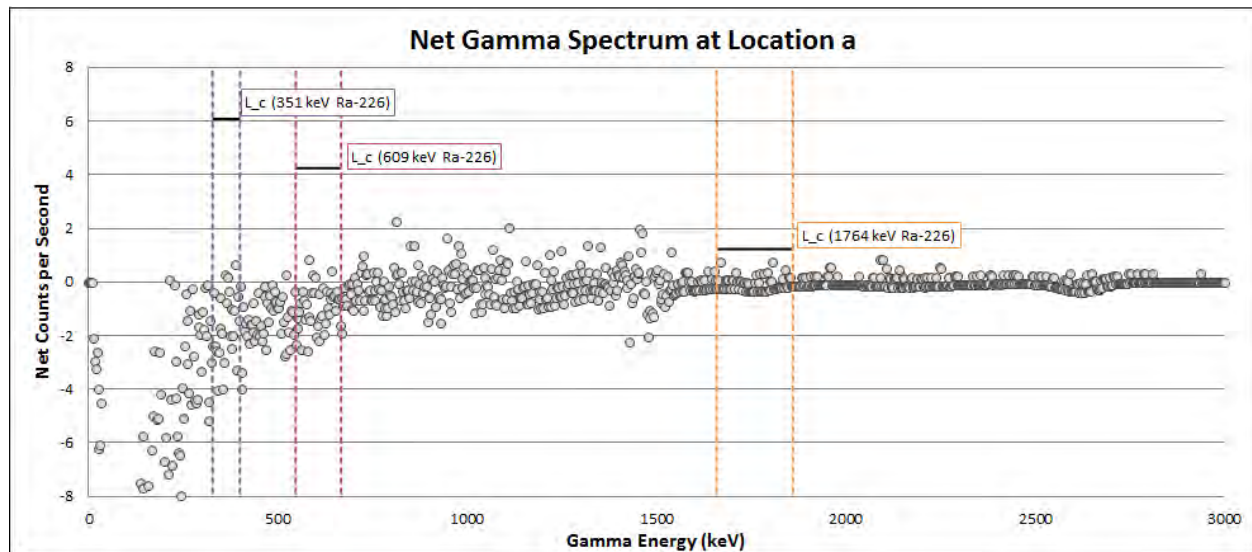


RSI Spectral Analysis Results: RSY 11 Use 1, Part 3 – **Gamma Spectra at Location (a)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (a)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (a): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

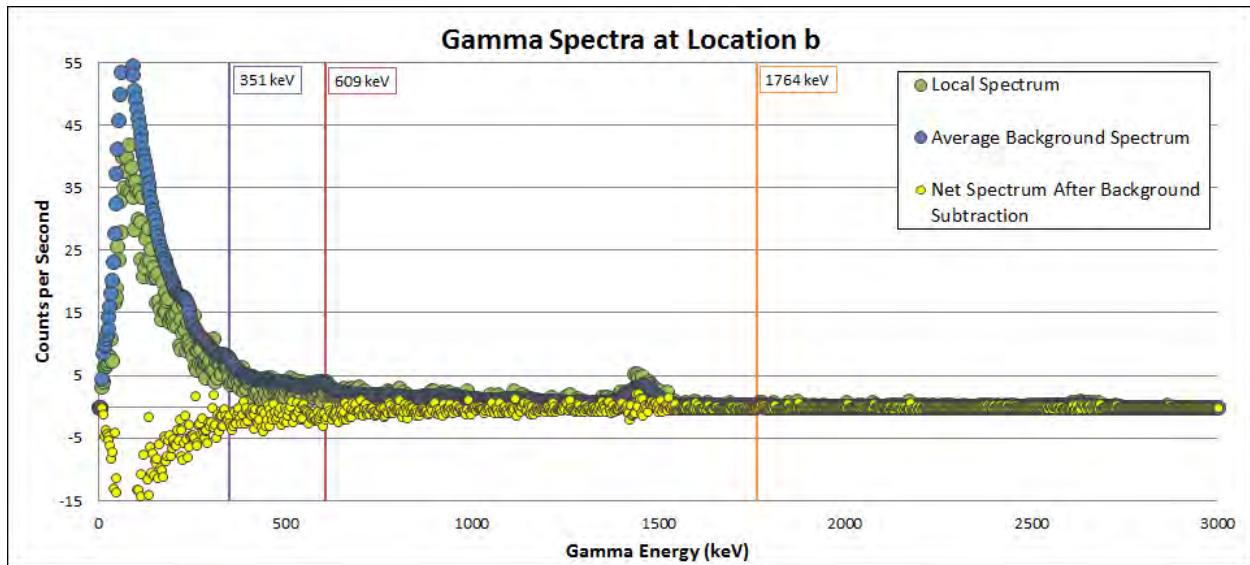
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

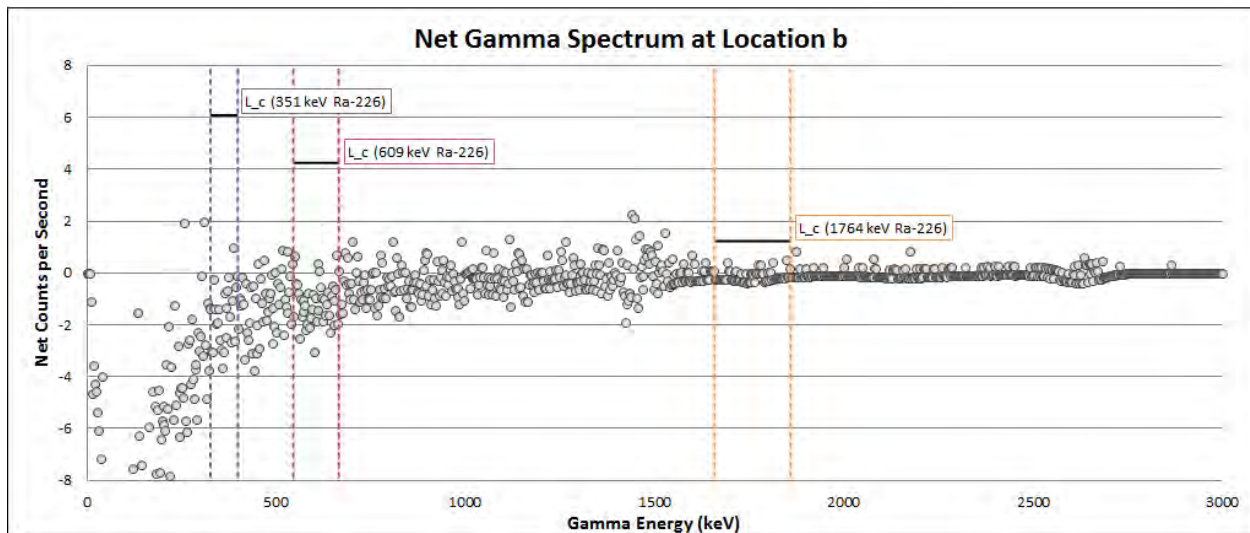
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1, Part 3 – **Gamma Spectra at Location (b)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (b)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (b): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

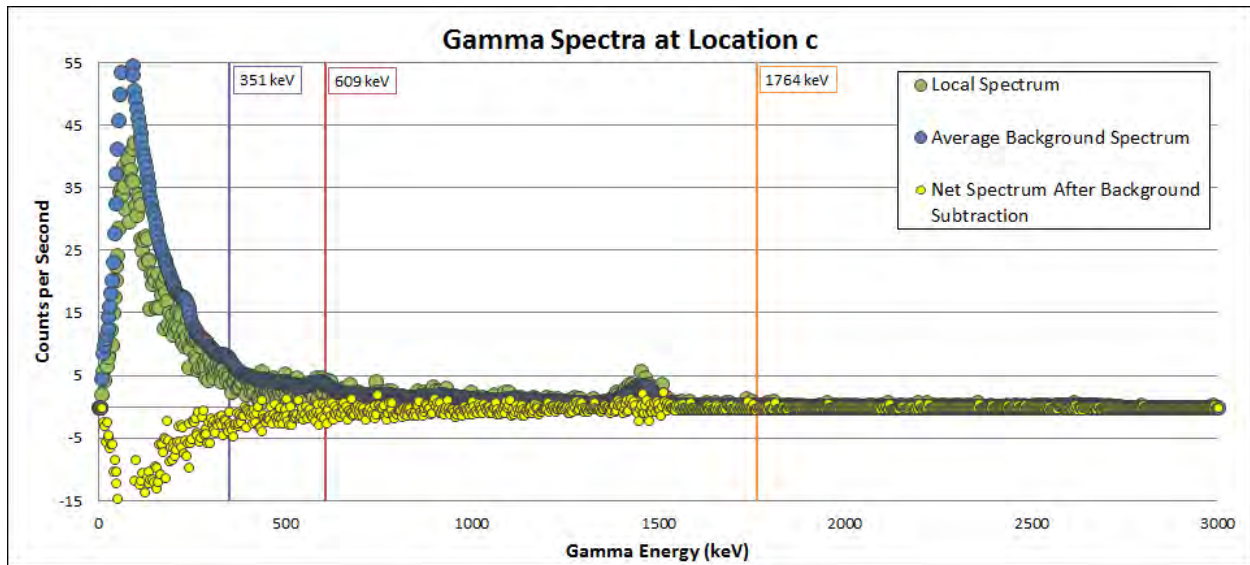
B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{**B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

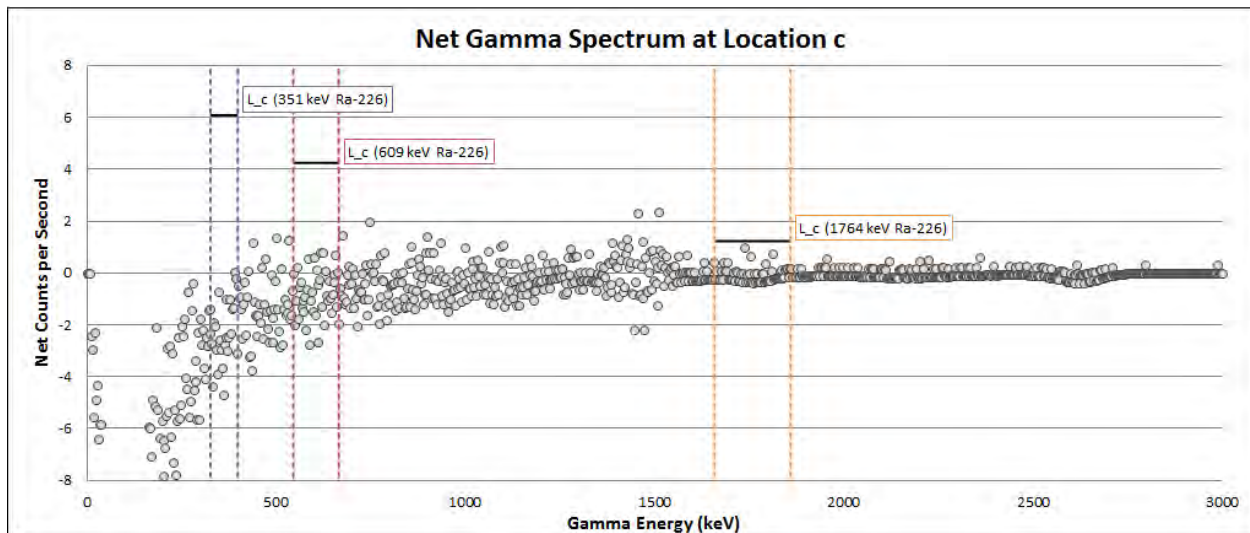
$$L_c = 2.33\sqrt{B}$$

RSI Spectral Analysis Results: RSY 11 Use 1, Part 3 – **Gamma Spectra at Location (c)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (c)**: local – background* = net

*Average background spectrum obtained from Reference Area 7.



Net spectrum for Location (c): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c: Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B: number of background counts that are expected to occur while performing an actual measurement (mean value)

{B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-17136-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn

Micha Korinhizer

Authorized for release by:

5/24/2016 10:10:04 AM

Micha Korinhizer, Project Management Assistant I
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Designee for

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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QC Association Summary	19



Case Narrative

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Job ID: 160-17136-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-17136-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 17 of 32

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Job ID: 160-17136-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 04/27/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 18.7° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04_NP-R-FSSSU4-S421 (160-17136-1), TITO04_NP-R-FSSSU4-S422 (160-17136-2), TITO04_NP-R-FSSSU4-S423 (160-17136-3), TITO04_NP-R-FSSSU4-S424 (160-17136-4), TITO04_NP-R-FSSSU4-S425 (160-17136-5), TITO04_NP-R-FSSSU4-S426 (160-17136-6), TITO04_NP-R-FSSSU4-S427 (160-17136-7), TITO04_NP-R-FSSSU4-S428 (160-17136-8), TITO04_NP-R-FSSSU4-S429 (160-17136-9), TITO04_NP-R-FSSSU4-S430 (160-17136-10), TITO04_NP-R-FSSSU4-S431 (160-17136-11) and TITO04_NP-R-FSSSU4-S432 (160-17136-12) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 04/27/2016, prepared on 04/28/2016 and analyzed on 05/19/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL P3_RSY11 USE1 P3_225
Page 1 of 2

Project Number: **500060**

Project Name / Location: **CTO-04 Phase III**

Purchase Order #: **201455**

Project Manager: **Ulrika Messer**
(Name & phone #)

Send Report To: **Patricia Flynn**

Phone/Fax Number: **925-288-2037**

Address: **4005 Port Chicago Hwy**

City: **Concord, CA, 94520**

Shipment Date: **4-26-16**

Waybill Number: **12 59446 201455 331120**

Lab Destination: **Earth Toxics Inc To Test America**

Lab Contact Name / ph. #: **Mike Dryden**

Collection Information			Matrix		Preservative (water)		Preservative (soil)		Container Type		Dose Rate $\mu\text{R/hr}$	
Sample ID Number	Sample Description	Date	Time	Method	# of Containers	Matrix	Preservative (water)	Preservative (soil)	Container Type	Dose Rate $\mu\text{R/hr}$	Analyses Requested	
TITO04_NP-R-FSSSU4-S421	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1436	G	1	SO	16 oz Plastic	X				
TITO04_NP-R-FSSSU4-S422	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1439	G	1	SO	16 oz Plastic	X				
TITO04_NP-R-FSSSU4-S423	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1442	G	1	SO	16 oz Plastic	X				
TITO04_NP-R-FSSSU4-S424	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1445	G	1	SO	16 oz Plastic	X				
TITO04_NP-R-FSSSU4-S425	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1448	G	1	SO	16 oz Plastic	X				
TITO04_NP-R-FSSSU4-S426	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1451	G	1	SO	16 oz Plastic	X				
TITO04_NP-R-FSSSU4-S427	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1453	G	1	SO	16 oz Plastic	X				
TITO04_NP-R-FSSSU4-S428	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1459	G	1	SO	16 oz Plastic	X				
TITO04_NP-R-FSSSU4-S429	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1455	G	1	SO	16 oz Plastic	X				
TITO04_NP-R-FSSSU4-S430	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1457	G	1	SO	16 oz Plastic	X				

160-17136 Chain of Custody

Special Instructions:		Method Codes	
7 days ingrown draft and follow with 21 days final		C = Composite G = Grab Matrix Codes: DW = Drinking Water GW = Ground Water WW = Waste Water A = Air ABS=Asbestos, PO=Pipe Opening	

Standard TAT		Project Specific:	
<input type="checkbox"/> 24-hr <input type="checkbox"/> 3-day <input type="checkbox"/> 7-day	<input type="checkbox"/> I <input type="checkbox"/> II <input checked="" type="checkbox"/> III	Date: 4-26-16 Time: 1230	Date: 4-27-16 Time: 0836



CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # T1_P3_RSY11 USE1 P3_225
Page 2 of 2

Project Number: 500060

CTO-04 Phase III

Project Name / Location: RSY11 USE 1 Part 3

Purchase Order #: 201455

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date: 4-26-16

Waybill Number: 12591463018331300

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Collection Information				Preservative (water)		Preservative (soil)		Container Type		Matrix		# of containers		Gamma Scan		Analyses Requested	
Sample ID Number	Sample Description	Date	Time	Method	Date	Time	Method	Date	Time	Matrix	# of containers	Preservative (water)	Preservative (soil)	Container Type	Gamma Scan	Analyses Requested	
TITO04_NP-R-FSSSU4-S431	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1450	G						SO	1	16 oz Plastic			X		
TITO04_NP-R-FSSSU4-S432	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1501	G						SO	1	16 oz Plastic			X		
Special Instructions: 7 days ingrown draft and follow with 21 days final																	
Level Of QC Required:																	
Standard TAT <input type="checkbox"/> 24-hr <input type="checkbox"/> 3-day <input type="checkbox"/> 7-day																	
Relinquished By: <u>AF</u> Date: <u>4-26-16</u> Time: <u>1230</u> Received By: <u>C. McK</u> Date: <u>042716</u> Time: <u>0830</u>																	
Relinquished By: Date: Time: Received By: Date: Time:																	
Method Codes: G = Composite G = Grab																	
Matrix Codes: DW = Drinking Water SO = Soil																	
GW = Ground Water SL = Sludge																	
WW = Waste Water CP = Chip Samples																	
A = Air ABS=Asbestos, PO=Pipe Opening																	

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-17136-2

Login Number: 17136**List Source: TestAmerica St. Louis****List Number: 1****Creator: McKinney, Gerrod E**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-17136-1	TITO04_NP-R-FSSSU4-S421	Solid	04/25/16 14:36	04/27/16 08:30
160-17136-2	TITO04_NP-R-FSSSU4-S422	Solid	04/25/16 14:39	04/27/16 08:30
160-17136-3	TITO04_NP-R-FSSSU4-S423	Solid	04/25/16 14:42	04/27/16 08:30
160-17136-4	TITO04_NP-R-FSSSU4-S424	Solid	04/25/16 14:45	04/27/16 08:30
160-17136-5	TITO04_NP-R-FSSSU4-S425	Solid	04/25/16 14:48	04/27/16 08:30
160-17136-6	TITO04_NP-R-FSSSU4-S426	Solid	04/25/16 14:51	04/27/16 08:30
160-17136-7	TITO04_NP-R-FSSSU4-S427	Solid	04/25/16 14:53	04/27/16 08:30
160-17136-8	TITO04_NP-R-FSSSU4-S428	Solid	04/25/16 14:59	04/27/16 08:30
160-17136-9	TITO04_NP-R-FSSSU4-S429	Solid	04/25/16 14:55	04/27/16 08:30
160-17136-10	TITO04_NP-R-FSSSU4-S430	Solid	04/25/16 14:57	04/27/16 08:30
160-17136-11	TITO04_NP-R-FSSSU4-S431	Solid	04/25/16 14:50	04/27/16 08:30
160-17136-12	TITO04_NP-R-FSSSU4-S432	Solid	04/25/16 15:01	04/27/16 08:30

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S421

Lab Sample ID: 160-17136-1

Date Collected: 04/25/16 14:36

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.356		0.131	0.136		0.128	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Actinium-227	-0.0295	U	0.0550	0.0551		0.983	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Bismuth-212	0.000	U	0.518	0.518		1.38	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Bismuth-214	0.251		0.110	0.113		0.122	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Cesium-137	0.0533	U	0.0529	0.0532		0.0804	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Lead-210	1.03	U	1.32	1.32		1.90	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Lead-212	0.319		0.0826	0.0923		0.0815	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Lead-214	0.292		0.117	0.121		0.135	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Potassium-40	9.26		1.65	1.90		0.758	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Protactinium-231	0.416	U	1.39	1.39		3.17	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Radium-226	0.251		0.110	0.113	0.500	0.122	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Radium-228	0.356		0.131	0.136		0.128	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Thallium-208	0.117		0.0537	0.0550		0.0511	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Thorium-228	0.319		0.0826	0.0923		0.0815	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Thorium-232	0.356		0.131	0.136		0.128	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Thorium-234	-0.616	U	1.16	1.16		1.92	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Uranium-235	0.0940	U	0.295	0.295		0.541	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Uranium-238	-0.616	U	1.16	1.16		1.92	pCi/g	04/28/16 09:26	05/19/16 09:21	1

Client Sample ID: TITO04_NP-R-FSSSU4-S422

Lab Sample ID: 160-17136-2

Date Collected: 04/25/16 14:39

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.451		0.174	0.180		0.181	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Actinium-227	-0.305	U	0.741	0.742		1.25	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Bismuth-212	0.182	U	0.432	0.433		0.757	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Bismuth-214	0.334		0.136	0.140		0.131	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Cesium-137	-0.0331	U	0.0549	0.0550		0.0895	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Lead-210	-0.978	U	1.54	1.55		2.44	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Lead-212	0.302		0.0850	0.0936		0.109	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Lead-214	0.274		0.0915	0.0958		0.110	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Potassium-40	10.7		1.41	1.78		0.753	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Protactinium-231	-0.713	U	2.32	2.32		3.91	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Radium-226	0.334		0.136	0.140	0.500	0.131	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Radium-228	0.451		0.174	0.180		0.181	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Thallium-208	0.119		0.0509	0.0524		0.0561	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Thorium-228	0.302		0.0850	0.0936		0.109	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Thorium-232	0.451		0.174	0.180		0.181	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Thorium-234	0.397	U	0.892	0.893		1.28	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Uranium-235	-0.0343	U	0.122	0.122		0.573	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Uranium-238	0.397	U	0.892	0.893		1.28	pCi/g	04/28/16 09:26	05/19/16 09:18	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S423

Lab Sample ID: 160-17136-3

Date Collected: 04/25/16 14:42

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.421		0.126	0.133		0.0690	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Actinium-227	0.265	U	0.582	0.583		0.978	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Bismuth-212	0.292	U	0.520	0.521		0.881	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Bismuth-214	0.254		0.0843	0.0884		0.0939	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Cesium-137	0.0137	U	0.0300	0.0301		0.0523	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Lead-210	-0.690	U	1.52	1.52		2.55	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Lead-212	0.241		0.0652	0.0722		0.0785	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Lead-214	0.372		0.0803	0.0891		0.0977	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Potassium-40	11.2		1.32	1.75		0.579	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Protactinium-231	0.346	U	1.27	1.28		3.70	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Radium-226	0.254		0.0843	0.0884	0.500	0.0939	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Radium-228	0.421		0.126	0.133		0.0690	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Thallium-208	0.131		0.0363	0.0388		0.0185	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Thorium-228	0.241		0.0652	0.0722		0.0785	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Thorium-232	0.421		0.126	0.133		0.0690	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Thorium-234	0.000	U	0.680	0.680		2.14	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Uranium-235	0.000	U	0.155	0.155		0.682	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Uranium-238	0.000	U	0.680	0.680		2.14	pCi/g	04/28/16 09:26	05/19/16 10:13	1

Client Sample ID: TITO04_NP-R-FSSSU4-S424

Lab Sample ID: 160-17136-4

Date Collected: 04/25/16 14:45

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.374		0.145	0.150		0.114	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Actinium-227	-0.283	U	0.766	0.767		1.29	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Bismuth-212	-0.210	U	0.625	0.625		1.08	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Bismuth-214	0.238		0.0867	0.0901		0.0903	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Cesium-137	0.0181	U	0.0397	0.0398		0.0685	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Lead-210	1.24	U	1.04	1.05		1.42	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Lead-212	0.286		0.0732	0.0820		0.0876	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Lead-214	0.367		0.0997	0.107		0.124	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Potassium-40	9.92		1.27	1.63		0.517	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Protactinium-231	-0.712	U	2.34	2.34		3.94	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Radium-226	0.238		0.0867	0.0901	0.500	0.0903	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Radium-228	0.374		0.145	0.150		0.114	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Thallium-208	0.132		0.0408	0.0430		0.0354	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Thorium-228	0.286		0.0732	0.0820		0.0876	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Thorium-232	0.374		0.145	0.150		0.114	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Thorium-234	1.07	U	1.09	1.09		1.35	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Uranium-235	0.143	U	0.271	0.271		0.460	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Uranium-238	1.07	U	1.09	1.09		1.35	pCi/g	04/28/16 09:26	05/19/16 10:14	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S425

Lab Sample ID: 160-17136-5

Date Collected: 04/25/16 14:48

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.327		0.154	0.157		0.147	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Actinium-227	0.170	U	0.442	0.442		0.748	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Bismuth-212	-0.177	U	0.554	0.554		0.955	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Bismuth-214	0.330		0.0840	0.0907		0.0679	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Cesium-137	0.0165	U	0.0269	0.0270		0.0456	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Lead-210	-0.0351	U	0.651	0.651		1.78	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Lead-212	0.295		0.0537	0.0659		0.0420	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Lead-214	0.327		0.0734	0.0809		0.0561	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Potassium-40	9.59		1.12	1.49		0.404	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Protactinium-231	0.265	U	0.941	0.942		3.02	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Radium-226	0.330		0.0840	0.0907	0.500	0.0679	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Radium-228	0.327		0.154	0.157		0.147	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Thallium-208	0.108		0.0320	0.0339		0.0257	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Thorium-228	0.295		0.0537	0.0659		0.0420	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Thorium-232	0.327		0.154	0.157		0.147	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Thorium-234	0.289	U	0.614	0.615		1.50	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Uranium-235	0.0671	U	0.160	0.160		0.633	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Uranium-238	0.289	U	0.614	0.615		1.50	pCi/g	04/28/16 09:26	05/19/16 10:45	1

Client Sample ID: TITO04_NP-R-FSSSU4-S426

Lab Sample ID: 160-17136-6

Date Collected: 04/25/16 14:51

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.393		0.143	0.148		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Actinium-227	0.186	U	0.432	0.433		0.626	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Bismuth-212	-0.330	U	0.748	0.749		1.28	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Bismuth-214	0.271		0.0947	0.0989		0.0918	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Cesium-137	-0.0424	U	0.0733	0.0734		0.123	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Lead-210	0.295	U	1.05	1.05		1.57	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Lead-212	0.303		0.0741	0.0838		0.0824	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Lead-214	0.432		0.104	0.113		0.0888	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Potassium-40	11.9		1.55	1.97		0.583	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Protactinium-231	0.000	U	0.679	0.679		2.95	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Radium-226	0.271		0.0947	0.0989	0.500	0.0918	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Radium-228	0.393		0.143	0.148		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Thallium-208	0.102		0.0460	0.0472		0.0422	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Thorium-228	0.303		0.0741	0.0838		0.0824	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Thorium-232	0.393		0.143	0.148		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Thorium-234	-0.0797	U	0.964	0.964		1.66	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Uranium-235	-0.0214	U	0.287	0.287		0.552	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Uranium-238	-0.0797	U	0.964	0.964		1.66	pCi/g	04/28/16 09:26	05/19/16 10:16	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S427

Lab Sample ID: 160-17136-7

Date Collected: 04/25/16 14:53

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.101	U	0.208	0.208		0.382	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Actinium-227	0.332	U	0.341	0.343		1.18	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Bismuth-212	0.0155	U	0.657	0.657		1.20	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Bismuth-214	0.383		0.142	0.147		0.134	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Cesium-137	-0.00923	U	0.0751	0.0751		0.133	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Lead-210	-0.221	U	1.50	1.50		2.60	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Lead-212	0.250		0.0811	0.0873		0.100	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Lead-214	0.392		0.108	0.115		0.139	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Potassium-40	11.0		1.63	1.99		0.445	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Protactinium-231	-0.922	U	2.97	2.97		4.99	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Radium-226	0.383		0.142	0.147	0.500	0.134	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Radium-228	0.101	U	0.208	0.208		0.382	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Thallium-208	0.105		0.0897	0.0904		0.0915	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Thorium-228	0.250		0.0811	0.0873		0.100	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Thorium-232	0.101	U	0.208	0.208		0.382	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Thorium-234	-0.539	U	1.20	1.20		2.90	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Uranium-235	0.0958	U	0.186	0.186		0.835	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Uranium-238	-0.539	U	1.20	1.20		2.90	pCi/g	04/28/16 09:26	05/19/16 10:17	1

Client Sample ID: TITO04_NP-R-FSSSU4-S428

Lab Sample ID: 160-17136-8

Date Collected: 04/25/16 14:59

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.234		0.0997	0.103		0.0782	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Actinium-227	-0.0595	U	0.0975	0.0978		1.39	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Bismuth-212	0.000	U	0.525	0.525		1.25	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Bismuth-214	0.397		0.106	0.113		0.0928	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Cesium-137	-0.00249	U	0.0661	0.0661		0.117	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Lead-210	1.68	U	1.37	1.38		1.78	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Lead-212	0.265		0.0750	0.0825		0.0917	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Lead-214	0.332		0.0905	0.0968		0.0852	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Potassium-40	10.1		1.35	1.70		0.728	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Protactinium-231	0.638	U	1.42	1.42		3.25	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Radium-226	0.397		0.106	0.113	0.500	0.0928	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Radium-228	0.234		0.0997	0.103		0.0782	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Thallium-208	0.105		0.0687	0.0695		0.0724	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Thorium-228	0.265		0.0750	0.0825		0.0917	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Thorium-232	0.234		0.0997	0.103		0.0782	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Thorium-234	0.736	U	0.759	0.763		1.22	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Uranium-235	0.121	U	0.260	0.260		0.777	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Uranium-238	0.736	U	0.759	0.763		1.22	pCi/g	04/28/16 09:26	05/19/16 10:19	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S429

Lab Sample ID: 160-17136-9

Date Collected: 04/25/16 14:55

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.260		0.204	0.206		0.245	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Actinium-227	0.206	U	0.518	0.519		0.877	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Bismuth-212	-0.356	U	0.676	0.677		1.46	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Bismuth-214	0.271		0.0927	0.0969		0.0812	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Cesium-137	-0.0384	U	0.0759	0.0760		0.101	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Lead-210	-0.145	U	1.17	1.17		2.02	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Lead-212	0.265		0.0619	0.0707		0.0639	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Lead-214	0.257		0.0661	0.0712		0.0913	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Potassium-40	11.0		1.49	1.87		0.605	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Protactinium-231	0.000	U	0.218	0.218		2.81	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Radium-226	0.271		0.0927	0.0969	0.500	0.0812	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Radium-228	0.260		0.204	0.206		0.245	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Thallium-208	0.0827		0.0419	0.0427		0.0825	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Thorium-228	0.265		0.0619	0.0707		0.0639	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Thorium-232	0.260		0.204	0.206		0.245	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Thorium-234	0.340	U	0.314	0.316		0.915	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Uranium-235	0.0967	U	0.205	0.205		0.348	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Uranium-238	0.340	U	0.314	0.316		0.915	pCi/g	04/28/16 09:26	05/19/16 19:26	1

Client Sample ID: TITO04_NP-R-FSSSU4-S430

Lab Sample ID: 160-17136-10

Date Collected: 04/25/16 14:57

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.481		0.188	0.195		0.319	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Actinium-227	-0.263	U	0.823	0.824		1.39	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Bismuth-212	0.297	U	0.604	0.604		1.04	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Bismuth-214	0.365		0.124	0.130		0.120	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Cesium-137	0.0161	U	0.0795	0.0795		0.138	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Lead-210	-0.803	U	1.60	1.60		2.67	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Lead-212	0.321		0.0766	0.0871		0.0778	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Lead-214	0.397		0.104	0.112		0.0801	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Potassium-40	10.4		1.57	1.90		0.692	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Protactinium-231	0.000	U	0.280	0.280		4.57	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Radium-226	0.365		0.124	0.130	0.500	0.120	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Radium-228	0.481		0.188	0.195		0.319	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Thallium-208	0.123		0.0448	0.0466		0.0399	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Thorium-228	0.321		0.0766	0.0871		0.0778	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Thorium-232	0.481		0.188	0.195		0.319	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Thorium-234	1.14	U	1.13	1.14		1.45	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Uranium-235	0.157	U	0.343	0.343		0.877	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Uranium-238	1.14	U	1.13	1.14		1.45	pCi/g	04/28/16 09:26	05/19/16 19:25	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S431

Lab Sample ID: 160-17136-11

Date Collected: 04/25/16 14:50

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.395		0.190	0.195		0.370	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Actinium-227	-0.0166	U	0.0540	0.0541		0.937	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Bismuth-212	-0.0258	U	0.782	0.782		1.42	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Bismuth-214	0.402		0.144	0.150		0.135	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Cesium-137	0.0253	U	0.0451	0.0452		0.0751	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Lead-210	0.796	U	0.894	0.899		1.35	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Lead-212	0.371		0.0880	0.100		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Lead-214	0.346		0.106	0.112		0.142	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Potassium-40	10.0		1.65	1.95		0.708	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Protactinium-231	0.000	U	0.713	0.713		3.40	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Radium-226	0.402		0.144	0.150	0.500	0.135	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Radium-228	0.395		0.190	0.195		0.370	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Thallium-208	0.0997		0.102	0.103		0.0932	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Thorium-228	0.371		0.0880	0.100		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Thorium-232	0.395		0.190	0.195		0.370	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Thorium-234	-0.886	U	0.777	0.783		1.84	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Uranium-235	0.0362	U	0.179	0.179		0.520	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Uranium-238	-0.886	U	0.777	0.783		1.84	pCi/g	04/28/16 09:26	05/19/16 10:29	1

Client Sample ID: TITO04_NP-R-FSSSU4-S432

Lab Sample ID: 160-17136-12

Date Collected: 04/25/16 15:01

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.389		0.117	0.123		0.186	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Actinium-227	0.0939	U	0.439	0.439		1.09	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Bismuth-212	0.310	U	0.576	0.577		0.979	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Bismuth-214	0.349		0.0928	0.0997		0.0770	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Cesium-137	-0.0130	U	0.0551	0.0551		0.119	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Lead-210	-0.508	U	1.33	1.33		2.33	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Lead-212	0.250		0.0748	0.0815		0.0942	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Lead-214	0.365		0.0945	0.102		0.122	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Potassium-40	11.3		1.43	1.84		0.740	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Protactinium-231	0.262	U	1.01	1.01		3.28	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Radium-226	0.349		0.0928	0.0997	0.500	0.0770	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Radium-228	0.389		0.117	0.123		0.186	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Thallium-208	0.118		0.0500	0.0515		0.0499	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Thorium-228	0.250		0.0748	0.0815		0.0942	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Thorium-232	0.389		0.117	0.123		0.186	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Thorium-234	-0.0808	U	1.06	1.06		1.82	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Uranium-235	0.111	U	0.264	0.264		0.452	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Uranium-238	-0.0808	U	1.06	1.06		1.82	pCi/g	04/28/16 09:26	05/19/16 10:27	1

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-248507/1-A

Matrix: Solid

Analysis Batch: 252063

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 248507

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0000	U	0.0385	0.0385		0.142	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Actinium-227	-0.1510	U	0.682	0.683		1.18	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Bismuth-212	0.1384	U	0.690	0.690		1.26	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Bismuth-214	-0.02374	U	0.148	0.148		0.271	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Cesium-137	-0.02617	U	0.0768	0.0768		0.145	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Lead-210	0.5632	U	1.14	1.14		1.94	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Lead-212	-0.007974	U	0.0752	0.0752		0.136	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Lead-214	-0.03351	U	0.110	0.110		0.194	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Potassium-40	-0.1917	U	0.910	0.910		1.34	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Protactinium-231	0.0000	U	0.497	0.497		3.49	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Radium-226	-0.02374	U	0.148	0.148	0.500	0.271	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Radium-228	0.0000	U	0.0385	0.0385		0.142	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Thallium-208	-0.04114	U	0.0638	0.0640		0.0998	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Thorium-228	-0.007974	U	0.0752	0.0752		0.136	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Thorium-232	0.0000	U	0.0385	0.0385		0.142	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Thorium-234	0.2838	U	0.516	0.516		1.28	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Uranium-235	-0.01397	U	0.277	0.277		0.490	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Uranium-238	0.2838	U	0.516	0.516		1.28	pCi/g	04/28/16 09:26	05/19/16 09:19	1

Lab Sample ID: LCS 160-248507/2-A

Matrix: Solid

Analysis Batch: 252065

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 248507

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	95.35		10.0		1.07	pCi/g	98	87 - 116
Cesium-137	29.7	28.20		3.00		0.269	pCi/g	95	87 - 120
Cobalt-60	17.3	16.10		1.67		0.104	pCi/g	93	87 - 115

Lab Sample ID: 160-17136-1 DU

Matrix: Solid

Analysis Batch: 252059

Client Sample ID: TITO04_NP-R-FSSSU4-S421

Prep Type: Total/NA

Prep Batch: 248507

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.356		0.2826		0.154		0.193	pCi/g	0.25	1
Actinium-227	-0.0295	U	0.1697	U	0.367		0.885	pCi/g	0.47	1
Bismuth-212	0.000	U	0.4094	U	0.737		1.24	pCi/g	0.33	1
Bismuth-214	0.251		0.3015		0.105		0.0944	pCi/g	0.23	1
Cesium-137	0.0533	U	-0.01693	U	0.0445		0.0768	pCi/g	0.72	1
Lead-210	1.03	U	0.4187	U	1.25		2.11	pCi/g	0.24	1
Lead-212	0.319		0.2750		0.0701		0.0587	pCi/g	0.27	1
Lead-214	0.292		0.3643		0.0891		0.0821	pCi/g	0.35	1
Potassium-40	9.26		9.782		1.59		0.574	pCi/g	0.15	1
Protactinium-231	0.416	U	0.0000	U	0.334		3.46	pCi/g	0.24	1
Radium-226	0.251		0.3015		0.105	0.500	0.0944	pCi/g	0.23	1
Radium-228	0.356		0.2826		0.154		0.193	pCi/g	0.25	1

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-17136-1 DU

Matrix: Solid

Analysis Batch: 252059

Client Sample ID: TITO04_NP-R-FSSSU4-S421

Prep Type: Total/NA

Prep Batch: 248507

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.117		0.1238		0.0523		0.0441	pCi/g	0.06	1
Thorium-228	0.319		0.2750		0.0701		0.0587	pCi/g	0.27	1
Thorium-232	0.356		0.2826		0.154		0.193	pCi/g	0.25	1
Thorium-234	-0.616	U	0.0000	U	0.416		2.06	pCi/g	0.39	1
Uranium-235	0.0940	U	0.0000	U	0.171		0.720	pCi/g	0.20	1
Uranium-238	-0.616	U	0.0000	U	0.416		2.06	pCi/g	0.39	1

QC Association Summary

Page 32 of 32

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Rad

Leach Batch: 248122

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17136-1	TITO04_NP-R-FSSSU4-S421	Total/NA	Solid	Dry and Grind	
160-17136-1 DU	TITO04_NP-R-FSSSU4-S421	Total/NA	Solid	Dry and Grind	
160-17136-2	TITO04_NP-R-FSSSU4-S422	Total/NA	Solid	Dry and Grind	
160-17136-3	TITO04_NP-R-FSSSU4-S423	Total/NA	Solid	Dry and Grind	
160-17136-4	TITO04_NP-R-FSSSU4-S424	Total/NA	Solid	Dry and Grind	
160-17136-5	TITO04_NP-R-FSSSU4-S425	Total/NA	Solid	Dry and Grind	
160-17136-6	TITO04_NP-R-FSSSU4-S426	Total/NA	Solid	Dry and Grind	
160-17136-7	TITO04_NP-R-FSSSU4-S427	Total/NA	Solid	Dry and Grind	
160-17136-8	TITO04_NP-R-FSSSU4-S428	Total/NA	Solid	Dry and Grind	
160-17136-9	TITO04_NP-R-FSSSU4-S429	Total/NA	Solid	Dry and Grind	
160-17136-10	TITO04_NP-R-FSSSU4-S430	Total/NA	Solid	Dry and Grind	
160-17136-11	TITO04_NP-R-FSSSU4-S431	Total/NA	Solid	Dry and Grind	
160-17136-12	TITO04_NP-R-FSSSU4-S432	Total/NA	Solid	Dry and Grind	

Prep Batch: 248507

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17136-1	TITO04_NP-R-FSSSU4-S421	Total/NA	Solid	Fill_Geo-21	248122
160-17136-1 DU	TITO04_NP-R-FSSSU4-S421	Total/NA	Solid	Fill_Geo-21	248122
160-17136-2	TITO04_NP-R-FSSSU4-S422	Total/NA	Solid	Fill_Geo-21	248122
160-17136-3	TITO04_NP-R-FSSSU4-S423	Total/NA	Solid	Fill_Geo-21	248122
160-17136-4	TITO04_NP-R-FSSSU4-S424	Total/NA	Solid	Fill_Geo-21	248122
160-17136-5	TITO04_NP-R-FSSSU4-S425	Total/NA	Solid	Fill_Geo-21	248122
160-17136-6	TITO04_NP-R-FSSSU4-S426	Total/NA	Solid	Fill_Geo-21	248122
160-17136-7	TITO04_NP-R-FSSSU4-S427	Total/NA	Solid	Fill_Geo-21	248122
160-17136-8	TITO04_NP-R-FSSSU4-S428	Total/NA	Solid	Fill_Geo-21	248122
160-17136-9	TITO04_NP-R-FSSSU4-S429	Total/NA	Solid	Fill_Geo-21	248122
160-17136-10	TITO04_NP-R-FSSSU4-S430	Total/NA	Solid	Fill_Geo-21	248122
160-17136-11	TITO04_NP-R-FSSSU4-S431	Total/NA	Solid	Fill_Geo-21	248122
160-17136-12	TITO04_NP-R-FSSSU4-S432	Total/NA	Solid	Fill_Geo-21	248122
LCS 160-248507/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-248507/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

From: [Weyant, David B CIV NAVSEA 04, 04N](#)
To: [Guillory, Jeffrey](#)
Cc: [Edwards, Zachary L CIV SEA 04 04N](#); [Yantos, Christopher N CIV NAVFAC SW, BRAC](#); [Messer, Ulrika](#); [Hackett, John R](#); [Schul, Raymond](#); [Morrison, Dennis](#); [Bohannon, Derek](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 11 (Use 5)
Date: Wednesday, December 21, 2016 10:27:07 AM

Hello Jeff,

I concur to designating the Revised RSY-11 (Use 5) soil as Non-LLRW soil.

VR

David Weyant
Health Physicist/Environmental Protection Manager
Environmental Protection Division
NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederalservices.com>]
Sent: Monday, December 12, 2016 1:08 AM
To: Weyant, David B CIV NAVSEA 04, 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: [Non-DoD Source] RE: NSTI RSY Soil Release Request - RSY 11 (Use 5)

Mr. Weyant,

Attached is a revised copy of NSTI RSY Soil Release Request - RSY 11 (Use 5). This report includes revisions to the Summary (page 2).

My apologies for the inconvenience. If you have any questions, please do not hesitate to contact me. Thank you for your time.

Jeffrey Guillory

Scientist 3

Federal Services

Cell: +1 979 422 5534

jeffrey.guillory@cbifederaleservices.com

From: Guillory, Jeffrey
Sent: Sunday, December 11, 2016 6:50 PM
To: David.veyant@navy.mil
Cc: zachary.edwards@navy.mil; Yantos, Christopher N CIV NAVFAC SW, BRAC (christopher.yantos@navy.mil); Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: NSTI RSY Soil Release Request - RSY 11 (Use 5)

Mr. Weyant,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Jeffrey Guillory

Scientist 3

Federal Services

Cell: +1 979 422 5534

jeffrey.guillory@cbifederaleservices.com

CB&I

950 Avenue M - Treasure Island

San Francisco, CA 94130

United States of America

www.CBI.com <<http://www.cbi.com/>>



Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY 11	RSY Unit Use Number: USE 5	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 12/12/2016

Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static Survey Meter (Model 2221) Serial Number	One-Minute Static Reading (CPM)	Static Count Exceeds Reference Area IL?	²²⁶ Ra Final Analytical Results (pCi/g)
Upper limit of site reference background						1.69
TITO04-BS-FSS-SU2RSY11-5-S501	1	Systematic	262322	10,970	No	0.0723
TITO04-BS-FSS-SU2RSY11-5-S502	2	Systematic	262322	11,141	No	0.366
TITO04-BS-FSS-SU2RSY11-5-S503	3	Systematic	262322	11,031	No	0.407
TITO04-BS-FSS-SU2RSY11-5-S504	4	Systematic	262322	11,003	No	0.0509
TITO04-BS-FSS-SU2RSY11-5-S505	5	Systematic	262322	10,949	No	0.259
TITO04-BS-FSS-SU2RSY11-5-S506	6	Systematic	262322	10,958	No	0.0669
TITO04-BS-FSS-SU2RSY11-5-S507	7	Systematic	262322	11,026	No	0.313
TITO04-BS-FSS-SU2RSY11-5-S508	8	Systematic	262322	11,269	No	0.315
TITO04-BS-FSS-SU2RSY11-5-S509	9	Systematic	262322	11,189	No	0.324
TITO04-BS-FSS-SU2RSY11-5-S510	10	Systematic	262322	11,016	No	0.296
TITO04-BS-FSS-SU2RSY11-5-S511	11	Systematic	262322	10,898	No	0.101
TITO04-BS-FSS-SU2RSY11-5-S512	12	Systematic	262322	11,007	No	0.234
TITO04-BS-FSS-SU2RSY11-5-S513	13	Systematic	262322	11,092	No	0.0237
TITO04-BS-FSS-SU2RSY11-5-S514	14	Systematic	262322	11,214	No	0.334
TITO04-BS-FSS-SU2RSY11-5-S515	15	Systematic	262322	10,996	No	0.419
TITO04-BS-FSS-SU2RSY11-5-S516	16	Systematic	262322	10,804	No	0.244
TITO04-BS-FSS-SU2RSY11-5-S517	17	Systematic	262322	10,876	No	0.225
TITO04-BS-FSS-SU2RSY11-5-S518	18	Systematic	262322	10,712	No	0.235
TITO04-BS-FSS-SU2RSY11-5-S519	19	Systematic	262322	10,960	No	0.279
TITO04-BS-FSS-SU2RSY11-5-S520	20	Systematic	262322	11,087	No	0.394

CPM Counts per minute
 IL Investigation Level (based on Reference Area data set)
²²⁶Ra Radium-226
 pCi/g Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd (CPM)	Reference Area Static 3σ IL (CPM)	Reference Area Scan Bkgd (CPM)	Reference Area Scan 3σ IL (CPM)	Range (CPM)
Gamma Walkover Survey (Part 1)	TIRS-102152016-12P3-GWS-2558	10/21/2016	2221	8/12/2017	262322	N/A	N/A	14,047	17,356	8,955 – 12,501
Gamma Walkover Survey (Part 2)	TIRS-102152016-12P3-GWS-2559	10/21/2016	2221	8/12/2017	262322	N/A	N/A	14,047	17,356	9,068 – 12,336
Follow-up Static Survey (Parts 1 & 2)	TIRS-10262016-12P3-JSS-2575	10/26/2016	2221	8/12/2017	262322	14,024	16,662	N/A	N/A	10,422 – 11,077
Systematic Sampling Survey	TIRS-10262016-12P3-JSS-2578	10/26/2016	2221	8/12/2017	262322	14,024	16,662	N/A	N/A	10,712 – 11,269

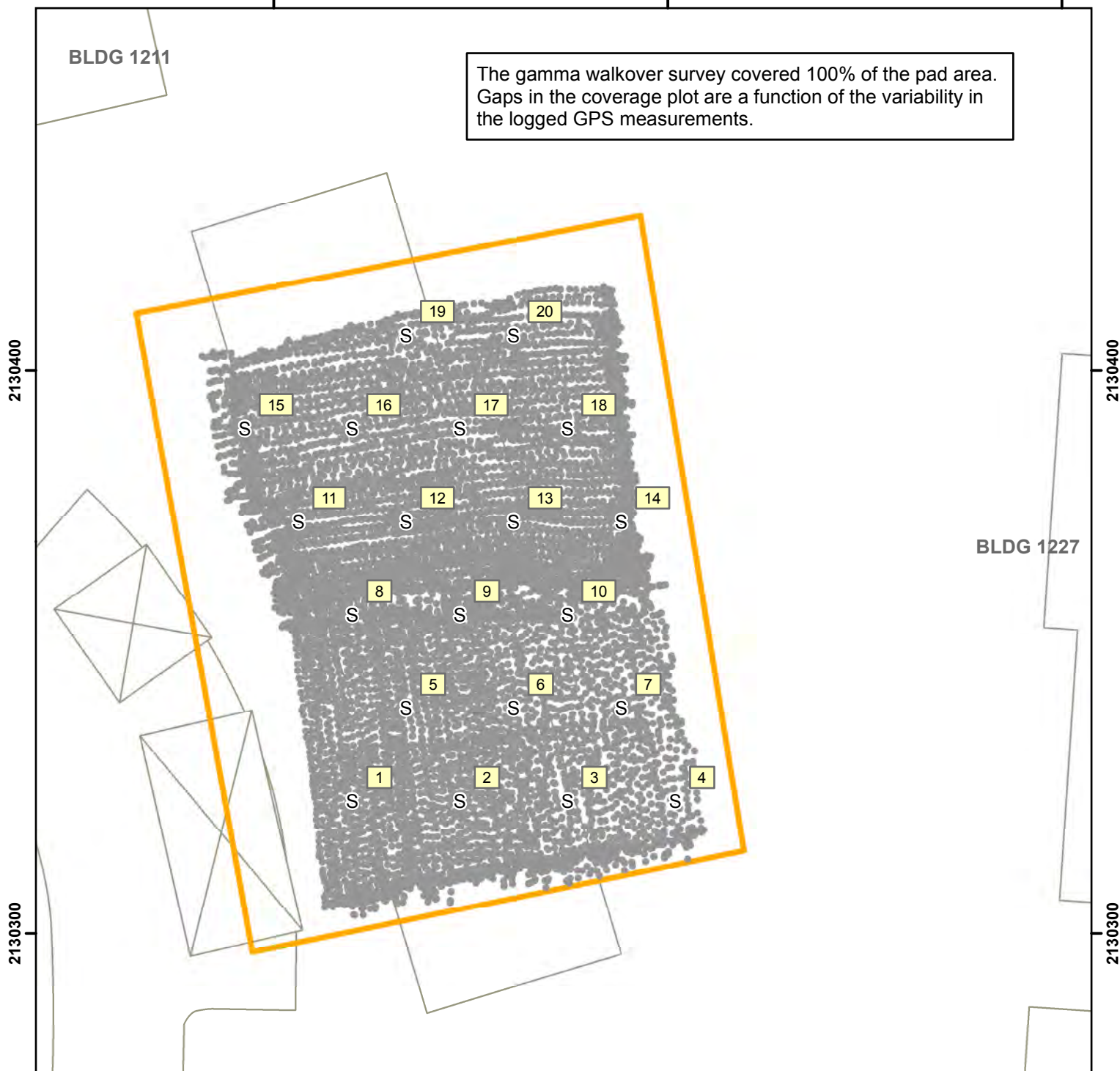
3σ IL Investigation Level (established at 3σ above the mean of the Reference Area data set)
 CPM Counts per minute

Summary
<p>1) Gamma walkover survey and data review (Part 1)—all locations surveyed in the northern half (Part 1) of RSY 11 (Use 5) were less than the Reference Area scan IL. As a conservative measure, locations exceeding three standard deviations of the data set average for RSY 11 (Use 5, Part 1) were selected for follow-up investigation. Gamma scan coverage (Parts 1 & 2) is shown on Systematic Sample Survey map (page 3). GWS count rate statistics are also provided (page 4).</p>
<p>2) Gamma walkover survey and data review (Part 2)—all locations surveyed in the southern half (Part 2) of RSY 11 (Use 5) were less than the Reference Area scan IL. As a conservative measure, locations exceeding three standard deviations of the data set average for RSY 11 (Use 5, Part 2) were selected for follow-up investigation. Gamma scan coverage (Parts 1 & 2) is shown on Systematic Sample Survey map (page 3). GWS count rate statistics are also provided (page 5).</p>
<p>3) Follow-up static survey—14 total locations (Parts 1 & 2) identified during the data review process as exceeding three standard deviations of the data set averages for Parts 1 & 2 of RSY 11 (Use 5) were investigated, resulting in all locations less than the Reference Area static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 6).</p>
<p>4) Twenty systematic soil samples (501-520) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with static readings < Reference Area static IL for all sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 9-31).</p>
<p>Conclusions:</p> <p>All count rates recorded during the gamma walkover surveys were less than the Reference Area scan IL. All locations identified as exceeding three standard deviations of the data set means for Parts 1 & 2 of RSY 11 (Use 5) were investigated and deemed comparable to background. Fourteen total follow-up static locations were investigated for Parts 1 & 2 of RSY 11 (Use 5), with readings less than the Reference Area static IL at all locations.</p> <p>Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 7-8. These statistical tools were utilized to verify the appropriate level of reasonable effort.</p> <p>RSY 11 (Use 5) contains soil from the final 6-inch over excavation of FSS material from the bottom of the excavation at SWDA Bayside SU 2.</p> <p><u>Note:</u> Soil on RSY Pad 11 (Use 5) was over-excavated at the final depth from the bottom of the excavation at Bayside SU 2, and no visible debris and/or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.</p> <p>CB&I requests RASO concurrence to release this soil as Non-LLRW.</p> <p>Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.</p>

Survey Number:
TIRS-10262016-12P3-JSS-2578


6020090

6020160

**Instrument # 262322**

S Systematic Samples Locations

• GWS Coverage

 RSY Boundaries**CB&I Federal Services, LLC****f**

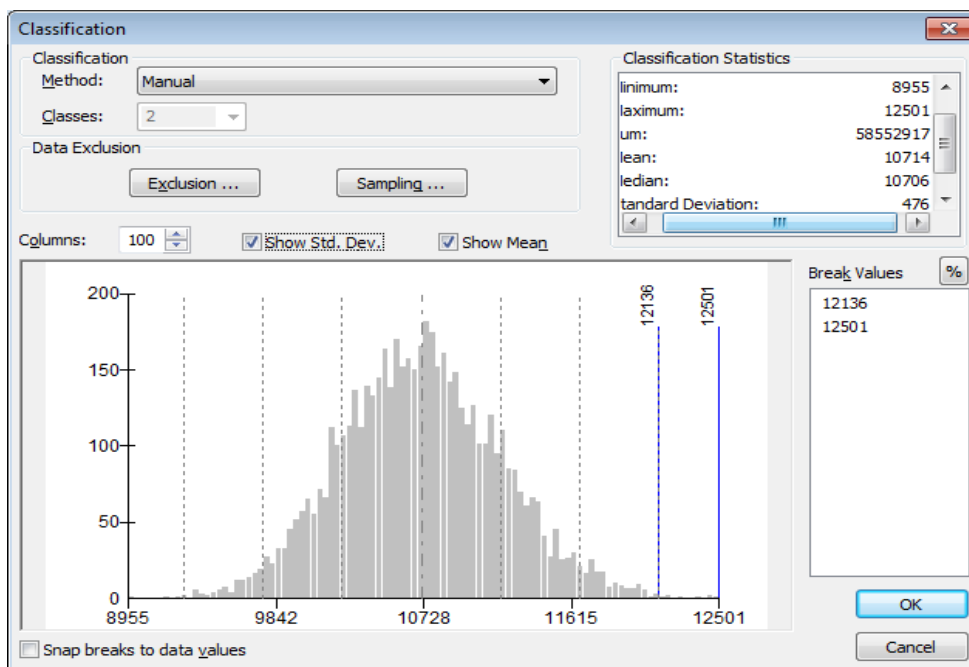
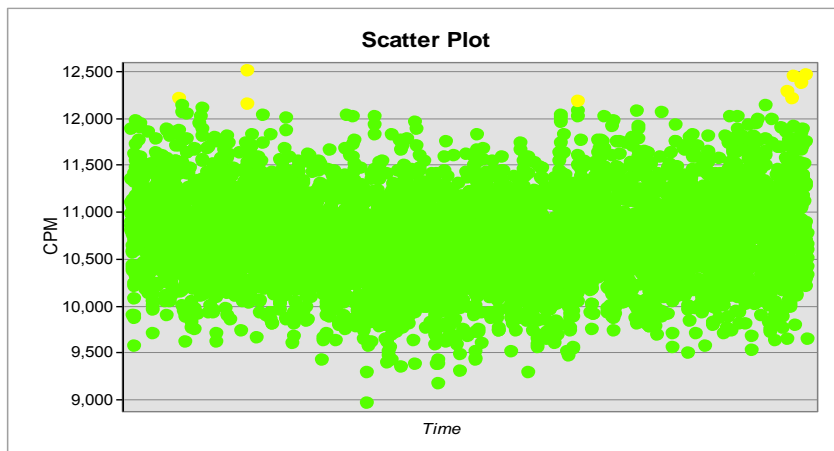
0 10 20 40
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

Survey # TIRS-10212016-12P3-GWS-2558

RSY Pad 11 (Use 5, Part 1)

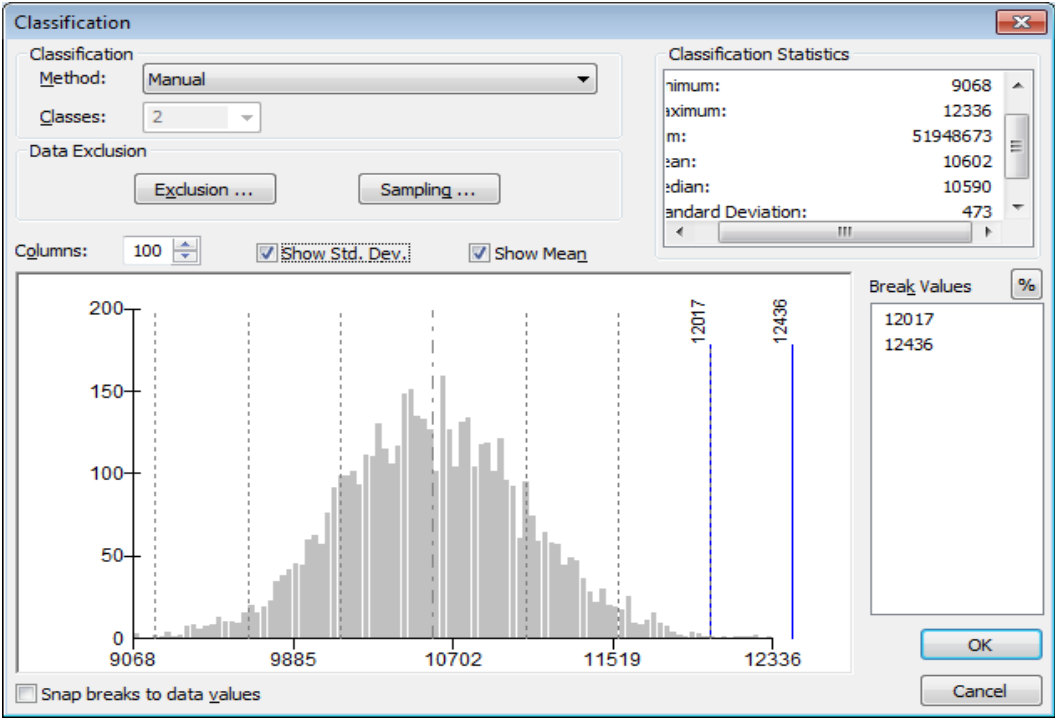
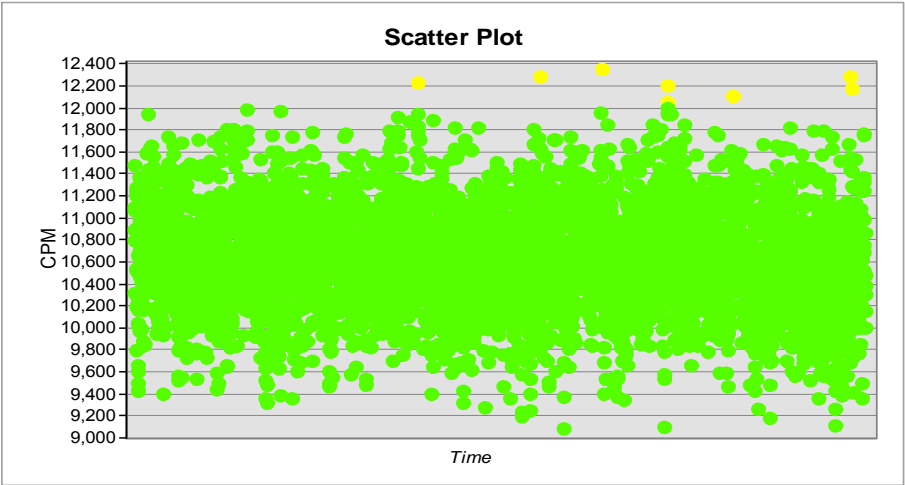
In the 8,000 (cpm)	In the 9,000 (cpm)	In the 10,000 (cpm)	In the 11,000 (cpm)	In the 12,000 (cpm)
1	345	3644	1447	28



Survey # TIRS-10212016-12P3-GWS-2559

RSY Pad 11 (Use 5, Part 2)

In the 9,000 (cpm)	In the 10,000 (cpm)	In the 11,000 (cpm)	In the 12,000 (cpm)
477	3449	966	8



Survey Number:
TIRS-10262016-12P3-JSS-2575

6020090

6020160

**Instrument # 262322**

- * Follow-up Static Location
- > mean + 3 std. dev.
- < mean + 3 std. dev.

RSY Boundaries

CB&I Federal Services, LLC**f**

0 10 20 40
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 11-5
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.072	S	-0.410639192	4	4	21	R
0.366	S	-0.116939192	17	17	22	R
0.407	S	-0.075939192	19	19	23	R
0.051	S	-0.432039192	2	2	24	R
0.259	S	-0.223939192	10	10	25	R
0.067	S	-0.416039192	3	3	26	R
0.313	S	-0.169939192	13	13	27.5	R
0.315	S	-0.167939192	14	14	27.5	R
0.324	S	-0.158939192	15	15	29.5	R
0.296	S	-0.186939192	12	12	29.5	R
0.101	S	-0.381939192	5	5	31	R
0.234	S	-0.248939192	7	7	32	R
0.024	S	-0.459239192	1	1	33	R
0.334	S	-0.148939192	16	16	34	R
0.419	S	-0.063939192	20	20	35.5	R
0.244	S	-0.238939192	9	9	35.5	R
0.225	S	-0.257939192	6	6	37	R
0.235	S	-0.247939192	8	8	38	R
0.279	S	-0.203939192	11	11	39	R
0.394	S	-0.088939192	18	18	40	R
Sum =			820	210		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 *n*
 # of S: 20 *m*
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For *m* or *n* greater than 20, the critical value (*k*) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

z = 97.5% percentile of standard normal distribution = 1.960

k = 482.5

$\alpha_w = \alpha/2 = 0.025$

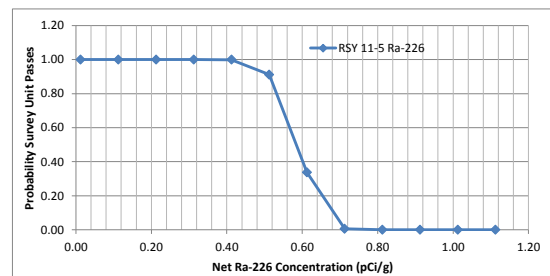
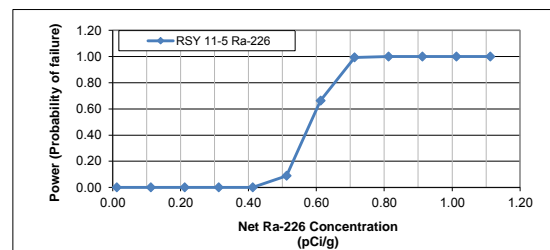
$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.124
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count 20 *m*
 SD 0.124
 Median 0.269
 Ref Stats
 Count 20 *n*
 SD 0.161
 Critical Value 482.5

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	6.7788	43.18647	6.5716411	40.3521	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	15.42	120.9048	10.995672	23.3308	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	45.8664	438.8427	20.948572	10.7927	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	87.3352	846.8185	29.100146	6.3444	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	155.4596	1282.524	35.812351	3.25303	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	222.4924	1345.121	36.675894	1.34873	0.09	0.91
1.3	0.61	0.8	0.71420	0.57447	285.6784	1060.423	32.564133	-0.42133	0.66	0.34
1.4	0.71	1.4	0.83890	0.74170	335.5604	630.7938	25.115608	-2.53238	0.99	0.01
1.5	0.81	2.0	0.92135	0.86577	368.54	285.5796	16.8991	-5.71521	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	388.7524	81.69222	9.0383749	-12.922	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	396.0752	21.5749	4.6448794	-26.7213	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	399.0644	3.510254	1.8735671	-67.8418	1.00	0.00

**QUANTILE TEST**

From NUREG 1505, Table A.7c Values of *r* and *k* for the Quantile Test When α is Approximately 0.05

20 *n* (number of survey unit measurements)
 20 *m* (number of reference area measurements)

Use:
m = 20
n = 20
 4 *r*
 4 *k*
 0.053 α

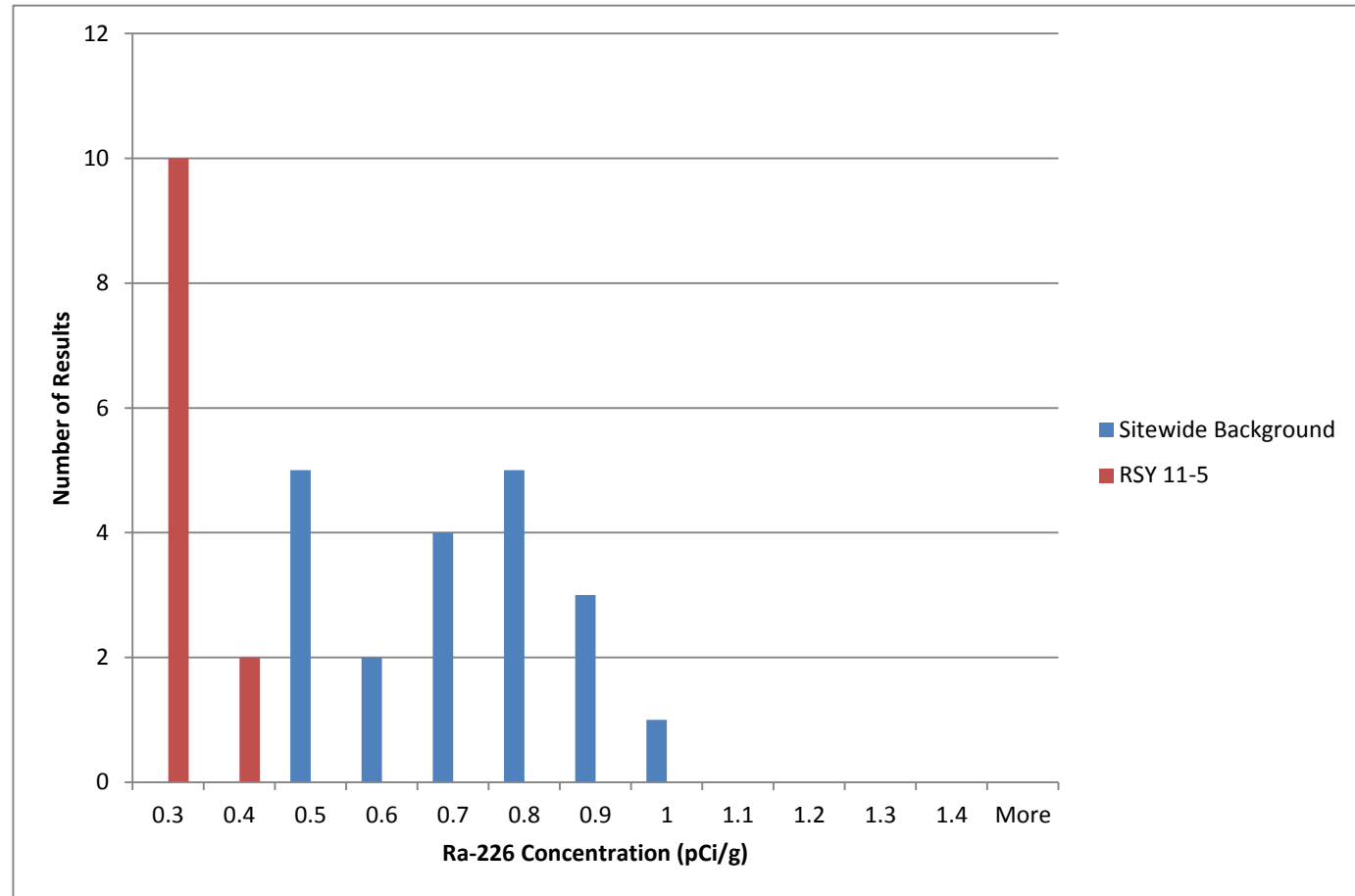
If *k* or more of the *r* largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S. The null hypothesis is accepted.

Histogram, RSY 11 (Use 5) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 11-5	
<i>Bin</i>	<i>Frequency</i>
0.3	10
0.4	2
0.5	0
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-19730-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

11/22/2016 4:07:41 PM

Micha Korinhizer, Project Management Assistant I
(314)298-8566

micha.korinhizer@testamericainc.com

Designee for

Erika Gish, Project Manager II
(314)298-8566

erika.gish@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Job ID: 160-19730-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-19730-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Job ID: 160-19730-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/28/2016 8:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 18.8° C and 18.8° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSS-SU2RSY11-5-S501 (160-19730-1), TITO04-BS-FSS-SU2RSY11-5-S502 (160-19730-2), TITO04-BS-FSS-SU2RSY11-5-S503 (160-19730-3), TITO04-BS-FSS-SU2RSY11-5-S504 (160-19730-4), TITO04-BS-FSS-SU2RSY11-5-S505 (160-19730-5), TITO04-BS-FSS-SU2RSY11-5-S506 (160-19730-6), TITO04-BS-FSS-SU2RSY11-5-S507 (160-19730-7), TITO04-BS-FSS-SU2RSY11-5-S508 (160-19730-8), TITO04-BS-FSS-SU2RSY11-5-S509 (160-19730-9), TITO04-BS-FSS-SU2RSY11-5-S510 (160-19730-10), TITO04-BS-FSS-SU2RSY11-5-S511 (160-19730-11), TITO04-BS-FSS-SU2RSY11-5-S512 (160-19730-12), TITO04-BS-FSS-SU2RSY11-5-S513 (160-19730-13), TITO04-BS-FSS-SU2RSY11-5-S514 (160-19730-14), TITO04-BS-FSS-SU2RSY11-5-S515 (160-19730-15), TITO04-BS-FSS-SU2RSY11-5-S516 (160-19730-16), TITO04-BS-FSS-SU2RSY11-5-S517 (160-19730-17), TITO04-BS-FSS-SU2RSY11-5-S518 (160-19730-18), TITO04-BS-FSS-SU2RSY11-5-S519 (160-19730-19) and TITO04-BS-FSS-SU2RSY11-5-S520 (160-19730-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/28/2016, prepared on 10/31/2016 and analyzed on 11/21/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-19730-2

Login Number: 19730**List Source: TestAmerica St. Louis****List Number: 1****Creator: Clarke, Jill C**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:
DOE = U.S. Department of Energy

Laboratory References:
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



Sample Summary

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-19730-1	TITO04-BS-FSS-SU2RSY11-5-S501	Solid	10/26/16 13:11	10/28/16 08:50
160-19730-2	TITO04-BS-FSS-SU2RSY11-5-S502	Solid	10/26/16 13:13	10/28/16 08:50
160-19730-3	TITO04-BS-FSS-SU2RSY11-5-S503	Solid	10/26/16 13:15	10/28/16 08:50
160-19730-4	TITO04-BS-FSS-SU2RSY11-5-S504	Solid	10/26/16 13:17	10/28/16 08:50
160-19730-5	TITO04-BS-FSS-SU2RSY11-5-S505	Solid	10/26/16 13:19	10/28/16 08:50
160-19730-6	TITO04-BS-FSS-SU2RSY11-5-S506	Solid	10/26/16 13:21	10/28/16 08:50
160-19730-7	TITO04-BS-FSS-SU2RSY11-5-S507	Solid	10/26/16 13:23	10/28/16 08:50
160-19730-8	TITO04-BS-FSS-SU2RSY11-5-S508	Solid	10/26/16 13:25	10/28/16 08:50
160-19730-9	TITO04-BS-FSS-SU2RSY11-5-S509	Solid	10/26/16 13:27	10/28/16 08:50
160-19730-10	TITO04-BS-FSS-SU2RSY11-5-S510	Solid	10/26/16 13:29	10/28/16 08:50
160-19730-11	TITO04-BS-FSS-SU2RSY11-5-S511	Solid	10/26/16 13:31	10/28/16 08:50
160-19730-12	TITO04-BS-FSS-SU2RSY11-5-S512	Solid	10/26/16 13:33	10/28/16 08:50
160-19730-13	TITO04-BS-FSS-SU2RSY11-5-S513	Solid	10/26/16 13:35	10/28/16 08:50
160-19730-14	TITO04-BS-FSS-SU2RSY11-5-S514	Solid	10/26/16 13:37	10/28/16 08:50
160-19730-15	TITO04-BS-FSS-SU2RSY11-5-S515	Solid	10/26/16 13:39	10/28/16 08:50
160-19730-16	TITO04-BS-FSS-SU2RSY11-5-S516	Solid	10/26/16 13:41	10/28/16 08:50
160-19730-17	TITO04-BS-FSS-SU2RSY11-5-S517	Solid	10/26/16 13:41	10/28/16 08:50
160-19730-18	TITO04-BS-FSS-SU2RSY11-5-S518	Solid	10/26/16 13:42	10/28/16 08:50
160-19730-19	TITO04-BS-FSS-SU2RSY11-5-S519	Solid	10/26/16 13:43	10/28/16 08:50
160-19730-20	TITO04-BS-FSS-SU2RSY11-5-S520	Solid	10/26/16 13:43	10/28/16 08:50

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S501

Lab Sample ID: 160-19730-1

Date Collected: 10/26/16 13:11

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.164	U	0.211	0.212		0.286	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Actinium-227	0.0778	U	0.607	0.607		1.04	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Bismuth-212	0.000	U	0.302	0.302		1.16	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Bismuth-214	0.0723	U	0.168	0.168		0.294	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Cesium-137	-0.00195	U	0.0637	0.0637		0.113	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Lead-210	0.352	U	1.12	1.12		1.90	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Lead-212	0.285		0.0657	0.0754		0.0688	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Lead-214	0.376		0.0840	0.0926		0.0459	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Potassium-40	10.0		1.44	1.77		0.575	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Protactinium-231	0.000	U	0.319	0.319		2.87	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Radium-226	0.0723	U	0.168	0.168	0.500	0.294	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Radium-228	0.164	U	0.211	0.212		0.286	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Thallium-208	0.131		0.0523	0.0540		0.0480	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Thorium-228	0.285		0.0657	0.0754		0.0688	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Thorium-232	0.164	U	0.211	0.212		0.286	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Thorium-234	-0.0619	U	0.800	0.800		1.39	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Uranium-235	0.0193	U	0.0261	0.0262		0.631	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Uranium-238	-0.0619	U	0.800	0.800		1.39	pCi/g	10/31/16 12:10	11/21/16 16:07	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S502

Lab Sample ID: 160-19730-2

Date Collected: 10/26/16 13:13

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.510		0.175	0.182		0.105	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Actinium-227	0.296	U	0.432	0.433		1.17	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Bismuth-212	0.474	U	0.895	0.896		1.52	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Bismuth-214	0.366		0.119	0.125		0.0969	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Cesium-137	0.00489	U	0.0615	0.0615		0.110	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Lead-210	0.315	U	1.70	1.70		2.89	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Lead-212	0.272		0.120	0.125		0.180	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Lead-214	0.401		0.0923	0.101		0.0723	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Potassium-40	10.1		1.56	1.87		0.604	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Protactinium-231	0.000	U	0.810	0.810		4.27	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Radium-226	0.366		0.119	0.125	0.500	0.0969	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Radium-228	0.510		0.175	0.182		0.105	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Thallium-208	0.0942		0.0406	0.0417		0.0368	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Thorium-228	0.272		0.120	0.125		0.180	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Thorium-232	0.510		0.175	0.182		0.105	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Thorium-234	-0.811	U	0.984	0.988		2.51	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Uranium-235	0.00594	U	0.0263	0.0263		0.932	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Uranium-238	-0.811	U	0.984	0.988		2.51	pCi/g	10/31/16 12:10	11/21/16 16:09	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S503

Lab Sample ID: 160-19730-3

Date Collected: 10/26/16 13:15

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.417		0.188	0.193		0.200	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Actinium-227	0.0374	U	0.0325	0.0327		0.936	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Bismuth-212	-0.370	U	0.818	0.819		1.39	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Bismuth-214	0.407		0.118	0.126		0.107	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Cesium-137	0.00936	U	0.0477	0.0478		0.0852	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Lead-210	0.247	U	1.39	1.39		2.13	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Lead-212	0.236		0.0767	0.0826		0.0983	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Lead-214	0.343		0.109	0.114		0.129	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Potassium-40	10.5		1.43	1.79		0.695	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Protactinium-231	-0.795	U	2.44	2.44		4.10	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Radium-226	0.407		0.118	0.126	0.500	0.107	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Radium-228	0.417		0.188	0.193		0.200	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Thallium-208	0.112		0.0517	0.0530		0.0534	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Thorium-228	0.236		0.0767	0.0826		0.0983	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Thorium-232	0.417		0.188	0.193		0.200	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Thorium-234	1.05	U	1.06	1.07		1.51	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Uranium-235	0.0566	U	0.286	0.286		0.487	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Uranium-238	1.05	U	1.06	1.07		1.51	pCi/g	10/31/16 12:10	11/21/16 16:34	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S504

Lab Sample ID: 160-19730-4

Date Collected: 10/26/16 13:17

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.305		0.124	0.128		0.169	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Actinium-227	-0.303	U	0.799	0.800		1.35	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Bismuth-212	-0.432	U	0.801	0.803		1.26	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Bismuth-214	0.0509	U	0.137	0.137		0.241	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Cesium-137	0.0147	U	0.0314	0.0314		0.0549	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Lead-210	1.28	U	1.33	1.34		2.15	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Lead-212	0.224		0.0727	0.0782		0.0938	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Lead-214	0.306		0.0984	0.103		0.101	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Potassium-40	10.1		1.57	1.88		1.03	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Protactinium-231	-0.800	U	2.63	2.63		4.42	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Radium-226	0.0509	U	0.137	0.137	0.500	0.241	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Radium-228	0.305		0.124	0.128		0.169	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Thallium-208	0.109		0.0477	0.0490		0.0511	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Thorium-228	0.224		0.0727	0.0782		0.0938	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Thorium-232	0.305		0.124	0.128		0.169	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Thorium-234	1.25		0.744	0.755		1.13	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Uranium-235	-0.0445	U	0.0897	0.0898		0.805	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Uranium-238	1.25		0.744	0.755		1.13	pCi/g	10/31/16 12:10	11/21/16 16:26	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S505

Lab Sample ID: 160-19730-5

Date Collected: 10/26/16 13:19

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.431		0.185	0.190		0.167	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Actinium-227	-0.340	U	0.723	0.724		1.21	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Bismuth-212	0.000	U	0.322	0.322		0.444	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Bismuth-214	0.259		0.100	0.104		0.104	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Cesium-137	-0.0306	U	0.0521	0.0522		0.0877	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Lead-210	-0.661	U	1.46	1.46		2.45	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Lead-212	0.306		0.0689	0.0794		0.0744	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Lead-214	0.373		0.0826	0.0913		0.0856	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Potassium-40	11.6		1.36	1.80		0.592	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Protactinium-231	-0.718	U	2.37	2.37		3.97	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Radium-226	0.259		0.100	0.104	0.500	0.104	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Radium-228	0.431		0.185	0.190		0.167	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Thallium-208	0.104		0.0625	0.0634		0.0536	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Thorium-228	0.306		0.0689	0.0794		0.0744	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Thorium-232	0.431		0.185	0.190		0.167	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Thorium-234	0.533	U	1.17	1.17		1.95	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Uranium-235	-0.00807	U	0.318	0.318		0.742	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Uranium-238	0.533	U	1.17	1.17		1.95	pCi/g	10/31/16 12:10	11/21/16 16:37	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S506

Lab Sample ID: 160-19730-6

Date Collected: 10/26/16 13:21

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.156	U	0.282	0.283		0.318	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Actinium-227	-0.300	U	0.883	0.884		1.49	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Bismuth-212	0.264	U	0.630	0.631		1.09	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Bismuth-214	0.0669	U	0.0681	0.0685		0.250	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Cesium-137	0.0318	U	0.0629	0.0630		0.107	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-210	1.59	U	1.58	1.59		2.02	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-212	0.283		0.0814	0.0892		0.0986	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-214	0.400		0.0981	0.107		0.100	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Potassium-40	10.5		1.45	1.81		0.642	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Protactinium-231	0.588	U	2.07	2.08		3.52	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Radium-226	0.0669	U	0.0681	0.0685	0.500	0.250	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Radium-228	0.156	U	0.282	0.283		0.318	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thallium-208	0.0777		0.0494	0.0501		0.0589	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-228	0.283		0.0814	0.0892		0.0986	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-232	0.156	U	0.282	0.283		0.318	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-234	1.09	U	1.21	1.21		1.60	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Uranium-235	0.0977	U	0.215	0.215		0.460	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Uranium-238	1.09	U	1.21	1.21		1.60	pCi/g	10/31/16 12:10	11/21/16 16:38	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S507

Lab Sample ID: 160-19730-7

Date Collected: 10/26/16 13:23

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.385		0.105	0.112		0.118	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Actinium-227	-0.336	U	1.09	1.09		1.82	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Bismuth-212	0.175	U	0.474	0.475		0.822	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Bismuth-214	0.313		0.0885	0.0943		0.0793	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Cesium-137	-0.0000891	U	0.0403	0.0403		0.0725	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Lead-210	-0.733	U	2.41	2.41		4.02	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Lead-212	0.230		0.0562	0.0636		0.0622	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Lead-214	0.303		0.0802	0.0862		0.0928	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Potassium-40	10.4		1.20	1.60		0.431	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Protactinium-231	-0.646	U	2.03	2.03		3.41	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Radium-226	0.313		0.0885	0.0943	0.500	0.0793	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Radium-228	0.385		0.105	0.112		0.118	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Thallium-208	0.107		0.0327	0.0345		0.0232	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Thorium-228	0.230		0.0562	0.0636		0.0622	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Thorium-232	0.385		0.105	0.112		0.118	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Thorium-234	0.426	U	0.915	0.916		1.54	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Uranium-235	0.138	U	0.149	0.150		0.615	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Uranium-238	0.426	U	0.915	0.916		1.54	pCi/g	10/31/16 12:10	11/21/16 16:40	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S508

Lab Sample ID: 160-19730-8

Date Collected: 10/26/16 13:25

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.271	U	0.117	0.120		0.313	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Actinium-227	0.0431	U	0.101	0.101		0.856	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Bismuth-212	0.000	U	0.464	0.464		1.33	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Bismuth-214	0.315		0.117	0.122		0.115	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Cesium-137	0.0292	U	0.0559	0.0560		0.0954	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-210	0.282	U	0.939	0.940		1.46	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-212	0.366		0.0880	0.0999		0.0994	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-214	0.311		0.0955	0.101		0.133	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Potassium-40	10.2		1.54	1.86		0.749	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Protactinium-231	0.000	U	0.430	0.430		3.11	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Radium-226	0.315		0.117	0.122	0.500	0.115	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Radium-228	0.271	U	0.117	0.120		0.313	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thallium-208	0.167		0.0605	0.0630		0.0569	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-228	0.366		0.0880	0.0999		0.0994	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-232	0.271	U	0.117	0.120		0.313	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-234	0.704	U	0.790	0.794		1.27	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Uranium-235	0.273	U	0.235	0.237		0.505	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Uranium-238	0.704	U	0.790	0.794		1.27	pCi/g	10/31/16 12:10	11/21/16 16:38	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S509

Lab Sample ID: 160-19730-9

Date Collected: 10/26/16 13:27

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.335		0.214	0.217		0.209	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Actinium-227	-0.413	U	0.914	0.915		1.53	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Bismuth-212	0.379	U	0.647	0.648		1.10	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Bismuth-214	0.324		0.131	0.135		0.127	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Cesium-137	0.0338	U	0.0719	0.0719		0.123	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Lead-210	0.636	U	1.12	1.12		1.63	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Lead-212	0.316		0.0841	0.0935		0.0894	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Lead-214	0.409		0.102	0.111		0.113	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Potassium-40	10.3		1.69	2.00		0.803	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Protactinium-231	0.000	U	0.321	0.321		4.20	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Radium-226	0.324		0.131	0.135	0.500	0.127	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Radium-228	0.335		0.214	0.217		0.209	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Thallium-208	0.135		0.0656	0.0671		0.0598	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Thorium-228	0.316		0.0841	0.0935		0.0894	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Thorium-232	0.335		0.214	0.217		0.209	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Thorium-234	0.0227	U	1.56	1.56		2.65	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Uranium-235	0.290	U	0.245	0.246		0.768	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Uranium-238	0.0227	U	1.56	1.56		2.65	pCi/g	10/31/16 12:10	11/21/16 16:39	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S510

Lab Sample ID: 160-19730-10

Date Collected: 10/26/16 13:29

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.572		0.163	0.173		0.170	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Actinium-227	0.327	U	0.719	0.720		1.21	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Bismuth-212	-0.361	U	0.866	0.867		1.48	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Bismuth-214	0.296		0.113	0.118		0.137	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Cesium-137	0.0230	U	0.0471	0.0472		0.0807	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Lead-210	-0.816	U	1.82	1.82		3.14	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Lead-212	0.346		0.0850	0.0961		0.0971	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Lead-214	0.293		0.110	0.114		0.127	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Potassium-40	11.1		1.60	1.96		0.979	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Protactinium-231	0.636	U	1.54	1.54		3.54	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Radium-226	0.296		0.113	0.118	0.500	0.137	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Radium-228	0.572		0.163	0.173		0.170	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Thallium-208	0.0859	U	0.0732	0.0737		0.0872	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Thorium-228	0.346		0.0850	0.0961		0.0971	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Thorium-232	0.572		0.163	0.173		0.170	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Thorium-234	1.79		0.786	0.808		1.12	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Uranium-235	0.0290	U	0.0381	0.0382		0.473	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Uranium-238	1.79		0.786	0.808		1.12	pCi/g	10/31/16 12:10	11/21/16 16:41	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S511

Lab Sample ID: 160-19730-11

Date Collected: 10/26/16 13:31

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.365		0.159	0.163		0.135	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Actinium-227	0.126	U	0.615	0.615		0.905	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Bismuth-212	0.370	U	0.976	0.976		1.69	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Bismuth-214	0.101	U	0.0953	0.0959		0.378	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Cesium-137	0.00334	U	0.0518	0.0518		0.0794	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Lead-210	-1.09	U	1.42	1.42		2.45	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Lead-212	0.301		0.0847	0.0932		0.0895	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Lead-214	0.407		0.127	0.134		0.148	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Potassium-40	10.2		1.79	2.07		0.808	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Protactinium-231	-0.0000000	U	1.95	1.95		3.41	pCi/g	10/31/16 12:10	11/21/16 16:46	1
	18									
Radium-226	0.101	U	0.0953	0.0959	0.500	0.378	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Radium-228	0.365		0.159	0.163		0.135	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Thallium-208	0.100		0.0768	0.0775		0.0794	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Thorium-228	0.301		0.0847	0.0932		0.0895	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Thorium-232	0.365		0.159	0.163		0.135	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Thorium-234	0.171	U	0.190	0.191		1.89	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Uranium-235	-0.0287	U	0.0582	0.0583		0.472	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Uranium-238	0.171	U	0.190	0.191		1.89	pCi/g	10/31/16 12:10	11/21/16 16:46	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S512

Lab Sample ID: 160-19730-12

Date Collected: 10/26/16 13:33

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.331		0.146	0.150		0.230	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Actinium-227	0.209	U	0.533	0.533		0.904	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Bismuth-212	-0.284	U	0.855	0.856		1.47	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Bismuth-214	0.234		0.0801	0.0837		0.0673	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Cesium-137	-0.0502	U	0.0859	0.0860		0.144	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Lead-210	-1.06	U	1.40	1.41		2.50	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Lead-212	0.305		0.0721	0.0822		0.0784	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Lead-214	0.331		0.0931	0.0993		0.0738	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Potassium-40	11.8		1.62	2.02		0.618	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Protactinium-231	-0.203	U	2.23	2.23		3.79	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Radium-226	0.234		0.0801	0.0837	0.500	0.0673	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Radium-228	0.331		0.146	0.150		0.230	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Thallium-208	0.143		0.0433	0.0457		0.0285	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Thorium-228	0.305		0.0721	0.0822		0.0784	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Thorium-232	0.331		0.146	0.150		0.230	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Thorium-234	-0.702	U	0.960	0.963		1.61	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Uranium-235	-0.0398	U	0.0820	0.0821		0.656	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Uranium-238	-0.702	U	0.960	0.963		1.61	pCi/g	10/31/16 12:10	11/21/16 16:47	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S513

Lab Sample ID: 160-19730-13

Date Collected: 10/26/16 13:35

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.329		0.263	0.265		0.284	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Actinium-227	-0.0789	U	0.387	0.387		1.59	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Bismuth-212	0.0932	U	0.819	0.819		1.47	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Bismuth-214	0.0237	U	0.184	0.184		0.299	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Cesium-137	0.00839	U	0.0866	0.0866		0.152	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Lead-210	-1.01	U	2.21	2.21		3.70	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Lead-212	0.256		0.0785	0.0852		0.0874	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Lead-214	0.355		0.106	0.112		0.111	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Potassium-40	12.3		1.86	2.25		0.707	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Protactinium-231	-0.952	U	3.01	3.01		5.08	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Radium-226	0.0237	U	0.184	0.184	0.500	0.299	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Radium-228	0.329		0.263	0.265		0.284	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Thallium-208	0.133		0.0605	0.0621		0.0562	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Thorium-228	0.256		0.0785	0.0852		0.0874	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Thorium-232	0.329		0.263	0.265		0.284	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Thorium-234	-1.70	U	1.22	1.24		3.21	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Uranium-235	0.162	U	0.176	0.177		0.875	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Uranium-238	-1.70	U	1.22	1.24		3.21	pCi/g	10/31/16 12:10	11/21/16 16:48	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S514

Lab Sample ID: 160-19730-14

Date Collected: 10/26/16 13:37

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.280	U	0.151	0.154		0.299	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Actinium-227	0.265	U	0.672	0.673		1.14	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Bismuth-212	-0.0187	U	0.622	0.622		1.12	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Bismuth-214	0.334		0.107	0.112		0.125	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Cesium-137	-0.0205	U	0.0740	0.0740		0.127	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-210	-0.230	U	1.55	1.55		2.67	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-212	0.329		0.0820	0.0925		0.0954	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-214	0.407		0.104	0.113		0.126	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Potassium-40	12.1		1.53	1.96		0.755	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Protactinium-231	-0.917	U	3.11	3.11		5.21	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Radium-226	0.334		0.107	0.112	0.500	0.125	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Radium-228	0.280	U	0.151	0.154		0.299	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thallium-208	0.0923		0.0458	0.0468		0.0522	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-228	0.329		0.0820	0.0925		0.0954	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-232	0.280	U	0.151	0.154		0.299	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-234	0.559	U	1.23	1.23		1.69	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Uranium-235	0.164	U	0.293	0.294		0.499	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Uranium-238	0.559	U	1.23	1.23		1.69	pCi/g	10/31/16 12:10	11/21/16 17:45	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S515

Lab Sample ID: 160-19730-15

Date Collected: 10/26/16 13:39

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.322		0.148	0.152		0.134	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Actinium-227	0.0397	U	0.0934	0.0935		0.868	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Bismuth-212	-0.753	U	1.24	1.24		2.07	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Bismuth-214	0.419		0.172	0.177		0.166	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Cesium-137	-0.0215	U	0.104	0.104		0.136	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-210	1.45	U	1.27	1.28		1.66	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-212	0.269		0.0899	0.0964		0.112	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-214	0.308		0.120	0.124		0.139	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Potassium-40	11.2		1.85	2.18		0.797	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Protactinium-231	0.323	U	1.10	1.10		3.64	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Radium-226	0.419		0.172	0.177	0.500	0.166	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Radium-228	0.322		0.148	0.152		0.134	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thallium-208	0.0912		0.0906	0.0911		0.0894	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-228	0.269		0.0899	0.0964		0.112	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-232	0.322		0.148	0.152		0.134	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-234	0.713	U	0.984	0.987		1.38	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Uranium-235	0.0221	U	0.0882	0.0882		0.567	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Uranium-238	0.713	U	0.984	0.987		1.38	pCi/g	10/31/16 12:10	11/21/16 17:45	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S516

Lab Sample ID: 160-19730-16

Date Collected: 10/26/16 13:41

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.139	U	0.235	0.235		0.253	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Actinium-227	0.0287	U	0.594	0.594		1.02	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Bismuth-212	0.203	U	0.642	0.642		1.12	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Bismuth-214	0.244		0.0995	0.103		0.0904	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Cesium-137	-0.0412	U	0.0674	0.0675		0.113	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Lead-210	-0.741	U	1.35	1.35		2.11	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Lead-212	0.267		0.0723	0.0801		0.0893	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Lead-214	0.261		0.0910	0.0950		0.0810	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Potassium-40	10.9		1.51	1.87		0.575	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Protactinium-231	0.000	U	0.626	0.626		2.93	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Radium-226	0.244		0.0995	0.103	0.500	0.0904	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Radium-228	0.139	U	0.235	0.235		0.253	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Thallium-208	0.113		0.0375	0.0393		0.0266	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Thorium-228	0.267		0.0723	0.0801		0.0893	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Thorium-232	0.139	U	0.235	0.235		0.253	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Thorium-234	0.774	U	0.409	0.417		0.963	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Uranium-235	-0.0111	U	0.255	0.255		0.366	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Uranium-238	0.774	U	0.409	0.417		0.963	pCi/g	10/31/16 12:10	11/21/16 17:46	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S517

Lab Sample ID: 160-19730-17

Date Collected: 10/26/16 13:41

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.339		0.138	0.143		0.276	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Actinium-227	-0.0604	U	0.105	0.105		1.45	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Bismuth-212	0.362	U	0.833	0.834		1.44	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Bismuth-214	0.225	U	0.173	0.174		0.335	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Cesium-137	-0.0549	U	0.118	0.118		0.138	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Lead-210	0.443	U	1.52	1.52		2.60	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Lead-212	0.398		0.0943	0.107		0.0996	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Lead-214	0.258		0.112	0.115		0.223	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Potassium-40	12.1		1.82	2.20		0.687	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Protactinium-231	0.395	U	1.47	1.47		4.82	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Radium-226	0.225	U	0.173	0.174	0.500	0.335	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Radium-228	0.339		0.138	0.143		0.276	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Thallium-208	0.131		0.0588	0.0604		0.0581	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Thorium-228	0.398		0.0943	0.107		0.0996	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Thorium-232	0.339		0.138	0.143		0.276	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Thorium-234	0.983	U	0.598	0.606		1.63	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Uranium-235	-0.268	U	0.354	0.355		1.00	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Uranium-238	0.983	U	0.598	0.606		1.63	pCi/g	10/31/16 12:10	11/21/16 17:47	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S518

Lab Sample ID: 160-19730-18

Date Collected: 10/26/16 13:42

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.515		0.161	0.170		0.204	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Actinium-227	0.174	U	0.627	0.627		1.06	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Bismuth-212	0.177	U	0.442	0.443		0.771	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Bismuth-214	0.235		0.0951	0.0982		0.103	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Cesium-137	0.00175	U	0.0417	0.0417		0.0754	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Lead-210	-0.700	U	1.30	1.30		2.17	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Lead-212	0.357		0.0738	0.0870		0.0768	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Lead-214	0.343		0.0789	0.0865		0.100	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Potassium-40	11.2		1.36	1.78		0.607	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Protactinium-231	0.540	U	1.49	1.49		3.39	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Radium-226	0.235		0.0951	0.0982	0.500	0.103	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Radium-228	0.515		0.161	0.170		0.204	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Thallium-208	0.131		0.0453	0.0473		0.0368	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Thorium-228	0.357		0.0738	0.0870		0.0768	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Thorium-232	0.515		0.161	0.170		0.204	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Thorium-234	0.310	U	1.00	1.00		1.69	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Uranium-235	-0.00827	U	0.274	0.274		0.645	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Uranium-238	0.310	U	1.00	1.00		1.69	pCi/g	10/31/16 12:10	11/21/16 17:44	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S519

Lab Sample ID: 160-19730-19

Date Collected: 10/26/16 13:43

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.454		0.176	0.182		0.179	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Actinium-227	-0.0836	U	0.168	0.168		1.55	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Bismuth-212	0.266	U	1.07	1.07		1.84	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Bismuth-214	0.279		0.125	0.128		0.128	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Cesium-137	-0.000716	U	0.0659	0.0659		0.144	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-210	1.22	U	1.64	1.65		2.69	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-212	0.347		0.0914	0.102		0.106	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-214	0.381		0.120	0.126		0.153	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Potassium-40	9.76		1.49	1.79		0.718	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Protactinium-231	0.707	U	1.72	1.72		3.95	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Radium-226	0.279		0.125	0.128	0.500	0.128	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Radium-228	0.454		0.176	0.182		0.179	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thallium-208	0.142		0.0557	0.0576		0.0578	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-228	0.347		0.0914	0.102		0.106	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-232	0.454		0.176	0.182		0.179	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-234	0.513	U	0.502	0.505		1.41	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Uranium-235	0.251		0.145	0.148		0.180	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Uranium-238	0.513	U	0.502	0.505		1.41	pCi/g	10/31/16 12:10	11/21/16 17:43	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S520

Lab Sample ID: 160-19730-20

Date Collected: 10/26/16 13:43

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0683	U	0.116	0.116		0.396	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Actinium-227	-0.345	U	0.853	0.853		1.43	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Bismuth-212	0.402	U	0.845	0.846		1.43	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Bismuth-214	0.394		0.112	0.119		0.105	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Cesium-137	0.0336	U	0.0624	0.0625		0.105	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-210	1.07	U	1.01	1.02		1.61	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-212	0.275		0.0806	0.0881		0.103	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-214	0.255		0.104	0.107		0.113	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Potassium-40	12.0		1.47	1.92		0.532	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Protactinium-231	0.0975	U	1.05	1.05		3.39	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Radium-226	0.394		0.112	0.119	0.500	0.105	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Radium-228	0.0683	U	0.116	0.116		0.396	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thallium-208	0.106		0.0379	0.0395		0.0339	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-228	0.275		0.0806	0.0881		0.103	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-232	0.0683	U	0.116	0.116		0.396	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-234	1.27	U	1.15	1.16		1.46	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Uranium-235	0.178	U	0.346	0.347		0.706	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Uranium-238	1.27	U	1.15	1.16		1.46	pCi/g	10/31/16 12:10	11/21/16 17:43	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-276880/1-A

Matrix: Solid

Analysis Batch: 280382

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 276880

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-228	-0.007868	U	0.0134	0.0134		0.354	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Actinium-227	0.01032	U	0.690	0.690		1.21	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Bismuth-212	-0.3410	U	0.773	0.774		1.33	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Bismuth-214	-0.06604	U	0.229	0.229		0.400	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Cesium-137	-0.02481	U	0.0583	0.0584		0.101	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Lead-210	-0.5019	U	1.41	1.41		2.52	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Lead-212	-0.05904	U	0.0892	0.0895		0.186	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Lead-214	-0.1303	U	0.112	0.112		0.234	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Potassium-40	-0.5340	U	1.15	1.15		1.59	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Protactinium-231	0.0000	U	0.136	0.136		3.43	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Radium-226	-0.06604	U	0.229	0.229	0.500	0.400	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Radium-228	-0.007868	U	0.0134	0.0134		0.354	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Thallium-208	-0.03224	U	0.0596	0.0597		0.101	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Thorium-228	-0.05904	U	0.0892	0.0895		0.186	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Thorium-232	-0.007868	U	0.0134	0.0134		0.354	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Thorium-234	0.5515	U	0.732	0.734		1.10	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Uranium-235	-0.1098	U	0.230	0.231		0.392	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Uranium-238	0.5515	U	0.732	0.734		1.10	pCi/g	10/31/16 12:10	11/21/16 16:11	1

Lab Sample ID: LCS 160-276880/2-A

Matrix: Solid

Analysis Batch: 280383

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 276880

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	100.1		10.5		1.33	pCi/g	103	87 - 116
Cesium-137	29.3	28.96		3.12		0.269	pCi/g	99	87 - 120
Cobalt-60	16.1	16.27		1.71		0.0587	pCi/g	101	87 - 115

Lab Sample ID: 160-19730-1 DU

Matrix: Solid

Analysis Batch: 280382

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S501

Prep Type: Total/NA

Prep Batch: 276880

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium-228	0.164	U	0.2598		0.200		0.237	pCi/g	0.23	1
Actinium-227	0.0778	U	0.2497	U	0.676		1.14	pCi/g	0.13	1
Bismuth-212	0.000	U	0.3832	U	0.644		1.08	pCi/g	0.41	1
Bismuth-214	0.0723	U	0.2923		0.125		0.143	pCi/g	0.75	1
Cesium-137	-0.00195	U	0.001526	U	0.0526		0.0946	pCi/g	0.03	1
Lead-210	0.352	U	0.4245	U	1.15		1.94	pCi/g	0.03	1
Lead-212	0.285		0.2909		0.0933		0.110	pCi/g	0.03	1
Lead-214	0.376		0.4521		0.132		0.133	pCi/g	0.34	1
Potassium-40	10.0		11.86		1.93		0.747	pCi/g	0.50	1
Protactinium-231	0.000	U	0.0000	U	0.437		3.75	pCi/g	0	1
Radium-226	0.0723	U	0.2923		0.125	0.500	0.143	pCi/g	0.75	1
Radium-228	0.164	U	0.2598		0.200		0.237	pCi/g	0.23	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-19730-1 DU

Matrix: Solid

Analysis Batch: 280382

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S501

Prep Type: Total/NA

Prep Batch: 276880

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2 σ +/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.131		0.1400		0.0469		0.0397	pCi/g	0.09	1
Thorium-228	0.285		0.2909		0.0933		0.110	pCi/g	0.03	1
Thorium-232	0.164	U	0.2598		0.200		0.237	pCi/g	0.23	1
Thorium-234	-0.0619	U	1.264	U	1.04		1.29	pCi/g	0.72	1
Uranium-235	0.0193	U	0.1339	U	0.316		0.510	pCi/g	0.33	1
Uranium-238	-0.0619	U	1.264	U	1.04		1.29	pCi/g	0.72	1

QC Association Summary

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Rad

Leach Batch: 276618

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19730-1	TITO04-BS-FSS-SU2RSY11-5-S501	Total/NA	Solid	Dry and Grind	
160-19730-2	TITO04-BS-FSS-SU2RSY11-5-S502	Total/NA	Solid	Dry and Grind	
160-19730-3	TITO04-BS-FSS-SU2RSY11-5-S503	Total/NA	Solid	Dry and Grind	
160-19730-4	TITO04-BS-FSS-SU2RSY11-5-S504	Total/NA	Solid	Dry and Grind	
160-19730-5	TITO04-BS-FSS-SU2RSY11-5-S505	Total/NA	Solid	Dry and Grind	
160-19730-6	TITO04-BS-FSS-SU2RSY11-5-S506	Total/NA	Solid	Dry and Grind	
160-19730-7	TITO04-BS-FSS-SU2RSY11-5-S507	Total/NA	Solid	Dry and Grind	
160-19730-8	TITO04-BS-FSS-SU2RSY11-5-S508	Total/NA	Solid	Dry and Grind	
160-19730-9	TITO04-BS-FSS-SU2RSY11-5-S509	Total/NA	Solid	Dry and Grind	
160-19730-10	TITO04-BS-FSS-SU2RSY11-5-S510	Total/NA	Solid	Dry and Grind	
160-19730-11	TITO04-BS-FSS-SU2RSY11-5-S511	Total/NA	Solid	Dry and Grind	
160-19730-12	TITO04-BS-FSS-SU2RSY11-5-S512	Total/NA	Solid	Dry and Grind	
160-19730-13	TITO04-BS-FSS-SU2RSY11-5-S513	Total/NA	Solid	Dry and Grind	
160-19730-14	TITO04-BS-FSS-SU2RSY11-5-S514	Total/NA	Solid	Dry and Grind	
160-19730-15	TITO04-BS-FSS-SU2RSY11-5-S515	Total/NA	Solid	Dry and Grind	
160-19730-16	TITO04-BS-FSS-SU2RSY11-5-S516	Total/NA	Solid	Dry and Grind	
160-19730-17	TITO04-BS-FSS-SU2RSY11-5-S517	Total/NA	Solid	Dry and Grind	
160-19730-18	TITO04-BS-FSS-SU2RSY11-5-S518	Total/NA	Solid	Dry and Grind	
160-19730-19	TITO04-BS-FSS-SU2RSY11-5-S519	Total/NA	Solid	Dry and Grind	
160-19730-20	TITO04-BS-FSS-SU2RSY11-5-S520	Total/NA	Solid	Dry and Grind	
160-19730-1 DU	TITO04-BS-FSS-SU2RSY11-5-S501	Total/NA	Solid	Dry and Grind	

Prep Batch: 276880

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19730-1	TITO04-BS-FSS-SU2RSY11-5-S501	Total/NA	Solid	Fill_Geo-21	276618
160-19730-2	TITO04-BS-FSS-SU2RSY11-5-S502	Total/NA	Solid	Fill_Geo-21	276618
160-19730-3	TITO04-BS-FSS-SU2RSY11-5-S503	Total/NA	Solid	Fill_Geo-21	276618
160-19730-4	TITO04-BS-FSS-SU2RSY11-5-S504	Total/NA	Solid	Fill_Geo-21	276618
160-19730-5	TITO04-BS-FSS-SU2RSY11-5-S505	Total/NA	Solid	Fill_Geo-21	276618
160-19730-6	TITO04-BS-FSS-SU2RSY11-5-S506	Total/NA	Solid	Fill_Geo-21	276618
160-19730-7	TITO04-BS-FSS-SU2RSY11-5-S507	Total/NA	Solid	Fill_Geo-21	276618
160-19730-8	TITO04-BS-FSS-SU2RSY11-5-S508	Total/NA	Solid	Fill_Geo-21	276618
160-19730-9	TITO04-BS-FSS-SU2RSY11-5-S509	Total/NA	Solid	Fill_Geo-21	276618
160-19730-10	TITO04-BS-FSS-SU2RSY11-5-S510	Total/NA	Solid	Fill_Geo-21	276618
160-19730-11	TITO04-BS-FSS-SU2RSY11-5-S511	Total/NA	Solid	Fill_Geo-21	276618
160-19730-12	TITO04-BS-FSS-SU2RSY11-5-S512	Total/NA	Solid	Fill_Geo-21	276618
160-19730-13	TITO04-BS-FSS-SU2RSY11-5-S513	Total/NA	Solid	Fill_Geo-21	276618
160-19730-14	TITO04-BS-FSS-SU2RSY11-5-S514	Total/NA	Solid	Fill_Geo-21	276618
160-19730-15	TITO04-BS-FSS-SU2RSY11-5-S515	Total/NA	Solid	Fill_Geo-21	276618
160-19730-16	TITO04-BS-FSS-SU2RSY11-5-S516	Total/NA	Solid	Fill_Geo-21	276618
160-19730-17	TITO04-BS-FSS-SU2RSY11-5-S517	Total/NA	Solid	Fill_Geo-21	276618
160-19730-18	TITO04-BS-FSS-SU2RSY11-5-S518	Total/NA	Solid	Fill_Geo-21	276618
160-19730-19	TITO04-BS-FSS-SU2RSY11-5-S519	Total/NA	Solid	Fill_Geo-21	276618
160-19730-20	TITO04-BS-FSS-SU2RSY11-5-S520	Total/NA	Solid	Fill_Geo-21	276618
MB 160-276880/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-276880/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-19730-1 DU	TITO04-BS-FSS-SU2RSY11-5-S501	Total/NA	Solid	Fill_Geo-21	276618

From: [Weyant, David B CIV NAVSEA 04, 04N](#)
To: [Guillory, Jeffrey](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 11 (Use 7)
Date: Wednesday, December 21, 2016 10:47:40 AM

Hello Jeff,

I concur to designating the Revised RSY-11 (Use 7) soil as Non-LLRW soil.

VR

David Weyant
Health Physicist/Environmental Protection Manager
Environmental Protection Division
NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Weyant, David B CIV NAVSEA 04, 04N
Sent: Monday, December 19, 2016 3:03 PM
To: 'Guillory, Jeffrey'
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: RE: NSTI RSY Soil Release Request - RSY 11 (Use 7)

Jeff,

Were the 30 follow-up readings based on distinctive areas around clusters?

Were there any elevated Z-scores that did not meet the criteria for standard follow-up?

VR

David Weyant
Health Physicist/Environmental Protection Manager
Environmental Protection Division
NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederaleservices.com>]

Sent: Monday, December 19, 2016 4:58 AM

To: Weyant, David B CIV NAVSEA 04, 04N

Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek

Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 11 (Use 7)

Mr. Weyant,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Jeffrey Guillory

Scientist 3

Federal Services

Cell: +1 979 422 5534

jeffrey.guillory@cbifederaleservices.com <<mailto:jeffrey.guillory@cbifederaleservices.com>>

CB&I

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Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004			
RSY Unit: RSY 11	RSY Unit Use Number: USE 7	First Submittal <input checked="" type="checkbox"/>	Second Submittal <input type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 12/19/2016	

Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static Survey Meter (Model 2221) Serial Number	One-Minute Static Reading (CPM)	Static Count Exceeds Reference Area IL?	²²⁶ Ra Final Analytical Results (pCi/g)
Upper limit of site reference background						1.69
TITO04-BS-FSSSU3-RSY11-U7-S701	1	Systematic	262322	10,793	No	0.364
TITO04-BS-FSSSU3-RSY11-U7-S702	2	Systematic	262322	11,019	No	0.306
TITO04-BS-FSSSU3-RSY11-U7-S703	3	Systematic	262322	10,875	No	0.401
TITO04-BS-FSSSU3-RSY11-U7-S704	4	Systematic	262322	11,037	No	0.393
TITO04-BS-FSSSU3-RSY11-U7-S705	5	Systematic	262322	10,916	No	0.114
TITO04-BS-FSSSU3-RSY11-U7-S706	6	Systematic	262322	10,930	No	0.341
TITO04-BS-FSSSU3-RSY11-U7-S707	7	Systematic	262322	10,893	No	0.337
TITO04-BS-FSSSU3-RSY11-U7-S708	8	Systematic	262322	11,074	No	0.328
TITO04-BS-FSSSU3-RSY11-U7-S709	9	Systematic	262322	11,046	No	0.433
TITO04-BS-FSSSU3-RSY11-U7-S710	10	Systematic	262322	10,929	No	0.361
TITO04-BS-FSSSU3-RSY11-U7-S711	11	Systematic	262322	10,835	No	0.295
TITO04-BS-FSSSU3-RSY11-U7-S712	12	Systematic	262322	11,065	No	0.388

CPM Counts per minute
 IL Investigation Level (based on Reference Area data set)
²²⁶Ra Radium-226
 pCi/g Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd (CPM)	Reference Area Static 3σ IL (CPM)	Reference Area Scan Bkgd (CPM)	Reference Area Scan 3σ IL (CPM)	Range (CPM)
Gamma Walkover Survey	TIRS-110452016-12P3-GWS-2607	11/3/2016 – 11/4/2016	2221	8/12/2017	262322	N/A	N/A	14,047	17,356	9,230 – 12,452
Follow-up Static Survey	TIRS-11072016-12P3-JSS-2608	11/7/2016	2221	8/12/2017	262322	14,024	16,662	N/A	N/A	10,370 – 11,483
Systematic Sampling Survey	TIRS-11082016-12P3-JSS-2613	11/8/2016 – 11/9/2016	2221	8/12/2017	262322	14,024	16,662	N/A	N/A	10,793 – 11,074

3σ IL Investigation Level (established at 3σ above the mean of the Reference Area data set)
 CPM Counts per minute

Summary

1) Gamma walkover survey and data review—all locations surveyed on RSY 11 (Use 7) were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the data set average for RSY 11 (Use 7) were evaluated for follow-up investigation; 46 total data points clustered around 30 discrete locations were identified as exceeding three standard deviations of the data set average. Gamma scan coverage is shown on the Systematic Sample Survey map (page 3). GWS count rate statistics are also provided (page 4).

2) Follow-up static survey—30 locations identified during the data review process as exceeding three standard deviations of the data set average for RSY 11 (Use 7) were investigated, resulting in all locations less than the Reference Area static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 5).

3) Twelve systematic soil samples (701-712) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with static readings < Reference Area static IL for all sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 8-26).

Conclusions:

All count rates recorded during the gamma walkover survey were less than the Reference Area scan IL. As an additional conservative characterization approach, all individual or clustered locations identified as exceeding three standard deviations of the data set mean for RSY 11 (Use 7) were investigated and deemed comparable to background. Thirty total follow-up static locations were investigated, with readings less than the Reference Area static IL at all locations.

Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 6-7. These statistical tools were utilized to verify the appropriate level of reasonable effort.

RSY 11 (Use 7) contains soil from the final 6-inch over excavation of FSS material from the bottom of the excavation at SWDA Bayside SU 3.

Note: Soil on RSY Pad 11 (Use 7) was over-excavated at the final depth from the bottom of the excavation at Bayside SU 3, and no visible debris and/or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.

CB&I requests RASO concurrence to release this soil as Non-LLRW.

Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.

Survey Number:
TIRS-11082016-12P3-JSS-2613

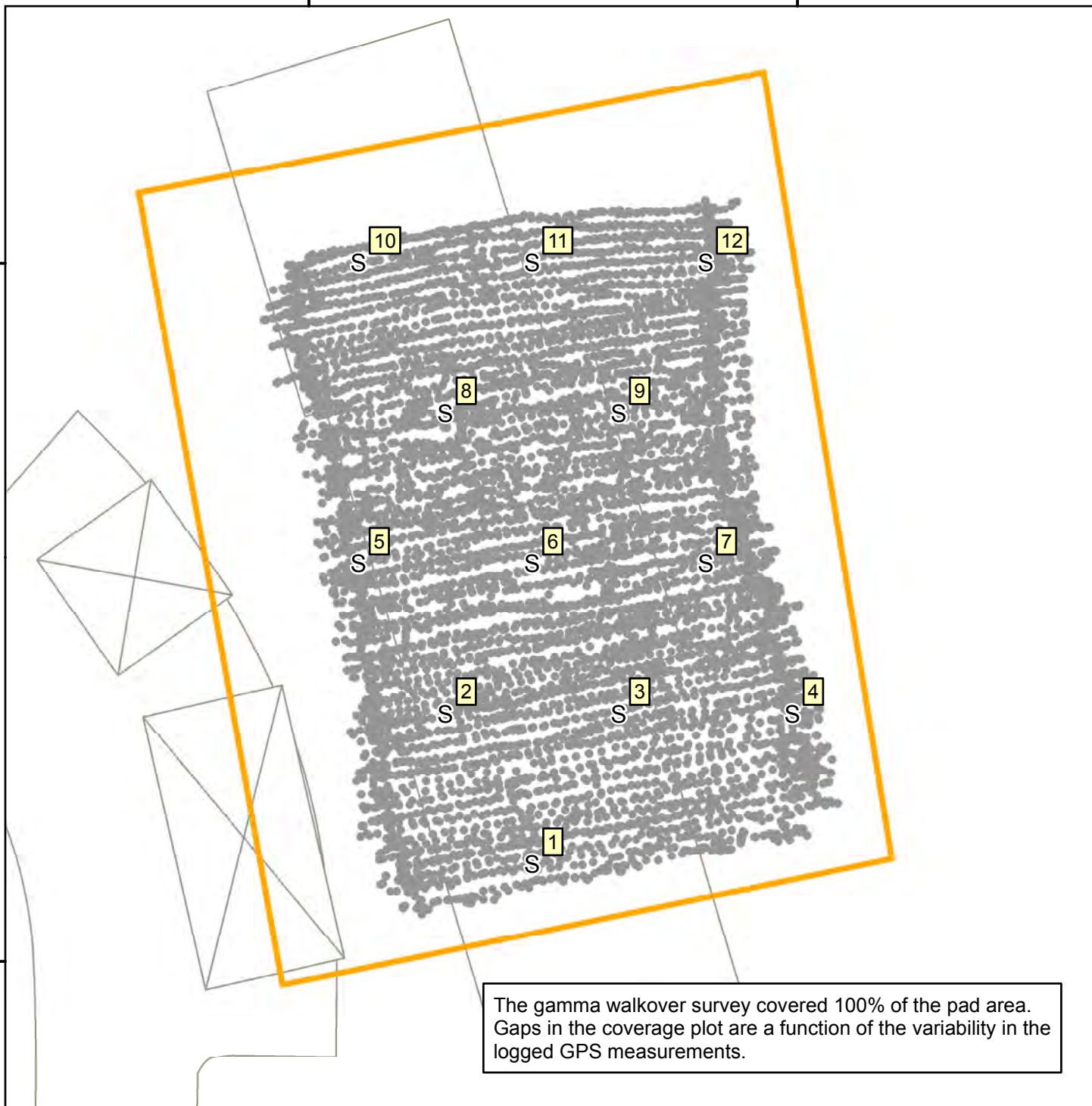
6020090

2130400

2130400

2130300

2130300



Instrument # 262322

- GWS Coverage
- S Systematic Samples
- RSY Boundaries

CB&I Federal Services, LLC

f

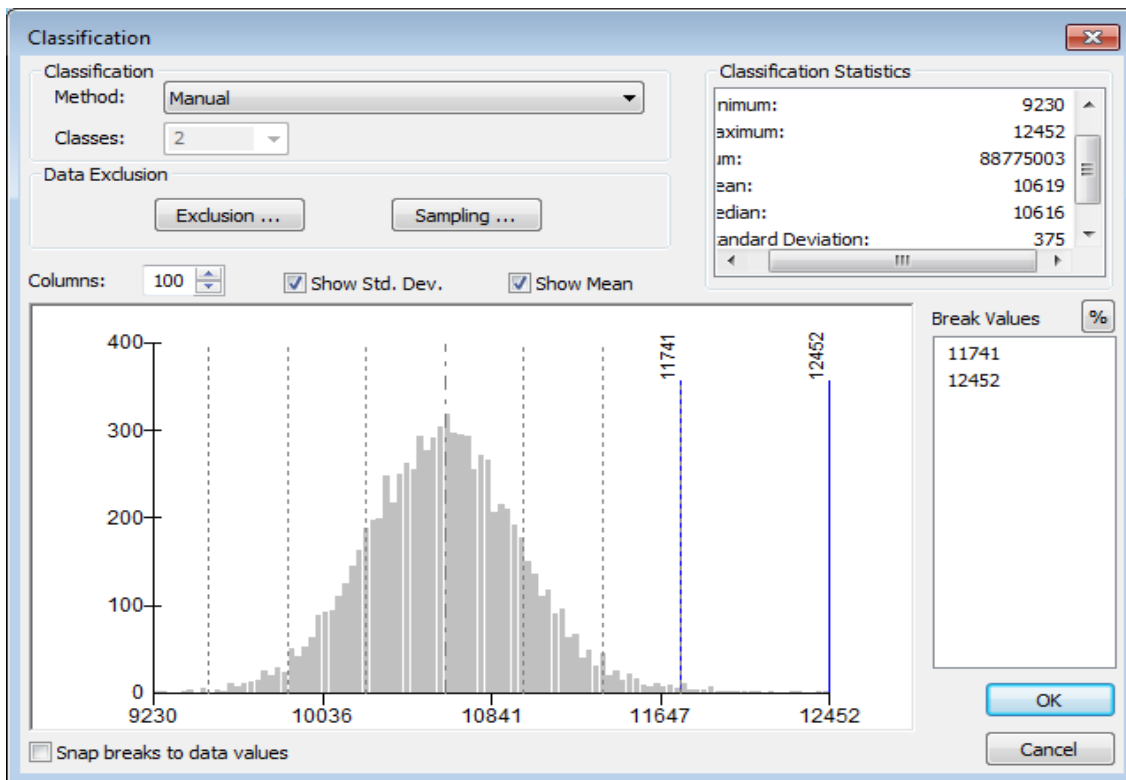
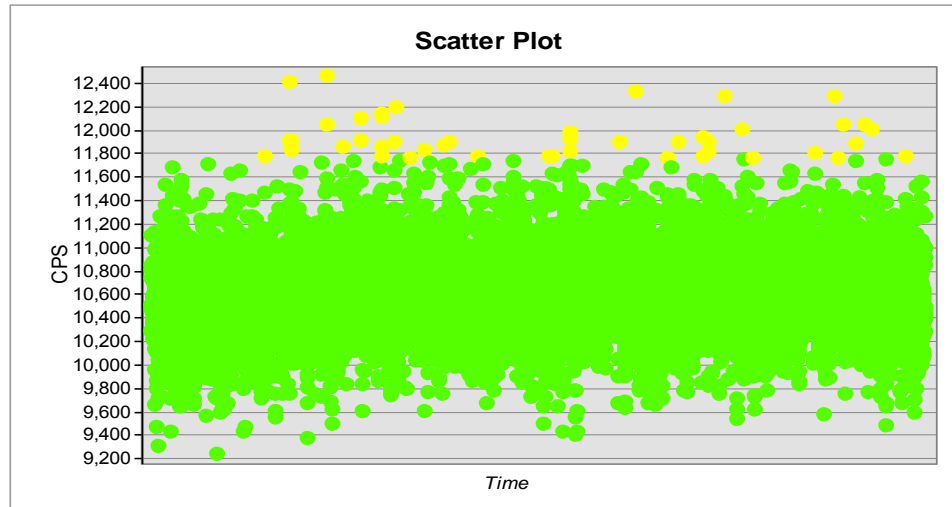
0 5 10 20
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

TIRS-11042016-12P3-GWS-2607

Count Rate Statistics Bayside RSY 11 (Use 7)

Frequency Table			
In the 9,00	In the 10,00	In the 11,00	In the 12,00
372	6780	1196	12



Survey Number:
TIRS-11072016-12P3-JSS-2608

6020090

2130400

2130400

2130300

2130300

Instrument # 262322

- ▲ Follow-up Static Locations
- Data Points Not Requiring Further Investigation
- RSY Boundaries

CB&I Federal Services, LLC

0 5 10 20
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

f

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 11-7
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

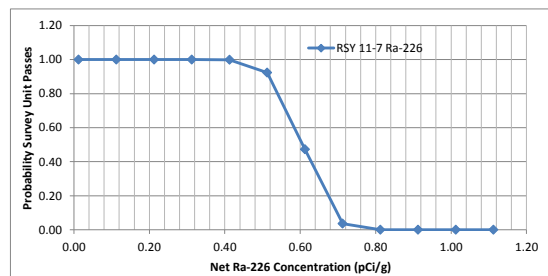
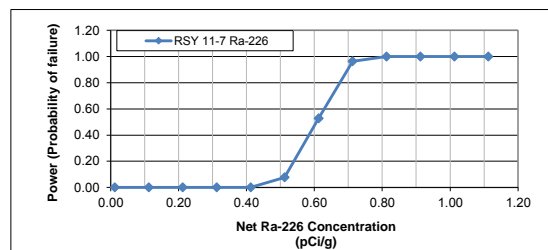
POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4	S
0.57	R	0.57	19.5	0	5	S
0.55	R	0.55	18	0	6	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.364	S	-0.118939192	8	8	21.5	R
0.306	S	-0.176939192	3	3	21.5	R
0.401	S	-0.081939192	11	11	23	R
0.393	S	-0.089939192	10	10	24	R
0.114	S	-0.368939192	1	1	25	R
0.341	S	-0.141939192	6	6	26	R
0.337	S	-0.145939192	5	5	27.5	R
0.328	S	-0.154939192	4	4	27.5	R
0.433	S	-0.049939192	12	12	29	R
0.361	S	-0.121939192	7	7	30	R
0.295	S	-0.187939192	2	2	31	R
0.388	S	-0.094939192	9	9	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.081
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count	SU Stats	Concentration	Background (C)	SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
Count	12	0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
SD	0.081	0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
Median	0.351	0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
		1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
		1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
Count	20	1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
SD	0.161	1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
		1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
Critical Value	248.4	1.5	0.81	2.0	0.92135	0.86577	221.124	338.9359	11.787107	-4.34973	1.00	0.00
		1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
		1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
		1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_W = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)
 Use:
 $m = 20$
 $n = 15$
 $6 r$
 $5 k$
 0.04 α

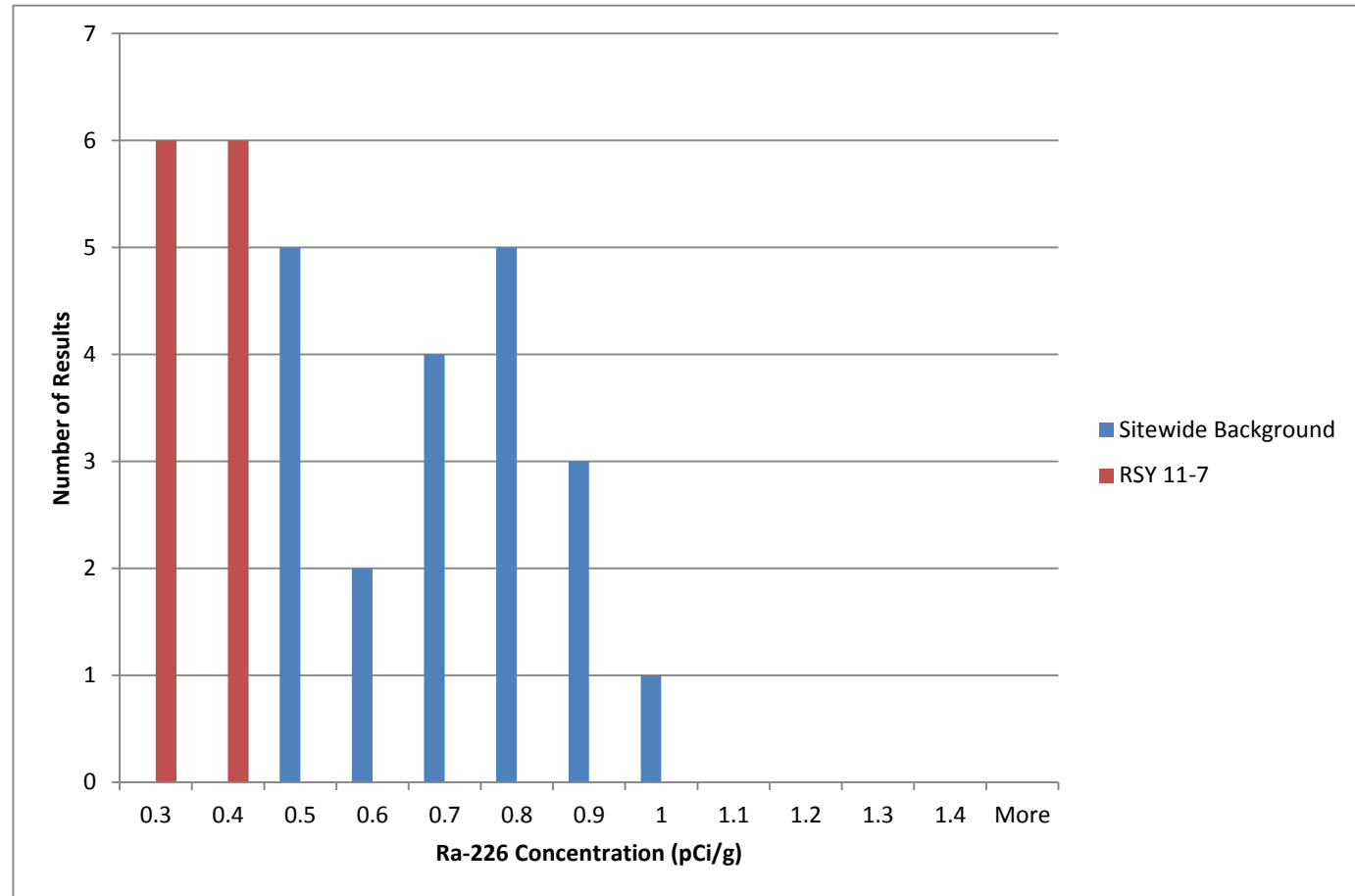
If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

Histogram, RSY 11 (Use 7) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 11-7	
<i>Bin</i>	<i>Frequency</i>
0.3	6
0.4	6
0.5	0
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-19923-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan



Authorized for release by:
12/6/2016 1:57:19 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Job ID: 160-19923-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-19923-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 11 of 26

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Job ID: 160-19923-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 11/10/2016 8:30 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 18.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSSSU3-RSY11-U7-S701 (160-19923-1), TITO04-BS-FSSSU3-RSY11-U7-S702 (160-19923-2), TITO04-BS-FSSSU3-RSY11-U7-S703 (160-19923-3), TITO04-BS-FSSSU3-RSY11-U7-S704 (160-19923-4), TITO04-BS-FSSSU3-RSY11-U7-S705 (160-19923-5), TITO04-BS-FSSSU3-RSY11-U7-S706 (160-19923-6), TITO04-BS-FSSSU3-RSY11-U7-S707 (160-19923-7), TITO04-BS-FSSSU3-RSY11-U7-S708 (160-19923-8), TITO04-BS-FSSSU3-RSY11-U7-S709 (160-19923-9), TITO04-BS-FSSSU3-RSY11-U7-S710 (160-19923-10), TITO04-BS-FSSSU3-RSY11-U7-S711 (160-19923-11) and TITO04-BS-FSSSU3-RSY11-U7-S712 (160-19923-12) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/10/2016, prepared on 11/11/2016 and analyzed on 12/02/2016.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-19923-2

Login Number: 19923**List Number: 1****Creator: Clarke, Jill C****List Source: TestAmerica St. Louis**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:
DOE = U.S. Department of Energy

Laboratory References:
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-19923-1	TITO04-BS-FSSSU3-RSY11-U7-S701	Solid	11/08/16 09:55	11/10/16 08:30
160-19923-2	TITO04-BS-FSSSU3-RSY11-U7-S702	Solid	11/08/16 09:58	11/10/16 08:30
160-19923-3	TITO04-BS-FSSSU3-RSY11-U7-S703	Solid	11/08/16 09:53	11/10/16 08:30
160-19923-4	TITO04-BS-FSSSU3-RSY11-U7-S704	Solid	11/08/16 09:56	11/10/16 08:30
160-19923-5	TITO04-BS-FSSSU3-RSY11-U7-S705	Solid	11/08/16 09:49	11/10/16 08:30
160-19923-6	TITO04-BS-FSSSU3-RSY11-U7-S706	Solid	11/08/16 09:51	11/10/16 08:30
160-19923-7	TITO04-BS-FSSSU3-RSY11-U7-S707	Solid	11/08/16 09:58	11/10/16 08:30
160-19923-8	TITO04-BS-FSSSU3-RSY11-U7-S708	Solid	11/08/16 09:41	11/10/16 08:30
160-19923-9	TITO04-BS-FSSSU3-RSY11-U7-S709	Solid	11/08/16 09:46	11/10/16 08:30
160-19923-10	TITO04-BS-FSSSU3-RSY11-U7-S710	Solid	11/08/16 09:39	11/10/16 08:30
160-19923-11	TITO04-BS-FSSSU3-RSY11-U7-S711	Solid	11/08/16 09:44	11/10/16 08:30
160-19923-12	TITO04-BS-FSSSU3-RSY11-U7-S712	Solid	11/08/16 09:48	11/10/16 08:30

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S701

Lab Sample ID: 160-19923-1

Date Collected: 11/08/16 09:55

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.416		0.136	0.143		0.0982	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Actinium-227	0.522	U	0.511	0.514		0.702	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Bismuth-212	0.0142	U	0.701	0.701		1.27	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Bismuth-214	0.364		0.103	0.110		0.0925	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Cesium-137	-0.00117	U	0.0541	0.0541		0.0983	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Lead-210	1.10	U	1.13	1.13		1.54	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Lead-212	0.206		0.107	0.111		0.164	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Lead-214	0.353		0.111	0.117		0.138	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Potassium-40	11.1		1.58	1.94		0.727	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Protactinium-231	0.000	U	0.611	0.611		3.06	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Radium-226	0.364		0.103	0.110	0.500	0.0925	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Radium-228	0.416		0.136	0.143		0.0982	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Thallium-208	0.117		0.0479	0.0494		0.0430	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Thorium-228	0.206		0.107	0.111		0.164	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Thorium-232	0.416		0.136	0.143		0.0982	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Thorium-234	0.0138	U	0.947	0.947		1.63	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Uranium-235	-0.0107	U	0.404	0.404		0.552	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Uranium-238	0.0138	U	0.947	0.947		1.63	pCi/g	11/11/16 13:08	12/02/16 08:36	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S702

Lab Sample ID: 160-19923-2

Date Collected: 11/08/16 09:58

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.444		0.149	0.156		0.112	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Actinium-227	0.185	U	0.363	0.363		1.33	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Bismuth-212	0.0320	U	0.838	0.838		1.50	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Bismuth-214	0.306		0.130	0.134		0.137	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Cesium-137	-0.0282	U	0.0747	0.0748		0.129	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Lead-210	-0.401	U	1.50	1.50		2.62	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Lead-212	0.333		0.0879	0.0979		0.0993	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Lead-214	0.467		0.110	0.121		0.119	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Potassium-40	9.51		1.58	1.86		0.763	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Protactinium-231	0.0000000	U	2.13	2.13		3.68	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Radium-226	0.306		0.130	0.134	0.500	0.137	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Radium-228	0.444		0.149	0.156		0.112	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Thallium-208	0.129		0.0933	0.0943		0.0872	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Thorium-228	0.333		0.0879	0.0979		0.0993	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Thorium-232	0.444		0.149	0.156		0.112	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Thorium-234	0.0329	U	1.43	1.43		2.43	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Uranium-235	0.0323	U	0.0388	0.0389		1.04	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Uranium-238	0.0329	U	1.43	1.43		2.43	pCi/g	11/11/16 13:08	12/02/16 08:37	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S703

Lab Sample ID: 160-19923-3

Date Collected: 11/08/16 09:53

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.312		0.153	0.156		0.211	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Actinium-227	0.143	U	0.331	0.331		0.766	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Bismuth-212	0.255	U	0.459	0.460		0.784	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Bismuth-214	0.401		0.113	0.120		0.105	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Cesium-137	-0.0218	U	0.0469	0.0469		0.0964	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Lead-210	-0.785	U	1.34	1.35		2.36	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Lead-212	0.315		0.0749	0.0853		0.0860	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Lead-214	0.309		0.0957	0.101		0.107	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Potassium-40	11.3		1.38	1.80		0.672	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Protactinium-231	0.000	U	0.905	0.905		3.50	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Radium-226	0.401		0.113	0.120	0.500	0.105	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Radium-228	0.312		0.153	0.156		0.211	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Thallium-208	0.133		0.0453	0.0473		0.0440	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Thorium-228	0.315		0.0749	0.0853		0.0860	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Thorium-232	0.312		0.153	0.156		0.211	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Thorium-234	-0.178	U	1.36	1.36		2.31	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Uranium-235	-0.0401	U	0.0732	0.0733		0.408	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Uranium-238	-0.178	U	1.36	1.36		2.31	pCi/g	11/11/16 13:08	12/02/16 08:38	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S704

Lab Sample ID: 160-19923-4

Date Collected: 11/08/16 09:56

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.285		0.195	0.197		0.204	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Actinium-227	0.214	U	0.351	0.352		0.852	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Bismuth-212	0.312	U	0.740	0.740		1.27	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Bismuth-214	0.393		0.124	0.130		0.109	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Cesium-137	0.0149	U	0.0338	0.0338		0.0595	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Lead-210	1.67	U	1.37	1.39		1.89	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Lead-212	0.281		0.0768	0.0850		0.0890	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Lead-214	0.263		0.106	0.110		0.127	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Potassium-40	10.2		1.43	1.77		0.708	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Protactinium-231	0.503	U	1.12	1.12		2.63	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Radium-226	0.393		0.124	0.130	0.500	0.109	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Radium-228	0.285		0.195	0.197		0.204	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Thallium-208	0.134		0.0470	0.0490		0.0440	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Thorium-228	0.281		0.0768	0.0850		0.0890	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Thorium-232	0.285		0.195	0.197		0.204	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Thorium-234	1.84		0.983	1.00		1.23	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Uranium-235	-0.0585	U	0.293	0.293		0.588	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Uranium-238	1.84		0.983	1.00		1.23	pCi/g	11/11/16 13:08	12/02/16 08:41	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S705

Lab Sample ID: 160-19923-5

Date Collected: 11/08/16 09:49

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.397		0.194	0.198		0.248	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Actinium-227	-0.404	U	0.845	0.847		1.42	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Bismuth-212	0.310	U	0.896	0.897		1.55	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Bismuth-214	0.114	U	0.244	0.244		0.298	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Cesium-137	-0.0138	U	0.0564	0.0564		0.105	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Lead-210	0.599	U	1.62	1.62		2.74	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Lead-212	0.321		0.113	0.120		0.160	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Lead-214	0.316		0.0951	0.101		0.0858	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Potassium-40	10.6		1.62	1.95		0.619	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Protactinium-231	-0.870	U	2.84	2.84		4.77	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Radium-226	0.114	U	0.244	0.244	0.500	0.298	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Radium-228	0.397		0.194	0.198		0.248	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Thallium-208	0.135		0.0468	0.0488		0.0378	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Thorium-228	0.321		0.113	0.120		0.160	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Thorium-232	0.397		0.194	0.198		0.248	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Thorium-234	-0.374	U	1.45	1.45		2.51	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Uranium-235	0.104	U	0.379	0.379		0.817	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Uranium-238	-0.374	U	1.45	1.45		2.51	pCi/g	11/11/16 13:08	12/02/16 08:44	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S706

Lab Sample ID: 160-19923-6

Date Collected: 11/08/16 09:51

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.255		0.200	0.202		0.211	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Actinium-227	-0.267	U	0.663	0.663		1.11	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Bismuth-212	-0.0248	U	0.605	0.605		1.09	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Bismuth-214	0.341		0.101	0.107		0.0904	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Cesium-137	-0.00101	U	0.0516	0.0516		0.0931	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Lead-210	0.690	U	0.774	0.778		1.17	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Lead-212	0.239		0.0673	0.0741		0.0828	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Lead-214	0.361		0.0802	0.0885		0.0677	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Potassium-40	10.7		1.48	1.84		0.567	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Protactinium-231	0.265	U	0.880	0.880		2.88	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Radium-226	0.341		0.101	0.107	0.500	0.0904	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Radium-228	0.255		0.200	0.202		0.211	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Thallium-208	0.0335	U	0.0734	0.0734		0.0893	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Thorium-228	0.239		0.0673	0.0741		0.0828	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Thorium-232	0.255		0.200	0.202		0.211	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Thorium-234	-0.277	U	0.950	0.950		1.65	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Uranium-235	0.117	U	0.205	0.206		0.465	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Uranium-238	-0.277	U	0.950	0.950		1.65	pCi/g	11/11/16 13:08	12/02/16 08:46	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S707

Lab Sample ID: 160-19923-7

Date Collected: 11/08/16 09:58

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.564		0.199	0.207		0.130	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Actinium-227	0.169	U	0.576	0.577		0.843	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Bismuth-212	0.196	U	1.28	1.28		2.23	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Bismuth-214	0.337		0.150	0.154		0.171	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Cesium-137	-0.0342	U	0.119	0.119		0.173	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Lead-210	0.692	U	1.34	1.34		1.97	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Lead-212	0.336		0.0858	0.0962		0.0866	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Lead-214	0.322		0.108	0.113		0.155	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Potassium-40	11.0		1.81	2.13		0.774	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Protactinium-231	0.362	U	1.07	1.07		3.66	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Radium-226	0.337		0.150	0.154	0.500	0.171	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Radium-228	0.564		0.199	0.207		0.130	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Thallium-208	0.149		0.0545	0.0566		0.0459	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Thorium-228	0.336		0.0858	0.0962		0.0866	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Thorium-232	0.564		0.199	0.207		0.130	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Thorium-234	0.393	U	1.05	1.05		1.50	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Uranium-235	0.0763	U	0.326	0.326		0.555	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Uranium-238	0.393	U	1.05	1.05		1.50	pCi/g	11/11/16 13:08	12/02/16 08:47	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S708

Lab Sample ID: 160-19923-8

Date Collected: 11/08/16 09:41

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.264	U	0.117	0.120		0.269	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Actinium-227	0.153	U	0.355	0.356		0.963	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Bismuth-212	-0.0235	U	0.521	0.521		0.931	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Bismuth-214	0.328		0.0821	0.0889		0.0732	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Cesium-137	0.0164	U	0.0381	0.0381		0.0655	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Lead-210	-0.652	U	1.26	1.26		2.10	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Lead-212	0.282		0.0589	0.0693		0.0578	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Lead-214	0.364		0.0945	0.102		0.0867	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Potassium-40	10.9		1.24	1.67		0.439	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Protactinium-231	-0.187	U	1.98	1.98		3.35	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Radium-226	0.328		0.0821	0.0889	0.500	0.0732	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Radium-228	0.264	U	0.117	0.120		0.269	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Thallium-208	0.118		0.0356	0.0377		0.0250	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Thorium-228	0.282		0.0589	0.0693		0.0578	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Thorium-232	0.264	U	0.117	0.120		0.269	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Thorium-234	-0.377	U	1.14	1.14		1.91	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Uranium-235	0.0846	U	0.169	0.169		0.608	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Uranium-238	-0.377	U	1.14	1.14		1.91	pCi/g	11/11/16 13:08	12/02/16 09:10	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S709

Lab Sample ID: 160-19923-9

Date Collected: 11/08/16 09:46

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.232	U	0.179	0.181		0.280	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Actinium-227	0.120	U	0.309	0.309		0.754	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Bismuth-212	0.237	U	0.902	0.902		1.57	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Bismuth-214	0.433		0.120	0.128		0.121	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Cesium-137	-0.0341	U	0.0647	0.0648		0.110	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Lead-210	-0.0962	U	1.38	1.38		2.08	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Lead-212	0.0194	U	0.115	0.115		0.196	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Lead-214	0.388		0.117	0.124		0.134	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Potassium-40	10.9		1.60	1.95		0.759	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Protactinium-231	0.000	U	0.594	0.594		3.00	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Radium-226	0.433		0.120	0.128	0.500	0.121	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Radium-228	0.232	U	0.179	0.181		0.280	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Thallium-208	0.0822		0.0423	0.0432		0.0426	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Thorium-228	0.0194	U	0.115	0.115		0.196	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Thorium-232	0.232	U	0.179	0.181		0.280	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Thorium-234	0.0145	U	1.17	1.17		2.01	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Uranium-235	0.0252	U	0.168	0.168		0.538	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Uranium-238	0.0145	U	1.17	1.17		2.01	pCi/g	11/11/16 13:08	12/02/16 09:11	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S710

Lab Sample ID: 160-19923-10

Date Collected: 11/08/16 09:39

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.421		0.165	0.171		0.323	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Actinium-227	-0.410	U	0.875	0.876		1.47	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Bismuth-212	0.369	U	0.770	0.771		1.32	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Bismuth-214	0.361		0.146	0.151		0.146	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Cesium-137	-0.0600	U	0.103	0.103		0.173	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Lead-210	-1.36	U	1.86	1.86		2.73	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Lead-212	0.0261	U	0.129	0.129		0.219	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Lead-214	0.399		0.111	0.118		0.103	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Potassium-40	11.1		1.73	2.07		0.784	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Protactinium-231	0.584	U	1.99	1.99		3.39	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Radium-226	0.361		0.146	0.151	0.500	0.146	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Radium-228	0.421		0.165	0.171		0.323	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Thallium-208	0.180		0.0652	0.0678		0.0462	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Thorium-228	0.0261	U	0.129	0.129		0.219	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Thorium-232	0.421		0.165	0.171		0.323	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Thorium-234	-0.586	U	1.46	1.46		2.77	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Uranium-235	-0.208	U	0.416	0.417		1.05	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Uranium-238	-0.586	U	1.46	1.46		2.77	pCi/g	11/11/16 13:08	12/02/16 09:13	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S711

Lab Sample ID: 160-19923-11

Date Collected: 11/08/16 09:44

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.407		0.132	0.139		0.0790	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Actinium-227	0.224	U	0.474	0.474		1.24	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Bismuth-212	0.0348	U	0.834	0.834		1.46	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Bismuth-214	0.295		0.107	0.111		0.133	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Cesium-137	0.0142	U	0.0322	0.0322		0.0561	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Lead-210	1.33	U	1.35	1.36		1.75	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Lead-212	0.305		0.0821	0.0911		0.103	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Lead-214	0.407		0.120	0.127		0.127	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Potassium-40	9.89		1.34	1.68		0.708	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Protactinium-231	-0.848	U	2.64	2.64		4.43	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Radium-226	0.295		0.107	0.111	0.500	0.133	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Radium-228	0.407		0.132	0.139		0.0790	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Thallium-208	0.164		0.0519	0.0546		0.0476	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Thorium-228	0.305		0.0821	0.0911		0.103	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Thorium-232	0.407		0.132	0.139		0.0790	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Thorium-234	1.07	U	1.18	1.18		1.48	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Uranium-235	0.0864	U	0.174	0.174		0.780	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Uranium-238	1.07	U	1.18	1.18		1.48	pCi/g	11/11/16 13:08	12/02/16 09:16	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S712

Lab Sample ID: 160-19923-12

Date Collected: 11/08/16 09:48

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.522		0.156	0.165		0.0858	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Actinium-227	0.495	U	0.538	0.541		0.709	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Bismuth-212	0.239	U	0.723	0.723		1.25	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Bismuth-214	0.388		0.113	0.120		0.104	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Cesium-137	0.0245	U	0.0676	0.0677		0.116	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Lead-210	-0.400	U	1.40	1.40		2.19	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Lead-212	0.248		0.0749	0.0815		0.0921	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Lead-214	0.353		0.0945	0.101		0.115	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Potassium-40	11.5		1.49	1.90		0.685	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Protactinium-231	0.000	U	0.257	0.257		2.78	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Radium-226	0.388		0.113	0.120	0.500	0.104	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Radium-228	0.522		0.156	0.165		0.0858	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Thallium-208	0.0707		0.0388	0.0395		0.0463	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Thorium-228	0.248		0.0749	0.0815		0.0921	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Thorium-232	0.522		0.156	0.165		0.0858	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Thorium-234	-0.652	U	0.979	0.981		1.75	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Uranium-235	-0.203	U	0.302	0.302		0.499	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Uranium-238	-0.652	U	0.979	0.981		1.75	pCi/g	11/11/16 13:08	12/02/16 09:17	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-278932/1-A

Matrix: Solid

Analysis Batch: 282158

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 278932

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.06269	U	0.135	0.136		0.165	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Actinium-227	0.08470	U	0.188	0.189		0.835	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Bismuth-212	0.02701	U	0.473	0.473		0.881	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Bismuth-214	-0.06564	U	0.135	0.135		0.244	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Cesium-137	-0.006810	U	0.0434	0.0434		0.0788	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Lead-210	0.3767	U	1.03	1.03		1.77	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Lead-212	0.01188	U	0.0752	0.0753		0.130	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Lead-214	-0.08381	U	0.154	0.154		0.165	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Potassium-40	-0.2820	U	0.671	0.671		0.989	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Protactinium-231	0.09571	U	0.965	0.965		3.14	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Radium-226	-0.06564	U	0.135	0.135	0.500	0.244	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Radium-228	0.06269	U	0.135	0.136		0.165	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Thallium-208	0.01000	U	0.0202	0.0203		0.0618	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Thorium-228	0.01188	U	0.0752	0.0753		0.130	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Thorium-232	0.06269	U	0.135	0.136		0.165	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Thorium-234	0.08144	U	0.337	0.338		1.46	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Uranium-235	-0.01169	U	0.0486	0.0487		0.511	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Uranium-238	0.08144	U	0.337	0.338		1.46	pCi/g	11/11/16 13:08	12/02/16 09:06	1

Lab Sample ID: LCS 160-278932/2-A

Matrix: Solid

Analysis Batch: 282157

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 278932

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	99.85		10.5		1.20	pCi/g	103	87 - 116
Cesium-137	29.3	29.62		3.16		0.211	pCi/g	101	87 - 120
Cobalt-60	16.1	15.85		1.64		0.0399	pCi/g	99	87 - 115

Lab Sample ID: 160-19923-1 DU

Matrix: Solid

Analysis Batch: 282159

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S701

Prep Type: Total/NA

Prep Batch: 278932

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.416		0.1981	U	0.163		0.226	pCi/g	0.71	1
Actinium-227	0.522	U	-0.3138	U	0.791		1.33	pCi/g	0.64	1
Bismuth-212	0.0142	U	0.1662	U	0.359		0.628	pCi/g	0.14	1
Bismuth-214	0.364		0.4929		0.162		0.133	pCi/g	0.48	1
Cesium-137	-0.00117	U	-0.01392	U	0.0707		0.122	pCi/g	0.10	1
Lead-210	1.10	U	-0.8609	U	1.48		2.61	pCi/g	0.75	1
Lead-212	0.206		0.3611		0.0914		0.0827	pCi/g	0.77	1
Lead-214	0.353		0.4371		0.137		0.127	pCi/g	0.33	1
Potassium-40	11.1		11.04		1.80		0.523	pCi/g	0.01	1
Protactinium-231	0.000	U	0.0000	U	0.281		3.30	pCi/g	0	1
Radium-226	0.364		0.4929		0.162	0.500	0.133	pCi/g	0.48	1
Radium-228	0.416		0.1981	U	0.163		0.226	pCi/g	0.71	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-19923-1 DU

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S701

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 282159

Prep Batch: 278932

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.117		0.07170	U	0.0789		0.0810	pCi/g	0.35	1
Thorium-228	0.206		0.3611		0.0914		0.0827	pCi/g	0.77	1
Thorium-232	0.416		0.1981	U	0.163		0.226	pCi/g	0.71	1
Thorium-234	0.0138	U	0.006493	U	1.46		2.48	pCi/g	0	1
Uranium-235	-0.0107	U	-0.08444	U	0.280		1.01	pCi/g	0.11	1
Uranium-238	0.0138	U	0.006493	U	1.46		2.48	pCi/g	0	1

QC Association Summary

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Rad

Leach Batch: 278646

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19923-1	TITO04-BS-FSSSU3-RSY11-U7-S701	Total/NA	Solid	Dry and Grind	
160-19923-2	TITO04-BS-FSSSU3-RSY11-U7-S702	Total/NA	Solid	Dry and Grind	
160-19923-3	TITO04-BS-FSSSU3-RSY11-U7-S703	Total/NA	Solid	Dry and Grind	
160-19923-4	TITO04-BS-FSSSU3-RSY11-U7-S704	Total/NA	Solid	Dry and Grind	
160-19923-5	TITO04-BS-FSSSU3-RSY11-U7-S705	Total/NA	Solid	Dry and Grind	
160-19923-6	TITO04-BS-FSSSU3-RSY11-U7-S706	Total/NA	Solid	Dry and Grind	
160-19923-7	TITO04-BS-FSSSU3-RSY11-U7-S707	Total/NA	Solid	Dry and Grind	
160-19923-8	TITO04-BS-FSSSU3-RSY11-U7-S708	Total/NA	Solid	Dry and Grind	
160-19923-9	TITO04-BS-FSSSU3-RSY11-U7-S709	Total/NA	Solid	Dry and Grind	
160-19923-10	TITO04-BS-FSSSU3-RSY11-U7-S710	Total/NA	Solid	Dry and Grind	
160-19923-11	TITO04-BS-FSSSU3-RSY11-U7-S711	Total/NA	Solid	Dry and Grind	
160-19923-12	TITO04-BS-FSSSU3-RSY11-U7-S712	Total/NA	Solid	Dry and Grind	
160-19923-1 DU	TITO04-BS-FSSSU3-RSY11-U7-S701	Total/NA	Solid	Dry and Grind	

Prep Batch: 278932

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19923-1	TITO04-BS-FSSSU3-RSY11-U7-S701	Total/NA	Solid	Fill_Geo-21	278646
160-19923-2	TITO04-BS-FSSSU3-RSY11-U7-S702	Total/NA	Solid	Fill_Geo-21	278646
160-19923-3	TITO04-BS-FSSSU3-RSY11-U7-S703	Total/NA	Solid	Fill_Geo-21	278646
160-19923-4	TITO04-BS-FSSSU3-RSY11-U7-S704	Total/NA	Solid	Fill_Geo-21	278646
160-19923-5	TITO04-BS-FSSSU3-RSY11-U7-S705	Total/NA	Solid	Fill_Geo-21	278646
160-19923-6	TITO04-BS-FSSSU3-RSY11-U7-S706	Total/NA	Solid	Fill_Geo-21	278646
160-19923-7	TITO04-BS-FSSSU3-RSY11-U7-S707	Total/NA	Solid	Fill_Geo-21	278646
160-19923-8	TITO04-BS-FSSSU3-RSY11-U7-S708	Total/NA	Solid	Fill_Geo-21	278646
160-19923-9	TITO04-BS-FSSSU3-RSY11-U7-S709	Total/NA	Solid	Fill_Geo-21	278646
160-19923-10	TITO04-BS-FSSSU3-RSY11-U7-S710	Total/NA	Solid	Fill_Geo-21	278646
160-19923-11	TITO04-BS-FSSSU3-RSY11-U7-S711	Total/NA	Solid	Fill_Geo-21	278646
160-19923-12	TITO04-BS-FSSSU3-RSY11-U7-S712	Total/NA	Solid	Fill_Geo-21	278646
MB 160-278932/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-278932/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-19923-1 DU	TITO04-BS-FSSSU3-RSY11-U7-S701	Total/NA	Solid	Fill_Geo-21	278646

From: [Weyant, David B CIV NAVSEA 04, 04N](#)
To: [Guillory, Jeffrey](#)
Cc: [Edwards, Zachary L CIV SEA 04 04N](#); [Yantos, Christopher N CIV NAVFAC SW, BRAC](#); [Messer, Ulrika](#); [Hackett, John R](#); [Schul, Raymond](#); [Morrison, Dennis](#); [Bohannon, Derek](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 11 (Use 9)
Date: Friday, January 06, 2017 10:17:06 AM

Hello Jeff,

I concur to designating the Revised RSY-11 (Use 9) soil as Non-LLRW soil.

VR

David Weyant
Health Physicist/Environmental Protection Manager
Environmental Protection Division
NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederaleservices.com>]
Sent: Monday, December 26, 2016 7:39 PM
To: Weyant, David B CIV NAVSEA 04, 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 11 (Use 9)

Mr. Weyant,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Jeffrey Guillory

Scientist 3

Federal Services

Cell: +1 979 422 5534

jeffrey.guillory@cbifederaleservices.com <<mailto:jeffrey.guillory@cbifederaleservices.com>>

CB&I

950 Avenue M - Treasure Island

San Francisco, CA 94130

United States of America

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Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY 11	RSY Unit Use Number: USE 9	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 12/27/2016

Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static Survey Meter (Model 2221) Serial Number	One-Minute Static Reading (CPM)	Static Count Exceeds Reference Area IL?	²²⁶ Ra Final Analytical Results (pCi/g)
Upper limit of site reference background						1.69
TITO04-BS-FSSSU5-RSY11-U9-S901	1	Systematic	254783	11,018	No	0.359
TITO04-BS-FSSSU5-RSY11-U9-S902	2	Systematic	254783	11,224	No	0.321
TITO04-BS-FSSSU5-RSY11-U9-S903	3	Systematic	254783	11,304	No	0.410
TITO04-BS-FSSSU5-RSY11-U9-S904	4	Systematic	254783	11,096	No	0.386
TITO04-BS-FSSSU5-RSY11-U9-S905	5	Systematic	254783	11,009	No	0.298
TITO04-BS-FSSSU5-RSY11-U9-S906	6	Systematic	254783	11,156	No	0.372
TITO04-BS-FSSSU5-RSY11-U9-S907	7	Systematic	254783	11,141	No	0.250
TITO04-BS-FSSSU5-RSY11-U9-S908	8	Systematic	254783	11,229	No	0.454
TITO04-BS-FSSSU5-RSY11-U9-S909	9	Systematic	254783	10,931	No	0.332
TITO04-BS-FSSSU5-RSY11-U9-S910	10	Systematic	254783	10,829	No	0.404
TITO04-BS-FSSSU5-RSY11-U9-S911	11	Systematic	254783	10,858	No	0.413
TITO04-BS-FSSSU5-RSY11-U9-S912	12	Systematic	254783	10,882	No	0.367

CPM Counts per minute
 IL Investigation Level (based on Reference Area data set)
²²⁶Ra Radium-226
 pCi/g Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd (CPM)	Reference Area Static 3σ IL (CPM)	Reference Area Scan Bkgd (CPM)	Reference Area Scan 3σ IL (CPM)	Range (CPM)
Gamma Walkover Survey	TIRS-11162016-12P3-GWS-2639	11/16/2016	2221	10/31/2017	254783	N/A	N/A	14,633	18,077	8,156 – 16,918
Follow-up Static Survey	TIRS-11172016-12P3-JSS-2643	11/17/2016	2221	10/31/2017	254783	14,709	17,037	N/A	N/A	10,793 – 11,286
Systematic Sampling Survey	TIRS-11172016-12P3-JSS-2647	11/17/2016	2221	10/31/2017	254783	14,709	17,037	N/A	N/A	10,829 – 11,304

3σ IL Investigation Level (established at 3σ above the mean of the Reference Area data set)
 CPM Counts per minute

Summary

1) Gamma walkover survey and data review—all locations surveyed on RSY 11 (Use 9) were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the data set average for RSY 11 (Use 9) were evaluated for follow-up investigation; 51 total data points clustered around 21 discrete locations were identified as exceeding three standard deviations of the data set average. Gamma scan coverage is shown on the Systematic Sample Survey map (page 3). GWS count rate statistics are also provided (page 4).

Note: An observed count rate peak at the fifth follow-up static location—as illustrated in the scatter plot on the GWS Count Rate Statistics page (page 4)—is likely due to transient electrical interference, and does not indicate a potential radiological object or contamination. Count rates at this location do not exceed the Reference Area scan IL, and additional scan data collected from the same location (with identical GPS coordinates) show count rates consistent with the rest of the GWS scan data set. Furthermore, follow-up static measurements collected at this location (the fifth follow-up location) did not exceed the Reference Area static IL, and were consistent with static readings collected at other locations on the RSY pad.

2) Follow-up static survey—21 locations identified during the data review process as exceeding three standard deviations of the data set average for RSY 11 (Use 9) were investigated, resulting in all locations less than the Reference Area static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 5).

3) Twelve systematic soil samples (901-912) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with static readings < Reference Area static IL for all sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 8-26).

Conclusions:

All count rates recorded during the gamma walkover survey were less than the Reference Area scan IL. As an additional conservative characterization approach, individual or clustered locations identified as exceeding three standard deviations of the data set mean for RSY 11 (Use 9) were investigated and deemed comparable to background. Twenty-one total follow-up static locations were investigated, with readings less than the Reference Area static IL at all locations.

Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 6-7. These statistical tools were utilized to verify the appropriate level of reasonable effort.

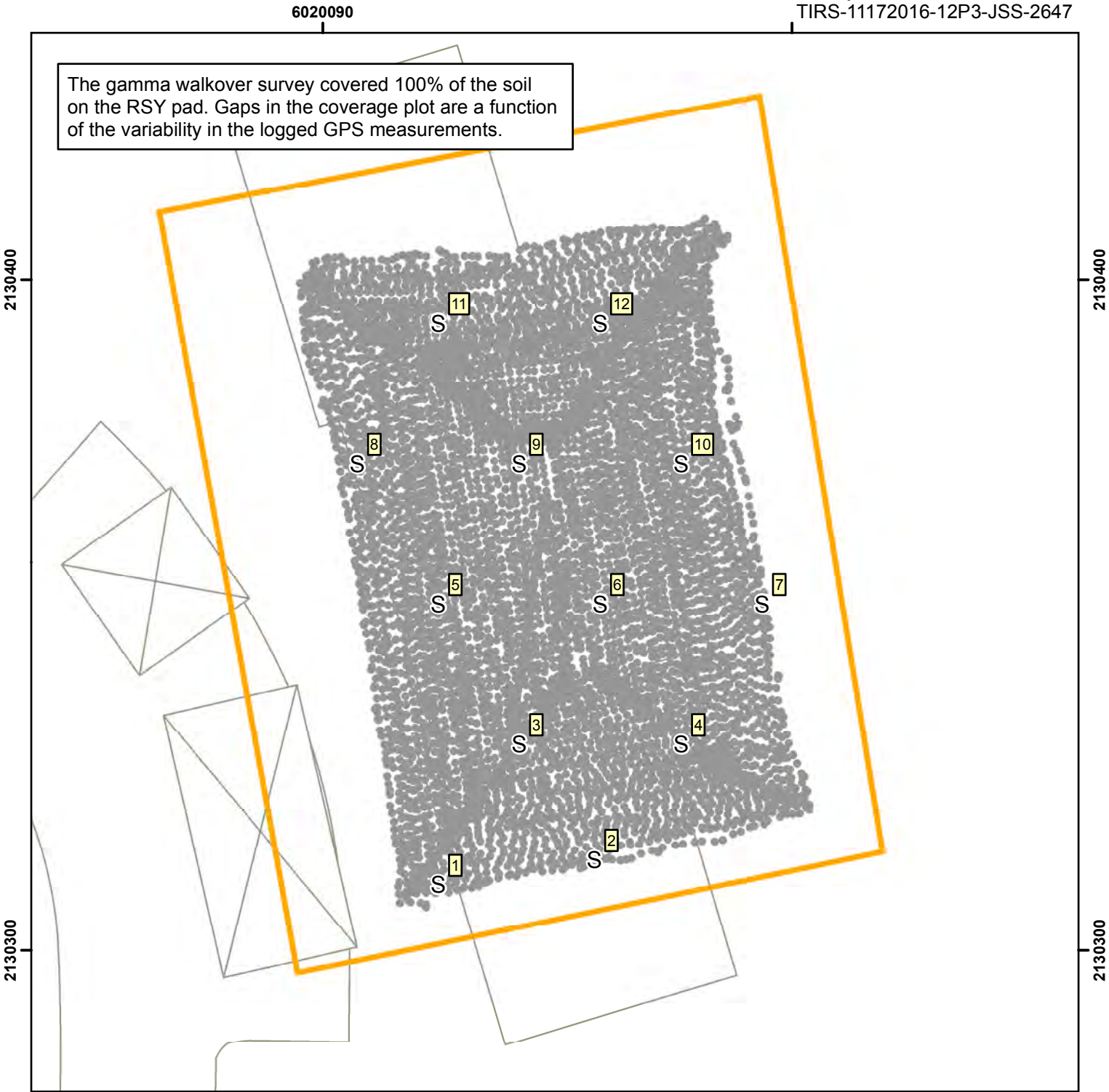
RSY 11 (Use 9) contains soil from the final 6-inch over excavation of FSS material from the bottom of the excavation at SWDA Bayside SU 5.

Note: Soil on RSY Pad 11 (Use 9) was over-excavated at the final depth from the bottom of the excavation at Bayside SU 5, and no visible debris and/or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.

CB&I requests RASO concurrence to release this soil as Non-LLRW.

Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.

Survey Number:
TIRS-11172016-12P3-JSS-2647



Instrument # 254783

S

 Systematic Sample Location

•

 GWS Coverage

RSY Boundaries

CB&I Federal Services, LLC

0 5 10 20

Feet

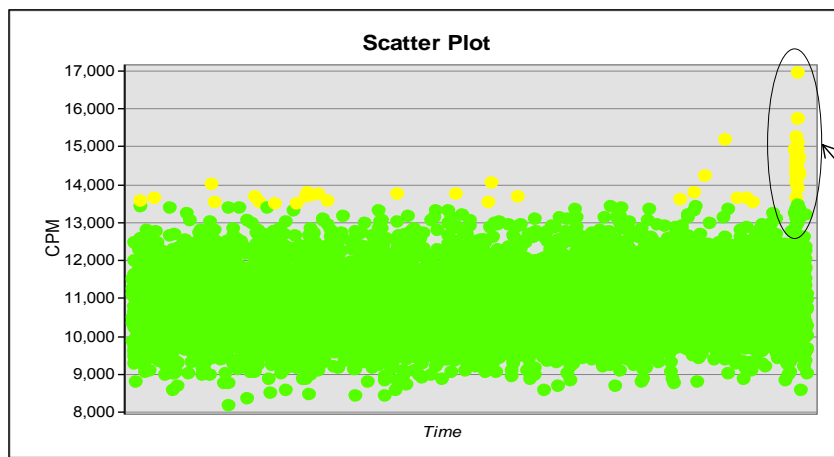
Coordinate system: CSP Zone III. NAD83, US Survey Foot

f

TIRS-11162016-12P3-GWS-2639

**Count Rate Statistics
Bayside RSY 11 (Use 9)**

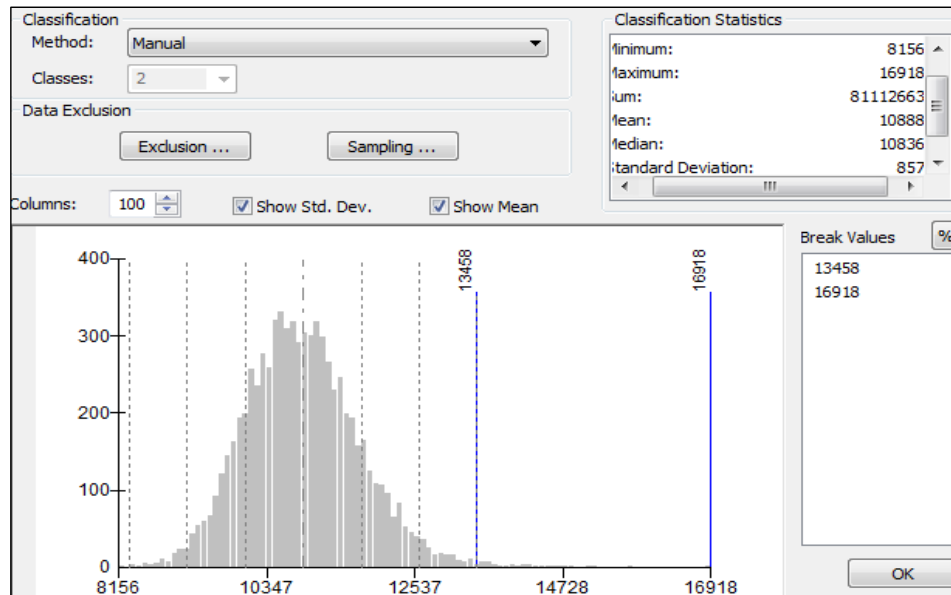
Frequency Table			
In the 8,000 (cpm)	In the 9,000 (cpm)	In the 10,000 (cpm)	In the 11,000 (cpm)
51	998	3232	2453
In the 12,000 (cpm)	In the 13,000 (cpm)	In the 14,000 (cpm)	In the 15,000 (cpm)
608	81	21	5
In the 16,000 (cpm)			
1			



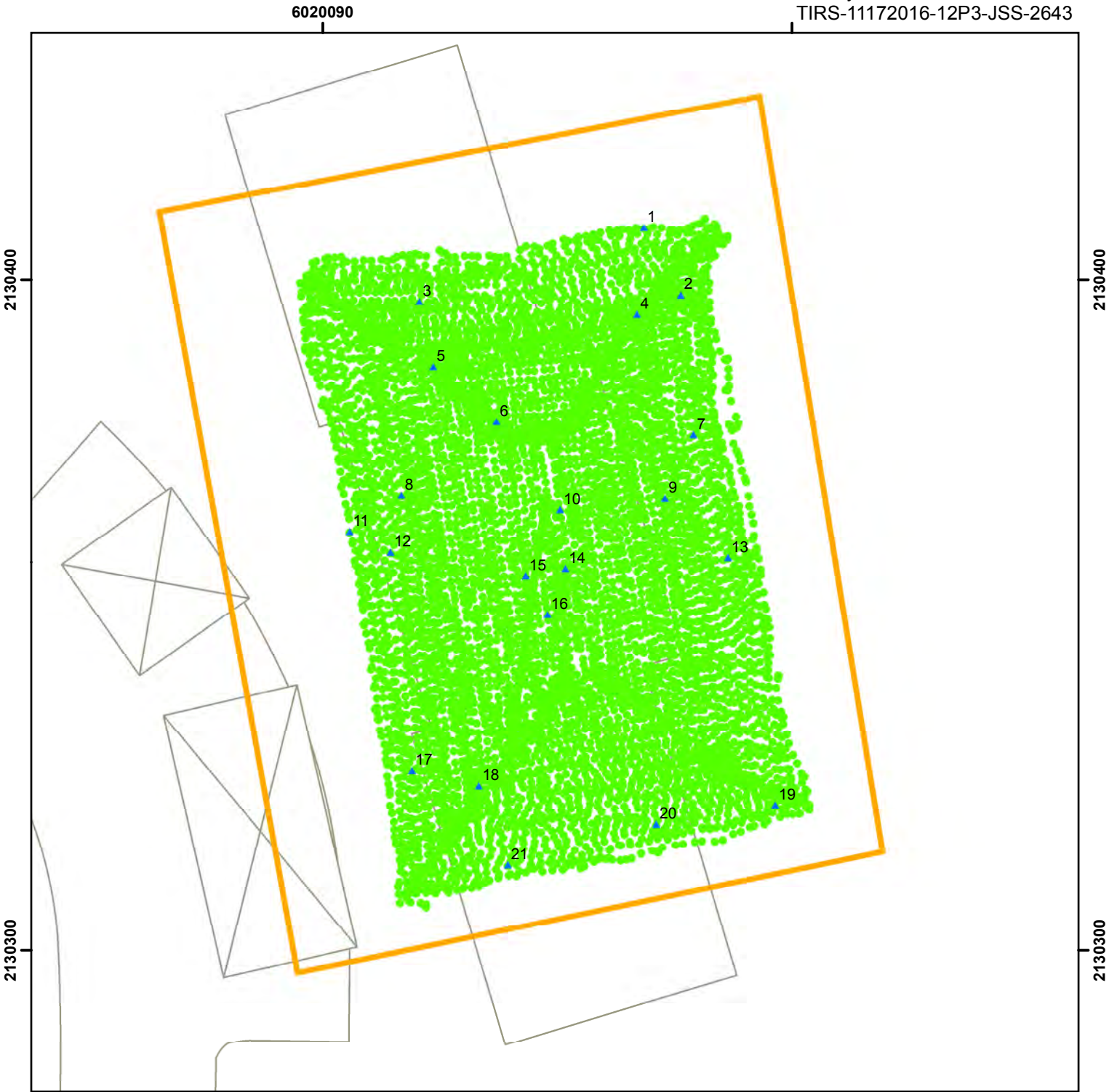
Count rate peak likely due to transient electrical interference.

Scan data collected at the location of this peak both before and after detection show count rates consistent with the rest of the GWS scan data set.




Static follow-up readings at this location did not exceed the Reference Area IL, and were also consistent with static readings collected at other locations on the RSY pad.



Survey Number:
TIRS-11172016-12P3-JSS-2643



Instrument # 254783

-  Follow-up Static Locations
-  Data Points Not Requiring Further Investigation
-  RSY Boundaries

CB&I Federal Services, LLC

0 5 10 20
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

f

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 11-9
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

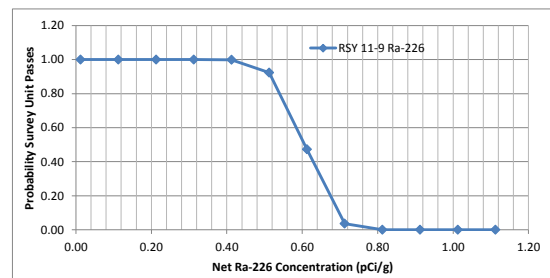
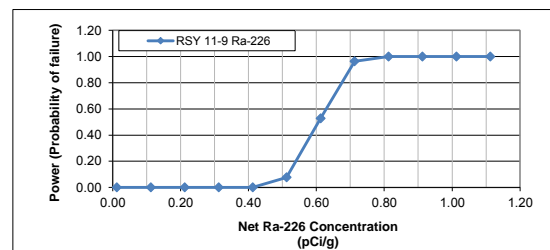
POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4	S
0.57	R	0.57	19.5	0	5	S
0.55	R	0.55	18	0	6	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.359	S	-0.123939192	5	5	21.5	R
0.321	S	-0.161939192	3	3	21.5	R
0.410	S	-0.072939192	10	10	23	R
0.386	S	-0.096939192	8	8	24	R
0.298	S	-0.184939192	2	2	25	R
0.372	S	-0.110939192	7	7	26	R
0.250	S	-0.232939192	1	1	27.5	R
0.454	S	-0.028939192	12	12	27.5	R
0.332	S	-0.150939192	4	4	29	R
0.404	S	-0.078939192	9	9	30	R
0.413	S	-0.069939192	11	11	31	R
0.367	S	-0.115939192	6	6	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.056
Z(1-alpha)	1.960
Z(1-beta)	1.645

Concentration	Background (C)	SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
1.5	0.81	2.0	0.92135	0.86577	221.124	138.9359	11.787107	-4.34973	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)
 Use:
 $m = 20$
 $n = 15$
 $6 r$
 $5 k$
 0.04 α

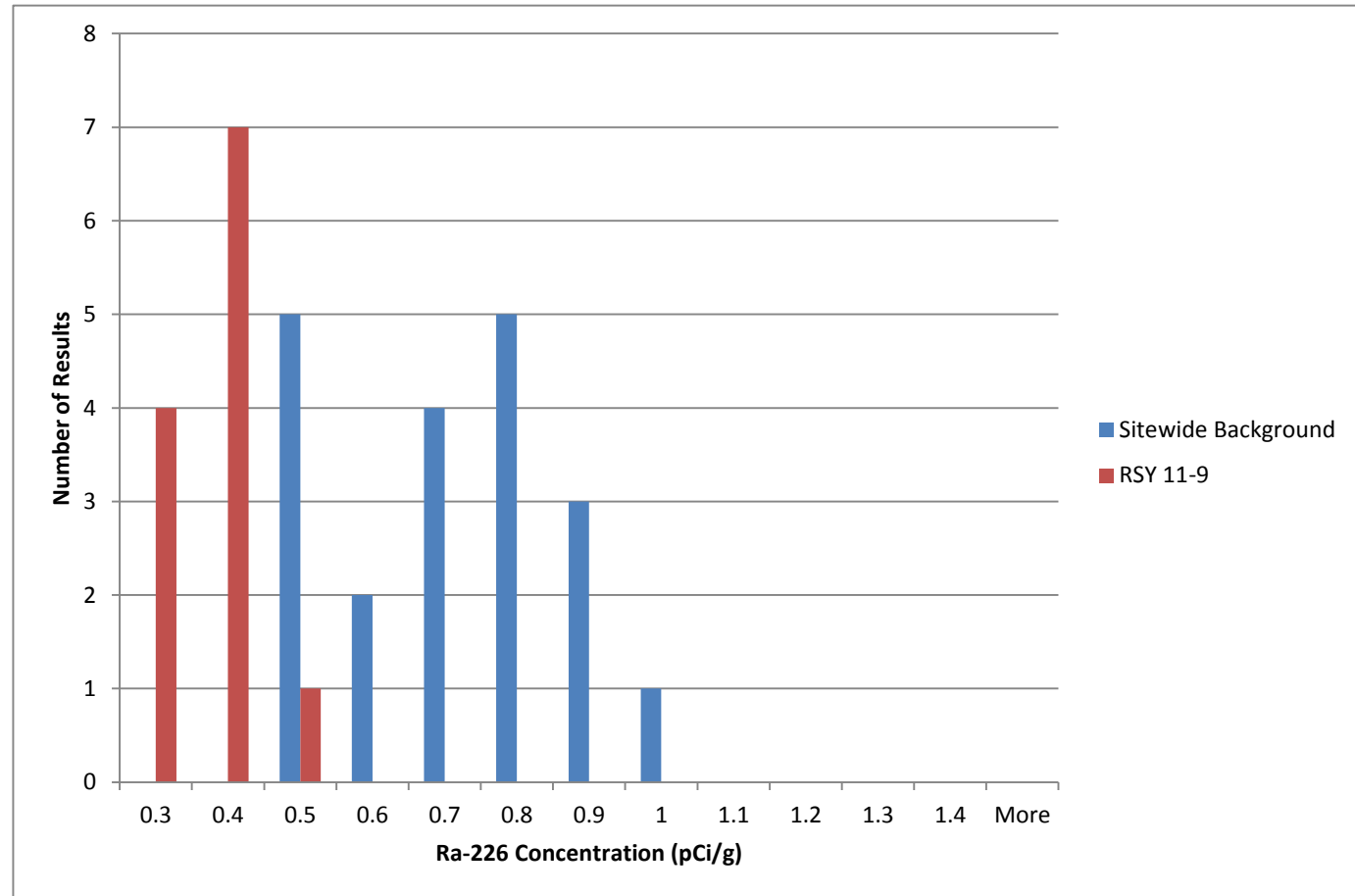
If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

Histogram, RSY 11 (Use 9) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 11-9	
<i>Bin</i>	<i>Frequency</i>
0.3	4
0.4	7
0.5	1
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-20102-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

12/16/2016 4:24:17 PM

Micha Korinhizer, Project Management Assistant I
(314)298-8566

micha.korinhizer@testamericainc.com

Designee for

Erika Gish, Project Manager II
(314)298-8566

erika.gish@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

LINKS

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results through

TotalAccess

Have a Question?



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www.testamericainc.com



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QC Association Summary	19

Case Narrative

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Job ID: 160-20102-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-20102-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 11 of 26

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Job ID: 160-20102-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 11/19/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 17.5° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSSSU5-RSY11-U9-S901 (160-20102-1), TITO04-BS-FSSSU5-RSY11-U9-S902 (160-20102-2), TITO04-BS-FSSSU5-RSY11-U9-S903 (160-20102-3), TITO04-BS-FSSSU5-RSY11-U9-S904 (160-20102-4), TITO04-BS-FSSSU5-RSY11-U9-S905 (160-20102-5), TITO04-BS-FSSSU5-RSY11-U9-S906 (160-20102-6), TITO04-BS-FSSSU5-RSY11-U9-S907 (160-20102-7), TITO04-BS-FSSSU5-RSY11-U9-S908 (160-20102-8), TITO04-BS-FSSSU5-RSY11-U9-S909 (160-20102-9), TITO04-BS-FSSSU5-RSY11-U9-S910 (160-20102-10), TITO04-BS-FSSSU5-RSY11-U9-S911 (160-20102-11) and TITO04-BS-FSSSU5-RSY11-U9-S912 (160-20102-12) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/21/2016, prepared on 11/22/2016 and analyzed on 12/13/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_BS_FSS_SU5_RSY11_U9_#335 Page 12 of 26

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Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside FSS SU5
RSY11 USE 9 Systematic

Purchase Order #: 201455

Shipment Date: 11/18/16

Waybill Number: 128944624492565757

Lab Destination: Earth Toxics Inc To Test America

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Lynn Caragan
Phone/Fax Number: 714-669-7022

Address: lynn.caragan@cbifederalservices.com Contact Name / ph. #: Mike Dryden

City: San Francisco

Sampler's Name(s): D. Jackson

Collection Information

Sample ID Number	Sample Description	Date	Time	Method	Matrix	# of containers	Preservative (water)		Preservative (soil)		Container Type		Gamma Scan		Dose Rate μ R/hr	
TITO04-BS-FSSSU5-RSY11-U9-S901	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1530	G	CP	1	16 oz Plastic	X							5	
TITO04-BS-FSSSU5-RSY11-U9-S902	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1532	G	CP	1	16 oz Plastic	X							5	
TITO04-BS-FSSSU5-RSY11-U9-S903	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1534	G	CP	1	16 oz Plastic	X							6	
TITO04-BS-FSSSU5-RSY11-U9-S904	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1540	G	CP	1	16 oz Plastic	X							5	
TITO04-BS-FSSSU5-RSY11-U9-S905	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1542	G	CP	1	16 oz Plastic	X							6	
TITO04-BS-FSSSU5-RSY11-U9-S906	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1544	G	CP	1	16 oz Plastic	X							6	
TITO04-BS-FSSSU5-RSY11-U9-S907	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1546	G	CP	1	16 oz Plastic	X							5	
TITO04-BS-FSSSU5-RSY11-U9-S908	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1548	G	CP	1	16 oz Plastic	X							5	
TITO04-BS-FSSSU5-RSY11-U9-S909	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1600	G	CP	1	16 oz Plastic	X							5	
TITO04-BS-FSSSU5-RSY11-U9-S910	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1605	G	CP	1	16 oz Plastic	X							6	

Special Instructions:

7 days ingrown draft and follow with 21 days final

☐ 24-hr

Level Of QC Required:

I

II

III

Project Specific:

Standard TAT ☐

☐ 3-day

☐ 7-day

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

SO = Soil

GW = Ground Water

SL = Sludge

WW = Waste Water

CP = Chip Samples

A = Air

ABS=Asbestos, PO=Pipe Opening

Relinquished By:

Date: 11/18/16

Received By:

Date: 11-19-16

Time: 1145

Received By:

Time: 0835

Relinquished By:

Date:

Received By:

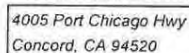
Date:

Time:

Time:

160-20102 Chain of Custody





Ref. Document # TI_P3_BS_FSS_SU5_RSY11_U9_#335

Page 2 of 2

City: San Francisco

Sampler's Name(s): D. Jackson

[illegible]

Special Instructions:

7 days ingrown draft and follow with 21 days final

☐ 24-hr

Level Of QC Required

Standard TAT ☐☐ 3-day☐ 3-day ☐ 7-day

1

11

11

Project Specific:

Relinquished By:

Date: 11/18/16

Received By:

Date: 11-19-17

Time: 11459

Received By:

Time: 0835

Time:

1

Time:

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-20102-2

Login Number: 20102**List Source: TestAmerica St. Louis****List Number: 1****Creator: Clarke, Jill C**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-20102-1	TITO04-BS-FSSSU5-RSY11-U9-S901	Solid	11/17/16 15:30	11/19/16 08:35
160-20102-2	TITO04-BS-FSSSU5-RSY11-U9-S902	Solid	11/17/16 15:32	11/19/16 08:35
160-20102-3	TITO04-BS-FSSSU5-RSY11-U9-S903	Solid	11/17/16 15:34	11/19/16 08:35
160-20102-4	TITO04-BS-FSSSU5-RSY11-U9-S904	Solid	11/17/16 15:40	11/19/16 08:35
160-20102-5	TITO04-BS-FSSSU5-RSY11-U9-S905	Solid	11/17/16 15:42	11/19/16 08:35
160-20102-6	TITO04-BS-FSSSU5-RSY11-U9-S906	Solid	11/17/16 15:44	11/19/16 08:35
160-20102-7	TITO04-BS-FSSSU5-RSY11-U9-S907	Solid	11/17/16 15:46	11/19/16 08:35
160-20102-8	TITO04-BS-FSSSU5-RSY11-U9-S908	Solid	11/17/16 15:48	11/19/16 08:35
160-20102-9	TITO04-BS-FSSSU5-RSY11-U9-S909	Solid	11/17/16 16:00	11/19/16 08:35
160-20102-10	TITO04-BS-FSSSU5-RSY11-U9-S910	Solid	11/17/16 16:05	11/19/16 08:35
160-20102-11	TITO04-BS-FSSSU5-RSY11-U9-S911	Solid	11/17/16 16:07	11/19/16 08:35
160-20102-12	TITO04-BS-FSSSU5-RSY11-U9-S912	Solid	11/17/16 16:10	11/19/16 08:35

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S901

Lab Sample ID: 160-20102-1

Date Collected: 11/17/16 15:30

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.331	U	0.144	0.148		0.347	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Actinium-227	-0.324	U	0.825	0.825		1.39	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Bismuth-212	-0.297	U	0.902	0.903		1.55	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Bismuth-214	0.359		0.143	0.148		0.143	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Cesium-137	0.0143	U	0.0709	0.0709		0.123	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Lead-210	1.32	U	1.36	1.37		1.82	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Lead-212	0.269		0.0869	0.0936		0.116	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Lead-214	0.282		0.0930	0.0975		0.117	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Potassium-40	11.4		1.49	1.90		0.828	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Protactinium-231	0.187	U	1.14	1.14		3.68	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Radium-226	0.359		0.143	0.148	0.500	0.143	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Radium-228	0.331	U	0.144	0.148		0.347	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Thallium-208	0.145		0.0474	0.0497		0.0430	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Thorium-228	0.269		0.0869	0.0936		0.116	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Thorium-232	0.331	U	0.144	0.148		0.347	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Thorium-234	0.146	U	0.222	0.223		2.44	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Uranium-235	-0.0442	U	0.278	0.278		1.02	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Uranium-238	0.146	U	0.222	0.223		2.44	pCi/g	11/22/16 13:10	12/13/16 17:37	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S902

Lab Sample ID: 160-20102-2

Date Collected: 11/17/16 15:32

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.455		0.126	0.135		0.152	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Actinium-227	-0.199	U	0.571	0.572		0.967	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Bismuth-212	0.000	U	0.178	0.178		1.11	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Bismuth-214	0.321		0.102	0.107		0.0951	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Cesium-137	-0.0150	U	0.0519	0.0520		0.0907	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Lead-210	1.01	U	0.927	0.935		1.18	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Lead-212	0.288		0.0662	0.0759		0.0718	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Lead-214	0.355		0.0852	0.0928		0.111	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Potassium-40	11.0		1.56	1.92		0.769	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Protactinium-231	0.366	U	0.893	0.894		2.10	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Radium-226	0.321		0.102	0.107	0.500	0.0951	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Radium-228	0.455		0.126	0.135		0.152	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Thallium-208	0.114		0.0488	0.0502		0.0473	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Thorium-228	0.288		0.0662	0.0759		0.0718	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Thorium-232	0.455		0.126	0.135		0.152	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Thorium-234	-0.00828	U	0.815	0.815		1.41	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Uranium-235	-0.00806	U	0.0172	0.0172		0.603	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Uranium-238	-0.00828	U	0.815	0.815		1.41	pCi/g	11/22/16 13:10	12/13/16 11:23	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S903

Lab Sample ID: 160-20102-3

Date Collected: 11/17/16 15:34

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.179	U	0.229	0.230		0.309	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Actinium-227	-0.341	U	0.544	0.545		1.05	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Bismuth-212	0.000	U	0.576	0.576		1.39	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Bismuth-214	0.410		0.131	0.138		0.124	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Cesium-137	-0.0473	U	0.0566	0.0568		0.156	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Lead-210	1.47	U	1.15	1.16		1.55	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Lead-212	0.296		0.0854	0.0936		0.0954	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Lead-214	0.430		0.119	0.127		0.164	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Potassium-40	11.3		1.85	2.19		0.867	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Protactinium-231	0.364	U	1.08	1.08		3.68	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Radium-226	0.410		0.131	0.138	0.500	0.124	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Radium-228	0.179	U	0.229	0.230		0.309	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Thallium-208	0.169		0.0695	0.0717		0.0628	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Thorium-228	0.296		0.0854	0.0936		0.0954	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Thorium-232	0.179	U	0.229	0.230		0.309	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Thorium-234	-0.107	U	1.21	1.21		1.82	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Uranium-235	-0.0385	U	0.286	0.286		0.619	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Uranium-238	-0.107	U	1.21	1.21		1.82	pCi/g	11/22/16 13:10	12/13/16 11:24	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S904

Lab Sample ID: 160-20102-4

Date Collected: 11/17/16 15:40

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.291		0.177	0.180		0.174	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Actinium-227	0.268	U	0.483	0.484		1.24	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Bismuth-212	0.319	U	0.765	0.765		1.32	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Bismuth-214	0.386		0.116	0.123		0.107	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Cesium-137	-0.00272	U	0.0500	0.0500		0.0921	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Lead-210	-0.693	U	1.48	1.48		2.48	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Lead-212	0.327		0.0808	0.0911		0.0903	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Lead-214	0.349		0.103	0.109		0.112	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Potassium-40	9.55		1.48	1.78		0.599	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Protactinium-231	-0.842	U	2.67	2.67		4.49	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Radium-226	0.386		0.116	0.123	0.500	0.107	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Radium-228	0.291		0.177	0.180		0.174	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Thallium-208	0.0317	U	0.0639	0.0640		0.102	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Thorium-228	0.327		0.0808	0.0911		0.0903	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Thorium-232	0.291		0.177	0.180		0.174	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Thorium-234	-0.258	U	1.28	1.28		2.21	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Uranium-235	0.119	U	0.319	0.319		0.787	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Uranium-238	-0.258	U	1.28	1.28		2.21	pCi/g	11/22/16 13:10	12/13/16 12:23	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S905

Lab Sample ID: 160-20102-5

Date Collected: 11/17/16 15:42

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.281		0.181	0.184		0.257	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Actinium-227	-0.275	U	0.631	0.632		0.903	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Bismuth-212	-0.487	U	0.938	0.940		1.59	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Bismuth-214	0.298		0.113	0.118		0.123	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Cesium-137	-0.0201	U	0.0561	0.0562		0.0975	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Lead-210	-0.335	U	1.26	1.27		1.94	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Lead-212	0.0222	U	0.106	0.106		0.180	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Lead-214	0.375		0.0855	0.0939		0.113	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Potassium-40	11.0		1.54	1.91		0.695	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Protactinium-231	0.300	U	0.910	0.911		3.02	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Radium-226	0.298		0.113	0.118	0.500	0.123	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Radium-228	0.281		0.181	0.184		0.257	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Thallium-208	0.101		0.0551	0.0561		0.0593	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Thorium-228	0.0222	U	0.106	0.106		0.180	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Thorium-232	0.281		0.181	0.184		0.257	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Thorium-234	-0.148	U	0.936	0.936		1.62	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Uranium-235	0.0591	U	0.153	0.154		0.540	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Uranium-238	-0.148	U	0.936	0.936		1.62	pCi/g	11/22/16 13:10	12/13/16 12:27	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S906

Lab Sample ID: 160-20102-6

Date Collected: 11/17/16 15:44

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.386		0.164	0.169		0.122	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Actinium-227	0.0150	U	0.530	0.530		0.794	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Bismuth-212	0.260	U	0.539	0.540		0.943	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Bismuth-214	0.372		0.149	0.154		0.154	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Cesium-137	-0.0748	U	0.0921	0.0924		0.157	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Lead-210	-0.0854	U	1.34	1.34		2.03	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Lead-212	0.314		0.0831	0.0925		0.0894	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Lead-214	0.379		0.109	0.116		0.127	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Potassium-40	10.1		1.69	1.98		0.808	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Protactinium-231	0.339	U	0.997	0.997		3.30	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Radium-226	0.372		0.149	0.154	0.500	0.154	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Radium-228	0.386		0.164	0.169		0.122	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Thallium-208	0.131		0.0501	0.0519		0.0443	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Thorium-228	0.314		0.0831	0.0925		0.0894	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Thorium-232	0.386		0.164	0.169		0.122	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Thorium-234	0.120	U	0.256	0.256		1.94	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Uranium-235	0.109	U	0.332	0.332		0.562	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Uranium-238	0.120	U	0.256	0.256		1.94	pCi/g	11/22/16 13:10	12/13/16 12:56	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S907

Lab Sample ID: 160-20102-7

Date Collected: 11/17/16 15:46

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.320		0.135	0.139		0.122	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Actinium-227	0.159	U	0.396	0.396		1.16	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Bismuth-212	0.301	U	0.748	0.748		1.28	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Bismuth-214	0.250		0.121	0.124		0.139	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Cesium-137	0.000	U	0.0231	0.0231		0.0777	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Lead-210	-0.0915	U	1.46	1.46		2.50	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Lead-212	0.276		0.0638	0.0732		0.0690	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Lead-214	0.400		0.0832	0.0930		0.0818	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Potassium-40	10.8		1.44	1.82		0.533	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Protactinium-231	0.471	U	1.22	1.22		2.77	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Radium-226	0.250		0.121	0.124	0.500	0.139	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Radium-228	0.320		0.135	0.139		0.122	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Thallium-208	0.0861		0.0371	0.0382		0.0365	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Thorium-228	0.276		0.0638	0.0732		0.0690	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Thorium-232	0.320		0.135	0.139		0.122	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Thorium-234	0.531	U	0.755	0.757		1.03	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Uranium-235	-0.00740	U	0.0180	0.0180		0.640	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Uranium-238	0.531	U	0.755	0.757		1.03	pCi/g	11/22/16 13:10	12/13/16 12:57	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S908

Lab Sample ID: 160-20102-8

Date Collected: 11/17/16 15:48

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.311		0.143	0.146		0.235	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Actinium-227	0.306	U	0.786	0.786		1.32	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Bismuth-212	-0.325	U	0.824	0.824		1.42	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Bismuth-214	0.454		0.116	0.125		0.0936	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Cesium-137	-0.00753	U	0.0544	0.0544		0.101	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Lead-210	-0.869	U	1.89	1.89		3.16	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Lead-212	0.292		0.0796	0.0881		0.0931	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Lead-214	0.281		0.0935	0.0980		0.0939	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Potassium-40	10.8		1.59	1.94		0.610	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Protactinium-231	0.000	U	0.227	0.227		4.17	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Radium-226	0.454		0.116	0.125	0.500	0.0936	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Radium-228	0.311		0.143	0.146		0.235	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Thallium-208	0.123		0.0798	0.0809		0.0722	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Thorium-228	0.292		0.0796	0.0881		0.0931	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Thorium-232	0.311		0.143	0.146		0.235	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Thorium-234	-0.273	U	1.38	1.39		2.38	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Uranium-235	-0.0149	U	0.0592	0.0592		0.933	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Uranium-238	-0.273	U	1.38	1.39		2.38	pCi/g	11/22/16 13:10	12/13/16 12:58	1

Client Sample Results

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Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S909

Lab Sample ID: 160-20102-9

Date Collected: 11/17/16 16:00

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.318		0.211	0.213		0.219	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Actinium-227	-0.273	U	0.628	0.628		0.898	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Bismuth-212	0.449	U	0.859	0.860		1.45	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Bismuth-214	0.332		0.116	0.121		0.119	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Cesium-137	-0.0317	U	0.0601	0.0602		0.102	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Lead-210	-0.317	U	1.32	1.32		2.02	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Lead-212	0.00333	U	0.124	0.124		0.211	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Lead-214	0.402		0.101	0.109		0.129	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Potassium-40	10.6		1.52	1.87		0.703	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Protactinium-231	0.498	U	1.12	1.12		2.62	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Radium-226	0.332		0.116	0.121	0.500	0.119	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Radium-228	0.318		0.211	0.213		0.219	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Thallium-208	0.158		0.0450	0.0479		0.0228	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Thorium-228	0.00333	U	0.124	0.124		0.211	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Thorium-232	0.318		0.211	0.213		0.219	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Thorium-234	0.238	U	0.398	0.398		1.21	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Uranium-235	0.0695	U	0.310	0.310		0.502	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Uranium-238	0.238	U	0.398	0.398		1.21	pCi/g	11/22/16 13:10	12/13/16 13:00	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S910

Lab Sample ID: 160-20102-10

Date Collected: 11/17/16 16:05

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.131	U	0.237	0.237		0.326	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Actinium-227	-0.364	U	0.848	0.849		1.42	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Bismuth-212	0.328	U	0.542	0.543		0.919	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Bismuth-214	0.404		0.121	0.128		0.107	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Cesium-137	0.00519	U	0.0479	0.0479		0.0874	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Lead-210	0.710	U	1.37	1.37		1.82	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Lead-212	0.278		0.0799	0.0876		0.0960	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Lead-214	0.316		0.114	0.119		0.119	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Potassium-40	10.8		1.60	1.94		0.653	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Protactinium-231	0.136	U	1.07	1.07		3.46	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Radium-226	0.404		0.121	0.128	0.500	0.107	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Radium-228	0.131	U	0.237	0.237		0.326	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Thallium-208	0.118		0.0519	0.0533		0.0540	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Thorium-228	0.278		0.0799	0.0876		0.0960	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Thorium-232	0.131	U	0.237	0.237		0.326	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Thorium-234	0.233	U	0.365	0.365		2.20	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Uranium-235	-0.193	U	0.0741	0.0767		0.847	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Uranium-238	0.233	U	0.365	0.365		2.20	pCi/g	11/22/16 13:10	12/13/16 13:01	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S911

Lab Sample ID: 160-20102-11

Date Collected: 11/17/16 16:07

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.427		0.152	0.158		0.112	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Actinium-227	0.126	U	0.505	0.506		1.12	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Bismuth-212	0.413	U	0.725	0.726		1.22	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Bismuth-214	0.413		0.116	0.124		0.107	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Cesium-137	-0.00559	U	0.0512	0.0512		0.0910	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Lead-210	-0.727	U	1.55	1.55		2.69	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Lead-212	0.275		0.0755	0.0835		0.0927	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Lead-214	0.345		0.115	0.121		0.122	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Potassium-40	11.1		1.40	1.81		0.753	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Protactinium-231	-0.0000000	U	2.12	2.12		3.62	pCi/g	11/22/16 13:10	12/13/16 13:02	1
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Radium-226	0.413		0.116	0.124	0.500	0.107	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Radium-228	0.427		0.152	0.158		0.112	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Thallium-208	0.101		0.0435	0.0447		0.0462	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Thorium-228	0.275		0.0755	0.0835		0.0927	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Thorium-232	0.427		0.152	0.158		0.112	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Thorium-234	1.22		0.725	0.736		0.941	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Uranium-235	-0.0493	U	0.108	0.108		0.831	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Uranium-238	1.22		0.725	0.736		0.941	pCi/g	11/22/16 13:10	12/13/16 13:02	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S912

Lab Sample ID: 160-20102-12

Date Collected: 11/17/16 16:10

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.484		0.150	0.158		0.115	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Actinium-227	-0.133	U	0.595	0.595		0.863	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Bismuth-212	0.381	U	0.773	0.774		1.31	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Bismuth-214	0.367		0.115	0.121		0.110	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Cesium-137	0.0167	U	0.0445	0.0446		0.0775	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Lead-210	-0.238	U	1.39	1.39		2.14	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Lead-212	0.189		0.0702	0.0744		0.0948	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Lead-214	0.212		0.108	0.111		0.189	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Potassium-40	10.1		1.35	1.70		0.631	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Protactinium-231	0.164	U	0.851	0.852		2.78	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Radium-226	0.367		0.115	0.121	0.500	0.110	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Radium-228	0.484		0.150	0.158		0.115	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Thallium-208	0.122		0.0487	0.0503		0.0477	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Thorium-228	0.189		0.0702	0.0744		0.0948	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Thorium-232	0.484		0.150	0.158		0.115	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Thorium-234	1.18	U	1.14	1.14		1.48	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Uranium-235	0.0133	U	0.0609	0.0609		0.590	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Uranium-238	1.18	U	1.14	1.14		1.48	pCi/g	11/22/16 13:10	12/13/16 13:03	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-280756/1-A
Matrix: Solid
Analysis Batch: 283873

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 280756

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-228	0.05352	U	0.164	0.164		0.173	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Actinium-227	-0.003675	U	0.0174	0.0174		0.745	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Bismuth-212	0.3039	U	0.541	0.542		0.922	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Bismuth-214	-0.06043	U	0.107	0.107		0.249	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Cesium-137	0.008917	U	0.0509	0.0509		0.0910	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Lead-210	0.3652	U	0.716	0.717		1.22	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Lead-212	-0.05779	U	0.0627	0.0632		0.163	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Lead-214	-0.001055	U	0.00344	0.00344		0.140	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Potassium-40	0.02754	U	0.427	0.427		0.806	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Protactinium-231	0.2606	U	0.781	0.782		1.89	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Radium-226	-0.06043	U	0.107	0.107	0.500	0.249	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Radium-228	0.05352	U	0.164	0.164		0.173	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Thallium-208	-0.007068	U	0.0457	0.0457		0.0564	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Thorium-228	-0.05779	U	0.0627	0.0632		0.163	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Thorium-232	0.05352	U	0.164	0.164		0.173	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Thorium-234	0.0000	U	0.218	0.218		1.57	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Uranium-235	0.0004322	U	0.000850	0.000851		0.564	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Uranium-238	0.0000	U	0.218	0.218		1.57	pCi/g	11/22/16 13:10	12/14/16 15:21	1

Lab Sample ID: LCS 160-280756/2-A
Matrix: Solid
Analysis Batch: 283679

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 280756

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.0	99.95		10.5		1.13	pCi/g	103	87 - 116
Cesium-137	29.3	29.25		3.12		0.267	pCi/g	100	87 - 120
Cobalt-60	16.0	15.67		1.63		0.169	pCi/g	98	87 - 115

Lab Sample ID: 160-20102-1 DU
Matrix: Solid
Analysis Batch: 283683

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S901
Prep Type: Total/NA
Prep Batch: 280756

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium-228	0.331	U	0.4052		0.147		0.0900	pCi/g	0.25	1
Actinium-227	-0.324	U	-0.3412	U	0.756		1.08	pCi/g	0.01	1
Bismuth-212	-0.297	U	0.4278	U	0.736		1.24	pCi/g	0.44	1
Bismuth-214	0.359		0.4354		0.130		0.113	pCi/g	0.27	1
Cesium-137	0.0143	U	-0.02269	U	0.0711		0.110	pCi/g	0.26	1
Lead-210	1.32	U	0.7692	U	1.19		1.84	pCi/g	0.22	1
Lead-212	0.269		0.2821		0.0919		0.107	pCi/g	0.07	1
Lead-214	0.282		0.3475		0.110		0.125	pCi/g	0.32	1
Potassium-40	11.4		10.08		1.77		0.708	pCi/g	0.37	1
Protactinium-231	0.187	U	0.04922	U	0.680		3.04	pCi/g	0.08	1
Radium-226	0.359		0.4354		0.130	0.500	0.113	pCi/g	0.27	1
Radium-228	0.331	U	0.4052		0.147		0.0900	pCi/g	0.25	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-20102-1 DU

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S901

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 283683

Prep Batch: 280756

Analyte	Sample		DU		Total	LOQ	MDC	Unit	RER	RER Limit
	Result	Qual	Result	Qual	Uncert. (2σ+/-)					
Thallium-208	0.145		0.08324		0.0721		0.0820	pCi/g	0.50	1
Thorium-228	0.269		0.2821		0.0919		0.107	pCi/g	0.07	1
Thorium-232	0.331	U	0.4052		0.147		0.0900	pCi/g	0.25	1
Thorium-234	0.146	U	0.6097	U	0.550		1.33	pCi/g	0.60	1
Uranium-235	-0.0442	U	-0.05883	U	0.372		0.586	pCi/g	0.02	1
Uranium-238	0.146	U	0.6097	U	0.550		1.33	pCi/g	0.60	1

QC Association Summary

Page 26 of 26

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Rad

Leach Batch: 280295

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20102-1	TITO04-BS-FSSSU5-RSY11-U9-S901	Total/NA	Solid	Dry and Grind	
160-20102-2	TITO04-BS-FSSSU5-RSY11-U9-S902	Total/NA	Solid	Dry and Grind	
160-20102-3	TITO04-BS-FSSSU5-RSY11-U9-S903	Total/NA	Solid	Dry and Grind	
160-20102-4	TITO04-BS-FSSSU5-RSY11-U9-S904	Total/NA	Solid	Dry and Grind	
160-20102-5	TITO04-BS-FSSSU5-RSY11-U9-S905	Total/NA	Solid	Dry and Grind	
160-20102-6	TITO04-BS-FSSSU5-RSY11-U9-S906	Total/NA	Solid	Dry and Grind	
160-20102-7	TITO04-BS-FSSSU5-RSY11-U9-S907	Total/NA	Solid	Dry and Grind	
160-20102-8	TITO04-BS-FSSSU5-RSY11-U9-S908	Total/NA	Solid	Dry and Grind	
160-20102-9	TITO04-BS-FSSSU5-RSY11-U9-S909	Total/NA	Solid	Dry and Grind	
160-20102-10	TITO04-BS-FSSSU5-RSY11-U9-S910	Total/NA	Solid	Dry and Grind	
160-20102-11	TITO04-BS-FSSSU5-RSY11-U9-S911	Total/NA	Solid	Dry and Grind	
160-20102-12	TITO04-BS-FSSSU5-RSY11-U9-S912	Total/NA	Solid	Dry and Grind	
160-20102-1 DU	TITO04-BS-FSSSU5-RSY11-U9-S901	Total/NA	Solid	Dry and Grind	

Prep Batch: 280756

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20102-1	TITO04-BS-FSSSU5-RSY11-U9-S901	Total/NA	Solid	Fill_Geo-21	280295
160-20102-2	TITO04-BS-FSSSU5-RSY11-U9-S902	Total/NA	Solid	Fill_Geo-21	280295
160-20102-3	TITO04-BS-FSSSU5-RSY11-U9-S903	Total/NA	Solid	Fill_Geo-21	280295
160-20102-4	TITO04-BS-FSSSU5-RSY11-U9-S904	Total/NA	Solid	Fill_Geo-21	280295
160-20102-5	TITO04-BS-FSSSU5-RSY11-U9-S905	Total/NA	Solid	Fill_Geo-21	280295
160-20102-6	TITO04-BS-FSSSU5-RSY11-U9-S906	Total/NA	Solid	Fill_Geo-21	280295
160-20102-7	TITO04-BS-FSSSU5-RSY11-U9-S907	Total/NA	Solid	Fill_Geo-21	280295
160-20102-8	TITO04-BS-FSSSU5-RSY11-U9-S908	Total/NA	Solid	Fill_Geo-21	280295
160-20102-9	TITO04-BS-FSSSU5-RSY11-U9-S909	Total/NA	Solid	Fill_Geo-21	280295
160-20102-10	TITO04-BS-FSSSU5-RSY11-U9-S910	Total/NA	Solid	Fill_Geo-21	280295
160-20102-11	TITO04-BS-FSSSU5-RSY11-U9-S911	Total/NA	Solid	Fill_Geo-21	280295
160-20102-12	TITO04-BS-FSSSU5-RSY11-U9-S912	Total/NA	Solid	Fill_Geo-21	280295
MB 160-280756/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-280756/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-20102-1 DU	TITO04-BS-FSSSU5-RSY11-U9-S901	Total/NA	Solid	Fill_Geo-21	280295

From: [Sevcik, Joseph T CIV SEA 04 04N](#)
To: [Guillory, Jeffrey](#)
Cc: [Edwards, Zachary L CIV SEA 04 04N](#); [Yantos, Christopher N CIV NAVFAC SW, BRAC](#); [Messer, Ulrika](#); [Hackett, John R](#); [Schul, Raymond](#); [Coffey, Lisa M](#); [Morrison, Dennis](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 14 (Use 2)
Date: Monday, November 16, 2015 2:33:23 PM

Jeff,
I concur with designating RSY 14 (Use 2) soil as Non-LLRW.

v/r,

Joe Sevcik
Environmental Protection Manager
NAVSEADET RASO
160 Main Road
Building 1959
NWS Yorktown, VA 23691
Office: (757) 887-4483
DSN: 953-4483
Fax: (757) 887-4900

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederaleservices.com>]
Sent: Monday, November 09, 2015 3:15 PM
To: Sevcik, Joseph T CIV SEA 04 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Coffey, Lisa M; Morrison, Dennis
Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 14 (Use 2)

Mr. Sevcik,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Description: Description: Description: Description: cid:_1_OAD725A00AD721CC001388C386257B11

Jeffrey Guillory

Health Physics Support

Radiation Safety

Federal Services

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jeffrey.guillory@cbifederalservices.com <<mailto:jeffrey.guillory@cbifederalservices.com>>

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Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY #14	RSY Unit Use Number: USE 2	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Lisa Coffey/Tina Piquet/Jeff Guillory		Data Report Submittal Date: 11/09/2015

Soil Sample Data						
Sample Identification	Location	Type Of Sample	Static 2221 Meter Serial Number	One Minute Static Reading (CPM)	Static Count Over Static Mean + 3σ	Ra ²²⁶ Final Analytical Results
TITO04_RSY14_2-CH-S201	1	Systematic	262301	14,197	No	0.375
TITO04_RSY14_2-CH-S202	2	Systematic	262301	13,563	No	0.347
TITO04_RSY14_2-CH-S203	3	Systematic	262301	13,365	No	0.214
TITO04_RSY14_2-CH-S204	4	Systematic	262301	13,362	No	0.237
TITO04_RSY14_2-CH-S205	5	Systematic	262301	13,326	No	0.355
TITO04_RSY14_2-CH-S206	6	Systematic	262301	13,280	No	0.403
TITO04_RSY14_2-CH-S207	7	Systematic	262301	12,840	No	0.280
TITO04_RSY14_2-CH-S208	8	Systematic	262301	13,205	No	0.388
TITO04_RSY14_2-CH-S209	9	Systematic	262301	12,915	No	0.222
TITO04_RSY14_2-CH-S210	10	Systematic	262301	12,860	No	0.243
TITO04_RSY14_2-CH-S211	11	Systematic	262301	12,578	No	0.362
TITO04_RSY14_2-CH-S212	12	Systematic	262301	12,935	No	0.275
TITO04_RSY14_2-CH-S213	13	Systematic	262301	12,817	No	0.364
TITO04_RSY14_2-CH-S214	14	Systematic	262301	12,734	No	0.367
TITO04_RSY14_2-CH-S215	15	Systematic	262301	12,441	No	0.300
TITO04_RSY14_2-CH-S216	16	Systematic	262301	12,484	No	0.318
TITO04_RSY14_2-CH-S217	17	Systematic	262301	12,815	No	0.403
TITO04_RSY14_2-CH-S218	18	Systematic	262301	12,620	No	0.310
TITO04_RSY14_2-CH-S219	19	Systematic	262301	12,485	No	0.324
TITO04_RSY14_2-CH-S220	20	Systematic	262301	12,323	No	0.351

Instrument Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Static Background (CPM)	Static Background Plus 3σ (CPM)	Scan Background	Scan Background Plus 3σ	Range
General Area Exposure Rates	TIRS-07232015-12P3-JSS-933	7/23/2015	19	10/24/2015	267085	N/A	N/A	N/A	N/A	6 - 7 μR/hr.
Initial Walkover	TIRS-07272015-12P3-ROV-951	7/27/2015 - 7/29/2015	RS-701/RSX-1	N/A	Console: B-1051 / Detectors: 5447, 5448	N/A	N/A	837 CPS	972 CPS	560 - 947 CPS
Follow-up Required Static	TIRS-07292015-12P3-JSS-983	7/29/2015	2221	1/27/2016	262301	16,577	18,663	N/A	N/A	12,978 - 17,706 CPM
One Minute Systematic Sampling Static Counts	TIRS-07292015-12P3-JSS-979	7/29/2015	2221	1/27/2016	262301	16,577	18,663	N/A	N/A	12,323 - 14,197 CPM

CPM = Counts Per Minute
CPS = Counts Per Second

Summary	
1) General area survey performed of staged soil piles prior to soil being spread into a 6-inch screening layer.	
2) Initial RSI gamma scan and data review—upon review of initial scan data, follow-up static investigations were deemed necessary, and investigation locations were identified as per the RSI Data Evaluation Process (page 4). Gamma scan coverage shown on Systematic Sample Survey map (page 3). Contour maps of initial scan data are shown on RSI Data Plots (page 5). Data review results are summarized on RSI Review Summary (page 6).	
3) Follow-up static survey—10 locations identified during the data review process were investigated, resulting in all locations < static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 7).	
4) Twenty systematic soil samples (201-220) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). Test America sample results are attached.	
Summary:	
All locations with elevated Z-scores identified by the initial RSI gamma scan were deemed comparable to background. 10 follow-up static locations were investigated, with readings < static IL at all locations.	
An additional location (a, page 5) with elevated Z-scores that did not meet the criteria for a follow-up investigation was evaluated by spectral analysis, which failed to indicate the presence of activity above background levels (pages 10 to 11).	
Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 8 and 9. These statistical tools were utilized to verify the appropriate level of reasonable effort.	
RSY 14 (Use 2) contains soil from Bayside Drive Building 1213 (3rd and 4th lifts) excavation area.	
Note: 4th lift from Bayside Drive Building 1213 reached the final depth of the excavation, and no visible debris or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.	
CB&I requests RASO concurrence to release this soil as Non-LLRW.	
Disposition: This soil shall be dispositioned as CERCLA Class I waste following additional on-site chemical characterization.	

Site 32 RSY-14 Use 2

Survey Number:
TIRS-07292015-12P3-JSS-979

6021770

6021840

6021910

100% of the soil on the RSY pad was surveyed by the RSI unit.

2130500

2130500

371

2130400

2130400

Instrument # 262301

S Systematic sample location

● RSI Coverage

▭ RSYPAD Boundaries

CB&I Federal Services, LLC



0 10 20 40
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

RSI Data Evaluation Process

RS-700 Mobile Radiation Monitoring System

- Self-contained gamma-ray radiation detection and monitoring system
- Built-in GPS receiver
- (2) RSX-1 4-liter NaI(Tl) gamma detectors oriented perpendicular to the direction of travel (VD1 denotes both detectors summed; VD3 refers to the left detector; and VD4 refers to the right detector)
- Multi-Channel Analyzer, allowing for monitoring of energy-specific regions of interest (ROIs)
- RadAssist survey software for control, monitoring, and recording

Ten ROIs have been established for radium and progeny as well as other naturally-occurring or anthropogenic gamma-emitting radionuclides that may be of interest:

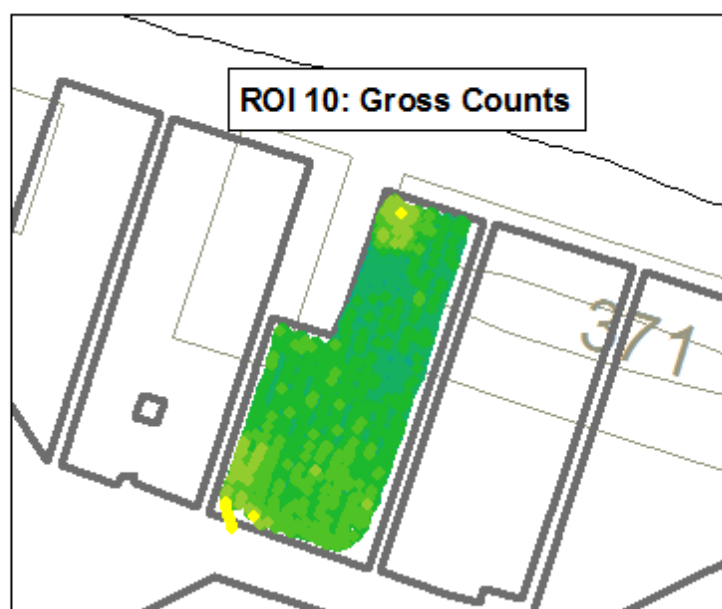
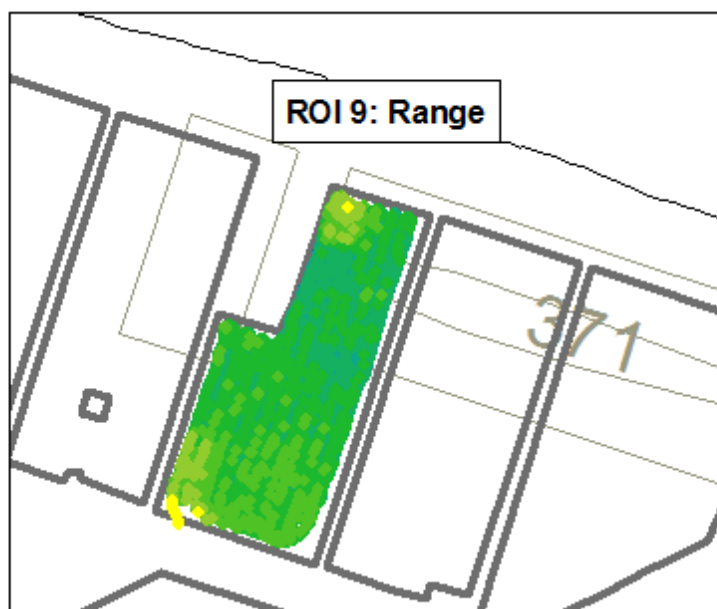
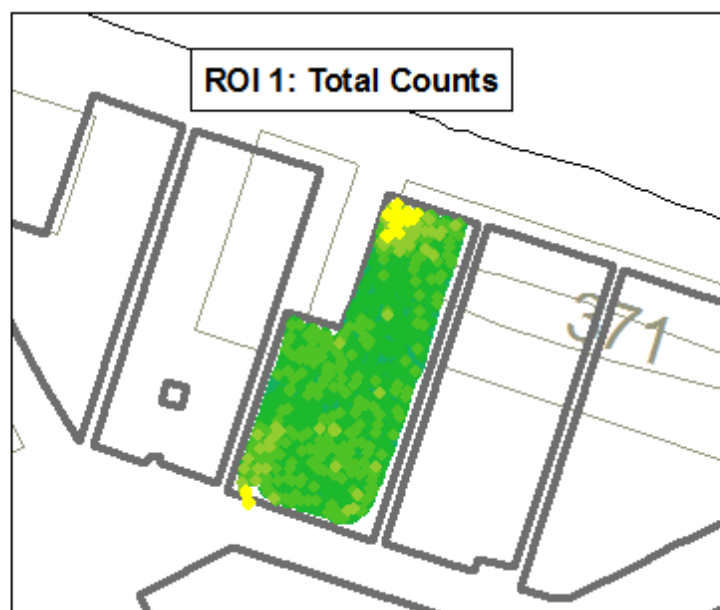
ROI	Description	Energy Range (keV)	Primary Peak (keV)
1	Total counts	411 – 2811	N/A
2	Potassium	1371 – 1569	1460
3	U/Ra-226	1659 – 1860	1764 (Bi-214)
4	Thorium	2409 – 2811	2614 (Tl-208)
5	Annihilation	456 – 570	511
6	Ra-226	546 – 666	609 (Bi-214)
7	Cs-137	549 – 741	662
8	I-131	327 – 399	364
9	Range	45 – 1980	N/A
10	Gross Counts	3 – 3072	N/A

A tiered approach is used during data review to identify follow-up locations. Raw data are exported to a comma delimited format using RadAssist and imported into an Excel spreadsheet for review and analysis. Count rate data are compared with ROI- and material-specific investigation levels (ILs). In addition, the following review steps are completed to determine if additional follow-up measurements are necessary:

- **Playback Review:** The data file is replayed in RadAssist and reviewed for elevated count rates in ROIs 1, 3, 6, and 10 for virtual detector (VD) 1 (both detectors summed). The scan screen is also monitored for elevated count rates and alarms.
- **Count Rate Time Series Review:** The count rates for ROIs 1, 3, 6, and 10 for VDs 1, 3 (detector 1), and 4 (detector 2) are plotted in a time series and reviewed for additional peaks in count rate.
- **Z-Scores:** The Z-Scores are calculated for each location in all ROIs for VDs 1, 3, and 4. Any location with four or more ROIs having a Z-Score greater than three ($Z > 3$) is marked for follow-up.
- **Local Z-Scores:** Local Z-Scores are calculated using a moving average for each data point in all ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with four or more ROIs having a local $Z > 3$ is marked for follow-up.
- **Semi-local Z-Scores:** Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with four or more ROIs having a semi-local $Z > 3$ is marked for follow-up.
- **Z-Score Time Series Review:** The three types of Z-Scores for ROIs 1, 3, 6, and 10 for VDs 1, 3, and 4 are plotted in a time series and reviewed for additional peaks in Z-Scores.
- **Count Rate Ratio Review:** Count rate ratios are calculated for ROIs 3:4, 3:2, 3:6, 6:2, and 6:7. The count rate ratios are then plotted in a time series and reviewed for obvious peaks or outliers.

RSI Data Plots

Site 32 RSY-14 Use 2







ROI from RSI Walkover Survey (VD1)

- | | | |
|----------------------|------------------------|------------------------|
| ◆ > 3 std dev | ◆ > 0 to < 1 std dev | ◆ > -3 to < -2 std dev |
| ◆ > 2 to < 3 std dev | ◆ > -1 to < 0 std dev | ◆ < -3 std dev |
| ◆ > 1 to < 2 std dev | ◆ > -2 to < -1 std dev | □ RSYPAD Boundaries |

RSY Pad 14-2 Investigation						Follow-up					
Longitude	Latitude	Details	Maximum Result			Northing	Easting	Meter SN	Static Count	Static IL (cpm)	Comments
			VD	ROI	Z-Score						
-122.3693038	37.8311184	Count rate time series peak				2130478.70571	6021844.65496	262301	14,663	18,663	< IL
-122.3693772	37.8308715	Count rate time series peak				2130393.42350	6021824.26720	262301	13,137	18,663	< IL
-122.3694487	37.8309513	4-10 ROIs Z>3 (semi-local)	3	9	3.5624751	-122.3694487	37.8309513	262301	12,978	18,663	< IL
-122.3695289	37.8308454	4-10 ROIs Z>3 (semi-local)	4	2	3.4719056	2130383.70002	6021775.95593	262301	14,009	18,663	< IL
-122.3695500	37.8308525	4-10 ROIs Z>3 (semi-local), 4-7 ROIs Z>3 (normal)	4	3	4.2935320	-122.36955	37.83085	262301	14,299	18,663	< IL
-122.3695694	37.8308999	4-10 ROIs Z>3 (semi-local)	3	1	3.6454306	2130377.53361	6021763.46175	262301	17,706	18,663	< IL
-122.3695471	37.8309192	4-10 ROIs Z>3 (semi-local)	4	5	4.0704805	-122.3695471	37.8309192	262301	13,127	18,663	< IL
-122.3693115	37.8312109	4-7 ROIs Z>3	3	7	3.5484043	-122.3693115	37.8312109	262301	14,394	18,663	< IL
-122.3695909	37.8308610	4-22 ROIs Z>3 (normal), 4-	1	10	8.9652015	2130509.29985	6021842.10737	262301	13,412	18,663	< IL
-122.3695822	37.8308368	19 ROIs Z>3 (semi-local),									
-122.3693345	37.8312198	4-10 ROIs Z>3 (semi-local),	1	1	4.6806380	2130511.75694	6021836.68588	262301	13,915	18,663	< IL
-122.3693483	37.8312103	4-7 ROIs Z>3 (normal).									
-122.3693401	37.8311976	Scan area between these									
-122.3693535	37.8311871	points and take statics at									



Instrument # 262301

-  Investigation points
-  Data Points Not Requiring Further Investigation
-  RSYPAD Boundaries
-  Investigation points ID

CB&I Federal Services, LLC



0 12.5 25 50
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY Pad 14-2
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a median Ra-226 concentration of 0.8 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the observed Ra-226 median concentration of 0.336 pCi/g and estimated LBGR of 0.483, the SU will pass the WRS test at a 100% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19.5	S
0.69	R	0.69	31	0	19.5	S
0.375	S	-0.108	17	17	21	R
0.347	S	-0.136	11	11	22	R
0.214	S	-0.269	1	1	23	R
0.237	S	-0.246	3	3	24	R
0.355	S	-0.128	13	13	25	R
0.403	S	-0.08	19.5	19.5	26	R
0.280	S	-0.203	6	6	27.5	R
0.388	S	-0.095	18	18	27.5	R
0.222	S	-0.261	2	2	29.5	R
0.243	S	-0.24	4	4	29.5	R
0.362	S	-0.121	14	14	31	R
0.275	S	-0.208	5	5	32	R
0.364	S	-0.119	15	15	33	R
0.367	S	-0.116	16	16	34	R
0.300	S	-0.183	7	7	35.5	R
0.318	S	-0.165	9	9	35.5	R
0.403	S	-0.08	19.5	19.5	37	R
0.310	S	-0.173	8	8	38	R
0.324	S	-0.159	10	10	39	R
0.351	S	-0.132	12	12	40	R
Sum =			820	210		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 20 m
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 482.5$

$\alpha_W = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

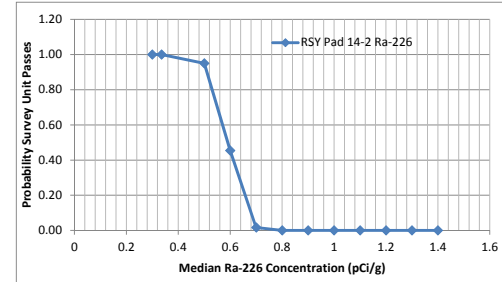
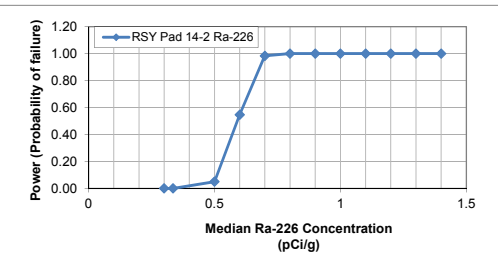
From NUREG 1505, Table A.7c: Values of r and k for the Quantile Test When α is Approximately 0.05

20 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 20$
 4 r
 4 k
 0.053 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

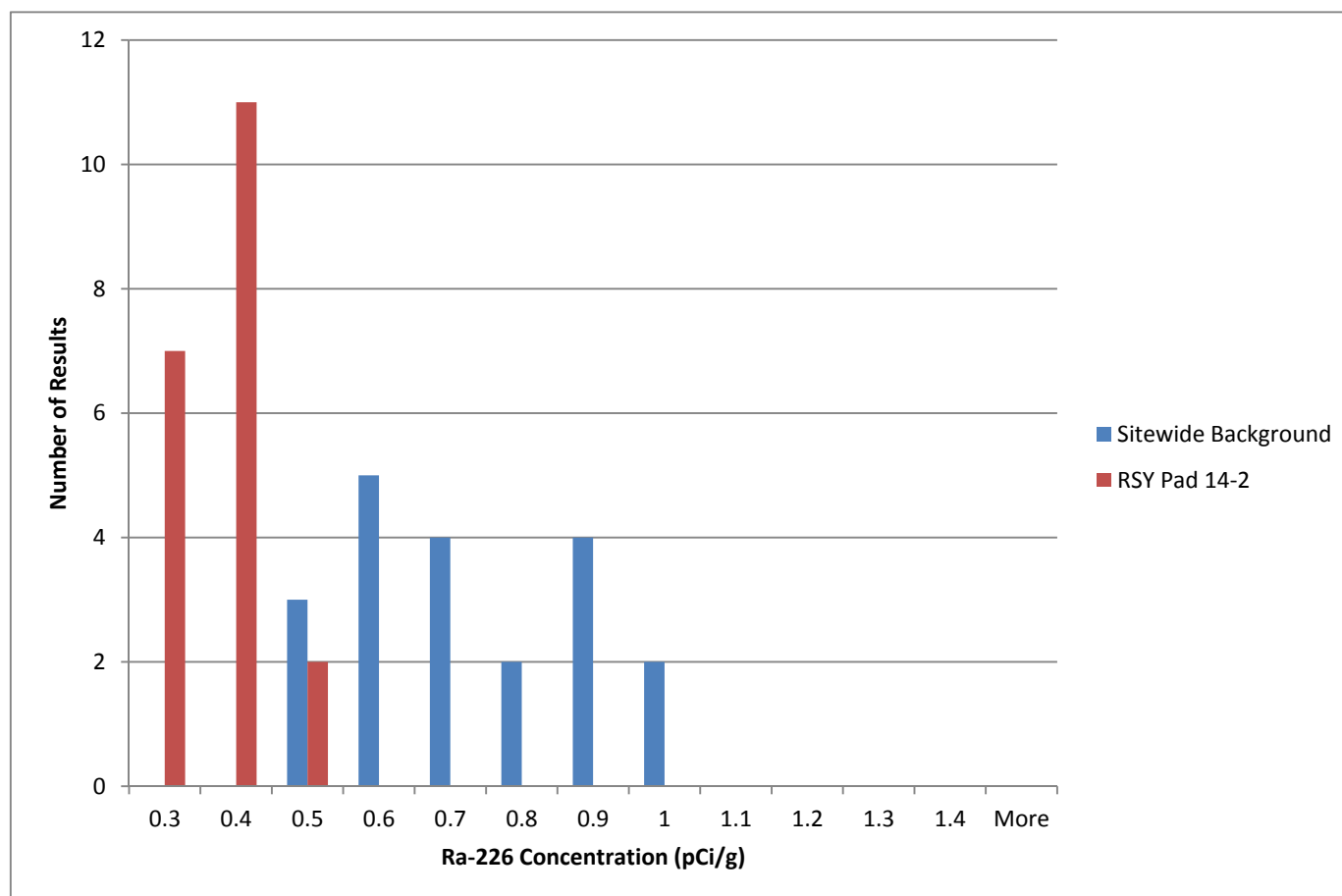
0 of the largest 4 adjusted measurements are from S. The null hypothesis is accepted.



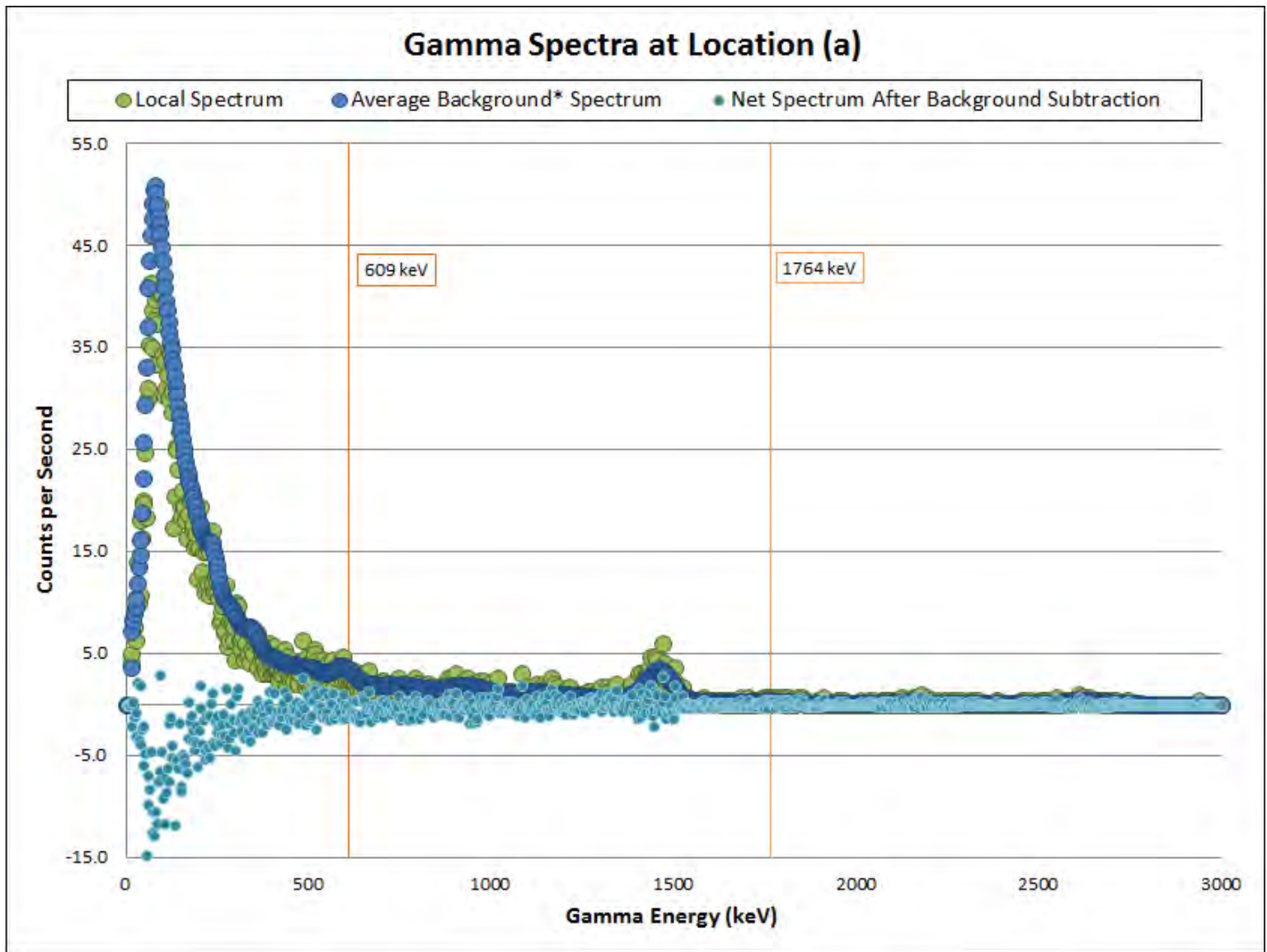
Histogram, RSY Pad 14-2 vs, Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY Pad 14-2	
<i>Bin</i>	<i>Frequency</i>
0.3	7
0.4	11
0.5	2
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



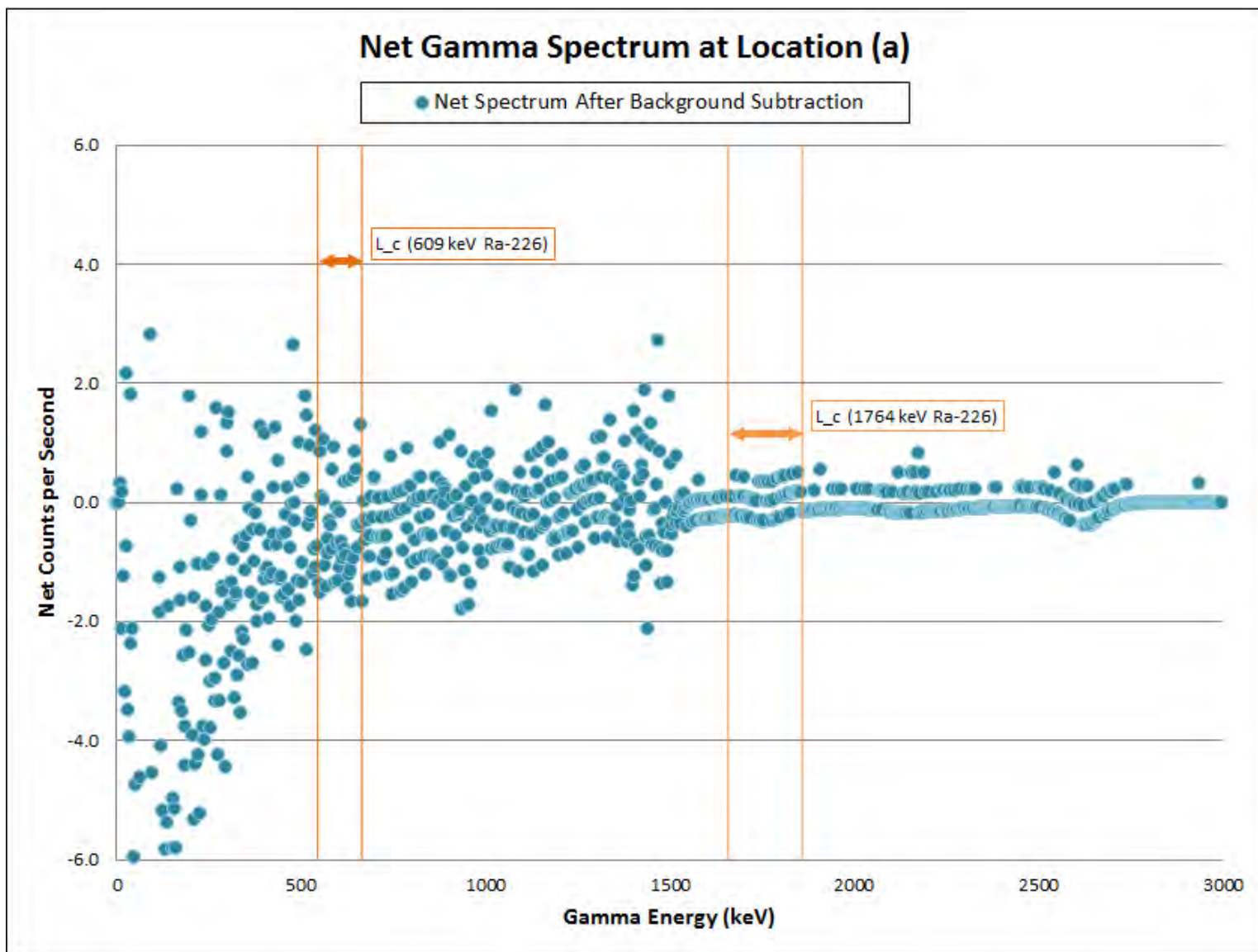
RSI Spectral Analysis Results: RSY 14 Use 2 – **Gamma Spectra at Location (a)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (a)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 14 Use 2 – **Net Gamma Spectrum at Location (a)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (a): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

MARSSIM APPENDIX I, TABLE I.1

$$L_c = 2.33\sqrt{B}$$

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-13114-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn

Elizabeth M. Hoerchler

Authorized for release by:

8/31/2015 4:35:52 PM

Elizabeth Hoerchler, Project Mgmt. Assistant
elizabeth.hoerchler@testamericainc.com

Designee for

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

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Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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QC Association Summary	24



Case Narrative

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Job ID: 160-13114-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-13114-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 15 of 35

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Job ID: 160-13114-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 08/03/2015; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 22.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04_RSY14_2-CH-S201 (160-13114-1), TITO04_RSY14_2-CH-S202 (160-13114-2), TITO04_RSY14_2-CH-S203 (160-13114-3), TITO04_RSY14_2-CH-S204 (160-13114-4), TITO04_RSY14_2-CH-S205 (160-13114-5), TITO04_RSY14_2-CH-S206 (160-13114-6), TITO04_RSY14_2-CH-S207 (160-13114-7), TITO04_RSY14_2-CH-S208 (160-13114-8), TITO04_RSY14_2-CH-S209 (160-13114-9), TITO04_RSY14_2-CH-S210 (160-13114-10), TITO04_RSY14_2-CH-S211 (160-13114-11), TITO04_RSY14_2-CH-S212 (160-13114-12), TITO04_RSY14_2-CH-S213 (160-13114-13), TITO04_RSY14_2-CH-S214 (160-13114-14), TITO04_RSY14_2-CH-S215 (160-13114-15), TITO04_RSY14_2-CH-S216 (160-13114-16), TITO04_RSY14_2-CH-S217 (160-13114-17), TITO04_RSY14_2-CH-S218 (160-13114-18), TITO04_RSY14_2-CH-S219 (160-13114-19) and TITO04_RSY14_2-CH-S220 (160-13114-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 08/03/2015, prepared on 08/05/2015 and analyzed on 08/27/2015.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TI_P3_RSY14 USE2_068
Page 2 of 3

Project Number: **500060**

Project Name / Location: CTO-04 Phase III RSY14

USED 2

Purchase Order #: 201455

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date: 7/31/15

Waybill Number: 13667545139139294

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Collection Information				Matrix		Preservative (water)		Preservative (soil)		Container Type		Analyses Requested	
Sample ID Number	Sample Description	Date	Time	Method	# Containers	Matrix	Preservative (water)	Preservative (soil)	Container Type	Gamma Scan	Dose Rate $\mu\text{R/hr}$		
TITO04_RSY14_2-CH-S210	Site 32 RSY14 USE 2	7-29-15	1636	G	1	SO	16 oz Plastic			X	S		
TITO04_RSY14_2-CH-S211	Site 32 RSY14 USE 2	7-29-15	1631	G	1	SO	16 oz Plastic			X	S		
TITO04_RSY14_2-CH-S212	Site 32 RSY14 USE 2	7-29-15	1641	G	1	SO	16 oz Plastic			X	S		
TITO04_RSY14_2-CH-S213	Site 32 RSY14 USE 2	7-29-15	1639	G	1	SO	16 oz Plastic			X	S		
TITO04_RSY14_2-CH-S214	Site 32 RSY14 USE 2	7-29-15	1613	G	1	SO	16 oz Plastic			X	S		
TITO04_RSY14_2-CH-S215	Site 32 RSY14 USE 2	7-29-15	1445	G	1	SO	16 oz Plastic			X	S		
TITO04_RSY14_2-CH-S216	Site 32 RSY14 USE 2	7/30/15	0936	G	1	SO	16 oz Plastic			X	S		
TITO04_RSY14_2-CH-S217	Site 32 RSY14 USE 2	7/30/15	0840	G	1	SO	16 oz Plastic			X	S		
TITO04_RSY14_2-CH-S218	Site 32 RSY14 USE 2	7/30/15	0843	G	1	SO	16 oz Plastic			X	S		
Special Instructions: 7 days ingrown draft and follow with 21 days final													
Level Of QC Required: <input type="checkbox"/> 24-hr <input type="checkbox"/> 3-day <input type="checkbox"/> 7-day													
Standard TAT <input type="checkbox"/>													
Relinquished By: <u>Eden Brubaker</u> Date: <u>7/31/15</u> Time: <u>1000</u>													
Relinquished By: <u>Ulrika Messer</u> Date: <u>8/3/15</u> Time: <u>0846</u>													
Project Specific: <u>III</u>													
Method Codes C = Composite G = Grab Matrix Codes DW = Drinking Water GW = Ground Water WW = Waste Water A = Air ABS=Asbestos, PO=Pipe Opening													



CBI Federal Services LLC
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_RSY14 USE2_068

Page 3 of 3

Project Number: 500060

Project Name / Location: CTO-04 Phase III RSY14

USED 2

Purchase Order #: 201455

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date: 7/30/15

Waybill Number: 1260VS4539113829

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Analyses Requested		Gamma Scan		Dose Rate μ R/Hr	
Sample ID Number	Sample Description	Matrix	# of containers	Preservative (water) Preservative (soil) Container Type	Method
TIT004_RSY14_2-CH-S219	Site 32 RSY14 USE 2	SO	1	16 oz Plastic	X
TIT004_RSY14_2-CH-S220	Site 32 RSY14 USE 2	SO	1	16 oz Plastic	X
Special Instructions: 7 days ingrown draft and follow with 21 days final					
Level Of QC Required:					
<input type="checkbox"/> 24-hr <input type="checkbox"/> 3-day <input type="checkbox"/> 7-day					
Standard TAT <input type="checkbox"/>					
Relinquished By: <u>Evan Babbington</u> Date: <u>8/3/15</u> Time: <u>0840</u>					
Received By: <u>Jill Clark</u> Date: <u>8/3/15</u> Time: <u>0840</u>					
Project Specific: <u>III</u>					
Method Codes					
C = Composite G = Grab					
Matrix Codes					
DW = Drinking Water SO = Soil					
GW = Ground Water SL = Sludge					
WW = Waste Water CP = Chip Samples					
A = Air ABS=Asbestos, PO=Pipe Opening					

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-13114-2

Login Number: 13114**List Number: 1****Creator: Clarke, Jill C****List Source: TestAmerica St. Louis**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Page 22 of 35

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-13114-1	TITO04_RSY14_2-CH-S201	Solid	07/29/15 16:27	08/03/15 08:40
160-13114-2	TITO04_RSY14_2-CH-S202	Solid	07/29/15 15:54	08/03/15 08:40
160-13114-3	TITO04_RSY14_2-CH-S203	Solid	07/29/15 16:07	08/03/15 08:40
160-13114-4	TITO04_RSY14_2-CH-S204	Solid	07/29/15 15:57	08/03/15 08:40
160-13114-5	TITO04_RSY14_2-CH-S205	Solid	07/29/15 16:00	08/03/15 08:40
160-13114-6	TITO04_RSY14_2-CH-S206	Solid	07/29/15 16:26	08/03/15 08:40
160-13114-7	TITO04_RSY14_2-CH-S207	Solid	07/29/15 16:09	08/03/15 08:40
160-13114-8	TITO04_RSY14_2-CH-S208	Solid	07/29/15 16:27	08/03/15 08:40
160-13114-9	TITO04_RSY14_2-CH-S209	Solid	07/29/15 16:32	08/03/15 08:40
160-13114-10	TITO04_RSY14_2-CH-S210	Solid	07/29/15 16:36	08/03/15 08:40
160-13114-11	TITO04_RSY14_2-CH-S211	Solid	07/29/15 16:31	08/03/15 08:40
160-13114-12	TITO04_RSY14_2-CH-S212	Solid	07/29/15 16:41	08/03/15 08:40
160-13114-13	TITO04_RSY14_2-CH-S213	Solid	07/29/15 16:39	08/03/15 08:40
160-13114-14	TITO04_RSY14_2-CH-S214	Solid	07/29/15 16:13	08/03/15 08:40
160-13114-15	TITO04_RSY14_2-CH-S215	Solid	07/29/15 14:45	08/03/15 08:40
160-13114-16	TITO04_RSY14_2-CH-S216	Solid	07/30/15 08:36	08/03/15 08:40
160-13114-17	TITO04_RSY14_2-CH-S217	Solid	07/30/15 08:40	08/03/15 08:40
160-13114-18	TITO04_RSY14_2-CH-S218	Solid	07/30/15 08:43	08/03/15 08:40
160-13114-19	TITO04_RSY14_2-CH-S219	Solid	07/30/15 08:46	08/03/15 08:40
160-13114-20	TITO04_RSY14_2-CH-S220	Solid	07/30/15 08:50	08/03/15 08:40

Client Sample Results

Page 23 of 35

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S201

Lab Sample ID: 160-13114-1

Date Collected: 07/29/15 16:27

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.182	U	0.135	0.136		0.214	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Actinium-227	0.264	U	0.392	0.393		0.653	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Bismuth-212	0.415	U	0.355	0.358		0.532	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Bismuth-214	0.375		0.0996	0.107		0.0948	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Cesium-137	0.00442	U	0.0329	0.0329		0.0601	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Lead-210	0.366	U	0.866	0.867		1.47	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Lead-212	0.336		0.0873	0.0976		0.0814	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Lead-214	0.343		0.0852	0.0924		0.0564	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Potassium-40	10.5		1.29	1.68		0.599	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Protactinium-231	0.273	U	0.370	0.372		1.42	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Radium-226	0.375		0.0996	0.107	0.500	0.0948	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Radium-228	0.182	U	0.135	0.136		0.214	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thallium-208	0.0752		0.0409	0.0417		0.0578	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thorium-228	0.336		0.0873	0.0976		0.0814	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thorium-232	0.182	U	0.135	0.136		0.214	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thorium-234	0.634	U	0.353	0.359		1.22	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Uranium-235	0.178	U	0.169	0.170		0.244	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Uranium-238	0.634	U	0.353	0.359		1.22	pCi/g	08/05/15 10:30	08/27/15 16:35	1

Client Sample ID: TITO04_RSY14_2-CH-S202

Lab Sample ID: 160-13114-2

Date Collected: 07/29/15 15:54

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.561		0.119	0.132		0.0867	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Actinium-227	0.0272	U	0.172	0.172		0.652	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Bismuth-212	0.208	U	0.396	0.396		0.685	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Bismuth-214	0.347		0.101	0.107		0.0670	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Cesium-137	0.0262	U	0.0336	0.0337		0.0551	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Lead-210	1.07	U	1.07	1.08		1.40	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Lead-212	0.341		0.0738	0.0860		0.0702	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Lead-214	0.348		0.0813	0.0890		0.0741	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Potassium-40	12.3		1.55	2.00		0.362	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Protactinium-231	0.0812	U	0.230	0.230		1.31	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Radium-226	0.347		0.101	0.107	0.500	0.0670	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Radium-228	0.561		0.119	0.132		0.0867	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thallium-208	0.135		0.0401	0.0424		0.0336	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thorium-228	0.341		0.0738	0.0860		0.0702	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thorium-232	0.561		0.119	0.132		0.0867	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thorium-234	0.592	U	0.728	0.730		1.25	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Uranium-235	0.0921	U	0.143	0.143		0.259	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Uranium-238	0.592	U	0.728	0.730		1.25	pCi/g	08/05/15 10:30	08/27/15 16:38	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S203

Lab Sample ID: 160-13114-3

Date Collected: 07/29/15 16:07

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.522		0.168	0.176		0.103	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Actinium-227	0.0472	U	0.146	0.147		0.989	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Bismuth-212	0.164	U	0.491	0.491		0.878	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Bismuth-214	0.214		0.0970	0.0995		0.119	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Cesium-137	0.0120	U	0.0435	0.0435		0.0846	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Lead-210	0.492	U	1.06	1.06		1.79	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Lead-212	0.254		0.0789	0.0854		0.104	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Lead-214	0.365		0.0824	0.0907		0.105	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Potassium-40	12.2		1.68	2.09		0.663	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Protactinium-231	0.143	U	0.215	0.216		1.72	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Radium-226	0.214		0.0970	0.0995	0.500	0.119	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Radium-228	0.522		0.168	0.176		0.103	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Thallium-208	0.0270	U	0.0449	0.0450		0.0797	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Thorium-228	0.254		0.0789	0.0854		0.104	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Thorium-232	0.522		0.168	0.176		0.103	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Thorium-234	0.960	U	0.820	0.826		1.41	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Uranium-235	0.0872	U	0.110	0.111		0.377	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Uranium-238	0.960	U	0.820	0.826		1.41	pCi/g	08/05/15 10:30	08/27/15 16:39	1

Client Sample ID: TITO04_RSY14_2-CH-S204

Lab Sample ID: 160-13114-4

Date Collected: 07/29/15 15:57

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.210	U	0.143	0.144		0.248	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Actinium-227	0.000	U	0.343	0.343		0.815	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Bismuth-212	0.0198	U	0.537	0.537		0.982	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Bismuth-214	0.237		0.0946	0.0978		0.110	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Cesium-137	0.00996	U	0.0385	0.0385		0.0692	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Lead-210	0.125	U	1.09	1.09		2.07	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Lead-212	0.330		0.0959	0.105		0.106	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Lead-214	0.282		0.0975	0.102		0.121	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Potassium-40	11.9		1.49	1.92		0.563	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Protactinium-231	0.263	U	0.350	0.351		1.58	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Radium-226	0.237		0.0946	0.0978	0.500	0.110	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Radium-228	0.210	U	0.143	0.144		0.248	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thallium-208	0.101		0.0490	0.0501		0.0587	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thorium-228	0.330		0.0959	0.105		0.106	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thorium-232	0.210	U	0.143	0.144		0.248	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thorium-234	0.722	U	0.935	0.938		1.65	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Uranium-235	0.0341	U	0.0657	0.0658		0.406	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Uranium-238	0.722	U	0.935	0.938		1.65	pCi/g	08/05/15 10:30	08/27/15 16:36	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S205

Lab Sample ID: 160-13114-5

Date Collected: 07/29/15 16:00

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0919	U	0.0893	0.0898		0.293	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Actinium-227	0.0343	U	0.303	0.303		0.542	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Bismuth-212	0.170	U	0.486	0.486		0.861	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Bismuth-214	0.355		0.108	0.114		0.102	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Cesium-137	-0.00647	U	0.0353	0.0353		0.0650	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Lead-210	-0.247	U	1.70	1.70		1.69	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Lead-212	0.337		0.104	0.113		0.103	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Lead-214	0.298		0.0872	0.0925		0.122	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Potassium-40	9.89		1.43	1.75		0.744	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Protactinium-231	0.309	U	0.570	0.571		1.58	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Radium-226	0.355		0.108	0.114	0.500	0.102	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Radium-228	0.0919	U	0.0893	0.0898		0.293	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Thallium-208	0.0851		0.0341	0.0352		0.0367	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Thorium-228	0.337		0.104	0.113		0.103	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Thorium-232	0.0919	U	0.0893	0.0898		0.293	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Thorium-234	0.710	U	0.704	0.708		1.20	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Uranium-235	0.0691	U	0.164	0.164		0.281	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Uranium-238	0.710	U	0.704	0.708		1.20	pCi/g	08/05/15 10:30	08/27/15 16:34	1

Client Sample ID: TITO04_RSY14_2-CH-S206

Lab Sample ID: 160-13114-6

Date Collected: 07/29/15 16:26

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.196	U	0.171	0.172		0.262	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Actinium-227	0.148	U	0.368	0.368		0.633	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Bismuth-212	0.167	U	0.522	0.523		0.931	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Bismuth-214	0.403		0.103	0.111		0.0765	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Cesium-137	0.00490	U	0.0404	0.0404		0.0747	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Lead-210	-0.393	U	2.38	2.38		1.71	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Lead-212	0.299		0.112	0.119		0.118	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Lead-214	0.128	U	0.0792	0.0803		0.139	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Potassium-40	8.36		1.46	1.69		1.07	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Protactinium-231	0.153	U	0.460	0.460		1.57	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Radium-226	0.403		0.103	0.111	0.500	0.0765	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Radium-228	0.196	U	0.171	0.172		0.262	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thallium-208	0.115		0.0480	0.0494		0.0522	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thorium-228	0.299		0.112	0.119		0.118	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thorium-232	0.196	U	0.171	0.172		0.262	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thorium-234	0.264	U	0.439	0.440		1.38	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Uranium-235	0.0841	U	0.185	0.185		0.308	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Uranium-238	0.264	U	0.439	0.440		1.38	pCi/g	08/05/15 10:30	08/27/15 16:35	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S207

Lab Sample ID: 160-13114-7

Date Collected: 07/29/15 16:09

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.238		0.132	0.134		0.161	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Actinium-227	0.0445	U	0.162	0.162		0.899	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Bismuth-212	0.293	U	0.465	0.466		0.784	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Bismuth-214	0.280		0.122	0.125		0.131	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Cesium-137	0.00316	U	0.0370	0.0370		0.0678	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Lead-210	-0.474	U	1.95	1.95		2.17	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Lead-212	0.286		0.0811	0.0891		0.0951	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Lead-214	0.406		0.117	0.125		0.117	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Potassium-40	9.11		1.25	1.56		0.741	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Protactinium-231	0.331	U	0.720	0.721		1.24	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Radium-226	0.280		0.122	0.125	0.500	0.131	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Radium-228	0.238		0.132	0.134		0.161	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thallium-208	0.0691		0.0456	0.0462		0.0678	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thorium-228	0.286		0.0811	0.0891		0.0951	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thorium-232	0.238		0.132	0.134		0.161	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thorium-234	0.237	U	0.805	0.805		1.45	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Uranium-235	0.0112	U	0.239	0.239		0.414	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Uranium-238	0.237	U	0.805	0.805		1.45	pCi/g	08/05/15 10:30	08/27/15 16:36	1

Client Sample ID: TITO04_RSY14_2-CH-S208

Lab Sample ID: 160-13114-8

Date Collected: 07/29/15 16:27

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.386		0.159	0.164		0.144	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Actinium-227	0.100	U	0.394	0.394		0.686	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Bismuth-212	0.554	U	0.428	0.432		0.626	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Bismuth-214	0.388		0.113	0.120		0.109	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Cesium-137	0.000	U	0.0295	0.0295		0.0972	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Lead-210	0.266	U	0.948	0.949		1.71	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Lead-212	0.351		0.0877	0.0987		0.0936	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Lead-214	0.305		0.104	0.109		0.109	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Potassium-40	10.3		1.41	1.76		0.723	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Protactinium-231	0.155	U	0.426	0.426		1.72	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Radium-226	0.388		0.113	0.120	0.500	0.109	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Radium-228	0.386		0.159	0.164		0.144	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Thallium-208	0.0622	U	0.0510	0.0514		0.0730	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Thorium-228	0.351		0.0877	0.0987		0.0936	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Thorium-232	0.386		0.159	0.164		0.144	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Thorium-234	0.214	U	0.422	0.422		1.65	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Uranium-235	0.104	U	0.133	0.134		0.297	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Uranium-238	0.214	U	0.422	0.422		1.65	pCi/g	08/05/15 10:30	08/27/15 16:37	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S209

Lab Sample ID: 160-13114-9

Date Collected: 07/29/15 16:32

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.191	U	0.162	0.163		0.368	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Actinium-227	0.332	U	0.298	0.301		0.627	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Bismuth-212	0.215	U	0.603	0.603		1.07	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Bismuth-214	0.222		0.144	0.146		0.157	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Cesium-137	0.000718	U	0.0511	0.0511		0.103	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Lead-210	-0.337	U	2.98	2.98		2.11	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Lead-212	0.303		0.129	0.135		0.137	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Lead-214	0.380		0.0911	0.0993		0.0975	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Potassium-40	10.9		1.74	2.07		0.761	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Protactinium-231	-0.182	U	1.03	1.03		1.84	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Radium-226	0.222		0.144	0.146	0.500	0.157	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Radium-228	0.191	U	0.162	0.163		0.368	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Thallium-208	0.120		0.0607	0.0620		0.0775	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Thorium-228	0.303		0.129	0.135		0.137	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Thorium-232	0.191	U	0.162	0.163		0.368	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Thorium-234	0.588	U	0.365	0.370		1.22	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Uranium-235	0.102	U	0.207	0.207		0.328	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Uranium-238	0.588	U	0.365	0.370		1.22	pCi/g	08/05/15 10:30	08/27/15 17:11	1

Client Sample ID: TITO04_RSY14_2-CH-S210

Lab Sample ID: 160-13114-10

Date Collected: 07/29/15 16:36

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.167	U	0.110	0.111		0.237	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Actinium-227	0.275	U	0.385	0.387		0.640	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Bismuth-212	0.0956	U	0.437	0.437		0.787	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Bismuth-214	0.243		0.0833	0.0871		0.0937	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Cesium-137	-0.0104	U	0.0412	0.0412		0.0730	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Lead-210	0.967	U	0.920	0.927		1.37	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Lead-212	0.329		0.0970	0.106		0.103	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Lead-214	0.342		0.0992	0.105		0.126	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Potassium-40	9.62		1.33	1.66		0.830	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Protactinium-231	0.256	U	0.281	0.282		1.72	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Radium-226	0.243		0.0833	0.0871	0.500	0.0937	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Radium-228	0.167	U	0.110	0.111		0.237	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Thallium-208	0.141		0.0459	0.0482		0.0441	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Thorium-228	0.329		0.0970	0.106		0.103	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Thorium-232	0.167	U	0.110	0.111		0.237	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Thorium-234	0.297	U	0.744	0.745		1.32	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Uranium-235	0.0519	U	0.140	0.140		0.209	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Uranium-238	0.297	U	0.744	0.745		1.32	pCi/g	08/05/15 10:30	08/27/15 17:12	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S211

Lab Sample ID: 160-13114-11

Date Collected: 07/29/15 16:31

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.275		0.155	0.157		0.252	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Actinium-227	0.0522	U	0.125	0.125		0.897	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Bismuth-212	0.538	U	0.472	0.475		0.710	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Bismuth-214	0.362		0.0944	0.102		0.0669	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Cesium-137	-0.00113	U	0.0541	0.0541		0.0961	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Lead-210	-0.167	U	0.969	0.970		1.69	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Lead-212	0.258		0.0895	0.0955		0.0967	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Lead-214	0.261		0.0992	0.103		0.105	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Potassium-40	10.3		1.53	1.85		0.648	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Protactinium-231	-0.0811	U	0.867	0.867		1.56	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Radium-226	0.362		0.0944	0.102	0.500	0.0669	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Radium-228	0.275		0.155	0.157		0.252	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Thallium-208	0.123		0.0422	0.0441		0.0400	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Thorium-228	0.258		0.0895	0.0955		0.0967	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Thorium-232	0.275		0.155	0.157		0.252	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Thorium-234	0.590	U	0.412	0.417		1.19	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Uranium-235	0.0785	U	0.112	0.112		0.360	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Uranium-238	0.590	U	0.412	0.417		1.19	pCi/g	08/05/15 10:30	08/27/15 17:13	1

Client Sample ID: TITO04_RSY14_2-CH-S212

Lab Sample ID: 160-13114-12

Date Collected: 07/29/15 16:41

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.343		0.124	0.129		0.173	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Actinium-227	0.000	U	0.236	0.236		0.701	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Bismuth-212	0.388	U	0.356	0.358		0.549	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Bismuth-214	0.275		0.0805	0.0854		0.0833	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Cesium-137	0.0111	U	0.0257	0.0257		0.0453	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Lead-210	0.178	U	0.680	0.680		1.18	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Lead-212	0.317		0.0713	0.0823		0.0663	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Lead-214	0.236		0.0703	0.0745		0.0943	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Potassium-40	11.4		1.28	1.73		0.542	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Protactinium-231	0.149	U	0.259	0.259		1.33	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Radium-226	0.275		0.0805	0.0854	0.500	0.0833	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Radium-228	0.343		0.124	0.129		0.173	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thallium-208	0.155		0.0437	0.0466		0.0281	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thorium-228	0.317		0.0713	0.0823		0.0663	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thorium-232	0.343		0.124	0.129		0.173	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thorium-234	0.633	U	0.696	0.699		1.14	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Uranium-235	0.0881	U	0.112	0.113		0.296	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Uranium-238	0.633	U	0.696	0.699		1.14	pCi/g	08/05/15 10:30	08/27/15 17:08	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S213

Lab Sample ID: 160-13114-13

Date Collected: 07/29/15 16:39

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.291		0.125	0.129		0.219	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Actinium-227	-0.171	U	0.398	0.398		0.678	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Bismuth-212	0.0804	U	0.448	0.448		0.820	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Bismuth-214	0.364		0.0940	0.101		0.0816	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Cesium-137	0.00946	U	0.0335	0.0335		0.0608	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Lead-210	0.241	U	0.879	0.879		1.62	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Lead-212	0.282		0.0864	0.0938		0.0935	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Lead-214	0.276		0.0852	0.0899		0.118	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Potassium-40	9.74		1.39	1.71		0.633	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Protactinium-231	0.157	U	0.222	0.223		1.36	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Radium-226	0.364		0.0940	0.101	0.500	0.0816	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Radium-228	0.291		0.125	0.129		0.219	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Thallium-208	0.0682	U	0.0509	0.0514		0.0696	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Thorium-228	0.282		0.0864	0.0938		0.0935	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Thorium-232	0.291		0.125	0.129		0.219	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Thorium-234	0.441	U	0.912	0.913		1.31	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Uranium-235	0.170	U	0.146	0.147		0.227	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Uranium-238	0.441	U	0.912	0.913		1.31	pCi/g	08/05/15 10:30	08/27/15 17:07	1

Client Sample ID: TITO04_RSY14_2-CH-S214

Lab Sample ID: 160-13114-14

Date Collected: 07/29/15 16:13

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.252	U	0.134	0.136		0.258	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Actinium-227	0.0638	U	0.398	0.398		0.699	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Bismuth-212	0.125	U	0.488	0.489		0.885	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Bismuth-214	0.367		0.117	0.123		0.102	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Cesium-137	0.0136	U	0.0397	0.0397		0.0708	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Lead-210	-0.203	U	1.30	1.30		1.59	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Lead-212	0.262		0.0921	0.0982		0.103	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Lead-214	0.182		0.0850	0.0871		0.133	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Potassium-40	8.96		1.55	1.80		1.26	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Protactinium-231	0.104	U	0.243	0.243		1.69	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Radium-226	0.367		0.117	0.123	0.500	0.102	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Radium-228	0.252	U	0.134	0.136		0.258	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thallium-208	0.111		0.0679	0.0689		0.0697	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thorium-228	0.262		0.0921	0.0982		0.103	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thorium-232	0.252	U	0.134	0.136		0.258	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thorium-234	0.373	U	0.769	0.770		1.39	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Uranium-235	0.178	U	0.201	0.202		0.334	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Uranium-238	0.373	U	0.769	0.770		1.39	pCi/g	08/05/15 10:30	08/27/15 17:08	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S215

Lab Sample ID: 160-13114-15

Date Collected: 07/29/15 14:45

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.195	U	0.131	0.133		0.231	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Actinium-227	0.0447	U	0.113	0.113		0.468	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Bismuth-212	0.271	U	0.377	0.378		0.627	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Bismuth-214	0.300		0.0972	0.102		0.109	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Cesium-137	-0.00115	U	0.0378	0.0378		0.0695	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Lead-210	0.519	U	0.859	0.861		1.58	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Lead-212	0.322		0.0936	0.102		0.105	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Lead-214	0.201		0.0783	0.0811		0.139	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Potassium-40	9.72		1.32	1.65		0.936	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Protactinium-231	0.247	U	0.833	0.834		1.45	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Radium-226	0.300		0.0972	0.102	0.500	0.109	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Radium-228	0.195	U	0.131	0.133		0.231	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Thallium-208	0.117		0.0585	0.0597		0.0565	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Thorium-228	0.322		0.0936	0.102		0.105	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Thorium-232	0.195	U	0.131	0.133		0.231	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Thorium-234	0.114	U	0.456	0.457		1.57	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Uranium-235	0.134	U	0.183	0.184		0.298	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Uranium-238	0.114	U	0.456	0.457		1.57	pCi/g	08/05/15 10:30	08/27/15 17:09	1

Client Sample ID: TITO04_RSY14_2-CH-S216

Lab Sample ID: 160-13114-16

Date Collected: 07/30/15 08:36

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0983	U	0.126	0.126		0.235	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Actinium-227	0.0317	U	0.387	0.387		0.681	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Bismuth-212	0.130	U	0.394	0.394		0.702	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Bismuth-214	0.318		0.0903	0.0961		0.0872	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Cesium-137	0.00334	U	0.0329	0.0329		0.0608	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Lead-210	1.46	U	1.13	1.15		1.67	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Lead-212	0.260		0.0838	0.0903		0.0927	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Lead-214	0.304		0.0913	0.0966		0.103	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Potassium-40	9.49		1.25	1.58		0.523	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Protactinium-231	0.0713	U	0.720	0.720		1.30	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Radium-226	0.318		0.0903	0.0961	0.500	0.0872	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Radium-228	0.0983	U	0.126	0.126		0.235	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Thallium-208	0.0990		0.0469	0.0480		0.0520	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Thorium-228	0.260		0.0838	0.0903		0.0927	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Thorium-232	0.0983	U	0.126	0.126		0.235	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Thorium-234	0.632	U	0.493	0.497		1.41	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Uranium-235	0.159	U	0.162	0.163		0.239	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Uranium-238	0.632	U	0.493	0.497		1.41	pCi/g	08/05/15 10:30	08/27/15 17:10	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S217

Lab Sample ID: 160-13114-17

Date Collected: 07/30/15 08:40

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.204	U	0.136	0.138		0.270	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Actinium-227	-0.380	U	0.454	0.456		0.745	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Bismuth-212	0.0482	U	0.481	0.481		0.891	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Bismuth-214	0.403		0.100	0.108		0.0649	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Cesium-137	-0.0226	U	0.904	0.904		0.131	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Lead-210	0.500	U	0.990	0.992		1.67	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Lead-212	0.346		0.0888	0.0994		0.0899	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Lead-214	0.344		0.0861	0.0932		0.120	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Potassium-40	11.8		1.61	2.01		0.629	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Protactinium-231	0.313	U	0.584	0.585		1.15	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Radium-226	0.403		0.100	0.108	0.500	0.0649	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Radium-228	0.204	U	0.136	0.138		0.270	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Thallium-208	0.0963		0.0453	0.0464		0.0615	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Thorium-228	0.346		0.0888	0.0994		0.0899	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Thorium-232	0.204	U	0.136	0.138		0.270	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Thorium-234	0.578	U	0.780	0.782		1.38	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Uranium-235	0.0482	U	0.192	0.192		0.341	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Uranium-238	0.578	U	0.780	0.782		1.38	pCi/g	08/05/15 10:30	08/27/15 17:46	1

Client Sample ID: TITO04_RSY14_2-CH-S218

Lab Sample ID: 160-13114-18

Date Collected: 07/30/15 08:43

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.305		0.0944	0.0994		0.214	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Actinium-227	-0.180	U	0.367	0.367		0.621	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Bismuth-212	0.268	U	0.299	0.300		0.477	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Bismuth-214	0.310		0.0883	0.0940		0.0840	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Cesium-137	-0.00776	U	0.0294	0.0294		0.0528	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Lead-210	-0.0197	U	0.666	0.666		1.18	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Lead-212	0.250		0.0737	0.0805		0.0718	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Lead-214	0.450		0.0787	0.0916		0.0654	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Potassium-40	10.6		1.23	1.64		0.541	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Protactinium-231	0.186	U	0.229	0.230		1.29	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Radium-226	0.310		0.0883	0.0940	0.500	0.0840	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Radium-228	0.305		0.0944	0.0994		0.214	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Thallium-208	0.0951		0.0328	0.0342		0.0239	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Thorium-228	0.250		0.0737	0.0805		0.0718	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Thorium-232	0.305		0.0944	0.0994		0.214	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Thorium-234	0.360	U	0.253	0.256		0.899	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Uranium-235	0.110	U	0.155	0.155		0.265	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Uranium-238	0.360	U	0.253	0.256		0.899	pCi/g	08/05/15 10:30	08/27/15 17:42	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S219

Lab Sample ID: 160-13114-19

Date Collected: 07/30/15 08:46

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.464		0.118	0.128		0.0865	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Actinium-227	-0.148	U	0.478	0.478		0.821	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Bismuth-212	0.416	U	0.465	0.467		0.747	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Bismuth-214	0.324		0.0877	0.0939		0.0879	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Cesium-137	-0.000104	U	0.0354	0.0354		0.0669	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Lead-210	-0.114	U	1.31	1.31		2.14	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Lead-212	0.308		0.0978	0.106		0.109	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Lead-214	0.379		0.115	0.121		0.134	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Potassium-40	8.08		1.28	1.52		0.850	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Protactinium-231	0.272	U	0.457	0.458		1.70	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Radium-226	0.324		0.0877	0.0939	0.500	0.0879	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Radium-228	0.464		0.118	0.128		0.0865	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Thallium-208	0.103		0.0428	0.0442		0.0486	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Thorium-228	0.308		0.0978	0.106		0.109	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Thorium-232	0.464		0.118	0.128		0.0865	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Thorium-234	0.163	U	0.328	0.329		1.66	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Uranium-235	0.0438	U	0.195	0.195		0.329	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Uranium-238	0.163	U	0.328	0.329		1.66	pCi/g	08/05/15 10:30	08/27/15 17:43	1

Client Sample ID: TITO04_RSY14_2-CH-S220

Lab Sample ID: 160-13114-20

Date Collected: 07/30/15 08:50

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.402		0.158	0.163		0.248	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Actinium-227	-0.168	U	0.387	0.388		0.662	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Bismuth-212	0.533	U	0.538	0.541		0.851	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Bismuth-214	0.351		0.123	0.128		0.120	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Cesium-137	0.00120	U	0.0401	0.0401		0.0749	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Lead-210	1.41	U	1.02	1.04		1.46	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Lead-212	0.449		0.0885	0.106		0.0729	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Lead-214	0.398		0.0986	0.107		0.134	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Potassium-40	11.0		1.52	1.89		0.675	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Protactinium-231	0.119	U	0.563	0.563		1.45	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Radium-226	0.351		0.123	0.128	0.500	0.120	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Radium-228	0.402		0.158	0.163		0.248	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Thallium-208	0.161		0.0570	0.0594		0.0561	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Thorium-228	0.449		0.0885	0.106		0.0729	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Thorium-232	0.402		0.158	0.163		0.248	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Thorium-234	0.269	U	0.925	0.925		1.63	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Uranium-235	0.111	U	0.188	0.189		0.310	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Uranium-238	0.269	U	0.925	0.925		1.63	pCi/g	08/05/15 10:30	08/27/15 17:41	1

QC Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-204116/1-A

Matrix: Solid

Analysis Batch: 208135

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 204116

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-228	0.001436	U	0.144	0.144		0.278	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Actinium-227	0.2625	U	0.346	0.347		0.571	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Bismuth-212	0.2306	U	0.436	0.436		0.759	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Bismuth-214	-0.02765	U	0.196	0.196		0.176	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Cesium-137	0.0000	U	0.00805	0.00805		0.0603	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Lead-210	0.06291	U	0.880	0.880		1.79	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Lead-212	-0.03963	U	0.608	0.608		0.119	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Lead-214	-0.05978	U	1.54	1.54		0.165	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Potassium-40	-0.004692	U	0.398	0.398		1.06	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Protactinium-231	0.06346	U	0.130	0.131		1.64	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Radium-226	-0.02765	U	0.196	0.196	0.500	0.176	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Radium-228	0.001436	U	0.144	0.144		0.278	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thallium-208	-0.02743	U	0.191	0.191		0.0867	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thorium-228	-0.03963	U	0.608	0.608		0.119	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thorium-232	0.001436	U	0.144	0.144		0.278	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thorium-234	-0.05263	U	0.731	0.731		1.29	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Uranium-235	0.1072	U	0.144	0.144		0.235	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Uranium-238	-0.05263	U	0.731	0.731		1.29	pCi/g	08/05/15 10:30	08/27/15 16:38	1

Lab Sample ID: LCS 160-204116/2-A

Matrix: Solid

Analysis Batch: 208136

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 204116

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.3	101.5		10.7		1.23	pCi/g	104	87 - 116
Cesium-137	30.2	30.57		3.30		0.338	pCi/g	101	87 - 120
Cobalt-60	19.0	19.19		2.01		0.163	pCi/g	101	87 - 115

Lab Sample ID: 160-13114-1 DU

Matrix: Solid

Analysis Batch: 208139

Client Sample ID: TITO04_RSY14_2-CH-S201

Prep Type: Total/NA

Prep Batch: 204116

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium-228	0.182	U	0.2924		0.141		0.249	pCi/g	0.40	1
Actinium-227	0.264	U	-0.01846	U	0.434		0.772	pCi/g	0.34	1
Bismuth-212	0.415	U	0.2262	U	0.447		0.776	pCi/g	0.23	1
Bismuth-214	0.375		0.4023		0.121		0.111	pCi/g	0.12	1
Cesium-137	0.00442	U	-0.00947	U	0.0401		0.0727	pCi/g	0.19	1
Lead-210	0.366	U	1.250	U	1.22		1.91	pCi/g	0.42	1
Lead-212	0.336		0.3457		0.104		0.0998	pCi/g	0.05	1
Lead-214	0.343		0.3138		0.0974		0.130	pCi/g	0.15	1
Potassium-40	10.5		9.900		1.75		0.619	pCi/g	0.17	1
Protactinium-231	0.273	U	0.4333	U	0.497		1.58	pCi/g	0.18	1
Radium-226	0.375		0.4023		0.121	0.500	0.111	pCi/g	0.12	1
Radium-228	0.182	U	0.2924		0.141		0.249	pCi/g	0.40	1

QC Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-13114-1 DU

Matrix: Solid

Analysis Batch: 208139

Client Sample ID: TITO04_RSY14_2-CH-S201

Prep Type: Total/NA

Prep Batch: 204116

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.0752		0.1213		0.0487		0.0527	pCi/g	0.51	1
Thorium-228	0.336		0.3457		0.104		0.0998	pCi/g	0.05	1
Thorium-232	0.182	U	0.2924		0.141		0.249	pCi/g	0.40	1
Thorium-234	0.634	U	0.5483	U	0.546		1.61	pCi/g	0.09	1
Uranium-235	0.178	U	0.01826	U	0.180		0.326	pCi/g	0.46	1
Uranium-238	0.634	U	0.5483	U	0.546		1.61	pCi/g	0.09	1

QC Association Summary

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Rad

Leach Batch: 203648

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13114-1	TITO04_RSY14_2-CH-S201	Total/NA	Solid	Dry and Grind	
160-13114-1 DU	TITO04_RSY14_2-CH-S201	Total/NA	Solid	Dry and Grind	
160-13114-2	TITO04_RSY14_2-CH-S202	Total/NA	Solid	Dry and Grind	
160-13114-3	TITO04_RSY14_2-CH-S203	Total/NA	Solid	Dry and Grind	
160-13114-4	TITO04_RSY14_2-CH-S204	Total/NA	Solid	Dry and Grind	
160-13114-5	TITO04_RSY14_2-CH-S205	Total/NA	Solid	Dry and Grind	
160-13114-6	TITO04_RSY14_2-CH-S206	Total/NA	Solid	Dry and Grind	
160-13114-7	TITO04_RSY14_2-CH-S207	Total/NA	Solid	Dry and Grind	
160-13114-8	TITO04_RSY14_2-CH-S208	Total/NA	Solid	Dry and Grind	
160-13114-9	TITO04_RSY14_2-CH-S209	Total/NA	Solid	Dry and Grind	
160-13114-10	TITO04_RSY14_2-CH-S210	Total/NA	Solid	Dry and Grind	
160-13114-11	TITO04_RSY14_2-CH-S211	Total/NA	Solid	Dry and Grind	
160-13114-12	TITO04_RSY14_2-CH-S212	Total/NA	Solid	Dry and Grind	
160-13114-13	TITO04_RSY14_2-CH-S213	Total/NA	Solid	Dry and Grind	
160-13114-14	TITO04_RSY14_2-CH-S214	Total/NA	Solid	Dry and Grind	
160-13114-15	TITO04_RSY14_2-CH-S215	Total/NA	Solid	Dry and Grind	
160-13114-16	TITO04_RSY14_2-CH-S216	Total/NA	Solid	Dry and Grind	
160-13114-17	TITO04_RSY14_2-CH-S217	Total/NA	Solid	Dry and Grind	
160-13114-18	TITO04_RSY14_2-CH-S218	Total/NA	Solid	Dry and Grind	
160-13114-19	TITO04_RSY14_2-CH-S219	Total/NA	Solid	Dry and Grind	
160-13114-20	TITO04_RSY14_2-CH-S220	Total/NA	Solid	Dry and Grind	

Prep Batch: 204116

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13114-1	TITO04_RSY14_2-CH-S201	Total/NA	Solid	Fill_Geo-21	203648
160-13114-1 DU	TITO04_RSY14_2-CH-S201	Total/NA	Solid	Fill_Geo-21	203648
160-13114-2	TITO04_RSY14_2-CH-S202	Total/NA	Solid	Fill_Geo-21	203648
160-13114-3	TITO04_RSY14_2-CH-S203	Total/NA	Solid	Fill_Geo-21	203648
160-13114-4	TITO04_RSY14_2-CH-S204	Total/NA	Solid	Fill_Geo-21	203648
160-13114-5	TITO04_RSY14_2-CH-S205	Total/NA	Solid	Fill_Geo-21	203648
160-13114-6	TITO04_RSY14_2-CH-S206	Total/NA	Solid	Fill_Geo-21	203648
160-13114-7	TITO04_RSY14_2-CH-S207	Total/NA	Solid	Fill_Geo-21	203648
160-13114-8	TITO04_RSY14_2-CH-S208	Total/NA	Solid	Fill_Geo-21	203648
160-13114-9	TITO04_RSY14_2-CH-S209	Total/NA	Solid	Fill_Geo-21	203648
160-13114-10	TITO04_RSY14_2-CH-S210	Total/NA	Solid	Fill_Geo-21	203648
160-13114-11	TITO04_RSY14_2-CH-S211	Total/NA	Solid	Fill_Geo-21	203648
160-13114-12	TITO04_RSY14_2-CH-S212	Total/NA	Solid	Fill_Geo-21	203648
160-13114-13	TITO04_RSY14_2-CH-S213	Total/NA	Solid	Fill_Geo-21	203648
160-13114-14	TITO04_RSY14_2-CH-S214	Total/NA	Solid	Fill_Geo-21	203648
160-13114-15	TITO04_RSY14_2-CH-S215	Total/NA	Solid	Fill_Geo-21	203648
160-13114-16	TITO04_RSY14_2-CH-S216	Total/NA	Solid	Fill_Geo-21	203648
160-13114-17	TITO04_RSY14_2-CH-S217	Total/NA	Solid	Fill_Geo-21	203648
160-13114-18	TITO04_RSY14_2-CH-S218	Total/NA	Solid	Fill_Geo-21	203648
160-13114-19	TITO04_RSY14_2-CH-S219	Total/NA	Solid	Fill_Geo-21	203648
160-13114-20	TITO04_RSY14_2-CH-S220	Total/NA	Solid	Fill_Geo-21	203648
LCS 160-204116/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-204116/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Guillory, Jeffrey

From: Weyant, David B CIV NAVSEA 04, 04N <david.weyant@navy.mil>
Sent: Wednesday, May 03, 2017 6:46 AM
To: Guillory, Jeffrey
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: RE: NSTI RSY Soil Release Request - RSY 15 (Use 8)

Hello Jeff,

I concur to designating RSY-15 (Use 8) soil as Non-LLRW soil.

VR

David Weyant
Health Physicist/Environmental Protection Manager
Environmental Protection Division
NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [mailto:jeffrey.guillory@cbifederaleservices.com]
Sent: Friday, April 21, 2017 10:35 AM
To: Weyant, David B CIV NAVSEA 04, 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 15 (Use 8)

Mr. Weyant,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Jeffrey Guillory

Scientist 3

Federal Services

Cell: +1 979 422 5534

jeffrey.guillory@cbifederalservices.com <<mailto:jeffrey.guillory@cbifederalservices.com>>

CB&I

950 Avenue M - Treasure Island

San Francisco, CA 94130

United States of America

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Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004			
RSY Unit: RSY 15	RSY Unit Use Number: USE 8	First Submittal <input checked="" type="checkbox"/>	Second Submittal <input type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 4/21/2017	

Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static Survey Meter (Model 2221) Serial Number	One-Minute Static Reading (CPM)	Static Count Exceeds Reference Area IL?	²²⁶ Ra Final Analytical Results (pCi/g)
Upper limit of site reference background						1.69
TITO04-RSY15-U8-BS-FSSSU6-S001	1	Systematic	254783	11,692	No	0.379
TITO04-RSY15-U8-BS-FSSSU6-S002	2	Systematic	254783	11,232	No	0.305
TITO04-RSY15-U8-BS-FSSSU6-S003	3	Systematic	254783	11,363	No	0.473
TITO04-RSY15-U8-BS-FSSSU6-S004	4	Systematic	254783	11,019	No	0.296
TITO04-RSY15-U8-BS-FSSSU6-S005	5	Systematic	254783	11,247	No	0.382
TITO04-RSY15-U8-BS-FSSSU6-S006	6	Systematic	254783	10,981	No	0.353
TITO04-RSY15-U8-BS-FSSSU6-S007	7	Systematic	254783	10,988	No	0.310
TITO04-RSY15-U8-BS-FSSSU6-S008	8	Systematic	254783	11,125	No	0.311
TITO04-RSY15-U8-BS-FSSSU6-S009	9	Systematic	254783	10,998	No	0.383
TITO04-RSY15-U8-BS-FSSSU6-S010	10	Systematic	254783	11,024	No	0.439
TITO04-RSY15-U8-BS-FSSSU6-S011	11	Systematic	254783	11,007	No	0.410
TITO04-RSY15-U8-BS-FSSSU6-S012	12	Systematic	254783	11,199	No	0.489

CPM Counts per minute
 IL Investigation Level (based on Reference Area data set)
²²⁶Ra Radium-226
 pCi/g Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd (CPM)	Reference Area Static 3σ IL (CPM)	Reference Area Scan Bkgd (CPM)	Reference Area Scan 3σ IL (CPM)	Range (CPM)
Gamma Walkover Survey	TIRS-03142017-12P3-GWS-2777	3/14/2017	2221	10/31/2017	254783	N/A	N/A	14,633	18,077	8,679 – 14,549
Follow-up Static Survey	TIRS-03152017-12P3-JSS-2781	3/15/2017	2221	10/31/2017	254783	14,709	17,037	N/A	N/A	10,630 – 12,287
Systematic Sampling Survey	TIRS-03152017-12P3-JSS-2780	3/15/2017 – 3/16/2017	2221	10/31/2017	254783	14,709	17,037	N/A	N/A	10,981 – 11,692

3σ IL Investigation Level (established at 3σ above the mean of the Reference Area data set)
 CPM Counts per minute

Summary

1) Gamma walkover survey and data review—all locations surveyed on RSY 15 (Use 8) were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the data set average for RSY 15 (Use 8) were evaluated for follow-up investigation; 23 total data points clustered around 14 discrete locations were identified as exceeding three standard deviations of the data set average. Gamma scan coverage is shown on the Systematic Sample Survey map (page 3). GWS count rate statistics are also provided (page 4).

2) Follow-up static survey—14 clustered locations (23 GWS data points) identified during the data review process as exceeding three standard deviations of the data set average for RSY 15 (Use 8) were investigated, resulting in all locations less than the Reference Area static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 5).

3) Twelve systematic soil samples (S001-S012) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with static readings < Reference Area static IL for all sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 8-26).

Conclusions:

All count rates recorded during the gamma walkover survey were less than the Reference Area scan IL. As an additional conservative characterization approach, clustered locations identified as exceeding three standard deviations of the data set mean for RSY 15 (Use 8) were investigated and deemed comparable to background. 14 total follow-up static locations were investigated, with readings less than the Reference Area static IL at all locations.

Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 6-7. These statistical tools were utilized to verify the appropriate level of reasonable effort.

RSY 15 (Use 8) contains FSS material from the 6-inch over excavation of the bottom of the excavation at SWDA Bayside SU 6.

Note: Soil on RSY Pad 15 (Use 8) was over-excavated at the final depth from the bottom of the excavation at Bayside SU 6, and no visible debris and/or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.

CB&I requests RASO concurrence to release this soil as Non-LLRW.

Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.

Survey Number:
TIRS-03152017-12P3-JSS-2780



Instrument #254783

S Systematic Sample Locations

● GWS Scan Area

RSY Pad Boundary

CB&I Federal Services, LLC

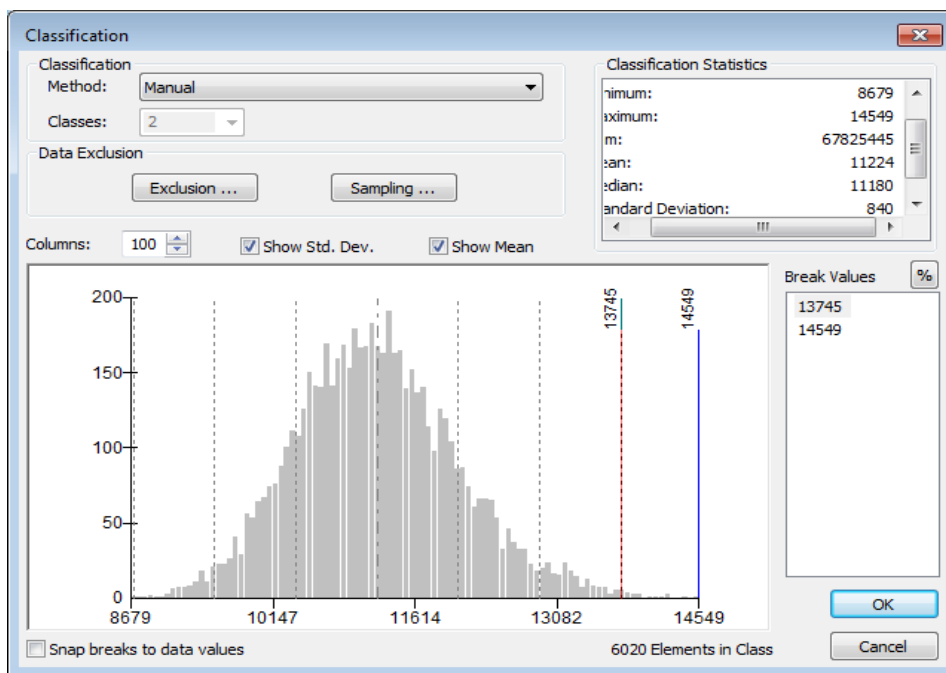
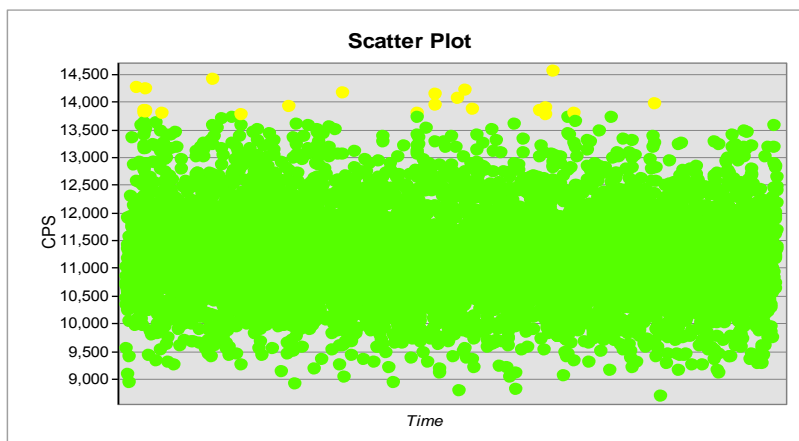
Data Processed In Treasure Island Office

Survey: TIRS-03142017-12P3-GWS-2777

RSY Pad 15 (Use 8)

Site 32




In the 8,000	In the 9,000	In the 10,000	In the 11,000	In the 12,000	In the 13,000	In the 14,000
6	374	2091	2542	861	161	8



Survey Number:
TIRS-03152017-12P3-JSS-2781



Instrument #254783

-  Follow-up Static Location
-  Areas Not Requiring Further Investigation
-  RSY Pad Boundary

CB&I Federal Services, LLC

Data Processed In Treasure Island Office

WRS Test, Quantile Test, and Power Calculation

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 15-8
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

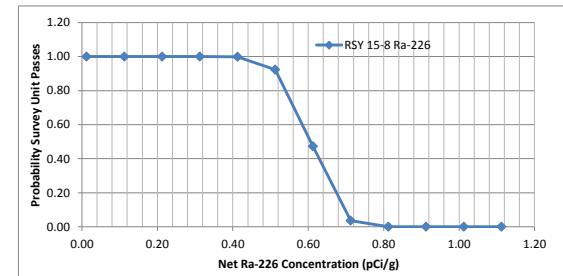
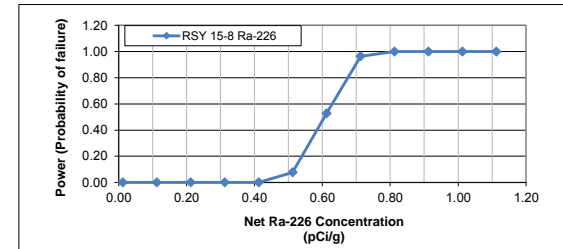
POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4	S
0.57	R	0.57	19.5	0	5	S
0.55	R	0.55	18	0	6	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.379	S	-0.103939192	6	6	21.5	R
0.305	S	-0.177939192	2	2	21.5	R
0.473	S	-0.009939192	11	11	23	R
0.296	S	-0.186939192	1	1	24	R
0.382	S	-0.100939192	7	7	25	R
0.353	S	-0.129939192	5	5	26	R
0.310	S	-0.172939192	3	3	27.5	R
0.311	S	-0.171939192	4	4	27.5	R
0.383	S	-0.099939192	8	8	29	R
0.439	S	-0.043939192	10	10	30	R
0.410	S	-0.072939192	9	9	31	R
0.489	S	0.006060808	12	12	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.066
Z(1-alpha)	1.960
Z(1-beta)	1.645

Concentration	Background (C)	SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
1.5	0.81	2.0	0.92135	0.86577	221.124	138.9359	11.787107	-4.34973	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 15$
 $6 r$
 $5 k$
 0.04 α

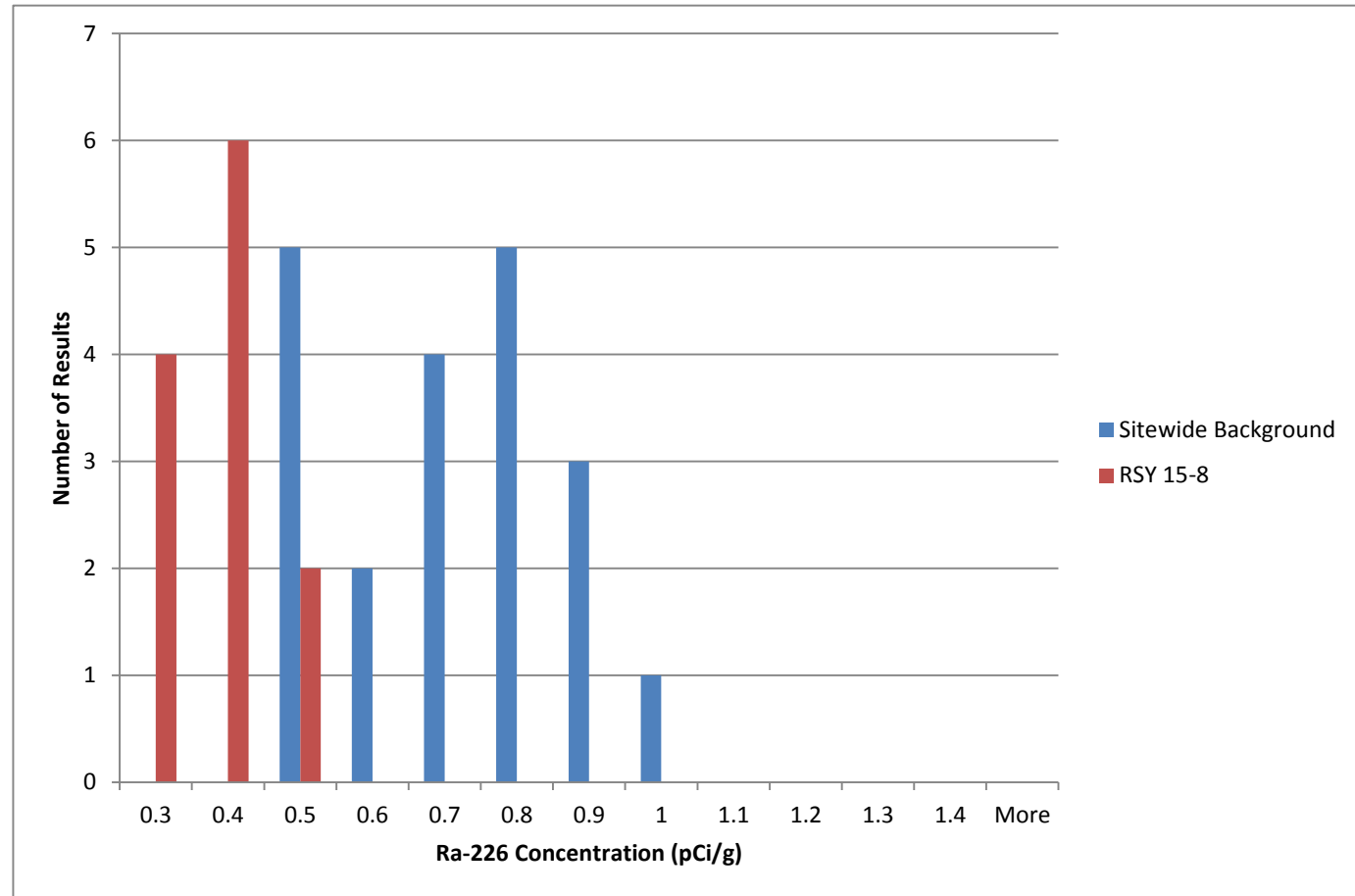
If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

Histogram, RSY 15 (Use 8) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 15-8	
<i>Bin</i>	<i>Frequency</i>
0.3	4
0.4	6
0.5	2
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-21509-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan



Authorized for release by:
4/17/2017 10:06:49 AM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

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results through

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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QC Sample Results	17
QC Association Summary	19

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Job ID: 160-21509-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-21509-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Job ID: 160-21509-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 3/17/2017 8:45 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-RSY15-U8-BS-FSSSU6-S001 (160-21509-1), TITO04-RSY15-U8-BS-FSSSU6-S002 (160-21509-2), TITO04-RSY15-U8-BS-FSSSU6-S003 (160-21509-3), TITO04-RSY15-U8-BS-FSSSU6-S004 (160-21509-4), TITO04-RSY15-U8-BS-FSSSU6-S005 (160-21509-5), TITO04-RSY15-U8-BS-FSSSU6-S006 (160-21509-6), TITO04-RSY15-U8-BS-FSSSU6-S007 (160-21509-7), TITO04-RSY15-U8-BS-FSSSU6-S008 (160-21509-8), TITO04-RSY15-U8-BS-FSSSU6-S009 (160-21509-9), TITO04-RSY15-U8-BS-FSSSU6-S010 (160-21509-10), TITO04-RSY15-U8-BS-FSSSU6-S011 (160-21509-11) and TITO04-RSY15-U8-BS-FSSSU6-S012 (160-21509-12) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 03/17/2017, prepared on 03/20/2017 and analyzed on 04/11/2017 and 04/12/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520



160-21509 Chain of Custody

CHAIN OF CUSTODY

Ref. Document # TLP3_RSY15_U8_BS_FSSU6_#377

Page 1 of 2

Project Number: 500060

CTO-04 Phase III Site 32 RSY15

Project Name / Location: USE 8 From Bayside FSS SU6

Systematic

Purchase Order #: 201455

Shipment Date: 3/16/17

Waybill Number: 1789V462 019056 6232

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Renata Vidovic

Phone/Fax Number: 408-505-7319

Address: renata.vidovic@cbifederalservices.com

City:

Sampler's Name(s): Mark Star

Collection Information

Sample ID Number	Sample Description	Date	Time	Method	Matrix	# of containers	Preservative (water)	Preservative (soil)	Container Type	Dose Rate $\mu\text{R}/\text{hr}$
TITO04-RSY15-U8-BS-FSSU6-S001	Site 32 RSY 15 L10 8 From Bayside FSS SU6 Systematic	3-15-17	1431	G	SO	1			16 oz Plastic	
TITO04-RSY15-U8-BS-FSSU6-S002	Site 32 RSY 15 L10 8 From Bayside FSS SU6 Systematic	3-15-17	1439	G	SO	1			16 oz Plastic	5
TITO04-RSY15-U8-BS-FSSU6-S003	Site 32 RSY 15 L10 8 From Bayside FSS SU6 Systematic	3-15-17	1439	G	SO	1			16 oz Plastic	5
TITO04-RSY15-U8-BS-FSSU6-S004	Site 32 RSY 15 L10 8 From Bayside FSS SU6 Systematic	3-15-17	1440	G	SO	1			16 oz Plastic	5
TITO04-RSY15-U8-BS-FSSU6-S005	Site 32 RSY 15 L10 8 From Bayside FSS SU6 Systematic	3-15-17	1445	G	SO	1			16 oz Plastic	5
TITO04-RSY15-U8-BS-FSSU6-S006	Site 32 RSY 15 L10 8 From Bayside FSS SU6 Systematic	3-15-17	1502	G	SO	1			16 oz Plastic	5
TITO04-RSY15-U8-BS-FSSU6-S007	Site 32 RSY 15 L10 8 From Bayside FSS SU6 Systematic	3-15-17	1501	G	SO	1			16 oz Plastic	5
TITO04-RSY15-U8-BS-FSSU6-S008	Site 32 RSY 15 L10 8 From Bayside FSS SU6 Systematic	3-15-17	1517	G	SO	1			16 oz Plastic	5

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required

☐ 24-hr

☐ 3-day

☐ 7-day

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CHAIN OF CUSTODY

Page 2 of 2

City:

[illegible]

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-21509-2

Login Number: 21509**List Number: 1****Creator: Clarke, Jill C****List Source: TestAmerica St. Louis**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:
DOE = U.S. Department of Energy

Laboratory References:
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-21509-1	TITO04-RSY15-U8-BS-FSSSU6-S001	Solid	03/15/17 14:31	03/17/17 08:45
160-21509-2	TITO04-RSY15-U8-BS-FSSSU6-S002	Solid	03/15/17 14:39	03/17/17 08:45
160-21509-3	TITO04-RSY15-U8-BS-FSSSU6-S003	Solid	03/15/17 14:39	03/17/17 08:45
160-21509-4	TITO04-RSY15-U8-BS-FSSSU6-S004	Solid	03/15/17 14:40	03/17/17 08:45
160-21509-5	TITO04-RSY15-U8-BS-FSSSU6-S005	Solid	03/15/17 14:45	03/17/17 08:45
160-21509-6	TITO04-RSY15-U8-BS-FSSSU6-S006	Solid	03/15/17 15:02	03/17/17 08:45
160-21509-7	TITO04-RSY15-U8-BS-FSSSU6-S007	Solid	03/15/17 15:01	03/17/17 08:45
160-21509-8	TITO04-RSY15-U8-BS-FSSSU6-S008	Solid	03/15/17 15:17	03/17/17 08:45
160-21509-9	TITO04-RSY15-U8-BS-FSSSU6-S009	Solid	03/15/17 15:07	03/17/17 08:45
160-21509-10	TITO04-RSY15-U8-BS-FSSSU6-S010	Solid	03/15/17 15:06	03/17/17 08:45
160-21509-11	TITO04-RSY15-U8-BS-FSSSU6-S011	Solid	03/15/17 15:11	03/17/17 08:45
160-21509-12	TITO04-RSY15-U8-BS-FSSSU6-S012	Solid	03/15/17 15:09	03/17/17 08:45

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S001

Lab Sample ID: 160-21509-1

Date Collected: 03/15/17 14:31

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.368		0.111	0.117		0.0661	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Actinium-227	-0.294	U	0.625	0.626		1.05	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Bismuth-212	0.133	U	0.373	0.373		0.655	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Bismuth-214	0.379		0.0993	0.107		0.0857	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Cesium-137	-0.0189	U	0.0564	0.0565		0.0968	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Lead-210	-0.151	U	1.13	1.13		1.94	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Lead-212	0.329		0.0664	0.0789		0.0681	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Lead-214	0.433		0.123	0.131		0.106	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Potassium-40	10.0		1.19	1.57		0.261	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Protactinium-231	-0.357	U	2.06	2.06		3.48	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Radium-226	0.379		0.0993	0.107	0.500	0.0857	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Radium-228	0.368		0.111	0.117		0.0661	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Thallium-208	0.116		0.0398	0.0416		0.0350	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Thorium-228	0.329		0.0664	0.0789		0.0681	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Thorium-232	0.368		0.111	0.117		0.0661	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Thorium-234	0.489	U	1.03	1.03		1.73	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Uranium-235	-0.140	U	0.414	0.414		0.693	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Uranium-238	0.489	U	1.03	1.03		1.73	pCi/g	03/20/17 21:59	04/11/17 19:16	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S002

Lab Sample ID: 160-21509-2

Date Collected: 03/15/17 14:39

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.425		0.145	0.152		0.0866	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Actinium-227	0.312	U	0.777	0.778		1.31	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Bismuth-212	0.000	U	0.285	0.285		0.985	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Bismuth-214	0.305		0.110	0.115		0.132	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Cesium-137	-0.0122	U	0.0609	0.0609		0.107	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Lead-210	-1.02	U	1.75	1.75		3.05	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Lead-212	0.255		0.0842	0.0905		0.111	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Lead-214	0.377		0.117	0.123		0.128	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Potassium-40	9.24		1.34	1.64		0.646	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Protactinium-231	0.000	U	0.367	0.367		4.16	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Radium-226	0.305		0.110	0.115	0.500	0.132	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Radium-228	0.425		0.145	0.152		0.0866	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Thallium-208	0.111		0.0525	0.0538		0.0570	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Thorium-228	0.255		0.0842	0.0905		0.111	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Thorium-232	0.425		0.145	0.152		0.0866	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Thorium-234	-0.569	U	1.09	1.09		1.92	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Uranium-235	-0.0255	U	0.178	0.178		0.554	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Uranium-238	-0.569	U	1.09	1.09		1.92	pCi/g	03/20/17 21:59	04/11/17 20:01	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S003

Lab Sample ID: 160-21509-3

Date Collected: 03/15/17 14:39

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.348		0.131	0.135		0.109	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Actinium-227	-0.0576	U	0.100	0.100		1.20	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Bismuth-212	0.245	U	0.599	0.599		1.03	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Bismuth-214	0.473		0.131	0.140		0.121	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Cesium-137	0.0188	U	0.0481	0.0482		0.0832	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Lead-210	0.488	U	1.13	1.13		1.61	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Lead-212	0.388		0.0812	0.0955		0.0860	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Lead-214	0.376		0.0985	0.106		0.126	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Potassium-40	10.6		1.39	1.76		0.701	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Protactinium-231	0.000	U	0.276	0.276		4.05	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Radium-226	0.473		0.131	0.140	0.500	0.121	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Radium-228	0.348		0.131	0.135		0.109	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Thallium-208	0.106		0.0407	0.0422		0.0395	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Thorium-228	0.388		0.0812	0.0955		0.0860	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Thorium-232	0.348		0.131	0.135		0.109	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Thorium-234	-0.189	U	1.18	1.18		2.02	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Uranium-235	0.0376	U	0.0824	0.0825		0.606	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Uranium-238	-0.189	U	1.18	1.18		2.02	pCi/g	03/20/17 21:59	04/12/17 11:37	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S004

Lab Sample ID: 160-21509-4

Date Collected: 03/15/17 14:40

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.423		0.127	0.135		0.0708	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Actinium-227	-0.296	U	0.626	0.627		1.05	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Bismuth-212	-0.489	U	0.754	0.756		1.26	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Bismuth-214	0.296		0.0864	0.0917		0.0762	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Cesium-137	0.000	U	0.0178	0.0178		0.0879	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Lead-210	0.361	U	1.26	1.26		2.14	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Lead-212	0.385		0.0739	0.0892		0.0745	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Lead-214	0.402		0.108	0.116		0.105	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Potassium-40	11.3		1.35	1.78		0.624	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Protactinium-231	0.000	U	0.423	0.423		3.80	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Radium-226	0.296		0.0864	0.0917	0.500	0.0762	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Radium-228	0.423		0.127	0.135		0.0708	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Thallium-208	0.101		0.0598	0.0607		0.0656	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Thorium-228	0.385		0.0739	0.0892		0.0745	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Thorium-232	0.423		0.127	0.135		0.0708	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Thorium-234	0.182	U	1.21	1.21		2.05	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Uranium-235	-0.0281	U	0.0493	0.0494		0.795	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Uranium-238	0.182	U	1.21	1.21		2.05	pCi/g	03/20/17 21:59	04/11/17 20:47	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S005

Lab Sample ID: 160-21509-5

Date Collected: 03/15/17 14:45

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.539		0.162	0.171		0.0861	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Actinium-227	-0.299	U	0.866	0.867		1.46	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Bismuth-212	-0.227	U	0.643	0.643		1.12	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Bismuth-214	0.382		0.121	0.128		0.120	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Cesium-137	0.0310	U	0.0587	0.0588		0.0996	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Lead-210	0.946	U	1.40	1.41		1.93	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Lead-212	0.310		0.0792	0.0888		0.0899	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Lead-214	0.365		0.113	0.119		0.114	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Potassium-40	10.1		1.40	1.74		0.642	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Protactinium-231	-0.629	U	2.20	2.20		3.72	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Radium-226	0.382		0.121	0.128	0.500	0.120	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Radium-228	0.539		0.162	0.171		0.0861	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Thallium-208	0.133		0.0538	0.0556		0.0573	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Thorium-228	0.310		0.0792	0.0888		0.0899	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Thorium-232	0.539		0.162	0.171		0.0861	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Thorium-234	-0.608	U	1.39	1.40		2.01	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Uranium-235	0.0887	U	0.291	0.291		0.491	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Uranium-238	-0.608	U	1.39	1.40		2.01	pCi/g	03/20/17 21:59	04/11/17 20:48	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S006

Lab Sample ID: 160-21509-6

Date Collected: 03/15/17 15:02

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.269		0.187	0.189		0.193	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Actinium-227	-0.579	U	1.35	1.35		2.25	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Bismuth-212	0.208	U	0.460	0.460		0.791	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Bismuth-214	0.353		0.110	0.116		0.101	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Cesium-137	0.0182	U	0.0472	0.0472		0.0812	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Lead-210	-1.22	U	2.98	2.98		4.95	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Lead-212	0.360		0.0717	0.0856		0.0754	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Lead-214	0.395		0.0937	0.102		0.102	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Potassium-40	10.9		1.26	1.69		0.270	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Protactinium-231	0.578	U	1.68	1.68		3.67	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Radium-226	0.353		0.110	0.116	0.500	0.101	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Radium-228	0.269		0.187	0.189		0.193	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Thallium-208	0.108		0.0613	0.0623		0.0616	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Thorium-228	0.360		0.0717	0.0856		0.0754	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Thorium-232	0.269		0.187	0.189		0.193	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Thorium-234	0.340	U	0.689	0.690		1.72	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Uranium-235	0.0852	U	0.192	0.192		0.662	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Uranium-238	0.340	U	0.689	0.690		1.72	pCi/g	03/20/17 21:59	04/11/17 20:50	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S007

Lab Sample ID: 160-21509-7

Date Collected: 03/15/17 15:01

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.452		0.128	0.136		0.123	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Actinium-227	0.183	U	0.275	0.276		0.629	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Bismuth-212	0.351	U	0.677	0.678		1.15	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Bismuth-214	0.310		0.110	0.115		0.122	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Cesium-137	-0.0454	U	0.0679	0.0680		0.131	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-210	0.186	U	1.01	1.01		1.73	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-212	0.335		0.118	0.126		0.174	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-214	0.418		0.0998	0.109		0.126	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Potassium-40	10.7		1.38	1.76		0.563	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Protactinium-231	0.284	U	1.08	1.08		3.49	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Radium-226	0.310		0.110	0.115	0.500	0.122	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Radium-228	0.452		0.128	0.136		0.123	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thallium-208	0.164		0.0533	0.0559		0.0492	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-228	0.335		0.118	0.126		0.174	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-232	0.452		0.128	0.136		0.123	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-234	0.209	U	0.385	0.386		1.31	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Uranium-235	-0.0429	U	0.365	0.365		0.736	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Uranium-238	0.209	U	0.385	0.386		1.31	pCi/g	03/20/17 21:59	04/11/17 20:49	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S008

Lab Sample ID: 160-21509-8

Date Collected: 03/15/17 15:17

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.140	U	0.226	0.226		0.298	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Actinium-227	-0.387	U	0.828	0.829		1.39	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Bismuth-212	0.968		0.380	0.393		0.274	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Bismuth-214	0.311		0.115	0.120		0.119	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Cesium-137	-0.0323	U	0.0673	0.0673		0.114	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-210	-1.07	U	1.45	1.46		2.57	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-212	0.315		0.0852	0.0944		0.105	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-214	0.466		0.130	0.139		0.137	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Potassium-40	9.65		1.39	1.71		0.874	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Protactinium-231	-0.932	U	2.92	2.92		4.90	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Radium-226	0.311		0.115	0.120	0.500	0.119	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Radium-228	0.140	U	0.226	0.226		0.298	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thallium-208	0.136		0.0562	0.0580		0.0568	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-228	0.315		0.0852	0.0944		0.105	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-232	0.140	U	0.226	0.226		0.298	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-234	0.609	U	0.910	0.913		1.34	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Uranium-235	0.135	U	0.284	0.285		0.805	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Uranium-238	0.609	U	0.910	0.913		1.34	pCi/g	03/20/17 21:59	04/11/17 20:49	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S009

Lab Sample ID: 160-21509-9

Date Collected: 03/15/17 15:07

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.262		0.130	0.132		0.153	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Actinium-227	-0.0623	U	0.554	0.554		0.949	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Bismuth-212	0.213	U	0.463	0.464		0.796	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Bismuth-214	0.383		0.104	0.111		0.0867	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Cesium-137	0.0160	U	0.0322	0.0322		0.0554	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Lead-210	0.198	U	1.05	1.05		1.80	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Lead-212	0.379		0.0688	0.0845		0.0665	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Lead-214	0.417		0.0947	0.104		0.0898	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Potassium-40	10.6		1.30	1.69		0.693	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Protactinium-231	0.000	U	0.581	0.581		3.51	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Radium-226	0.383		0.104	0.111	0.500	0.0867	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Radium-228	0.262		0.130	0.132		0.153	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Thallium-208	0.149		0.0498	0.0521		0.0470	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Thorium-228	0.379		0.0688	0.0845		0.0665	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Thorium-232	0.262		0.130	0.132		0.153	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Thorium-234	-0.526	U	1.11	1.11		1.86	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Uranium-235	-0.131	U	0.224	0.225		0.375	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Uranium-238	-0.526	U	1.11	1.11		1.86	pCi/g	03/20/17 21:59	04/11/17 21:40	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S010

Lab Sample ID: 160-21509-10

Date Collected: 03/15/17 15:06

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.391		0.140	0.146		0.233	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Actinium-227	-0.261	U	0.877	0.877		1.48	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Bismuth-212	0.0348	U	0.761	0.761		1.36	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Bismuth-214	0.439		0.132	0.140		0.127	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Cesium-137	0.0241	U	0.0539	0.0539		0.0928	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Lead-210	0.709	U	1.52	1.52		2.17	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Lead-212	0.304		0.0942	0.102		0.122	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Lead-214	0.480		0.105	0.116		0.0978	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Potassium-40	12.3		1.61	2.05		0.707	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Protactinium-231	0.389	U	1.28	1.28		4.17	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Radium-226	0.439		0.132	0.140	0.500	0.127	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Radium-228	0.391		0.140	0.146		0.233	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Thallium-208	0.125		0.0538	0.0553		0.0608	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Thorium-228	0.304		0.0942	0.102		0.122	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Thorium-232	0.391		0.140	0.146		0.233	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Thorium-234	0.737	U	1.20	1.20		1.70	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Uranium-235	-0.0601	U	0.380	0.380		0.662	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Uranium-238	0.737	U	1.20	1.20		1.70	pCi/g	03/20/17 21:59	04/11/17 21:41	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S011

Lab Sample ID: 160-21509-11

Date Collected: 03/15/17 15:11

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.392		0.118	0.124		0.120	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Actinium-227	0.185	U	0.743	0.743		1.26	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Bismuth-212	-0.244	U	0.556	0.556		1.20	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Bismuth-214	0.410		0.109	0.117		0.0954	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Cesium-137	-0.0110	U	0.0448	0.0448		0.0969	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Lead-210	0.444	U	1.17	1.17		1.76	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Lead-212	0.335		0.0827	0.0934		0.0994	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Lead-214	0.420		0.102	0.111		0.103	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Potassium-40	8.02		1.19	1.45		0.550	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Protactinium-231	0.578	U	1.35	1.35		3.10	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Radium-226	0.410		0.109	0.117	0.500	0.0954	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Radium-228	0.392		0.118	0.124		0.120	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Thallium-208	0.161		0.0461	0.0490		0.0395	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Thorium-228	0.335		0.0827	0.0934		0.0994	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Thorium-232	0.392		0.118	0.124		0.120	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Thorium-234	0.879	U	0.895	0.900		1.24	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Uranium-235	-0.0524	U	0.0855	0.0856		0.752	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Uranium-238	0.879	U	0.895	0.900		1.24	pCi/g	03/20/17 21:59	04/11/17 21:42	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S012

Lab Sample ID: 160-21509-12

Date Collected: 03/15/17 15:09

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.484		0.130	0.139		0.0659	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Actinium-227	-0.0118	U	0.0802	0.0802		0.941	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Bismuth-212	-0.0206	U	0.526	0.526		0.948	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Bismuth-214	0.489		0.120	0.130		0.0956	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Cesium-137	0.0175	U	0.0377	0.0378		0.0649	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Lead-210	0.529	U	0.967	0.969		1.62	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Lead-212	0.279		0.107	0.113		0.163	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Lead-214	0.426		0.0837	0.0947		0.0854	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Potassium-40	11.6		1.28	1.75		0.260	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Protactinium-231	-0.676	U	2.28	2.28		3.82	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Radium-226	0.489		0.120	0.130	0.500	0.0956	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Radium-228	0.484		0.130	0.139		0.0659	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Thallium-208	0.0299	U	0.0900	0.0900		0.0908	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Thorium-228	0.279		0.107	0.113		0.163	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Thorium-232	0.484		0.130	0.139		0.0659	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Thorium-234	0.344	U	0.321	0.323		1.79	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Uranium-235	0.0173	U	0.202	0.202		0.765	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Uranium-238	0.344	U	0.321	0.323		1.79	pCi/g	03/20/17 21:59	04/11/17 21:43	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-298819/1-A

Matrix: Solid

Analysis Batch: 303018

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 298819

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.02508	U	0.128	0.128		0.165	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Actinium-227	0.09917	U	0.201	0.201		0.846	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Bismuth-212	-0.2769	U	0.644	0.645		1.11	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Bismuth-214	-0.03807	U	0.126	0.127		0.232	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Cesium-137	0.02341	U	0.0563	0.0564		0.0972	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Lead-210	-0.4473	U	0.925	0.927		1.57	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Lead-212	0.004255	U	0.0621	0.0621		0.110	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Lead-214	0.005493	U	0.0395	0.0395		0.125	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Potassium-40	-0.2809	U	0.683	0.684		1.02	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Protactinium-231	0.0000	U	0.113	0.113		2.90	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Radium-226	-0.03807	U	0.126	0.127	0.500	0.232	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Radium-228	-0.02508	U	0.128	0.128		0.165	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Thallium-208	0.01867	U	0.0273	0.0273		0.0431	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Thorium-228	0.004255	U	0.0621	0.0621		0.110	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Thorium-232	-0.02508	U	0.128	0.128		0.165	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Thorium-234	-0.3847	U	0.867	0.868		1.47	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Uranium-235	0.06131	U	0.250	0.250		0.429	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Uranium-238	-0.3847	U	0.867	0.868		1.47	pCi/g	03/20/17 21:59	04/11/17 19:13	1

Lab Sample ID: LCS 160-298819/2-A

Matrix: Solid

Analysis Batch: 303015

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 298819

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.0	95.16		10.0		1.10	pCi/g	98	87 - 116
Cesium-137	29.1	29.08		3.10		0.205	pCi/g	100	87 - 120
Cobalt-60	15.3	14.85		1.55		0.0815	pCi/g	97	87 - 115

Lab Sample ID: 160-21509-1 DU

Matrix: Solid

Analysis Batch: 303018

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S001

Prep Type: Total/NA

Prep Batch: 298819

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.368		0.5052		0.146		0.0691	pCi/g	0.52	1
Actinium-227	-0.294	U	-0.3060	U	0.653		1.09	pCi/g	0.01	1
Bismuth-212	0.133	U	0.2272	U	0.544		0.935	pCi/g	0.10	1
Bismuth-214	0.379		0.3424		0.106		0.0881	pCi/g	0.17	1
Cesium-137	-0.0189	U	0.001666	U	0.0422		0.0760	pCi/g	0.21	1
Lead-210	-0.151	U	0.5398	U	1.07		1.79	pCi/g	0.31	1
Lead-212	0.329		0.2949		0.0758		0.0697	pCi/g	0.22	1
Lead-214	0.433		0.3790		0.119		0.108	pCi/g	0.22	1
Potassium-40	10.0		11.17		1.75		0.609	pCi/g	0.34	1
Protactinium-231	-0.357	U	0.08871	U	1.05		3.61	pCi/g	0.14	1
Radium-226	0.379		0.3424		0.106	0.500	0.0881	pCi/g	0.17	1
Radium-228	0.368		0.5052		0.146		0.0691	pCi/g	0.52	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-21509-1 DU
Matrix: Solid
Analysis Batch: 303018

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S001
Prep Type: Total/NA
Prep Batch: 298819

Analyte	Sample		DU		Total	LOQ	MDC	Unit	RER	RER Limit
	Result	Qual	Result	Qual	Uncert. (2σ+/-)					
Thallium-208	0.116		0.1447		0.0429		0.0322	pCi/g	0.34	1
Thorium-228	0.329		0.2949		0.0758		0.0697	pCi/g	0.22	1
Thorium-232	0.368		0.5052		0.146		0.0691	pCi/g	0.52	1
Thorium-234	0.489	U	0.0000	U	0.700		2.02	pCi/g	0.28	1
Uranium-235	-0.140	U	0.08254	U	0.182		0.645	pCi/g	0.37	1
Uranium-238	0.489	U	0.0000	U	0.700		2.02	pCi/g	0.28	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Rad

Leach Batch: 298219

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21509-1	TITO04-RSY15-U8-BS-FSSSU6-S001	Total/NA	Solid	Dry and Grind	
160-21509-2	TITO04-RSY15-U8-BS-FSSSU6-S002	Total/NA	Solid	Dry and Grind	
160-21509-3	TITO04-RSY15-U8-BS-FSSSU6-S003	Total/NA	Solid	Dry and Grind	
160-21509-4	TITO04-RSY15-U8-BS-FSSSU6-S004	Total/NA	Solid	Dry and Grind	
160-21509-5	TITO04-RSY15-U8-BS-FSSSU6-S005	Total/NA	Solid	Dry and Grind	
160-21509-6	TITO04-RSY15-U8-BS-FSSSU6-S006	Total/NA	Solid	Dry and Grind	
160-21509-7	TITO04-RSY15-U8-BS-FSSSU6-S007	Total/NA	Solid	Dry and Grind	
160-21509-8	TITO04-RSY15-U8-BS-FSSSU6-S008	Total/NA	Solid	Dry and Grind	
160-21509-9	TITO04-RSY15-U8-BS-FSSSU6-S009	Total/NA	Solid	Dry and Grind	
160-21509-10	TITO04-RSY15-U8-BS-FSSSU6-S010	Total/NA	Solid	Dry and Grind	
160-21509-11	TITO04-RSY15-U8-BS-FSSSU6-S011	Total/NA	Solid	Dry and Grind	
160-21509-12	TITO04-RSY15-U8-BS-FSSSU6-S012	Total/NA	Solid	Dry and Grind	
160-21509-1 DU	TITO04-RSY15-U8-BS-FSSSU6-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 298819

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21509-1	TITO04-RSY15-U8-BS-FSSSU6-S001	Total/NA	Solid	Fill_Geo-21	298219
160-21509-2	TITO04-RSY15-U8-BS-FSSSU6-S002	Total/NA	Solid	Fill_Geo-21	298219
160-21509-3	TITO04-RSY15-U8-BS-FSSSU6-S003	Total/NA	Solid	Fill_Geo-21	298219
160-21509-4	TITO04-RSY15-U8-BS-FSSSU6-S004	Total/NA	Solid	Fill_Geo-21	298219
160-21509-5	TITO04-RSY15-U8-BS-FSSSU6-S005	Total/NA	Solid	Fill_Geo-21	298219
160-21509-6	TITO04-RSY15-U8-BS-FSSSU6-S006	Total/NA	Solid	Fill_Geo-21	298219
160-21509-7	TITO04-RSY15-U8-BS-FSSSU6-S007	Total/NA	Solid	Fill_Geo-21	298219
160-21509-8	TITO04-RSY15-U8-BS-FSSSU6-S008	Total/NA	Solid	Fill_Geo-21	298219
160-21509-9	TITO04-RSY15-U8-BS-FSSSU6-S009	Total/NA	Solid	Fill_Geo-21	298219
160-21509-10	TITO04-RSY15-U8-BS-FSSSU6-S010	Total/NA	Solid	Fill_Geo-21	298219
160-21509-11	TITO04-RSY15-U8-BS-FSSSU6-S011	Total/NA	Solid	Fill_Geo-21	298219
160-21509-12	TITO04-RSY15-U8-BS-FSSSU6-S012	Total/NA	Solid	Fill_Geo-21	298219
MB 160-298819/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-298819/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-21509-1 DU	TITO04-RSY15-U8-BS-FSSSU6-S001	Total/NA	Solid	Fill_Geo-21	298219

Guillory, Jeffrey

From: Weyant, David B CIV NAVSEA 04, 04N <david.weyant@navy.mil>
Sent: Wednesday, May 03, 2017 6:41 AM
To: Guillory, Jeffrey
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: RE: NSTI RSY Soil Release Request - RSY 15 (Use 9)

Hello Jeff,

I concur to designating RSY-15 (Use 9) soil as Non-LLRW soil.

VR

David Weyant
Health Physicist/Environmental Protection Manager
Environmental Protection Division
NAVSEADET RASO
160 Main Road, Bldg 1959
YORKTOWN, VA 23691

Office: (757) 887-7650

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-----Original Message-----

From: Guillory, Jeffrey [mailto:jeffrey.guillory@cbifederaleservices.com]
Sent: Friday, April 21, 2017 10:34 AM
To: Weyant, David B CIV NAVSEA 04, 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Schul, Raymond; Morrison, Dennis; Bohannon, Derek
Subject: [Non-DoD Source] NSTI RSY Soil Release Request - RSY 15 (Use 9)

Mr. Weyant,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Jeffrey Guillory

Scientist 3

Federal Services

Cell: +1 979 422 5534

jeffrey.guillory@cbifederalservices.com <mailto:jeffrey.guillory@cbifederalservices.com>

CB&I

950 Avenue M - Treasure Island

San Francisco, CA 94130

United States of America

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Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004			
RSY Unit: RSY 15	RSY Unit Use Number: USE 9	First Submittal <input checked="" type="checkbox"/>	Second Submittal <input type="checkbox"/>
Data attached and submitted by: Jeff Guillory		Data Report Submittal Date: 4/21/2017	

Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static Survey Meter (Model 2221) Serial Number	One-Minute Static Reading (CPM)	Static Count Exceeds Reference Area IL?	²²⁶ Ra Final Analytical Results (pCi/g)
Upper limit of site reference background						1.69
TITO04-RSY15-U9-BS-FSSSU5-S001	1	Systematic	117648	11,518	No	0.361
TITO04-RSY15-U9-BS-FSSSU5-S002	2	Systematic	117648	11,349	No	0.397
TITO04-RSY15-U9-BS-FSSSU5-S003	3	Systematic	117648	11,535	No	0.292
TITO04-RSY15-U9-BS-FSSSU5-S004	4	Systematic	117648	11,454	No	0.360
TITO04-RSY15-U9-BS-FSSSU5-S005	5	Systematic	117648	11,076	No	0.125
TITO04-RSY15-U9-BS-FSSSU5-S006	6	Systematic	117648	11,185	No	0.350
TITO04-RSY15-U9-BS-FSSSU5-S007	7	Systematic	117648	11,089	No	0.370
TITO04-RSY15-U9-BS-FSSSU5-S008	8	Systematic	117648	11,313	No	0.326
TITO04-RSY15-U9-BS-FSSSU5-S009	9	Systematic	117648	11,105	No	0.324
TITO04-RSY15-U9-BS-FSSSU5-S010	10	Systematic	117648	11,103	No	0.524
TITO04-RSY15-U9-BS-FSSSU5-S011	11	Systematic	117648	11,444	No	0.396
TITO04-RSY15-U9-BS-FSSSU5-S012	12	Systematic	117648	11,253	No	0.271

CPM Counts per minute
 IL Investigation Level (based on Reference Area data set)
²²⁶Ra Radium-226
 pCi/g Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd (CPM)	Reference Area Static 3σ IL (CPM)	Reference Area Scan Bkgd (CPM)	Reference Area Scan 3σ IL (CPM)	Range (CPM)
Gamma Walkover Survey	TIRS-03182017-12P3-GWS-2798	3/18/2017	2221	8/12/2017	117648	N/A	N/A	14,256	17,684	7,827 – 12,682
Follow-up Static Survey	TIRS-03202017-12P3-JSS-2799	3/20/2017	2221	8/12/2017	117648	14,157	16,702	N/A	N/A	10,544 – 12,863
Systematic Sampling Survey	TIRS-03202017-12P3-JSS-2803	3/20/2017 – 3/21/2017	2221	8/12/2017	117648	14,157	16,702	N/A	N/A	11,076 – 11,535

3σ IL Investigation Level (established at 3σ above the mean of the Reference Area data set)
 CPM Counts per minute

Summary
<p>1) Gamma walkover survey and data review—all locations surveyed on RSY 15 (Use 9) were less than the Reference Area scan IL. As a conservative measure, data points exceeding three standard deviations of the data set average for RSY 15 (Use 9) were evaluated for follow-up investigation; 17 total data points clustered around 12 discrete locations were identified as exceeding three standard deviations of the data set average. Gamma scan coverage is shown on the Systematic Sample Survey map (page 3). GWS count rate statistics are also provided (page 4).</p> <p>2) Follow-up static survey—12 clustered locations (17 GWS data points) identified during the data review process as exceeding three standard deviations of the data set average for RSY 15 (Use 9) were investigated, resulting in all locations less than the Reference Area static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 5).</p> <p>3) Twelve systematic soil samples (S001-S012) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations, with static readings < Reference Area static IL for all sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). TestAmerica sample results are attached (pages 8-26).</p> <p>Conclusions:</p> <p>All count rates recorded during the gamma walkover survey were less than the Reference Area scan IL. As an additional conservative characterization approach, clustered locations identified as exceeding three standard deviations of the data set mean for RSY 15 (Use 9) were investigated and deemed comparable to background. 12 total follow-up static locations were investigated, with readings less than the Reference Area static IL at all locations.</p> <p>Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 6-7. These statistical tools were utilized to verify the appropriate level of reasonable effort.</p> <p>RSY 15 (Use 9) contains FSS material from the 6-inch over excavation of the bottom of the excavation at SWDA Bayside SU 5.</p> <p>Note: Soil on RSY Pad 15 (Use 9) was over-excavated at the final depth from the bottom of the excavation at Bayside SU 5, and no visible debris and/or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.</p> <p>CB&I requests RASO concurrence to release this soil as Non-LLRW.</p> <p>Disposition: This soil shall be dispositioned as non-LLRW waste to be disposed of offsite following appropriate chemical characterization.</p>

Survey Number:
TIRS-03202017-12P3-JSS-2803



Instrument #117648

S Systematic Sample Location

● GWS Scan Coverage

RSY Pad Boundary

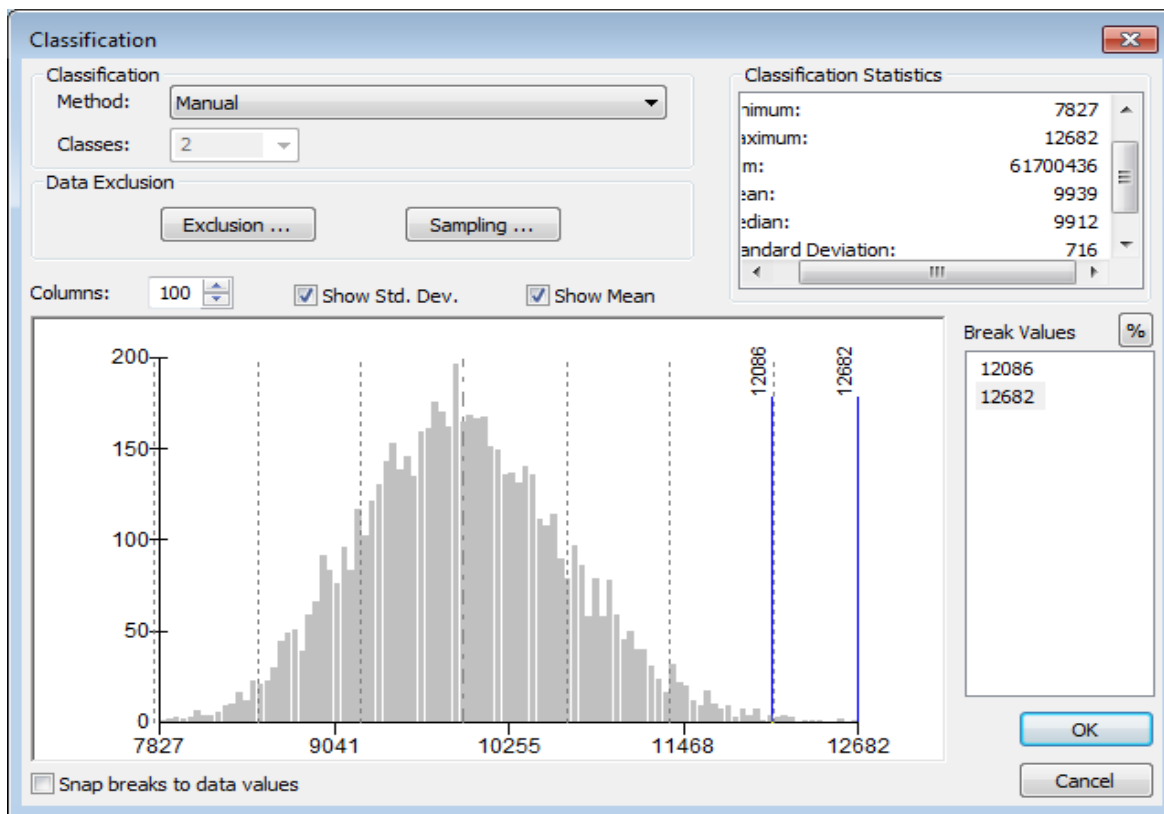
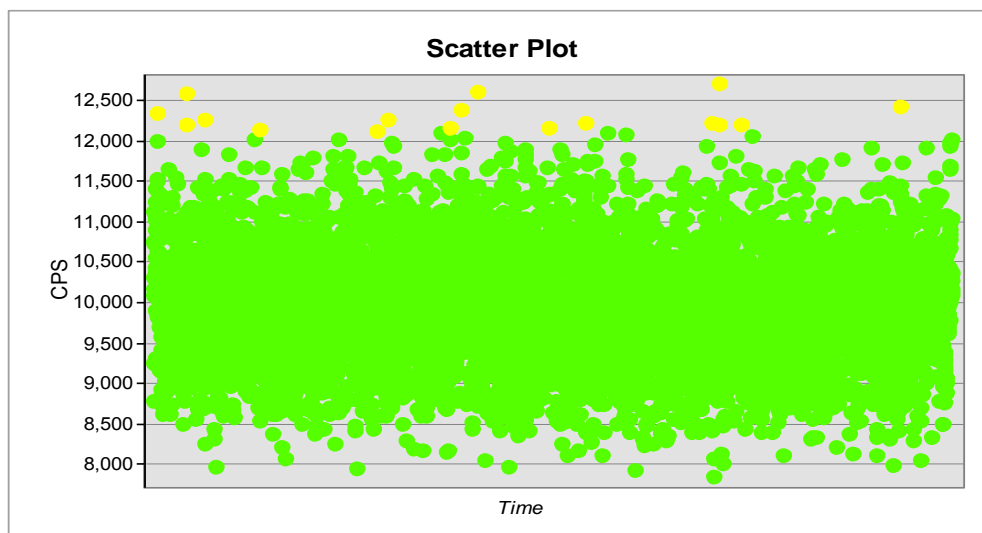
CB&I Federal Services, LLC

Data Processed In Treasure Island Office

Survey: TIRS-03182017-12P3-GWS-2778

RSY Pad 15 (Use 9)
Site 32

In the 7,000	In the 8,000	In the 9,000	In the 10,000	In the 11,000	In the 12,000
7	580	2829	2325	445	22

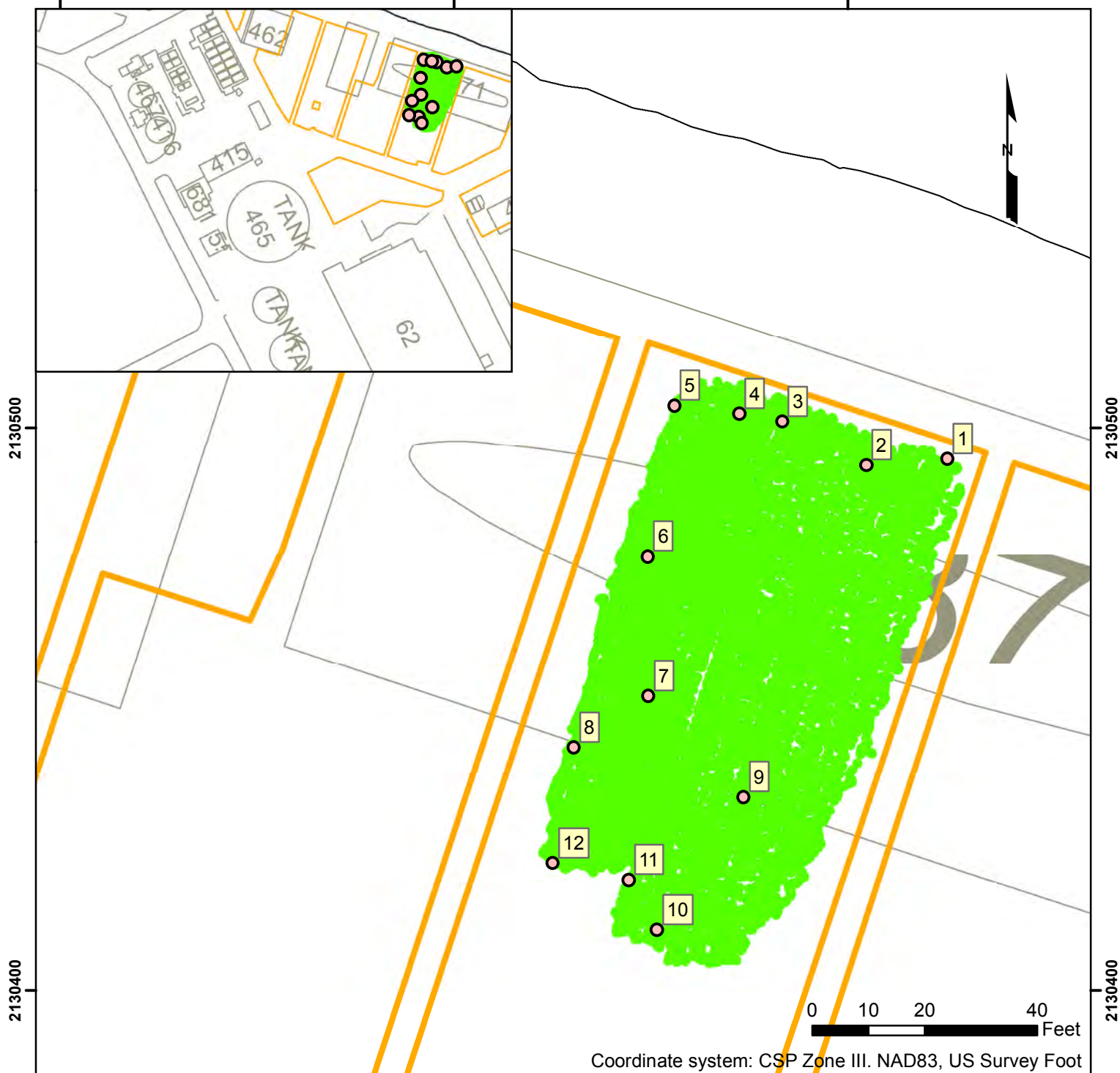


Survey Number:
TIRS-03202017-12P3-JSS-2799




6021770

6021840

6021910



Instrument #117648

-  Follow-up Location
-  Areas Not Requiring Further Investigation
-  RSY Pad Boundary

CB&I Federal Services, LLC

Data Processed In Treasure Island Office

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 15-9
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

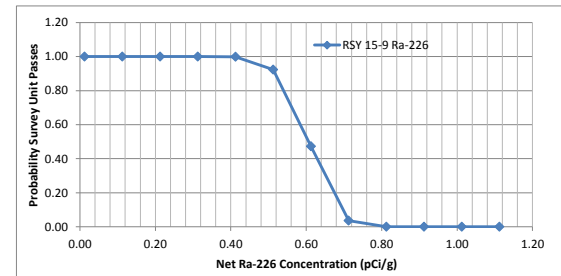
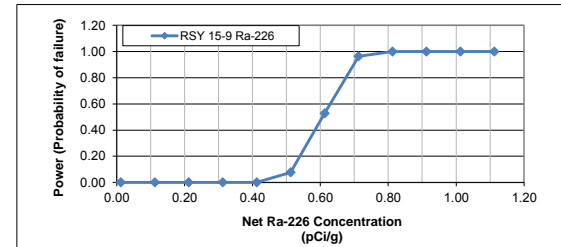
POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4	S
0.57	R	0.57	19.5	0	5	S
0.55	R	0.55	18	0	6	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.361	S	-0.121939192	8	8	21.5	R
0.397	S	-0.085939192	11	11	21.5	R
0.292	S	-0.190939192	3	3	23	R
0.360	S	-0.122939192	7	7	24	R
0.125	S	-0.357939192	1	1	25	R
0.350	S	-0.132939192	6	6	26	R
0.370	S	-0.112939192	9	9	27.5	R
0.326	S	-0.156939192	5	5	27.5	R
0.324	S	-0.158939192	4	4	29	R
0.524	S	0.041060808	12	12	30	R
0.396	S	-0.086939192	10	10	31	R
0.271	S	-0.211939192	2	2	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.093
Z(1-alpha)	1.960
Z(1-beta)	1.645

Concentration	Background (C)	SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
1.5	0.81	2.0	0.92135	0.86577	221.124	138.9359	11.787107	-4.34973	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_W = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)
 Use:
 $m = 20$
 $n = 15$
 $6 r$
 $5 k$
 0.04 α

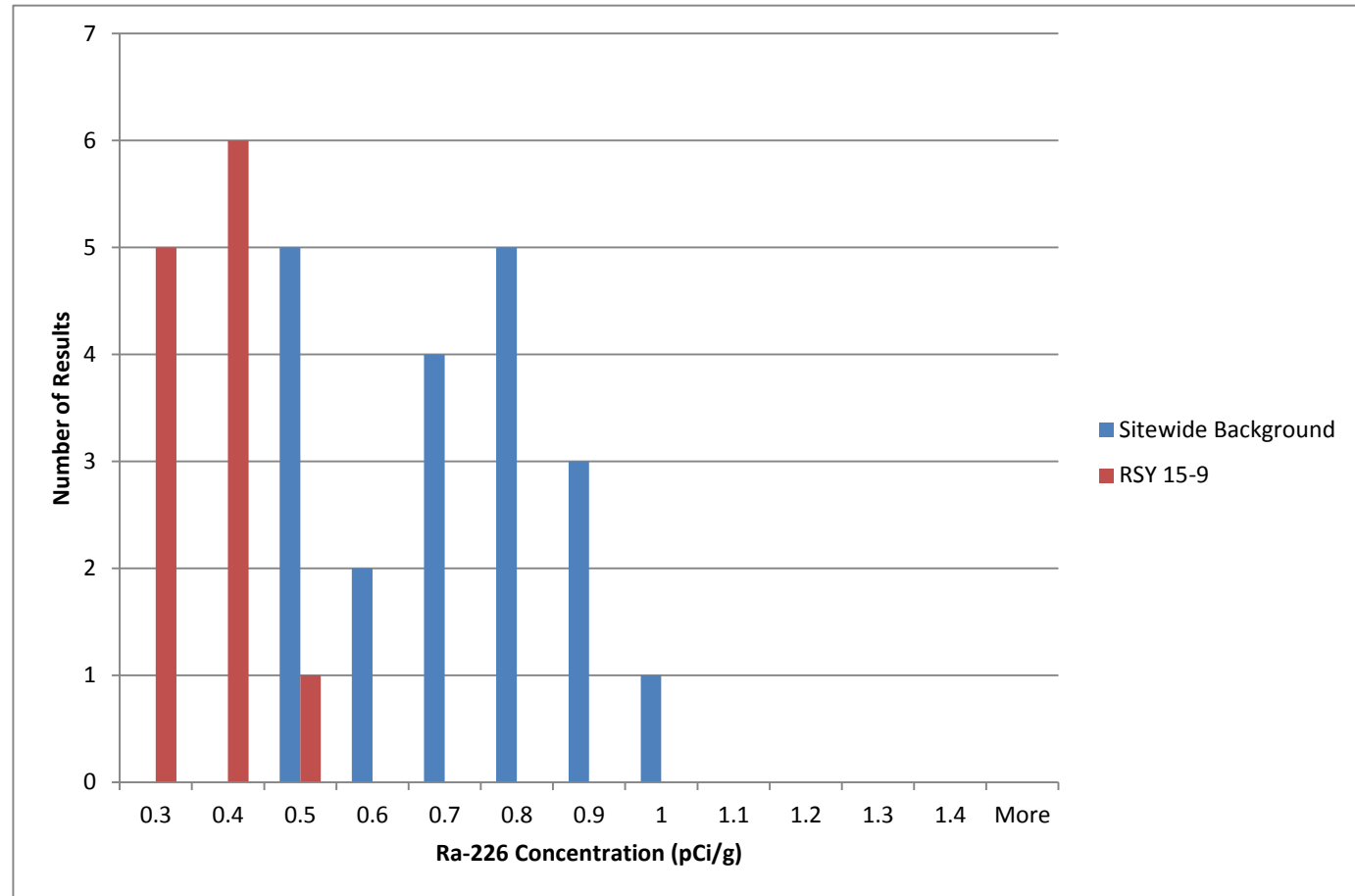
If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

Histogram, RSY 15 (Use 9) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY 15-9	
<i>Bin</i>	<i>Frequency</i>
0.3	5
0.4	6
0.5	1
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-21561-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

4/18/2017 3:00:35 PM

Micha Korinhizer, Project Management Assistant I
(314)298-8566

micha.korinhizer@testamericainc.com

Designee for

Erika Gish, Project Manager II
(314)298-8566

erika.gish@testamericainc.com

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Job ID: 160-21561-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-21561-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Job ID: 160-21561-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 3/22/2017 8:40 AM; the samples arrived in good condition and properly preserved. The temperatures of the 2 coolers at receipt time were 19.0° C and 19.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-RSY15-U9-BS-FSSSU5-S001 (160-21561-1), TITO04-RSY15-U9-BS-FSSSU5-S002 (160-21561-2), TITO04-RSY15-U9-BS-FSSSU5-S003 (160-21561-3), TITO04-RSY15-U9-BS-FSSSU5-S004 (160-21561-4), TITO04-RSY15-U9-BS-FSSSU5-S005 (160-21561-5), TITO04-RSY15-U9-BS-FSSSU5-S006 (160-21561-6), TITO04-RSY15-U9-BS-FSSSU5-S007 (160-21561-7), TITO04-RSY15-U9-BS-FSSSU5-S008 (160-21561-8), TITO04-RSY15-U9-BS-FSSSU5-S009 (160-21561-9), TITO04-RSY15-U9-BS-FSSSU5-S010 (160-21561-10), TITO04-RSY15-U9-BS-FSSSU5-S011 (160-21561-11) and TITO04-RSY15-U9-BS-FSSSU5-S012 (160-21561-12) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 03/22/2017, prepared on 03/27/2017 and analyzed on 04/18/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

CHAIN OF CUSTODY

Ref. Document # TL_P3_RSY15_U9_BS_FSSSU5_#379

Page 1 of 2



CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520



160-21561 Chain of Custody

Project Number: 500060

CTO-04 Phase III Site 32 RSY15

Project Name / Location: USE 9 From Bayside SU5
Systematic

Purchase Order #: 201455

Shipment Date: 3-21-17

Waybill Number: 1239V46Z019468124

Lab Destination: Earth Toxics Inc To Test America

Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer

(Name & Phone #)

Send Report To: Renata Vidovic

Phone/Fax Number: 408-505-7319

Address: renata.vidovic@cbifederalservices.com

City:

Sampler's Name(s): M. Star

Sample ID Number	Sample Description	Date	Time	Method	Matrix	# of containers	Preservative (water)	Preservative (soil)	Container Type	Dose Rate $\mu\text{R}/\text{Hr}$
TITO04-RSY15-U9-BS-FSSSU5-S001	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1412	G	SO	1			16 oz Plastic	5
TITO04-RSY15-U9-BS-FSSSU5-S002	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1409	G	SO	1			16 oz Plastic	5
TITO04-RSY15-U9-BS-FSSSU5-S003	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1403	G	SO	1			16 oz Plastic	5
TITO04-RSY15-U9-BS-FSSSU5-S004	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1417	G	SO	1			16 oz Plastic	5
TITO04-RSY15-U9-BS-FSSSU5-S005	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1426	G	SO	1			16 oz Plastic	5
TITO04-RSY15-U9-BS-FSSSU5-S006	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1418	G	SO	1			16 oz Plastic	5
TITO04-RSY15-U9-BS-FSSSU5-S007	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1425	G	SO	1			16 oz Plastic	5
TITO04-RSY15-U9-BS-FSSSU5-S008	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1430	G	SO	1			16 oz Plastic	5

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required

☐ 24-hr☐ 3-day☐ 7-day

Project Specific:

I

II

III

G = Grab

C = Composite

Method Codes

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening

Relinquished By:

Date: 3-20-17
Time: 1715

Relinquished By:

Date: 3-21-17
Time: 0855

Relinquished By:

Date: 3-21-17
Time: 1010

Relinquished By:

Date: 3-21-17
Time: 0840Date: 3-20-17
Time: 1715Date: 3-21-17
Time: 0855Date: 3-21-17
Time: 1010Date: 3-21-17
Time: 08401
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CHAIN OF CUSTODY

Ref. Document # TI_P3_RSY15_U9_BS_FSSSU5_#379

Page 2 of 2

CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

Project Number: **500060**
CTO-04 Phase III Site 32 RSY15
Project Name / Location: **USE 9 From Bayside SU5**
Systematic
Purchase Order #: **201455**
Shipment Date: **3-21-17**
Waybill Number: **1298V4620194468724**
Lab Destination: **Earth Toxics Inc To Test America**
Contact Name / ph. #: **Mike Dryden**

Project Manager: **Ulrika Messer**
(Name & phone #)
Send Report To: **Renata Vidovic**
Phone/Fax Number: **408-505-7319**
Address: **renata.vidovic@cbifederalservices.com**
City:

Collection Information				Matrix		Preservative (water)		Preservative (soil)		Container Type		Dose Rate $\mu\text{R}/\text{H}$
Sample ID Number	Sample Description	Date	Time	Method	# of containers	Preservative (water)	Preservative (soil)	Container Type				
TITO04-RSY15-U9-BS-FSSSU5-S009	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1432	G	SO 1			16 oz Plastic	X			5
TITO04-RSY15-U9-BS-FSSSU5-S010	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1428	G	SO 1			16 oz Plastic	X			5
TITO04-RSY15-U9-BS-FSSSU5-S011	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1419	G	SO 1			16 oz Plastic	X			5
TITO04-RSY15-U9-BS-FSSSU5-S012	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1423	G	SO 1			16 oz Plastic	X			5
<i>(Handwritten signature across the table)</i>												

Special Instructions: 7 days ingrown draft and follow with 21 days final

Level Of QC Required: ☐ 24-hr ☐ 3-day ☐ 7-day

Standard TAT ☐

Relinquished By: *Ulrika* Date: **3-20-17** Time: **1715** Received By: *HP* Date: **3-20-17** Time: **1715**

Relinquished By: *Ulrika* Date: **3-20-17** Time: **0855** Received By: *Nal* Date: **3-21-17** Time: **0855**

Relinquished By: *Ulrika* Date: **3-21-17** Time: **1010** Received By: *UPS* Date: **3-21-17** Time: **1010**

Relinquished By: *UPS* Date: **3-22-17** Time: **0840** Received By: *Wuster Jayne* Date: **3-22-17** Time: **0840**

Method Codes
C = Composite
G = Grab

Matrix Codes
DW = Drinking Water
GW = Ground Water
WW = Waste Water
A = Air
SO = Soil
SL = Sludge
CP = Chip Samples
ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-21561-2

Login Number: 21561**List Source: TestAmerica St. Louis****List Number: 1****Creator: Clarke, Jill C**

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:
DOE = U.S. Department of Energy

Laboratory References:
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-21561-1	TITO04-RSY15-U9-BS-FSSSU5-S001	Solid	03/20/17 14:12	03/22/17 08:40
160-21561-2	TITO04-RSY15-U9-BS-FSSSU5-S002	Solid	03/20/17 14:09	03/22/17 08:40
160-21561-3	TITO04-RSY15-U9-BS-FSSSU5-S003	Solid	03/20/17 14:13	03/22/17 08:40
160-21561-4	TITO04-RSY15-U9-BS-FSSSU5-S004	Solid	03/20/17 14:17	03/22/17 08:40
160-21561-5	TITO04-RSY15-U9-BS-FSSSU5-S005	Solid	03/20/17 14:26	03/22/17 08:40
160-21561-6	TITO04-RSY15-U9-BS-FSSSU5-S006	Solid	03/20/17 14:18	03/22/17 08:40
160-21561-7	TITO04-RSY15-U9-BS-FSSSU5-S007	Solid	03/20/17 14:25	03/22/17 08:40
160-21561-8	TITO04-RSY15-U9-BS-FSSSU5-S008	Solid	03/20/17 14:30	03/22/17 08:40
160-21561-9	TITO04-RSY15-U9-BS-FSSSU5-S009	Solid	03/20/17 14:32	03/22/17 08:40
160-21561-10	TITO04-RSY15-U9-BS-FSSSU5-S010	Solid	03/20/17 14:28	03/22/17 08:40
160-21561-11	TITO04-RSY15-U9-BS-FSSSU5-S011	Solid	03/20/17 14:19	03/22/17 08:40
160-21561-12	TITO04-RSY15-U9-BS-FSSSU5-S012	Solid	03/20/17 14:23	03/22/17 08:40

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S001

Lab Sample ID: 160-21561-1

Date Collected: 03/20/17 14:12

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.515		0.147	0.156		0.0775	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Actinium-227	-0.291	U	0.728	0.728		1.22	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Bismuth-212	0.306	U	0.547	0.548		0.928	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Bismuth-214	0.361		0.123	0.128		0.130	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Cesium-137	0.0242	U	0.0438	0.0439		0.0743	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Lead-210	-0.0875	U	1.27	1.27		2.20	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Lead-212	0.323		0.0772	0.0878		0.0890	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Lead-214	0.355		0.113	0.119		0.121	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Potassium-40	11.0		1.39	1.78		0.682	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Protactinium-231	0.000	U	0.446	0.446		3.51	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Radium-226	0.361		0.123	0.128	0.500	0.130	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Radium-228	0.515		0.147	0.156		0.0775	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Thallium-208	0.173		0.0597	0.0624		0.0512	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Thorium-228	0.323		0.0772	0.0878		0.0890	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Thorium-232	0.515		0.147	0.156		0.0775	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Thorium-234	-0.167	U	0.836	0.837		1.46	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Uranium-235	0.0576	U	0.142	0.142		0.516	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Uranium-238	-0.167	U	0.836	0.837		1.46	pCi/g	03/27/17 20:40	04/18/17 07:17	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S002

Lab Sample ID: 160-21561-2

Date Collected: 03/20/17 14:09

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.253		0.135	0.138		0.162	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Actinium-227	0.185	U	0.766	0.767		1.00	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Bismuth-212	0.00782	U	0.636	0.636		1.17	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Bismuth-214	0.397		0.123	0.130		0.106	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Cesium-137	-0.0163	U	0.0702	0.0702		0.128	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Lead-210	-0.0243	U	1.75	1.75		3.00	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Lead-212	0.313		0.0813	0.0909		0.0898	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Lead-214	0.364		0.106	0.113		0.120	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Potassium-40	11.9		1.72	2.11		0.620	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Protactinium-231	0.000	U	2.35	2.35		4.00	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Radium-226	0.397		0.123	0.130	0.500	0.106	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Radium-228	0.253		0.135	0.138		0.162	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Thallium-208	0.198		0.0571	0.0607		0.0420	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Thorium-228	0.313		0.0813	0.0909		0.0898	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Thorium-232	0.253		0.135	0.138		0.162	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Thorium-234	-0.441	U	1.30	1.30		2.26	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Uranium-235	-0.0902	U	0.187	0.187		0.772	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Uranium-238	-0.441	U	1.30	1.30		2.26	pCi/g	03/27/17 20:40	04/18/17 07:27	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S003

Lab Sample ID: 160-21561-3

Date Collected: 03/20/17 14:13

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.282		0.163	0.166		0.155	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Actinium-227	0.203	U	0.528	0.528		0.893	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Bismuth-212	0.0370	U	0.528	0.528		0.961	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Bismuth-214	0.292		0.105	0.109		0.0850	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Cesium-137	0.0305	U	0.0561	0.0562		0.0950	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Lead-210	0.302	U	1.06	1.06		1.79	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Lead-212	0.315		0.0929	0.101		0.0920	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Lead-214	0.266		0.0954	0.0993		0.134	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Potassium-40	10.8		1.47	1.84		0.370	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Protactinium-231	-0.141	U	2.11	2.11		3.59	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Radium-226	0.292		0.105	0.109	0.500	0.0850	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Radium-228	0.282		0.163	0.166		0.155	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Thallium-208	0.0629	U	0.0680	0.0684		0.0731	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Thorium-228	0.315		0.0929	0.101		0.0920	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Thorium-232	0.282		0.163	0.166		0.155	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Thorium-234	0.268	U	0.404	0.405		1.14	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Uranium-235	-0.0638	U	0.224	0.224		0.562	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Uranium-238	0.268	U	0.404	0.405		1.14	pCi/g	03/27/17 20:40	04/18/17 07:29	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S004

Lab Sample ID: 160-21561-4

Date Collected: 03/20/17 14:17

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.132	U	0.205	0.205		0.284	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Actinium-227	0.245	U	0.542	0.542		0.782	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Bismuth-212	-0.00355	U	0.830	0.830		1.49	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Bismuth-214	0.360		0.161	0.165		0.154	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Cesium-137	-0.0351	U	0.0897	0.0897		0.182	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Lead-210	1.40		1.03	1.04		1.35	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Lead-212	0.238		0.0745	0.0806		0.0852	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Lead-214	0.328		0.105	0.111		0.105	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Potassium-40	10.9		1.73	2.06		0.731	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Protactinium-231	0.000	U	0.371	0.371		3.09	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Radium-226	0.360		0.161	0.165	0.500	0.154	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Radium-228	0.132	U	0.205	0.205		0.284	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Thallium-208	0.120		0.0535	0.0549		0.0454	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Thorium-228	0.238		0.0745	0.0806		0.0852	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Thorium-232	0.132	U	0.205	0.205		0.284	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Thorium-234	0.651	U	0.343	0.349		1.66	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Uranium-235	0.0325	U	0.0504	0.0505		0.547	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Uranium-238	0.651	U	0.343	0.349		1.66	pCi/g	03/27/17 20:40	04/18/17 07:31	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S005

Lab Sample ID: 160-21561-5

Date Collected: 03/20/17 14:26

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.379		0.213	0.217		0.213	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Actinium-227	0.132	U	0.513	0.513		1.29	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Bismuth-212	-0.0163	U	0.835	0.835		1.51	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Bismuth-214	0.125	U	0.251	0.252		0.330	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Cesium-137	0.00801	U	0.0588	0.0588		0.106	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Lead-210	-0.614	U	1.78	1.78		3.10	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Lead-212	0.349		0.0932	0.104		0.110	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Lead-214	0.394		0.123	0.129		0.120	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Potassium-40	9.95		1.63	1.92		0.748	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Protactinium-231	-0.932	U	3.01	3.01		5.07	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Radium-226	0.125	U	0.251	0.252	0.500	0.330	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Radium-228	0.379		0.213	0.217		0.213	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Thallium-208	0.107		0.0678	0.0687		0.0742	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Thorium-228	0.349		0.0932	0.104		0.110	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Thorium-232	0.379		0.213	0.217		0.213	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Thorium-234	0.0369	U	1.56	1.56		2.65	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Uranium-235	-0.0146	U	0.0575	0.0575		1.12	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Uranium-238	0.0369	U	1.56	1.56		2.65	pCi/g	03/27/17 20:40	04/18/17 07:35	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S006

Lab Sample ID: 160-21561-6

Date Collected: 03/20/17 14:18

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.410		0.145	0.151		0.107	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Actinium-227	0.270	U	0.575	0.576		0.964	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Bismuth-212	-0.0198	U	0.743	0.743		1.30	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Bismuth-214	0.350		0.102	0.108		0.0830	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Cesium-137	0.000	U	0.0215	0.0215		0.0712	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-210	-0.611	U	1.13	1.13		1.89	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-212	0.341		0.0644	0.0781		0.0622	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-214	0.391		0.0779	0.0878		0.0719	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Potassium-40	11.8		1.27	1.75		0.250	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Protactinium-231	0.000	U	0.554	0.554		3.39	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Radium-226	0.350		0.102	0.108	0.500	0.0830	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Radium-228	0.410		0.145	0.151		0.107	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thallium-208	0.183		0.0410	0.0452		0.0255	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-228	0.341		0.0644	0.0781		0.0622	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-232	0.410		0.145	0.151		0.107	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-234	0.288	U	0.668	0.669		1.63	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Uranium-235	-0.157	U	0.418	0.419		0.699	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Uranium-238	0.288	U	0.668	0.669		1.63	pCi/g	03/27/17 20:40	04/18/17 08:00	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S007

Lab Sample ID: 160-21561-7

Date Collected: 03/20/17 14:25

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.446		0.124	0.132		0.0798	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Actinium-227	-0.0486	U	0.0853	0.0855		1.28	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Bismuth-212	0.0351	U	0.583	0.583		1.05	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Bismuth-214	0.370		0.119	0.125		0.108	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Cesium-137	0.0204	U	0.0404	0.0405		0.0694	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Lead-210	0.818	U	1.02	1.02		1.48	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Lead-212	0.295		0.0747	0.0839		0.0862	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Lead-214	0.333		0.0907	0.0971		0.125	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Potassium-40	10.2		1.36	1.72		0.703	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Protactinium-231	-0.388	U	2.42	2.42		4.09	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Radium-226	0.370		0.119	0.125	0.500	0.108	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Radium-228	0.446		0.124	0.132		0.0798	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Thallium-208	0.124		0.0453	0.0471		0.0426	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Thorium-228	0.295		0.0747	0.0839		0.0862	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Thorium-232	0.446		0.124	0.132		0.0798	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Thorium-234	0.270	U	0.397	0.398		1.22	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Uranium-235	0.0849	U	0.283	0.283		0.479	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Uranium-238	0.270	U	0.397	0.398		1.22	pCi/g	03/27/17 20:40	04/18/17 07:57	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S008

Lab Sample ID: 160-21561-8

Date Collected: 03/20/17 14:30

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.132	U	0.0627	0.0642		0.313	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Actinium-227	-0.330	U	0.783	0.784		1.31	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Bismuth-212	0.409	U	0.689	0.690		1.16	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Bismuth-214	0.326		0.104	0.110		0.0980	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Cesium-137	0.000	U	0.0323	0.0323		0.0882	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-210	0.745	U	1.28	1.28		1.76	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-212	0.264		0.0798	0.0868		0.105	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-214	0.415		0.0983	0.107		0.109	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Potassium-40	10.2		1.35	1.70		0.787	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Protactinium-231	0.000	U	0.455	0.455		3.49	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Radium-226	0.326		0.104	0.110	0.500	0.0980	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Radium-228	0.132	U	0.0627	0.0642		0.313	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thallium-208	0.0986		0.0749	0.0756		0.0742	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-228	0.264		0.0798	0.0868		0.105	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-232	0.132	U	0.0627	0.0642		0.313	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-234	0.180	U	0.197	0.198		2.30	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Uranium-235	-0.223	U	0.257	0.258		0.957	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Uranium-238	0.180	U	0.197	0.198		2.30	pCi/g	03/27/17 20:40	04/18/17 08:00	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S009

Lab Sample ID: 160-21561-9

Date Collected: 03/20/17 14:32

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0899	U	0.173	0.173		0.368	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Actinium-227	-0.344	U	0.323	0.325		1.37	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Bismuth-212	0.000	U	0.392	0.392		1.36	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Bismuth-214	0.324		0.107	0.113		0.0994	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Cesium-137	-0.0609	U	0.114	0.114		0.128	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Lead-210	-0.858	U	0.681	0.688		2.91	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Lead-212	0.313		0.0786	0.0885		0.0867	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Lead-214	0.315		0.112	0.116		0.112	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Potassium-40	11.6		1.64	2.03		0.578	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Protactinium-231	0.181	U	1.27	1.27		4.07	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Radium-226	0.324		0.107	0.113	0.500	0.0994	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Radium-228	0.0899	U	0.173	0.173		0.368	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Thallium-208	0.108		0.0873	0.0880		0.0789	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Thorium-228	0.313		0.0786	0.0885		0.0867	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Thorium-232	0.0899	U	0.173	0.173		0.368	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Thorium-234	0.870	U	0.774	0.779		1.15	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Uranium-235	0.0274	U	0.0956	0.0956		0.687	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Uranium-238	0.870	U	0.774	0.779		1.15	pCi/g	03/27/17 20:40	04/18/17 08:04	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S010

Lab Sample ID: 160-21561-10

Date Collected: 03/20/17 14:28

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.225	U	0.216	0.217		0.283	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Actinium-227	-0.0287	U	0.592	0.592		1.02	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Bismuth-212	0.000	U	0.400	0.400		1.08	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Bismuth-214	0.524		0.106	0.119		0.0390	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Cesium-137	0.0220	U	0.0430	0.0431		0.0738	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Lead-210	-0.255	U	1.21	1.21		2.12	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Lead-212	0.269		0.0748	0.0825		0.0951	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Lead-214	0.323		0.0888	0.0949		0.0819	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Potassium-40	10.6		1.47	1.82		0.378	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Protactinium-231	-0.420	U	2.08	2.08		3.53	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Radium-226	0.524		0.106	0.119	0.500	0.0390	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Radium-228	0.225	U	0.216	0.217		0.283	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Thallium-208	0.108		0.0542	0.0554		0.0559	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Thorium-228	0.269		0.0748	0.0825		0.0951	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Thorium-232	0.225	U	0.216	0.217		0.283	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Thorium-234	0.391	U	0.395	0.397		1.10	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Uranium-235	-0.119	U	0.210	0.210		0.633	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Uranium-238	0.391	U	0.395	0.397		1.10	pCi/g	03/27/17 20:40	04/18/17 08:10	1

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S011

Lab Sample ID: 160-21561-11

Date Collected: 03/20/17 14:19

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.243	U	0.212	0.214		0.406	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Actinium-227	0.216	U	0.577	0.578		0.839	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Bismuth-212	0.547	U	1.14	1.15		1.94	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Bismuth-214	0.396		0.147	0.152		0.145	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Cesium-137	0.00874	U	0.0643	0.0643		0.0913	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Lead-210	0.483	U	1.31	1.32		1.96	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Lead-212	0.235		0.0801	0.0857		0.0968	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Lead-214	0.348		0.122	0.127		0.140	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Potassium-40	11.1		1.81	2.14		0.784	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Protactinium-231	0.306	U	1.11	1.11		3.67	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Radium-226	0.396		0.147	0.152	0.500	0.145	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Radium-228	0.243	U	0.212	0.214		0.406	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Thallium-208	0.0562	U	0.0803	0.0805		0.108	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Thorium-228	0.235		0.0801	0.0857		0.0968	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Thorium-232	0.243	U	0.212	0.214		0.406	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Thorium-234	-0.0498	U	1.37	1.37		2.03	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Uranium-235	0.137	U	0.307	0.307		0.545	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Uranium-238	-0.0498	U	1.37	1.37		2.03	pCi/g	03/27/17 20:40	04/18/17 08:29	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S012

Lab Sample ID: 160-21561-12

Date Collected: 03/20/17 14:23

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.390		0.172	0.176		0.229	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Actinium-227	-0.208	U	0.692	0.693		0.943	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Bismuth-212	0.0119	U	0.632	0.632		1.14	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Bismuth-214	0.271		0.106	0.110		0.122	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Cesium-137	-0.0201	U	0.0428	0.0428		0.0982	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Lead-210	-0.0591	U	1.62	1.62		2.77	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Lead-212	0.324		0.0799	0.0902		0.0930	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Lead-214	0.310		0.103	0.108		0.118	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Potassium-40	10.2		1.38	1.73		0.717	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Protactinium-231	-0.819	U	2.79	2.79		4.68	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Radium-226	0.271		0.106	0.110	0.500	0.122	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Radium-228	0.390		0.172	0.176		0.229	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Thallium-208	0.157		0.0447	0.0475		0.0341	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Thorium-228	0.324		0.0799	0.0902		0.0930	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Thorium-232	0.390		0.172	0.176		0.229	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Thorium-234	-0.129	U	1.07	1.07		1.85	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Uranium-235	0.00805	U	0.0466	0.0466		0.561	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Uranium-238	-0.129	U	1.07	1.07		1.85	pCi/g	03/27/17 20:40	04/18/17 08:31	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-300414/1-A

Matrix: Solid

Analysis Batch: 304064

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 300414

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.09733	U	0.126	0.126		0.157	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Actinium-227	0.03484	U	0.434	0.434		0.767	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Bismuth-212	0.05625	U	0.386	0.386		0.718	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Bismuth-214	0.002071	U	0.130	0.130		0.227	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Cesium-137	-0.04272	U	0.0684	0.0685		0.115	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Lead-210	0.4198	U	0.845	0.846		1.44	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Lead-212	-0.01075	U	0.0624	0.0624		0.0911	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Lead-214	0.1147	U	0.0807	0.0816		0.121	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Potassium-40	0.09465	U	0.803	0.803		0.892	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Protactinium-231	0.2655	U	0.881	0.881		2.85	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Radium-226	0.002071	U	0.130	0.130	0.500	0.227	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Radium-228	0.09733	U	0.126	0.126		0.157	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Thallium-208	0.005934	U	0.0195	0.0195		0.0580	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Thorium-228	-0.01075	U	0.0624	0.0624		0.0911	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Thorium-232	0.09733	U	0.126	0.126		0.157	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Thorium-234	-0.3246	U	1.02	1.02		1.74	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Uranium-235	0.0000	U	0.0435	0.0435		0.489	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Uranium-238	-0.3246	U	1.02	1.02		1.74	pCi/g	03/27/17 20:40	04/18/17 07:15	1

Lab Sample ID: LCS 160-300414/2-A

Matrix: Solid

Analysis Batch: 304062

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 300414

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.0	97.44		10.2		1.19	pCi/g	100	87 - 116
Cesium-137	29.1	28.46		3.04		0.212	pCi/g	98	87 - 120
Cobalt-60	15.3	14.83		1.54		0.0757	pCi/g	97	87 - 115

Lab Sample ID: 160-21561-1 DU

Matrix: Solid

Analysis Batch: 304063

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S001

Prep Type: Total/NA

Prep Batch: 300414

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.515		0.4086		0.145		0.113	pCi/g	0.35	1
Actinium-227	-0.291	U	-0.3543	U	0.805		1.35	pCi/g	0.04	1
Bismuth-212	0.306	U	-0.4705	U	0.557		1.30	pCi/g	0.70	1
Bismuth-214	0.361		0.3172		0.101		0.0895	pCi/g	0.19	1
Cesium-137	0.0242	U	0.01705	U	0.0461		0.0798	pCi/g	0.08	1
Lead-210	-0.0875	U	-0.6853	U	1.39		2.44	pCi/g	0.22	1
Lead-212	0.323		0.3769		0.0900		0.0767	pCi/g	0.30	1
Lead-214	0.355		0.3793		0.109		0.0928	pCi/g	0.11	1
Potassium-40	11.0		10.84		1.73		0.518	pCi/g	0.03	1
Protactinium-231	0.000	U	-0.6719	U	2.06		3.46	pCi/g	0.27	1
Radium-226	0.361		0.3172		0.101	0.500	0.0895	pCi/g	0.19	1
Radium-228	0.515		0.4086		0.145		0.113	pCi/g	0.35	1

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-21561-1 DU
Matrix: Solid
Analysis Batch: 304063

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S001
Prep Type: Total/NA
Prep Batch: 300414

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.173		0.1090		0.0596		0.0621	pCi/g	0.53	1
Thorium-228	0.323		0.3769		0.0900		0.0767	pCi/g	0.30	1
Thorium-232	0.515		0.4086		0.145		0.113	pCi/g	0.35	1
Thorium-234	-0.167	U	0.02933	U	1.20		2.05	pCi/g	0.1	1
Uranium-235	0.0576	U	-0.03951	U	0.427		0.725	pCi/g	0.17	1
Uranium-238	-0.167	U	0.02933	U	1.20		2.05	pCi/g	0.1	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Rad

Leach Batch: 299075

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21561-1	TITO04-RSY15-U9-BS-FSSSU5-S001	Total/NA	Solid	Dry and Grind	
160-21561-2	TITO04-RSY15-U9-BS-FSSSU5-S002	Total/NA	Solid	Dry and Grind	
160-21561-3	TITO04-RSY15-U9-BS-FSSSU5-S003	Total/NA	Solid	Dry and Grind	
160-21561-4	TITO04-RSY15-U9-BS-FSSSU5-S004	Total/NA	Solid	Dry and Grind	
160-21561-5	TITO04-RSY15-U9-BS-FSSSU5-S005	Total/NA	Solid	Dry and Grind	
160-21561-6	TITO04-RSY15-U9-BS-FSSSU5-S006	Total/NA	Solid	Dry and Grind	
160-21561-7	TITO04-RSY15-U9-BS-FSSSU5-S007	Total/NA	Solid	Dry and Grind	
160-21561-8	TITO04-RSY15-U9-BS-FSSSU5-S008	Total/NA	Solid	Dry and Grind	
160-21561-9	TITO04-RSY15-U9-BS-FSSSU5-S009	Total/NA	Solid	Dry and Grind	
160-21561-10	TITO04-RSY15-U9-BS-FSSSU5-S010	Total/NA	Solid	Dry and Grind	
160-21561-11	TITO04-RSY15-U9-BS-FSSSU5-S011	Total/NA	Solid	Dry and Grind	
160-21561-12	TITO04-RSY15-U9-BS-FSSSU5-S012	Total/NA	Solid	Dry and Grind	
160-21561-1 DU	TITO04-RSY15-U9-BS-FSSSU5-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 300414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21561-1	TITO04-RSY15-U9-BS-FSSSU5-S001	Total/NA	Solid	Fill_Geo-21	299075
160-21561-2	TITO04-RSY15-U9-BS-FSSSU5-S002	Total/NA	Solid	Fill_Geo-21	299075
160-21561-3	TITO04-RSY15-U9-BS-FSSSU5-S003	Total/NA	Solid	Fill_Geo-21	299075
160-21561-4	TITO04-RSY15-U9-BS-FSSSU5-S004	Total/NA	Solid	Fill_Geo-21	299075
160-21561-5	TITO04-RSY15-U9-BS-FSSSU5-S005	Total/NA	Solid	Fill_Geo-21	299075
160-21561-6	TITO04-RSY15-U9-BS-FSSSU5-S006	Total/NA	Solid	Fill_Geo-21	299075
160-21561-7	TITO04-RSY15-U9-BS-FSSSU5-S007	Total/NA	Solid	Fill_Geo-21	299075
160-21561-8	TITO04-RSY15-U9-BS-FSSSU5-S008	Total/NA	Solid	Fill_Geo-21	299075
160-21561-9	TITO04-RSY15-U9-BS-FSSSU5-S009	Total/NA	Solid	Fill_Geo-21	299075
160-21561-10	TITO04-RSY15-U9-BS-FSSSU5-S010	Total/NA	Solid	Fill_Geo-21	299075
160-21561-11	TITO04-RSY15-U9-BS-FSSSU5-S011	Total/NA	Solid	Fill_Geo-21	299075
160-21561-12	TITO04-RSY15-U9-BS-FSSSU5-S012	Total/NA	Solid	Fill_Geo-21	299075
MB 160-300414/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-300414/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-21561-1 DU	TITO04-RSY15-U9-BS-FSSSU5-S001	Total/NA	Solid	Fill_Geo-21	299075

From: [Sevcik, Joseph T CIV SEA 04 04N](#)
To: [Guillory, Jeffrey](#)
Cc: [Edwards, Zachary L CIV SEA 04 04N](#); [Yantos, Christopher N CIV NAVFAC SW, BRAC](#); [Messer, Ulrika](#); [Hackett, John R](#); [Schul, Raymond](#); [Coffey, Lisa M](#); [Morrison, Dennis](#)
Subject: RE: NSTI RSY Soil Release Request - RSY 17 (Use 2)
Date: Wednesday, November 04, 2015 5:22:34 AM

Jeff,

I concur with designating RSY 17 (Use 2) soil as non-LLRW.

v/r,

Joe Sevcik
Environmental Protection Manager
NAVSEADET RASO
160 Main Road
Building 1959
NWS Yorktown, VA 23691
Office: (757) 887-4483
DSN: 953-4483
Fax: (757) 887-4900

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-----Original Message-----

From: Guillory, Jeffrey [<mailto:jeffrey.guillory@cbifederaleservices.com>]
Sent: Monday, November 02, 2015 6:23 PM
To: Sevcik, Joseph T CIV SEA 04 04N
Cc: Edwards, Zachary L CIV SEA 04 04N; Yantos, Christopher N CIV NAVFAC SW, BRAC; Messer, Ulrika; Hackett, John R; Schul, Raymond; Coffey, Lisa M; Morrison, Dennis
Subject: RE: NSTI RSY Soil Release Request - RSY 17 (Use 2)

Mr. Sevcik,

Attached is a revised copy of NSTI RSY Soil Release Request – RSY 17 (Use 2).

This revision includes new spectral figures for locations a-h (pages 10-25) with values for critical levels above which a net count is considered above background.

My apologies for the inconvenience. If you have any questions, please do not hesitate to contact me. Thank you for your time.

Jeffrey Guillory

Health Physics Support

Radiation Safety

Federal Services

Cell: +1 979.422.5534

jeffrey.guillory@cbifederalservices.com

CB&I

950 Avenue M

Treasure Island

San Francisco, CA 94130

United States of America

www.CBI.com

From: Guillory, Jeffrey

Sent: Tuesday, October 27, 2015 5:46 PM

To: 'Sevcik, Joseph T CIV SEA 04 04N'

Cc: zachary.edwards@navy.mil; Yantos, Christopher N CIV NAVFAC SW, BRAC (christopher.yantos@navy.mil); Messer, Ulrika; Hackett, John R; Schul, Raymond; Coffey, Lisa M; Morrison, Dennis

Subject: NSTI RSY Soil Release Request - RSY 17 (Use 2)

Mr. Sevcik,

CB&I requests RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

Description: Description: Description: Description: cid:_1_OAD725A00AD721CC001388C386257B11

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Naval Station Treasure Island Site 12 Phase 3 RSY Data Report

Contract No. EMAC III CTO-0004		
RSY Unit: RSY #17	RSY Unit Use Number: USE 2	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Lisa Coffey/Tina Piquet/Jeff Guillory		Data Report Submittal Date: 10/27/2015

Soil Sample Data						
Sample Identification	Survey Location	Type Of Sample	Static 2221 Meter Serial Number	One Minute Static Reading (CPM)	Static Count Over Static Mean + 3σ	Ra ²²⁶ Final Analytical Results
TITO04_RSY17_2-CH-S201	1	Systematic	262301	14,569	No	0.367
TITO04_RSY17_2-CH-S202	2	Systematic	262301	14,032	No	0.386
TITO04_RSY17_2-CH-S203	3	Systematic	262301	13,549	No	0.512
TITO04_RSY17_2-CH-S204	4	Systematic	262301	12,982	No	0.366
TITO04_RSY17_2-CH-S205	5	Systematic	262301	14,011	No	0.394
TITO04_RSY17_2-CH-S206	6	Systematic	262301	14,361	No	0.443
TITO04_RSY17_2-CH-S207	7	Systematic	262301	13,564	No	0.406
TITO04_RSY17_2-CH-S208	8	Systematic	262301	12,783	No	0.200
TITO04_RSY17_2-CH-S209	9	Systematic	262301	12,168	No	0.399
TITO04_RSY17_2-CH-S210	10	Systematic	262301	13,468	No	0.494
TITO04_RSY17_2-CH-S211	11	Systematic	262301	13,425	No	0.430
TITO04_RSY17_2-CH-S212	12	Systematic	262301	13,663	No	0.426
TITO04_RSY17_2-CH-S213	13	Systematic	262301	13,092	No	0.172
TITO04_RSY17_2-CH-S214	14	Systematic	262301	12,699	No	0.261
TITO04_RSY17_2-CH-S215	15	Systematic	262301	12,596	No	0.304
TITO04_RSY17_2-CH-S216	16	Systematic	262301	13,560	No	0.362
TITO04_RSY17_2-CH-S217	17	Systematic	262301	13,416	No	0.372
TITO04_RSY17_2-CH-S218	18	Systematic	262301	12,484	No	0.126
TITO04_RSY17_2-CH-S219	19	Systematic	262301	13,052	No	0.333
TITO04_RSY17_2-CH-S220	20	Systematic	262301	13,408	No	0.399

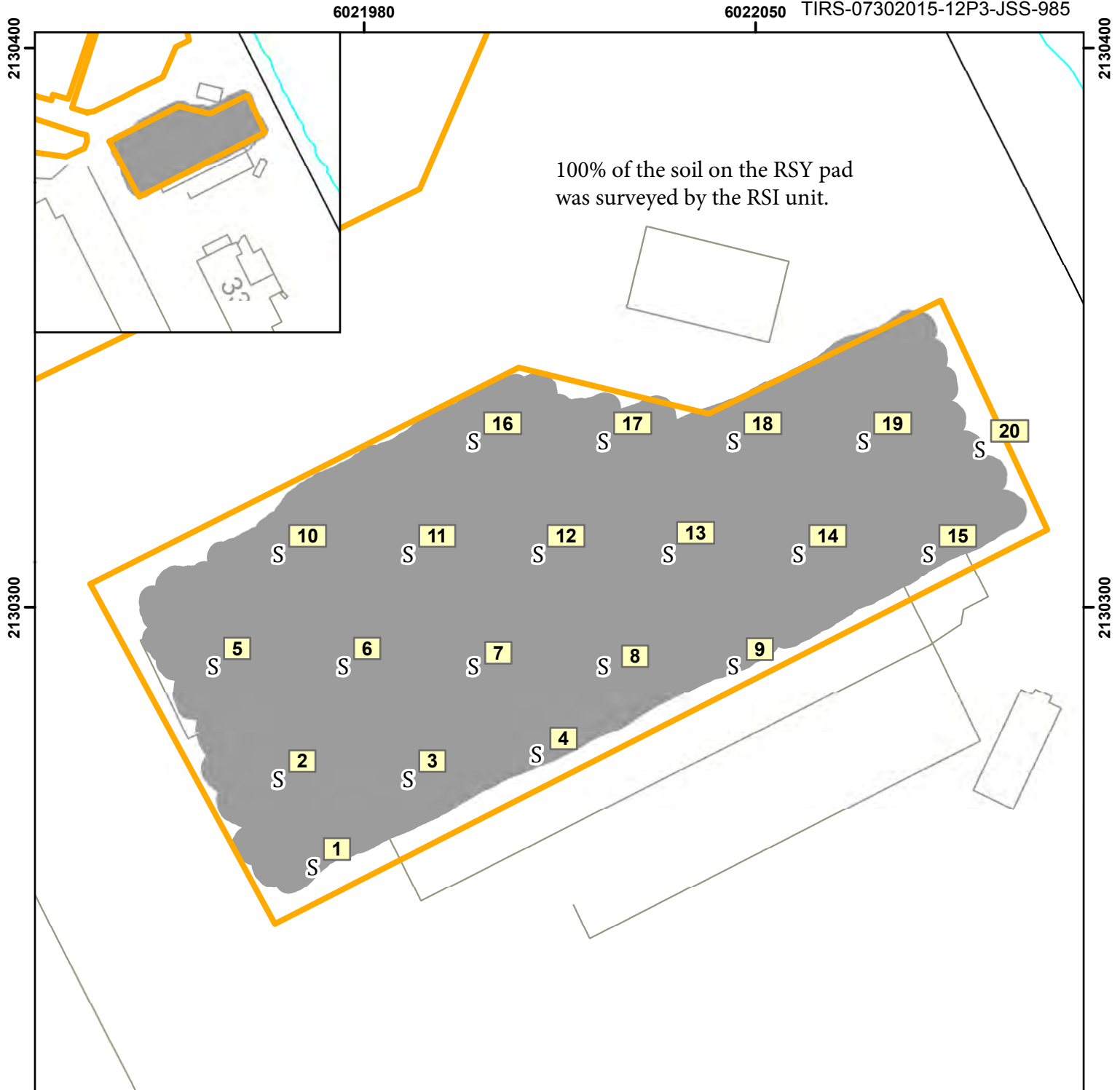
Instrument Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Static Background (CPM)	Static Background Plus 3σ (CPM)	Scan Background	Scan Background Plus 3σ	Range
General Area Exposure Rates	TIRS-06302015-12P3-JSS-804	6/30/2015	19	1/27/2016	138426	N/A	N/A	N/A	N/A	6 - 7 μR/hr
Initial Walkover	TIRS-07292015-12P3-ROV-974	7/29/2015	RS-701/RSX-1	N/A	Console: B-1051 / Detectors: 5447, 5448	N/A	N/A	837 CPS	972 CPS	545 - 818 CPS
Follow-up Required Static	TIRS-07302015-12P3-JSS-994	7/30/2015	2221	1/27/2016	262301	16,577	18,663	N/A	N/A	13,100 - 14,080 CPM
One Minute Systematic Sampling Static Counts	TIRS-07302015-12P3-JSS-985	7/30/2015 - 7/31/2015	2221	1/27/2016	262301	16,577	18,663	N/A	N/A	12,168 - 14,569 CPM

CPM = Counts Per Minute
CPS = Counts Per Second

Summary	
1) General area survey performed of staged soil piles prior to soil being spread into a 6-inch screening layer.	
2) Initial RSI gamma scan and data review—upon review of initial scan data, follow-up static investigations were deemed necessary, and investigation locations were identified as per the RSI Data Evaluation Process (page 4). Gamma scan coverage shown on Systematic Sample Survey map (page 3). Contour maps of initial scan data are shown on RSI Data Plots (page 5). Data review results are summarized on RSI Review Summary (page 6).	
3) Follow-up static survey—8 locations identified during the data review process were investigated, resulting in all locations < static IL. Follow-up locations are shown on the Follow-up Static Survey map (page 7).	
4) Twenty systematic soil samples (201-220) were obtained and submitted for gamma spectroscopy analysis. Static measurements were performed at all systematic sample locations. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 3). Test America sample results are attached.	
Summary:	
All locations with elevated Z-scores identified by the initial RSI gamma scan were deemed comparable to background. 8 follow-up static locations were investigated, with readings < static IL. Additional locations (a-h, page 5) with elevated Z-scores that did not meet the criteria for a follow-up investigation were evaluated by spectral analysis, which failed to indicate the presence of activity above background levels (pages 10 to 25).	
Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background, based on the Wilcoxon Rank Sum test, Quantile test, Retrospective Power Curve calculation, and histogram, as shown on pages 9 and 10. These statistical tools were utilized to verify the appropriate level of reasonable effort.	
RSY 17 (Use 2) contains soil from: Bayside Building 1207 excavation area (1st and 2nd lifts), and Bayside Building 1213 excavation area (4th lift).	
Note: 4th lift from Bayside Building 1213 reached the final depth of the excavation, and no visible debris or staining was identified. This report and concurrence will therefore be utilized as part of the Final Status Survey Report.	
CB&I requests RASO concurrence to release this soil as Non-LLRW.	
Disposition: This soil shall be dispositioned as CERCLA Class I waste following additional on-site chemical characterization.	

Site 32 RSY-17 Use 2

Survey Number:
TIRS-07302015-12P3-JSS-985



Instrument # 262301

S Systematic sample location

● RSI Coverage

▭ RSY-17 Boundaries

CB&I Federal Services, LLC



0 10 20 40
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

RSI Data Evaluation Process

RS-700 Mobile Radiation Monitoring System

- Self-contained gamma-ray radiation detection and monitoring system
- Built-in GPS receiver
- (2) RSX-1 4-liter NaI(Tl) gamma detectors oriented perpendicular to the direction of travel (VD1 denotes both detectors summed; VD3 refers to the left detector; and VD4 refers to the right detector)
- Multi-Channel Analyzer, allowing for monitoring of energy-specific regions of interest (ROIs)
- RadAssist survey software for control, monitoring, and recording

Ten ROIs have been established for radium and progeny as well as other naturally-occurring or anthropogenic gamma-emitting radionuclides that may be of interest:

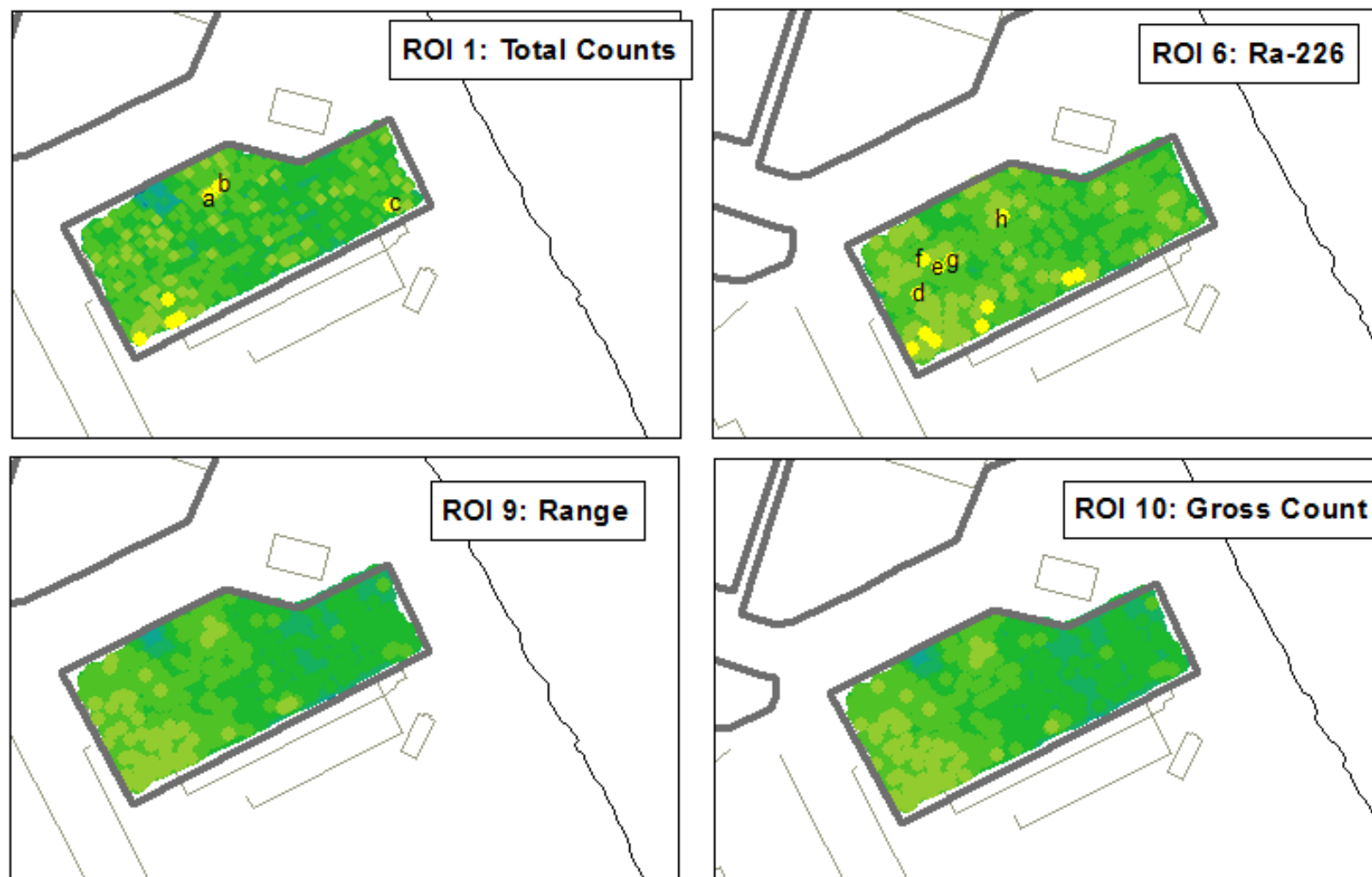
ROI	Description	Energy Range (keV)	Primary Peak (keV)
1	Total counts	411 – 2811	N/A
2	Potassium	1371 – 1569	1460
3	U/Ra-226	1659 – 1860	1764 (Bi-214)
4	Thorium	2409 – 2811	2614 (TI-208)
5	Annihilation	456 – 570	511
6	Ra-226	546 – 666	609 (Bi-214)
7	Cs-137	549 – 741	662
8	I-131	327 – 399	364
9	Range	45 – 1980	N/A
10	Gross Counts	3 – 3072	N/A

A tiered approach is used during data review to identify follow-up locations. Raw data are exported to a comma delimited format using RadAssist and imported into an Excel spreadsheet for review and analysis. Count rate data are compared with ROI- and material-specific investigation levels (ILs). In addition, the following review steps are completed to determine if additional follow-up measurements are necessary:

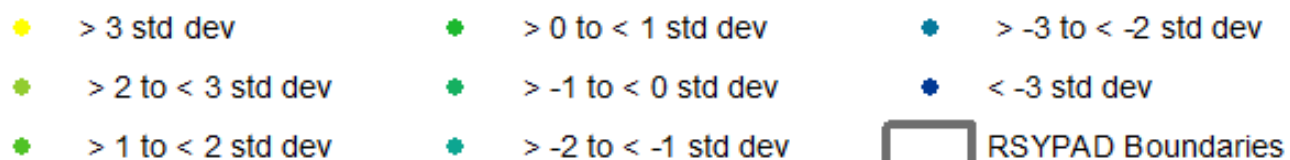
- **Playback Review:** The data file is replayed in RadAssist and reviewed for elevated count rates in ROIs 1, 3, 6, and 10 for virtual detector (VD) 1 (both detectors summed). The scan screen is also monitored for elevated count rates and alarms.
- **Count Rate Time Series Review:** The count rates for ROIs 1, 3, 6, and 10 for VDs 1, 3 (detector 1), and 4 (detector 2) are plotted in a time series and reviewed for additional peaks in count rate.
- **Z-Scores:** The Z-Scores are calculated for each location in all ROIs for VDs 1, 3, and 4. Any location with four or more ROIs having a Z-Score greater than three ($Z > 3$) is marked for follow-up.
- **Local Z-Scores:** Local Z-Scores are calculated using a moving average for each data point in all ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with four or more ROIs having a local $Z > 3$ is marked for follow-up.
- **Semi-local Z-Scores:** Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with four or more ROIs having a semi-local $Z > 3$ is marked for follow-up.
- **Z-Score Time Series Review:** The three types of Z-Scores for ROIs 1, 3, 6, and 10 for VDs 1, 3, and 4 are plotted in a time series and reviewed for additional peaks in Z-Scores.
- **Count Rate Ratio Review:** Count rate ratios are calculated for ROIs 3:4, 3:2, 3:6, 6:2, and 6:7. The count rate ratios are then plotted in a time series and reviewed for obvious peaks or outliers.

RSI Data Plots

Site 32 RSY-17 Use 2



ROI from RSI Walkover Survey (VD1)



RSI Review Summary

Summary:

8 locations were selected for follow-up investigation. Locations were identified by elevated peaks noted in the playback review and/or time series charts, and by using the Z-Score, Local Z-Score, and Semi-Local Z-Score reviews as described in the RSI Data Evaluation Process on page 4. The table below details the reasons for each investigation by location.

Locations denoted a-h on RSI Data Plots (see previous page) did not meet the evaluation criteria for further investigation. Elevated Z-scores at these locations were identified only in specific ROIs, including: three locations exclusive to ROI 1 (a-c), and five locations exclusive to ROI 6 (d-h). Elevated gross count rates at these locations were not identified, and a review of the data did not reveal any additional indicators warranting a follow-up investigation. Furthermore, spectral analyses performed on data obtained from these locations failed to indicate the presence of Radium-226 above background; figures are provided on pages 10 to 25.

RSY Pad 17-2 Investigation						Follow-up					
Longitude	Latitude	Details	Maximum Result			Northing	Easting	Meter SN	Static Count	Static IL (cpm)	Comments
			VD	ROI	Z-Score						
-122.3686077	37.8305997	4-5 ROIs Z>3	1	6	3.8194566	-122.3686077	37.8305997	262301	13,123	18,663	< IL
-122.3688289	37.8305155	4-5 ROIs Z>3	3	1	3.2484016	-122.3688289	37.8305155	262301	13,821	18,663	< IL
-122.3687531	37.8305577	4-5 ROIs Z>3	3	3	3.4063412	-122.3687531	37.8305577	262301	13,321	18,663	< IL
-122.3688719	37.8305029	4-5 ROIs Z>3	4	6	3.7780431	2130258.06692	6021964.30857	262301	14,080	18,663	< IL
-122.3688362	37.8305425	4-5 ROIs Z>3	3	5	4.3868269	2130264.39642	6021981.59765	262301	13,784	18,663	< IL
-122.3684651	37.8307538	6 ROIs Z>3 (local)	4	9	4.2309671	-122.3684651	37.8307538	262301	13,100	18,663	< IL
-122.3688527	37.8304914	Highest Z-Score	1	4	4.9392719	2130246.63092	6021967.16868	262301	14,044	18,663	< IL
-122.3687599	37.8305321	Highest Z-Score (local)	3	6	4.4200876	-122.3687599	37.8305321	262301	13,297	18,663	< IL



Instrument # 262301

- Investigation Points
- Data Points Not Requiring Further Investigation
- RSYPAD Boundaries
- # Investigation Point ID

CB&I Federal Services, LLC



0 10 20 40
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY Pad 17-2
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a median Ra-226 concentration of 0.8 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the observed Ra-226 median concentration of 0.390 pCi/g and estimated LBGR of 0.483, the SU will pass the WRS test at a 100% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12.5	S
0.86	R	0.86	37	0	12.5	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.367	S	-0.116	8	8	21	R
0.386	S	-0.097	10	10	22	R
0.512	S	0.029	20	20	23	R
0.366	S	-0.117	7	7	24	R
0.394	S	-0.089	11	11	25	R
0.443	S	-0.04	17	17	26	R
0.406	S	-0.077	14	14	27.5	R
0.2	S	-0.283	2	2	27.5	R
0.399	S	-0.084	12.5	12.5	29.5	R
0.484	S	0.011	18	18	29.5	R
0.43	S	-0.053	16	16	31	R
0.426	S	-0.057	15	15	32	R
0.172	S	-0.311	1	1	33	R
0.261	S	-0.222	3	3	34	R
0.304	S	-0.179	4	4	35.5	R
0.362	S	-0.121	6	6	35.5	R
0.372	S	-0.111	9	9	37	R
0.5	S	0.017	19	19	38	R
0.333	S	-0.15	5	5	39	R
0.399	S	-0.084	12.5	12.5	40	R
Sum =			820	210		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 20 m
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 482.5$

$\alpha_W = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

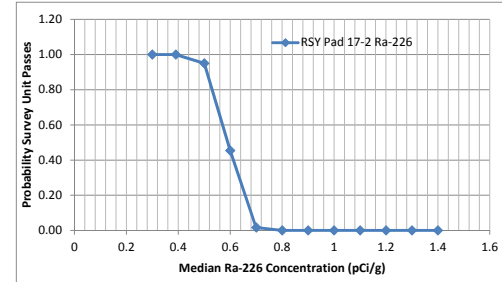
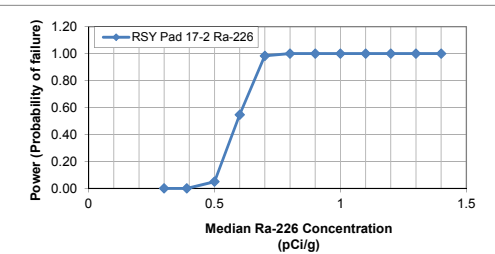
From NUREG 1505, Table A.7c: Values of r and k for the Quantile Test When α is Approximately 0.05

20 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 20$
 4 r
 4 k
 0.053 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

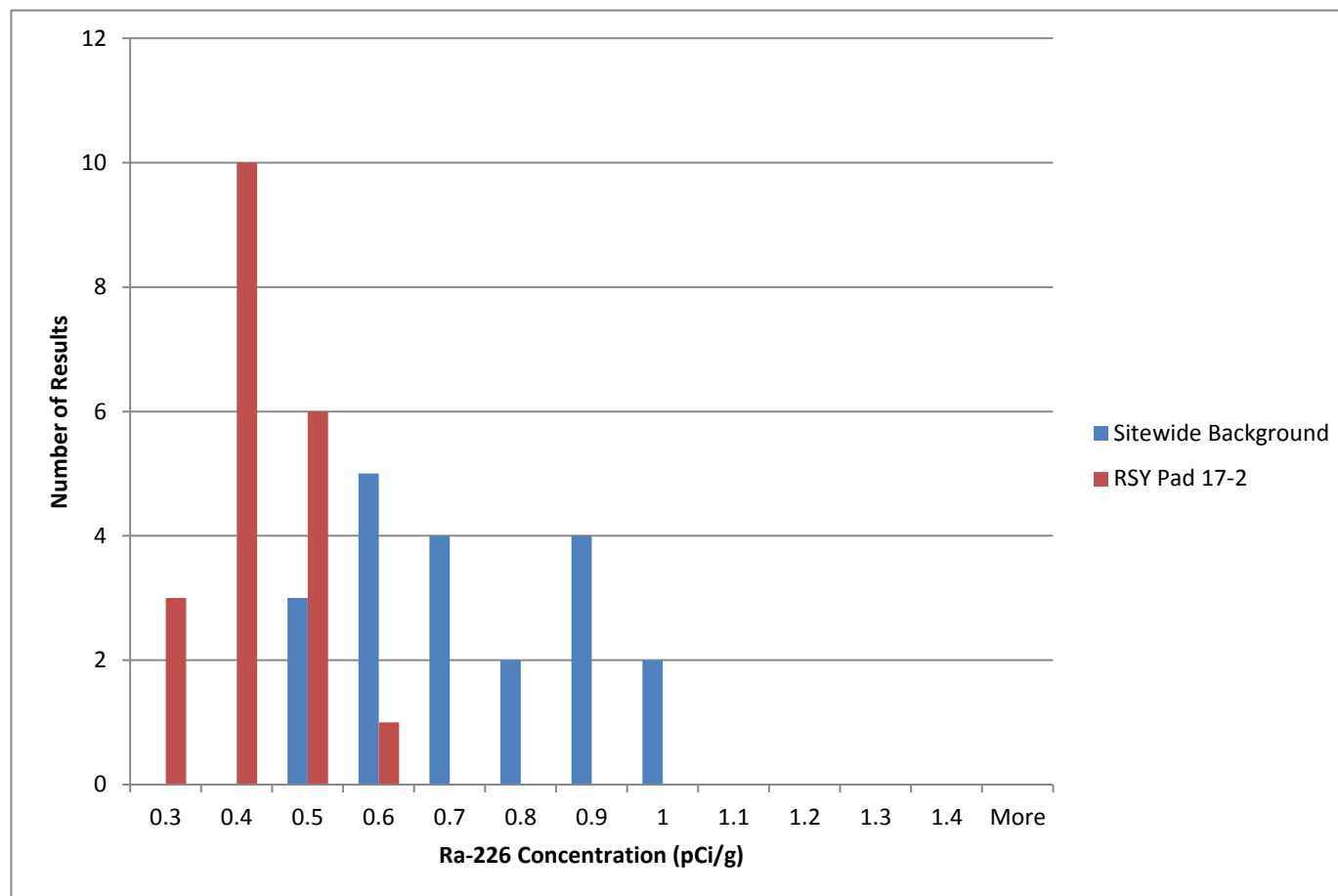
0 of the largest 4 adjusted measurements are from S. The null hypothesis is accepted.



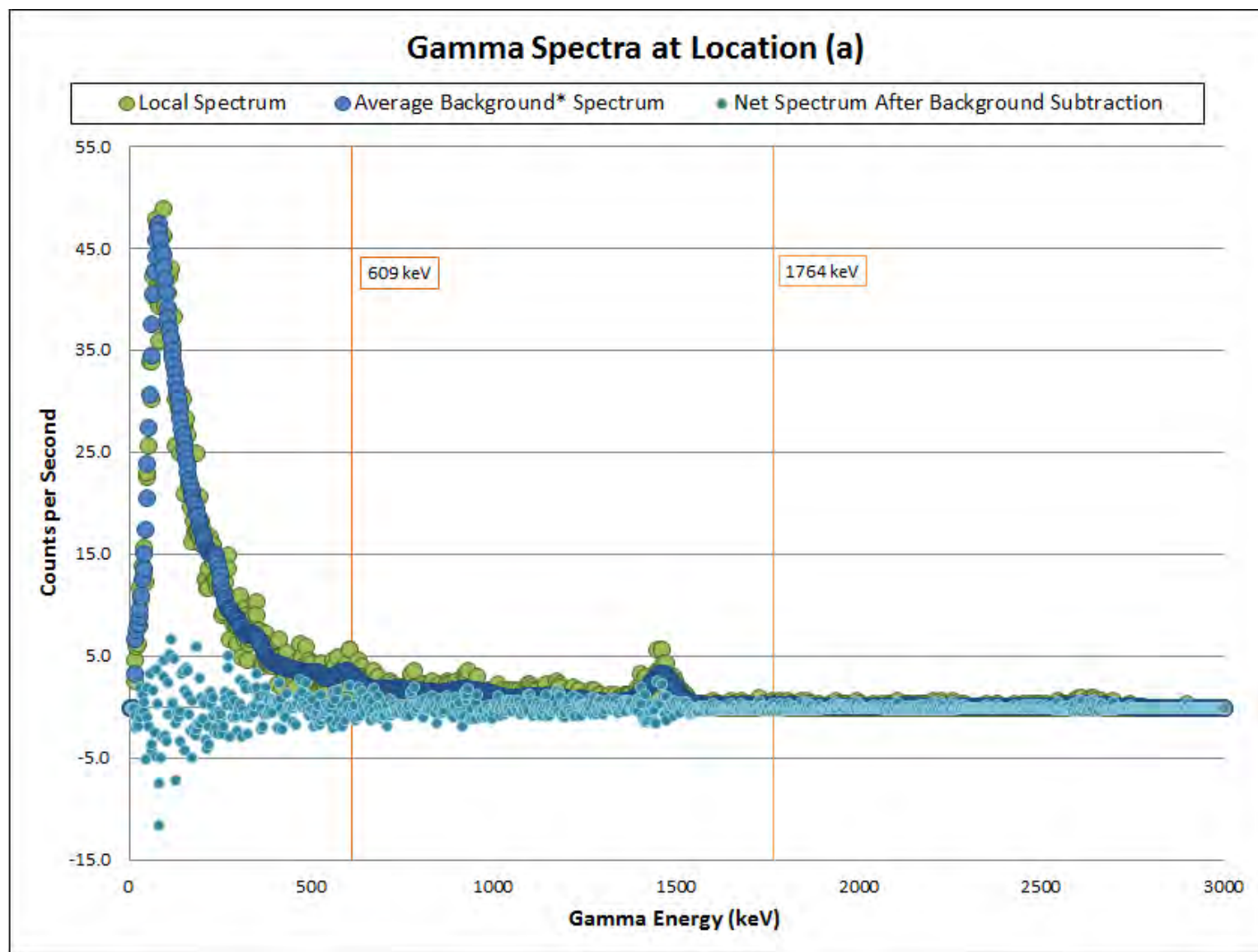
Histogram, vs. RSY Pad 17-2 Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY Pad 17-2	
<i>Bin</i>	<i>Frequency</i>
0.3	3
0.4	10
0.5	6
0.6	1
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



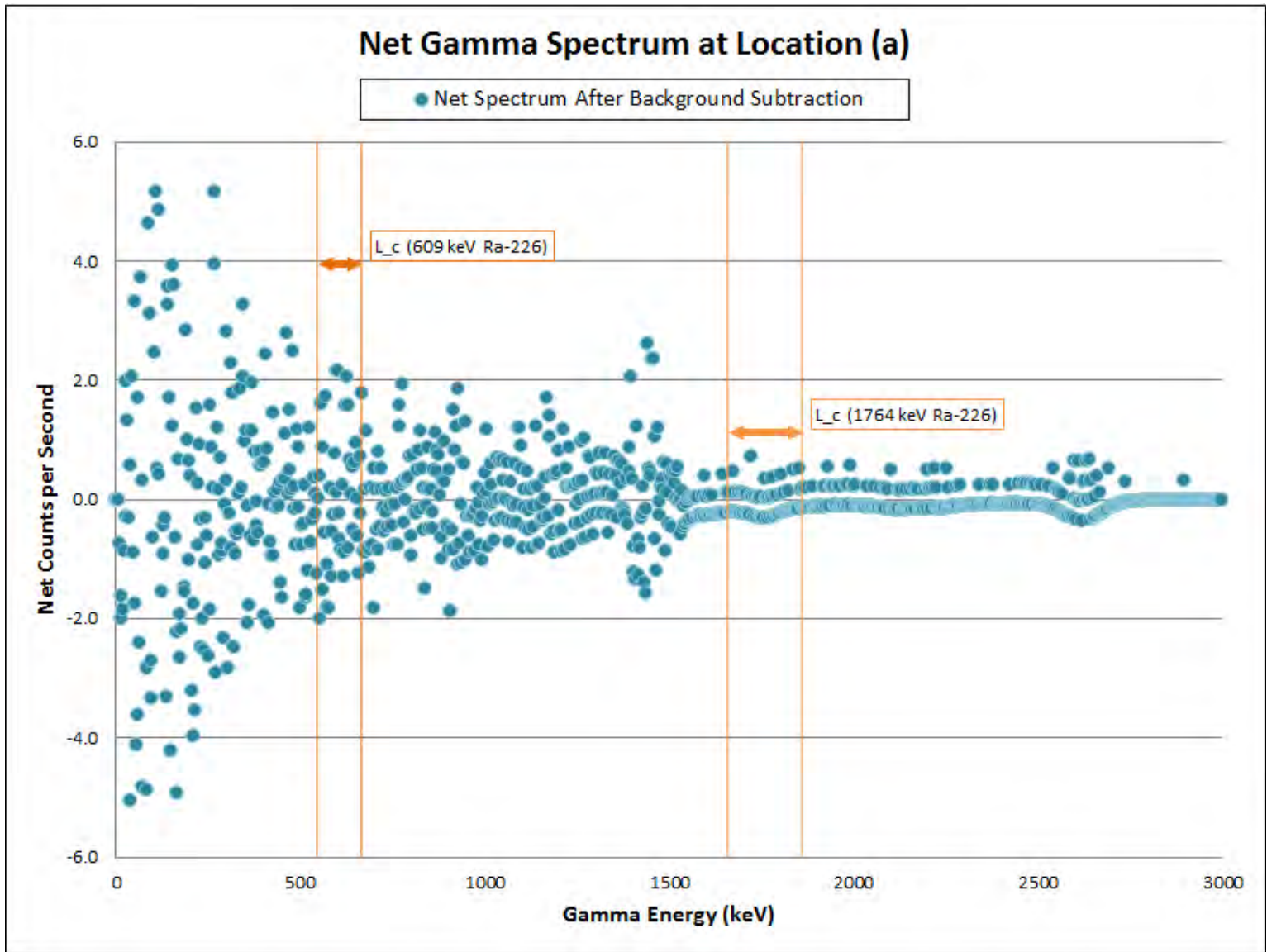
RSI Spectral Analysis Results: RSY 17 Use 2 – **Gamma Spectra at Location (a)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (a)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 17 Use 2 – **Net Gamma Spectrum at Location (a)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (a): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

k : Poisson probability sum for α and β (assuming α and β are equal)

α : Probability of a Type I error

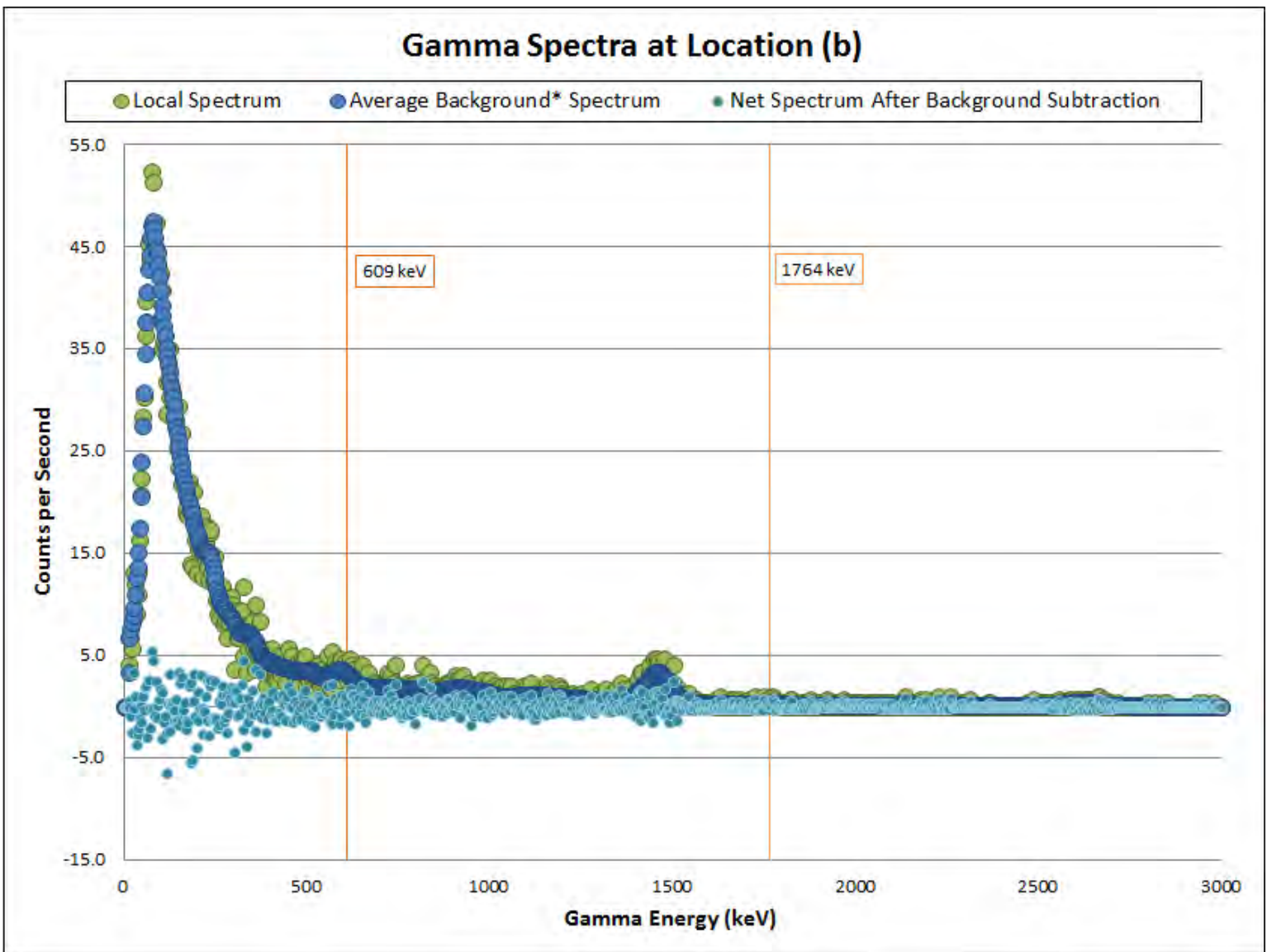
β : Probability of a Type II error

MARSSIM APPENDIX I, TABLE I.1

For $\alpha = \beta = 0.05 \rightarrow k = 1.645$

$$L_c = 2.33\sqrt{B}$$

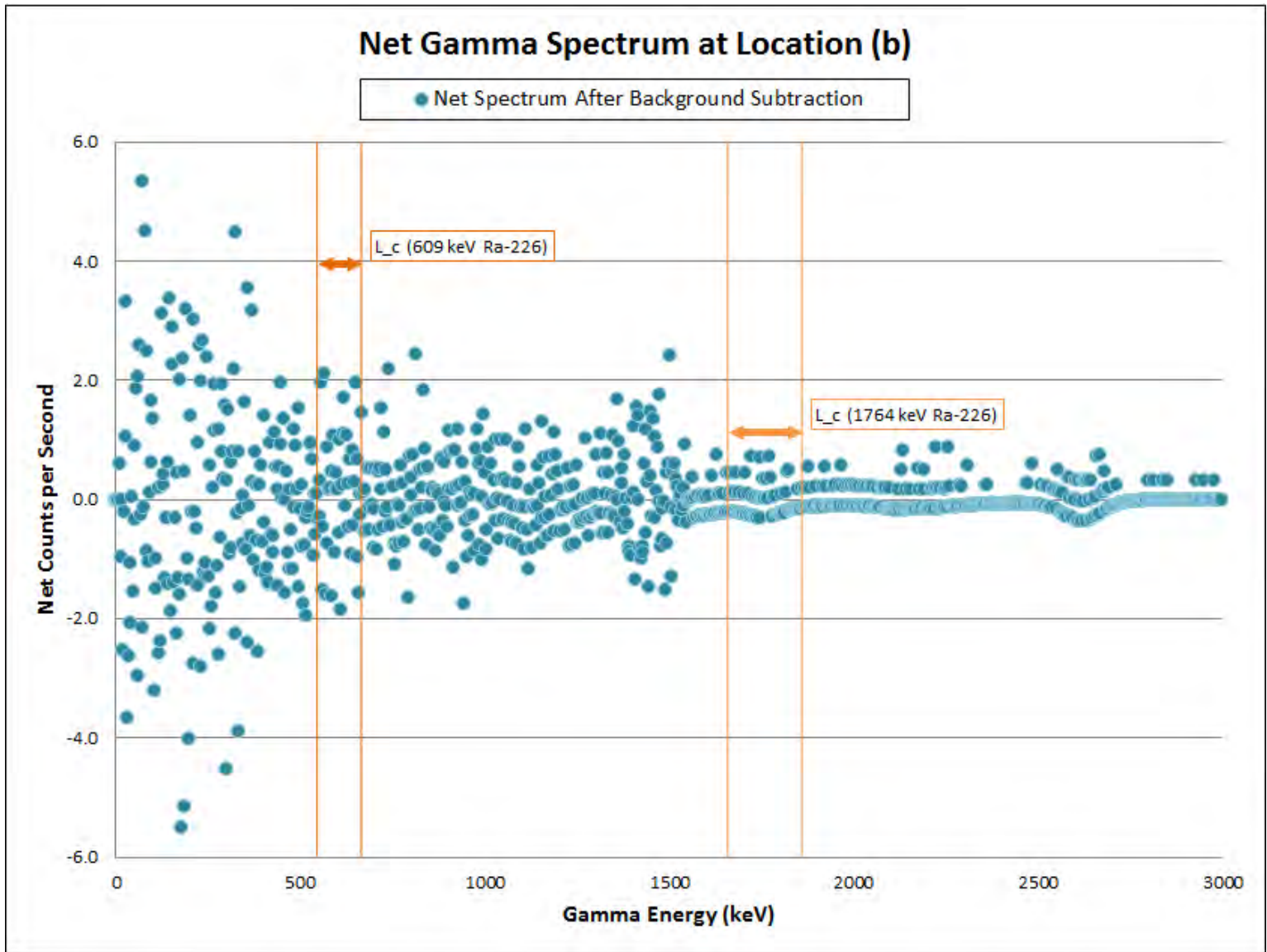
RSI Spectral Analysis Results: RSY 17 Use 2 – **Gamma Spectra at Location (b)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (b)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 17 Use 2 – **Net Gamma Spectrum at Location (b)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (b): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ **B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

k : Poisson probability sum for α and β (assuming α and β are equal)

α : Probability of a Type I error

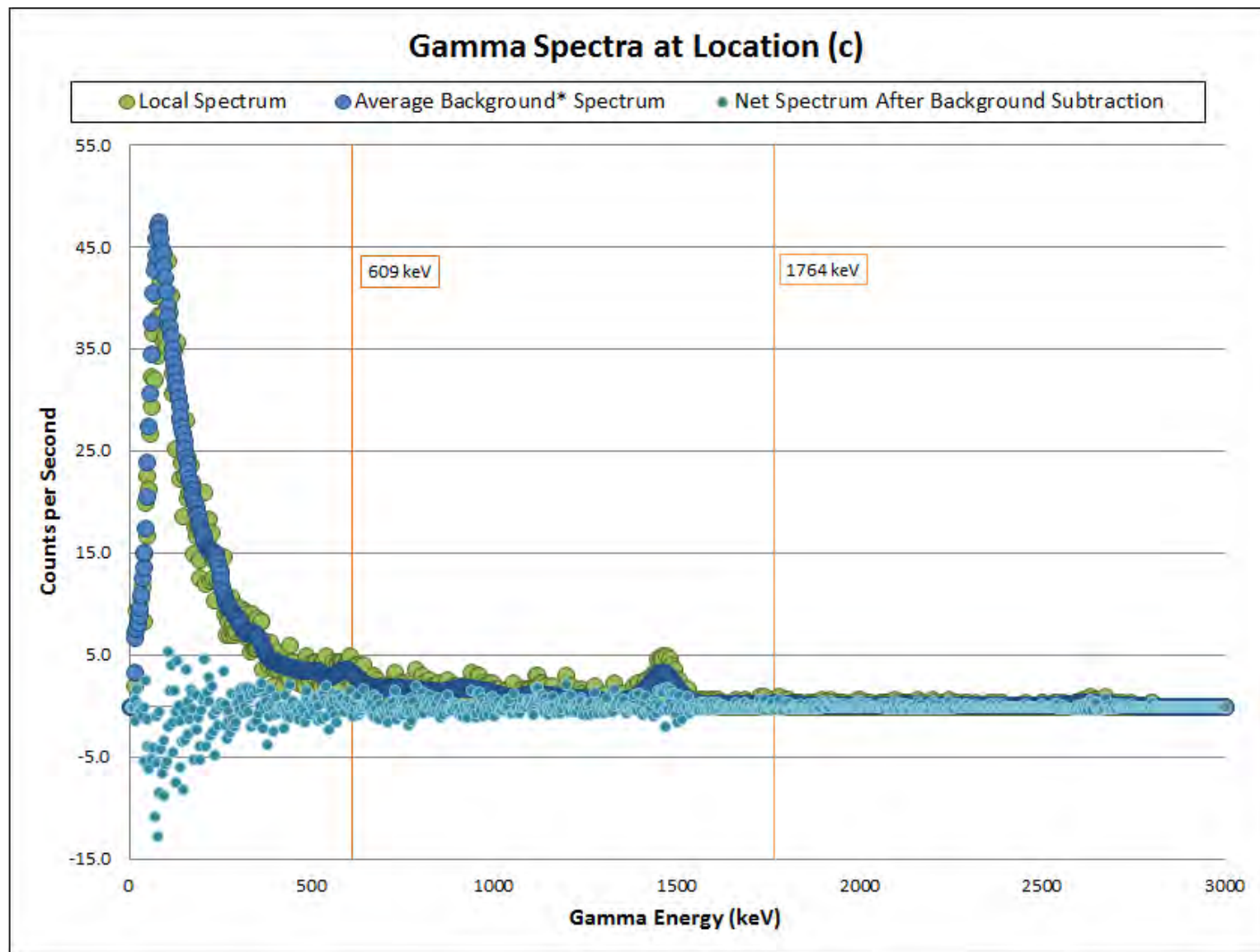
β : Probability of a Type II error

MARSSIM APPENDIX I, TABLE I.1

For $\alpha = \beta = 0.05 \rightarrow k = 1.645$

$$L_c = 2.33\sqrt{B}$$

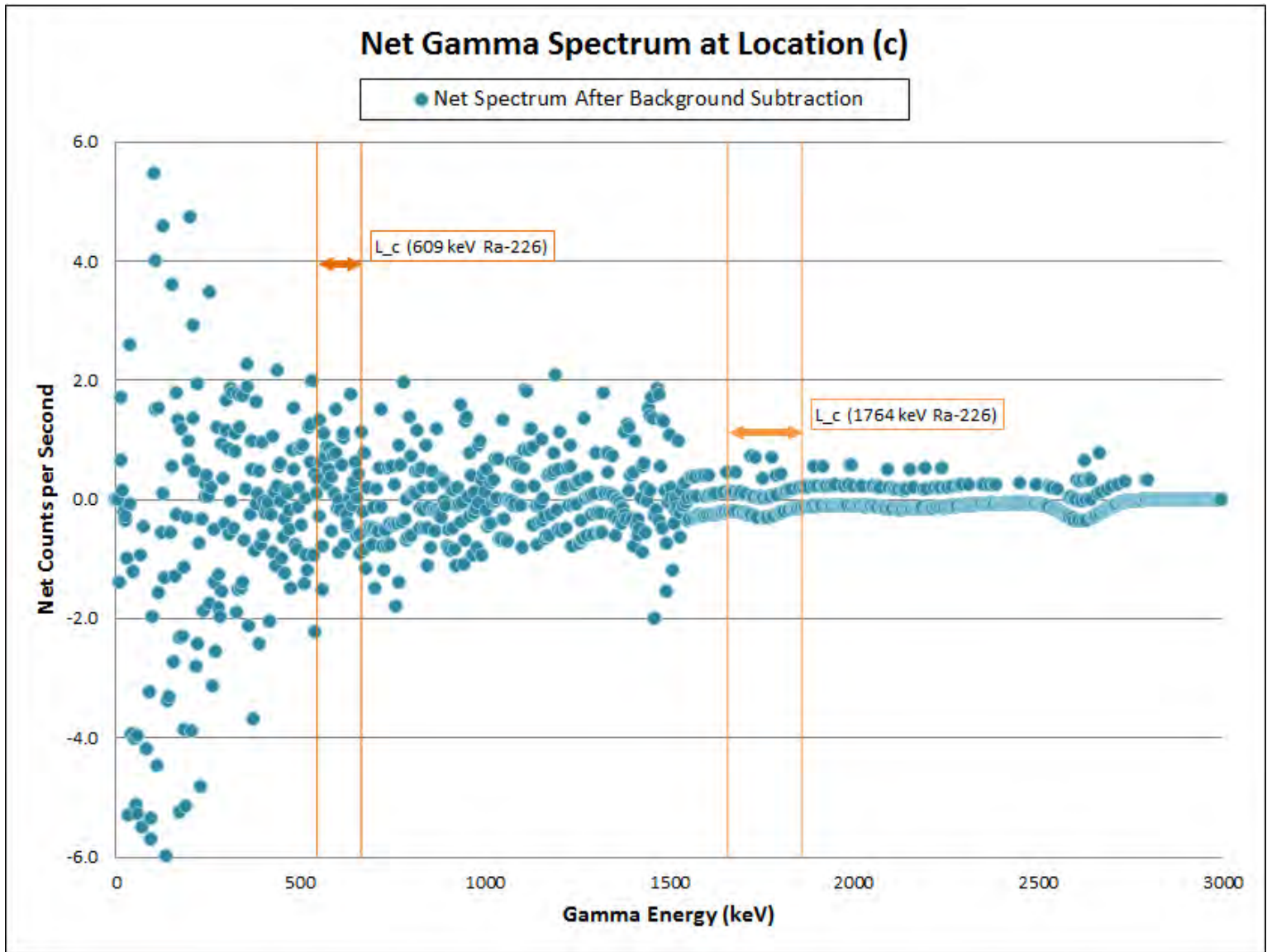
RSI Spectral Analysis Results: RSY 17 Use 2 – **Gamma Spectra at Location (c)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (c)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 17 Use 2 – **Net Gamma Spectrum at Location (c)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (c): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

k : Poisson probability sum for α and β (assuming α and β are equal)

α : Probability of a Type I error

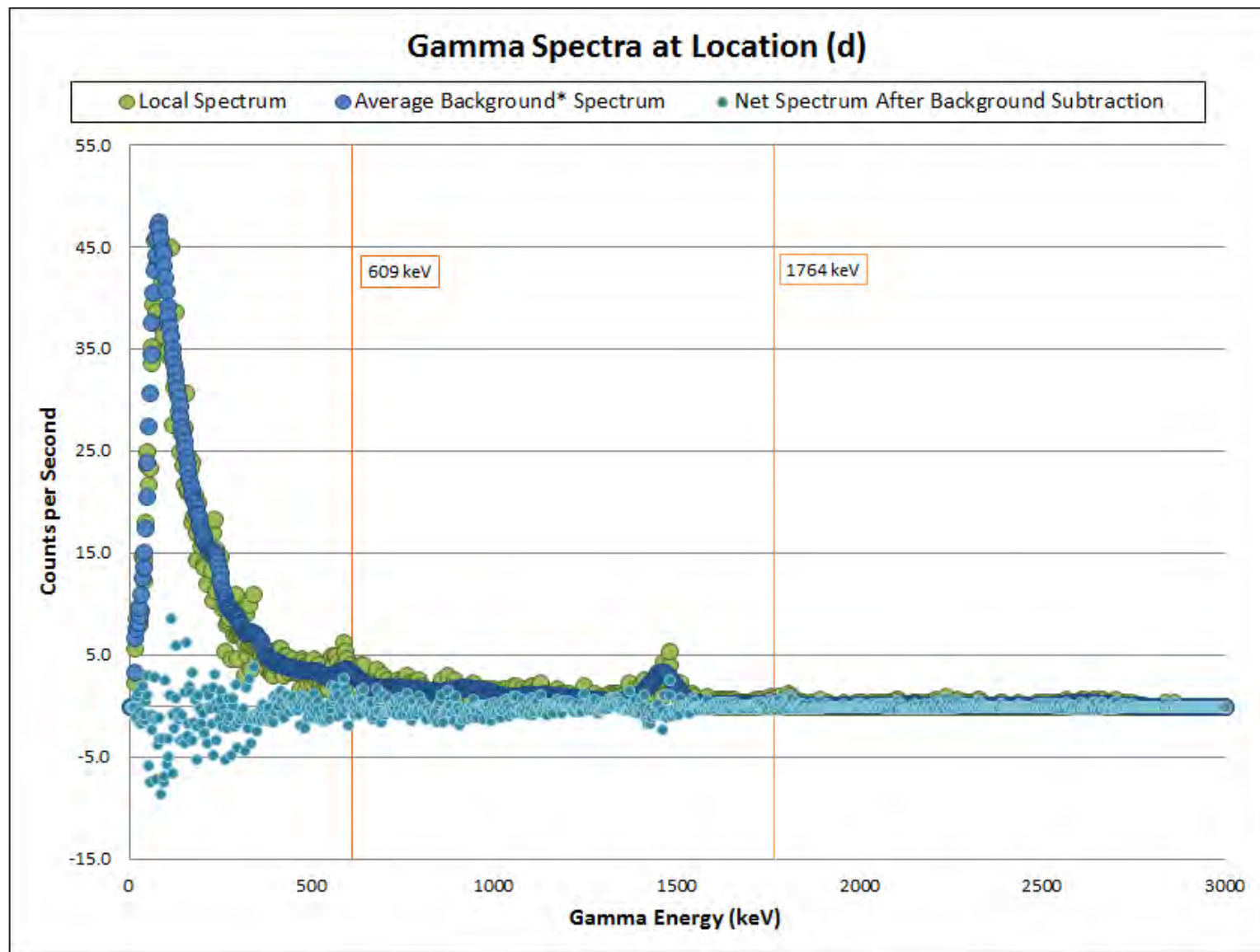
β : Probability of a Type II error

MARSSIM APPENDIX I, TABLE I.1

For $\alpha = \beta = 0.05 \rightarrow k = 1.645$

$$L_c = 2.33\sqrt{B}$$

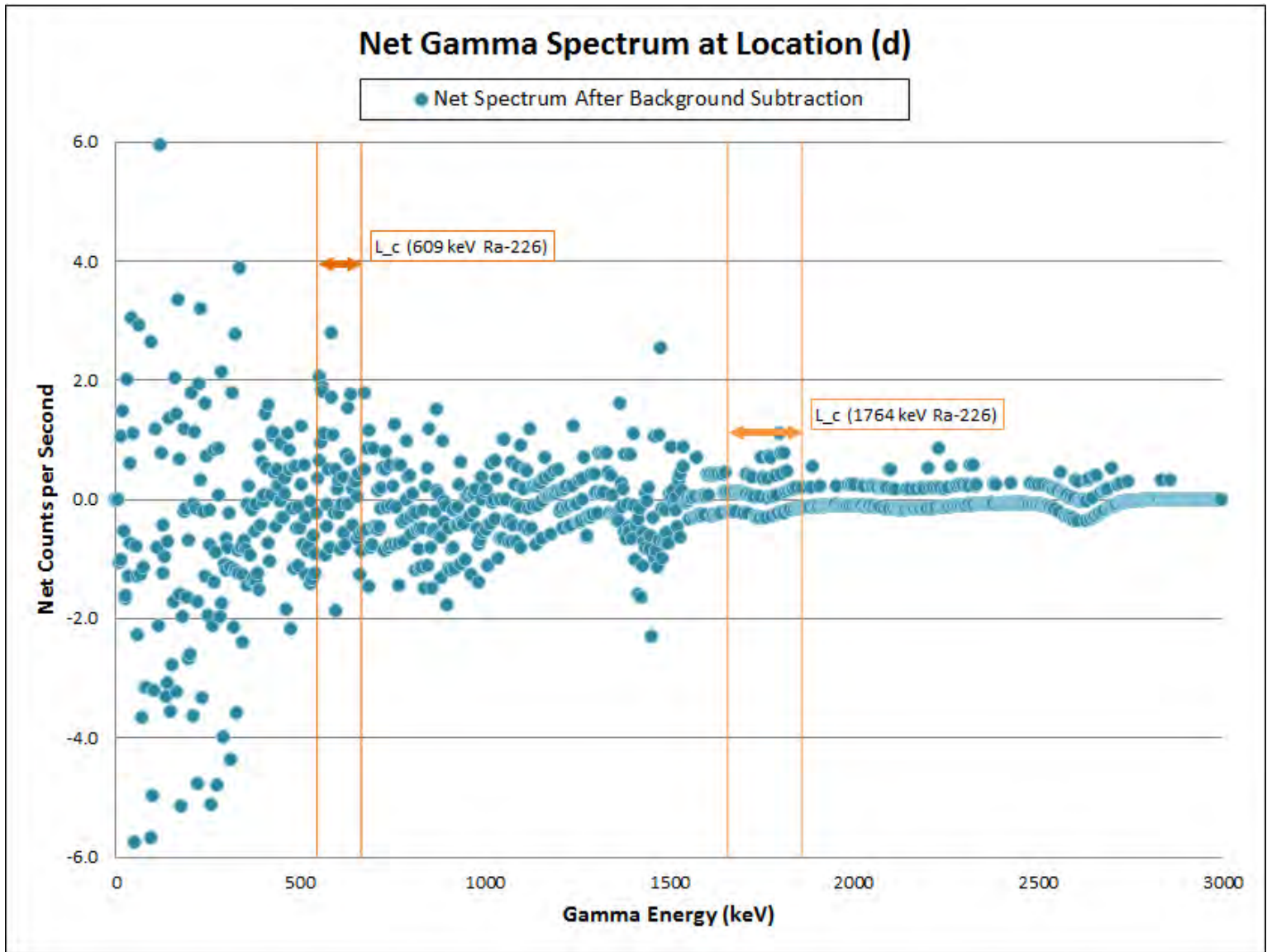
RSI Spectral Analysis Results: RSY 17 Use 2 – **Gamma Spectra at Location (d)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (d)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 17 Use 2 – **Net Gamma Spectrum at Location (d)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (d): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ **B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

k : Poisson probability sum for α and β (assuming α and β are equal)

α : Probability of a Type I error

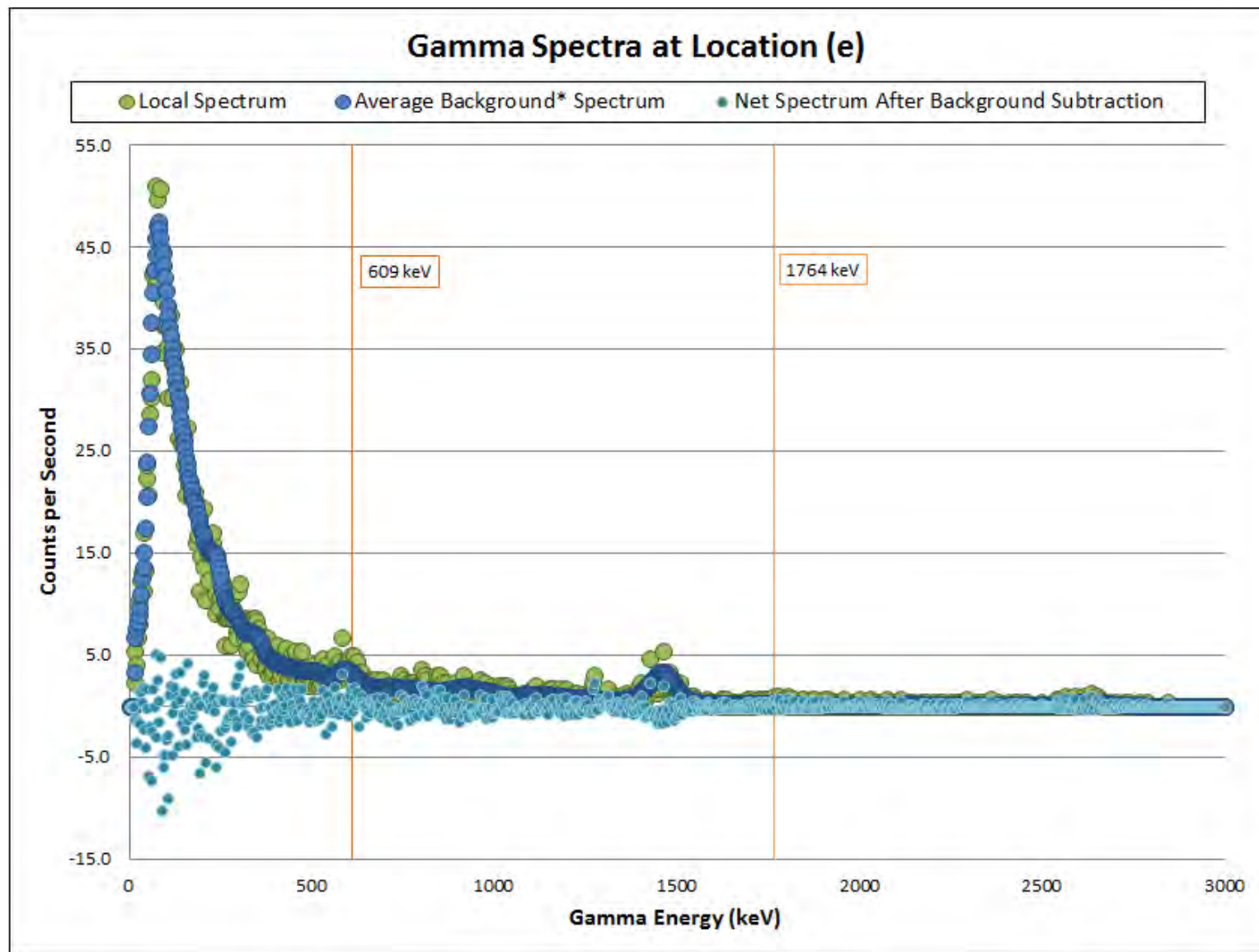
β : Probability of a Type II error

MARSSIM APPENDIX I, TABLE I.1

For $\alpha = \beta = 0.05 \rightarrow k = 1.645$

$$L_c = 2.33\sqrt{B}$$

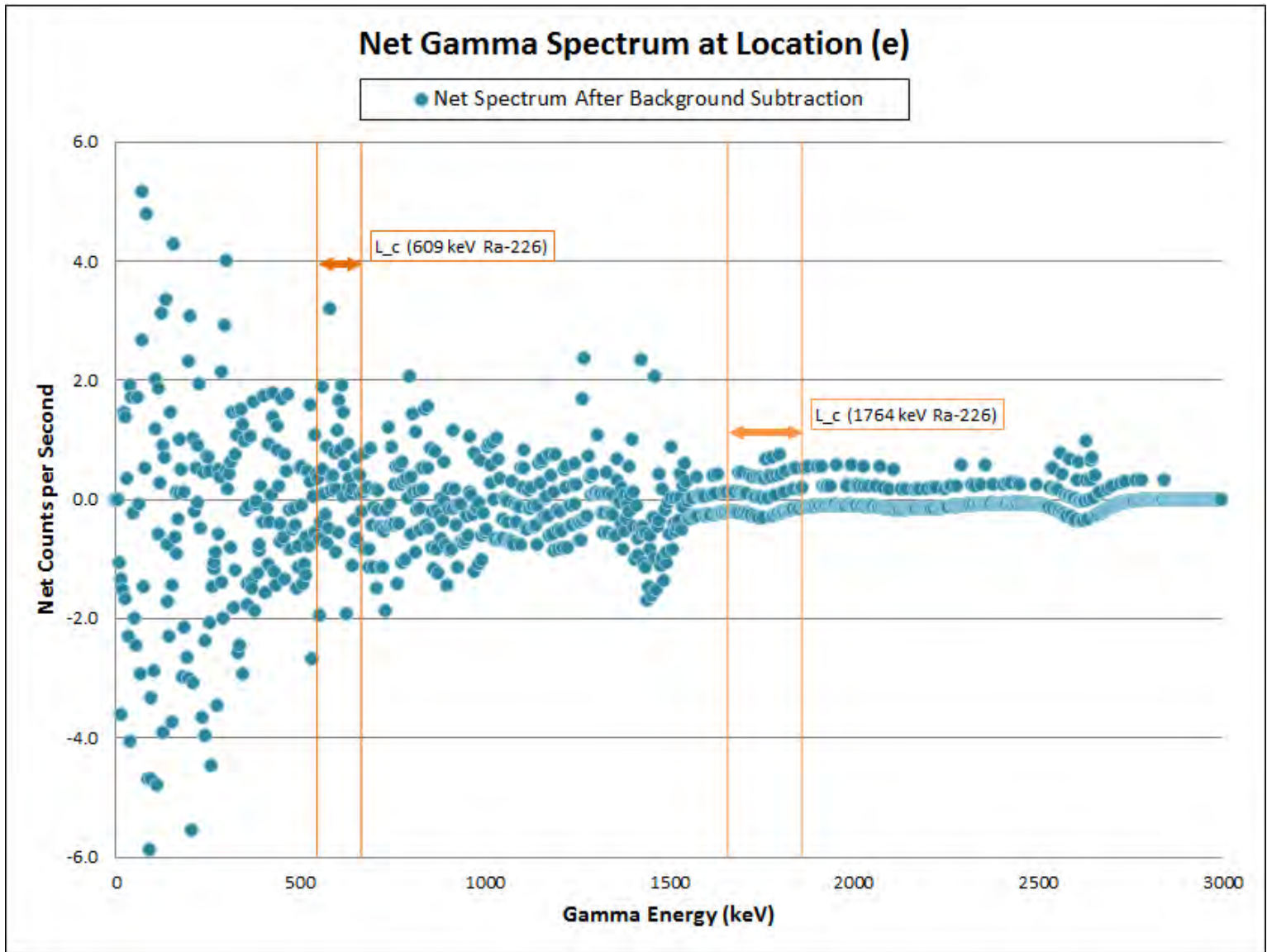
RSI Spectral Analysis Results: RSY 17 Use 2 – **Gamma Spectra at Location (e)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (e)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 17 Use 2 – **Net Gamma Spectrum at Location (e)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (e): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

k : Poisson probability sum for α and β (assuming α and β are equal)

α : Probability of a Type I error

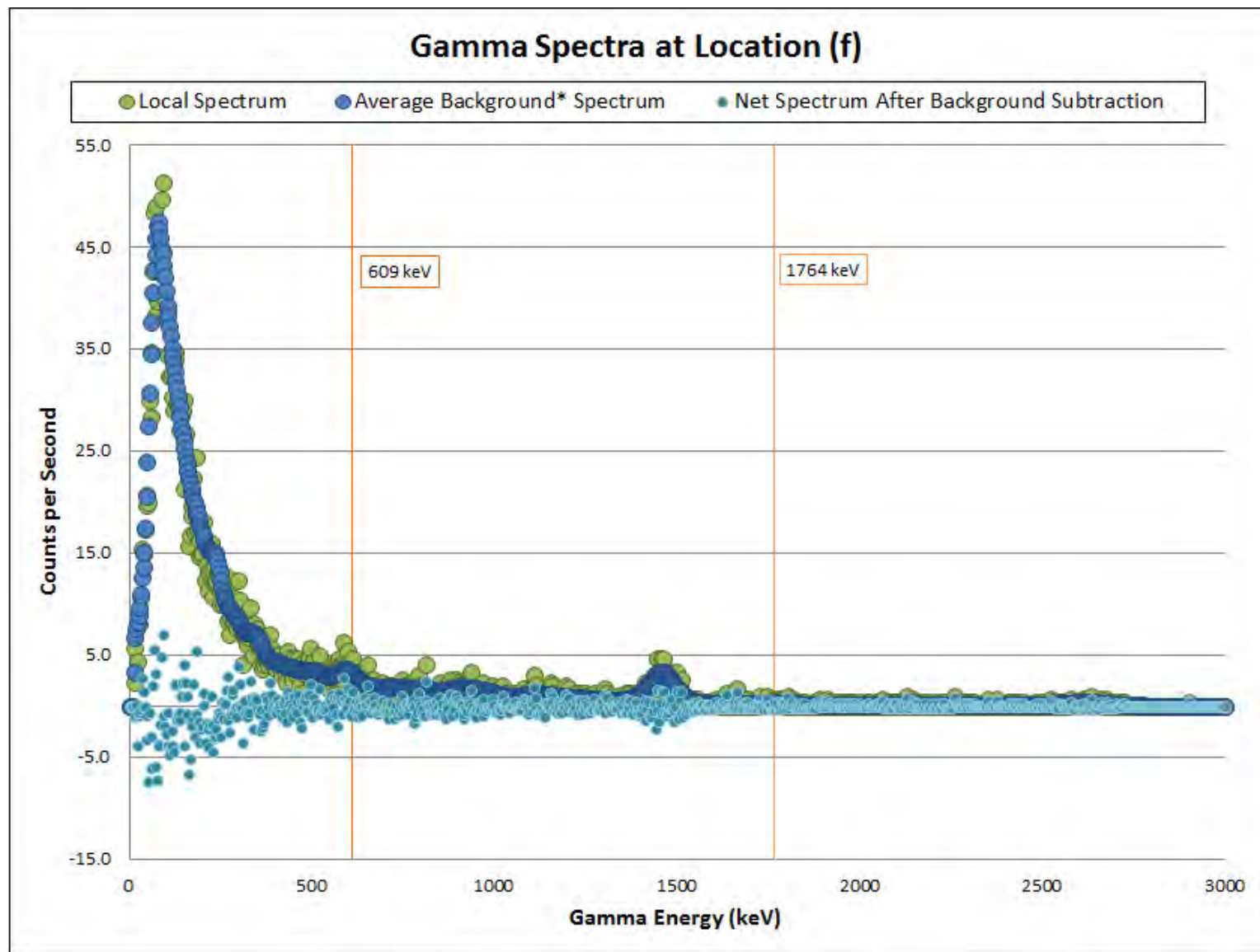
β : Probability of a Type II error

MARSSIM APPENDIX I, TABLE I.1

For $\alpha = \beta = 0.05 \rightarrow k = 1.645$

$$L_c = 2.33\sqrt{B}$$

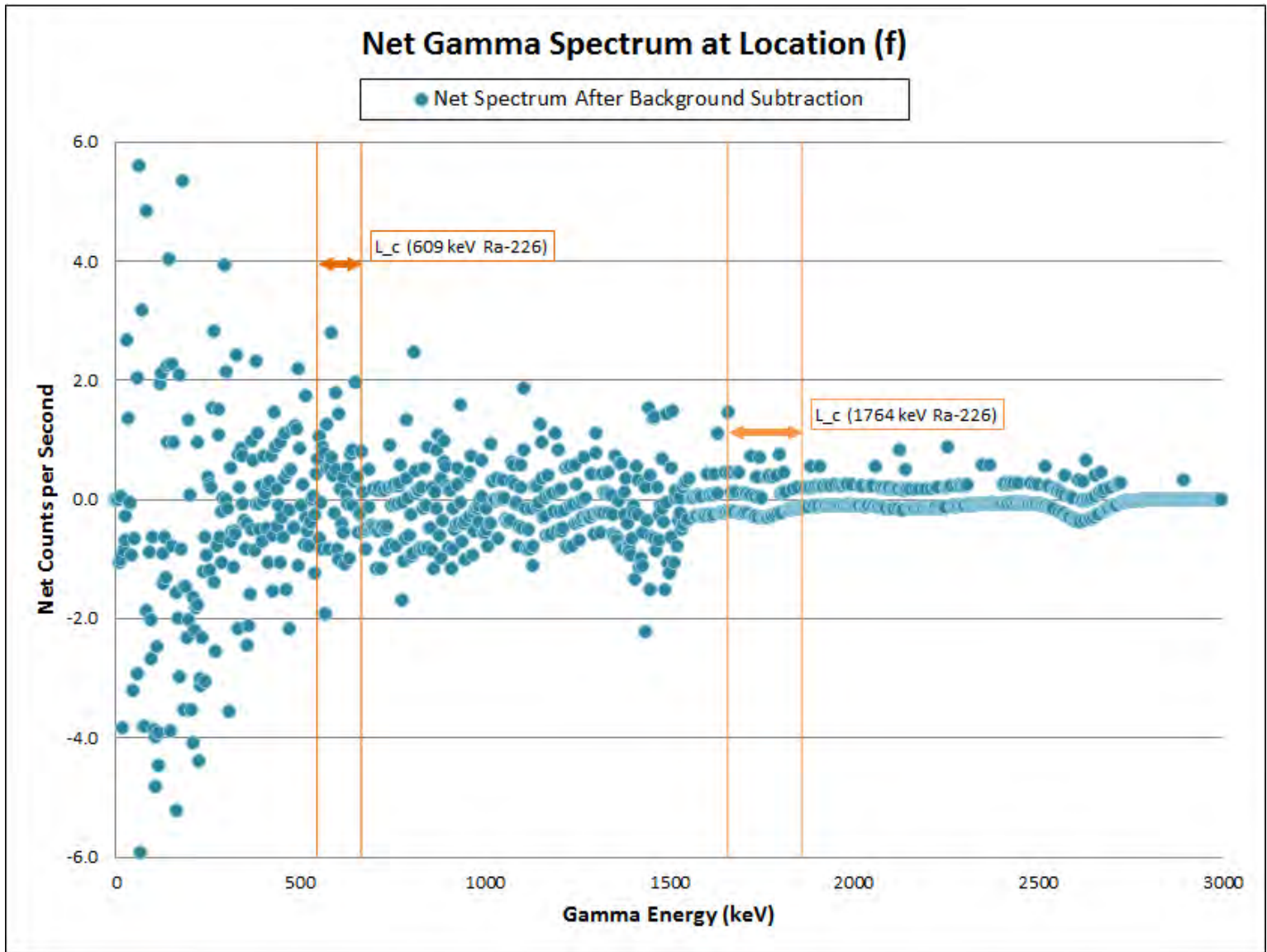
RSI Spectral Analysis Results: RSY 17 Use 2 – **Gamma Spectra at Location (f)**
 (VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (f)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 17 Use 2 – **Net Gamma Spectrum at Location (f)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (f): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ **B** = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

k : Poisson probability sum for α and β (assuming α and β are equal)

α : Probability of a Type I error

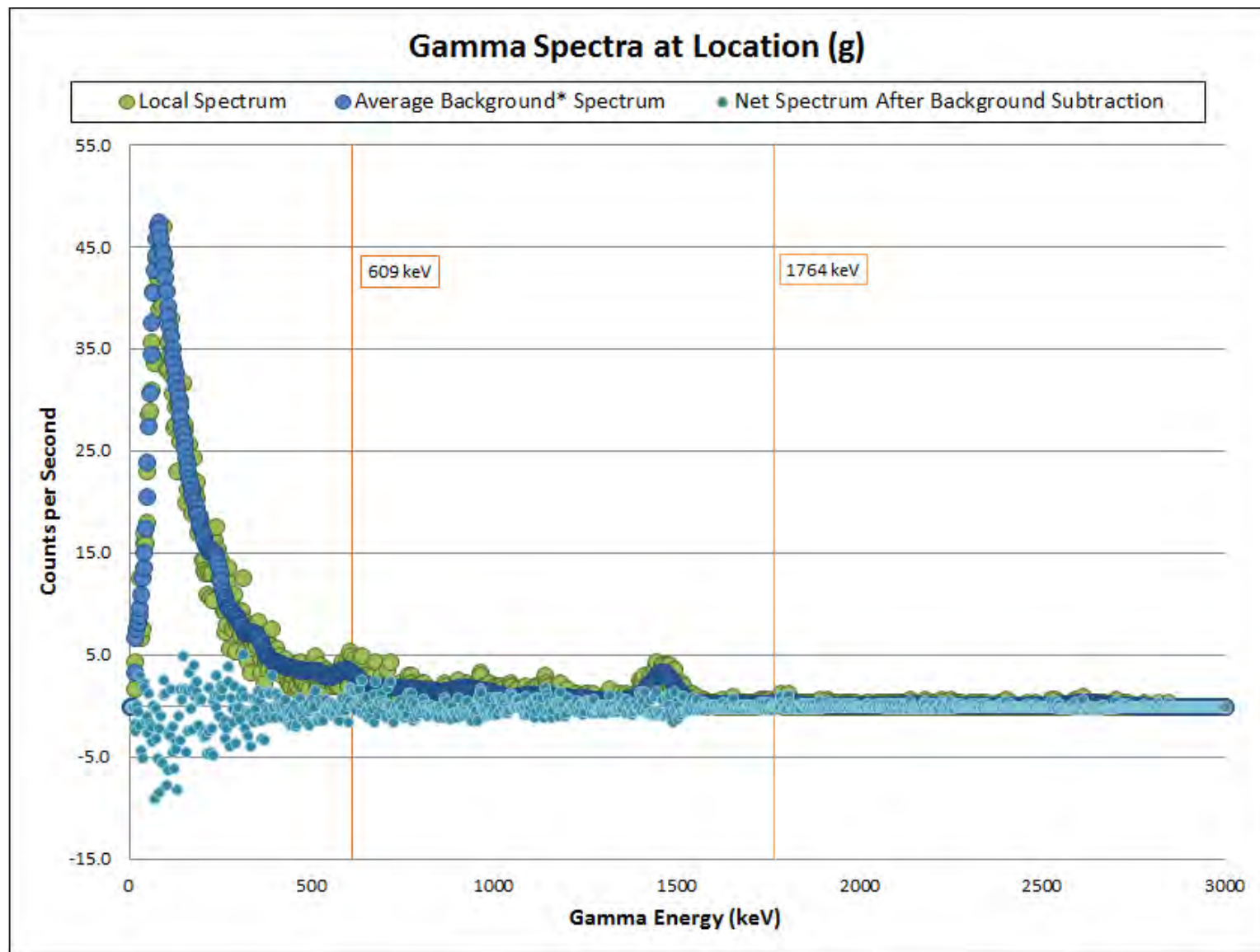
β : Probability of a Type II error

MARSSIM APPENDIX I, TABLE I.1

For $\alpha = \beta = 0.05 \rightarrow k = 1.645$

$$L_c = 2.33\sqrt{B}$$

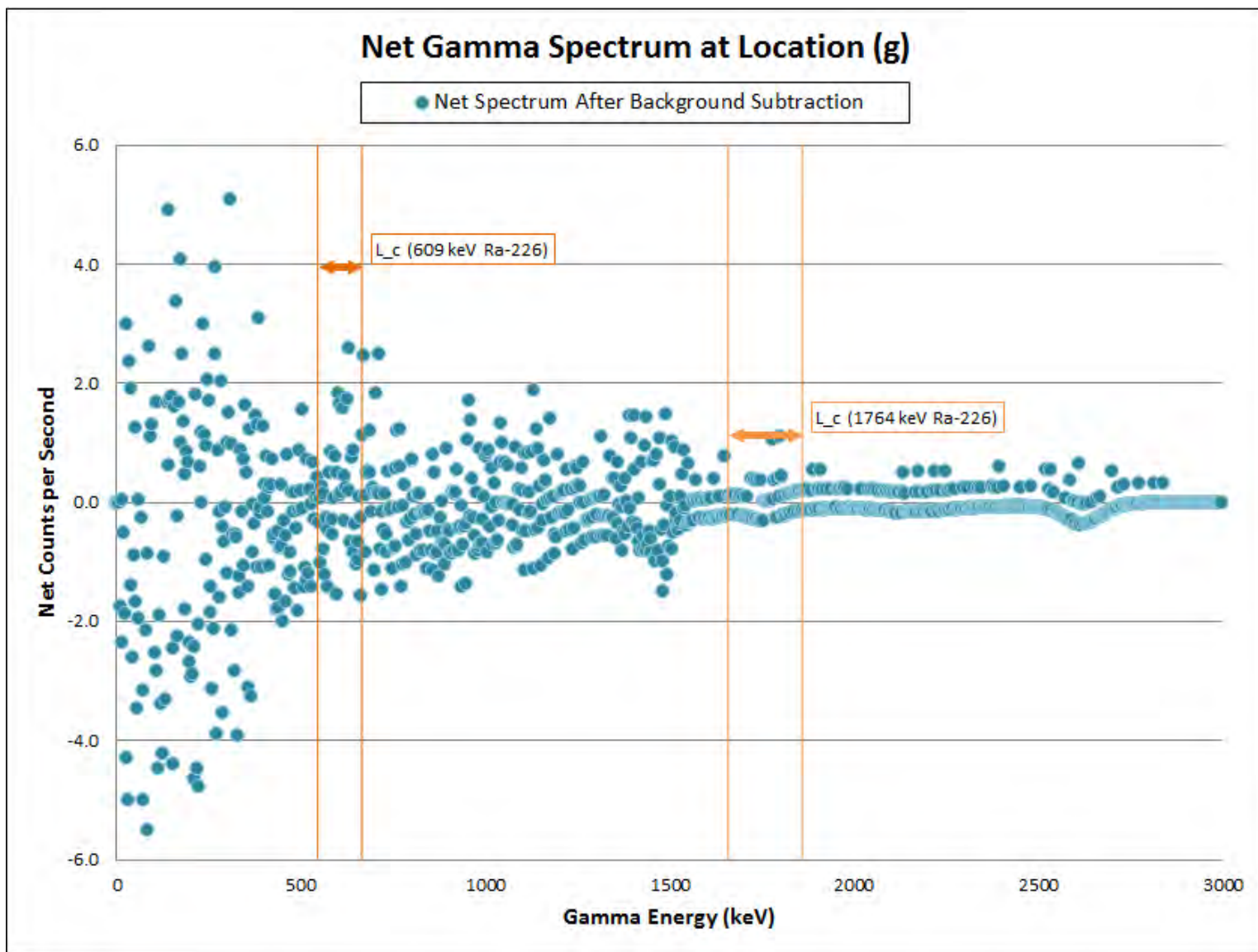
RSI Spectral Analysis Results: RSY 17 Use 2 – **Gamma Spectra at Location (g)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for Location (g): local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 17 Use 2 – **Net Gamma Spectrum at Location (g)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (g): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

k : Poisson probability sum for α and β (assuming α and β are equal)

α : Probability of a Type I error

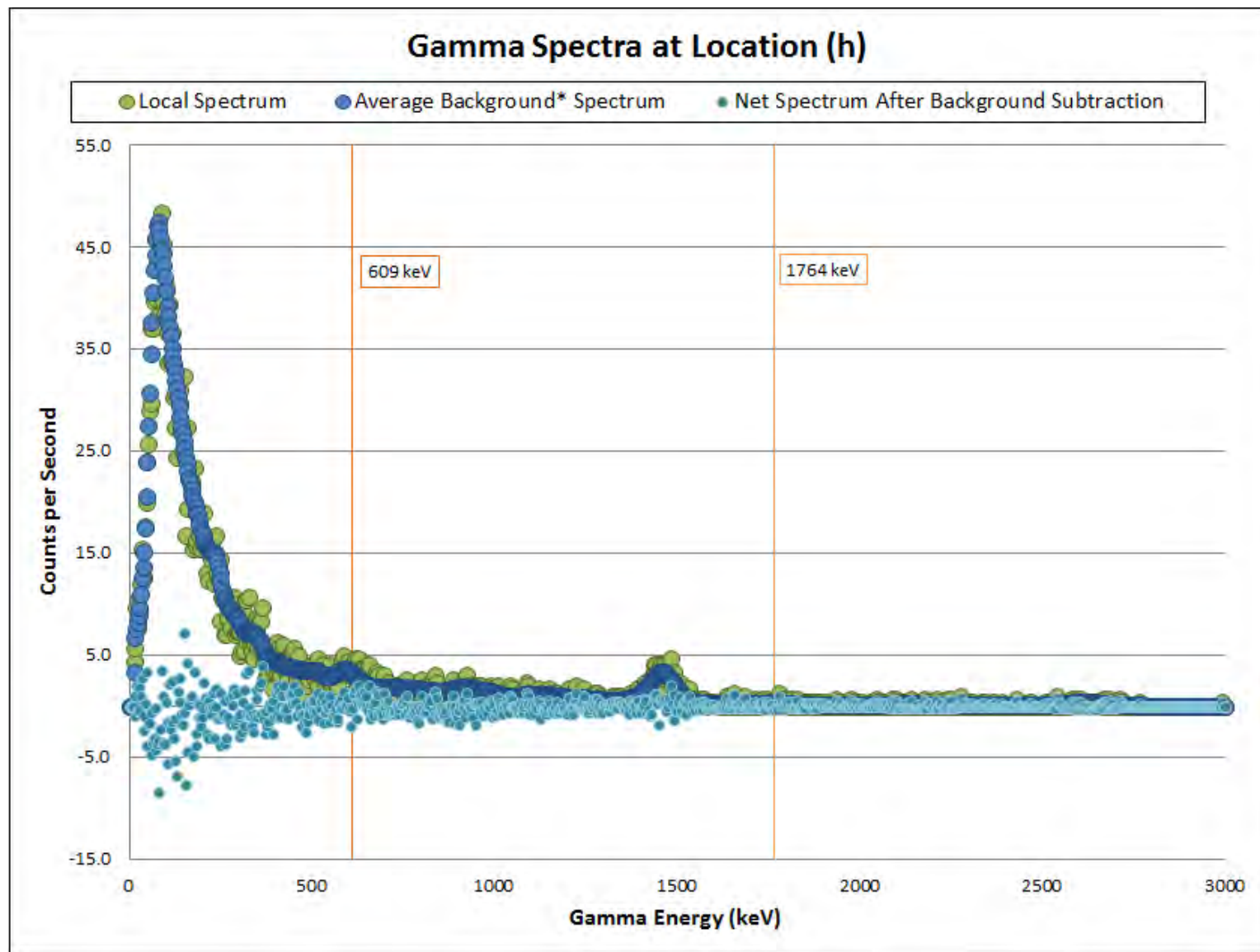
β : Probability of a Type II error

MARSSIM APPENDIX I, TABLE I.1

For $\alpha = \beta = 0.05 \rightarrow k = 1.645$

$$L_c = 2.33\sqrt{B}$$

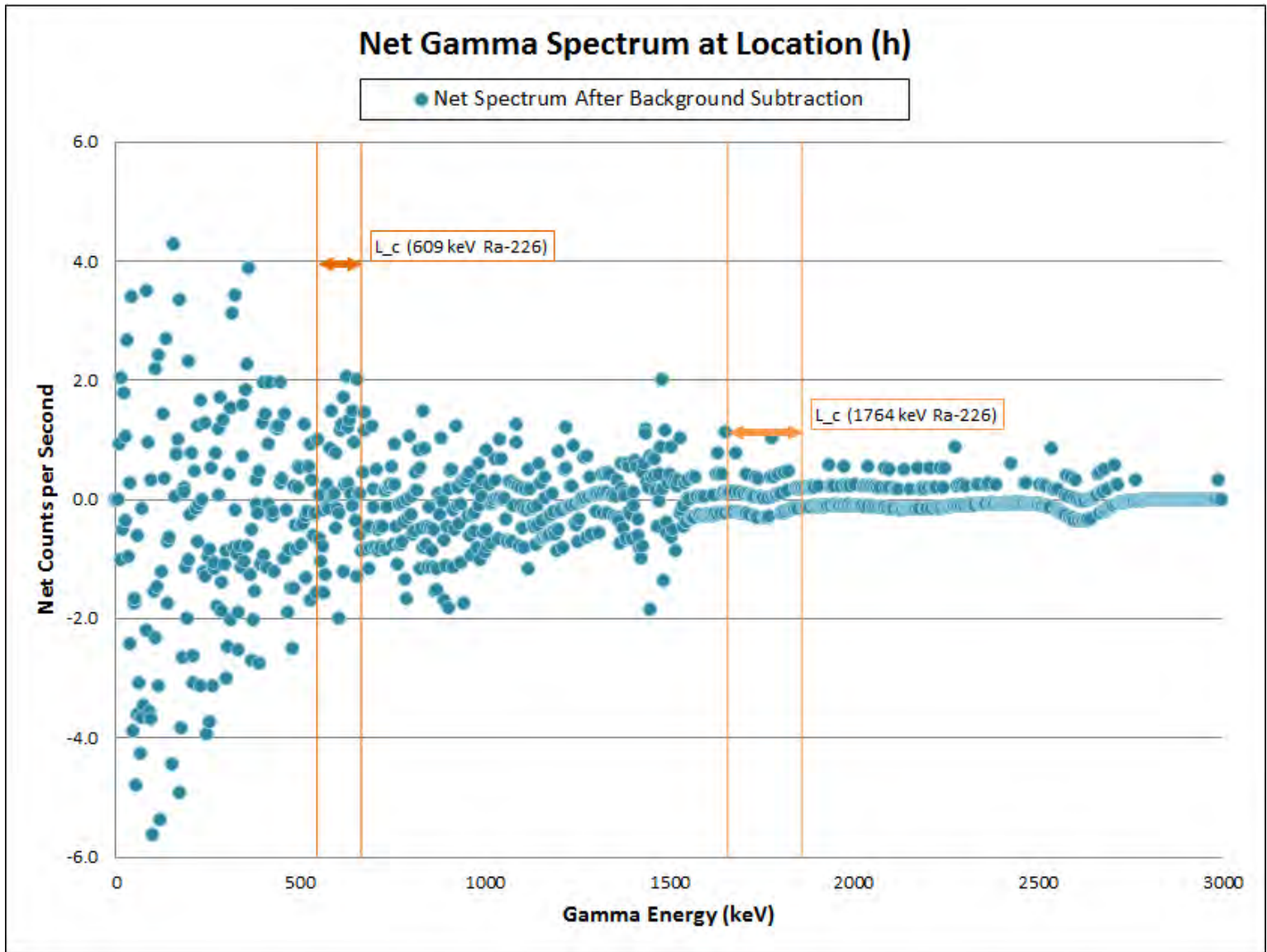
RSI Spectral Analysis Results: RSY 17 Use 2 – **Gamma Spectra at Location (h)**
(VD1 – Right and Left Detectors Summed)



Gamma spectra for **Location (h)**: local – background* = net

*Average background spectrum obtained from baseline scan of RSY pad prior to use.

RSI Spectral Analysis Results: RSY 17 Use 2 – **Net Gamma Spectrum at Location (h)**
(VD1 – Right and Left Detectors Summed)



Net spectrum for Location (h): net count rate does not exceed critical levels (L_c) at any of the indicated energy ranges

MARSSIM 6.7.1

L_c : Critical level above which a net count is considered above background (lower bound on a 95% detection interval)

B : number of background counts that are expected to occur while performing an actual measurement (mean value)

{ B = background counts for each channel averaged over all locations in background scan, then averaged over specified energy ranges}

k : Poisson probability sum for α and β (assuming α and β are equal)

α : Probability of a Type I error

β : Probability of a Type II error

MARSSIM APPENDIX I, TABLE I.1

For $\alpha = \beta = 0.05 \rightarrow k = 1.645$

$$L_c = 2.33\sqrt{B}$$

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-13119-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
9/3/2015 3:10:50 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

Review your project
results through
TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Table of Contents	2
Case Narrative	3
Chain of Custody	5
Receipt Checklists	8
Definitions/Glossary	9
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Case Narrative

Page 28 of 49

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Job ID: 160-13119-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-13119-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Page 29 of 49

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Job ID: 160-13119-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 8/3/2015 8:40 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 22.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04_RSY17_2-CH-S201 (160-13119-1), TITO04_RSY17_2-CH-S202 (160-13119-2), TITO04_RSY17_2-CH-S203 (160-13119-3), TITO04_RSY17_2-CH-S204 (160-13119-4), TITO04_RSY17_2-CH-S205 (160-13119-5), TITO04_RSY17_2-CH-S206 (160-13119-6), TITO04_RSY17_2-CH-S207 (160-13119-7), TITO04_RSY17_2-CH-S208 (160-13119-8), TITO04_RSY17_2-CH-S209 (160-13119-9), TITO04_RSY17_2-CH-S210 (160-13119-10), TITO04_RSY17_2-CH-S211 (160-13119-11), TITO04_RSY17_2-CH-S212 (160-13119-12), TITO04_RSY17_2-CH-S213 (160-13119-13), TITO04_RSY17_2-CH-S214 (160-13119-14), TITO04_RSY17_2-CH-S215 (160-13119-15), TITO04_RSY17_2-CH-S216 (160-13119-16), TITO04_RSY17_2-CH-S217 (160-13119-17), TITO04_RSY17_2-CH-S218 (160-13119-18), TITO04_RSY17_2-CH-S219 (160-13119-19) and TITO04_RSY17_2-CH-S220 (160-13119-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 08/04/2015, prepared on 08/05/2015 and analyzed on 08/27/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



CBI Federal Services LLC
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_RSY17 USE2_070

Page 1 of 3

Project Number: 500060

Project Name / Location: CTO-04 Phase III RSY17

USED 2

Purchase Order #: 201455

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date: 7/31/15

Waybill Number: 126645134313806

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Sampler's Name(s): Edna Barabany

Sample ID Number	Sample Description	Date	Time	Method	Matrix	# of Containers	Preservative (water) Preservative (soil)	Container Type	Gamma Scan	Dose Rate μ R/hr
TIT004_RSY17_2-CH-S201	Site 32 RSY17 USE 2	7/30/15	0914	G	SO	1		16 oz Plastic	X	S
TIT004_RSY17_2-CH-S202	Site 32 RSY17 USE 2	7/30/15	0917	G	SO	1		16 oz Plastic	X	S
TIT004_RSY17_2-CH-S203	Site 32 RSY17 USE 2	7/30/15	0921	G	SO	1		16 oz Plastic	X	S
TIT004_RSY17_2-CH-S204	Site 32 RSY17 USE 2	7/30/15	0924	G	SO	1		16 oz Plastic	X	S
TIT004_RSY17_2-CH-S205	Site 32 RSY17 USE 2	7/30/15	0927	G	SO	1		16 oz Plastic	X	S
TIT004_RSY17_2-CH-S206	Site 32 RSY17 USE 2	7/30/15	0930	G	SO	1		16 oz Plastic	X	S
TIT004_RSY17_2-CH-S207	Site 32 RSY17 USE 2	7/30/15	0935	G	SO	1		16 oz Plastic	X	S
TIT004_RSY17_2-CH-S208	Site 32 RSY17 USE 2	7/30/15	0939	G	SO	1		16 oz Plastic	X	S
TIT004_RSY17_2-CH-S209	Site 32 RSY17 USE 2	7/30/15	0935	G	SO	1		16 oz Plastic	X	S

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

Standard TAT ☐

☐ 3-day

☐ 7-day

Project Specific:

I

II

III

Relinquished By:

Edna Barabany

Date:

7/31/15

Time:

1245

Relinquished By:

Patricia Flynn

Date:

7/31/15

Time:

0840

Date:

7/31/15

Time:

0840

Date:

7/31/15

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Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_RSY17 USE2_070

Page 2 of 3

Project Number: 500060

Project Name / Location: CTO-04 Phase III RSY17

Purchase Order #: 201455

Shipment Date: 7/31/15

Waybill Number: 1266543139327396

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Sampler's Name(s): Edna G. Balaban

Sample ID Number	Sample Description	Date	Time	Method	Matrix	# of containers	Preservative (water) Preservative (soil)	Container Type	Dose Rate $\mu\text{R/hr}$
TITO04_RSY17_2-CH-S210	Site 32 RSY17 USE 2	7/30/15	0944	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S211	Site 32 RSY17 USE 2	7/30/15	0942	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S212	Site 32 RSY17 USE 2	7/30/15	0954	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S213	Site 32 RSY17 USE 2	7/30/15	0952	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S214	Site 32 RSY17 USE 2	7/30/15	0958	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S215	Site 32 RSY17 USE 2	7/30/15	1003	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S216	Site 32 RSY17 USE 2	7/30/15	0954	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S217	Site 32 RSY17 USE 2	7/30/15	1007	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S218	Site 32 RSY17 USE 2	7/30/15	1011	G	SO	1		16 oz Plastic	X

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

I II III

Method Codes

C = Composite

G = Grab

Relinquished By: Edna G. Balaban

Date: 7/30/15

Time: 1245

Relinquished By: Edna G. Balaban

Date: 7/30/15

Time: 1245

Received By: Edna G. Balaban

Date: 7/30/15

Time: 1245

Received By: Edna G. Balaban

Date: 7/30/15

Time: 1245

Analyses Requested

Gamma Scan

N/A

Preservative (water)

Preservative (soil)

Container Type

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

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Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

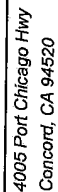
A = Air

SO = Soil

SL = Sludge

CP = Chip Samples

ABS = Asbestos, PO = Pipe Opening



Page 3 of 3

[illegible]

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-13119-2

Login Number: 13119**List Source: TestAmerica St. Louis****List Number: 1****Creator: Clarke, Jill C**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Page 34 of 49

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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Sample Summary

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-13119-1	TITO04_RSY17_2-CH-S201	Solid	07/30/15 09:14	08/03/15 08:40
160-13119-2	TITO04_RSY17_2-CH-S202	Solid	07/30/15 09:17	08/03/15 08:40
160-13119-3	TITO04_RSY17_2-CH-S203	Solid	07/30/15 09:21	08/03/15 08:40
160-13119-4	TITO04_RSY17_2-CH-S204	Solid	07/30/15 09:24	08/03/15 08:40
160-13119-5	TITO04_RSY17_2-CH-S205	Solid	07/30/15 09:27	08/03/15 08:40
160-13119-6	TITO04_RSY17_2-CH-S206	Solid	07/30/15 09:30	08/03/15 08:40
160-13119-7	TITO04_RSY17_2-CH-S207	Solid	07/30/15 09:35	08/03/15 08:40
160-13119-8	TITO04_RSY17_2-CH-S208	Solid	07/30/15 09:39	08/03/15 08:40
160-13119-9	TITO04_RSY17_2-CH-S209	Solid	07/30/15 09:35	08/03/15 08:40
160-13119-10	TITO04_RSY17_2-CH-S210	Solid	07/30/15 09:44	08/03/15 08:40
160-13119-11	TITO04_RSY17_2-CH-S211	Solid	07/30/15 09:42	08/03/15 08:40
160-13119-12	TITO04_RSY17_2-CH-S212	Solid	07/30/15 09:54	08/03/15 08:40
160-13119-13	TITO04_RSY17_2-CH-S213	Solid	07/30/15 09:52	08/03/15 08:40
160-13119-14	TITO04_RSY17_2-CH-S214	Solid	07/30/15 09:58	08/03/15 08:40
160-13119-15	TITO04_RSY17_2-CH-S215	Solid	07/30/15 10:03	08/03/15 08:40
160-13119-16	TITO04_RSY17_2-CH-S216	Solid	07/30/15 09:54	08/03/15 08:40
160-13119-17	TITO04_RSY17_2-CH-S217	Solid	07/30/15 10:07	08/03/15 08:40
160-13119-18	TITO04_RSY17_2-CH-S218	Solid	07/30/15 10:11	08/03/15 08:40
160-13119-19	TITO04_RSY17_2-CH-S219	Solid	07/30/15 10:05	08/03/15 08:40
160-13119-20	TITO04_RSY17_2-CH-S220	Solid	07/30/15 10:10	08/03/15 08:40

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S201

Lab Sample ID: 160-13119-1

Date Collected: 07/30/15 09:14

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.283		0.121	0.124		0.212	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Actinium-227	0.171	U	0.202	0.203		0.526	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Bismuth-212	0.262	U	0.390	0.391		0.654	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Bismuth-214	0.367		0.108	0.114		0.100	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Cesium-137	-0.00916	U	0.0387	0.0388		0.0694	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Lead-210	0.455	U	0.801	0.803		1.32	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Lead-212	0.452		0.0883	0.106		0.0773	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Lead-214	0.464		0.0863	0.0989		0.123	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Potassium-40	8.56		1.24	1.52		0.576	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Protactinium-231	0.105	U	0.165	0.165		1.40	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Radium-226	0.367		0.108	0.114	0.500	0.100	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Radium-228	0.283		0.121	0.124		0.212	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Thallium-208	0.182		0.0522	0.0555		0.0436	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Thorium-228	0.452		0.0883	0.106		0.0773	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Thorium-232	0.283		0.121	0.124		0.212	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Thorium-234	0.343	U	0.307	0.309		1.32	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Uranium-235	0.130	U	0.116	0.116		0.279	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Uranium-238	0.343	U	0.307	0.309		1.32	pCi/g	08/05/15 17:56	08/27/15 19:36	1

Client Sample ID: TITO04_RSY17_2-CH-S202

Lab Sample ID: 160-13119-2

Date Collected: 07/30/15 09:17

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.313		0.136	0.140		0.213	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Actinium-227	-0.0249	U	0.342	0.342		0.601	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Bismuth-212	0.311	U	0.400	0.401		0.658	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Bismuth-214	0.386		0.117	0.123		0.121	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Cesium-137	0.00444	U	0.0314	0.0314		0.0573	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Lead-210	-0.113	U	1.06	1.06		1.79	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Lead-212	0.379		0.105	0.116		0.111	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Lead-214	0.448		0.0929	0.104		0.116	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Potassium-40	8.68		1.16	1.46		0.726	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Protactinium-231	0.153	U	0.611	0.611		1.34	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Radium-226	0.386		0.117	0.123	0.500	0.121	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Radium-228	0.313		0.136	0.140		0.213	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Thallium-208	0.138		0.0421	0.0445		0.0385	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Thorium-228	0.379		0.105	0.116		0.111	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Thorium-232	0.313		0.136	0.140		0.213	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Thorium-234	0.153	U	0.212	0.213		1.59	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Uranium-235	0.205	U	0.176	0.177		0.288	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Uranium-238	0.153	U	0.212	0.213		1.59	pCi/g	08/05/15 17:56	08/27/15 19:38	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S203

Lab Sample ID: 160-13119-3

Date Collected: 07/30/15 09:21

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.428		0.162	0.168		0.178	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Actinium-227	-0.206	U	0.490	0.491		0.832	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Bismuth-212	0.329	U	0.455	0.456		0.755	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Bismuth-214	0.512		0.124	0.135		0.108	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Cesium-137	0.000	U	0.0253	0.0253		0.0671	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Lead-210	-0.0173	U	1.00	1.00		1.89	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Lead-212	0.449		0.105	0.120		0.106	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Lead-214	0.419		0.106	0.115		0.0973	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Potassium-40	9.15		1.24	1.56		0.534	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Protactinium-231	0.274	U	0.264	0.266		1.63	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Radium-226	0.512		0.124	0.135	0.500	0.108	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Radium-228	0.428		0.162	0.168		0.178	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Thallium-208	0.0760		0.0446	0.0453		0.0674	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Thorium-228	0.449		0.105	0.120		0.106	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Thorium-232	0.428		0.162	0.168		0.178	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Thorium-234	0.501	U	0.955	0.956		1.46	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Uranium-235	0.104	U	0.196	0.196		0.298	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Uranium-238	0.501	U	0.955	0.956		1.46	pCi/g	08/05/15 17:56	08/27/15 19:39	1

Client Sample ID: TITO04_RSY17_2-CH-S204

Lab Sample ID: 160-13119-4

Date Collected: 07/30/15 09:24

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.214	U	0.119	0.121		0.248	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Actinium-227	0.131	U	0.423	0.423		0.728	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Bismuth-212	0.317	U	0.454	0.455		0.758	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Bismuth-214	0.366		0.101	0.108		0.101	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Cesium-137	-0.00321	U	0.0406	0.0406		0.0739	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Lead-210	1.50	U	1.27	1.29		1.78	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Lead-212	0.390		0.0967	0.109		0.106	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Lead-214	0.400		0.106	0.114		0.126	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Potassium-40	8.88		1.24	1.53		0.521	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Protactinium-231	0.337	U	0.308	0.310		1.70	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Radium-226	0.366		0.101	0.108	0.500	0.101	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Radium-228	0.214	U	0.119	0.121		0.248	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thallium-208	0.136		0.0546	0.0564		0.0529	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thorium-228	0.390		0.0967	0.109		0.106	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thorium-232	0.214	U	0.119	0.121		0.248	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thorium-234	0.0757	U	0.392	0.393		1.34	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Uranium-235	0.0430	U	0.169	0.169		0.299	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Uranium-238	0.0757	U	0.392	0.393		1.34	pCi/g	08/05/15 17:56	08/27/15 20:14	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S205

Lab Sample ID: 160-13119-5

Date Collected: 07/30/15 09:27

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.257		0.154	0.156		0.221	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Actinium-227	0.435	U	0.375	0.378		0.592	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Bismuth-212	0.233	U	0.447	0.448		0.774	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Bismuth-214	0.394		0.110	0.117		0.0927	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Cesium-137	-0.000408	U	0.0350	0.0350		0.0667	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Lead-210	0.674	U	0.899	0.902		1.61	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Lead-212	0.442		0.112	0.126		0.112	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Lead-214	0.432		0.0966	0.107		0.106	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Potassium-40	9.80		1.47	1.78		0.640	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Protactinium-231	0.0689	U	0.153	0.154		1.61	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Radium-226	0.394		0.110	0.117	0.500	0.0927	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Radium-228	0.257		0.154	0.156		0.221	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thallium-208	0.139		0.0433	0.0456		0.0405	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thorium-228	0.442		0.112	0.126		0.112	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thorium-232	0.257		0.154	0.156		0.221	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thorium-234	0.297	U	0.910	0.911		1.62	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Uranium-235	0.169	U	0.198	0.198		0.319	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Uranium-238	0.297	U	0.910	0.911		1.62	pCi/g	08/05/15 17:56	08/27/15 20:13	1

Client Sample ID: TITO04_RSY17_2-CH-S206

Lab Sample ID: 160-13119-6

Date Collected: 07/30/15 09:30

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.452		0.174	0.180		0.141	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Actinium-227	0.000	U	0.346	0.346		0.790	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Bismuth-212	0.251	U	0.579	0.580		1.00	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Bismuth-214	0.443		0.122	0.131		0.118	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Cesium-137	-0.00510	U	0.0406	0.0406		0.0743	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Lead-210	0.876	U	0.948	0.954		1.65	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Lead-212	0.470		0.102	0.118		0.102	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Lead-214	0.564		0.152	0.163		0.148	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Potassium-40	12.4		1.58	2.03		0.647	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Protactinium-231	0.354	U	0.448	0.450		1.32	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Radium-226	0.443		0.122	0.131	0.500	0.118	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Radium-228	0.452		0.174	0.180		0.141	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thallium-208	0.202		0.0553	0.0592		0.0462	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thorium-228	0.470		0.102	0.118		0.102	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thorium-232	0.452		0.174	0.180		0.141	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thorium-234	0.946	U	0.963	0.969		1.34	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Uranium-235	0.112	U	0.151	0.152		0.350	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Uranium-238	0.946	U	0.963	0.969		1.34	pCi/g	08/05/15 17:56	08/27/15 20:13	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S207

Lab Sample ID: 160-13119-7

Date Collected: 07/30/15 09:35

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.286	U	0.183	0.186		0.302	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Actinium-227	0.0695	U	0.196	0.196		0.669	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Bismuth-212	0.233	U	0.489	0.489		0.845	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Bismuth-214	0.406		0.120	0.128		0.125	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Cesium-137	0.00297	U	0.0331	0.0331		0.0619	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Lead-210	-0.129	U	1.25	1.25		2.14	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Lead-212	0.336		0.101	0.110		0.119	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Lead-214	0.405		0.114	0.122		0.147	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Potassium-40	10.7		1.40	1.78		0.806	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Protactinium-231	0.783	U	0.763	0.768		1.65	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Radium-226	0.406		0.120	0.128	0.500	0.125	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Radium-228	0.286	U	0.183	0.186		0.302	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thallium-208	0.149		0.0593	0.0613		0.0585	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thorium-228	0.336		0.101	0.110		0.119	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thorium-232	0.286	U	0.183	0.186		0.302	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thorium-234	0.143	U	0.493	0.493		1.61	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Uranium-235	0.155	U	0.222	0.222		0.368	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Uranium-238	0.143	U	0.493	0.493		1.61	pCi/g	08/05/15 17:56	08/27/15 20:14	1

Client Sample ID: TITO04_RSY17_2-CH-S208

Lab Sample ID: 160-13119-8

Date Collected: 07/30/15 09:39

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.224	U	0.115	0.118		0.238	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Actinium-227	0.397	U	0.449	0.451		0.733	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Bismuth-212	0.232	U	0.525	0.526		0.911	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Bismuth-214	0.200		0.0991	0.101		0.124	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Cesium-137	0.00398	U	0.0379	0.0379		0.0698	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Lead-210	0.560	U	1.21	1.21		1.93	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Lead-212	0.357		0.0952	0.106		0.0980	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Lead-214	0.432		0.103	0.113		0.0940	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Potassium-40	11.2		1.44	1.84		0.587	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Protactinium-231	-0.319	U	1.05	1.05		1.82	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Radium-226	0.200		0.0991	0.101	0.500	0.124	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Radium-228	0.224	U	0.115	0.118		0.238	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Thallium-208	0.122		0.0430	0.0448		0.0451	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Thorium-228	0.357		0.0952	0.106		0.0980	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Thorium-232	0.224	U	0.115	0.118		0.238	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Thorium-234	0.412	U	0.437	0.439		1.63	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Uranium-235	0.00537	U	0.0758	0.0758		0.299	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Uranium-238	0.412	U	0.437	0.439		1.63	pCi/g	08/05/15 17:56	08/27/15 20:15	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S209

Lab Sample ID: 160-13119-9

Date Collected: 07/30/15 09:35

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.152	U	0.0804	0.0818		0.231	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Actinium-227	0.166	U	0.271	0.271		0.678	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Bismuth-212	0.485	U	0.426	0.429		0.650	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Bismuth-214	0.399		0.117	0.124		0.114	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Cesium-137	0.0210	U	0.0344	0.0345		0.0585	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Lead-210	0.0887	U	0.880	0.880		1.65	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Lead-212	0.270		0.107	0.113		0.122	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Lead-214	0.226		0.0903	0.0933		0.132	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Potassium-40	9.93		1.40	1.73		1.10	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Protactinium-231	-0.0294	U	0.0498	0.0499		1.62	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Radium-226	0.399		0.117	0.124	0.500	0.114	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Radium-228	0.152	U	0.0804	0.0818		0.231	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thallium-208	0.0802		0.0481	0.0488		0.0730	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thorium-228	0.270		0.107	0.113		0.122	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thorium-232	0.152	U	0.0804	0.0818		0.231	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thorium-234	0.318	U	0.881	0.882		1.55	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Uranium-235	0.103	U	0.159	0.159		0.303	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Uranium-238	0.318	U	0.881	0.882		1.55	pCi/g	08/05/15 17:56	08/27/15 20:16	1

Client Sample ID: TITO04_RSY17_2-CH-S210

Lab Sample ID: 160-13119-10

Date Collected: 07/30/15 09:44

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.312		0.163	0.166		0.286	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Actinium-227	-0.157	U	0.464	0.465		0.807	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Bismuth-212	0.677	U	0.677	0.680		1.06	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Bismuth-214	0.494		0.155	0.163		0.142	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Cesium-137	-0.00244	U	0.0634	0.0635		0.110	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Lead-210	0.0235	U	1.09	1.09		2.08	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Lead-212	0.369		0.123	0.132		0.129	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Lead-214	0.519		0.143	0.153		0.171	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Potassium-40	9.48		1.75	2.00		0.875	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Protactinium-231	0.464	U	0.879	0.880		1.96	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Radium-226	0.494		0.155	0.163	0.500	0.142	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Radium-228	0.312		0.163	0.166		0.286	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thallium-208	0.199		0.0672	0.0703		0.0462	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thorium-228	0.369		0.123	0.132		0.129	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thorium-232	0.312		0.163	0.166		0.286	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thorium-234	0.488	U	1.06	1.06		1.88	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Uranium-235	0.0587	U	0.222	0.222		0.376	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Uranium-238	0.488	U	1.06	1.06		1.88	pCi/g	08/05/15 17:56	08/27/15 20:16	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S211

Lab Sample ID: 160-13119-11

Date Collected: 07/30/15 09:42

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.234	U	0.145	0.147		0.284	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Actinium-227	-0.209	U	0.576	0.576		0.979	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Bismuth-212	0.218	U	0.567	0.568		0.996	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Bismuth-214	0.430		0.115	0.124		0.0902	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Cesium-137	-0.0119	U	0.153	0.153		0.101	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Lead-210	0.799	U	1.14	1.15		1.90	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Lead-212	0.405		0.110	0.122		0.109	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Lead-214	0.470		0.120	0.129		0.0898	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Potassium-40	11.8		1.65	2.04		0.657	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Protactinium-231	-0.0154	U	0.0278	0.0279		1.78	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Radium-226	0.430		0.115	0.124	0.500	0.0902	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Radium-228	0.234	U	0.145	0.147		0.284	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Thallium-208	0.159		0.0635	0.0656		0.0615	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Thorium-228	0.405		0.110	0.122		0.109	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Thorium-232	0.234	U	0.145	0.147		0.284	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Thorium-234	0.400	U	0.502	0.504		1.76	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Uranium-235	-0.0498	U	1.84	1.84		0.397	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Uranium-238	0.400	U	0.502	0.504		1.76	pCi/g	08/05/15 17:56	08/27/15 20:17	1

Client Sample ID: TITO04_RSY17_2-CH-S212

Lab Sample ID: 160-13119-12

Date Collected: 07/30/15 09:54

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.426		0.166	0.172		0.130	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Actinium-227	0.129	U	0.487	0.487		0.838	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Bismuth-212	0.379	U	0.406	0.408		0.642	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Bismuth-214	0.426		0.111	0.119		0.108	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Cesium-137	0.000863	U	0.0347	0.0347		0.0653	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Lead-210	0.579	U	1.28	1.28		1.85	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Lead-212	0.315		0.117	0.124		0.128	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Lead-214	0.471		0.116	0.126		0.111	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Potassium-40	11.8		1.55	1.96		0.923	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Protactinium-231	-0.00966	U	0.851	0.851		1.54	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Radium-226	0.426		0.111	0.119	0.500	0.108	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Radium-228	0.426		0.166	0.172		0.130	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Thallium-208	0.0800	U	0.0529	0.0535		0.0805	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Thorium-228	0.315		0.117	0.124		0.128	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Thorium-232	0.426		0.166	0.172		0.130	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Thorium-234	0.262	U	0.975	0.976		1.46	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Uranium-235	0.0913	U	0.154	0.154		0.297	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Uranium-238	0.262	U	0.975	0.976		1.46	pCi/g	08/05/15 17:56	08/27/15 20:50	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S213

Lab Sample ID: 160-13119-13

Date Collected: 07/30/15 09:52

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.294		0.139	0.142		0.282	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Actinium-227	0.0289	U	0.155	0.155		0.691	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Bismuth-212	0.0499	U	0.474	0.474		0.906	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Bismuth-214	0.172		0.102	0.103		0.150	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Cesium-137	-0.0169	U	0.287	0.287		0.103	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Lead-210	-0.724	U	29.0	29.0		1.75	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Lead-212	0.338		0.110	0.118		0.113	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Lead-214	0.298		0.0880	0.0933		0.0843	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Potassium-40	9.38		1.67	1.93		1.15	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Protactinium-231	0.000	U	0.377	0.377		1.72	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Radium-226	0.172		0.102	0.103	0.500	0.150	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Radium-228	0.294		0.139	0.142		0.282	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Thallium-208	0.109		0.0502	0.0514		0.0431	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Thorium-228	0.338		0.110	0.118		0.113	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Thorium-232	0.294		0.139	0.142		0.282	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Thorium-234	0.338	U	0.432	0.433		1.53	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Uranium-235	0.0235	U	0.0773	0.0773		0.302	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Uranium-238	0.338	U	0.432	0.433		1.53	pCi/g	08/05/15 17:56	08/27/15 20:49	1

Client Sample ID: TITO04_RSY17_2-CH-S214

Lab Sample ID: 160-13119-14

Date Collected: 07/30/15 09:58

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.381		0.188	0.192		0.241	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Actinium-227	0.0658	U	0.275	0.275		0.730	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Bismuth-212	0.441	U	0.457	0.459		0.719	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Bismuth-214	0.261		0.0966	0.100		0.115	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Cesium-137	-0.0353	U	0.190	0.191		0.0872	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Lead-210	0.342	U	0.943	0.944		1.61	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Lead-212	0.243		0.0767	0.0829		0.0902	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Lead-214	0.369		0.0871	0.0952		0.0796	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Potassium-40	10.2		1.49	1.82		0.623	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Protactinium-231	0.301	U	0.435	0.436		1.33	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Radium-226	0.261		0.0966	0.100	0.500	0.115	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Radium-228	0.381		0.188	0.192		0.241	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Thallium-208	0.108		0.0420	0.0434		0.0457	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Thorium-228	0.243		0.0767	0.0829		0.0902	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Thorium-232	0.381		0.188	0.192		0.241	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Thorium-234	0.434	U	0.437	0.440		1.42	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Uranium-235	0.0272	U	0.0377	0.0378		0.430	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Uranium-238	0.434	U	0.437	0.440		1.42	pCi/g	08/05/15 17:56	08/27/15 20:51	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S215

Lab Sample ID: 160-13119-15

Date Collected: 07/30/15 10:03

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.435		0.123	0.131		0.0641	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Actinium-227	0.0177	U	0.136	0.136		0.737	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Bismuth-212	0.271	U	0.321	0.322		0.520	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Bismuth-214	0.304		0.0899	0.0953		0.0898	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Cesium-137	0.000	U	0.00927	0.00927		0.0846	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-210	0.000	U	0.514	0.514		1.58	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-212	0.373		0.0906	0.103		0.0859	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-214	0.345		0.0836	0.0909		0.0716	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Potassium-40	10.4		1.21	1.61		0.531	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Protactinium-231	0.165	U	0.366	0.366		1.36	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Radium-226	0.304		0.0899	0.0953	0.500	0.0898	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Radium-228	0.435		0.123	0.131		0.0641	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thallium-208	0.105		0.0367	0.0383		0.0406	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-228	0.373		0.0906	0.103		0.0859	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-232	0.435		0.123	0.131		0.0641	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-234	0.840	U	0.746	0.751		1.20	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Uranium-235	0.00256	U	0.0287	0.0287		0.229	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Uranium-238	0.840	U	0.746	0.751		1.20	pCi/g	08/05/15 17:56	08/27/15 20:47	1

Client Sample ID: TITO04_RSY17_2-CH-S216

Lab Sample ID: 160-13119-16

Date Collected: 07/30/15 09:54

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.451		0.160	0.166		0.125	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Actinium-227	0.0817	U	0.441	0.441		0.767	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Bismuth-212	0.249	U	0.410	0.411		0.696	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Bismuth-214	0.362		0.118	0.124		0.124	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Cesium-137	0.00575	U	0.0374	0.0374		0.0681	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-210	0.0756	U	1.03	1.03		1.96	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-212	0.384		0.0991	0.111		0.102	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-214	0.397		0.116	0.123		0.142	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Potassium-40	10.8		1.38	1.77		0.537	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Protactinium-231	-0.0575	U	0.319	0.319		1.82	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Radium-226	0.362		0.118	0.124	0.500	0.124	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Radium-228	0.451		0.160	0.166		0.125	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thallium-208	0.131		0.0483	0.0502		0.0516	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-228	0.384		0.0991	0.111		0.102	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-232	0.451		0.160	0.166		0.125	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-234	0.290	U	0.903	0.904		1.63	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Uranium-235	-0.0598	U	0.161	0.161		0.429	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Uranium-238	0.290	U	0.903	0.904		1.63	pCi/g	08/05/15 17:56	08/27/15 20:47	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S217

Lab Sample ID: 160-13119-17

Date Collected: 07/30/15 10:07

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.547		0.163	0.172		0.0895	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Actinium-227	-0.153	U	0.422	0.422		0.723	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Bismuth-212	0.186	U	0.395	0.396		0.693	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Bismuth-214	0.372		0.112	0.118		0.103	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Cesium-137	0.00775	U	0.0382	0.0382		0.0694	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Lead-210	-0.750	U	30.0	30.0		1.91	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Lead-212	0.284		0.0774	0.0857		0.0809	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Lead-214	0.242		0.0926	0.0960		0.129	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Potassium-40	10.2		1.49	1.82		0.816	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Protactinium-231	0.290	U	0.317	0.318		1.58	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Radium-226	0.372		0.112	0.118	0.500	0.103	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Radium-228	0.547		0.163	0.172		0.0895	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thallium-208	0.0745		0.0424	0.0431		0.0600	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thorium-228	0.284		0.0774	0.0857		0.0809	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thorium-232	0.547		0.163	0.172		0.0895	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thorium-234	0.815	U	0.724	0.729		1.22	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Uranium-235	0.0266	U	0.0497	0.0498		0.292	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Uranium-238	0.815	U	0.724	0.729		1.22	pCi/g	08/05/15 17:56	08/27/15 20:46	1

Client Sample ID: TITO04_RSY17_2-CH-S218

Lab Sample ID: 160-13119-18

Date Collected: 07/30/15 10:11

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.198	U	0.130	0.132		0.268	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Actinium-227	0.0434	U	0.476	0.476		0.833	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Bismuth-212	0.000	U	0.124	0.124		0.920	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Bismuth-214	0.126	U	0.0997	0.101		0.131	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Cesium-137	0.00420	U	0.0339	0.0339		0.0640	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Lead-210	-0.0750	U	0.975	0.975		1.61	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Lead-212	0.295		0.0961	0.103		0.101	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Lead-214	0.358		0.122	0.128		0.127	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Potassium-40	9.24		1.46	1.74		0.674	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Protactinium-231	0.135	U	0.514	0.514		1.57	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Radium-226	0.126	U	0.0997	0.101	0.500	0.131	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Radium-228	0.198	U	0.130	0.132		0.268	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thallium-208	0.0792		0.0476	0.0483		0.0714	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thorium-228	0.295		0.0961	0.103		0.101	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thorium-232	0.198	U	0.130	0.132		0.268	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thorium-234	0.132	U	0.349	0.349		1.69	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Uranium-235	0.0969	U	0.195	0.196		0.294	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Uranium-238	0.132	U	0.349	0.349		1.69	pCi/g	08/05/15 17:56	08/27/15 20:46	1

Client Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S219

Lab Sample ID: 160-13119-19

Date Collected: 07/30/15 10:05

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.213		0.141	0.143		0.202	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Actinium-227	-0.197	U	0.473	0.473		0.801	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Bismuth-212	0.478	U	0.433	0.436		0.670	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Bismuth-214	0.333		0.113	0.118		0.116	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Cesium-137	-0.00994	U	0.0427	0.0427		0.0756	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-210	-0.127	U	1.10	1.10		1.87	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-212	0.340		0.0991	0.108		0.103	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-214	0.370		0.104	0.110		0.115	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Potassium-40	11.5		1.37	1.81		0.718	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Protactinium-231	0.0781	U	0.108	0.108		1.68	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Radium-226	0.333		0.113	0.118	0.500	0.116	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Radium-228	0.213		0.141	0.143		0.202	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thallium-208	0.154		0.0484	0.0510		0.0439	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-228	0.340		0.0991	0.108		0.103	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-232	0.213		0.141	0.143		0.202	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-234	1.32	U	0.866	0.877		1.43	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Uranium-235	0.171	U	0.176	0.177		0.296	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Uranium-238	1.32	U	0.866	0.877		1.43	pCi/g	08/05/15 17:56	08/27/15 20:47	1

Client Sample ID: TITO04_RSY17_2-CH-S220

Lab Sample ID: 160-13119-20

Date Collected: 07/30/15 10:10

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.254		0.111	0.114		0.200	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Actinium-227	0.208	U	0.423	0.423		0.716	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Bismuth-212	0.0465	U	0.355	0.355		0.662	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Bismuth-214	0.399		0.0993	0.108		0.0885	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Cesium-137	-0.00113	U	0.0370	0.0370		0.0684	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Lead-210	0.483	U	1.14	1.14		1.73	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Lead-212	0.302		0.0893	0.0975		0.101	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Lead-214	0.247		0.0760	0.0802		0.110	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Potassium-40	9.58		1.27	1.60		0.534	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Protactinium-231	0.109	U	0.190	0.191		1.33	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Radium-226	0.399		0.0993	0.108	0.500	0.0885	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Radium-228	0.254		0.111	0.114		0.200	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Thallium-208	0.107		0.0471	0.0483		0.0645	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Thorium-228	0.302		0.0893	0.0975		0.101	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Thorium-232	0.254		0.111	0.114		0.200	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Thorium-234	0.371	U	0.414	0.416		1.28	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Uranium-235	0.0804	U	0.199	0.199		0.321	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Uranium-238	0.371	U	0.414	0.416		1.28	pCi/g	08/05/15 17:56	08/27/15 20:48	1

QC Sample Results

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Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-204229/1-A

Matrix: Solid

Analysis Batch: 208139

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 204229

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.1036	U	0.133	0.133		0.284	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Actinium-227	0.1013	U	0.141	0.141		0.610	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Bismuth-212	0.06202	U	0.491	0.491		0.931	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Bismuth-214	-0.06285	U	2.51	2.51		0.212	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Cesium-137	-0.002988	U	0.0455	0.0455		0.0859	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Lead-210	0.2055	U	0.823	0.823		1.90	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Lead-212	-0.08885	U	0.255	0.255		0.126	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Lead-214	-0.03137	U	0.0606	0.0607		0.160	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Potassium-40	-0.1131	U	0.996	0.996		1.03	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Protactinium-231	0.2081	U	0.262	0.263		1.51	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Radium-226	-0.06285	U	2.51	2.51	0.500	0.212	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Radium-228	0.1036	U	0.133	0.133		0.284	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Thallium-208	0.008445	U	0.0394	0.0394		0.0893	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Thorium-228	-0.08885	U	0.255	0.255		0.126	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Thorium-232	0.1036	U	0.133	0.133		0.284	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Thorium-234	0.5913	U	0.467	0.472		1.47	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Uranium-235	0.03402	U	0.168	0.168		0.343	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Uranium-238	0.5913	U	0.467	0.472		1.47	pCi/g	08/05/15 17:56	08/27/15 19:37	1

Lab Sample ID: LCS 160-204229/2-A

Matrix: Solid

Analysis Batch: 208144

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 204229

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.3	97.86		10.3		1.37	pCi/g	101	87 - 116
Cesium-137	30.2	29.74		3.19		0.292	pCi/g	98	87 - 120
Cobalt-60	19.0	18.71		1.95		0.137	pCi/g	98	87 - 115

Lab Sample ID: 160-13119-1 DU

Matrix: Solid

Analysis Batch: 208141

Client Sample ID: TITO04_RSY17_2-CH-S201

Prep Type: Total/NA

Prep Batch: 204229

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.283		0.5276		0.140		0.0580	pCi/g	0.93	1
Actinium-227	0.171	U	0.06609	U	0.230		0.565	pCi/g	0.24	1
Bismuth-212	0.262	U	0.2965	U	0.328		0.525	pCi/g	0.05	1
Bismuth-214	0.367		0.4365		0.118		0.0963	pCi/g	0.30	1
Cesium-137	-0.00916	U	0.01479	U	0.0302		0.0518	pCi/g	0.35	1
Lead-210	0.455	U	0.4848	U	0.633		1.04	pCi/g	0.02	1
Lead-212	0.452		0.3688		0.101		0.0836	pCi/g	0.40	1
Lead-214	0.464		0.4996		0.102		0.0607	pCi/g	0.18	1
Potassium-40	8.56		8.486		1.36		0.481	pCi/g	0.03	1
Protactinium-231	0.105	U	0.2083	U	0.368		1.23	pCi/g	0.19	1
Radium-226	0.367		0.4365		0.118	0.500	0.0963	pCi/g	0.30	1
Radium-228	0.283		0.5276		0.140		0.0580	pCi/g	0.93	1

QC Sample Results

Page 48 of 49

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-13119-1 DU

Matrix: Solid

Analysis Batch: 208141

Client Sample ID: TITO04_RSY17_2-CH-S201

Prep Type: Total/NA

Prep Batch: 204229

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2 σ +/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.182		0.1201		0.0486		0.0419	pCi/g	0.60	1
Thorium-228	0.452		0.3688		0.101		0.0836	pCi/g	0.40	1
Thorium-232	0.283		0.5276		0.140		0.0580	pCi/g	0.93	1
Thorium-234	0.343	U	0.2454	U	0.732		1.24	pCi/g	0.09	1
Uranium-235	0.130	U	0.1166	U	0.0992		0.164	pCi/g	0.06	1
Uranium-238	0.343	U	0.2454	U	0.732		1.24	pCi/g	0.09	1

QC Association Summary

Page 49 of 49

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Rad

Leach Batch: 203831

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13119-1	TITO04_RSY17_2-CH-S201	Total/NA	Solid	Dry and Grind	
160-13119-1 DU	TITO04_RSY17_2-CH-S201	Total/NA	Solid	Dry and Grind	
160-13119-2	TITO04_RSY17_2-CH-S202	Total/NA	Solid	Dry and Grind	
160-13119-3	TITO04_RSY17_2-CH-S203	Total/NA	Solid	Dry and Grind	
160-13119-4	TITO04_RSY17_2-CH-S204	Total/NA	Solid	Dry and Grind	
160-13119-5	TITO04_RSY17_2-CH-S205	Total/NA	Solid	Dry and Grind	
160-13119-6	TITO04_RSY17_2-CH-S206	Total/NA	Solid	Dry and Grind	
160-13119-7	TITO04_RSY17_2-CH-S207	Total/NA	Solid	Dry and Grind	
160-13119-8	TITO04_RSY17_2-CH-S208	Total/NA	Solid	Dry and Grind	
160-13119-9	TITO04_RSY17_2-CH-S209	Total/NA	Solid	Dry and Grind	
160-13119-10	TITO04_RSY17_2-CH-S210	Total/NA	Solid	Dry and Grind	
160-13119-11	TITO04_RSY17_2-CH-S211	Total/NA	Solid	Dry and Grind	
160-13119-12	TITO04_RSY17_2-CH-S212	Total/NA	Solid	Dry and Grind	
160-13119-13	TITO04_RSY17_2-CH-S213	Total/NA	Solid	Dry and Grind	
160-13119-14	TITO04_RSY17_2-CH-S214	Total/NA	Solid	Dry and Grind	
160-13119-15	TITO04_RSY17_2-CH-S215	Total/NA	Solid	Dry and Grind	
160-13119-16	TITO04_RSY17_2-CH-S216	Total/NA	Solid	Dry and Grind	
160-13119-17	TITO04_RSY17_2-CH-S217	Total/NA	Solid	Dry and Grind	
160-13119-18	TITO04_RSY17_2-CH-S218	Total/NA	Solid	Dry and Grind	
160-13119-19	TITO04_RSY17_2-CH-S219	Total/NA	Solid	Dry and Grind	
160-13119-20	TITO04_RSY17_2-CH-S220	Total/NA	Solid	Dry and Grind	

Prep Batch: 204229

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13119-1	TITO04_RSY17_2-CH-S201	Total/NA	Solid	Fill_Geo-21	203831
160-13119-1 DU	TITO04_RSY17_2-CH-S201	Total/NA	Solid	Fill_Geo-21	203831
160-13119-2	TITO04_RSY17_2-CH-S202	Total/NA	Solid	Fill_Geo-21	203831
160-13119-3	TITO04_RSY17_2-CH-S203	Total/NA	Solid	Fill_Geo-21	203831
160-13119-4	TITO04_RSY17_2-CH-S204	Total/NA	Solid	Fill_Geo-21	203831
160-13119-5	TITO04_RSY17_2-CH-S205	Total/NA	Solid	Fill_Geo-21	203831
160-13119-6	TITO04_RSY17_2-CH-S206	Total/NA	Solid	Fill_Geo-21	203831
160-13119-7	TITO04_RSY17_2-CH-S207	Total/NA	Solid	Fill_Geo-21	203831
160-13119-8	TITO04_RSY17_2-CH-S208	Total/NA	Solid	Fill_Geo-21	203831
160-13119-9	TITO04_RSY17_2-CH-S209	Total/NA	Solid	Fill_Geo-21	203831
160-13119-10	TITO04_RSY17_2-CH-S210	Total/NA	Solid	Fill_Geo-21	203831
160-13119-11	TITO04_RSY17_2-CH-S211	Total/NA	Solid	Fill_Geo-21	203831
160-13119-12	TITO04_RSY17_2-CH-S212	Total/NA	Solid	Fill_Geo-21	203831
160-13119-13	TITO04_RSY17_2-CH-S213	Total/NA	Solid	Fill_Geo-21	203831
160-13119-14	TITO04_RSY17_2-CH-S214	Total/NA	Solid	Fill_Geo-21	203831
160-13119-15	TITO04_RSY17_2-CH-S215	Total/NA	Solid	Fill_Geo-21	203831
160-13119-16	TITO04_RSY17_2-CH-S216	Total/NA	Solid	Fill_Geo-21	203831
160-13119-17	TITO04_RSY17_2-CH-S217	Total/NA	Solid	Fill_Geo-21	203831
160-13119-18	TITO04_RSY17_2-CH-S218	Total/NA	Solid	Fill_Geo-21	203831
160-13119-19	TITO04_RSY17_2-CH-S219	Total/NA	Solid	Fill_Geo-21	203831
160-13119-20	TITO04_RSY17_2-CH-S220	Total/NA	Solid	Fill_Geo-21	203831
LCS 160-204229/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-204229/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Appendix C

Analytical Data

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-19955-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

12/6/2016 12:11:50 PM

Micha Korinhizer, Project Management Assistant I
(314)298-8566

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Designee for

Erika Gish, Project Manager II
(314)298-8566

erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19955-2

Job ID: 160-19955-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-19955-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19955-2

Job ID: 160-19955-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 11/11/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 18.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Sample TITO04-NP-SU5SW-FSS-5-09-S001 (160-19955-1) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/11/2016, prepared on 11/14/2016 and analyzed on 12/05/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-19955-2

Login Number: 19955

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19955-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19955-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19955-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-19955-1	TITO04-NP-SU5SW-FSS-5-09-S001	Solid	11/09/16 14:10	11/11/16 08:30

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19955-2

Client Sample ID: TITO04-NP-SU5SW-FSS-5-09-S001

Lab Sample ID: 160-19955-1

Date Collected: 11/09/16 14:10

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.467		0.176	0.183		0.151	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Actinium-227	0.00651	U	0.714	0.714		1.23	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Bismuth-212	-0.0754	U	0.606	0.606		1.22	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Bismuth-214	0.435		0.116	0.124		0.109	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Cesium-137	0.0232	U	0.0488	0.0488		0.0834	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Lead-210	0.937	U	1.16	1.17		1.66	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Lead-212	0.342		0.0808	0.0922		0.0927	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Lead-214	0.347		0.0982	0.105		0.125	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Potassium-40	11.6		1.43	1.86		0.508	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Protactinium-231	0.325	U	0.997	0.997		3.25	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Radium-226	0.435		0.116	0.124	0.500	0.109	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Radium-228	0.467		0.176	0.183		0.151	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Thallium-208	0.0691	U	0.0684	0.0688		0.0813	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Thorium-228	0.342		0.0808	0.0922		0.0927	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Thorium-232	0.467		0.176	0.183		0.151	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Thorium-234	1.29	U	1.08	1.08		1.34	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Uranium-235	0.0548	U	0.121	0.121		0.714	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Uranium-238	1.29	U	1.08	1.08		1.34	pCi/g	11/14/16 10:31	12/05/16 13:41	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19955-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-279158/1-A

Matrix: Solid

Analysis Batch: 282238

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 279158

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.004439	U	0.128	0.128		0.173	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Actinium-227	0.1111	U	0.390	0.390		0.682	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Bismuth-212	-0.02701	U	0.429	0.429		0.808	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Bismuth-214	0.02646	U	0.0370	0.0371		0.198	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Cesium-137	0.02341	U	0.0539	0.0540		0.0930	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Lead-210	0.2825	U	0.765	0.766		1.33	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Lead-212	0.02756	U	0.0533	0.0534		0.0900	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Lead-214	-0.0006759	U	0.101	0.101		0.177	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Potassium-40	0.02754	U	0.427	0.427		0.806	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Protactinium-231	-0.4683	U	2.13	2.14		3.63	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Radium-226	0.02646	U	0.0370	0.0371	0.500	0.198	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Radium-228	0.004439	U	0.128	0.128		0.173	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Thallium-208	0.01775	U	0.0341	0.0342		0.0564	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Thorium-228	0.02756	U	0.0533	0.0534		0.0900	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Thorium-232	0.004439	U	0.128	0.128		0.173	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Thorium-234	-0.1919	U	0.929	0.929		1.60	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Uranium-235	-0.1174	U	0.336	0.337		0.569	pCi/g	11/14/16 10:31	12/05/16 13:37	1
Uranium-238	-0.1919	U	0.929	0.929		1.60	pCi/g	11/14/16 10:31	12/05/16 13:37	1

Lab Sample ID: LCS 160-279158/2-A

Matrix: Solid

Analysis Batch: 282239

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 279158

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	97.08		10.2		1.18	pCi/g	100	87 - 116
Cesium-137	29.3	28.94		3.09		0.248	pCi/g	99	87 - 120
Cobalt-60	16.1	15.60		1.62		0.0790	pCi/g	97	87 - 115

Lab Sample ID: 160-19955-1 DU

Matrix: Solid

Analysis Batch: 282241

Client Sample ID: TITO04-NP-SU5SW-FSS-5-09-S001

Prep Type: Total/NA

Prep Batch: 279158

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.467		0.3074		0.129		0.239	pCi/g	0.51	1
Actinium-227	0.00651	U	0.2353	U	0.512		0.862	pCi/g	0.19	1
Bismuth-212	-0.0754	U	0.5235	U	0.987		1.65	pCi/g	0.38	1
Bismuth-214	0.435		0.4099		0.107		0.0832	pCi/g	0.11	1
Cesium-137	0.0232	U	0.01347	U	0.0334		0.0582	pCi/g	0.12	1
Lead-210	0.937	U	0.5881	U	1.09		1.82	pCi/g	0.15	1
Lead-212	0.342		0.3144		0.0762		0.0643	pCi/g	0.17	1
Lead-214	0.347		0.3357		0.0855		0.0771	pCi/g	0.06	1
Potassium-40	11.6		9.803		1.62		0.655	pCi/g	0.52	1
Protactinium-231	0.325	U	0.4658	U	1.29		2.94	pCi/g	0.06	1
Radium-226	0.435		0.4099		0.107	0.500	0.0832	pCi/g	0.11	1
Radium-228	0.467		0.3074		0.129		0.239	pCi/g	0.51	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19955-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-19955-1 DU

Matrix: Solid

Analysis Batch: 282241

Client Sample ID: TITO04-NP-SU5SW-FSS-5-09-S001

Prep Type: Total/NA

Prep Batch: 279158

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.0691	U	0.1198		0.0401		0.0267	pCi/g	0.46	1
Thorium-228	0.342		0.3144		0.0762		0.0643	pCi/g	0.17	1
Thorium-232	0.467		0.3074		0.129		0.239	pCi/g	0.51	1
Thorium-234	1.29	U	-0.4762	U	1.10		1.85	pCi/g	0.81	1
Uranium-235	0.0548	U	0.02204	U	0.170		0.643	pCi/g	0.11	1
Uranium-238	1.29	U	-0.4762	U	1.10		1.85	pCi/g	0.81	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19955-2

Rad

Leach Batch: 278921

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19955-1	TITO04-NP-SU5SW-FSS-5-09-S001	Total/NA	Solid	Dry and Grind	
160-19955-1 DU	TITO04-NP-SU5SW-FSS-5-09-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 279158

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19955-1	TITO04-NP-SU5SW-FSS-5-09-S001	Total/NA	Solid	Fill_Geo-21	278921
MB 160-279158/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-279158/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-19955-1 DU	TITO04-NP-SU5SW-FSS-5-09-S001	Total/NA	Solid	Fill_Geo-21	278921

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-19730-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

11/22/2016 4:07:41 PM

Micha Korinhizer, Project Management Assistant I
(314)298-8566

micha.korinhizer@testamericainc.com

Designee for

Erika Gish, Project Manager II
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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Job ID: 160-19730-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-19730-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Job ID: 160-19730-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

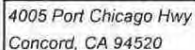
RECEIPT

The samples were received on 10/28/2016 8:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 18.8° C and 18.8° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSS-SU2RSY11-5-S501 (160-19730-1), TITO04-BS-FSS-SU2RSY11-5-S502 (160-19730-2), TITO04-BS-FSS-SU2RSY11-5-S503 (160-19730-3), TITO04-BS-FSS-SU2RSY11-5-S504 (160-19730-4), TITO04-BS-FSS-SU2RSY11-5-S505 (160-19730-5), TITO04-BS-FSS-SU2RSY11-5-S506 (160-19730-6), TITO04-BS-FSS-SU2RSY11-5-S507 (160-19730-7), TITO04-BS-FSS-SU2RSY11-5-S508 (160-19730-8), TITO04-BS-FSS-SU2RSY11-5-S509 (160-19730-9), TITO04-BS-FSS-SU2RSY11-5-S510 (160-19730-10), TITO04-BS-FSS-SU2RSY11-5-S511 (160-19730-11), TITO04-BS-FSS-SU2RSY11-5-S512 (160-19730-12), TITO04-BS-FSS-SU2RSY11-5-S513 (160-19730-13), TITO04-BS-FSS-SU2RSY11-5-S514 (160-19730-14), TITO04-BS-FSS-SU2RSY11-5-S515 (160-19730-15), TITO04-BS-FSS-SU2RSY11-5-S516 (160-19730-16), TITO04-BS-FSS-SU2RSY11-5-S517 (160-19730-17), TITO04-BS-FSS-SU2RSY11-5-S518 (160-19730-18), TITO04-BS-FSS-SU2RSY11-5-S519 (160-19730-19) and TITO04-BS-FSS-SU2RSY11-5-S520 (160-19730-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/28/2016, prepared on 10/31/2016 and analyzed on 11/21/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-19730-2

Login Number: 19730

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-19730-1	TITO04-BS-FSS-SU2RSY11-5-S501	Solid	10/26/16 13:11	10/28/16 08:50
160-19730-2	TITO04-BS-FSS-SU2RSY11-5-S502	Solid	10/26/16 13:13	10/28/16 08:50
160-19730-3	TITO04-BS-FSS-SU2RSY11-5-S503	Solid	10/26/16 13:15	10/28/16 08:50
160-19730-4	TITO04-BS-FSS-SU2RSY11-5-S504	Solid	10/26/16 13:17	10/28/16 08:50
160-19730-5	TITO04-BS-FSS-SU2RSY11-5-S505	Solid	10/26/16 13:19	10/28/16 08:50
160-19730-6	TITO04-BS-FSS-SU2RSY11-5-S506	Solid	10/26/16 13:21	10/28/16 08:50
160-19730-7	TITO04-BS-FSS-SU2RSY11-5-S507	Solid	10/26/16 13:23	10/28/16 08:50
160-19730-8	TITO04-BS-FSS-SU2RSY11-5-S508	Solid	10/26/16 13:25	10/28/16 08:50
160-19730-9	TITO04-BS-FSS-SU2RSY11-5-S509	Solid	10/26/16 13:27	10/28/16 08:50
160-19730-10	TITO04-BS-FSS-SU2RSY11-5-S510	Solid	10/26/16 13:29	10/28/16 08:50
160-19730-11	TITO04-BS-FSS-SU2RSY11-5-S511	Solid	10/26/16 13:31	10/28/16 08:50
160-19730-12	TITO04-BS-FSS-SU2RSY11-5-S512	Solid	10/26/16 13:33	10/28/16 08:50
160-19730-13	TITO04-BS-FSS-SU2RSY11-5-S513	Solid	10/26/16 13:35	10/28/16 08:50
160-19730-14	TITO04-BS-FSS-SU2RSY11-5-S514	Solid	10/26/16 13:37	10/28/16 08:50
160-19730-15	TITO04-BS-FSS-SU2RSY11-5-S515	Solid	10/26/16 13:39	10/28/16 08:50
160-19730-16	TITO04-BS-FSS-SU2RSY11-5-S516	Solid	10/26/16 13:41	10/28/16 08:50
160-19730-17	TITO04-BS-FSS-SU2RSY11-5-S517	Solid	10/26/16 13:41	10/28/16 08:50
160-19730-18	TITO04-BS-FSS-SU2RSY11-5-S518	Solid	10/26/16 13:42	10/28/16 08:50
160-19730-19	TITO04-BS-FSS-SU2RSY11-5-S519	Solid	10/26/16 13:43	10/28/16 08:50
160-19730-20	TITO04-BS-FSS-SU2RSY11-5-S520	Solid	10/26/16 13:43	10/28/16 08:50

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S501

Lab Sample ID: 160-19730-1

Date Collected: 10/26/16 13:11

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.164	U	0.211	0.212		0.286	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Actinium-227	0.0778	U	0.607	0.607		1.04	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Bismuth-212	0.000	U	0.302	0.302		1.16	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Bismuth-214	0.0723	U	0.168	0.168		0.294	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Cesium-137	-0.00195	U	0.0637	0.0637		0.113	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Lead-210	0.352	U	1.12	1.12		1.90	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Lead-212	0.285		0.0657	0.0754		0.0688	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Lead-214	0.376		0.0840	0.0926		0.0459	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Potassium-40	10.0		1.44	1.77		0.575	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Protactinium-231	0.000	U	0.319	0.319		2.87	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Radium-226	0.0723	U	0.168	0.168	0.500	0.294	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Radium-228	0.164	U	0.211	0.212		0.286	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Thallium-208	0.131		0.0523	0.0540		0.0480	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Thorium-228	0.285		0.0657	0.0754		0.0688	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Thorium-232	0.164	U	0.211	0.212		0.286	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Thorium-234	-0.0619	U	0.800	0.800		1.39	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Uranium-235	0.0193	U	0.0261	0.0262		0.631	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Uranium-238	-0.0619	U	0.800	0.800		1.39	pCi/g	10/31/16 12:10	11/21/16 16:07	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S502

Lab Sample ID: 160-19730-2

Date Collected: 10/26/16 13:13

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.510		0.175	0.182		0.105	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Actinium-227	0.296	U	0.432	0.433		1.17	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Bismuth-212	0.474	U	0.895	0.896		1.52	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Bismuth-214	0.366		0.119	0.125		0.0969	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Cesium-137	0.00489	U	0.0615	0.0615		0.110	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Lead-210	0.315	U	1.70	1.70		2.89	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Lead-212	0.272		0.120	0.125		0.180	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Lead-214	0.401		0.0923	0.101		0.0723	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Potassium-40	10.1		1.56	1.87		0.604	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Protactinium-231	0.000	U	0.810	0.810		4.27	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Radium-226	0.366		0.119	0.125	0.500	0.0969	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Radium-228	0.510		0.175	0.182		0.105	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Thallium-208	0.0942		0.0406	0.0417		0.0368	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Thorium-228	0.272		0.120	0.125		0.180	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Thorium-232	0.510		0.175	0.182		0.105	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Thorium-234	-0.811	U	0.984	0.988		2.51	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Uranium-235	0.00594	U	0.0263	0.0263		0.932	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Uranium-238	-0.811	U	0.984	0.988		2.51	pCi/g	10/31/16 12:10	11/21/16 16:09	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S503

Lab Sample ID: 160-19730-3

Date Collected: 10/26/16 13:15

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.417		0.188	0.193		0.200	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Actinium-227	0.0374	U	0.0325	0.0327		0.936	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Bismuth-212	-0.370	U	0.818	0.819		1.39	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Bismuth-214	0.407		0.118	0.126		0.107	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Cesium-137	0.00936	U	0.0477	0.0478		0.0852	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Lead-210	0.247	U	1.39	1.39		2.13	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Lead-212	0.236		0.0767	0.0826		0.0983	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Lead-214	0.343		0.109	0.114		0.129	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Potassium-40	10.5		1.43	1.79		0.695	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Protactinium-231	-0.795	U	2.44	2.44		4.10	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Radium-226	0.407		0.118	0.126	0.500	0.107	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Radium-228	0.417		0.188	0.193		0.200	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Thallium-208	0.112		0.0517	0.0530		0.0534	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Thorium-228	0.236		0.0767	0.0826		0.0983	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Thorium-232	0.417		0.188	0.193		0.200	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Thorium-234	1.05	U	1.06	1.07		1.51	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Uranium-235	0.0566	U	0.286	0.286		0.487	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Uranium-238	1.05	U	1.06	1.07		1.51	pCi/g	10/31/16 12:10	11/21/16 16:34	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S504

Lab Sample ID: 160-19730-4

Date Collected: 10/26/16 13:17

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.305		0.124	0.128		0.169	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Actinium-227	-0.303	U	0.799	0.800		1.35	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Bismuth-212	-0.432	U	0.801	0.803		1.26	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Bismuth-214	0.0509	U	0.137	0.137		0.241	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Cesium-137	0.0147	U	0.0314	0.0314		0.0549	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Lead-210	1.28	U	1.33	1.34		2.15	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Lead-212	0.224		0.0727	0.0782		0.0938	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Lead-214	0.306		0.0984	0.103		0.101	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Potassium-40	10.1		1.57	1.88		1.03	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Protactinium-231	-0.800	U	2.63	2.63		4.42	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Radium-226	0.0509	U	0.137	0.137	0.500	0.241	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Radium-228	0.305		0.124	0.128		0.169	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Thallium-208	0.109		0.0477	0.0490		0.0511	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Thorium-228	0.224		0.0727	0.0782		0.0938	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Thorium-232	0.305		0.124	0.128		0.169	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Thorium-234	1.25		0.744	0.755		1.13	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Uranium-235	-0.0445	U	0.0897	0.0898		0.805	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Uranium-238	1.25		0.744	0.755		1.13	pCi/g	10/31/16 12:10	11/21/16 16:26	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S505

Lab Sample ID: 160-19730-5

Date Collected: 10/26/16 13:19

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.431		0.185	0.190		0.167	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Actinium-227	-0.340	U	0.723	0.724		1.21	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Bismuth-212	0.000	U	0.322	0.322		0.444	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Bismuth-214	0.259		0.100	0.104		0.104	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Cesium-137	-0.0306	U	0.0521	0.0522		0.0877	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Lead-210	-0.661	U	1.46	1.46		2.45	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Lead-212	0.306		0.0689	0.0794		0.0744	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Lead-214	0.373		0.0826	0.0913		0.0856	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Potassium-40	11.6		1.36	1.80		0.592	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Protactinium-231	-0.718	U	2.37	2.37		3.97	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Radium-226	0.259		0.100	0.104	0.500	0.104	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Radium-228	0.431		0.185	0.190		0.167	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Thallium-208	0.104		0.0625	0.0634		0.0536	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Thorium-228	0.306		0.0689	0.0794		0.0744	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Thorium-232	0.431		0.185	0.190		0.167	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Thorium-234	0.533	U	1.17	1.17		1.95	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Uranium-235	-0.00807	U	0.318	0.318		0.742	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Uranium-238	0.533	U	1.17	1.17		1.95	pCi/g	10/31/16 12:10	11/21/16 16:37	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S506

Lab Sample ID: 160-19730-6

Date Collected: 10/26/16 13:21

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.156	U	0.282	0.283		0.318	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Actinium-227	-0.300	U	0.883	0.884		1.49	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Bismuth-212	0.264	U	0.630	0.631		1.09	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Bismuth-214	0.0669	U	0.0681	0.0685		0.250	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Cesium-137	0.0318	U	0.0629	0.0630		0.107	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-210	1.59	U	1.58	1.59		2.02	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-212	0.283		0.0814	0.0892		0.0986	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-214	0.400		0.0981	0.107		0.100	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Potassium-40	10.5		1.45	1.81		0.642	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Protactinium-231	0.588	U	2.07	2.08		3.52	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Radium-226	0.0669	U	0.0681	0.0685	0.500	0.250	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Radium-228	0.156	U	0.282	0.283		0.318	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thallium-208	0.0777		0.0494	0.0501		0.0589	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-228	0.283		0.0814	0.0892		0.0986	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-232	0.156	U	0.282	0.283		0.318	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-234	1.09	U	1.21	1.21		1.60	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Uranium-235	0.0977	U	0.215	0.215		0.460	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Uranium-238	1.09	U	1.21	1.21		1.60	pCi/g	10/31/16 12:10	11/21/16 16:38	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S507

Lab Sample ID: 160-19730-7

Date Collected: 10/26/16 13:23

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.385		0.105	0.112		0.118	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Actinium-227	-0.336	U	1.09	1.09		1.82	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Bismuth-212	0.175	U	0.474	0.475		0.822	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Bismuth-214	0.313		0.0885	0.0943		0.0793	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Cesium-137	-0.0000891	U	0.0403	0.0403		0.0725	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Lead-210	-0.733	U	2.41	2.41		4.02	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Lead-212	0.230		0.0562	0.0636		0.0622	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Lead-214	0.303		0.0802	0.0862		0.0928	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Potassium-40	10.4		1.20	1.60		0.431	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Protactinium-231	-0.646	U	2.03	2.03		3.41	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Radium-226	0.313		0.0885	0.0943	0.500	0.0793	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Radium-228	0.385		0.105	0.112		0.118	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Thallium-208	0.107		0.0327	0.0345		0.0232	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Thorium-228	0.230		0.0562	0.0636		0.0622	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Thorium-232	0.385		0.105	0.112		0.118	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Thorium-234	0.426	U	0.915	0.916		1.54	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Uranium-235	0.138	U	0.149	0.150		0.615	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Uranium-238	0.426	U	0.915	0.916		1.54	pCi/g	10/31/16 12:10	11/21/16 16:40	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S508

Lab Sample ID: 160-19730-8

Date Collected: 10/26/16 13:25

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.271	U	0.117	0.120		0.313	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Actinium-227	0.0431	U	0.101	0.101		0.856	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Bismuth-212	0.000	U	0.464	0.464		1.33	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Bismuth-214	0.315		0.117	0.122		0.115	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Cesium-137	0.0292	U	0.0559	0.0560		0.0954	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-210	0.282	U	0.939	0.940		1.46	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-212	0.366		0.0880	0.0999		0.0994	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-214	0.311		0.0955	0.101		0.133	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Potassium-40	10.2		1.54	1.86		0.749	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Protactinium-231	0.000	U	0.430	0.430		3.11	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Radium-226	0.315		0.117	0.122	0.500	0.115	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Radium-228	0.271	U	0.117	0.120		0.313	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thallium-208	0.167		0.0605	0.0630		0.0569	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-228	0.366		0.0880	0.0999		0.0994	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-232	0.271	U	0.117	0.120		0.313	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-234	0.704	U	0.790	0.794		1.27	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Uranium-235	0.273	U	0.235	0.237		0.505	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Uranium-238	0.704	U	0.790	0.794		1.27	pCi/g	10/31/16 12:10	11/21/16 16:38	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S509

Lab Sample ID: 160-19730-9

Date Collected: 10/26/16 13:27

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.335		0.214	0.217		0.209	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Actinium-227	-0.413	U	0.914	0.915		1.53	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Bismuth-212	0.379	U	0.647	0.648		1.10	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Bismuth-214	0.324		0.131	0.135		0.127	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Cesium-137	0.0338	U	0.0719	0.0719		0.123	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Lead-210	0.636	U	1.12	1.12		1.63	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Lead-212	0.316		0.0841	0.0935		0.0894	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Lead-214	0.409		0.102	0.111		0.113	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Potassium-40	10.3		1.69	2.00		0.803	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Protactinium-231	0.000	U	0.321	0.321		4.20	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Radium-226	0.324		0.131	0.135	0.500	0.127	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Radium-228	0.335		0.214	0.217		0.209	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Thallium-208	0.135		0.0656	0.0671		0.0598	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Thorium-228	0.316		0.0841	0.0935		0.0894	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Thorium-232	0.335		0.214	0.217		0.209	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Thorium-234	0.0227	U	1.56	1.56		2.65	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Uranium-235	0.290	U	0.245	0.246		0.768	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Uranium-238	0.0227	U	1.56	1.56		2.65	pCi/g	10/31/16 12:10	11/21/16 16:39	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S510

Lab Sample ID: 160-19730-10

Date Collected: 10/26/16 13:29

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.572		0.163	0.173		0.170	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Actinium-227	0.327	U	0.719	0.720		1.21	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Bismuth-212	-0.361	U	0.866	0.867		1.48	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Bismuth-214	0.296		0.113	0.118		0.137	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Cesium-137	0.0230	U	0.0471	0.0472		0.0807	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Lead-210	-0.816	U	1.82	1.82		3.14	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Lead-212	0.346		0.0850	0.0961		0.0971	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Lead-214	0.293		0.110	0.114		0.127	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Potassium-40	11.1		1.60	1.96		0.979	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Protactinium-231	0.636	U	1.54	1.54		3.54	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Radium-226	0.296		0.113	0.118	0.500	0.137	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Radium-228	0.572		0.163	0.173		0.170	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Thallium-208	0.0859	U	0.0732	0.0737		0.0872	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Thorium-228	0.346		0.0850	0.0961		0.0971	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Thorium-232	0.572		0.163	0.173		0.170	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Thorium-234	1.79		0.786	0.808		1.12	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Uranium-235	0.0290	U	0.0381	0.0382		0.473	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Uranium-238	1.79		0.786	0.808		1.12	pCi/g	10/31/16 12:10	11/21/16 16:41	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S511

Lab Sample ID: 160-19730-11

Date Collected: 10/26/16 13:31

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.365		0.159	0.163		0.135	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Actinium-227	0.126	U	0.615	0.615		0.905	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Bismuth-212	0.370	U	0.976	0.976		1.69	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Bismuth-214	0.101	U	0.0953	0.0959		0.378	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Cesium-137	0.00334	U	0.0518	0.0518		0.0794	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Lead-210	-1.09	U	1.42	1.42		2.45	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Lead-212	0.301		0.0847	0.0932		0.0895	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Lead-214	0.407		0.127	0.134		0.148	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Potassium-40	10.2		1.79	2.07		0.808	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Protactinium-231	-0.0000000	U	1.95	1.95		3.41	pCi/g	10/31/16 12:10	11/21/16 16:46	1
	18									
Radium-226	0.101	U	0.0953	0.0959	0.500	0.378	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Radium-228	0.365		0.159	0.163		0.135	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Thallium-208	0.100		0.0768	0.0775		0.0794	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Thorium-228	0.301		0.0847	0.0932		0.0895	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Thorium-232	0.365		0.159	0.163		0.135	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Thorium-234	0.171	U	0.190	0.191		1.89	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Uranium-235	-0.0287	U	0.0582	0.0583		0.472	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Uranium-238	0.171	U	0.190	0.191		1.89	pCi/g	10/31/16 12:10	11/21/16 16:46	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S512

Lab Sample ID: 160-19730-12

Date Collected: 10/26/16 13:33

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.331		0.146	0.150		0.230	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Actinium-227	0.209	U	0.533	0.533		0.904	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Bismuth-212	-0.284	U	0.855	0.856		1.47	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Bismuth-214	0.234		0.0801	0.0837		0.0673	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Cesium-137	-0.0502	U	0.0859	0.0860		0.144	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Lead-210	-1.06	U	1.40	1.41		2.50	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Lead-212	0.305		0.0721	0.0822		0.0784	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Lead-214	0.331		0.0931	0.0993		0.0738	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Potassium-40	11.8		1.62	2.02		0.618	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Protactinium-231	-0.203	U	2.23	2.23		3.79	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Radium-226	0.234		0.0801	0.0837	0.500	0.0673	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Radium-228	0.331		0.146	0.150		0.230	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Thallium-208	0.143		0.0433	0.0457		0.0285	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Thorium-228	0.305		0.0721	0.0822		0.0784	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Thorium-232	0.331		0.146	0.150		0.230	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Thorium-234	-0.702	U	0.960	0.963		1.61	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Uranium-235	-0.0398	U	0.0820	0.0821		0.656	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Uranium-238	-0.702	U	0.960	0.963		1.61	pCi/g	10/31/16 12:10	11/21/16 16:47	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S513

Lab Sample ID: 160-19730-13

Date Collected: 10/26/16 13:35

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.329		0.263	0.265		0.284	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Actinium-227	-0.0789	U	0.387	0.387		1.59	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Bismuth-212	0.0932	U	0.819	0.819		1.47	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Bismuth-214	0.0237	U	0.184	0.184		0.299	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Cesium-137	0.00839	U	0.0866	0.0866		0.152	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Lead-210	-1.01	U	2.21	2.21		3.70	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Lead-212	0.256		0.0785	0.0852		0.0874	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Lead-214	0.355		0.106	0.112		0.111	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Potassium-40	12.3		1.86	2.25		0.707	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Protactinium-231	-0.952	U	3.01	3.01		5.08	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Radium-226	0.0237	U	0.184	0.184	0.500	0.299	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Radium-228	0.329		0.263	0.265		0.284	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Thallium-208	0.133		0.0605	0.0621		0.0562	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Thorium-228	0.256		0.0785	0.0852		0.0874	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Thorium-232	0.329		0.263	0.265		0.284	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Thorium-234	-1.70	U	1.22	1.24		3.21	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Uranium-235	0.162	U	0.176	0.177		0.875	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Uranium-238	-1.70	U	1.22	1.24		3.21	pCi/g	10/31/16 12:10	11/21/16 16:48	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S514

Lab Sample ID: 160-19730-14

Date Collected: 10/26/16 13:37

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.280	U	0.151	0.154		0.299	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Actinium-227	0.265	U	0.672	0.673		1.14	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Bismuth-212	-0.0187	U	0.622	0.622		1.12	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Bismuth-214	0.334		0.107	0.112		0.125	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Cesium-137	-0.0205	U	0.0740	0.0740		0.127	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-210	-0.230	U	1.55	1.55		2.67	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-212	0.329		0.0820	0.0925		0.0954	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-214	0.407		0.104	0.113		0.126	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Potassium-40	12.1		1.53	1.96		0.755	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Protactinium-231	-0.917	U	3.11	3.11		5.21	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Radium-226	0.334		0.107	0.112	0.500	0.125	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Radium-228	0.280	U	0.151	0.154		0.299	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thallium-208	0.0923		0.0458	0.0468		0.0522	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-228	0.329		0.0820	0.0925		0.0954	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-232	0.280	U	0.151	0.154		0.299	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-234	0.559	U	1.23	1.23		1.69	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Uranium-235	0.164	U	0.293	0.294		0.499	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Uranium-238	0.559	U	1.23	1.23		1.69	pCi/g	10/31/16 12:10	11/21/16 17:45	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S515

Lab Sample ID: 160-19730-15

Date Collected: 10/26/16 13:39

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.322		0.148	0.152		0.134	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Actinium-227	0.0397	U	0.0934	0.0935		0.868	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Bismuth-212	-0.753	U	1.24	1.24		2.07	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Bismuth-214	0.419		0.172	0.177		0.166	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Cesium-137	-0.0215	U	0.104	0.104		0.136	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-210	1.45	U	1.27	1.28		1.66	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-212	0.269		0.0899	0.0964		0.112	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-214	0.308		0.120	0.124		0.139	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Potassium-40	11.2		1.85	2.18		0.797	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Protactinium-231	0.323	U	1.10	1.10		3.64	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Radium-226	0.419		0.172	0.177	0.500	0.166	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Radium-228	0.322		0.148	0.152		0.134	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thallium-208	0.0912		0.0906	0.0911		0.0894	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-228	0.269		0.0899	0.0964		0.112	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-232	0.322		0.148	0.152		0.134	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-234	0.713	U	0.984	0.987		1.38	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Uranium-235	0.0221	U	0.0882	0.0882		0.567	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Uranium-238	0.713	U	0.984	0.987		1.38	pCi/g	10/31/16 12:10	11/21/16 17:45	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S516

Lab Sample ID: 160-19730-16

Date Collected: 10/26/16 13:41

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.139	U	0.235	0.235		0.253	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Actinium-227	0.0287	U	0.594	0.594		1.02	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Bismuth-212	0.203	U	0.642	0.642		1.12	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Bismuth-214	0.244		0.0995	0.103		0.0904	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Cesium-137	-0.0412	U	0.0674	0.0675		0.113	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Lead-210	-0.741	U	1.35	1.35		2.11	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Lead-212	0.267		0.0723	0.0801		0.0893	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Lead-214	0.261		0.0910	0.0950		0.0810	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Potassium-40	10.9		1.51	1.87		0.575	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Protactinium-231	0.000	U	0.626	0.626		2.93	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Radium-226	0.244		0.0995	0.103	0.500	0.0904	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Radium-228	0.139	U	0.235	0.235		0.253	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Thallium-208	0.113		0.0375	0.0393		0.0266	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Thorium-228	0.267		0.0723	0.0801		0.0893	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Thorium-232	0.139	U	0.235	0.235		0.253	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Thorium-234	0.774	U	0.409	0.417		0.963	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Uranium-235	-0.0111	U	0.255	0.255		0.366	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Uranium-238	0.774	U	0.409	0.417		0.963	pCi/g	10/31/16 12:10	11/21/16 17:46	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S517

Lab Sample ID: 160-19730-17

Date Collected: 10/26/16 13:41

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.339		0.138	0.143		0.276	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Actinium-227	-0.0604	U	0.105	0.105		1.45	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Bismuth-212	0.362	U	0.833	0.834		1.44	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Bismuth-214	0.225	U	0.173	0.174		0.335	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Cesium-137	-0.0549	U	0.118	0.118		0.138	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Lead-210	0.443	U	1.52	1.52		2.60	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Lead-212	0.398		0.0943	0.107		0.0996	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Lead-214	0.258		0.112	0.115		0.223	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Potassium-40	12.1		1.82	2.20		0.687	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Protactinium-231	0.395	U	1.47	1.47		4.82	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Radium-226	0.225	U	0.173	0.174	0.500	0.335	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Radium-228	0.339		0.138	0.143		0.276	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Thallium-208	0.131		0.0588	0.0604		0.0581	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Thorium-228	0.398		0.0943	0.107		0.0996	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Thorium-232	0.339		0.138	0.143		0.276	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Thorium-234	0.983	U	0.598	0.606		1.63	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Uranium-235	-0.268	U	0.354	0.355		1.00	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Uranium-238	0.983	U	0.598	0.606		1.63	pCi/g	10/31/16 12:10	11/21/16 17:47	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S518

Lab Sample ID: 160-19730-18

Date Collected: 10/26/16 13:42

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.515		0.161	0.170		0.204	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Actinium-227	0.174	U	0.627	0.627		1.06	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Bismuth-212	0.177	U	0.442	0.443		0.771	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Bismuth-214	0.235		0.0951	0.0982		0.103	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Cesium-137	0.00175	U	0.0417	0.0417		0.0754	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Lead-210	-0.700	U	1.30	1.30		2.17	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Lead-212	0.357		0.0738	0.0870		0.0768	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Lead-214	0.343		0.0789	0.0865		0.100	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Potassium-40	11.2		1.36	1.78		0.607	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Protactinium-231	0.540	U	1.49	1.49		3.39	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Radium-226	0.235		0.0951	0.0982	0.500	0.103	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Radium-228	0.515		0.161	0.170		0.204	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Thallium-208	0.131		0.0453	0.0473		0.0368	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Thorium-228	0.357		0.0738	0.0870		0.0768	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Thorium-232	0.515		0.161	0.170		0.204	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Thorium-234	0.310	U	1.00	1.00		1.69	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Uranium-235	-0.00827	U	0.274	0.274		0.645	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Uranium-238	0.310	U	1.00	1.00		1.69	pCi/g	10/31/16 12:10	11/21/16 17:44	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S519

Lab Sample ID: 160-19730-19

Date Collected: 10/26/16 13:43

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.454		0.176	0.182		0.179	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Actinium-227	-0.0836	U	0.168	0.168		1.55	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Bismuth-212	0.266	U	1.07	1.07		1.84	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Bismuth-214	0.279		0.125	0.128		0.128	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Cesium-137	-0.000716	U	0.0659	0.0659		0.144	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-210	1.22	U	1.64	1.65		2.69	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-212	0.347		0.0914	0.102		0.106	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-214	0.381		0.120	0.126		0.153	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Potassium-40	9.76		1.49	1.79		0.718	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Protactinium-231	0.707	U	1.72	1.72		3.95	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Radium-226	0.279		0.125	0.128	0.500	0.128	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Radium-228	0.454		0.176	0.182		0.179	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thallium-208	0.142		0.0557	0.0576		0.0578	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-228	0.347		0.0914	0.102		0.106	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-232	0.454		0.176	0.182		0.179	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-234	0.513	U	0.502	0.505		1.41	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Uranium-235	0.251		0.145	0.148		0.180	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Uranium-238	0.513	U	0.502	0.505		1.41	pCi/g	10/31/16 12:10	11/21/16 17:43	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S520

Lab Sample ID: 160-19730-20

Date Collected: 10/26/16 13:43

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0683	U	0.116	0.116		0.396	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Actinium-227	-0.345	U	0.853	0.853		1.43	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Bismuth-212	0.402	U	0.845	0.846		1.43	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Bismuth-214	0.394		0.112	0.119		0.105	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Cesium-137	0.0336	U	0.0624	0.0625		0.105	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-210	1.07	U	1.01	1.02		1.61	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-212	0.275		0.0806	0.0881		0.103	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-214	0.255		0.104	0.107		0.113	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Potassium-40	12.0		1.47	1.92		0.532	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Protactinium-231	0.0975	U	1.05	1.05		3.39	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Radium-226	0.394		0.112	0.119	0.500	0.105	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Radium-228	0.0683	U	0.116	0.116		0.396	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thallium-208	0.106		0.0379	0.0395		0.0339	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-228	0.275		0.0806	0.0881		0.103	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-232	0.0683	U	0.116	0.116		0.396	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-234	1.27	U	1.15	1.16		1.46	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Uranium-235	0.178	U	0.346	0.347		0.706	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Uranium-238	1.27	U	1.15	1.16		1.46	pCi/g	10/31/16 12:10	11/21/16 17:43	1

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QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-276880/1-A
Matrix: Solid
Analysis Batch: 280382

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 276880

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.007868	U	0.0134	0.0134		0.354	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Actinium-227	0.01032	U	0.690	0.690		1.21	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Bismuth-212	-0.3410	U	0.773	0.774		1.33	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Bismuth-214	-0.06604	U	0.229	0.229		0.400	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Cesium-137	-0.02481	U	0.0583	0.0584		0.101	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Lead-210	-0.5019	U	1.41	1.41		2.52	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Lead-212	-0.05904	U	0.0892	0.0895		0.186	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Lead-214	-0.1303	U	0.112	0.112		0.234	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Potassium-40	-0.5340	U	1.15	1.15		1.59	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Protactinium-231	0.0000	U	0.136	0.136		3.43	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Radium-226	-0.06604	U	0.229	0.229	0.500	0.400	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Radium-228	-0.007868	U	0.0134	0.0134		0.354	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Thallium-208	-0.03224	U	0.0596	0.0597		0.101	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Thorium-228	-0.05904	U	0.0892	0.0895		0.186	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Thorium-232	-0.007868	U	0.0134	0.0134		0.354	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Thorium-234	0.5515	U	0.732	0.734		1.10	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Uranium-235	-0.1098	U	0.230	0.231		0.392	pCi/g	10/31/16 12:10	11/21/16 16:11	1
Uranium-238	0.5515	U	0.732	0.734		1.10	pCi/g	10/31/16 12:10	11/21/16 16:11	1

Lab Sample ID: LCS 160-276880/2-A
Matrix: Solid
Analysis Batch: 280383

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 276880

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	100.1		10.5		1.33	pCi/g	103	87 - 116
Cesium-137	29.3	28.96		3.12		0.269	pCi/g	99	87 - 120
Cobalt-60	16.1	16.27		1.71		0.0587	pCi/g	101	87 - 115

Lab Sample ID: 160-19730-1 DU
Matrix: Solid
Analysis Batch: 280382

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S501
Prep Type: Total/NA
Prep Batch: 276880

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.164	U	0.2598		0.200		0.237	pCi/g	0.23	1
Actinium-227	0.0778	U	0.2497	U	0.676		1.14	pCi/g	0.13	1
Bismuth-212	0.000	U	0.3832	U	0.644		1.08	pCi/g	0.41	1
Bismuth-214	0.0723	U	0.2923		0.125		0.143	pCi/g	0.75	1
Cesium-137	-0.00195	U	0.001526	U	0.0526		0.0946	pCi/g	0.03	1
Lead-210	0.352	U	0.4245	U	1.15		1.94	pCi/g	0.03	1
Lead-212	0.285		0.2909		0.0933		0.110	pCi/g	0.03	1
Lead-214	0.376		0.4521		0.132		0.133	pCi/g	0.34	1
Potassium-40	10.0		11.86		1.93		0.747	pCi/g	0.50	1
Protactinium-231	0.000	U	0.0000	U	0.437		3.75	pCi/g	0	1
Radium-226	0.0723	U	0.2923		0.125	0.500	0.143	pCi/g	0.75	1
Radium-228	0.164	U	0.2598		0.200		0.237	pCi/g	0.23	1

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QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-19730-1 DU

Matrix: Solid

Analysis Batch: 280382

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S501

Prep Type: Total/NA

Prep Batch: 276880

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.131		0.1400		0.0469		0.0397	pCi/g	0.09	1
Thorium-228	0.285		0.2909		0.0933		0.110	pCi/g	0.03	1
Thorium-232	0.164	U	0.2598		0.200		0.237	pCi/g	0.23	1
Thorium-234	-0.0619	U	1.264	U	1.04		1.29	pCi/g	0.72	1
Uranium-235	0.0193	U	0.1339	U	0.316		0.510	pCi/g	0.33	1
Uranium-238	-0.0619	U	1.264	U	1.04		1.29	pCi/g	0.72	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Rad

Leach Batch: 276618

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19730-1	TITO04-BS-FSS-SU2RSY11-5-S501	Total/NA	Solid	Dry and Grind	
160-19730-2	TITO04-BS-FSS-SU2RSY11-5-S502	Total/NA	Solid	Dry and Grind	
160-19730-3	TITO04-BS-FSS-SU2RSY11-5-S503	Total/NA	Solid	Dry and Grind	
160-19730-4	TITO04-BS-FSS-SU2RSY11-5-S504	Total/NA	Solid	Dry and Grind	
160-19730-5	TITO04-BS-FSS-SU2RSY11-5-S505	Total/NA	Solid	Dry and Grind	
160-19730-6	TITO04-BS-FSS-SU2RSY11-5-S506	Total/NA	Solid	Dry and Grind	
160-19730-7	TITO04-BS-FSS-SU2RSY11-5-S507	Total/NA	Solid	Dry and Grind	
160-19730-8	TITO04-BS-FSS-SU2RSY11-5-S508	Total/NA	Solid	Dry and Grind	
160-19730-9	TITO04-BS-FSS-SU2RSY11-5-S509	Total/NA	Solid	Dry and Grind	
160-19730-10	TITO04-BS-FSS-SU2RSY11-5-S510	Total/NA	Solid	Dry and Grind	
160-19730-11	TITO04-BS-FSS-SU2RSY11-5-S511	Total/NA	Solid	Dry and Grind	
160-19730-12	TITO04-BS-FSS-SU2RSY11-5-S512	Total/NA	Solid	Dry and Grind	
160-19730-13	TITO04-BS-FSS-SU2RSY11-5-S513	Total/NA	Solid	Dry and Grind	
160-19730-14	TITO04-BS-FSS-SU2RSY11-5-S514	Total/NA	Solid	Dry and Grind	
160-19730-15	TITO04-BS-FSS-SU2RSY11-5-S515	Total/NA	Solid	Dry and Grind	
160-19730-16	TITO04-BS-FSS-SU2RSY11-5-S516	Total/NA	Solid	Dry and Grind	
160-19730-17	TITO04-BS-FSS-SU2RSY11-5-S517	Total/NA	Solid	Dry and Grind	
160-19730-18	TITO04-BS-FSS-SU2RSY11-5-S518	Total/NA	Solid	Dry and Grind	
160-19730-19	TITO04-BS-FSS-SU2RSY11-5-S519	Total/NA	Solid	Dry and Grind	
160-19730-20	TITO04-BS-FSS-SU2RSY11-5-S520	Total/NA	Solid	Dry and Grind	
160-19730-1 DU	TITO04-BS-FSS-SU2RSY11-5-S501	Total/NA	Solid	Dry and Grind	

Prep Batch: 276880

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19730-1	TITO04-BS-FSS-SU2RSY11-5-S501	Total/NA	Solid	Fill_Geo-21	276618
160-19730-2	TITO04-BS-FSS-SU2RSY11-5-S502	Total/NA	Solid	Fill_Geo-21	276618
160-19730-3	TITO04-BS-FSS-SU2RSY11-5-S503	Total/NA	Solid	Fill_Geo-21	276618
160-19730-4	TITO04-BS-FSS-SU2RSY11-5-S504	Total/NA	Solid	Fill_Geo-21	276618
160-19730-5	TITO04-BS-FSS-SU2RSY11-5-S505	Total/NA	Solid	Fill_Geo-21	276618
160-19730-6	TITO04-BS-FSS-SU2RSY11-5-S506	Total/NA	Solid	Fill_Geo-21	276618
160-19730-7	TITO04-BS-FSS-SU2RSY11-5-S507	Total/NA	Solid	Fill_Geo-21	276618
160-19730-8	TITO04-BS-FSS-SU2RSY11-5-S508	Total/NA	Solid	Fill_Geo-21	276618
160-19730-9	TITO04-BS-FSS-SU2RSY11-5-S509	Total/NA	Solid	Fill_Geo-21	276618
160-19730-10	TITO04-BS-FSS-SU2RSY11-5-S510	Total/NA	Solid	Fill_Geo-21	276618
160-19730-11	TITO04-BS-FSS-SU2RSY11-5-S511	Total/NA	Solid	Fill_Geo-21	276618
160-19730-12	TITO04-BS-FSS-SU2RSY11-5-S512	Total/NA	Solid	Fill_Geo-21	276618
160-19730-13	TITO04-BS-FSS-SU2RSY11-5-S513	Total/NA	Solid	Fill_Geo-21	276618
160-19730-14	TITO04-BS-FSS-SU2RSY11-5-S514	Total/NA	Solid	Fill_Geo-21	276618
160-19730-15	TITO04-BS-FSS-SU2RSY11-5-S515	Total/NA	Solid	Fill_Geo-21	276618
160-19730-16	TITO04-BS-FSS-SU2RSY11-5-S516	Total/NA	Solid	Fill_Geo-21	276618
160-19730-17	TITO04-BS-FSS-SU2RSY11-5-S517	Total/NA	Solid	Fill_Geo-21	276618
160-19730-18	TITO04-BS-FSS-SU2RSY11-5-S518	Total/NA	Solid	Fill_Geo-21	276618
160-19730-19	TITO04-BS-FSS-SU2RSY11-5-S519	Total/NA	Solid	Fill_Geo-21	276618
160-19730-20	TITO04-BS-FSS-SU2RSY11-5-S520	Total/NA	Solid	Fill_Geo-21	276618
MB 160-276880/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-276880/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-19730-1 DU	TITO04-BS-FSS-SU2RSY11-5-S501	Total/NA	Solid	Fill_Geo-21	276618

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-20048-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Elizabeth M. Hoerchler

Authorized for release by:

12/12/2016 12:20:57 PM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Job ID: 160-20048-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-20048-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Job ID: 160-20048-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 11/17/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 19.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSSSU3P2-RSY10-U9-S901 (160-20048-1), TITO04-BS-FSSSU3P2-RSY10-U9-S902 (160-20048-2), TITO04-BS-FSSSU3P2-RSY10-U9-S903 (160-20048-3), TITO04-BS-FSSSU3P2-RSY10-U9-S904 (160-20048-4), TITO04-BS-FSSSU3P2-RSY10-U9-S905 (160-20048-5), TITO04-BS-FSSSU3P2-RSY10-U9-S906 (160-20048-6), TITO04-BS-FSSSU3P2-RSY10-U9-S907 (160-20048-7), TITO04-BS-FSSSU3P2-RSY10-U9-S908 (160-20048-8), TITO04-BS-FSSSU3P2-RSY10-U9-S909 (160-20048-9), TITO04-BS-FSSSU3P2-RSY10-U9-S910 (160-20048-10), TITO04-BS-FSSSU3P2-RSY10-U9-S911 (160-20048-11), TITO04-BS-FSSSU3P2-RSY10-U9-S912 (160-20048-12), TITO04-BS-FSSSU3P2-RSY10-U9-S913 (160-20048-13), TITO04-BS-FSSSU3P2-RSY10-U9-S914 (160-20048-14) and TITO04-BS-FSSSU3P2-RSY10-U9-S915 (160-20048-15) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/17/2016, prepared on 11/18/2016 and analyzed on 12/09/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-20048-2

Login Number: 20048

List Source: TestAmerica St. Louis

List Number: 1

Creator: Daniels, Brian J

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-20048-1	TITO04-BS-FSSSU3P2-RSY10-U9-S901	Solid	11/15/16 12:45	11/17/16 08:30
160-20048-2	TITO04-BS-FSSSU3P2-RSY10-U9-S902	Solid	11/15/16 12:46	11/17/16 08:30
160-20048-3	TITO04-BS-FSSSU3P2-RSY10-U9-S903	Solid	11/15/16 12:48	11/17/16 08:30
160-20048-4	TITO04-BS-FSSSU3P2-RSY10-U9-S904	Solid	11/15/16 12:49	11/17/16 08:30
160-20048-5	TITO04-BS-FSSSU3P2-RSY10-U9-S905	Solid	11/15/16 12:56	11/17/16 08:30
160-20048-6	TITO04-BS-FSSSU3P2-RSY10-U9-S906	Solid	11/15/16 12:56	11/17/16 08:30
160-20048-7	TITO04-BS-FSSSU3P2-RSY10-U9-S907	Solid	11/15/16 12:57	11/17/16 08:30
160-20048-8	TITO04-BS-FSSSU3P2-RSY10-U9-S908	Solid	11/15/16 12:58	11/17/16 08:30
160-20048-9	TITO04-BS-FSSSU3P2-RSY10-U9-S909	Solid	11/15/16 13:01	11/17/16 08:30
160-20048-10	TITO04-BS-FSSSU3P2-RSY10-U9-S910	Solid	11/15/16 13:01	11/17/16 08:30
160-20048-11	TITO04-BS-FSSSU3P2-RSY10-U9-S911	Solid	11/15/16 12:59	11/17/16 08:30
160-20048-12	TITO04-BS-FSSSU3P2-RSY10-U9-S912	Solid	11/15/16 13:04	11/17/16 08:30
160-20048-13	TITO04-BS-FSSSU3P2-RSY10-U9-S913	Solid	11/15/16 13:03	11/17/16 08:30
160-20048-14	TITO04-BS-FSSSU3P2-RSY10-U9-S914	Solid	11/15/16 13:06	11/17/16 08:30
160-20048-15	TITO04-BS-FSSSU3P2-RSY10-U9-S915	Solid	11/15/16 13:06	11/17/16 08:30

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S901

Lab Sample ID: 160-20048-1

Date Collected: 11/15/16 12:45

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.320		0.130	0.134		0.131	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Actinium-227	-0.217	U	0.571	0.571		0.964	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Bismuth-212	-0.401	U	0.725	0.726		1.22	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Bismuth-214	0.290		0.0909	0.0957		0.0865	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Cesium-137	0.0132	U	0.0291	0.0292		0.0508	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Lead-210	0.288	U	0.981	0.982		1.68	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Lead-212	0.266		0.0614	0.0704		0.0647	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Lead-214	0.323		0.102	0.107		0.0997	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Potassium-40	10.3		1.26	1.65		0.591	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Protactinium-231	0.000	U	0.682	0.682		3.26	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Radium-226	0.290		0.0909	0.0957	0.500	0.0865	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Radium-228	0.320		0.130	0.134		0.131	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Thallium-208	0.0865		0.0668	0.0674		0.0679	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Thorium-228	0.266		0.0614	0.0704		0.0647	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Thorium-232	0.320		0.130	0.134		0.131	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Thorium-234	-0.0929	U	0.828	0.828		1.42	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Uranium-235	-0.145	U	0.402	0.403		0.673	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Uranium-238	-0.0929	U	0.828	0.828		1.42	pCi/g	11/18/16 13:40	12/09/16 16:13	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S902

Lab Sample ID: 160-20048-2

Date Collected: 11/15/16 12:46

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.417		0.173	0.178		0.140	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Actinium-227	0.253	U	0.763	0.763		1.29	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Bismuth-212	-0.352	U	0.876	0.877		1.50	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Bismuth-214	0.112	U	0.0742	0.0751		0.251	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Cesium-137	-0.0157	U	0.0581	0.0581		0.108	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-210	0.477	U	1.34	1.34		1.97	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-212	0.395		0.134	0.143		0.194	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-214	0.365		0.111	0.118		0.118	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Potassium-40	10.5		1.46	1.81		0.375	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Protactinium-231	0.583	U	1.46	1.46		3.37	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Radium-226	0.112	U	0.0742	0.0751	0.500	0.251	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Radium-228	0.417		0.173	0.178		0.140	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thallium-208	0.129		0.0476	0.0494		0.0476	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-228	0.395		0.134	0.143		0.194	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-232	0.417		0.173	0.178		0.140	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-234	0.799	U	1.05	1.05		1.50	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Uranium-235	-0.153	U	0.368	0.368		0.619	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Uranium-238	0.799	U	1.05	1.05		1.50	pCi/g	11/18/16 13:40	12/09/16 16:14	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S903

Lab Sample ID: 160-20048-3

Date Collected: 11/15/16 12:48

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.378		0.123	0.129		0.204	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Actinium-227	-0.00901	U	0.696	0.696		1.20	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Bismuth-212	-0.0378	U	0.696	0.696		1.07	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Bismuth-214	0.416		0.125	0.133		0.115	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Cesium-137	0.0288	U	0.0566	0.0566		0.0958	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-210	-0.554	U	1.40	1.40		2.45	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-212	0.354		0.0788	0.0911		0.0885	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-214	0.247		0.0760	0.0802		0.0975	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Potassium-40	11.2		1.36	1.78		0.479	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Protactinium-231	0.165	U	0.976	0.976		3.15	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Radium-226	0.416		0.125	0.133	0.500	0.115	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Radium-228	0.378		0.123	0.129		0.204	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thallium-208	0.165		0.0441	0.0473		0.0328	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-228	0.354		0.0788	0.0911		0.0885	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-232	0.378		0.123	0.129		0.204	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-234	-0.180	U	1.36	1.36		2.32	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Uranium-235	0.0324	U	0.0749	0.0750		0.813	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Uranium-238	-0.180	U	1.36	1.36		2.32	pCi/g	11/18/16 13:40	12/09/16 16:15	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S904

Lab Sample ID: 160-20048-4

Date Collected: 11/15/16 12:49

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.188	U	0.107	0.108		0.223	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Actinium-227	-0.0633	U	0.695	0.696		1.18	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Bismuth-212	0.173	U	0.748	0.749		1.29	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Bismuth-214	0.0274	U	0.0997	0.0997		0.207	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Cesium-137	-0.0203	U	0.0555	0.0555		0.0948	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Lead-210	0.671	U	1.29	1.29		2.16	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Lead-212	0.258		0.0592	0.0680		0.0645	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Lead-214	0.340		0.0744	0.0824		0.0727	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Potassium-40	9.82		1.17	1.54		0.492	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Protactinium-231	-0.617	U	1.92	1.92		3.22	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Radium-226	0.0274	U	0.0997	0.0997	0.500	0.207	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Radium-228	0.188	U	0.107	0.108		0.223	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Thallium-208	0.118		0.0425	0.0442		0.0340	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Thorium-228	0.258		0.0592	0.0680		0.0645	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Thorium-232	0.188	U	0.107	0.108		0.223	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Thorium-234	0.336	U	0.984	0.984		1.66	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Uranium-235	0.0627	U	0.177	0.177		0.646	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Uranium-238	0.336	U	0.984	0.984		1.66	pCi/g	11/18/16 13:40	12/09/16 16:18	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S905

Lab Sample ID: 160-20048-5

Date Collected: 11/15/16 12:56

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.220	U	0.202	0.203		0.223	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Actinium-227	0.235	U	0.265	0.267		0.454	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Bismuth-212	0.155	U	0.963	0.963		1.68	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Bismuth-214	0.288		0.115	0.119		0.127	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Cesium-137	-0.0361	U	0.0670	0.0671		0.113	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-210	0.951	U	1.08	1.08		1.52	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-212	0.224		0.0784	0.0836		0.103	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-214	0.317		0.0940	0.0996		0.104	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Potassium-40	10.0		1.50	1.81		0.718	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Protactinium-231	0.385	U	1.12	1.12		2.99	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Radium-226	0.288		0.115	0.119	0.500	0.127	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Radium-228	0.220	U	0.202	0.203		0.223	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thallium-208	0.0758		0.0635	0.0640		0.0756	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-228	0.224		0.0784	0.0836		0.103	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-232	0.220	U	0.202	0.203		0.223	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-234	0.522	U	0.536	0.539		1.33	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Uranium-235	0.0894	U	0.286	0.286		0.485	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Uranium-238	0.522	U	0.536	0.539		1.33	pCi/g	11/18/16 13:40	12/09/16 16:14	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S906

Lab Sample ID: 160-20048-6

Date Collected: 11/15/16 12:56

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.130	U	0.218	0.218		0.325	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Actinium-227	-0.383	U	0.842	0.843		1.41	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Bismuth-212	0.000	U	0.506	0.506		1.38	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Bismuth-214	0.398		0.154	0.160		0.137	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Cesium-137	-0.0348	U	0.0903	0.0904		0.155	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-210	-0.301	U	1.53	1.53		2.66	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-212	0.254		0.0800	0.0865		0.0953	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-214	0.359		0.113	0.119		0.132	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Potassium-40	12.2		1.81	2.19		0.739	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Protactinium-231	0.690	U	1.53	1.53		3.56	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Radium-226	0.398		0.154	0.160	0.500	0.137	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Radium-228	0.130	U	0.218	0.218		0.325	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thallium-208	0.117		0.0590	0.0602		0.0565	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-228	0.254		0.0800	0.0865		0.0953	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-232	0.130	U	0.218	0.218		0.325	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-234	0.0628	U	1.43	1.43		2.45	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Uranium-235	-0.0583	U	0.497	0.497		0.839	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Uranium-238	0.0628	U	1.43	1.43		2.45	pCi/g	11/18/16 13:40	12/09/16 16:15	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S907

Lab Sample ID: 160-20048-7

Date Collected: 11/15/16 12:57

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.363		0.198	0.202		0.192	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Actinium-227	-0.371	U	0.807	0.808		1.35	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Bismuth-212	0.337	U	0.753	0.753		1.28	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Bismuth-214	0.381		0.120	0.127		0.115	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Cesium-137	0.0385	U	0.0723	0.0724		0.122	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Lead-210	1.70		1.06	1.08		1.35	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Lead-212	0.287		0.0776	0.0861		0.0937	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Lead-214	0.370		0.110	0.116		0.121	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Potassium-40	11.5		1.46	1.88		0.794	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Protactinium-231	0.000	U	0.197	0.197		3.70	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Radium-226	0.381		0.120	0.127	0.500	0.115	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Radium-228	0.363		0.198	0.202		0.192	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Thallium-208	0.148		0.0545	0.0567		0.0515	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Thorium-228	0.287		0.0776	0.0861		0.0937	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Thorium-232	0.363		0.198	0.202		0.192	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Thorium-234	-0.664	U	1.36	1.37		2.36	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Uranium-235	-0.172	U	0.518	0.518		0.865	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Uranium-238	-0.664	U	1.36	1.37		2.36	pCi/g	11/18/16 13:40	12/09/16 16:16	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S908

Lab Sample ID: 160-20048-8

Date Collected: 11/15/16 12:58

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.244		0.149	0.151		0.146	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Actinium-227	0.150	U	0.301	0.302		0.860	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Bismuth-212	0.000	U	0.420	0.420		1.19	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Bismuth-214	0.0347	U	0.268	0.268		0.364	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Cesium-137	0.0216	U	0.0499	0.0500		0.0622	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Lead-210	0.552	U	1.46	1.46		2.05	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Lead-212	0.332		0.0772	0.0884		0.0826	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Lead-214	0.347		0.0816	0.0892		0.106	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Potassium-40	11.8		1.49	1.92		0.663	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Protactinium-231	0.000	U	0.526	0.526		3.05	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Radium-226	0.0347	U	0.268	0.268	0.500	0.364	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Radium-228	0.244		0.149	0.151		0.146	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Thallium-208	0.110		0.0522	0.0535		0.0540	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Thorium-228	0.332		0.0772	0.0884		0.0826	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Thorium-232	0.244		0.149	0.151		0.146	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Thorium-234	-0.377	U	1.06	1.06		1.86	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Uranium-235	-0.201	U	0.284	0.284		0.578	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Uranium-238	-0.377	U	1.06	1.06		1.86	pCi/g	11/18/16 13:40	12/09/16 16:50	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S909

Lab Sample ID: 160-20048-9

Date Collected: 11/15/16 13:01

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.449		0.179	0.185		0.291	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Actinium-227	0.0331	U	0.0906	0.0907		0.867	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Bismuth-212	0.371	U	0.963	0.964		1.66	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Bismuth-214	0.408		0.126	0.133		0.117	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Cesium-137	0.00423	U	0.0605	0.0605		0.109	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Lead-210	0.784	U	1.14	1.15		1.64	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Lead-212	0.194		0.0752	0.0792		0.0967	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Lead-214	0.293		0.118	0.122		0.141	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Potassium-40	10.5		1.73	2.03		0.815	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Protactinium-231	0.582	U	1.41	1.41		3.30	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Radium-226	0.408		0.126	0.133	0.500	0.117	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Radium-228	0.449		0.179	0.185		0.291	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Thallium-208	0.0301	U	0.0817	0.0817		0.107	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Thorium-228	0.194		0.0752	0.0792		0.0967	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Thorium-232	0.449		0.179	0.185		0.291	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Thorium-234	0.609	U	0.743	0.746		1.21	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Uranium-235	-0.141	U	0.500	0.500		0.547	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Uranium-238	0.609	U	0.743	0.746		1.21	pCi/g	11/18/16 13:40	12/09/16 16:52	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S910

Lab Sample ID: 160-20048-10

Date Collected: 11/15/16 13:01

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.211	U	0.248	0.249		0.348	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Actinium-227	-0.401	U	0.820	0.821		1.37	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Bismuth-212	0.229	U	0.515	0.516		0.901	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Bismuth-214	0.0782	U	0.182	0.182		0.299	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Cesium-137	-0.0249	U	0.0633	0.0633		0.118	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Lead-210	-0.268	U	1.31	1.31		2.25	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Lead-212	0.321		0.0853	0.0949		0.102	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Lead-214	0.360		0.0875	0.0951		0.115	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Potassium-40	11.7		1.65	2.04		0.607	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Protactinium-231	0.000	U	0.391	0.391		4.11	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Radium-226	0.0782	U	0.182	0.182	0.500	0.299	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Radium-228	0.211	U	0.248	0.249		0.348	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Thallium-208	0.157		0.0496	0.0522		0.0399	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Thorium-228	0.321		0.0853	0.0949		0.102	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Thorium-232	0.211	U	0.248	0.249		0.348	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Thorium-234	1.20	U	1.06	1.07		1.35	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Uranium-235	0.0860	U	0.334	0.335		0.649	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Uranium-238	1.20	U	1.06	1.07		1.35	pCi/g	11/18/16 13:40	12/09/16 16:55	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S911

Lab Sample ID: 160-20048-11

Date Collected: 11/15/16 12:59

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.203	U	0.165	0.166		0.209	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Actinium-227	-0.0380	U	0.633	0.633		1.09	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Bismuth-212	-0.240	U	0.641	0.641		1.10	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Bismuth-214	0.402		0.113	0.120		0.111	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Cesium-137	0.000	U	0.0197	0.0197		0.0702	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Lead-210	-0.440	U	1.29	1.30		2.19	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Lead-212	0.256		0.0644	0.0724		0.0712	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Lead-214	0.306		0.0753	0.0817		0.0845	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Potassium-40	11.9		1.41	1.86		0.636	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Protactinium-231	0.000	U	0.218	0.218		3.58	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Radium-226	0.402		0.113	0.120	0.500	0.111	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Radium-228	0.203	U	0.165	0.166		0.209	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Thallium-208	0.0305	U	0.0658	0.0659		0.0773	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Thorium-228	0.256		0.0644	0.0724		0.0712	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Thorium-232	0.203	U	0.165	0.166		0.209	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Thorium-234	0.00996	U	0.0476	0.0476		2.14	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Uranium-235	0.128	U	0.372	0.373		0.625	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Uranium-238	0.00996	U	0.0476	0.0476		2.14	pCi/g	11/18/16 13:40	12/09/16 16:49	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S912

Lab Sample ID: 160-20048-12

Date Collected: 11/15/16 13:04

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.263		0.191	0.193		0.207	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Actinium-227	-0.334	U	0.889	0.889		1.49	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Bismuth-212	-0.179	U	0.227	0.228		1.20	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Bismuth-214	0.330		0.138	0.142		0.140	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Cesium-137	0.0184	U	0.0471	0.0471		0.0814	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-210	1.23	U	1.23	1.24		1.65	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-212	0.242		0.0723	0.0787		0.0900	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-214	0.305		0.0934	0.0987		0.0979	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Potassium-40	11.0		1.39	1.79		0.503	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Protactinium-231	0.000	U	0.807	0.807		3.48	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Radium-226	0.330		0.138	0.142	0.500	0.140	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Radium-228	0.263		0.191	0.193		0.207	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thallium-208	0.153		0.0487	0.0513		0.0429	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-228	0.242		0.0723	0.0787		0.0900	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-232	0.263		0.191	0.193		0.207	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-234	0.208	U	0.571	0.572		1.27	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Uranium-235	0.0710	U	0.0591	0.0595		0.727	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Uranium-238	0.208	U	0.571	0.572		1.27	pCi/g	11/18/16 13:40	12/09/16 16:51	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S913

Lab Sample ID: 160-20048-13

Date Collected: 11/15/16 13:03

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.263		0.149	0.151		0.208	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Actinium-227	0.352	U	0.207	0.211		0.762	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Bismuth-212	0.350	U	0.614	0.616		1.03	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Bismuth-214	0.293		0.0759	0.0818		0.0690	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Cesium-137	-0.0334	U	0.0519	0.0520		0.0867	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Lead-210	-0.357	U	1.13	1.13		1.92	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Lead-212	0.329		0.0723	0.0839		0.0615	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Lead-214	0.400		0.0781	0.0885		0.0391	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Potassium-40	10.4		1.22	1.61		0.505	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Protactinium-231	-0.0840	U	1.82	1.82		3.10	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Radium-226	0.293		0.0759	0.0818	0.500	0.0690	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Radium-228	0.263		0.149	0.151		0.208	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Thallium-208	0.145		0.0433	0.0459		0.0289	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Thorium-228	0.329		0.0723	0.0839		0.0615	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Thorium-232	0.263		0.149	0.151		0.208	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Thorium-234	0.458	U	0.972	0.973		1.63	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Uranium-235	0.0678	U	0.153	0.153		0.741	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Uranium-238	0.458	U	0.972	0.973		1.63	pCi/g	11/18/16 13:40	12/09/16 16:53	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S914

Lab Sample ID: 160-20048-14

Date Collected: 11/15/16 13:06

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.408		0.152	0.157		0.163	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Actinium-227	0.173	U	0.502	0.502		0.728	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Bismuth-212	-0.487	U	0.851	0.852		1.43	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Bismuth-214	0.340		0.106	0.111		0.107	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Cesium-137	-0.00503	U	0.0476	0.0476		0.0864	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-210	-0.303	U	1.33	1.33		2.02	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-212	0.323		0.0830	0.0929		0.0982	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-214	0.282		0.0904	0.0950		0.0916	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Potassium-40	10.3		1.49	1.83		0.695	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Protactinium-231	0.000	U	0.370	0.370		3.50	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Radium-226	0.340		0.106	0.111	0.500	0.107	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Radium-228	0.408		0.152	0.157		0.163	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thallium-208	0.121		0.0529	0.0544		0.0454	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-228	0.323		0.0830	0.0929		0.0982	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-232	0.408		0.152	0.157		0.163	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-234	-0.307	U	1.19	1.19		2.05	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Uranium-235	0.121	U	0.209	0.210		0.487	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Uranium-238	-0.307	U	1.19	1.19		2.05	pCi/g	11/18/16 13:40	12/09/16 16:51	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S915

Lab Sample ID: 160-20048-15

Date Collected: 11/15/16 13:06

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.177	U	0.303	0.304		0.365	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Actinium-227	-0.373	U	0.878	0.879		1.48	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Bismuth-212	-0.451	U	0.967	0.969		1.65	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Bismuth-214	0.355		0.164	0.168		0.163	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Cesium-137	-0.0423	U	0.0949	0.0950		0.111	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Lead-210	1.24	U	1.11	1.12		1.58	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Lead-212	0.246		0.0937	0.0989		0.129	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Lead-214	0.362		0.107	0.114		0.111	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Potassium-40	10.8		1.70	2.02		0.733	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Protactinium-231	0.559	U	1.36	1.36		3.17	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Radium-226	0.355		0.164	0.168	0.500	0.163	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Radium-228	0.177	U	0.303	0.304		0.365	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Thallium-208	0.170		0.0539	0.0567		0.0418	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Thorium-228	0.246		0.0937	0.0989		0.129	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Thorium-232	0.177	U	0.303	0.304		0.365	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Thorium-234	0.747	U	0.572	0.578		1.33	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Uranium-235	0.182	U	0.320	0.321		0.570	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Uranium-238	0.747	U	0.572	0.578		1.33	pCi/g	11/18/16 13:40	12/09/16 16:54	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-280031/1-A
Matrix: Solid
Analysis Batch: 283304

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 280031

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.008784	U	0.0226	0.0226		0.326	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Actinium-227	0.07143	U	0.167	0.167		0.962	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Bismuth-212	0.0000	U	0.173	0.173		1.33	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Bismuth-214	-0.01755	U	0.155	0.155		0.281	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Cesium-137	-0.02815	U	0.0947	0.0948		0.174	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Lead-210	0.5215	U	0.988	0.990		1.68	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Lead-212	-0.08736	U	0.0718	0.0727		0.189	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Lead-214	-0.02185	U	0.0921	0.0921		0.172	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Potassium-40	0.3129	U	0.504	0.505		0.846	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Protactinium-231	-0.0000001	U	2.57	2.57		4.45	pCi/g	11/18/16 13:40	12/09/16 16:10	1
	50									
Radium-226	-0.01755	U	0.155	0.155	0.500	0.281	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Radium-228	-0.008784	U	0.0226	0.0226		0.326	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Thallium-208	-0.003788	U	0.0607	0.0607		0.0882	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Thorium-228	-0.08736	U	0.0718	0.0727		0.189	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Thorium-232	-0.008784	U	0.0226	0.0226		0.326	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Thorium-234	0.4338	U	0.451	0.453		1.41	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Uranium-235	-0.03221	U	0.0767	0.0768		0.605	pCi/g	11/18/16 13:40	12/09/16 16:10	1
Uranium-238	0.4338	U	0.451	0.453		1.41	pCi/g	11/18/16 13:40	12/09/16 16:10	1

Lab Sample ID: LCS 160-280031/2-A
Matrix: Solid
Analysis Batch: 283303

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 280031

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	95.94		10.1		0.970	pCi/g	99	87 - 116
Cesium-137	29.3	27.54		2.94		0.237	pCi/g	94	87 - 120
Cobalt-60	16.0	15.20		1.58		0.109	pCi/g	95	87 - 115

Lab Sample ID: 160-20048-1 DU
Matrix: Solid
Analysis Batch: 283294

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S901
Prep Type: Total/NA
Prep Batch: 280031

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.320		0.1398	U	0.174		0.250	pCi/g	0.59	1
Actinium-227	-0.217	U	-0.3513	U	0.888		1.49	pCi/g	0.09	1
Bismuth-212	-0.401	U	0.2010	U	0.586		1.03	pCi/g	0.46	1
Bismuth-214	0.290		0.2956		0.100		0.103	pCi/g	0.03	1
Cesium-137	0.0132	U	0.008057	U	0.0479		0.0845	pCi/g	0.07	1
Lead-210	0.288	U	0.09255	U	1.05		1.72	pCi/g	0.1	1
Lead-212	0.266		0.2685		0.0875		0.0998	pCi/g	0.02	1
Lead-214	0.323		0.2960		0.0973		0.136	pCi/g	0.13	1
Potassium-40	10.3		9.211		1.62		0.346	pCi/g	0.34	1
Protactinium-231	0.000	U	0.3094	U	1.03		3.44	pCi/g	0.18	1
Radium-226	0.290		0.2956		0.100	0.500	0.103	pCi/g	0.03	1
Radium-228	0.320		0.1398	U	0.174		0.250	pCi/g	0.59	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-20048-1 DU

Matrix: Solid

Analysis Batch: 283294

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S901

Prep Type: Total/NA

Prep Batch: 280031

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.0865		0.08611		0.0945		0.0815	pCi/g	0	1
Thorium-228	0.266		0.2685		0.0875		0.0998	pCi/g	0.02	1
Thorium-232	0.320		0.1398	U	0.174		0.250	pCi/g	0.59	1
Thorium-234	-0.0929	U	0.4284	U	1.09		1.56	pCi/g	0.27	1
Uranium-235	-0.145	U	0.1165	U	0.301		0.509	pCi/g	0.37	1
Uranium-238	-0.0929	U	0.4284	U	1.09		1.56	pCi/g	0.27	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Rad

Leach Batch: 279804

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20048-1	TITO04-BS-FSSSU3P2-RSY10-U9-S901	Total/NA	Solid	Dry and Grind	
160-20048-2	TITO04-BS-FSSSU3P2-RSY10-U9-S902	Total/NA	Solid	Dry and Grind	
160-20048-3	TITO04-BS-FSSSU3P2-RSY10-U9-S903	Total/NA	Solid	Dry and Grind	
160-20048-4	TITO04-BS-FSSSU3P2-RSY10-U9-S904	Total/NA	Solid	Dry and Grind	
160-20048-5	TITO04-BS-FSSSU3P2-RSY10-U9-S905	Total/NA	Solid	Dry and Grind	
160-20048-6	TITO04-BS-FSSSU3P2-RSY10-U9-S906	Total/NA	Solid	Dry and Grind	
160-20048-7	TITO04-BS-FSSSU3P2-RSY10-U9-S907	Total/NA	Solid	Dry and Grind	
160-20048-8	TITO04-BS-FSSSU3P2-RSY10-U9-S908	Total/NA	Solid	Dry and Grind	
160-20048-9	TITO04-BS-FSSSU3P2-RSY10-U9-S909	Total/NA	Solid	Dry and Grind	
160-20048-10	TITO04-BS-FSSSU3P2-RSY10-U9-S910	Total/NA	Solid	Dry and Grind	
160-20048-11	TITO04-BS-FSSSU3P2-RSY10-U9-S911	Total/NA	Solid	Dry and Grind	
160-20048-12	TITO04-BS-FSSSU3P2-RSY10-U9-S912	Total/NA	Solid	Dry and Grind	
160-20048-13	TITO04-BS-FSSSU3P2-RSY10-U9-S913	Total/NA	Solid	Dry and Grind	
160-20048-14	TITO04-BS-FSSSU3P2-RSY10-U9-S914	Total/NA	Solid	Dry and Grind	
160-20048-15	TITO04-BS-FSSSU3P2-RSY10-U9-S915	Total/NA	Solid	Dry and Grind	
160-20048-1 DU	TITO04-BS-FSSSU3P2-RSY10-U9-S901	Total/NA	Solid	Dry and Grind	

Prep Batch: 280031

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20048-1	TITO04-BS-FSSSU3P2-RSY10-U9-S901	Total/NA	Solid	Fill_Geo-21	279804
160-20048-2	TITO04-BS-FSSSU3P2-RSY10-U9-S902	Total/NA	Solid	Fill_Geo-21	279804
160-20048-3	TITO04-BS-FSSSU3P2-RSY10-U9-S903	Total/NA	Solid	Fill_Geo-21	279804
160-20048-4	TITO04-BS-FSSSU3P2-RSY10-U9-S904	Total/NA	Solid	Fill_Geo-21	279804
160-20048-5	TITO04-BS-FSSSU3P2-RSY10-U9-S905	Total/NA	Solid	Fill_Geo-21	279804
160-20048-6	TITO04-BS-FSSSU3P2-RSY10-U9-S906	Total/NA	Solid	Fill_Geo-21	279804
160-20048-7	TITO04-BS-FSSSU3P2-RSY10-U9-S907	Total/NA	Solid	Fill_Geo-21	279804
160-20048-8	TITO04-BS-FSSSU3P2-RSY10-U9-S908	Total/NA	Solid	Fill_Geo-21	279804
160-20048-9	TITO04-BS-FSSSU3P2-RSY10-U9-S909	Total/NA	Solid	Fill_Geo-21	279804
160-20048-10	TITO04-BS-FSSSU3P2-RSY10-U9-S910	Total/NA	Solid	Fill_Geo-21	279804
160-20048-11	TITO04-BS-FSSSU3P2-RSY10-U9-S911	Total/NA	Solid	Fill_Geo-21	279804
160-20048-12	TITO04-BS-FSSSU3P2-RSY10-U9-S912	Total/NA	Solid	Fill_Geo-21	279804
160-20048-13	TITO04-BS-FSSSU3P2-RSY10-U9-S913	Total/NA	Solid	Fill_Geo-21	279804
160-20048-14	TITO04-BS-FSSSU3P2-RSY10-U9-S914	Total/NA	Solid	Fill_Geo-21	279804
160-20048-15	TITO04-BS-FSSSU3P2-RSY10-U9-S915	Total/NA	Solid	Fill_Geo-21	279804
MB 160-280031/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-280031/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-20048-1 DU	TITO04-BS-FSSSU3P2-RSY10-U9-S901	Total/NA	Solid	Fill_Geo-21	279804

TestAmerica St. Louis

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-19923-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan



Authorized for release by:
12/6/2016 1:57:19 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Job ID: 160-19923-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-19923-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Job ID: 160-19923-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 11/10/2016 8:30 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 18.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSSSU3-RSY11-U7-S701 (160-19923-1), TITO04-BS-FSSSU3-RSY11-U7-S702 (160-19923-2), TITO04-BS-FSSSU3-RSY11-U7-S703 (160-19923-3), TITO04-BS-FSSSU3-RSY11-U7-S704 (160-19923-4), TITO04-BS-FSSSU3-RSY11-U7-S705 (160-19923-5), TITO04-BS-FSSSU3-RSY11-U7-S706 (160-19923-6), TITO04-BS-FSSSU3-RSY11-U7-S707 (160-19923-7), TITO04-BS-FSSSU3-RSY11-U7-S708 (160-19923-8), TITO04-BS-FSSSU3-RSY11-U7-S709 (160-19923-9), TITO04-BS-FSSSU3-RSY11-U7-S710 (160-19923-10), TITO04-BS-FSSSU3-RSY11-U7-S711 (160-19923-11) and TITO04-BS-FSSSU3-RSY11-U7-S712 (160-19923-12) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/10/2016, prepared on 11/11/2016 and analyzed on 12/02/2016.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Lynn Caragan
Phone/Fax Number: 714-669-7022

Address: lynn.caragan@cbifederalservices.com Contact Name / ph. #: Mike Dryden

City: _____

Project Number: 500060
Project Name / Location: CTO-04 Phase III Bayside FSS
SU3 RSY11 USE 7 Systematic
Purchase Order #: 201455

Shipment Date: ~~11-8-1~~ 11-9-16
Waybill Number: 12894620194381719
Lab Destination: Earth Toxics Inc To Test America

[illegible][illegible]

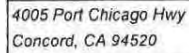
Special Instructions: 7 days ingrown draft and follow with 21 days final

<input type="checkbox"/> 24-hr <hr/> Standard TAT <input type="checkbox"/> <input type="checkbox"/> 3-day <input type="checkbox"/> 7-day	Level Of QC Required: I II III Project Specific:
---	---

<u>Method Codes</u>	
C = Composite	G = Grab
<u>Matrix Codes</u>	
DW = Drinking Water	SO = Soil
GW = Ground Water	SL = Sludge
WW = Waste Water	CP = Chip Samples
A = Air	ABS=Asbestos, PO=Pipe Opening

160-19923 Chain of Custody



Page 2 of 2

DW = Drinking Water
GW = Ground Water
WW = Waste Water
A = Air
SO = Soil
SL = Sludge
CP = Chip Samples
ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-19923-2

Login Number: 19923

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-19923-1	TITO04-BS-FSSSU3-RSY11-U7-S701	Solid	11/08/16 09:55	11/10/16 08:30
160-19923-2	TITO04-BS-FSSSU3-RSY11-U7-S702	Solid	11/08/16 09:58	11/10/16 08:30
160-19923-3	TITO04-BS-FSSSU3-RSY11-U7-S703	Solid	11/08/16 09:53	11/10/16 08:30
160-19923-4	TITO04-BS-FSSSU3-RSY11-U7-S704	Solid	11/08/16 09:56	11/10/16 08:30
160-19923-5	TITO04-BS-FSSSU3-RSY11-U7-S705	Solid	11/08/16 09:49	11/10/16 08:30
160-19923-6	TITO04-BS-FSSSU3-RSY11-U7-S706	Solid	11/08/16 09:51	11/10/16 08:30
160-19923-7	TITO04-BS-FSSSU3-RSY11-U7-S707	Solid	11/08/16 09:58	11/10/16 08:30
160-19923-8	TITO04-BS-FSSSU3-RSY11-U7-S708	Solid	11/08/16 09:41	11/10/16 08:30
160-19923-9	TITO04-BS-FSSSU3-RSY11-U7-S709	Solid	11/08/16 09:46	11/10/16 08:30
160-19923-10	TITO04-BS-FSSSU3-RSY11-U7-S710	Solid	11/08/16 09:39	11/10/16 08:30
160-19923-11	TITO04-BS-FSSSU3-RSY11-U7-S711	Solid	11/08/16 09:44	11/10/16 08:30
160-19923-12	TITO04-BS-FSSSU3-RSY11-U7-S712	Solid	11/08/16 09:48	11/10/16 08:30

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S701

Lab Sample ID: 160-19923-1

Date Collected: 11/08/16 09:55

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.416		0.136	0.143		0.0982	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Actinium-227	0.522	U	0.511	0.514		0.702	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Bismuth-212	0.0142	U	0.701	0.701		1.27	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Bismuth-214	0.364		0.103	0.110		0.0925	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Cesium-137	-0.00117	U	0.0541	0.0541		0.0983	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Lead-210	1.10	U	1.13	1.13		1.54	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Lead-212	0.206		0.107	0.111		0.164	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Lead-214	0.353		0.111	0.117		0.138	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Potassium-40	11.1		1.58	1.94		0.727	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Protactinium-231	0.000	U	0.611	0.611		3.06	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Radium-226	0.364		0.103	0.110	0.500	0.0925	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Radium-228	0.416		0.136	0.143		0.0982	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Thallium-208	0.117		0.0479	0.0494		0.0430	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Thorium-228	0.206		0.107	0.111		0.164	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Thorium-232	0.416		0.136	0.143		0.0982	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Thorium-234	0.0138	U	0.947	0.947		1.63	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Uranium-235	-0.0107	U	0.404	0.404		0.552	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Uranium-238	0.0138	U	0.947	0.947		1.63	pCi/g	11/11/16 13:08	12/02/16 08:36	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S702

Lab Sample ID: 160-19923-2

Date Collected: 11/08/16 09:58

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.444		0.149	0.156		0.112	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Actinium-227	0.185	U	0.363	0.363		1.33	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Bismuth-212	0.0320	U	0.838	0.838		1.50	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Bismuth-214	0.306		0.130	0.134		0.137	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Cesium-137	-0.0282	U	0.0747	0.0748		0.129	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Lead-210	-0.401	U	1.50	1.50		2.62	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Lead-212	0.333		0.0879	0.0979		0.0993	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Lead-214	0.467		0.110	0.121		0.119	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Potassium-40	9.51		1.58	1.86		0.763	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Protactinium-231	0.0000000	U	2.13	2.13		3.68	pCi/g	11/11/16 13:08	12/02/16 08:37	1
	30									
Radium-226	0.306		0.130	0.134	0.500	0.137	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Radium-228	0.444		0.149	0.156		0.112	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Thallium-208	0.129		0.0933	0.0943		0.0872	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Thorium-228	0.333		0.0879	0.0979		0.0993	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Thorium-232	0.444		0.149	0.156		0.112	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Thorium-234	0.0329	U	1.43	1.43		2.43	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Uranium-235	0.0323	U	0.0388	0.0389		1.04	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Uranium-238	0.0329	U	1.43	1.43		2.43	pCi/g	11/11/16 13:08	12/02/16 08:37	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S703

Lab Sample ID: 160-19923-3

Date Collected: 11/08/16 09:53

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.312		0.153	0.156		0.211	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Actinium-227	0.143	U	0.331	0.331		0.766	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Bismuth-212	0.255	U	0.459	0.460		0.784	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Bismuth-214	0.401		0.113	0.120		0.105	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Cesium-137	-0.0218	U	0.0469	0.0469		0.0964	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Lead-210	-0.785	U	1.34	1.35		2.36	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Lead-212	0.315		0.0749	0.0853		0.0860	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Lead-214	0.309		0.0957	0.101		0.107	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Potassium-40	11.3		1.38	1.80		0.672	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Protactinium-231	0.000	U	0.905	0.905		3.50	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Radium-226	0.401		0.113	0.120	0.500	0.105	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Radium-228	0.312		0.153	0.156		0.211	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Thallium-208	0.133		0.0453	0.0473		0.0440	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Thorium-228	0.315		0.0749	0.0853		0.0860	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Thorium-232	0.312		0.153	0.156		0.211	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Thorium-234	-0.178	U	1.36	1.36		2.31	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Uranium-235	-0.0401	U	0.0732	0.0733		0.408	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Uranium-238	-0.178	U	1.36	1.36		2.31	pCi/g	11/11/16 13:08	12/02/16 08:38	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S704

Lab Sample ID: 160-19923-4

Date Collected: 11/08/16 09:56

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.285		0.195	0.197		0.204	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Actinium-227	0.214	U	0.351	0.352		0.852	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Bismuth-212	0.312	U	0.740	0.740		1.27	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Bismuth-214	0.393		0.124	0.130		0.109	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Cesium-137	0.0149	U	0.0338	0.0338		0.0595	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Lead-210	1.67	U	1.37	1.39		1.89	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Lead-212	0.281		0.0768	0.0850		0.0890	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Lead-214	0.263		0.106	0.110		0.127	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Potassium-40	10.2		1.43	1.77		0.708	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Protactinium-231	0.503	U	1.12	1.12		2.63	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Radium-226	0.393		0.124	0.130	0.500	0.109	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Radium-228	0.285		0.195	0.197		0.204	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Thallium-208	0.134		0.0470	0.0490		0.0440	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Thorium-228	0.281		0.0768	0.0850		0.0890	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Thorium-232	0.285		0.195	0.197		0.204	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Thorium-234	1.84		0.983	1.00		1.23	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Uranium-235	-0.0585	U	0.293	0.293		0.588	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Uranium-238	1.84		0.983	1.00		1.23	pCi/g	11/11/16 13:08	12/02/16 08:41	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S705

Lab Sample ID: 160-19923-5

Date Collected: 11/08/16 09:49

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.397		0.194	0.198		0.248	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Actinium-227	-0.404	U	0.845	0.847		1.42	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Bismuth-212	0.310	U	0.896	0.897		1.55	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Bismuth-214	0.114	U	0.244	0.244		0.298	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Cesium-137	-0.0138	U	0.0564	0.0564		0.105	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Lead-210	0.599	U	1.62	1.62		2.74	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Lead-212	0.321		0.113	0.120		0.160	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Lead-214	0.316		0.0951	0.101		0.0858	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Potassium-40	10.6		1.62	1.95		0.619	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Protactinium-231	-0.870	U	2.84	2.84		4.77	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Radium-226	0.114	U	0.244	0.244	0.500	0.298	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Radium-228	0.397		0.194	0.198		0.248	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Thallium-208	0.135		0.0468	0.0488		0.0378	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Thorium-228	0.321		0.113	0.120		0.160	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Thorium-232	0.397		0.194	0.198		0.248	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Thorium-234	-0.374	U	1.45	1.45		2.51	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Uranium-235	0.104	U	0.379	0.379		0.817	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Uranium-238	-0.374	U	1.45	1.45		2.51	pCi/g	11/11/16 13:08	12/02/16 08:44	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S706

Lab Sample ID: 160-19923-6

Date Collected: 11/08/16 09:51

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.255		0.200	0.202		0.211	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Actinium-227	-0.267	U	0.663	0.663		1.11	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Bismuth-212	-0.0248	U	0.605	0.605		1.09	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Bismuth-214	0.341		0.101	0.107		0.0904	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Cesium-137	-0.00101	U	0.0516	0.0516		0.0931	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Lead-210	0.690	U	0.774	0.778		1.17	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Lead-212	0.239		0.0673	0.0741		0.0828	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Lead-214	0.361		0.0802	0.0885		0.0677	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Potassium-40	10.7		1.48	1.84		0.567	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Protactinium-231	0.265	U	0.880	0.880		2.88	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Radium-226	0.341		0.101	0.107	0.500	0.0904	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Radium-228	0.255		0.200	0.202		0.211	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Thallium-208	0.0335	U	0.0734	0.0734		0.0893	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Thorium-228	0.239		0.0673	0.0741		0.0828	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Thorium-232	0.255		0.200	0.202		0.211	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Thorium-234	-0.277	U	0.950	0.950		1.65	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Uranium-235	0.117	U	0.205	0.206		0.465	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Uranium-238	-0.277	U	0.950	0.950		1.65	pCi/g	11/11/16 13:08	12/02/16 08:46	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S707

Lab Sample ID: 160-19923-7

Date Collected: 11/08/16 09:58

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.564		0.199	0.207		0.130	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Actinium-227	0.169	U	0.576	0.577		0.843	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Bismuth-212	0.196	U	1.28	1.28		2.23	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Bismuth-214	0.337		0.150	0.154		0.171	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Cesium-137	-0.0342	U	0.119	0.119		0.173	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Lead-210	0.692	U	1.34	1.34		1.97	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Lead-212	0.336		0.0858	0.0962		0.0866	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Lead-214	0.322		0.108	0.113		0.155	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Potassium-40	11.0		1.81	2.13		0.774	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Protactinium-231	0.362	U	1.07	1.07		3.66	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Radium-226	0.337		0.150	0.154	0.500	0.171	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Radium-228	0.564		0.199	0.207		0.130	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Thallium-208	0.149		0.0545	0.0566		0.0459	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Thorium-228	0.336		0.0858	0.0962		0.0866	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Thorium-232	0.564		0.199	0.207		0.130	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Thorium-234	0.393	U	1.05	1.05		1.50	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Uranium-235	0.0763	U	0.326	0.326		0.555	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Uranium-238	0.393	U	1.05	1.05		1.50	pCi/g	11/11/16 13:08	12/02/16 08:47	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S708

Lab Sample ID: 160-19923-8

Date Collected: 11/08/16 09:41

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.264	U	0.117	0.120		0.269	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Actinium-227	0.153	U	0.355	0.356		0.963	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Bismuth-212	-0.0235	U	0.521	0.521		0.931	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Bismuth-214	0.328		0.0821	0.0889		0.0732	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Cesium-137	0.0164	U	0.0381	0.0381		0.0655	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Lead-210	-0.652	U	1.26	1.26		2.10	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Lead-212	0.282		0.0589	0.0693		0.0578	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Lead-214	0.364		0.0945	0.102		0.0867	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Potassium-40	10.9		1.24	1.67		0.439	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Protactinium-231	-0.187	U	1.98	1.98		3.35	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Radium-226	0.328		0.0821	0.0889	0.500	0.0732	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Radium-228	0.264	U	0.117	0.120		0.269	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Thallium-208	0.118		0.0356	0.0377		0.0250	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Thorium-228	0.282		0.0589	0.0693		0.0578	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Thorium-232	0.264	U	0.117	0.120		0.269	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Thorium-234	-0.377	U	1.14	1.14		1.91	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Uranium-235	0.0846	U	0.169	0.169		0.608	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Uranium-238	-0.377	U	1.14	1.14		1.91	pCi/g	11/11/16 13:08	12/02/16 09:10	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S709

Lab Sample ID: 160-19923-9

Date Collected: 11/08/16 09:46

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.232	U	0.179	0.181		0.280	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Actinium-227	0.120	U	0.309	0.309		0.754	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Bismuth-212	0.237	U	0.902	0.902		1.57	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Bismuth-214	0.433		0.120	0.128		0.121	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Cesium-137	-0.0341	U	0.0647	0.0648		0.110	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Lead-210	-0.0962	U	1.38	1.38		2.08	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Lead-212	0.0194	U	0.115	0.115		0.196	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Lead-214	0.388		0.117	0.124		0.134	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Potassium-40	10.9		1.60	1.95		0.759	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Protactinium-231	0.000	U	0.594	0.594		3.00	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Radium-226	0.433		0.120	0.128	0.500	0.121	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Radium-228	0.232	U	0.179	0.181		0.280	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Thallium-208	0.0822		0.0423	0.0432		0.0426	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Thorium-228	0.0194	U	0.115	0.115		0.196	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Thorium-232	0.232	U	0.179	0.181		0.280	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Thorium-234	0.0145	U	1.17	1.17		2.01	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Uranium-235	0.0252	U	0.168	0.168		0.538	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Uranium-238	0.0145	U	1.17	1.17		2.01	pCi/g	11/11/16 13:08	12/02/16 09:11	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S710

Lab Sample ID: 160-19923-10

Date Collected: 11/08/16 09:39

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.421		0.165	0.171		0.323	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Actinium-227	-0.410	U	0.875	0.876		1.47	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Bismuth-212	0.369	U	0.770	0.771		1.32	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Bismuth-214	0.361		0.146	0.151		0.146	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Cesium-137	-0.0600	U	0.103	0.103		0.173	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Lead-210	-1.36	U	1.86	1.86		2.73	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Lead-212	0.0261	U	0.129	0.129		0.219	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Lead-214	0.399		0.111	0.118		0.103	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Potassium-40	11.1		1.73	2.07		0.784	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Protactinium-231	0.584	U	1.99	1.99		3.39	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Radium-226	0.361		0.146	0.151	0.500	0.146	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Radium-228	0.421		0.165	0.171		0.323	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Thallium-208	0.180		0.0652	0.0678		0.0462	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Thorium-228	0.0261	U	0.129	0.129		0.219	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Thorium-232	0.421		0.165	0.171		0.323	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Thorium-234	-0.586	U	1.46	1.46		2.77	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Uranium-235	-0.208	U	0.416	0.417		1.05	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Uranium-238	-0.586	U	1.46	1.46		2.77	pCi/g	11/11/16 13:08	12/02/16 09:13	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S711

Lab Sample ID: 160-19923-11

Date Collected: 11/08/16 09:44

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.407		0.132	0.139		0.0790	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Actinium-227	0.224	U	0.474	0.474		1.24	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Bismuth-212	0.0348	U	0.834	0.834		1.46	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Bismuth-214	0.295		0.107	0.111		0.133	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Cesium-137	0.0142	U	0.0322	0.0322		0.0561	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Lead-210	1.33	U	1.35	1.36		1.75	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Lead-212	0.305		0.0821	0.0911		0.103	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Lead-214	0.407		0.120	0.127		0.127	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Potassium-40	9.89		1.34	1.68		0.708	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Protactinium-231	-0.848	U	2.64	2.64		4.43	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Radium-226	0.295		0.107	0.111	0.500	0.133	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Radium-228	0.407		0.132	0.139		0.0790	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Thallium-208	0.164		0.0519	0.0546		0.0476	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Thorium-228	0.305		0.0821	0.0911		0.103	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Thorium-232	0.407		0.132	0.139		0.0790	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Thorium-234	1.07	U	1.18	1.18		1.48	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Uranium-235	0.0864	U	0.174	0.174		0.780	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Uranium-238	1.07	U	1.18	1.18		1.48	pCi/g	11/11/16 13:08	12/02/16 09:16	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S712

Lab Sample ID: 160-19923-12

Date Collected: 11/08/16 09:48

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.522		0.156	0.165		0.0858	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Actinium-227	0.495	U	0.538	0.541		0.709	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Bismuth-212	0.239	U	0.723	0.723		1.25	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Bismuth-214	0.388		0.113	0.120		0.104	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Cesium-137	0.0245	U	0.0676	0.0677		0.116	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Lead-210	-0.400	U	1.40	1.40		2.19	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Lead-212	0.248		0.0749	0.0815		0.0921	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Lead-214	0.353		0.0945	0.101		0.115	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Potassium-40	11.5		1.49	1.90		0.685	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Protactinium-231	0.000	U	0.257	0.257		2.78	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Radium-226	0.388		0.113	0.120	0.500	0.104	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Radium-228	0.522		0.156	0.165		0.0858	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Thallium-208	0.0707		0.0388	0.0395		0.0463	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Thorium-228	0.248		0.0749	0.0815		0.0921	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Thorium-232	0.522		0.156	0.165		0.0858	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Thorium-234	-0.652	U	0.979	0.981		1.75	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Uranium-235	-0.203	U	0.302	0.302		0.499	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Uranium-238	-0.652	U	0.979	0.981		1.75	pCi/g	11/11/16 13:08	12/02/16 09:17	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-278932/1-A
Matrix: Solid
Analysis Batch: 282158

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 278932

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.06269	U	0.135	0.136		0.165	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Actinium-227	0.08470	U	0.188	0.189		0.835	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Bismuth-212	0.02701	U	0.473	0.473		0.881	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Bismuth-214	-0.06564	U	0.135	0.135		0.244	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Cesium-137	-0.006810	U	0.0434	0.0434		0.0788	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Lead-210	0.3767	U	1.03	1.03		1.77	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Lead-212	0.01188	U	0.0752	0.0753		0.130	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Lead-214	-0.08381	U	0.154	0.154		0.165	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Potassium-40	-0.2820	U	0.671	0.671		0.989	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Protactinium-231	0.09571	U	0.965	0.965		3.14	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Radium-226	-0.06564	U	0.135	0.135	0.500	0.244	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Radium-228	0.06269	U	0.135	0.136		0.165	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Thallium-208	0.01000	U	0.0202	0.0203		0.0618	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Thorium-228	0.01188	U	0.0752	0.0753		0.130	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Thorium-232	0.06269	U	0.135	0.136		0.165	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Thorium-234	0.08144	U	0.337	0.338		1.46	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Uranium-235	-0.01169	U	0.0486	0.0487		0.511	pCi/g	11/11/16 13:08	12/02/16 09:06	1
Uranium-238	0.08144	U	0.337	0.338		1.46	pCi/g	11/11/16 13:08	12/02/16 09:06	1

Lab Sample ID: LCS 160-278932/2-A
Matrix: Solid
Analysis Batch: 282157

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 278932

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	99.85		10.5		1.20	pCi/g	103	87 - 116
Cesium-137	29.3	29.62		3.16		0.211	pCi/g	101	87 - 120
Cobalt-60	16.1	15.85		1.64		0.0399	pCi/g	99	87 - 115

Lab Sample ID: 160-19923-1 DU
Matrix: Solid
Analysis Batch: 282159

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S701
Prep Type: Total/NA
Prep Batch: 278932

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.416		0.1981	U	0.163		0.226	pCi/g	0.71	1
Actinium-227	0.522	U	-0.3138	U	0.791		1.33	pCi/g	0.64	1
Bismuth-212	0.0142	U	0.1662	U	0.359		0.628	pCi/g	0.14	1
Bismuth-214	0.364		0.4929		0.162		0.133	pCi/g	0.48	1
Cesium-137	-0.00117	U	-0.01392	U	0.0707		0.122	pCi/g	0.10	1
Lead-210	1.10	U	-0.8609	U	1.48		2.61	pCi/g	0.75	1
Lead-212	0.206		0.3611		0.0914		0.0827	pCi/g	0.77	1
Lead-214	0.353		0.4371		0.137		0.127	pCi/g	0.33	1
Potassium-40	11.1		11.04		1.80		0.523	pCi/g	0.01	1
Protactinium-231	0.000	U	0.0000	U	0.281		3.30	pCi/g	0	1
Radium-226	0.364		0.4929		0.162	0.500	0.133	pCi/g	0.48	1
Radium-228	0.416		0.1981	U	0.163		0.226	pCi/g	0.71	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-19923-1 DU

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S701

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 282159

Prep Batch: 278932

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.117		0.07170	U	0.0789		0.0810	pCi/g	0.35	1
Thorium-228	0.206		0.3611		0.0914		0.0827	pCi/g	0.77	1
Thorium-232	0.416		0.1981	U	0.163		0.226	pCi/g	0.71	1
Thorium-234	0.0138	U	0.006493	U	1.46		2.48	pCi/g	0	1
Uranium-235	-0.0107	U	-0.08444	U	0.280		1.01	pCi/g	0.11	1
Uranium-238	0.0138	U	0.006493	U	1.46		2.48	pCi/g	0	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Rad

Leach Batch: 278646

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19923-1	TITO04-BS-FSSSU3-RSY11-U7-S701	Total/NA	Solid	Dry and Grind	
160-19923-2	TITO04-BS-FSSSU3-RSY11-U7-S702	Total/NA	Solid	Dry and Grind	
160-19923-3	TITO04-BS-FSSSU3-RSY11-U7-S703	Total/NA	Solid	Dry and Grind	
160-19923-4	TITO04-BS-FSSSU3-RSY11-U7-S704	Total/NA	Solid	Dry and Grind	
160-19923-5	TITO04-BS-FSSSU3-RSY11-U7-S705	Total/NA	Solid	Dry and Grind	
160-19923-6	TITO04-BS-FSSSU3-RSY11-U7-S706	Total/NA	Solid	Dry and Grind	
160-19923-7	TITO04-BS-FSSSU3-RSY11-U7-S707	Total/NA	Solid	Dry and Grind	
160-19923-8	TITO04-BS-FSSSU3-RSY11-U7-S708	Total/NA	Solid	Dry and Grind	
160-19923-9	TITO04-BS-FSSSU3-RSY11-U7-S709	Total/NA	Solid	Dry and Grind	
160-19923-10	TITO04-BS-FSSSU3-RSY11-U7-S710	Total/NA	Solid	Dry and Grind	
160-19923-11	TITO04-BS-FSSSU3-RSY11-U7-S711	Total/NA	Solid	Dry and Grind	
160-19923-12	TITO04-BS-FSSSU3-RSY11-U7-S712	Total/NA	Solid	Dry and Grind	
160-19923-1 DU	TITO04-BS-FSSSU3-RSY11-U7-S701	Total/NA	Solid	Dry and Grind	

Prep Batch: 278932

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19923-1	TITO04-BS-FSSSU3-RSY11-U7-S701	Total/NA	Solid	Fill_Geo-21	278646
160-19923-2	TITO04-BS-FSSSU3-RSY11-U7-S702	Total/NA	Solid	Fill_Geo-21	278646
160-19923-3	TITO04-BS-FSSSU3-RSY11-U7-S703	Total/NA	Solid	Fill_Geo-21	278646
160-19923-4	TITO04-BS-FSSSU3-RSY11-U7-S704	Total/NA	Solid	Fill_Geo-21	278646
160-19923-5	TITO04-BS-FSSSU3-RSY11-U7-S705	Total/NA	Solid	Fill_Geo-21	278646
160-19923-6	TITO04-BS-FSSSU3-RSY11-U7-S706	Total/NA	Solid	Fill_Geo-21	278646
160-19923-7	TITO04-BS-FSSSU3-RSY11-U7-S707	Total/NA	Solid	Fill_Geo-21	278646
160-19923-8	TITO04-BS-FSSSU3-RSY11-U7-S708	Total/NA	Solid	Fill_Geo-21	278646
160-19923-9	TITO04-BS-FSSSU3-RSY11-U7-S709	Total/NA	Solid	Fill_Geo-21	278646
160-19923-10	TITO04-BS-FSSSU3-RSY11-U7-S710	Total/NA	Solid	Fill_Geo-21	278646
160-19923-11	TITO04-BS-FSSSU3-RSY11-U7-S711	Total/NA	Solid	Fill_Geo-21	278646
160-19923-12	TITO04-BS-FSSSU3-RSY11-U7-S712	Total/NA	Solid	Fill_Geo-21	278646
MB 160-278932/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-278932/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-19923-1 DU	TITO04-BS-FSSSU3-RSY11-U7-S701	Total/NA	Solid	Fill_Geo-21	278646

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-20016-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Elizabeth M. Hoerchler

Authorized for release by:

12/12/2016 12:19:55 PM

Elizabeth Hoerchler, Project Mgmt. Assistant

elizabeth.hoerchler@testamericainc.com

Designee for

Erika Gish, Project Manager II

(314)298-8566

erika.gish@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Job ID: 160-20016-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-20016-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Job ID: 160-20016-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 11/16/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 18.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSSSU4P1-RSY10-U9-S901 (160-20016-1), TITO04-BS-FSSSU4P1-RSY10-U9-S902 (160-20016-2), TITO04-BS-FSSSU4P1-RSY10-U9-S903 (160-20016-3), TITO04-BS-FSSSU4P1-RSY10-U9-S904 (160-20016-4), TITO04-BS-FSSSU4P1-RSY10-U9-S905 (160-20016-5), TITO04-BS-FSSSU4P1-RSY10-U9-S906 (160-20016-6), TITO04-BS-FSSSU4P1-RSY10-U9-S907 (160-20016-7), TITO04-BS-FSSSU4P1-RSY10-U9-S908 (160-20016-8), TITO04-BS-FSSSU4P1-RSY10-U9-S909 (160-20016-9), TITO04-BS-FSSSU4P1-RSY10-U9-S910 (160-20016-10), TITO04-BS-FSSSU4P1-RSY10-U9-S911 (160-20016-11) and TITO04-BS-FSSSU4P1-RSY10-U9-S912 (160-20016-12) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/16/2016, prepared on 11/17/2016 and analyzed on 12/08/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_BS_FSS_SU4_RSY10_U9_#332

Page 2 of 2

Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside FSS SU4
RSY10 USE 9 Systematic Part 1

Purchase Order #: 201455

Shipment Date: 11-15-2016

Waybill Number: 138944620199732189

Lab Destination: Earth Toxics Inc To Test America

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Lynn Caragan

Phone/Fax Number: 714-669-7022

Address: lynn.caragan@cbifederalservices.com Contact Name / ph. #: Mike Dryden

City:

Sampler's Name(s): D. Fields

Collection Information

Sample ID Number	Sample Description	Date	Time	Method	Matrix	# of containers	Container Type																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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Special Instructions:

7 days ingrown draft and follow with 21 days final

☐ 24-hr

Level Of QC Required:

I

II

III

Project Specific:

Standard TAT ☐

☐ 3-day

☐ 7-day

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

SO = Soil

GW = Ground Water

SL = Sludge

WW = Waste Water

CP = Chip Samples

A = Air

ABS=Asbestos, PO=Pipe Opening

Relinquished By:

Date: 11-15-16

Time: 1135

Received By:

Date: 11-16-16

Time: 0830

Relinquished By:

Date:

Time:

Received By:

Date:

Time:

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-20016-2

Login Number: 20016

List Number: 1

Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-20016-1	TITO04-BS-FSSSU4P1-RSY10-U9-S901	Solid	11/14/16 10:33	11/16/16 08:30
160-20016-2	TITO04-BS-FSSSU4P1-RSY10-U9-S902	Solid	11/14/16 10:33	11/16/16 08:30
160-20016-3	TITO04-BS-FSSSU4P1-RSY10-U9-S903	Solid	11/14/16 10:36	11/16/16 08:30
160-20016-4	TITO04-BS-FSSSU4P1-RSY10-U9-S904	Solid	11/14/16 10:37	11/16/16 08:30
160-20016-5	TITO04-BS-FSSSU4P1-RSY10-U9-S905	Solid	11/14/16 10:37	11/16/16 08:30
160-20016-6	TITO04-BS-FSSSU4P1-RSY10-U9-S906	Solid	11/14/16 10:39	11/16/16 08:30
160-20016-7	TITO04-BS-FSSSU4P1-RSY10-U9-S907	Solid	11/14/16 10:39	11/16/16 08:30
160-20016-8	TITO04-BS-FSSSU4P1-RSY10-U9-S908	Solid	11/14/16 10:43	11/16/16 08:30
160-20016-9	TITO04-BS-FSSSU4P1-RSY10-U9-S909	Solid	11/14/16 10:43	11/16/16 08:30
160-20016-10	TITO04-BS-FSSSU4P1-RSY10-U9-S910	Solid	11/14/16 10:46	11/16/16 08:30
160-20016-11	TITO04-BS-FSSSU4P1-RSY10-U9-S911	Solid	11/14/16 10:48	11/16/16 08:30
160-20016-12	TITO04-BS-FSSSU4P1-RSY10-U9-S912	Solid	11/14/16 10:50	11/16/16 08:30

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S901

Lab Sample ID: 160-20016-1

Date Collected: 11/14/16 10:33

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.346		0.109	0.115		0.0648	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Actinium-227	0.0471	U	0.584	0.584		1.00	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Bismuth-212	0.185	U	0.474	0.474		0.820	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Bismuth-214	0.247		0.0900	0.0936		0.0947	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Cesium-137	0.0164	U	0.0360	0.0361		0.0621	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Lead-210	-0.595	U	1.17	1.17		1.97	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Lead-212	0.298		0.0638	0.0746		0.0672	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Lead-214	0.348		0.0731	0.0816		0.0827	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Potassium-40	10.9		1.27	1.69		0.565	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Protactinium-231	0.000	U	0.336	0.336		3.30	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Radium-226	0.247		0.0900	0.0936	0.500	0.0947	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Radium-228	0.346		0.109	0.115		0.0648	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Thallium-208	0.0776		0.0476	0.0483		0.0514	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Thorium-228	0.298		0.0638	0.0746		0.0672	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Thorium-232	0.346		0.109	0.115		0.0648	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Thorium-234	-0.505	U	1.06	1.06		1.77	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Uranium-235	0.000	U	0.0998	0.0998		0.637	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Uranium-238	-0.505	U	1.06	1.06		1.77	pCi/g	11/17/16 14:27	12/08/16 11:29	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S902

Lab Sample ID: 160-20016-2

Date Collected: 11/14/16 10:33

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0963	U	0.176	0.176		0.204	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Actinium-227	0.0613	U	0.194	0.194		0.837	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Bismuth-212	0.273	U	0.635	0.635		1.09	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Bismuth-214	0.356		0.0947	0.102		0.0682	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Cesium-137	0.0214	U	0.0477	0.0477		0.0821	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Lead-210	0.175	U	0.642	0.642		1.05	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Lead-212	0.205		0.0564	0.0623		0.0621	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Lead-214	0.322		0.0648	0.0729		0.0881	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Potassium-40	4.22		0.946	1.04		0.553	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Protactinium-231	0.000	U	0.381	0.381		2.37	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Radium-226	0.356		0.0947	0.102	0.500	0.0682	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Radium-228	0.0963	U	0.176	0.176		0.204	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Thallium-208	0.102		0.0537	0.0547		0.0577	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Thorium-228	0.205		0.0564	0.0623		0.0621	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Thorium-232	0.0963	U	0.176	0.176		0.204	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Thorium-234	-0.160	U	0.879	0.879		1.53	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Uranium-235	-0.103	U	0.329	0.329		0.553	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Uranium-238	-0.160	U	0.879	0.879		1.53	pCi/g	11/17/16 14:27	12/08/16 08:16	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S903

Lab Sample ID: 160-20016-3

Date Collected: 11/14/16 10:36

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.147	U	0.230	0.231		0.335	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Actinium-227	-0.0224	U	0.107	0.107		0.713	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Bismuth-212	-0.284	U	0.871	0.871		1.52	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Bismuth-214	0.267		0.106	0.110		0.114	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Cesium-137	0.000389	U	0.0593	0.0593		0.108	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Lead-210	2.05		1.14	1.17		1.39	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Lead-212	0.262		0.0755	0.0828		0.0818	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Lead-214	0.419		0.124	0.132		0.142	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Potassium-40	4.28		1.13	1.21		0.797	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Protactinium-231	0.327	U	0.971	0.972		3.22	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Radium-226	0.267		0.106	0.110	0.500	0.114	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Radium-228	0.147	U	0.230	0.231		0.335	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Thallium-208	0.0897		0.0698	0.0704		0.0711	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Thorium-228	0.262		0.0755	0.0828		0.0818	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Thorium-232	0.147	U	0.230	0.231		0.335	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Thorium-234	-0.0472	U	0.845	0.845		1.49	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Uranium-235	0.128	U	0.248	0.248		0.518	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Uranium-238	-0.0472	U	0.845	0.845		1.49	pCi/g	11/17/16 14:27	12/08/16 08:17	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S904

Lab Sample ID: 160-20016-4

Date Collected: 11/14/16 10:37

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.498		0.160	0.168		0.0942	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Actinium-227	0.236	U	0.544	0.544		0.781	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Bismuth-212	-0.218	U	0.741	0.741		1.29	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Bismuth-214	0.362		0.114	0.120		0.108	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Cesium-137	0.0222	U	0.0449	0.0449		0.0773	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Lead-210	0.794	U	1.23	1.23		1.62	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Lead-212	0.318		0.0808	0.0906		0.0934	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Lead-214	0.249		0.108	0.111		0.148	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Potassium-40	10.3		1.49	1.83		0.696	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Protactinium-231	0.000	U	0.642	0.642		3.59	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Radium-226	0.362		0.114	0.120	0.500	0.108	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Radium-228	0.498		0.160	0.168		0.0942	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Thallium-208	0.169		0.0578	0.0604		0.0481	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Thorium-228	0.318		0.0808	0.0906		0.0934	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Thorium-232	0.498		0.160	0.168		0.0942	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Thorium-234	-0.0685	U	0.982	0.982		1.69	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Uranium-235	0.00240	U	0.00475	0.00475		0.547	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Uranium-238	-0.0685	U	0.982	0.982		1.69	pCi/g	11/17/16 14:27	12/08/16 09:01	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S905

Lab Sample ID: 160-20016-5

Date Collected: 11/14/16 10:37

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.403		0.125	0.132		0.104	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Actinium-227	-0.381	U	0.888	0.889		1.49	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Bismuth-212	-0.0299	U	0.672	0.672		1.22	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Bismuth-214	0.315		0.102	0.107		0.0915	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Cesium-137	-0.0227	U	0.0717	0.0717		0.124	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Lead-210	-1.71	U	1.15	1.17		2.92	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Lead-212	0.206		0.0849	0.0889		0.119	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Lead-214	0.328		0.111	0.117		0.104	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Potassium-40	10.7		1.61	1.95		0.668	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Protactinium-231	0.000	U	0.164	0.164		3.80	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Radium-226	0.315		0.102	0.107	0.500	0.0915	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Radium-228	0.403		0.125	0.132		0.104	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Thallium-208	0.129		0.0655	0.0668		0.0870	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Thorium-228	0.206		0.0849	0.0889		0.119	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Thorium-232	0.403		0.125	0.132		0.104	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Thorium-234	0.0232	U	1.31	1.31		2.24	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Uranium-235	-0.0104	U	0.277	0.277		0.987	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Uranium-238	0.0232	U	1.31	1.31		2.24	pCi/g	11/17/16 14:27	12/08/16 09:02	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S906

Lab Sample ID: 160-20016-6

Date Collected: 11/14/16 10:39

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.393		0.144	0.149		0.209	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Actinium-227	0.171	U	0.447	0.447		1.19	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Bismuth-212	-0.481	U	1.01	1.01		1.70	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Bismuth-214	0.142	U	0.0868	0.0881		0.272	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Cesium-137	0.000902	U	0.0477	0.0477		0.0858	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Lead-210	1.19	U	1.31	1.32		1.73	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Lead-212	0.271		0.0761	0.0837		0.0961	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Lead-214	0.177	U	0.0605	0.0632		0.228	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Potassium-40	10.7		1.35	1.74		0.730	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Protactinium-231	-0.422	U	1.92	1.93		3.26	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Radium-226	0.142	U	0.0868	0.0881	0.500	0.272	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Radium-228	0.393		0.144	0.149		0.209	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Thallium-208	0.158		0.0497	0.0524		0.0450	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Thorium-228	0.271		0.0761	0.0837		0.0961	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Thorium-232	0.393		0.144	0.149		0.209	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Thorium-234	1.38		0.898	0.909		1.17	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Uranium-235	-0.167	U	0.492	0.492		0.821	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Uranium-238	1.38		0.898	0.909		1.17	pCi/g	11/17/16 14:27	12/08/16 09:03	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S907

Lab Sample ID: 160-20016-7

Date Collected: 11/14/16 10:39

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.375		0.133	0.138		0.0846	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Actinium-227	-0.180	U	0.662	0.662		0.955	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Bismuth-212	0.260	U	0.609	0.610		1.05	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Bismuth-214	0.153	U	0.0971	0.0984		0.413	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Cesium-137	0.0198	U	0.0435	0.0436		0.0752	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Lead-210	0.0878	U	1.44	1.44		2.09	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Lead-212	0.328		0.0798	0.0904		0.0905	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Lead-214	0.385		0.100	0.108		0.127	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Potassium-40	11.7		1.49	1.91		0.666	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Protactinium-231	0.000	U	0.327	0.327		3.32	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Radium-226	0.153	U	0.0971	0.0984	0.500	0.413	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Radium-228	0.375		0.133	0.138		0.0846	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Thallium-208	0.170		0.0592	0.0618		0.0523	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Thorium-228	0.328		0.0798	0.0904		0.0905	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Thorium-232	0.375		0.133	0.138		0.0846	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Thorium-234	0.439	U	0.951	0.952		1.59	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Uranium-235	0.0415	U	0.279	0.279		0.443	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Uranium-238	0.439	U	0.951	0.952		1.59	pCi/g	11/17/16 14:27	12/08/16 09:29	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S908

Lab Sample ID: 160-20016-8

Date Collected: 11/14/16 10:43

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.322		0.160	0.164		0.261	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Actinium-227	0.302	U	0.657	0.658		1.10	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Bismuth-212	-0.288	U	0.820	0.820		1.41	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Bismuth-214	0.314		0.111	0.115		0.106	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Cesium-137	-0.0571	U	0.0482	0.0485		0.131	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Lead-210	-0.773	U	1.68	1.68		2.82	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Lead-212	0.341		0.0736	0.0858		0.0698	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Lead-214	0.183		0.111	0.112		0.166	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Potassium-40	11.1		1.55	1.92		0.570	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Protactinium-231	0.000	U	0.335	0.335		4.00	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Radium-226	0.314		0.111	0.115	0.500	0.106	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Radium-228	0.322		0.160	0.164		0.261	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Thallium-208	0.107		0.0455	0.0469		0.0461	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Thorium-228	0.341		0.0736	0.0858		0.0698	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Thorium-232	0.322		0.160	0.164		0.261	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Thorium-234	-1.40	U	0.734	0.748		2.49	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Uranium-235	-0.0367	U	0.350	0.350		0.600	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Uranium-238	-1.40	U	0.734	0.748		2.49	pCi/g	11/17/16 14:27	12/08/16 09:05	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S909

Lab Sample ID: 160-20016-9

Date Collected: 11/14/16 10:43

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.533		0.157	0.166		0.0884	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Actinium-227	-0.256	U	0.669	0.669		1.13	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Bismuth-212	0.000	U	0.452	0.452		0.979	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Bismuth-214	0.390		0.0972	0.105		0.0699	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Cesium-137	0.0210	U	0.0430	0.0431		0.0741	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Lead-210	0.876	U	0.841	0.848		1.21	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Lead-212	0.276		0.0744	0.0825		0.0928	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Lead-214	0.380		0.0791	0.0884		0.0702	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Potassium-40	11.7		1.56	1.97		0.567	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Protactinium-231	0.000	U	0.411	0.411		2.86	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Radium-226	0.390		0.0972	0.105	0.500	0.0699	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Radium-228	0.533		0.157	0.166		0.0884	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Thallium-208	0.109		0.0411	0.0426		0.0379	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Thorium-228	0.276		0.0744	0.0825		0.0928	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Thorium-232	0.533		0.157	0.166		0.0884	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Thorium-234	-0.0843	U	0.858	0.858		1.49	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Uranium-235	0.145	U	0.281	0.281		0.576	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Uranium-238	-0.0843	U	0.858	0.858		1.49	pCi/g	11/17/16 14:27	12/08/16 09:06	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S910

Lab Sample ID: 160-20016-10

Date Collected: 11/14/16 10:46

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.401		0.180	0.185		0.212	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Actinium-227	0.0915	U	0.289	0.289		0.939	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Bismuth-212	0.217	U	0.900	0.900		1.59	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Bismuth-214	0.483		0.139	0.147		0.123	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Cesium-137	-0.0367	U	0.0879	0.0880		0.132	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Lead-210	0.829	U	1.29	1.30		1.79	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Lead-212	0.270		0.0918	0.0982		0.117	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Lead-214	0.345		0.111	0.117		0.150	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Potassium-40	12.6		1.94	2.33		0.862	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Protactinium-231	0.362	U	1.05	1.05		3.57	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Radium-226	0.483		0.139	0.147	0.500	0.123	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Radium-228	0.401		0.180	0.185		0.212	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Thallium-208	0.169		0.0579	0.0605		0.0472	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Thorium-228	0.270		0.0918	0.0982		0.117	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Thorium-232	0.401		0.180	0.185		0.212	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Thorium-234	-0.0283	U	0.0912	0.0912		1.91	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Uranium-235	0.0272	U	0.0654	0.0655		0.626	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Uranium-238	-0.0283	U	0.0912	0.0912		1.91	pCi/g	11/17/16 14:27	12/08/16 09:07	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S911

Lab Sample ID: 160-20016-11

Date Collected: 11/14/16 10:48

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.266		0.190	0.192		0.198	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Actinium-227	0.252	U	0.550	0.550		0.925	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Bismuth-212	-0.454	U	0.889	0.890		1.49	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Bismuth-214	0.327		0.0927	0.0988		0.0868	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Cesium-137	0.0135	U	0.0268	0.0268		0.0333	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Lead-210	0.532	U	1.18	1.18		1.99	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Lead-212	0.333		0.0733	0.0850		0.0832	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Lead-214	0.340		0.0805	0.0879		0.0787	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Potassium-40	10.7		1.30	1.69		0.602	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Protactinium-231	0.000	U	0.430	0.430		3.44	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Radium-226	0.327		0.0927	0.0988	0.500	0.0868	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Radium-228	0.266		0.190	0.192		0.198	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Thallium-208	0.139		0.0471	0.0493		0.0354	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Thorium-228	0.333		0.0733	0.0850		0.0832	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Thorium-232	0.266		0.190	0.192		0.198	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Thorium-234	0.455	U	0.986	0.987		1.65	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Uranium-235	-0.0200	U	0.0335	0.0336		0.714	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Uranium-238	0.455	U	0.986	0.987		1.65	pCi/g	11/17/16 14:27	12/08/16 09:32	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S912

Lab Sample ID: 160-20016-12

Date Collected: 11/14/16 10:50

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.162	U	0.199	0.199		0.276	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Actinium-227	0.242	U	0.741	0.741		1.25	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Bismuth-212	0.388	U	0.887	0.888		1.51	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Bismuth-214	0.117	U	0.0739	0.0749		0.426	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Cesium-137	-0.0521	U	0.0525	0.0528		0.114	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Lead-210	1.28	U	1.18	1.19		1.68	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Lead-212	0.318		0.0784	0.0886		0.0867	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Lead-214	0.396		0.110	0.117		0.129	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Potassium-40	11.1		1.42	1.82		0.337	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Protactinium-231	0.000	U	0.517	0.517		3.75	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Radium-226	0.117	U	0.0739	0.0749	0.500	0.426	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Radium-228	0.162	U	0.199	0.199		0.276	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Thallium-208	0.127		0.0525	0.0541		0.0522	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Thorium-228	0.318		0.0784	0.0886		0.0867	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Thorium-232	0.162	U	0.199	0.199		0.276	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Thorium-234	0.635	U	1.04	1.04		1.45	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Uranium-235	0.0710	U	0.209	0.209		0.545	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Uranium-238	0.635	U	1.04	1.04		1.45	pCi/g	11/17/16 14:27	12/08/16 09:33	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-279954/1-A
Matrix: Solid
Analysis Batch: 283015

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 279954

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.1458	U	0.215	0.215		0.215	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Actinium-227	-0.2960	U	0.922	0.922		1.57	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Bismuth-212	-0.008851	U	0.812	0.812		1.48	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Bismuth-214	-0.08691	U	0.108	0.108		0.247	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Cesium-137	-0.01070	U	0.0498	0.0498		0.0948	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Lead-210	0.7012	U	1.33	1.33		2.04	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Lead-212	0.1202	U	0.0918	0.0931		0.142	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Lead-214	-0.1269	U	0.116	0.117		0.205	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Potassium-40	0.4483	U	0.339	0.342		0.472	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Protactinium-231	0.6232	U	2.11	2.11		3.61	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Radium-226	-0.08691	U	0.108	0.108	0.500	0.247	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Radium-228	0.1458	U	0.215	0.215		0.215	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Thallium-208	0.01752	U	0.0257	0.0257		0.0945	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Thorium-228	0.1202	U	0.0918	0.0931		0.142	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Thorium-232	0.1458	U	0.215	0.215		0.215	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Thorium-234	0.4965	U	1.13	1.13		1.66	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Uranium-235	0.1218	U	0.285	0.286		0.485	pCi/g	11/17/16 14:27	12/08/16 08:57	1
Uranium-238	0.4965	U	1.13	1.13		1.66	pCi/g	11/17/16 14:27	12/08/16 08:57	1

Lab Sample ID: LCS 160-279954/2-A
Matrix: Solid
Analysis Batch: 283016

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 279954

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	101.1		10.6		1.20	pCi/g	104	87 - 116
Cesium-137	29.3	29.29		3.12		0.256	pCi/g	100	87 - 120
Cobalt-60	16.0	15.57		1.62		0.139	pCi/g	97	87 - 115

Lab Sample ID: 160-20016-1 DU
Matrix: Solid
Analysis Batch: 283295

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S901
Prep Type: Total/NA
Prep Batch: 279954

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.346		0.3424		0.111		0.103	pCi/g	0.02	1
Actinium-227	0.0471	U	-0.3076	U	0.749		1.26	pCi/g	0.27	1
Bismuth-212	0.185	U	-0.03717	U	0.567		1.03	pCi/g	0.21	1
Bismuth-214	0.247		0.2541		0.111		0.113	pCi/g	0.03	1
Cesium-137	0.0164	U	0.01150	U	0.0315		0.0556	pCi/g	0.07	1
Lead-210	-0.595	U	0.4357	U	1.19		1.72	pCi/g	0.44	1
Lead-212	0.298		0.2711		0.0809		0.0889	pCi/g	0.17	1
Lead-214	0.348		0.2971		0.0917		0.0946	pCi/g	0.29	1
Potassium-40	10.9		11.39		1.79		0.471	pCi/g	0.13	1
Protactinium-231	0.000	U	0.000000	U	2.04		3.49	pCi/g	0	1
Radium-226	0.247		0.2541		0.111	0.500	0.113	pCi/g	0.03	1
Radium-228	0.346		0.3424		0.111		0.103	pCi/g	0.02	1

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QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-20016-1 DU

Matrix: Solid

Analysis Batch: 283295

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S901

Prep Type: Total/NA

Prep Batch: 279954

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.0776		0.1235		0.0485		0.0448	pCi/g	0.47	1
Thorium-228	0.298		0.2711		0.0809		0.0889	pCi/g	0.17	1
Thorium-232	0.346		0.3424		0.111		0.103	pCi/g	0.02	1
Thorium-234	-0.505	U	0.4313	U	0.206		2.28	pCi/g	0.74	1
Uranium-235	0.000	U	-0.08736	U	0.235		0.864	pCi/g	0.26	1
Uranium-238	-0.505	U	0.4313	U	0.206		2.28	pCi/g	0.74	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Rad

Leach Batch: 279620

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20016-1	TITO04-BS-FSSSU4P1-RSY10-U9-S901	Total/NA	Solid	Dry and Grind	
160-20016-2	TITO04-BS-FSSSU4P1-RSY10-U9-S902	Total/NA	Solid	Dry and Grind	
160-20016-3	TITO04-BS-FSSSU4P1-RSY10-U9-S903	Total/NA	Solid	Dry and Grind	
160-20016-4	TITO04-BS-FSSSU4P1-RSY10-U9-S904	Total/NA	Solid	Dry and Grind	
160-20016-5	TITO04-BS-FSSSU4P1-RSY10-U9-S905	Total/NA	Solid	Dry and Grind	
160-20016-6	TITO04-BS-FSSSU4P1-RSY10-U9-S906	Total/NA	Solid	Dry and Grind	
160-20016-7	TITO04-BS-FSSSU4P1-RSY10-U9-S907	Total/NA	Solid	Dry and Grind	
160-20016-8	TITO04-BS-FSSSU4P1-RSY10-U9-S908	Total/NA	Solid	Dry and Grind	
160-20016-9	TITO04-BS-FSSSU4P1-RSY10-U9-S909	Total/NA	Solid	Dry and Grind	
160-20016-10	TITO04-BS-FSSSU4P1-RSY10-U9-S910	Total/NA	Solid	Dry and Grind	
160-20016-11	TITO04-BS-FSSSU4P1-RSY10-U9-S911	Total/NA	Solid	Dry and Grind	
160-20016-12	TITO04-BS-FSSSU4P1-RSY10-U9-S912	Total/NA	Solid	Dry and Grind	
160-20016-1 DU	TITO04-BS-FSSSU4P1-RSY10-U9-S901	Total/NA	Solid	Dry and Grind	

Prep Batch: 279954

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20016-1	TITO04-BS-FSSSU4P1-RSY10-U9-S901	Total/NA	Solid	Fill_Geo-21	279620
160-20016-2	TITO04-BS-FSSSU4P1-RSY10-U9-S902	Total/NA	Solid	Fill_Geo-21	279620
160-20016-3	TITO04-BS-FSSSU4P1-RSY10-U9-S903	Total/NA	Solid	Fill_Geo-21	279620
160-20016-4	TITO04-BS-FSSSU4P1-RSY10-U9-S904	Total/NA	Solid	Fill_Geo-21	279620
160-20016-5	TITO04-BS-FSSSU4P1-RSY10-U9-S905	Total/NA	Solid	Fill_Geo-21	279620
160-20016-6	TITO04-BS-FSSSU4P1-RSY10-U9-S906	Total/NA	Solid	Fill_Geo-21	279620
160-20016-7	TITO04-BS-FSSSU4P1-RSY10-U9-S907	Total/NA	Solid	Fill_Geo-21	279620
160-20016-8	TITO04-BS-FSSSU4P1-RSY10-U9-S908	Total/NA	Solid	Fill_Geo-21	279620
160-20016-9	TITO04-BS-FSSSU4P1-RSY10-U9-S909	Total/NA	Solid	Fill_Geo-21	279620
160-20016-10	TITO04-BS-FSSSU4P1-RSY10-U9-S910	Total/NA	Solid	Fill_Geo-21	279620
160-20016-11	TITO04-BS-FSSSU4P1-RSY10-U9-S911	Total/NA	Solid	Fill_Geo-21	279620
160-20016-12	TITO04-BS-FSSSU4P1-RSY10-U9-S912	Total/NA	Solid	Fill_Geo-21	279620
MB 160-279954/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-279954/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-20016-1 DU	TITO04-BS-FSSSU4P1-RSY10-U9-S901	Total/NA	Solid	Fill_Geo-21	279620

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-19954-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

12/6/2016 12:05:59 PM

Micha Korinhizer, Project Management Assistant I
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Designee for

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Job ID: 160-19954-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-19954-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Job ID: 160-19954-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

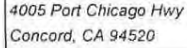
RECEIPT

The samples were received on 11/11/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 18.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSSSU4-RSY10-U8-S801 (160-19954-1), TITO04-BS-FSSSU4-RSY10-U8-S802 (160-19954-2), TITO04-BS-FSSSU4-RSY10-U8-S803 (160-19954-3), TITO04-BS-FSSSU4-RSY10-U8-S804 (160-19954-4), TITO04-BS-FSSSU4-RSY10-U8-S805 (160-19954-5), TITO04-BS-FSSSU4-RSY10-U8-S806 (160-19954-6), TITO04-BS-FSSSU4-RSY10-U8-S807 (160-19954-7), TITO04-BS-FSSSU4-RSY10-U8-S808 (160-19954-8), TITO04-BS-FSSSU4-RSY10-U8-S809 (160-19954-9), TITO04-BS-FSSSU4-RSY10-U8-S810 (160-19954-10), TITO04-BS-FSSSU4-RSY10-U8-S811 (160-19954-11), TITO04-BS-FSSSU4-RSY10-U8-S812 (160-19954-12), TITO04-BS-FSSSU4-RSY10-U8-S813 (160-19954-13), TITO04-BS-FSSSU4-RSY10-U8-S814 (160-19954-14), TITO04-BS-FSSSU4-RSY10-U8-S815 (160-19954-15), TITO04-BS-FSSSU4-RSY10-U8-S816 (160-19954-16), TITO04-BS-FSSSU4-RSY10-U8-S817 (160-19954-17), TITO04-BS-FSSSU4-RSY10-U8-S818 (160-19954-18), TITO04-BS-FSSSU4-RSY10-U8-S819 (160-19954-19) and TITO04-BS-FSSSU4-RSY10-U8-S820 (160-19954-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/11/2016, prepared on 11/14/2016 and analyzed on 12/05/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Page 1 of 2

CP = Chip Samples



Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-19954-2

Login Number: 19954

List Number: 1

Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-19954-1	TITO04-BS-FSSSU4-RSY10-U8-S801	Solid	11/09/16 09:33	11/11/16 08:30
160-19954-2	TITO04-BS-FSSSU4-RSY10-U8-S802	Solid	11/09/16 09:31	11/11/16 08:30
160-19954-3	TITO04-BS-FSSSU4-RSY10-U8-S803	Solid	11/09/16 09:36	11/11/16 08:30
160-19954-4	TITO04-BS-FSSSU4-RSY10-U8-S804	Solid	11/09/16 09:40	11/11/16 08:30
160-19954-5	TITO04-BS-FSSSU4-RSY10-U8-S805	Solid	11/09/16 09:44	11/11/16 08:30
160-19954-6	TITO04-BS-FSSSU4-RSY10-U8-S806	Solid	11/09/16 09:48	11/11/16 08:30
160-19954-7	TITO04-BS-FSSSU4-RSY10-U8-S807	Solid	11/09/16 09:58	11/11/16 08:30
160-19954-8	TITO04-BS-FSSSU4-RSY10-U8-S808	Solid	11/09/16 10:01	11/11/16 08:30
160-19954-9	TITO04-BS-FSSSU4-RSY10-U8-S809	Solid	11/09/16 10:04	11/11/16 08:30
160-19954-10	TITO04-BS-FSSSU4-RSY10-U8-S810	Solid	11/09/16 10:09	11/11/16 08:30
160-19954-11	TITO04-BS-FSSSU4-RSY10-U8-S811	Solid	11/09/16 10:01	11/11/16 08:30
160-19954-12	TITO04-BS-FSSSU4-RSY10-U8-S812	Solid	11/09/16 10:03	11/11/16 08:30
160-19954-13	TITO04-BS-FSSSU4-RSY10-U8-S813	Solid	11/09/16 10:03	11/11/16 08:30
160-19954-14	TITO04-BS-FSSSU4-RSY10-U8-S814	Solid	11/09/16 10:09	11/11/16 08:30
160-19954-15	TITO04-BS-FSSSU4-RSY10-U8-S815	Solid	11/09/16 10:11	11/11/16 08:30
160-19954-16	TITO04-BS-FSSSU4-RSY10-U8-S816	Solid	11/09/16 10:12	11/11/16 08:30
160-19954-17	TITO04-BS-FSSSU4-RSY10-U8-S817	Solid	11/09/16 10:06	11/11/16 08:30
160-19954-18	TITO04-BS-FSSSU4-RSY10-U8-S818	Solid	11/09/16 10:08	11/11/16 08:30
160-19954-19	TITO04-BS-FSSSU4-RSY10-U8-S819	Solid	11/09/16 10:10	11/11/16 08:30
160-19954-20	TITO04-BS-FSSSU4-RSY10-U8-S820	Solid	11/09/16 10:09	11/11/16 08:30

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S801

Lab Sample ID: 160-19954-1

Date Collected: 11/09/16 09:33

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.308		0.189	0.191		0.193	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Actinium-227	0.00953	U	0.533	0.533		0.917	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Bismuth-212	0.169	U	0.453	0.453		0.784	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Bismuth-214	0.283		0.0867	0.0916		0.0826	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Cesium-137	-0.0352	U	0.0543	0.0545		0.0907	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Lead-210	-0.533	U	0.990	0.992		1.66	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Lead-212	0.297		0.0608	0.0720		0.0639	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Lead-214	0.259		0.0750	0.0796		0.0780	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Potassium-40	9.78		1.14	1.52		0.470	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Protactinium-231	-0.196	U	1.78	1.78		3.01	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Radium-226	0.283		0.0867	0.0916	0.500	0.0826	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Radium-228	0.308		0.189	0.191		0.193	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Thallium-208	0.0660		0.0504	0.0509		0.0540	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Thorium-228	0.297		0.0608	0.0720		0.0639	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Thorium-232	0.308		0.189	0.191		0.193	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Thorium-234	0.433	U	0.919	0.920		1.54	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Uranium-235	0.176	U	0.314	0.314		0.703	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Uranium-238	0.433	U	0.919	0.920		1.54	pCi/g	11/14/16 10:15	12/05/16 13:44	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S802

Lab Sample ID: 160-19954-2

Date Collected: 11/09/16 09:31

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.499		0.179	0.186		0.197	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Actinium-227	-0.290	U	0.662	0.663		0.943	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Bismuth-212	-0.0248	U	0.722	0.722		1.29	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Bismuth-214	0.319		0.0986	0.104		0.0949	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Cesium-137	-0.0143	U	0.0418	0.0418		0.0736	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Lead-210	-0.371	U	1.23	1.23		1.87	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Lead-212	0.199		0.0822	0.0862		0.118	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Lead-214	0.407		0.0958	0.105		0.0795	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Potassium-40	9.86		1.39	1.72		0.634	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Protactinium-231	0.485	U	1.07	1.07		2.51	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Radium-226	0.319		0.0986	0.104	0.500	0.0949	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Radium-228	0.499		0.179	0.186		0.197	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Thallium-208	0.0770	U	0.0671	0.0675		0.0905	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Thorium-228	0.199		0.0822	0.0862		0.118	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Thorium-232	0.499		0.179	0.186		0.197	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Thorium-234	0.760	U	0.668	0.673		0.960	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Uranium-235	-0.143	U	0.207	0.207		0.573	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Uranium-238	0.760	U	0.668	0.673		0.960	pCi/g	11/14/16 10:15	12/05/16 13:41	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S803

Lab Sample ID: 160-19954-3

Date Collected: 11/09/16 09:36

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.413		0.111	0.119		0.0951	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Actinium-227	0.284	U	0.632	0.633		1.06	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Bismuth-212	0.217	U	0.455	0.456		0.794	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Bismuth-214	0.248		0.0981	0.101		0.101	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Cesium-137	-0.0106	U	0.0600	0.0600		0.106	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Lead-210	-0.248	U	1.39	1.39		2.40	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Lead-212	0.224		0.0713	0.0770		0.0887	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Lead-214	0.288		0.106	0.110		0.154	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Potassium-40	11.5		1.59	1.97		0.610	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Protactinium-231	0.000	U	0.259	0.259		3.20	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Radium-226	0.248		0.0981	0.101	0.500	0.101	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Radium-228	0.413		0.111	0.119		0.0951	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Thallium-208	0.104		0.0432	0.0445		0.0429	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Thorium-228	0.224		0.0713	0.0770		0.0887	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Thorium-232	0.413		0.111	0.119		0.0951	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Thorium-234	1.65		0.711	0.731		0.850	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Uranium-235	-0.00951	U	0.611	0.611		0.864	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Uranium-238	1.65		0.711	0.731		0.850	pCi/g	11/14/16 10:15	12/05/16 13:42	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S804

Lab Sample ID: 160-19954-4

Date Collected: 11/09/16 09:40

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.408		0.120	0.127		0.138	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Actinium-227	-0.369	U	0.900	0.901		1.51	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Bismuth-212	0.0171	U	0.733	0.733		1.30	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Bismuth-214	0.390		0.120	0.126		0.111	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Cesium-137	-0.0263	U	0.0564	0.0565		0.0961	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Lead-210	1.13	U	1.27	1.28		1.74	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Lead-212	0.264		0.0769	0.0841		0.0975	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Lead-214	0.381		0.106	0.113		0.102	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Potassium-40	9.84		1.33	1.67		0.760	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Protactinium-231	0.000	U	0.668	0.668		3.68	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Radium-226	0.390		0.120	0.126	0.500	0.111	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Radium-228	0.408		0.120	0.127		0.138	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Thallium-208	0.122		0.0527	0.0542		0.0551	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Thorium-228	0.264		0.0769	0.0841		0.0975	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Thorium-232	0.408		0.120	0.127		0.138	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Thorium-234	0.175	U	0.235	0.236		2.57	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Uranium-235	-0.0136	U	0.0257	0.0257		0.871	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Uranium-238	0.175	U	0.235	0.236		2.57	pCi/g	11/14/16 10:15	12/05/16 13:43	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S805

Lab Sample ID: 160-19954-5

Date Collected: 11/09/16 09:44

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.356		0.160	0.164		0.235	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Actinium-227	0.269	U	0.600	0.600		0.859	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Bismuth-212	0.000	U	0.283	0.283		1.20	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Bismuth-214	0.334		0.109	0.114		0.108	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Cesium-137	-0.0185	U	0.0431	0.0431		0.0919	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Lead-210	0.798	U	1.39	1.39		1.96	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Lead-212	0.331		0.0824	0.0929		0.0958	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Lead-214	0.395		0.109	0.117		0.117	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Potassium-40	12.3		1.53	1.98		0.675	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Protactinium-231	0.000	U	0.743	0.743		3.60	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Radium-226	0.334		0.109	0.114	0.500	0.108	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Radium-228	0.356		0.160	0.164		0.235	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Thallium-208	0.0784		0.0632	0.0637		0.0782	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Thorium-228	0.331		0.0824	0.0929		0.0958	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Thorium-232	0.356		0.160	0.164		0.235	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Thorium-234	-0.438	U	1.15	1.15		2.01	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Uranium-235	0.0358	U	0.102	0.102		0.602	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Uranium-238	-0.438	U	1.15	1.15		2.01	pCi/g	11/14/16 10:15	12/05/16 13:45	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S806

Lab Sample ID: 160-19954-6

Date Collected: 11/09/16 09:48

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.421		0.158	0.164		0.311	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Actinium-227	0.221	U	0.512	0.513		0.739	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Bismuth-212	0.425	U	0.862	0.863		1.47	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Bismuth-214	0.327		0.112	0.117		0.0993	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Cesium-137	-0.00601	U	0.0752	0.0753		0.133	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Lead-210	2.13		1.17	1.20		1.49	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Lead-212	0.177	U	0.123	0.125		0.194	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Lead-214	0.403		0.112	0.120		0.110	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Potassium-40	10.5		1.56	1.89		0.743	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Protactinium-231	0.485	U	1.32	1.32		2.94	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Radium-226	0.327		0.112	0.117	0.500	0.0993	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Radium-228	0.421		0.158	0.164		0.311	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Thallium-208	0.164		0.0475	0.0505		0.0241	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Thorium-228	0.177	U	0.123	0.125		0.194	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Thorium-232	0.421		0.158	0.164		0.311	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Thorium-234	-0.0660	U	1.24	1.24		2.12	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Uranium-235	0.0940	U	0.327	0.327		0.554	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Uranium-238	-0.0660	U	1.24	1.24		2.12	pCi/g	11/14/16 10:15	12/05/16 14:40	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S807

Lab Sample ID: 160-19954-7

Date Collected: 11/09/16 09:58

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.511		0.168	0.176		0.102	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Actinium-227	0.0743	U	0.208	0.209		1.24	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Bismuth-212	0.000	U	0.429	0.429		1.20	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Bismuth-214	0.462		0.130	0.139		0.110	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Cesium-137	0.0318	U	0.0572	0.0573		0.0972	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Lead-210	0.307	U	1.46	1.46		2.46	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Lead-212	0.236		0.0797	0.0854		0.104	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Lead-214	0.377		0.106	0.113		0.0945	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Potassium-40	10.5		1.57	1.90		0.653	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Protactinium-231	-0.867	U	2.79	2.79		4.69	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Radium-226	0.462		0.130	0.139	0.500	0.110	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Radium-228	0.511		0.168	0.176		0.102	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Thallium-208	0.145		0.0601	0.0619		0.0618	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Thorium-228	0.236		0.0797	0.0854		0.104	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Thorium-232	0.511		0.168	0.176		0.102	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Thorium-234	-0.861	U	0.797	0.802		2.74	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Uranium-235	0.163	U	0.280	0.281		0.460	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Uranium-238	-0.861	U	0.797	0.802		2.74	pCi/g	11/14/16 10:15	12/05/16 14:41	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S808

Lab Sample ID: 160-19954-8

Date Collected: 11/09/16 10:01

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.459		0.137	0.145		0.0752	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Actinium-227	-0.321	U	0.760	0.761		1.27	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Bismuth-212	0.256	U	0.421	0.422		0.714	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Bismuth-214	0.323		0.133	0.137		0.135	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Cesium-137	0.0217	U	0.0459	0.0459		0.0786	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Lead-210	1.01	U	1.32	1.32		1.79	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Lead-212	0.286		0.0754	0.0840		0.0917	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Lead-214	0.322		0.101	0.106		0.108	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Potassium-40	10.5		1.35	1.72		0.738	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Protactinium-231	0.646	U	1.43	1.43		3.28	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Radium-226	0.323		0.133	0.137	0.500	0.135	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Radium-228	0.459		0.137	0.145		0.0752	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Thallium-208	0.115		0.0528	0.0541		0.0582	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Thorium-228	0.286		0.0754	0.0840		0.0917	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Thorium-232	0.459		0.137	0.145		0.0752	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Thorium-234	-0.197	U	1.21	1.21		2.07	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Uranium-235	-0.181	U	0.500	0.500		0.835	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Uranium-238	-0.197	U	1.21	1.21		2.07	pCi/g	11/14/16 10:15	12/05/16 14:43	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S809

Lab Sample ID: 160-19954-9

Date Collected: 11/09/16 10:04

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.206	U	0.213	0.214		0.233	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Actinium-227	0.0807	U	0.605	0.605		0.885	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Bismuth-212	0.479	U	1.04	1.04		1.75	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Bismuth-214	0.374		0.125	0.131		0.109	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Cesium-137	0.0284	U	0.0511	0.0512		0.0866	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-210	-0.924	U	1.54	1.55		2.41	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-212	0.250		0.0780	0.0844		0.0998	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-214	0.331		0.0884	0.0948		0.0971	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Potassium-40	11.8		1.50	1.92		0.670	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Protactinium-231	0.000	U	0.330	0.330		3.21	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Radium-226	0.374		0.125	0.131	0.500	0.109	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Radium-228	0.206	U	0.213	0.214		0.233	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thallium-208	0.0876		0.0436	0.0445		0.0478	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-228	0.250		0.0780	0.0844		0.0998	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-232	0.206	U	0.213	0.214		0.233	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-234	-0.550	U	1.09	1.09		1.92	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Uranium-235	-0.216	U	0.327	0.328		0.661	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Uranium-238	-0.550	U	1.09	1.09		1.92	pCi/g	11/14/16 10:15	12/05/16 14:45	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S810

Lab Sample ID: 160-19954-10

Date Collected: 11/09/16 10:09

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.370		0.165	0.170		0.128	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Actinium-227	-0.387	U	0.678	0.679		1.18	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Bismuth-212	0.395	U	1.10	1.10		1.89	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Bismuth-214	0.371		0.123	0.129		0.121	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Cesium-137	0.00267	U	0.0761	0.0761		0.136	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-210	-0.140	U	1.43	1.43		2.17	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-212	0.310		0.0830	0.0922		0.0867	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-214	0.410		0.127	0.134		0.133	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Potassium-40	11.3		1.83	2.16		0.847	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Protactinium-231	0.000	U	0.278	0.278		4.06	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Radium-226	0.371		0.123	0.129	0.500	0.121	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Radium-228	0.370		0.165	0.170		0.128	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thallium-208	0.161		0.0575	0.0599		0.0464	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-228	0.310		0.0830	0.0922		0.0867	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-232	0.370		0.165	0.170		0.128	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-234	0.0144	U	1.03	1.03		1.79	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Uranium-235	0.139	U	0.292	0.292		0.523	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Uranium-238	0.0144	U	1.03	1.03		1.79	pCi/g	11/14/16 10:15	12/05/16 14:45	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S811

Lab Sample ID: 160-19954-11

Date Collected: 11/09/16 10:01

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.141	U	0.252	0.253		0.270	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Actinium-227	0.225	U	0.559	0.560		0.944	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Bismuth-212	0.0804	U	0.486	0.486		0.879	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Bismuth-214	0.324		0.0924	0.0984		0.0784	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Cesium-137	0.0294	U	0.0554	0.0555		0.0939	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Lead-210	-0.0597	U	1.11	1.11		1.92	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Lead-212	0.300		0.0686	0.0788		0.0764	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Lead-214	0.340		0.0754	0.0833		0.0916	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Potassium-40	12.0		1.53	1.96		0.541	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Protactinium-231	0.363	U	0.908	0.909		2.13	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Radium-226	0.324		0.0924	0.0984	0.500	0.0784	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Radium-228	0.141	U	0.252	0.253		0.270	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Thallium-208	0.127		0.0476	0.0494		0.0407	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Thorium-228	0.300		0.0686	0.0788		0.0764	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Thorium-232	0.141	U	0.252	0.253		0.270	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Thorium-234	1.40		0.860	0.873		1.06	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Uranium-235	0.147	U	0.110	0.111		0.158	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Uranium-238	1.40		0.860	0.873		1.06	pCi/g	11/14/16 10:15	12/05/16 14:48	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S812

Lab Sample ID: 160-19954-12

Date Collected: 11/09/16 10:03

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.271		0.217	0.219		0.234	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Actinium-227	0.288	U	0.628	0.629		1.06	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Bismuth-212	0.336	U	0.802	0.803		1.38	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Bismuth-214	0.286		0.106	0.110		0.108	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Cesium-137	-0.0231	U	0.0663	0.0663		0.123	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Lead-210	0.666	U	1.46	1.46		2.45	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Lead-212	0.374		0.0818	0.0951		0.0822	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Lead-214	0.334		0.0854	0.0922		0.117	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Potassium-40	12.1		1.67	2.08		0.607	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Protactinium-231	-0.785	U	2.68	2.69		4.52	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Radium-226	0.286		0.106	0.110	0.500	0.108	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Radium-228	0.271		0.217	0.219		0.234	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Thallium-208	0.0883	U	0.0820	0.0825		0.0982	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Thorium-228	0.374		0.0818	0.0951		0.0822	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Thorium-232	0.271		0.217	0.219		0.234	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Thorium-234	0.979	U	1.23	1.24		1.56	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Uranium-235	-0.141	U	0.175	0.176		0.761	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Uranium-238	0.979	U	1.23	1.24		1.56	pCi/g	11/14/16 10:15	12/05/16 14:50	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S813

Lab Sample ID: 160-19954-13

Date Collected: 11/09/16 10:03

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.107	U	0.207	0.207		0.382	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Actinium-227	-0.188	U	0.475	0.476		0.813	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Bismuth-212	-0.349	U	0.982	0.983		1.70	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Bismuth-214	0.401		0.136	0.143		0.138	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Cesium-137	-0.0482	U	0.0480	0.0482		0.141	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Lead-210	1.39		1.00	1.02		1.36	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Lead-212	0.312		0.0837	0.0930		0.0917	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Lead-214	0.364		0.126	0.131		0.128	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Potassium-40	11.2		1.77	2.11		0.804	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Protactinium-231	0.574	U	1.26	1.27		2.99	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Radium-226	0.401		0.136	0.143	0.500	0.138	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Radium-228	0.107	U	0.207	0.207		0.382	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Thallium-208	0.0875	U	0.0841	0.0846		0.0904	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Thorium-228	0.312		0.0837	0.0930		0.0917	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Thorium-232	0.107	U	0.207	0.207		0.382	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Thorium-234	1.58		1.04	1.06		1.29	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Uranium-235	0.00810	U	0.0139	0.0139		0.538	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Uranium-238	1.58		1.04	1.06		1.29	pCi/g	11/14/16 10:15	12/05/16 15:19	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S814

Lab Sample ID: 160-19954-14

Date Collected: 11/09/16 10:09

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.300		0.135	0.139		0.244	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Actinium-227	0.215	U	0.524	0.524		0.885	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Bismuth-212	0.265	U	0.640	0.640		1.10	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Bismuth-214	0.414		0.119	0.126		0.110	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Cesium-137	-0.0196	U	0.0530	0.0531		0.0918	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Lead-210	-0.809	U	0.928	0.932		2.49	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Lead-212	0.273		0.0736	0.0816		0.0920	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Lead-214	0.365		0.0874	0.0953		0.0779	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Potassium-40	9.75		1.41	1.73		0.556	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Protactinium-231	0.457	U	1.10	1.10		2.55	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Radium-226	0.414		0.119	0.126	0.500	0.110	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Radium-228	0.300		0.135	0.139		0.244	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Thallium-208	0.137		0.0520	0.0539		0.0482	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Thorium-228	0.273		0.0736	0.0816		0.0920	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Thorium-232	0.300		0.135	0.139		0.244	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Thorium-234	-0.0344	U	0.899	0.899		1.55	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Uranium-235	0.0868	U	0.275	0.275		0.463	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Uranium-238	-0.0344	U	0.899	0.899		1.55	pCi/g	11/14/16 10:15	12/05/16 15:21	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S815

Lab Sample ID: 160-19954-15

Date Collected: 11/09/16 10:11

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.103	U	0.229	0.229		0.349	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Actinium-227	0.354	U	0.746	0.747		1.25	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Bismuth-212	-0.726	U	1.16	1.16		1.93	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Bismuth-214	0.325		0.106	0.111		0.0934	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Cesium-137	-0.0166	U	0.0842	0.0842		0.151	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Lead-210	-0.581	U	1.47	1.47		2.48	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Lead-212	0.406		0.116	0.127		0.158	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Lead-214	0.284		0.101	0.105		0.103	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Potassium-40	10.6		1.57	1.91		0.609	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Protactinium-231	-0.888	U	2.81	2.81		4.72	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Radium-226	0.325		0.106	0.111	0.500	0.0934	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Radium-228	0.103	U	0.229	0.229		0.349	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Thallium-208	0.0407	U	0.0763	0.0764		0.0984	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Thorium-228	0.406		0.116	0.127		0.158	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Thorium-232	0.103	U	0.229	0.229		0.349	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Thorium-234	0.180	U	0.240	0.240		2.31	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Uranium-235	-0.0294	U	0.139	0.139		0.792	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Uranium-238	0.180	U	0.240	0.240		2.31	pCi/g	11/14/16 10:15	12/05/16 15:23	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S816

Lab Sample ID: 160-19954-16

Date Collected: 11/09/16 10:12

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.226		0.105	0.108		0.106	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Actinium-227	0.116	U	0.0911	0.0920		1.11	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Bismuth-212	0.000	U	0.441	0.441		1.11	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Bismuth-214	0.366		0.0940	0.101		0.0834	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Cesium-137	-0.0331	U	0.0544	0.0545		0.0911	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Lead-210	-0.670	U	1.30	1.30		2.17	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Lead-212	0.318		0.0664	0.0781		0.0694	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Lead-214	0.289		0.0859	0.0910		0.101	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Potassium-40	9.94		1.22	1.59		0.576	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Protactinium-231	0.493	U	1.30	1.30		2.96	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Radium-226	0.366		0.0940	0.101	0.500	0.0834	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Radium-228	0.226		0.105	0.108		0.106	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Thallium-208	0.127		0.0346	0.0371		0.0203	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Thorium-228	0.318		0.0664	0.0781		0.0694	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Thorium-232	0.226		0.105	0.108		0.106	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Thorium-234	0.443	U	0.954	0.956		1.60	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Uranium-235	-0.164	U	0.455	0.455		0.759	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Uranium-238	0.443	U	0.954	0.956		1.60	pCi/g	11/14/16 10:15	12/05/16 15:12	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S817

Lab Sample ID: 160-19954-17

Date Collected: 11/09/16 10:06

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.444		0.126	0.134		0.0639	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Actinium-227	0.000972	U	0.00226	0.00226		0.967	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Bismuth-212	0.220	U	0.489	0.490		0.840	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Bismuth-214	0.281		0.0882	0.0929		0.0895	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Cesium-137	0.0219	U	0.0396	0.0397		0.0672	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-210	0.539	U	1.17	1.17		1.96	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-212	0.338		0.0691	0.0818		0.0758	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-214	0.382		0.0796	0.0889		0.0977	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Potassium-40	11.6		1.28	1.75		0.505	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Protactinium-231	0.481	U	1.38	1.38		3.12	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Radium-226	0.281		0.0882	0.0929	0.500	0.0895	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Radium-228	0.444		0.126	0.134		0.0639	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thallium-208	0.122		0.0407	0.0426		0.0325	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-228	0.338		0.0691	0.0818		0.0758	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-232	0.444		0.126	0.134		0.0639	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-234	-0.567	U	1.30	1.30		2.17	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Uranium-235	0.0751	U	0.187	0.188		0.613	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Uranium-238	-0.567	U	1.30	1.30		2.17	pCi/g	11/14/16 10:15	12/05/16 15:15	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S818

Lab Sample ID: 160-19954-18

Date Collected: 11/09/16 10:08

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.289		0.205	0.207		0.216	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Actinium-227	-0.250	U	0.609	0.610		0.873	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Bismuth-212	-0.0136	U	0.616	0.616		1.12	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Bismuth-214	0.319		0.126	0.130		0.134	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Cesium-137	-0.0313	U	0.0579	0.0580		0.0983	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-210	0.365	U	1.20	1.20		1.78	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-212	0.172		0.0785	0.0816		0.113	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-214	0.280		0.0910	0.0955		0.122	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Potassium-40	9.68		1.45	1.76		0.695	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Protactinium-231	-0.104	U	2.00	2.00		3.42	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Radium-226	0.319		0.126	0.130	0.500	0.134	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Radium-228	0.289		0.205	0.207		0.216	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thallium-208	0.107		0.0486	0.0499		0.0454	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-228	0.172		0.0785	0.0816		0.113	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-232	0.289		0.205	0.207		0.216	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-234	0.413	U	1.13	1.13		1.63	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Uranium-235	0.0893	U	0.299	0.299		0.507	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Uranium-238	0.413	U	1.13	1.13		1.63	pCi/g	11/14/16 10:15	12/05/16 15:15	1

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Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S819

Lab Sample ID: 160-19954-19

Date Collected: 11/09/16 10:10

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.153	U	0.0769	0.0785		0.386	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Actinium-227	0.292	U	0.429	0.430		1.20	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Bismuth-212	0.000	U	0.231	0.231		1.41	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Bismuth-214	0.385		0.127	0.133		0.117	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Cesium-137	0.0180	U	0.0784	0.0785		0.137	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Lead-210	-0.269	U	1.43	1.43		2.48	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Lead-212	0.307		0.0905	0.0988		0.113	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Lead-214	0.375		0.114	0.120		0.142	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Potassium-40	12.2		1.76	2.16		0.702	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Protactinium-231	0.000	U	0.827	0.827		4.45	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Radium-226	0.385		0.127	0.133	0.500	0.117	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Radium-228	0.153	U	0.0769	0.0785		0.386	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Thallium-208	0.145		0.0491	0.0514		0.0400	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Thorium-228	0.307		0.0905	0.0988		0.113	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Thorium-232	0.153	U	0.0769	0.0785		0.386	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Thorium-234	0.634	U	0.479	0.484		1.41	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Uranium-235	-0.124	U	0.495	0.495		0.674	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Uranium-238	0.634	U	0.479	0.484		1.41	pCi/g	11/14/16 10:15	12/05/16 15:16	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S820

Lab Sample ID: 160-19954-20

Date Collected: 11/09/16 10:09

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.336		0.194	0.197		0.195	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Actinium-227	0.131	U	0.528	0.528		0.901	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Bismuth-212	0.332	U	0.559	0.560		0.941	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Bismuth-214	0.349		0.123	0.128		0.122	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Cesium-137	0.0230	U	0.0440	0.0440		0.0747	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Lead-210	0.416	U	1.21	1.21		2.05	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Lead-212	0.365		0.0704	0.0848		0.0701	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Lead-214	0.417		0.0954	0.105		0.0869	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Potassium-40	11.3		1.32	1.76		0.594	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Protactinium-231	0.000	U	0.734	0.734		3.70	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Radium-226	0.349		0.123	0.128	0.500	0.122	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Radium-228	0.336		0.194	0.197		0.195	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Thallium-208	0.0982		0.0726	0.0733		0.0591	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Thorium-228	0.365		0.0704	0.0848		0.0701	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Thorium-232	0.336		0.194	0.197		0.195	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Thorium-234	0.491	U	1.06	1.06		1.77	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Uranium-235	0.0671	U	0.316	0.316		0.596	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Uranium-238	0.491	U	1.06	1.06		1.77	pCi/g	11/14/16 10:15	12/05/16 15:56	1

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QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-279156/1-A
Matrix: Solid
Analysis Batch: 282663

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 279156

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.004589	U	0.00929	0.00931		0.320	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Actinium-227	-0.3669	U	0.854	0.855		1.44	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Bismuth-212	-0.2972	U	0.877	0.878		1.16	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Bismuth-214	-0.1118	U	0.142	0.142		0.415	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Cesium-137	0.01431	U	0.0605	0.0605		0.0783	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Lead-210	-0.9754	U	1.49	1.50		2.70	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Lead-212	-0.01496	U	0.0815	0.0815		0.146	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Lead-214	-0.08023	U	0.133	0.133		0.206	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Potassium-40	0.1885	U	0.736	0.736		0.965	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Protactinium-231	0.0000	U	0.261	0.261		3.34	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Radium-226	-0.1118	U	0.142	0.142	0.500	0.415	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Radium-228	0.004589	U	0.00929	0.00931		0.320	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Thallium-208	0.01250	U	0.0279	0.0279		0.0873	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Thorium-228	-0.01496	U	0.0815	0.0815		0.146	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Thorium-232	0.004589	U	0.00929	0.00931		0.320	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Thorium-234	-0.9265	U	1.26	1.26		2.17	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Uranium-235	-0.1801	U	0.353	0.353		0.655	pCi/g	11/14/16 10:15	12/06/16 02:58	1
Uranium-238	-0.9265	U	1.26	1.26		2.17	pCi/g	11/14/16 10:15	12/06/16 02:58	1

Lab Sample ID: LCS 160-279156/2-A
Matrix: Solid
Analysis Batch: 282239

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 279156

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	99.46		10.4		1.09	pCi/g	102	87 - 116
Cesium-137	29.3	29.32		3.13		0.257	pCi/g	100	87 - 120
Cobalt-60	16.1	15.89		1.65		0.111	pCi/g	99	87 - 115

Lab Sample ID: 160-19954-1 DU
Matrix: Solid
Analysis Batch: 282236

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S801
Prep Type: Total/NA
Prep Batch: 279156

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.308		0.03225	U	0.126		0.352	pCi/g	0.87	1
Actinium-227	0.00953	U	-0.2269	U	0.714		1.20	pCi/g	0.19	1
Bismuth-212	0.169	U	0.3915	U	0.650		1.09	pCi/g	0.20	1
Bismuth-214	0.283		0.3716		0.116		0.0931	pCi/g	0.43	1
Cesium-137	-0.0352	U	-0.00730	U	0.0515		0.0907	pCi/g	0.26	1
Lead-210	-0.533	U	0.7931	U	1.05		1.50	pCi/g	0.65	1
Lead-212	0.297		0.3435		0.0937		0.101	pCi/g	0.28	1
Lead-214	0.259		0.3518		0.0962		0.0986	pCi/g	0.53	1
Potassium-40	9.78		9.749		1.62		0.714	pCi/g	0.01	1
Protactinium-231	-0.196	U	0.5933	U	1.32		3.03	pCi/g	0.25	1
Radium-226	0.283		0.3716		0.116	0.500	0.0931	pCi/g	0.43	1
Radium-228	0.308		0.03225	U	0.126		0.352	pCi/g	0.87	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-19954-1 DU

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S801

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 282236

Prep Batch: 279156

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.0660		0.1360		0.0480		0.0468	pCi/g	0.71	1
Thorium-228	0.297		0.3435		0.0937		0.101	pCi/g	0.28	1
Thorium-232	0.308		0.03225	U	0.126		0.352	pCi/g	0.87	1
Thorium-234	0.433	U	0.2974	U	0.282		2.18	pCi/g	0.11	1
Uranium-235	0.176	U	0.0000	U	0.185		0.706	pCi/g	0.35	1
Uranium-238	0.433	U	0.2974	U	0.282		2.18	pCi/g	0.11	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Rad

Leach Batch: 278921

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19954-1	TITO04-BS-FSSSU4-RSY10-U8-S801	Total/NA	Solid	Dry and Grind	
160-19954-2	TITO04-BS-FSSSU4-RSY10-U8-S802	Total/NA	Solid	Dry and Grind	
160-19954-3	TITO04-BS-FSSSU4-RSY10-U8-S803	Total/NA	Solid	Dry and Grind	
160-19954-4	TITO04-BS-FSSSU4-RSY10-U8-S804	Total/NA	Solid	Dry and Grind	
160-19954-5	TITO04-BS-FSSSU4-RSY10-U8-S805	Total/NA	Solid	Dry and Grind	
160-19954-6	TITO04-BS-FSSSU4-RSY10-U8-S806	Total/NA	Solid	Dry and Grind	
160-19954-7	TITO04-BS-FSSSU4-RSY10-U8-S807	Total/NA	Solid	Dry and Grind	
160-19954-8	TITO04-BS-FSSSU4-RSY10-U8-S808	Total/NA	Solid	Dry and Grind	
160-19954-9	TITO04-BS-FSSSU4-RSY10-U8-S809	Total/NA	Solid	Dry and Grind	
160-19954-10	TITO04-BS-FSSSU4-RSY10-U8-S810	Total/NA	Solid	Dry and Grind	
160-19954-11	TITO04-BS-FSSSU4-RSY10-U8-S811	Total/NA	Solid	Dry and Grind	
160-19954-12	TITO04-BS-FSSSU4-RSY10-U8-S812	Total/NA	Solid	Dry and Grind	
160-19954-13	TITO04-BS-FSSSU4-RSY10-U8-S813	Total/NA	Solid	Dry and Grind	
160-19954-14	TITO04-BS-FSSSU4-RSY10-U8-S814	Total/NA	Solid	Dry and Grind	
160-19954-15	TITO04-BS-FSSSU4-RSY10-U8-S815	Total/NA	Solid	Dry and Grind	
160-19954-16	TITO04-BS-FSSSU4-RSY10-U8-S816	Total/NA	Solid	Dry and Grind	
160-19954-17	TITO04-BS-FSSSU4-RSY10-U8-S817	Total/NA	Solid	Dry and Grind	
160-19954-18	TITO04-BS-FSSSU4-RSY10-U8-S818	Total/NA	Solid	Dry and Grind	
160-19954-19	TITO04-BS-FSSSU4-RSY10-U8-S819	Total/NA	Solid	Dry and Grind	
160-19954-20	TITO04-BS-FSSSU4-RSY10-U8-S820	Total/NA	Solid	Dry and Grind	
160-19954-1 DU	TITO04-BS-FSSSU4-RSY10-U8-S801	Total/NA	Solid	Dry and Grind	

Prep Batch: 279156

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19954-1	TITO04-BS-FSSSU4-RSY10-U8-S801	Total/NA	Solid	Fill_Geo-21	278921
160-19954-2	TITO04-BS-FSSSU4-RSY10-U8-S802	Total/NA	Solid	Fill_Geo-21	278921
160-19954-3	TITO04-BS-FSSSU4-RSY10-U8-S803	Total/NA	Solid	Fill_Geo-21	278921
160-19954-4	TITO04-BS-FSSSU4-RSY10-U8-S804	Total/NA	Solid	Fill_Geo-21	278921
160-19954-5	TITO04-BS-FSSSU4-RSY10-U8-S805	Total/NA	Solid	Fill_Geo-21	278921
160-19954-6	TITO04-BS-FSSSU4-RSY10-U8-S806	Total/NA	Solid	Fill_Geo-21	278921
160-19954-7	TITO04-BS-FSSSU4-RSY10-U8-S807	Total/NA	Solid	Fill_Geo-21	278921
160-19954-8	TITO04-BS-FSSSU4-RSY10-U8-S808	Total/NA	Solid	Fill_Geo-21	278921
160-19954-9	TITO04-BS-FSSSU4-RSY10-U8-S809	Total/NA	Solid	Fill_Geo-21	278921
160-19954-10	TITO04-BS-FSSSU4-RSY10-U8-S810	Total/NA	Solid	Fill_Geo-21	278921
160-19954-11	TITO04-BS-FSSSU4-RSY10-U8-S811	Total/NA	Solid	Fill_Geo-21	278921
160-19954-12	TITO04-BS-FSSSU4-RSY10-U8-S812	Total/NA	Solid	Fill_Geo-21	278921
160-19954-13	TITO04-BS-FSSSU4-RSY10-U8-S813	Total/NA	Solid	Fill_Geo-21	278921
160-19954-14	TITO04-BS-FSSSU4-RSY10-U8-S814	Total/NA	Solid	Fill_Geo-21	278921
160-19954-15	TITO04-BS-FSSSU4-RSY10-U8-S815	Total/NA	Solid	Fill_Geo-21	278921
160-19954-16	TITO04-BS-FSSSU4-RSY10-U8-S816	Total/NA	Solid	Fill_Geo-21	278921
160-19954-17	TITO04-BS-FSSSU4-RSY10-U8-S817	Total/NA	Solid	Fill_Geo-21	278921
160-19954-18	TITO04-BS-FSSSU4-RSY10-U8-S818	Total/NA	Solid	Fill_Geo-21	278921
160-19954-19	TITO04-BS-FSSSU4-RSY10-U8-S819	Total/NA	Solid	Fill_Geo-21	278921
160-19954-20	TITO04-BS-FSSSU4-RSY10-U8-S820	Total/NA	Solid	Fill_Geo-21	278921
MB 160-279156/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-279156/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-19954-1 DU	TITO04-BS-FSSSU4-RSY10-U8-S801	Total/NA	Solid	Fill_Geo-21	278921

TestAmerica St. Louis

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-20102-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

12/16/2016 4:24:17 PM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Job ID: 160-20102-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-20102-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Job ID: 160-20102-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 11/19/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 17.5° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSSSU5-RSY11-U9-S901 (160-20102-1), TITO04-BS-FSSSU5-RSY11-U9-S902 (160-20102-2), TITO04-BS-FSSSU5-RSY11-U9-S903 (160-20102-3), TITO04-BS-FSSSU5-RSY11-U9-S904 (160-20102-4), TITO04-BS-FSSSU5-RSY11-U9-S905 (160-20102-5), TITO04-BS-FSSSU5-RSY11-U9-S906 (160-20102-6), TITO04-BS-FSSSU5-RSY11-U9-S907 (160-20102-7), TITO04-BS-FSSSU5-RSY11-U9-S908 (160-20102-8), TITO04-BS-FSSSU5-RSY11-U9-S909 (160-20102-9), TITO04-BS-FSSSU5-RSY11-U9-S910 (160-20102-10), TITO04-BS-FSSSU5-RSY11-U9-S911 (160-20102-11) and TITO04-BS-FSSSU5-RSY11-U9-S912 (160-20102-12) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/21/2016, prepared on 11/22/2016 and analyzed on 12/13/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_BS_FSS_SU5_RSY11_U9_#335

Page 1 of 2

Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside FSS SU5
RSY11 USE 9 Systematic

Purchase Order #: 201455

Shipment Date: 11/18/16

Waybill Number: 128924624492565757

Lab Destination: Earth Toxics Inc To Test America

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Lynn Caragan
Phone/Fax Number: 714-669-7022

Address: lynn.caragan@cbifederalservices.com Contact Name / ph. #: Mike Dryden

City: San Francisco

Sampler's Name(s): D. Jackson

Collection Information

Sample ID Number	Sample Description	Date	Time	Method	Matrix	# of containers	Preservative (water)		Preservative (soil)		Container Type		Gamma Scan		Dose Rate μ R/hr	
TITO04-BS-FSSSU5-RSY11-U9-S901	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1530	G	CP	1	16 oz Plastic	X							5	
TITO04-BS-FSSSU5-RSY11-U9-S902	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1532	G	CP	1	16 oz Plastic	X							5	
TITO04-BS-FSSSU5-RSY11-U9-S903	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1534	G	CP	1	16 oz Plastic	X							6	
TITO04-BS-FSSSU5-RSY11-U9-S904	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1540	G	CP	1	16 oz Plastic	X							5	
TITO04-BS-FSSSU5-RSY11-U9-S905	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1542	G	CP	1	16 oz Plastic	X							6	
TITO04-BS-FSSSU5-RSY11-U9-S906	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1544	G	CP	1	16 oz Plastic	X							6	
TITO04-BS-FSSSU5-RSY11-U9-S907	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1546	G	CP	1	16 oz Plastic	X							5	
TITO04-BS-FSSSU5-RSY11-U9-S908	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1548	G	CP	1	16 oz Plastic	X							5	
TITO04-BS-FSSSU5-RSY11-U9-S909	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1600	G	CP	1	16 oz Plastic	X							5	
TITO04-BS-FSSSU5-RSY11-U9-S910	Bayside FSS Survey Unit 5 RSY 11 Lift 9 Systematic	11/17/16	1605	G	CP	1	16 oz Plastic	X							6	

Special Instructions:

7 days ingrown draft and follow with 21 days final

☐ 24-hr

Level Of QC Required:

I

II

III

Project Specific:

Standard TAT ☐

☐ 3-day

☐ 7-day

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening

Relinquished By:

Date: 11/18/16

Time: 1145

Date:

Time:

Received By:

Date: 11-19-16

Time: 0835

Date:

Time:

Relinquished By:

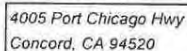
Received By:

Date:

Time:

160-20102 Chain of Custody





Ref. Document # TI_P3_BS_FSS_SU5_RSY11 U9 #335

Page 2 of 2

City: San Francisco

12/16/2016

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-20102-2

Login Number: 20102

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-20102-1	TITO04-BS-FSSSU5-RSY11-U9-S901	Solid	11/17/16 15:30	11/19/16 08:35
160-20102-2	TITO04-BS-FSSSU5-RSY11-U9-S902	Solid	11/17/16 15:32	11/19/16 08:35
160-20102-3	TITO04-BS-FSSSU5-RSY11-U9-S903	Solid	11/17/16 15:34	11/19/16 08:35
160-20102-4	TITO04-BS-FSSSU5-RSY11-U9-S904	Solid	11/17/16 15:40	11/19/16 08:35
160-20102-5	TITO04-BS-FSSSU5-RSY11-U9-S905	Solid	11/17/16 15:42	11/19/16 08:35
160-20102-6	TITO04-BS-FSSSU5-RSY11-U9-S906	Solid	11/17/16 15:44	11/19/16 08:35
160-20102-7	TITO04-BS-FSSSU5-RSY11-U9-S907	Solid	11/17/16 15:46	11/19/16 08:35
160-20102-8	TITO04-BS-FSSSU5-RSY11-U9-S908	Solid	11/17/16 15:48	11/19/16 08:35
160-20102-9	TITO04-BS-FSSSU5-RSY11-U9-S909	Solid	11/17/16 16:00	11/19/16 08:35
160-20102-10	TITO04-BS-FSSSU5-RSY11-U9-S910	Solid	11/17/16 16:05	11/19/16 08:35
160-20102-11	TITO04-BS-FSSSU5-RSY11-U9-S911	Solid	11/17/16 16:07	11/19/16 08:35
160-20102-12	TITO04-BS-FSSSU5-RSY11-U9-S912	Solid	11/17/16 16:10	11/19/16 08:35

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S901

Lab Sample ID: 160-20102-1

Date Collected: 11/17/16 15:30

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.331	U	0.144	0.148		0.347	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Actinium-227	-0.324	U	0.825	0.825		1.39	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Bismuth-212	-0.297	U	0.902	0.903		1.55	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Bismuth-214	0.359		0.143	0.148		0.143	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Cesium-137	0.0143	U	0.0709	0.0709		0.123	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Lead-210	1.32	U	1.36	1.37		1.82	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Lead-212	0.269		0.0869	0.0936		0.116	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Lead-214	0.282		0.0930	0.0975		0.117	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Potassium-40	11.4		1.49	1.90		0.828	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Protactinium-231	0.187	U	1.14	1.14		3.68	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Radium-226	0.359		0.143	0.148	0.500	0.143	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Radium-228	0.331	U	0.144	0.148		0.347	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Thallium-208	0.145		0.0474	0.0497		0.0430	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Thorium-228	0.269		0.0869	0.0936		0.116	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Thorium-232	0.331	U	0.144	0.148		0.347	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Thorium-234	0.146	U	0.222	0.223		2.44	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Uranium-235	-0.0442	U	0.278	0.278		1.02	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Uranium-238	0.146	U	0.222	0.223		2.44	pCi/g	11/22/16 13:10	12/13/16 17:37	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S902

Lab Sample ID: 160-20102-2

Date Collected: 11/17/16 15:32

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.455		0.126	0.135		0.152	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Actinium-227	-0.199	U	0.571	0.572		0.967	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Bismuth-212	0.000	U	0.178	0.178		1.11	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Bismuth-214	0.321		0.102	0.107		0.0951	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Cesium-137	-0.0150	U	0.0519	0.0520		0.0907	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Lead-210	1.01	U	0.927	0.935		1.18	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Lead-212	0.288		0.0662	0.0759		0.0718	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Lead-214	0.355		0.0852	0.0928		0.111	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Potassium-40	11.0		1.56	1.92		0.769	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Protactinium-231	0.366	U	0.893	0.894		2.10	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Radium-226	0.321		0.102	0.107	0.500	0.0951	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Radium-228	0.455		0.126	0.135		0.152	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Thallium-208	0.114		0.0488	0.0502		0.0473	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Thorium-228	0.288		0.0662	0.0759		0.0718	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Thorium-232	0.455		0.126	0.135		0.152	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Thorium-234	-0.00828	U	0.815	0.815		1.41	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Uranium-235	-0.00806	U	0.0172	0.0172		0.603	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Uranium-238	-0.00828	U	0.815	0.815		1.41	pCi/g	11/22/16 13:10	12/13/16 11:23	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S903

Lab Sample ID: 160-20102-3

Date Collected: 11/17/16 15:34

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.179	U	0.229	0.230		0.309	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Actinium-227	-0.341	U	0.544	0.545		1.05	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Bismuth-212	0.000	U	0.576	0.576		1.39	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Bismuth-214	0.410		0.131	0.138		0.124	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Cesium-137	-0.0473	U	0.0566	0.0568		0.156	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Lead-210	1.47	U	1.15	1.16		1.55	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Lead-212	0.296		0.0854	0.0936		0.0954	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Lead-214	0.430		0.119	0.127		0.164	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Potassium-40	11.3		1.85	2.19		0.867	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Protactinium-231	0.364	U	1.08	1.08		3.68	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Radium-226	0.410		0.131	0.138	0.500	0.124	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Radium-228	0.179	U	0.229	0.230		0.309	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Thallium-208	0.169		0.0695	0.0717		0.0628	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Thorium-228	0.296		0.0854	0.0936		0.0954	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Thorium-232	0.179	U	0.229	0.230		0.309	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Thorium-234	-0.107	U	1.21	1.21		1.82	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Uranium-235	-0.0385	U	0.286	0.286		0.619	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Uranium-238	-0.107	U	1.21	1.21		1.82	pCi/g	11/22/16 13:10	12/13/16 11:24	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S904

Lab Sample ID: 160-20102-4

Date Collected: 11/17/16 15:40

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.291		0.177	0.180		0.174	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Actinium-227	0.268	U	0.483	0.484		1.24	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Bismuth-212	0.319	U	0.765	0.765		1.32	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Bismuth-214	0.386		0.116	0.123		0.107	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Cesium-137	-0.00272	U	0.0500	0.0500		0.0921	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Lead-210	-0.693	U	1.48	1.48		2.48	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Lead-212	0.327		0.0808	0.0911		0.0903	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Lead-214	0.349		0.103	0.109		0.112	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Potassium-40	9.55		1.48	1.78		0.599	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Protactinium-231	-0.842	U	2.67	2.67		4.49	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Radium-226	0.386		0.116	0.123	0.500	0.107	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Radium-228	0.291		0.177	0.180		0.174	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Thallium-208	0.0317	U	0.0639	0.0640		0.102	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Thorium-228	0.327		0.0808	0.0911		0.0903	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Thorium-232	0.291		0.177	0.180		0.174	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Thorium-234	-0.258	U	1.28	1.28		2.21	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Uranium-235	0.119	U	0.319	0.319		0.787	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Uranium-238	-0.258	U	1.28	1.28		2.21	pCi/g	11/22/16 13:10	12/13/16 12:23	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S905

Lab Sample ID: 160-20102-5

Date Collected: 11/17/16 15:42

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.281		0.181	0.184		0.257	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Actinium-227	-0.275	U	0.631	0.632		0.903	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Bismuth-212	-0.487	U	0.938	0.940		1.59	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Bismuth-214	0.298		0.113	0.118		0.123	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Cesium-137	-0.0201	U	0.0561	0.0562		0.0975	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Lead-210	-0.335	U	1.26	1.27		1.94	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Lead-212	0.0222	U	0.106	0.106		0.180	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Lead-214	0.375		0.0855	0.0939		0.113	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Potassium-40	11.0		1.54	1.91		0.695	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Protactinium-231	0.300	U	0.910	0.911		3.02	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Radium-226	0.298		0.113	0.118	0.500	0.123	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Radium-228	0.281		0.181	0.184		0.257	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Thallium-208	0.101		0.0551	0.0561		0.0593	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Thorium-228	0.0222	U	0.106	0.106		0.180	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Thorium-232	0.281		0.181	0.184		0.257	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Thorium-234	-0.148	U	0.936	0.936		1.62	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Uranium-235	0.0591	U	0.153	0.154		0.540	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Uranium-238	-0.148	U	0.936	0.936		1.62	pCi/g	11/22/16 13:10	12/13/16 12:27	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S906

Lab Sample ID: 160-20102-6

Date Collected: 11/17/16 15:44

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.386		0.164	0.169		0.122	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Actinium-227	0.0150	U	0.530	0.530		0.794	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Bismuth-212	0.260	U	0.539	0.540		0.943	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Bismuth-214	0.372		0.149	0.154		0.154	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Cesium-137	-0.0748	U	0.0921	0.0924		0.157	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Lead-210	-0.0854	U	1.34	1.34		2.03	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Lead-212	0.314		0.0831	0.0925		0.0894	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Lead-214	0.379		0.109	0.116		0.127	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Potassium-40	10.1		1.69	1.98		0.808	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Protactinium-231	0.339	U	0.997	0.997		3.30	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Radium-226	0.372		0.149	0.154	0.500	0.154	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Radium-228	0.386		0.164	0.169		0.122	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Thallium-208	0.131		0.0501	0.0519		0.0443	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Thorium-228	0.314		0.0831	0.0925		0.0894	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Thorium-232	0.386		0.164	0.169		0.122	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Thorium-234	0.120	U	0.256	0.256		1.94	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Uranium-235	0.109	U	0.332	0.332		0.562	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Uranium-238	0.120	U	0.256	0.256		1.94	pCi/g	11/22/16 13:10	12/13/16 12:56	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S907

Lab Sample ID: 160-20102-7

Date Collected: 11/17/16 15:46

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.320		0.135	0.139		0.122	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Actinium-227	0.159	U	0.396	0.396		1.16	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Bismuth-212	0.301	U	0.748	0.748		1.28	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Bismuth-214	0.250		0.121	0.124		0.139	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Cesium-137	0.000	U	0.0231	0.0231		0.0777	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Lead-210	-0.0915	U	1.46	1.46		2.50	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Lead-212	0.276		0.0638	0.0732		0.0690	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Lead-214	0.400		0.0832	0.0930		0.0818	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Potassium-40	10.8		1.44	1.82		0.533	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Protactinium-231	0.471	U	1.22	1.22		2.77	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Radium-226	0.250		0.121	0.124	0.500	0.139	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Radium-228	0.320		0.135	0.139		0.122	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Thallium-208	0.0861		0.0371	0.0382		0.0365	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Thorium-228	0.276		0.0638	0.0732		0.0690	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Thorium-232	0.320		0.135	0.139		0.122	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Thorium-234	0.531	U	0.755	0.757		1.03	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Uranium-235	-0.00740	U	0.0180	0.0180		0.640	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Uranium-238	0.531	U	0.755	0.757		1.03	pCi/g	11/22/16 13:10	12/13/16 12:57	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S908

Lab Sample ID: 160-20102-8

Date Collected: 11/17/16 15:48

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.311		0.143	0.146		0.235	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Actinium-227	0.306	U	0.786	0.786		1.32	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Bismuth-212	-0.325	U	0.824	0.824		1.42	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Bismuth-214	0.454		0.116	0.125		0.0936	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Cesium-137	-0.00753	U	0.0544	0.0544		0.101	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Lead-210	-0.869	U	1.89	1.89		3.16	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Lead-212	0.292		0.0796	0.0881		0.0931	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Lead-214	0.281		0.0935	0.0980		0.0939	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Potassium-40	10.8		1.59	1.94		0.610	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Protactinium-231	0.000	U	0.227	0.227		4.17	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Radium-226	0.454		0.116	0.125	0.500	0.0936	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Radium-228	0.311		0.143	0.146		0.235	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Thallium-208	0.123		0.0798	0.0809		0.0722	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Thorium-228	0.292		0.0796	0.0881		0.0931	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Thorium-232	0.311		0.143	0.146		0.235	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Thorium-234	-0.273	U	1.38	1.39		2.38	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Uranium-235	-0.0149	U	0.0592	0.0592		0.933	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Uranium-238	-0.273	U	1.38	1.39		2.38	pCi/g	11/22/16 13:10	12/13/16 12:58	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S909

Lab Sample ID: 160-20102-9

Date Collected: 11/17/16 16:00

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.318		0.211	0.213		0.219	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Actinium-227	-0.273	U	0.628	0.628		0.898	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Bismuth-212	0.449	U	0.859	0.860		1.45	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Bismuth-214	0.332		0.116	0.121		0.119	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Cesium-137	-0.0317	U	0.0601	0.0602		0.102	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Lead-210	-0.317	U	1.32	1.32		2.02	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Lead-212	0.00333	U	0.124	0.124		0.211	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Lead-214	0.402		0.101	0.109		0.129	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Potassium-40	10.6		1.52	1.87		0.703	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Protactinium-231	0.498	U	1.12	1.12		2.62	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Radium-226	0.332		0.116	0.121	0.500	0.119	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Radium-228	0.318		0.211	0.213		0.219	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Thallium-208	0.158		0.0450	0.0479		0.0228	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Thorium-228	0.00333	U	0.124	0.124		0.211	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Thorium-232	0.318		0.211	0.213		0.219	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Thorium-234	0.238	U	0.398	0.398		1.21	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Uranium-235	0.0695	U	0.310	0.310		0.502	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Uranium-238	0.238	U	0.398	0.398		1.21	pCi/g	11/22/16 13:10	12/13/16 13:00	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S910

Lab Sample ID: 160-20102-10

Date Collected: 11/17/16 16:05

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.131	U	0.237	0.237		0.326	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Actinium-227	-0.364	U	0.848	0.849		1.42	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Bismuth-212	0.328	U	0.542	0.543		0.919	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Bismuth-214	0.404		0.121	0.128		0.107	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Cesium-137	0.00519	U	0.0479	0.0479		0.0874	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Lead-210	0.710	U	1.37	1.37		1.82	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Lead-212	0.278		0.0799	0.0876		0.0960	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Lead-214	0.316		0.114	0.119		0.119	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Potassium-40	10.8		1.60	1.94		0.653	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Protactinium-231	0.136	U	1.07	1.07		3.46	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Radium-226	0.404		0.121	0.128	0.500	0.107	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Radium-228	0.131	U	0.237	0.237		0.326	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Thallium-208	0.118		0.0519	0.0533		0.0540	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Thorium-228	0.278		0.0799	0.0876		0.0960	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Thorium-232	0.131	U	0.237	0.237		0.326	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Thorium-234	0.233	U	0.365	0.365		2.20	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Uranium-235	-0.193	U	0.0741	0.0767		0.847	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Uranium-238	0.233	U	0.365	0.365		2.20	pCi/g	11/22/16 13:10	12/13/16 13:01	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S911

Lab Sample ID: 160-20102-11

Date Collected: 11/17/16 16:07

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.427		0.152	0.158		0.112	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Actinium-227	0.126	U	0.505	0.506		1.12	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Bismuth-212	0.413	U	0.725	0.726		1.22	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Bismuth-214	0.413		0.116	0.124		0.107	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Cesium-137	-0.00559	U	0.0512	0.0512		0.0910	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Lead-210	-0.727	U	1.55	1.55		2.69	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Lead-212	0.275		0.0755	0.0835		0.0927	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Lead-214	0.345		0.115	0.121		0.122	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Potassium-40	11.1		1.40	1.81		0.753	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Protactinium-231	-0.0000000	U	2.12	2.12		3.62	pCi/g	11/22/16 13:10	12/13/16 13:02	1
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Radium-226	0.413		0.116	0.124	0.500	0.107	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Radium-228	0.427		0.152	0.158		0.112	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Thallium-208	0.101		0.0435	0.0447		0.0462	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Thorium-228	0.275		0.0755	0.0835		0.0927	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Thorium-232	0.427		0.152	0.158		0.112	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Thorium-234	1.22		0.725	0.736		0.941	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Uranium-235	-0.0493	U	0.108	0.108		0.831	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Uranium-238	1.22		0.725	0.736		0.941	pCi/g	11/22/16 13:10	12/13/16 13:02	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S912

Lab Sample ID: 160-20102-12

Date Collected: 11/17/16 16:10

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.484		0.150	0.158		0.115	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Actinium-227	-0.133	U	0.595	0.595		0.863	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Bismuth-212	0.381	U	0.773	0.774		1.31	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Bismuth-214	0.367		0.115	0.121		0.110	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Cesium-137	0.0167	U	0.0445	0.0446		0.0775	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Lead-210	-0.238	U	1.39	1.39		2.14	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Lead-212	0.189		0.0702	0.0744		0.0948	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Lead-214	0.212		0.108	0.111		0.189	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Potassium-40	10.1		1.35	1.70		0.631	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Protactinium-231	0.164	U	0.851	0.852		2.78	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Radium-226	0.367		0.115	0.121	0.500	0.110	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Radium-228	0.484		0.150	0.158		0.115	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Thallium-208	0.122		0.0487	0.0503		0.0477	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Thorium-228	0.189		0.0702	0.0744		0.0948	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Thorium-232	0.484		0.150	0.158		0.115	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Thorium-234	1.18	U	1.14	1.14		1.48	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Uranium-235	0.0133	U	0.0609	0.0609		0.590	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Uranium-238	1.18	U	1.14	1.14		1.48	pCi/g	11/22/16 13:10	12/13/16 13:03	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-280756/1-A
Matrix: Solid
Analysis Batch: 283873

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 280756

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.05352	U	0.164	0.164		0.173	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Actinium-227	-0.003675	U	0.0174	0.0174		0.745	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Bismuth-212	0.3039	U	0.541	0.542		0.922	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Bismuth-214	-0.06043	U	0.107	0.107		0.249	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Cesium-137	0.008917	U	0.0509	0.0509		0.0910	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Lead-210	0.3652	U	0.716	0.717		1.22	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Lead-212	-0.05779	U	0.0627	0.0632		0.163	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Lead-214	-0.001055	U	0.00344	0.00344		0.140	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Potassium-40	0.02754	U	0.427	0.427		0.806	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Protactinium-231	0.2606	U	0.781	0.782		1.89	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Radium-226	-0.06043	U	0.107	0.107	0.500	0.249	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Radium-228	0.05352	U	0.164	0.164		0.173	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Thallium-208	-0.007068	U	0.0457	0.0457		0.0564	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Thorium-228	-0.05779	U	0.0627	0.0632		0.163	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Thorium-232	0.05352	U	0.164	0.164		0.173	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Thorium-234	0.0000	U	0.218	0.218		1.57	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Uranium-235	0.0004322	U	0.000850	0.000851		0.564	pCi/g	11/22/16 13:10	12/14/16 15:21	1
Uranium-238	0.0000	U	0.218	0.218		1.57	pCi/g	11/22/16 13:10	12/14/16 15:21	1

Lab Sample ID: LCS 160-280756/2-A
Matrix: Solid
Analysis Batch: 283679

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 280756

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.0	99.95		10.5		1.13	pCi/g	103	87 - 116
Cesium-137	29.3	29.25		3.12		0.267	pCi/g	100	87 - 120
Cobalt-60	16.0	15.67		1.63		0.169	pCi/g	98	87 - 115

Lab Sample ID: 160-20102-1 DU
Matrix: Solid
Analysis Batch: 283683

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S901
Prep Type: Total/NA
Prep Batch: 280756

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.331	U	0.4052		0.147		0.0900	pCi/g	0.25	1
Actinium-227	-0.324	U	-0.3412	U	0.756		1.08	pCi/g	0.01	1
Bismuth-212	-0.297	U	0.4278	U	0.736		1.24	pCi/g	0.44	1
Bismuth-214	0.359		0.4354		0.130		0.113	pCi/g	0.27	1
Cesium-137	0.0143	U	-0.02269	U	0.0711		0.110	pCi/g	0.26	1
Lead-210	1.32	U	0.7692	U	1.19		1.84	pCi/g	0.22	1
Lead-212	0.269		0.2821		0.0919		0.107	pCi/g	0.07	1
Lead-214	0.282		0.3475		0.110		0.125	pCi/g	0.32	1
Potassium-40	11.4		10.08		1.77		0.708	pCi/g	0.37	1
Protactinium-231	0.187	U	0.04922	U	0.680		3.04	pCi/g	0.08	1
Radium-226	0.359		0.4354		0.130	0.500	0.113	pCi/g	0.27	1
Radium-228	0.331	U	0.4052		0.147		0.0900	pCi/g	0.25	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-20102-1 DU

Matrix: Solid

Analysis Batch: 283683

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S901

Prep Type: Total/NA

Prep Batch: 280756

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.145		0.08324		0.0721		0.0820	pCi/g	0.50	1
Thorium-228	0.269		0.2821		0.0919		0.107	pCi/g	0.07	1
Thorium-232	0.331	U	0.4052		0.147		0.0900	pCi/g	0.25	1
Thorium-234	0.146	U	0.6097	U	0.550		1.33	pCi/g	0.60	1
Uranium-235	-0.0442	U	-0.05883	U	0.372		0.586	pCi/g	0.02	1
Uranium-238	0.146	U	0.6097	U	0.550		1.33	pCi/g	0.60	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Rad

Leach Batch: 280295

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20102-1	TITO04-BS-FSSSU5-RSY11-U9-S901	Total/NA	Solid	Dry and Grind	
160-20102-2	TITO04-BS-FSSSU5-RSY11-U9-S902	Total/NA	Solid	Dry and Grind	
160-20102-3	TITO04-BS-FSSSU5-RSY11-U9-S903	Total/NA	Solid	Dry and Grind	
160-20102-4	TITO04-BS-FSSSU5-RSY11-U9-S904	Total/NA	Solid	Dry and Grind	
160-20102-5	TITO04-BS-FSSSU5-RSY11-U9-S905	Total/NA	Solid	Dry and Grind	
160-20102-6	TITO04-BS-FSSSU5-RSY11-U9-S906	Total/NA	Solid	Dry and Grind	
160-20102-7	TITO04-BS-FSSSU5-RSY11-U9-S907	Total/NA	Solid	Dry and Grind	
160-20102-8	TITO04-BS-FSSSU5-RSY11-U9-S908	Total/NA	Solid	Dry and Grind	
160-20102-9	TITO04-BS-FSSSU5-RSY11-U9-S909	Total/NA	Solid	Dry and Grind	
160-20102-10	TITO04-BS-FSSSU5-RSY11-U9-S910	Total/NA	Solid	Dry and Grind	
160-20102-11	TITO04-BS-FSSSU5-RSY11-U9-S911	Total/NA	Solid	Dry and Grind	
160-20102-12	TITO04-BS-FSSSU5-RSY11-U9-S912	Total/NA	Solid	Dry and Grind	
160-20102-1 DU	TITO04-BS-FSSSU5-RSY11-U9-S901	Total/NA	Solid	Dry and Grind	

Prep Batch: 280756

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20102-1	TITO04-BS-FSSSU5-RSY11-U9-S901	Total/NA	Solid	Fill_Geo-21	280295
160-20102-2	TITO04-BS-FSSSU5-RSY11-U9-S902	Total/NA	Solid	Fill_Geo-21	280295
160-20102-3	TITO04-BS-FSSSU5-RSY11-U9-S903	Total/NA	Solid	Fill_Geo-21	280295
160-20102-4	TITO04-BS-FSSSU5-RSY11-U9-S904	Total/NA	Solid	Fill_Geo-21	280295
160-20102-5	TITO04-BS-FSSSU5-RSY11-U9-S905	Total/NA	Solid	Fill_Geo-21	280295
160-20102-6	TITO04-BS-FSSSU5-RSY11-U9-S906	Total/NA	Solid	Fill_Geo-21	280295
160-20102-7	TITO04-BS-FSSSU5-RSY11-U9-S907	Total/NA	Solid	Fill_Geo-21	280295
160-20102-8	TITO04-BS-FSSSU5-RSY11-U9-S908	Total/NA	Solid	Fill_Geo-21	280295
160-20102-9	TITO04-BS-FSSSU5-RSY11-U9-S909	Total/NA	Solid	Fill_Geo-21	280295
160-20102-10	TITO04-BS-FSSSU5-RSY11-U9-S910	Total/NA	Solid	Fill_Geo-21	280295
160-20102-11	TITO04-BS-FSSSU5-RSY11-U9-S911	Total/NA	Solid	Fill_Geo-21	280295
160-20102-12	TITO04-BS-FSSSU5-RSY11-U9-S912	Total/NA	Solid	Fill_Geo-21	280295
MB 160-280756/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-280756/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-20102-1 DU	TITO04-BS-FSSSU5-RSY11-U9-S901	Total/NA	Solid	Fill_Geo-21	280295

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-20643-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan



Authorized for release by:
2/2/2017 2:08:19 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Job ID: 160-20643-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-20643-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Job ID: 160-20643-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 1/10/2017 8:30 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 19.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-SU5P1-RSY10-U11-S001 (160-20643-1), TITO04-BS-SU5P1-RSY10-U11-S002 (160-20643-2), TITO04-BS-SU5P1-RSY10-U11-S003 (160-20643-3), TITO04-BS-SU5P1-RSY10-U11-S004 (160-20643-4), TITO04-BS-SU5P1-RSY10-U11-S005 (160-20643-5), TITO04-BS-SU5P1-RSY10-U11-S006 (160-20643-6), TITO04-BS-SU5P1-RSY10-U11-S007 (160-20643-7), TITO04-BS-SU5P1-RSY10-U11-S008 (160-20643-8), TITO04-BS-SU5P1-RSY10-U11-S009 (160-20643-9), TITO04-BS-SU5P1-RSY10-U11-S010 (160-20643-10), TITO04-BS-SU5P1-RSY10-U11-S011 (160-20643-11) and TITO04-BS-SU5P1-RSY10-U11-S012 (160-20643-12) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 01/10/2017, prepared on 01/11/2017 and analyzed on 02/01/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Ref. Document # TI P3 BS SU6P1 RSY10 U11 #366

Page 1 of 2

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: *Lynn Caragan*

Phone/Fax Number: 714-669-7022

Address: lynn.caragan@cbifederaleservices.com

City:

Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside SU5
Part 1 RSY 10 Use 11
Systematic

Purchase Order #: 201455

Shipment Date: 1-9-17

Waybill Number: 1289V4620A062197C

Lab Destination: *Earth Toxics Inc To Test America*

Contact Name / ph. #: Mike Dryden

Sampler's Name(s): A. Owens

Collection Information

Preservative (water)

Preservative (soil)

Container Type

Gamma Scan

Dose Rate $\mu\text{R}/\text{Hr}$

Sample ID Number	Sample Description	Date	Time	Method	Matrix	# of containers	Container Type	Preservative (only)									
								1	2	3	4	5	6	7	8	9	10
TITO04-BS-SU5P1-RSY10-U11-S001	Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1000	G	CP	1	16 oz Plastic	X									5
TITO04-BS-SU5P1-RSY10-U11-S002	Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1002	G	CP	1	16 oz Plastic	X									5
TITO04-BS-SU5P1-RSY10-U11-S003	Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1003	G	CP	1	16 oz Plastic	X									5
TITO04-BS-SU5P1-RSY10-U11-S004	Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1006	G	CP	1	16 oz Plastic	X									5
TITO04-BS-SU5P1-RSY10-U11-S005	Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1007	G	CP	1	16 oz Plastic	X									5
TITO04-BS-SU5P1-RSY10-U11-S006	Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1009	G	CP	1	16 oz Plastic	X									5
TITO04-BS-SU5P1-RSY10-U11-S007	Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1011	G	CP	1	16 oz Plastic	X									5
TITO04-BS-SU5P1-RSY10-U11-S008	Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1013	G	CP	1	16 oz Plastic	X									5
Special Instructions:								7 days ingrown draft and follow with 21 days final									
<input type="checkbox"/> 24-hr <input type="checkbox"/> 3-day <input type="checkbox"/> 7-day				Level Of QC Required: I II III				Method Codes C = Composite G = Grab									
Standard TAT <input type="checkbox"/>				Project Specific:				Matrix Codes DW = Drinking Water SO = Soil GW = Ground Water SL = Sludge WW = Waste Water CP = Chip Samples A = Air ABS=Asbestos, PO=Pipe Opening									
Relinquished By: A. Owens Date: 1-9-17 Time: 1130				Received By: Jim Clark Date: 1-10-17 Time: 0830													
Relinquished By: Date: Time:				Received By: Date: Time:													

160-20643 Chain of Custody





Ref. Document # TI_P3_BS_SU5P1_RSY10_U11_#356

Page 2 of 2

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Lynn Caragan
Phone/Fax Number: 714-669-7022

Address: lynn.caragan@cbifederaleservices.com Contact Name / ph. #: Mike Dryden
City: _____

Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside SU5
Part 1 RSY 10 Use 11
Systematic

Purchase Order #: 201455

Shipment Date: 1-9-17

Waybill Number: 1289V462ei 9e6z 1976

Lab Destination: *Earth Toxics Inc To Test America*

Contact Name / ph. #: *Mike Dryden*

Sampler's Name(s): A. Owens

Collection Information

Sampler's Name(s): <u>A. Owens</u>		Collection Information			Matrix	# of containers	Preservative (water)												
Sample ID Number	Sample Description	Date	Time	Method			Preservative (soil)	N/A	Container Type										
TITO04-BS-SU5P1-RSY10-U11-S009	Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1014	G	CP	1	16 oz Plastic	X										S	
TITO04-BS-SU5P1-RSY10-U11-S010	Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1017	G	CP	1	16 oz Plastic	X										S	
TITO04-BS-SU5P1-RSY10-U11-S011	Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1020	G	CP	1	16 oz Plastic	X										S	
TITO04-BS-SU5P1-RSY10-U11-S012	Bayside Survey Unit 5 Part 1 RSY 10 Lift 11 Systematic	1-6-17	1022	G	CP	1	16 oz Plastic	X										S	
Special Instructions: 7 days ingrown draft and follow with 21 days final																			
<input type="checkbox"/> 24-hr		Level Of QC Required:																	
Standard TAT <input type="checkbox"/>		<div>I II III Project Specific</div>																	
<input type="checkbox"/> 3-day <input type="checkbox"/> 7-day																			
Relinquished By: <u>A. Owens</u>		Date: <u>1-9-17</u>		Received By: <u>[Signature]</u>		Date: <u>1.10.17</u>		Method Codes											
Time: <u>1130</u>						Time: <u>0830</u>		G = Composite G = Grab											
Relinquished By:		Date:		Received By:		Date:		Matrix Codes											
Time:						Time:		DW = Drinking Water SO = Soil											
								GW = Ground Water SL = Sludge											
								WW = Waste Water CP = Chip Samples											
								A = Air ABS=Asbestos, PO=Pipe Opening											

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-20643-2

Login Number: 20643

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-20643-1	TITO04-BS-SU5P1-RSY10-U11-S001	Solid	01/06/17 10:00	01/10/17 08:30
160-20643-2	TITO04-BS-SU5P1-RSY10-U11-S002	Solid	01/06/17 10:02	01/10/17 08:30
160-20643-3	TITO04-BS-SU5P1-RSY10-U11-S003	Solid	01/06/17 10:03	01/10/17 08:30
160-20643-4	TITO04-BS-SU5P1-RSY10-U11-S004	Solid	01/06/17 10:06	01/10/17 08:30
160-20643-5	TITO04-BS-SU5P1-RSY10-U11-S005	Solid	01/06/17 10:07	01/10/17 08:30
160-20643-6	TITO04-BS-SU5P1-RSY10-U11-S006	Solid	01/06/17 10:09	01/10/17 08:30
160-20643-7	TITO04-BS-SU5P1-RSY10-U11-S007	Solid	01/06/17 10:11	01/10/17 08:30
160-20643-8	TITO04-BS-SU5P1-RSY10-U11-S008	Solid	01/06/17 10:15	01/10/17 08:30
160-20643-9	TITO04-BS-SU5P1-RSY10-U11-S009	Solid	01/06/17 10:14	01/10/17 08:30
160-20643-10	TITO04-BS-SU5P1-RSY10-U11-S010	Solid	01/06/17 10:17	01/10/17 08:30
160-20643-11	TITO04-BS-SU5P1-RSY10-U11-S011	Solid	01/06/17 10:20	01/10/17 08:30
160-20643-12	TITO04-BS-SU5P1-RSY10-U11-S012	Solid	01/06/17 10:22	01/10/17 08:30

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S001

Lab Sample ID: 160-20643-1

Date Collected: 01/06/17 10:00

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.348		0.248	0.250		0.258	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Actinium-227	-0.318	U	0.818	0.819		1.37	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Bismuth-212	0.0644	U	0.569	0.569		1.01	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Bismuth-214	0.521		0.133	0.144		0.119	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Cesium-137	-0.0129	U	0.0549	0.0549		0.0956	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Lead-210	1.60	U	1.20	1.21		1.61	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Lead-212	0.371		0.0801	0.0934		0.0908	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Lead-214	0.479		0.0965	0.109		0.0867	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Potassium-40	12.3		1.40	1.89		0.455	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Protactinium-231	0.000	U	0.312	0.312		3.67	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Radium-226	0.521		0.133	0.144	0.500	0.119	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Radium-228	0.348		0.248	0.250		0.258	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thallium-208	0.136		0.0506	0.0526		0.0483	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thorium-228	0.371		0.0801	0.0934		0.0908	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thorium-232	0.348		0.248	0.250		0.258	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thorium-234	-0.172	U	1.47	1.47		2.51	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Uranium-235	0.0761	U	0.181	0.181		0.505	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Uranium-238	-0.172	U	1.47	1.47		2.51	pCi/g	01/11/17 12:34	02/01/17 07:19	1

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S002

Lab Sample ID: 160-20643-2

Date Collected: 01/06/17 10:02

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0802	U	0.204	0.205		0.330	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Actinium-227	0.178	U	0.531	0.531		0.767	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Bismuth-212	0.319	U	0.735	0.735		1.26	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Bismuth-214	0.321		0.115	0.119		0.118	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Cesium-137	-0.00872	U	0.0527	0.0527		0.0963	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Lead-210	0.199	U	0.745	0.745		1.22	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Lead-212	0.208		0.0972	0.101		0.146	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Lead-214	0.400		0.0964	0.105		0.104	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Potassium-40	10.7		1.46	1.83		0.656	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Protactinium-231	-0.0329	U	1.87	1.87		3.21	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Radium-226	0.321		0.115	0.119	0.500	0.118	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Radium-228	0.0802	U	0.204	0.205		0.330	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thallium-208	0.155		0.0415	0.0445		0.0208	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thorium-228	0.208		0.0972	0.101		0.146	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thorium-232	0.0802	U	0.204	0.205		0.330	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Thorium-234	1.08		0.631	0.641		0.852	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Uranium-235	-0.0125	U	0.0186	0.0186		0.437	pCi/g	01/11/17 12:34	02/01/17 07:19	1
Uranium-238	1.08		0.631	0.641		0.852	pCi/g	01/11/17 12:34	02/01/17 07:19	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S003

Lab Sample ID: 160-20643-3

Date Collected: 01/06/17 10:03

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.449		0.137	0.145		0.118	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Actinium-227	-0.303	U	0.774	0.775		1.30	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Bismuth-212	-0.447	U	0.760	0.762		1.28	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Bismuth-214	0.400		0.132	0.138		0.123	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Cesium-137	-0.00688	U	0.0478	0.0478		0.0863	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Lead-210	1.46	U	1.36	1.37		1.77	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Lead-212	0.249		0.0762	0.0828		0.0986	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Lead-214	0.420		0.109	0.118		0.115	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Potassium-40	12.2		1.45	1.91		0.741	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Protactinium-231	0.118	U	1.01	1.01		3.26	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Radium-226	0.400		0.132	0.138	0.500	0.123	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Radium-228	0.449		0.137	0.145		0.118	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Thallium-208	0.0676	U	0.0722	0.0725		0.0871	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Thorium-228	0.249		0.0762	0.0828		0.0986	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Thorium-232	0.449		0.137	0.145		0.118	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Thorium-234	-0.804	U	1.28	1.28		2.20	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Uranium-235	-0.137	U	0.267	0.267		0.951	pCi/g	01/11/17 12:34	02/01/17 07:21	1
Uranium-238	-0.804	U	1.28	1.28		2.20	pCi/g	01/11/17 12:34	02/01/17 07:21	1

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S004

Lab Sample ID: 160-20643-4

Date Collected: 01/06/17 10:06

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.398		0.131	0.137		0.0793	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Actinium-227	0.181	U	0.380	0.381		0.881	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Bismuth-212	-0.256	U	0.616	0.617		1.06	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Bismuth-214	0.347		0.137	0.142		0.138	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Cesium-137	-0.0168	U	0.0582	0.0583		0.101	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Lead-210	0.619	U	1.14	1.14		1.68	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Lead-212	0.248		0.0707	0.0777		0.0853	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Lead-214	0.239		0.0991	0.102		0.110	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Potassium-40	9.36		1.30	1.61		0.644	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Protactinium-231	0.000	U	0.307	0.307		3.34	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Radium-226	0.347		0.137	0.142	0.500	0.138	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Radium-228	0.398		0.131	0.137		0.0793	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Thallium-208	0.0840		0.0352	0.0362		0.0372	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Thorium-228	0.248		0.0707	0.0777		0.0853	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Thorium-232	0.398		0.131	0.137		0.0793	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Thorium-234	0.0771	U	0.810	0.810		1.31	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Uranium-235	-0.170	U	0.421	0.422		0.530	pCi/g	01/11/17 12:34	02/01/17 07:22	1
Uranium-238	0.0771	U	0.810	0.810		1.31	pCi/g	01/11/17 12:34	02/01/17 07:22	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S005

Lab Sample ID: 160-20643-5

Date Collected: 01/06/17 10:07

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.118	U	0.191	0.192		0.305	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Actinium-227	-0.233	U	0.697	0.698		1.18	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Bismuth-212	0.360	U	0.701	0.702		1.18	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Bismuth-214	0.442		0.128	0.136		0.119	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Cesium-137	-0.00169	U	0.0387	0.0387		0.0703	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Lead-210	1.20	U	1.13	1.14		1.49	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Lead-212	0.288		0.0672	0.0768		0.0738	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Lead-214	0.421		0.0885	0.0987		0.0977	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Potassium-40	9.27		1.19	1.52		0.434	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Protactinium-231	0.000	U	0.211	0.211		3.05	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Radium-226	0.442		0.128	0.136	0.500	0.119	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Radium-228	0.118	U	0.191	0.192		0.305	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Thallium-208	0.119		0.0421	0.0438		0.0366	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Thorium-228	0.288		0.0672	0.0768		0.0738	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Thorium-232	0.118	U	0.191	0.192		0.305	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Thorium-234	-0.505	U	0.915	0.917		2.26	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Uranium-235	0.0315	U	0.0838	0.0838		0.767	pCi/g	01/11/17 12:34	02/01/17 08:08	1
Uranium-238	-0.505	U	0.915	0.917		2.26	pCi/g	01/11/17 12:34	02/01/17 08:08	1

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S006

Lab Sample ID: 160-20643-6

Date Collected: 01/06/17 10:09

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.333		0.135	0.140		0.0997	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Actinium-227	0.169	U	0.526	0.526		0.762	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Bismuth-212	-0.239	U	0.731	0.732		1.27	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Bismuth-214	0.392		0.138	0.144		0.125	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Cesium-137	-0.0750	U	0.0936	0.0940		0.143	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Lead-210	0.276	U	1.04	1.04		1.57	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Lead-212	0.142		0.0725	0.0747		0.106	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Lead-214	0.306		0.0925	0.0979		0.103	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Potassium-40	10.5		1.49	1.84		0.692	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Protactinium-231	0.481	U	1.07	1.07		2.51	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Radium-226	0.392		0.138	0.144	0.500	0.125	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Radium-228	0.333		0.135	0.140		0.0997	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thallium-208	0.0396	U	0.0734	0.0735		0.0915	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thorium-228	0.142		0.0725	0.0747		0.106	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thorium-232	0.333		0.135	0.140		0.0997	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thorium-234	-0.333	U	0.956	0.956		1.68	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Uranium-235	0.0822	U	0.275	0.276		0.492	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Uranium-238	-0.333	U	0.956	0.956		1.68	pCi/g	01/11/17 12:34	02/01/17 08:07	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S007

Lab Sample ID: 160-20643-7

Date Collected: 01/06/17 10:11

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.361		0.116	0.121		0.0683	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Actinium-227	0.102	U	0.208	0.208		1.08	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Bismuth-212	-0.329	U	0.697	0.697		1.18	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Bismuth-214	0.453		0.106	0.116		0.0825	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Cesium-137	-0.0296	U	0.0640	0.0641		0.116	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Lead-210	-0.891	U	1.39	1.40		2.43	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Lead-212	0.289		0.0733	0.0823		0.0897	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Lead-214	0.310		0.109	0.113		0.110	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Potassium-40	8.83		1.18	1.49		0.667	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Protactinium-231	0.0835	U	1.88	1.88		3.21	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Radium-226	0.453		0.106	0.116	0.500	0.0825	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Radium-228	0.361		0.116	0.121		0.0683	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thallium-208	0.131		0.0458	0.0478		0.0452	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thorium-228	0.289		0.0733	0.0823		0.0897	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thorium-232	0.361		0.116	0.121		0.0683	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Thorium-234	0.815	U	0.724	0.729		1.16	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Uranium-235	0.0811	U	0.171	0.171		0.663	pCi/g	01/11/17 12:34	02/01/17 08:07	1
Uranium-238	0.815	U	0.724	0.729		1.16	pCi/g	01/11/17 12:34	02/01/17 08:07	1

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S008

Lab Sample ID: 160-20643-8

Date Collected: 01/06/17 10:15

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.343		0.152	0.156		0.126	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Actinium-227	-0.0745	U	0.548	0.548		0.802	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Bismuth-212	0.236	U	0.472	0.473		0.813	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Bismuth-214	0.479		0.115	0.126		0.0925	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Cesium-137	-0.00238	U	0.0486	0.0486		0.0874	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Lead-210	1.74		1.12	1.14		1.40	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Lead-212	0.301		0.0741	0.0838		0.0842	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Lead-214	0.439		0.102	0.112		0.108	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Potassium-40	9.91		1.33	1.67		0.639	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Protactinium-231	0.481	U	1.08	1.08		2.52	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Radium-226	0.479		0.115	0.126	0.500	0.0925	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Radium-228	0.343		0.152	0.156		0.126	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Thallium-208	0.137		0.0458	0.0479		0.0433	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Thorium-228	0.301		0.0741	0.0838		0.0842	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Thorium-232	0.343		0.152	0.156		0.126	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Thorium-234	0.347	U	0.883	0.883		1.48	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Uranium-235	-0.179	U	0.292	0.292		0.590	pCi/g	01/11/17 12:34	02/01/17 08:14	1
Uranium-238	0.347	U	0.883	0.883		1.48	pCi/g	01/11/17 12:34	02/01/17 08:14	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S009

Lab Sample ID: 160-20643-9

Date Collected: 01/06/17 10:14

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.378		0.138	0.144		0.225	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Actinium-227	0.204	U	0.473	0.474		0.683	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Bismuth-212	0.0134	U	0.626	0.626		1.14	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Bismuth-214	0.335		0.109	0.115		0.106	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Cesium-137	-0.0281	U	0.0493	0.0494		0.0955	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Lead-210	0.573	U	1.04	1.04		1.52	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Lead-212	0.190		0.0799	0.0836		0.113	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Lead-214	0.325		0.0991	0.105		0.0986	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Potassium-40	9.75		1.45	1.76		0.699	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Protactinium-231	0.000	U	0.650	0.650		3.00	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Radium-226	0.335		0.109	0.115	0.500	0.106	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Radium-228	0.378		0.138	0.144		0.225	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Thallium-208	0.107		0.0660	0.0669		0.0710	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Thorium-228	0.190		0.0799	0.0836		0.113	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Thorium-232	0.378		0.138	0.144		0.225	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Thorium-234	-0.0796	U	1.06	1.06		1.83	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Uranium-235	0.000	U	0.146	0.146		0.524	pCi/g	01/11/17 12:34	02/01/17 08:47	1
Uranium-238	-0.0796	U	1.06	1.06		1.83	pCi/g	01/11/17 12:34	02/01/17 08:47	1

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S010

Lab Sample ID: 160-20643-10

Date Collected: 01/06/17 10:17

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.453		0.188	0.194		0.168	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Actinium-227	-0.321	U	0.688	0.689		1.15	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Bismuth-212	-0.483	U	0.767	0.769		1.28	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Bismuth-214	0.365		0.114	0.120		0.106	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Cesium-137	-0.0501	U	0.0661	0.0663		0.106	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Lead-210	-0.723	U	1.42	1.42		2.46	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Lead-212	0.297		0.0729	0.0824		0.0856	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Lead-214	0.346		0.0999	0.106		0.0997	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Potassium-40	8.35		1.18	1.45		0.693	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Protactinium-231	-0.803	U	2.43	2.43		4.07	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Radium-226	0.365		0.114	0.120	0.500	0.106	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Radium-228	0.453		0.188	0.194		0.168	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Thallium-208	0.114		0.0686	0.0696		0.0633	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Thorium-228	0.297		0.0729	0.0824		0.0856	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Thorium-232	0.453		0.188	0.194		0.168	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Thorium-234	0.601	U	0.500	0.504		1.11	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Uranium-235	-0.0154	U	0.293	0.293		0.673	pCi/g	01/11/17 12:34	02/01/17 08:50	1
Uranium-238	0.601	U	0.500	0.504		1.11	pCi/g	01/11/17 12:34	02/01/17 08:50	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S011

Lab Sample ID: 160-20643-11

Date Collected: 01/06/17 10:20

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.198	U	0.116	0.117		0.289	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Actinium-227	-0.273	U	0.606	0.607		0.866	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Bismuth-212	0.206	U	0.636	0.636		1.10	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Bismuth-214	0.477		0.131	0.140		0.107	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Cesium-137	-0.00171	U	0.0622	0.0622		0.110	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Lead-210	0.927	U	1.18	1.19		1.68	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Lead-212	0.287		0.0739	0.0827		0.0868	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Lead-214	0.365		0.110	0.116		0.115	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Potassium-40	9.53		1.30	1.62		0.633	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Protactinium-231	0.531	U	1.54	1.55		2.62	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Radium-226	0.477		0.131	0.140	0.500	0.107	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Radium-228	0.198	U	0.116	0.117		0.289	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Thallium-208	0.122		0.0462	0.0479		0.0465	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Thorium-228	0.287		0.0739	0.0827		0.0868	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Thorium-232	0.198	U	0.116	0.117		0.289	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Thorium-234	1.34		0.719	0.733		0.966	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Uranium-235	-0.185	U	0.179	0.180		0.589	pCi/g	01/11/17 12:34	02/01/17 08:51	1
Uranium-238	1.34		0.719	0.733		0.966	pCi/g	01/11/17 12:34	02/01/17 08:51	1

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S012

Lab Sample ID: 160-20643-12

Date Collected: 01/06/17 10:22

Matrix: Solid

Date Received: 01/10/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.483		0.136	0.145		0.0895	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Actinium-227	-0.370	U	0.779	0.780		1.30	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Bismuth-212	-0.319	U	0.561	0.562		1.08	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Bismuth-214	0.620		0.135	0.149		0.0928	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Cesium-137	0.00538	U	0.0549	0.0549		0.0974	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Lead-210	-0.857	U	0.636	0.644		2.51	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Lead-212	0.263		0.0710	0.0787		0.0833	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Lead-214	0.621		0.128	0.143		0.101	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Potassium-40	9.93		1.43	1.75		0.561	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Protactinium-231	-0.544	U	2.38	2.38		4.01	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Radium-226	0.620		0.135	0.149	0.500	0.0928	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Radium-228	0.483		0.136	0.145		0.0895	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Thallium-208	0.109		0.0450	0.0464		0.0396	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Thorium-228	0.263		0.0710	0.0787		0.0833	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Thorium-232	0.483		0.136	0.145		0.0895	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Thorium-234	0.336	U	0.848	0.849		1.43	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Uranium-235	0.0150	U	0.0536	0.0537		0.859	pCi/g	01/11/17 12:34	02/01/17 08:53	1
Uranium-238	0.336	U	0.848	0.849		1.43	pCi/g	01/11/17 12:34	02/01/17 08:53	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-287491/1-A

Matrix: Solid

Analysis Batch: 290563

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 287491

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.01254	U	0.126	0.126		0.165	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Actinium-227	0.03184	U	0.471	0.471		0.831	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Bismuth-212	-0.2161	U	0.754	0.755		1.31	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Bismuth-214	-0.05409	U	0.0833	0.0835		0.160	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Cesium-137	0.003221	U	0.0428	0.0428		0.0788	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Lead-210	-0.6325	U	1.41	1.41		2.38	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Lead-212	-0.02021	U	0.0769	0.0769		0.132	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Lead-214	-0.05381	U	0.103	0.103		0.163	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Potassium-40	-0.1859	U	0.889	0.889		1.13	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Protactinium-231	-0.8744	U	2.96	2.96		4.98	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Radium-226	-0.05409	U	0.0833	0.0835	0.500	0.160	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Radium-228	-0.01254	U	0.126	0.126		0.165	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Thallium-208	0.03739	U	0.0511	0.0513		0.0437	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Thorium-228	-0.02021	U	0.0769	0.0769		0.132	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Thorium-232	-0.01254	U	0.126	0.126		0.165	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Thorium-234	-0.4214	U	0.923	0.924		1.56	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Uranium-235	-0.006023	U	0.00923	0.00925		0.470	pCi/g	01/11/17 12:34	02/01/17 07:18	1
Uranium-238	-0.4214	U	0.923	0.924		1.56	pCi/g	01/11/17 12:34	02/01/17 07:18	1

Lab Sample ID: LCS 160-287491/2-A

Matrix: Solid

Analysis Batch: 290567

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 287491

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.0	105.0		11.0		1.28	pCi/g	108	87 - 116
Cesium-137	29.2	28.93		3.10		0.256	pCi/g	99	87 - 120
Cobalt-60	15.7	15.97		1.67		0.0708	pCi/g	101	87 - 115

Lab Sample ID: 160-20643-1 DU

Matrix: Solid

Analysis Batch: 290563

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S001

Prep Type: Total/NA

Prep Batch: 287491

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.348		0.4473		0.166		0.117	pCi/g	0.24	1
Actinium-227	-0.318	U	0.2934	U	0.189		0.952	pCi/g	0.61	1
Bismuth-212	0.0644	U	0.3115	U	0.556		0.937	pCi/g	0.22	1
Bismuth-214	0.521		0.3914		0.103		0.0795	pCi/g	0.53	1
Cesium-137	-0.0129	U	-0.03194	U	0.0535		0.0895	pCi/g	0.18	1
Lead-210	1.60	U	0.3956	U	1.08		1.83	pCi/g	0.53	1
Lead-212	0.371		0.3036		0.0750		0.0678	pCi/g	0.40	1
Lead-214	0.479		0.4955		0.103		0.0882	pCi/g	0.08	1
Potassium-40	12.3		11.30		1.72		0.507	pCi/g	0.29	1
Protactinium-231	0.000	U	-0.7299	U	2.38		3.98	pCi/g	0.27	1
Radium-226	0.521		0.3914		0.103	0.500	0.0795	pCi/g	0.53	1
Radium-228	0.348		0.4473		0.166		0.117	pCi/g	0.24	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-20643-1 DU

Matrix: Solid

Analysis Batch: 290563

Client Sample ID: TITO04-BS-SU5P1-RSY10-U11-S001

Prep Type: Total/NA

Prep Batch: 287491

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.136		0.09440		0.0567		0.0593	pCi/g	0.38	1
Thorium-228	0.371		0.3036		0.0750		0.0678	pCi/g	0.40	1
Thorium-232	0.348		0.4473		0.166		0.117	pCi/g	0.24	1
Thorium-234	-0.172	U	-0.5378	U	1.13		1.89	pCi/g	0.14	1
Uranium-235	0.0761	U	0.006711	U	0.0950		0.638	pCi/g	0.25	1
Uranium-238	-0.172	U	-0.5378	U	1.13		1.89	pCi/g	0.14	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20643-2

Rad

Leach Batch: 287161

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20643-1	TITO04-BS-SU5P1-RSY10-U11-S001	Total/NA	Solid	Dry and Grind	
160-20643-2	TITO04-BS-SU5P1-RSY10-U11-S002	Total/NA	Solid	Dry and Grind	
160-20643-3	TITO04-BS-SU5P1-RSY10-U11-S003	Total/NA	Solid	Dry and Grind	
160-20643-4	TITO04-BS-SU5P1-RSY10-U11-S004	Total/NA	Solid	Dry and Grind	
160-20643-5	TITO04-BS-SU5P1-RSY10-U11-S005	Total/NA	Solid	Dry and Grind	
160-20643-6	TITO04-BS-SU5P1-RSY10-U11-S006	Total/NA	Solid	Dry and Grind	
160-20643-7	TITO04-BS-SU5P1-RSY10-U11-S007	Total/NA	Solid	Dry and Grind	
160-20643-8	TITO04-BS-SU5P1-RSY10-U11-S008	Total/NA	Solid	Dry and Grind	
160-20643-9	TITO04-BS-SU5P1-RSY10-U11-S009	Total/NA	Solid	Dry and Grind	
160-20643-10	TITO04-BS-SU5P1-RSY10-U11-S010	Total/NA	Solid	Dry and Grind	
160-20643-11	TITO04-BS-SU5P1-RSY10-U11-S011	Total/NA	Solid	Dry and Grind	
160-20643-12	TITO04-BS-SU5P1-RSY10-U11-S012	Total/NA	Solid	Dry and Grind	
160-20643-1 DU	TITO04-BS-SU5P1-RSY10-U11-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 287491

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-20643-1	TITO04-BS-SU5P1-RSY10-U11-S001	Total/NA	Solid	Fill_Geo-21	287161
160-20643-2	TITO04-BS-SU5P1-RSY10-U11-S002	Total/NA	Solid	Fill_Geo-21	287161
160-20643-3	TITO04-BS-SU5P1-RSY10-U11-S003	Total/NA	Solid	Fill_Geo-21	287161
160-20643-4	TITO04-BS-SU5P1-RSY10-U11-S004	Total/NA	Solid	Fill_Geo-21	287161
160-20643-5	TITO04-BS-SU5P1-RSY10-U11-S005	Total/NA	Solid	Fill_Geo-21	287161
160-20643-6	TITO04-BS-SU5P1-RSY10-U11-S006	Total/NA	Solid	Fill_Geo-21	287161
160-20643-7	TITO04-BS-SU5P1-RSY10-U11-S007	Total/NA	Solid	Fill_Geo-21	287161
160-20643-8	TITO04-BS-SU5P1-RSY10-U11-S008	Total/NA	Solid	Fill_Geo-21	287161
160-20643-9	TITO04-BS-SU5P1-RSY10-U11-S009	Total/NA	Solid	Fill_Geo-21	287161
160-20643-10	TITO04-BS-SU5P1-RSY10-U11-S010	Total/NA	Solid	Fill_Geo-21	287161
160-20643-11	TITO04-BS-SU5P1-RSY10-U11-S011	Total/NA	Solid	Fill_Geo-21	287161
160-20643-12	TITO04-BS-SU5P1-RSY10-U11-S012	Total/NA	Solid	Fill_Geo-21	287161
MB 160-287491/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-287491/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-20643-1 DU	TITO04-BS-SU5P1-RSY10-U11-S001	Total/NA	Solid	Fill_Geo-21	287161

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-19855-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

11/30/2016 9:10:31 AM

Micha Korinhizer, Project Management Assistant I
(314)298-8566

micha.korinhizer@testamericainc.com

Designee for

Erika Gish, Project Manager II
(314)298-8566

erika.gish@testamericainc.com

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Job ID: 160-19855-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-19855-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Job ID: 160-19855-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

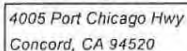
RECEIPT

The samples were received on 11/04/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 19.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-NP-FSS-SU3-BSRSY10-U7-S001 (160-19855-1), TITO04-NP-FSS-SU3-BSRSY10-U7-S002 (160-19855-2), TITO04-NP-FSS-SU3-BSRSY10-U7-S003 (160-19855-3), TITO04-NP-FSS-SU3-BSRSY10-U7-S004 (160-19855-4), TITO04-NP-FSS-SU3-BSRSY10-U7-S005 (160-19855-5), TITO04-NP-FSS-SU3-BSRSY10-U7-S006 (160-19855-6), TITO04-NP-FSS-SU3-BSRSY10-U7-S007 (160-19855-7), TITO04-NP-FSS-SU3-BSRSY10-U7-S008 (160-19855-8), TITO04-NP-FSS-SU3-BSRSY10-U7-S009 (160-19855-9), TITO04-NP-FSS-SU3-BSRSY10-U7-S010 (160-19855-10), TITO04-NP-FSS-SU3-BSRSY10-U7-S011 (160-19855-11), TITO04-NP-FSS-SU3-BSRSY10-U7-S012 (160-19855-12), TITO04-NP-FSS-SU3-BSRSY10-U7-S013 (160-19855-13), TITO04-NP-FSS-SU3-BSRSY10-U7-S014 (160-19855-14), TITO04-NP-FSS-SU3-BSRSY10-U7-S015 (160-19855-15), TITO04-NP-FSS-SU3-BSRSY10-U7-S016 (160-19855-16), TITO04-NP-FSS-SU3-BSRSY10-U7-S017 (160-19855-17), TITO04-NP-FSS-SU3-BSRSY10-U7-S018 (160-19855-18), TITO04-NP-FSS-SU3-BSRSY10-U7-S019 (160-19855-19) and TITO04-NP-FSS-SU3-BSRSY10-U7-S020 (160-19855-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/04/2016, prepared on 11/07/2016 and analyzed on 11/28/2016.

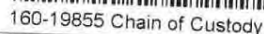
No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Ref. Document # TI_P3_NP_FSS_SU3 RSY10 U7 #317

Page 1 of 2

ABS=Asbestos, PO=Pipe Opening



Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-19855-2

Login Number: 19855

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-19855-1	TITO04-NP-FSS-SU3-BSRSY10-U7-S001	Solid	11/01/16 12:22	11/04/16 08:30
160-19855-2	TITO04-NP-FSS-SU3-BSRSY10-U7-S002	Solid	11/01/16 12:24	11/04/16 08:30
160-19855-3	TITO04-NP-FSS-SU3-BSRSY10-U7-S003	Solid	11/01/16 12:26	11/04/16 08:30
160-19855-4	TITO04-NP-FSS-SU3-BSRSY10-U7-S004	Solid	11/01/16 12:26	11/04/16 08:30
160-19855-5	TITO04-NP-FSS-SU3-BSRSY10-U7-S005	Solid	11/01/16 12:36	11/04/16 08:30
160-19855-6	TITO04-NP-FSS-SU3-BSRSY10-U7-S006	Solid	11/01/16 12:31	11/04/16 08:30
160-19855-7	TITO04-NP-FSS-SU3-BSRSY10-U7-S007	Solid	11/01/16 12:34	11/04/16 08:30
160-19855-8	TITO04-NP-FSS-SU3-BSRSY10-U7-S008	Solid	11/01/16 12:36	11/04/16 08:30
160-19855-9	TITO04-NP-FSS-SU3-BSRSY10-U7-S009	Solid	11/01/16 12:38	11/04/16 08:30
160-19855-10	TITO04-NP-FSS-SU3-BSRSY10-U7-S010	Solid	11/01/16 12:38	11/04/16 08:30
160-19855-11	TITO04-NP-FSS-SU3-BSRSY10-U7-S011	Solid	11/01/16 12:40	11/04/16 08:30
160-19855-12	TITO04-NP-FSS-SU3-BSRSY10-U7-S012	Solid	11/01/16 12:42	11/04/16 08:30
160-19855-13	TITO04-NP-FSS-SU3-BSRSY10-U7-S013	Solid	11/01/16 12:44	11/04/16 08:30
160-19855-14	TITO04-NP-FSS-SU3-BSRSY10-U7-S014	Solid	11/01/16 12:47	11/04/16 08:30
160-19855-15	TITO04-NP-FSS-SU3-BSRSY10-U7-S015	Solid	11/01/16 12:47	11/04/16 08:30
160-19855-16	TITO04-NP-FSS-SU3-BSRSY10-U7-S016	Solid	11/01/16 12:56	11/04/16 08:30
160-19855-17	TITO04-NP-FSS-SU3-BSRSY10-U7-S017	Solid	11/01/16 12:53	11/04/16 08:30
160-19855-18	TITO04-NP-FSS-SU3-BSRSY10-U7-S018	Solid	11/01/16 12:55	11/04/16 08:30
160-19855-19	TITO04-NP-FSS-SU3-BSRSY10-U7-S019	Solid	11/01/16 12:57	11/04/16 08:30
160-19855-20	TITO04-NP-FSS-SU3-BSRSY10-U7-S020	Solid	11/01/16 12:59	11/04/16 08:30

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S001

Lab Sample ID: 160-19855-1

Date Collected: 11/01/16 12:22

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.437		0.133	0.141		0.0750	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Actinium-227	0.253	U	0.665	0.665		1.12	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Bismuth-212	-0.0826	U	0.895	0.895		1.55	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Bismuth-214	0.261		0.0990	0.103		0.117	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Cesium-137	0.0279	U	0.0469	0.0470		0.0789	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Lead-210	1.37	U	1.29	1.30		1.71	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Lead-212	0.289		0.0743	0.0832		0.0887	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Lead-214	0.419		0.0923	0.102		0.0841	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Potassium-40	10.0		1.31	1.66		0.672	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Protactinium-231	0.269	U	1.08	1.08		3.49	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Radium-226	0.261		0.0990	0.103	0.500	0.117	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Radium-228	0.437		0.133	0.141		0.0750	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Thallium-208	0.108		0.0456	0.0469		0.0489	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Thorium-228	0.289		0.0743	0.0832		0.0887	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Thorium-232	0.437		0.133	0.141		0.0750	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Thorium-234	0.767	U	0.447	0.454		1.31	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Uranium-235	0.0805	U	0.216	0.216		0.822	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Uranium-238	0.767	U	0.447	0.454		1.31	pCi/g	11/07/16 15:28	11/28/16 11:28	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S002

Lab Sample ID: 160-19855-2

Date Collected: 11/01/16 12:24

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.370		0.179	0.183		0.229	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Actinium-227	-0.0371	U	0.239	0.239		0.931	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Bismuth-212	-0.327	U	0.724	0.725		1.24	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Bismuth-214	0.438		0.131	0.139		0.113	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Cesium-137	-0.0178	U	0.0625	0.0625		0.108	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-210	0.748	U	1.46	1.46		1.99	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-212	0.285		0.0774	0.0857		0.0924	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-214	0.499		0.105	0.117		0.127	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Potassium-40	11.3		1.46	1.86		0.669	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Protactinium-231	0.000	U	1.37	1.37		2.34	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Radium-226	0.438		0.131	0.139	0.500	0.113	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Radium-228	0.370		0.179	0.183		0.229	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thallium-208	0.0886		0.0606	0.0613		0.0718	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-228	0.285		0.0774	0.0857		0.0924	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-232	0.370		0.179	0.183		0.229	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-234	-0.636	U	1.13	1.13		1.99	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Uranium-235	-0.139	U	0.283	0.283		0.614	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Uranium-238	-0.636	U	1.13	1.13		1.99	pCi/g	11/07/16 15:28	11/28/16 11:31	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S003

Lab Sample ID: 160-19855-3

Date Collected: 11/01/16 12:26

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.182		0.151	0.152		0.171	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Actinium-227	0.230	U	0.496	0.497		1.19	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Bismuth-212	0.184	U	0.934	0.934		1.63	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Bismuth-214	0.311		0.119	0.123		0.0968	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Cesium-137	-0.0359	U	0.112	0.112		0.104	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-210	-0.785	U	1.71	1.71		2.86	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-212	0.365		0.0801	0.0931		0.0808	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-214	0.347		0.116	0.122		0.108	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Potassium-40	11.4		1.60	1.98		0.566	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Protactinium-231	0.0000000	U	2.38	2.38		4.07	pCi/g	11/07/16 15:28	11/28/16 11:31	1
	26									
Radium-226	0.311		0.119	0.123	0.500	0.0968	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Radium-228	0.182		0.151	0.152		0.171	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thallium-208	0.0800	U	0.0700	0.0705		0.0820	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-228	0.365		0.0801	0.0931		0.0808	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-232	0.182		0.151	0.152		0.171	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-234	-1.44	U	0.918	0.930		2.91	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Uranium-235	0.0827	U	0.219	0.219		0.916	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Uranium-238	-1.44	U	0.918	0.930		2.91	pCi/g	11/07/16 15:28	11/28/16 11:31	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S004

Lab Sample ID: 160-19855-4

Date Collected: 11/01/16 12:26

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.108	U	0.195	0.195		0.267	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Actinium-227	0.0816	U	0.518	0.518		0.715	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Bismuth-212	-0.585	U	0.940	0.942		1.57	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Bismuth-214	0.324		0.0832	0.0897		0.0583	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Cesium-137	-0.00758	U	0.0605	0.0605		0.106	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Lead-210	0.0210	U	1.12	1.12		1.93	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Lead-212	0.307		0.0674	0.0782		0.0730	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Lead-214	0.356		0.0773	0.0857		0.0898	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Potassium-40	9.22		1.34	1.64		0.535	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Protactinium-231	0.327	U	1.07	1.07		2.59	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Radium-226	0.324		0.0832	0.0897	0.500	0.0583	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Radium-228	0.108	U	0.195	0.195		0.267	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Thallium-208	0.103		0.0513	0.0524		0.0539	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Thorium-228	0.307		0.0674	0.0782		0.0730	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Thorium-232	0.108	U	0.195	0.195		0.267	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Thorium-234	0.510	U	0.874	0.876		1.21	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Uranium-235	-0.127	U	0.184	0.184		0.619	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Uranium-238	0.510	U	0.874	0.876		1.21	pCi/g	11/07/16 15:28	11/28/16 11:32	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S005

Lab Sample ID: 160-19855-5

Date Collected: 11/01/16 12:36

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.490		0.231	0.237		0.206	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Actinium-227	0.170	U	0.391	0.391		0.915	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Bismuth-212	-0.317	U	0.850	0.851		1.48	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Bismuth-214	0.387		0.183	0.187		0.187	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Cesium-137	-0.0229	U	0.0375	0.0376		0.159	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Lead-210	-0.0513	U	1.43	1.43		2.15	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Lead-212	0.189		0.0773	0.0811		0.104	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Lead-214	0.328		0.104	0.110		0.137	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Potassium-40	8.48		1.52	1.75		0.710	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Protactinium-231	0.408	U	1.20	1.21		3.40	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Radium-226	0.387		0.183	0.187	0.500	0.187	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Radium-228	0.490		0.231	0.237		0.206	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Thallium-208	0.0397	U	0.101	0.101		0.110	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Thorium-228	0.189		0.0773	0.0811		0.104	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Thorium-232	0.490		0.231	0.237		0.206	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Thorium-234	-0.305	U	1.03	1.03		1.81	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Uranium-235	-0.191	U	0.395	0.396		0.608	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Uranium-238	-0.305	U	1.03	1.03		1.81	pCi/g	11/07/16 15:28	11/28/16 11:34	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S006

Lab Sample ID: 160-19855-6

Date Collected: 11/01/16 12:31

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.310		0.107	0.112		0.0715	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Actinium-227	0.222	U	0.314	0.315		0.854	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Bismuth-212	0.219	U	0.407	0.408		0.695	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Bismuth-214	0.336		0.118	0.123		0.107	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Cesium-137	0.0137	U	0.0357	0.0358		0.0620	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-210	0.260	U	1.01	1.01		1.72	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-212	0.310		0.0578	0.0704		0.0490	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-214	0.332		0.0738	0.0814		0.0945	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Potassium-40	10.3		1.27	1.66		0.602	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Protactinium-231	0.266	U	0.929	0.929		3.00	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Radium-226	0.336		0.118	0.123	0.500	0.107	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Radium-228	0.310		0.107	0.112		0.0715	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thallium-208	0.117		0.0386	0.0405		0.0317	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-228	0.310		0.0578	0.0704		0.0490	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-232	0.310		0.107	0.112		0.0715	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-234	-0.501	U	1.05	1.05		1.75	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Uranium-235	0.0832	U	0.217	0.217		0.605	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Uranium-238	-0.501	U	1.05	1.05		1.75	pCi/g	11/07/16 15:28	11/28/16 12:08	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S007

Lab Sample ID: 160-19855-7

Date Collected: 11/01/16 12:34

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.241		0.172	0.173		0.189	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Actinium-227	0.137	U	0.278	0.279		1.23	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Bismuth-212	0.246	U	0.616	0.616		1.06	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Bismuth-214	0.231		0.0908	0.0939		0.106	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Cesium-137	0.0194	U	0.0504	0.0505		0.0870	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Lead-210	1.20	U	1.13	1.14		1.59	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Lead-212	0.285		0.0824	0.0903		0.106	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Lead-214	0.292		0.106	0.110		0.117	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Potassium-40	9.97		1.35	1.69		0.714	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Protactinium-231	0.373	U	1.13	1.13		3.66	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Radium-226	0.231		0.0908	0.0939	0.500	0.106	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Radium-228	0.241		0.172	0.173		0.189	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Thallium-208	0.0987		0.0565	0.0574		0.0583	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Thorium-228	0.285		0.0824	0.0903		0.106	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Thorium-232	0.241		0.172	0.173		0.189	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Thorium-234	1.54		1.08	1.09		1.36	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Uranium-235	0.0242	U	0.448	0.449		0.758	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Uranium-238	1.54		1.08	1.09		1.36	pCi/g	11/07/16 15:28	11/28/16 12:03	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S008

Lab Sample ID: 160-19855-8

Date Collected: 11/01/16 12:36

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.377		0.120	0.126		0.0836	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Actinium-227	-0.288	U	0.789	0.789		1.33	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Bismuth-212	-0.318	U	0.735	0.736		1.26	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Bismuth-214	0.460		0.116	0.125		0.102	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Cesium-137	0.0208	U	0.0527	0.0527		0.0909	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-210	2.11		1.06	1.09		1.26	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-212	0.288		0.0797	0.0880		0.0977	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-214	0.429		0.123	0.131		0.120	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Potassium-40	12.2		1.51	1.96		0.667	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Protactinium-231	0.000	U	0.354	0.354		2.98	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Radium-226	0.460		0.116	0.125	0.500	0.102	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Radium-228	0.377		0.120	0.126		0.0836	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thallium-208	0.106		0.0437	0.0451		0.0431	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-228	0.288		0.0797	0.0880		0.0977	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-232	0.377		0.120	0.126		0.0836	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-234	0.359	U	0.539	0.540		1.54	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Uranium-235	0.0544	U	0.293	0.293		0.498	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Uranium-238	0.359	U	0.539	0.540		1.54	pCi/g	11/07/16 15:28	11/28/16 12:08	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S009

Lab Sample ID: 160-19855-9

Date Collected: 11/01/16 12:38

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.141	U	0.206	0.206		0.359	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Actinium-227	0.115	U	0.563	0.563		1.34	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Bismuth-212	-0.409	U	0.861	0.862		1.47	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Bismuth-214	0.395		0.124	0.131		0.106	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Cesium-137	-0.00888	U	0.0498	0.0498		0.0933	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Lead-210	-0.878	U	1.91	1.91		3.20	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Lead-212	0.338		0.120	0.128		0.173	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Lead-214	0.444		0.110	0.119		0.111	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Potassium-40	11.7		1.67	2.06		0.602	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Protactinium-231	0.742	U	1.71	1.71		3.92	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Radium-226	0.395		0.124	0.131	0.500	0.106	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Radium-228	0.141	U	0.206	0.206		0.359	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Thallium-208	0.0613	U	0.0741	0.0744		0.0938	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Thorium-228	0.338		0.120	0.128		0.173	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Thorium-232	0.141	U	0.206	0.206		0.359	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Thorium-234	0.392	U	0.280	0.283		2.30	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Uranium-235	-0.0145	U	0.0781	0.0781		0.826	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Uranium-238	0.392	U	0.280	0.283		2.30	pCi/g	11/07/16 15:28	11/28/16 12:11	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S010

Lab Sample ID: 160-19855-10

Date Collected: 11/01/16 12:38

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0211	U	0.0495	0.0496		0.337	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Actinium-227	-0.278	U	0.666	0.666		0.897	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Bismuth-212	0.255	U	0.606	0.607		1.04	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Bismuth-214	0.287		0.0941	0.0987		0.0767	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Cesium-137	-0.0379	U	0.0635	0.0636		0.107	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Lead-210	0.0000946	U	1.12	1.12		1.94	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Lead-212	0.268		0.0605	0.0697		0.0620	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Lead-214	0.431		0.0790	0.0908		0.0722	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Potassium-40	9.91		1.38	1.71		0.529	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Protactinium-231	0.000	U	0.170	0.170		2.87	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Radium-226	0.287		0.0941	0.0987	0.500	0.0767	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Radium-228	0.0211	U	0.0495	0.0496		0.337	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Thallium-208	0.112		0.0416	0.0432		0.0344	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Thorium-228	0.268		0.0605	0.0697		0.0620	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Thorium-232	0.0211	U	0.0495	0.0496		0.337	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Thorium-234	-0.0634	U	0.740	0.740		1.29	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Uranium-235	0.0787	U	0.279	0.279		0.470	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Uranium-238	-0.0634	U	0.740	0.740		1.29	pCi/g	11/07/16 15:28	11/28/16 12:12	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S011

Lab Sample ID: 160-19855-11

Date Collected: 11/01/16 12:40

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0523	U	0.283	0.283		0.351	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Actinium-227	0.235	U	0.373	0.374		0.758	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Bismuth-212	-0.369	U	0.887	0.887		1.53	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Bismuth-214	0.0975	U	0.0779	0.0785		0.302	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Cesium-137	-0.0865	U	0.108	0.108		0.207	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Lead-210	-0.326	U	1.44	1.44		2.21	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Lead-212	0.236		0.0775	0.0833		0.0906	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Lead-214	0.288		0.115	0.119		0.131	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Potassium-40	10.1		1.73	2.02		0.766	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Protactinium-231	0.487	U	1.45	1.45		3.45	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Radium-226	0.0975	U	0.0779	0.0785	0.500	0.302	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Radium-228	0.0523	U	0.283	0.283		0.351	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Thallium-208	0.110		0.0479	0.0492		0.0454	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Thorium-228	0.236		0.0775	0.0833		0.0906	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Thorium-232	0.0523	U	0.283	0.283		0.351	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Thorium-234	0.779	U	0.508	0.515		1.39	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Uranium-235	0.0163	U	0.0771	0.0771		0.613	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Uranium-238	0.779	U	0.508	0.515		1.39	pCi/g	11/07/16 15:28	11/28/16 12:20	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S012

Lab Sample ID: 160-19855-12

Date Collected: 11/01/16 12:42

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.142	U	0.176	0.177		0.236	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Actinium-227	-0.231	U	0.586	0.587		0.989	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Bismuth-212	-0.230	U	0.647	0.647		1.11	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Bismuth-214	0.349		0.108	0.114		0.101	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Cesium-137	-0.0226	U	0.0459	0.0459		0.0781	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Lead-210	-0.296	U	1.10	1.10		1.87	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Lead-212	0.258		0.0706	0.0781		0.0893	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Lead-214	0.305		0.0904	0.0958		0.0838	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Potassium-40	10.8		1.28	1.69		0.561	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Protactinium-231	0.338	U	1.11	1.11		3.51	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Radium-226	0.349		0.108	0.114	0.500	0.101	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Radium-228	0.142	U	0.176	0.177		0.236	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Thallium-208	0.152		0.0496	0.0521		0.0382	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Thorium-228	0.258		0.0706	0.0781		0.0893	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Thorium-232	0.142	U	0.176	0.177		0.236	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Thorium-234	0.340	U	0.684	0.685		1.71	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Uranium-235	-0.157	U	0.278	0.279		0.724	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Uranium-238	0.340	U	0.684	0.685		1.71	pCi/g	11/07/16 15:28	11/28/16 12:38	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S013

Lab Sample ID: 160-19855-13

Date Collected: 11/01/16 12:44

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.262		0.193	0.194		0.218	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Actinium-227	-0.300	U	0.883	0.884		1.49	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Bismuth-212	-0.511	U	0.859	0.860		1.44	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Bismuth-214	0.430		0.126	0.134		0.113	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Cesium-137	0.0250	U	0.0565	0.0565		0.0969	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Lead-210	1.32	U	1.32	1.33		1.86	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Lead-212	0.270		0.0981	0.104		0.110	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Lead-214	0.332		0.133	0.137		0.189	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Potassium-40	9.74		1.42	1.73		0.656	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Protactinium-231	0.000	U	0.318	0.318		3.89	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Radium-226	0.430		0.126	0.134	0.500	0.113	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Radium-228	0.262		0.193	0.194		0.218	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Thallium-208	0.0681	U	0.0869	0.0872		0.100	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Thorium-228	0.270		0.0981	0.104		0.110	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Thorium-232	0.262		0.193	0.194		0.218	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Thorium-234	0.736	U	0.858	0.861		1.38	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Uranium-235	0.0911	U	0.289	0.289		0.491	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Uranium-238	0.736	U	0.858	0.861		1.38	pCi/g	11/07/16 15:28	11/28/16 12:39	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S014

Lab Sample ID: 160-19855-14

Date Collected: 11/01/16 12:47

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.107	U	0.150	0.150		0.309	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Actinium-227	0.273	U	0.737	0.737		1.24	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Bismuth-212	-0.482	U	0.568	0.570		1.43	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Bismuth-214	0.277		0.0927	0.0971		0.0948	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Cesium-137	0.0169	U	0.0416	0.0416		0.0722	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-210	0.915	U	1.37	1.37		1.80	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-212	0.267		0.0716	0.0795		0.0860	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-214	0.415		0.104	0.112		0.0861	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Potassium-40	10.6		1.32	1.71		0.489	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Protactinium-231	0.293	U	0.945	0.946		3.14	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Radium-226	0.277		0.0927	0.0971	0.500	0.0948	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Radium-228	0.107	U	0.150	0.150		0.309	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thallium-208	0.127		0.0431	0.0450		0.0413	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-228	0.267		0.0716	0.0795		0.0860	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-232	0.107	U	0.150	0.150		0.309	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-234	0.864	U	0.927	0.931		1.25	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Uranium-235	-0.0102	U	0.0566	0.0566		0.707	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Uranium-238	0.864	U	0.927	0.931		1.25	pCi/g	11/07/16 15:28	11/28/16 12:40	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S015

Lab Sample ID: 160-19855-15

Date Collected: 11/01/16 12:47

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.208		0.149	0.150		0.176	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Actinium-227	0.146	U	0.384	0.384		0.856	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Bismuth-212	-0.0131	U	0.437	0.437		0.789	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Bismuth-214	0.301		0.0878	0.0932		0.0844	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Cesium-137	-0.0206	U	0.0373	0.0374		0.0716	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Lead-210	0.504	U	0.920	0.921		1.54	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Lead-212	0.304		0.0616	0.0731		0.0649	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Lead-214	0.304		0.0824	0.0883		0.0784	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Potassium-40	9.85		1.14	1.52		0.409	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Protactinium-231	0.000	U	0.356	0.356		3.04	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Radium-226	0.301		0.0878	0.0932	0.500	0.0844	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Radium-228	0.208		0.149	0.150		0.176	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Thallium-208	0.0981		0.0424	0.0436		0.0407	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Thorium-228	0.304		0.0616	0.0731		0.0649	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Thorium-232	0.208		0.149	0.150		0.176	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Thorium-234	0.436	U	1.01	1.01		1.69	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Uranium-235	0.152	U	0.204	0.205		0.692	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Uranium-238	0.436	U	1.01	1.01		1.69	pCi/g	11/07/16 15:28	11/28/16 12:42	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S016

Lab Sample ID: 160-19855-16

Date Collected: 11/01/16 12:56

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.151	U	0.184	0.185		0.202	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Actinium-227	-0.275	U	0.744	0.745		1.25	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Bismuth-212	-0.422	U	0.798	0.799		1.34	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Bismuth-214	0.383		0.0966	0.105		0.0888	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Cesium-137	-0.00429	U	0.0462	0.0462		0.101	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-210	1.73		1.35	1.37		1.61	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-212	0.280		0.0754	0.0837		0.0949	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-214	0.336		0.0881	0.0948		0.104	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Potassium-40	10.1		1.28	1.64		0.642	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Protactinium-231	-0.565	U	2.35	2.35		3.95	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Radium-226	0.383		0.0966	0.105	0.500	0.0888	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Radium-228	0.151	U	0.184	0.185		0.202	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thallium-208	0.106		0.0509	0.0521		0.0501	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-228	0.280		0.0754	0.0837		0.0949	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-232	0.151	U	0.184	0.185		0.202	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-234	0.652	U	0.726	0.729		1.18	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Uranium-235	0.272		0.184	0.186		0.239	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Uranium-238	0.652	U	0.726	0.729		1.18	pCi/g	11/07/16 15:28	11/28/16 12:40	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S017

Lab Sample ID: 160-19855-17

Date Collected: 11/01/16 12:53

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.364		0.190	0.194		0.245	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Actinium-227	0.217	U	0.441	0.442		0.636	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Bismuth-212	0.776		0.394	0.402		0.359	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Bismuth-214	0.425		0.117	0.126		0.0969	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Cesium-137	-0.0297	U	0.0598	0.0599		0.102	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Lead-210	-0.993	U	1.27	1.27		2.04	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Lead-212	0.229		0.0710	0.0770		0.0896	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Lead-214	0.291		0.0861	0.0912		0.0997	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Potassium-40	10.7		1.38	1.76		0.631	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Protactinium-231	0.000	U	0.432	0.432		3.26	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Radium-226	0.425		0.117	0.126	0.500	0.0969	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Radium-228	0.364		0.190	0.194		0.245	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Thallium-208	0.127		0.0615	0.0629		0.0588	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Thorium-228	0.229		0.0710	0.0770		0.0896	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Thorium-232	0.364		0.190	0.194		0.245	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Thorium-234	0.385	U	0.359	0.362		1.33	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Uranium-235	-0.0533	U	0.111	0.111		0.499	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Uranium-238	0.385	U	0.359	0.362		1.33	pCi/g	11/07/16 15:28	11/28/16 12:44	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S018

Lab Sample ID: 160-19855-18

Date Collected: 11/01/16 12:55

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.108	U	0.233	0.233		0.318	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Actinium-227	-0.398	U	0.841	0.843		1.41	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Bismuth-212	-0.0148	U	0.703	0.703		1.28	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Bismuth-214	0.364		0.116	0.122		0.0990	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Cesium-137	-0.0531	U	0.0736	0.0738		0.119	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Lead-210	-0.817	U	1.78	1.78		2.98	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Lead-212	0.335		0.0842	0.0947		0.0958	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Lead-214	0.355		0.105	0.112		0.0956	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Potassium-40	11.1		1.72	2.06		0.904	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Protactinium-231	0.513	U	1.47	1.47		3.38	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Radium-226	0.364		0.116	0.122	0.500	0.0990	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Radium-228	0.108	U	0.233	0.233		0.318	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Thallium-208	0.0799	U	0.0751	0.0755		0.0853	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Thorium-228	0.335		0.0842	0.0947		0.0958	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Thorium-232	0.108	U	0.233	0.233		0.318	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Thorium-234	0.801	U	0.537	0.543		1.47	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Uranium-235	0.0621	U	0.168	0.168		0.713	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Uranium-238	0.801	U	0.537	0.543		1.47	pCi/g	11/07/16 15:28	11/28/16 12:45	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S019

Lab Sample ID: 160-19855-19

Date Collected: 11/01/16 12:57

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.372		0.123	0.129		0.152	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Actinium-227	-0.215	U	0.574	0.575		0.969	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Bismuth-212	0.227	U	0.583	0.583		1.01	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Bismuth-214	0.331		0.0991	0.105		0.0798	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Cesium-137	-0.0185	U	0.0533	0.0533		0.0922	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Lead-210	0.150	U	0.716	0.716		1.15	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Lead-212	0.309		0.0647	0.0760		0.0653	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Lead-214	0.337		0.0985	0.105		0.0896	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Potassium-40	10.8		1.44	1.82		0.532	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Protactinium-231	0.264	U	0.896	0.897		2.92	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Radium-226	0.331		0.0991	0.105	0.500	0.0798	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Radium-228	0.372		0.123	0.129		0.152	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Thallium-208	0.0754		0.0336	0.0345		0.0328	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Thorium-228	0.309		0.0647	0.0760		0.0653	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Thorium-232	0.372		0.123	0.129		0.152	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Thorium-234	-0.0449	U	0.933	0.933		1.32	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Uranium-235	0.0618	U	0.220	0.220		0.385	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Uranium-238	-0.0449	U	0.933	0.933		1.32	pCi/g	11/07/16 15:28	11/28/16 12:46	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S020

Lab Sample ID: 160-19855-20

Date Collected: 11/01/16 12:59

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.339		0.270	0.273		0.292	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Actinium-227	0.471	U	0.520	0.523		0.722	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Bismuth-212	-0.0730	U	0.967	0.967		1.73	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Bismuth-214	0.393		0.131	0.138		0.136	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Cesium-137	-0.0219	U	0.0656	0.0657		0.110	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Lead-210	0.842	U	0.941	0.946		1.39	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Lead-212	0.241		0.0829	0.0886		0.104	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Lead-214	0.376		0.112	0.119		0.191	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Potassium-40	12.4		1.89	2.28		0.757	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Protactinium-231	0.465	U	1.16	1.16		2.77	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Radium-226	0.393		0.131	0.138	0.500	0.136	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Radium-228	0.339		0.270	0.273		0.292	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Thallium-208	0.0749	U	0.0780	0.0784		0.0940	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Thorium-228	0.241		0.0829	0.0886		0.104	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Thorium-232	0.339		0.270	0.273		0.292	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Thorium-234	0.604	U	0.928	0.930		1.31	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Uranium-235	0.0519	U	0.278	0.278		0.479	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Uranium-238	0.604	U	0.928	0.930		1.31	pCi/g	11/07/16 15:28	11/28/16 12:52	1

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QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-278070/1-A
Matrix: Solid
Analysis Batch: 281220

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 278070

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.06269	U	0.221	0.221		0.260	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Actinium-227	-0.03546	U	0.508	0.508		0.892	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Bismuth-212	-0.07865	U	0.498	0.498		0.910	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Bismuth-214	-0.07608	U	0.0981	0.0984		0.387	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Cesium-137	0.0000	U	0.00946	0.00946		0.0246	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Lead-210	-0.4900	U	0.929	0.931		1.57	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Lead-212	-0.06128	U	0.0595	0.0600		0.158	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Lead-214	-0.1147	U	0.0953	0.0960		0.223	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Potassium-40	0.06507	U	0.418	0.418		0.775	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Protactinium-231	0.0000	U	0.319	0.319		3.94	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Radium-226	-0.07608	U	0.0981	0.0984	0.500	0.387	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Radium-228	-0.06269	U	0.221	0.221		0.260	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Thallium-208	0.03048	U	0.0230	0.0233		0.0618	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Thorium-228	-0.06128	U	0.0595	0.0600		0.158	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Thorium-232	-0.06269	U	0.221	0.221		0.260	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Thorium-234	0.2602	U	0.694	0.695		1.19	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Uranium-235	0.1278	U	0.265	0.265		0.533	pCi/g	11/07/16 15:28	11/28/16 12:04	1
Uranium-238	0.2602	U	0.694	0.695		1.19	pCi/g	11/07/16 15:28	11/28/16 12:04	1

Lab Sample ID: LCS 160-278070/2-A
Matrix: Solid
Analysis Batch: 281218

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 278070

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	101.4		10.7		1.18	pCi/g	104	87 - 116
Cesium-137	29.3	29.12		3.11		0.226	pCi/g	99	87 - 120
Cobalt-60	16.1	15.60		1.62		0.102	pCi/g	97	87 - 115

Lab Sample ID: 160-19855-1 DU
Matrix: Solid
Analysis Batch: 281219

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S001
Prep Type: Total/NA
Prep Batch: 278070

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.437		0.3150		0.113		0.259	pCi/g	0.48	1
Actinium-227	0.253	U	-0.3040	U	0.704		1.18	pCi/g	0.41	1
Bismuth-212	-0.0826	U	0.01476	U	0.689		1.22	pCi/g	0.06	1
Bismuth-214	0.261		0.3687		0.117		0.106	pCi/g	0.49	1
Cesium-137	0.0279	U	-0.03807	U	0.0660		0.110	pCi/g	0.58	1
Lead-210	1.37	U	-0.5408	U	1.39		2.43	pCi/g	0.71	1
Lead-212	0.289		0.2586		0.0809		0.0932	pCi/g	0.19	1
Lead-214	0.419		0.3790		0.0977		0.100	pCi/g	0.20	1
Potassium-40	10.0		11.05		1.75		0.477	pCi/g	0.30	1
Protactinium-231	0.269	U	-0.00000	U	1.72		2.95	pCi/g	0.1	1
			0005							
Radium-226	0.261		0.3687		0.117	0.500	0.106	pCi/g	0.49	1
Radium-228	0.437		0.3150		0.113		0.259	pCi/g	0.48	1

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QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-19855-1 DU

Matrix: Solid

Analysis Batch: 281219

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S001

Prep Type: Total/NA

Prep Batch: 278070

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.108		0.1139		0.0567		0.0529	pCi/g	0.06	1
Thorium-228	0.289		0.2586		0.0809		0.0932	pCi/g	0.19	1
Thorium-232	0.437		0.3150		0.113		0.259	pCi/g	0.48	1
Thorium-234	0.767	U	-0.6604	U	1.10		2.19	pCi/g	0.92	1
Uranium-235	0.0805	U	-0.1602	U	0.509		0.850	pCi/g	0.33	1
Uranium-238	0.767	U	-0.6604	U	1.10		2.19	pCi/g	0.92	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Rad

Leach Batch: 277740

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19855-1	TITO04-NP-FSS-SU3-BSRSY10-U7-S001	Total/NA	Solid	Dry and Grind	
160-19855-2	TITO04-NP-FSS-SU3-BSRSY10-U7-S002	Total/NA	Solid	Dry and Grind	
160-19855-3	TITO04-NP-FSS-SU3-BSRSY10-U7-S003	Total/NA	Solid	Dry and Grind	
160-19855-4	TITO04-NP-FSS-SU3-BSRSY10-U7-S004	Total/NA	Solid	Dry and Grind	
160-19855-5	TITO04-NP-FSS-SU3-BSRSY10-U7-S005	Total/NA	Solid	Dry and Grind	
160-19855-6	TITO04-NP-FSS-SU3-BSRSY10-U7-S006	Total/NA	Solid	Dry and Grind	
160-19855-7	TITO04-NP-FSS-SU3-BSRSY10-U7-S007	Total/NA	Solid	Dry and Grind	
160-19855-8	TITO04-NP-FSS-SU3-BSRSY10-U7-S008	Total/NA	Solid	Dry and Grind	
160-19855-9	TITO04-NP-FSS-SU3-BSRSY10-U7-S009	Total/NA	Solid	Dry and Grind	
160-19855-10	TITO04-NP-FSS-SU3-BSRSY10-U7-S010	Total/NA	Solid	Dry and Grind	
160-19855-11	TITO04-NP-FSS-SU3-BSRSY10-U7-S011	Total/NA	Solid	Dry and Grind	
160-19855-12	TITO04-NP-FSS-SU3-BSRSY10-U7-S012	Total/NA	Solid	Dry and Grind	
160-19855-13	TITO04-NP-FSS-SU3-BSRSY10-U7-S013	Total/NA	Solid	Dry and Grind	
160-19855-14	TITO04-NP-FSS-SU3-BSRSY10-U7-S014	Total/NA	Solid	Dry and Grind	
160-19855-15	TITO04-NP-FSS-SU3-BSRSY10-U7-S015	Total/NA	Solid	Dry and Grind	
160-19855-16	TITO04-NP-FSS-SU3-BSRSY10-U7-S016	Total/NA	Solid	Dry and Grind	
160-19855-17	TITO04-NP-FSS-SU3-BSRSY10-U7-S017	Total/NA	Solid	Dry and Grind	
160-19855-18	TITO04-NP-FSS-SU3-BSRSY10-U7-S018	Total/NA	Solid	Dry and Grind	
160-19855-19	TITO04-NP-FSS-SU3-BSRSY10-U7-S019	Total/NA	Solid	Dry and Grind	
160-19855-20	TITO04-NP-FSS-SU3-BSRSY10-U7-S020	Total/NA	Solid	Dry and Grind	
160-19855-1 DU	TITO04-NP-FSS-SU3-BSRSY10-U7-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 278070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19855-1	TITO04-NP-FSS-SU3-BSRSY10-U7-S001	Total/NA	Solid	Fill_Geo-21	277740
160-19855-2	TITO04-NP-FSS-SU3-BSRSY10-U7-S002	Total/NA	Solid	Fill_Geo-21	277740
160-19855-3	TITO04-NP-FSS-SU3-BSRSY10-U7-S003	Total/NA	Solid	Fill_Geo-21	277740
160-19855-4	TITO04-NP-FSS-SU3-BSRSY10-U7-S004	Total/NA	Solid	Fill_Geo-21	277740
160-19855-5	TITO04-NP-FSS-SU3-BSRSY10-U7-S005	Total/NA	Solid	Fill_Geo-21	277740
160-19855-6	TITO04-NP-FSS-SU3-BSRSY10-U7-S006	Total/NA	Solid	Fill_Geo-21	277740
160-19855-7	TITO04-NP-FSS-SU3-BSRSY10-U7-S007	Total/NA	Solid	Fill_Geo-21	277740
160-19855-8	TITO04-NP-FSS-SU3-BSRSY10-U7-S008	Total/NA	Solid	Fill_Geo-21	277740
160-19855-9	TITO04-NP-FSS-SU3-BSRSY10-U7-S009	Total/NA	Solid	Fill_Geo-21	277740
160-19855-10	TITO04-NP-FSS-SU3-BSRSY10-U7-S010	Total/NA	Solid	Fill_Geo-21	277740
160-19855-11	TITO04-NP-FSS-SU3-BSRSY10-U7-S011	Total/NA	Solid	Fill_Geo-21	277740
160-19855-12	TITO04-NP-FSS-SU3-BSRSY10-U7-S012	Total/NA	Solid	Fill_Geo-21	277740
160-19855-13	TITO04-NP-FSS-SU3-BSRSY10-U7-S013	Total/NA	Solid	Fill_Geo-21	277740
160-19855-14	TITO04-NP-FSS-SU3-BSRSY10-U7-S014	Total/NA	Solid	Fill_Geo-21	277740
160-19855-15	TITO04-NP-FSS-SU3-BSRSY10-U7-S015	Total/NA	Solid	Fill_Geo-21	277740
160-19855-16	TITO04-NP-FSS-SU3-BSRSY10-U7-S016	Total/NA	Solid	Fill_Geo-21	277740
160-19855-17	TITO04-NP-FSS-SU3-BSRSY10-U7-S017	Total/NA	Solid	Fill_Geo-21	277740
160-19855-18	TITO04-NP-FSS-SU3-BSRSY10-U7-S018	Total/NA	Solid	Fill_Geo-21	277740
160-19855-19	TITO04-NP-FSS-SU3-BSRSY10-U7-S019	Total/NA	Solid	Fill_Geo-21	277740
160-19855-20	TITO04-NP-FSS-SU3-BSRSY10-U7-S020	Total/NA	Solid	Fill_Geo-21	277740
MB 160-278070/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-278070/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-19855-1 DU	TITO04-NP-FSS-SU3-BSRSY10-U7-S001	Total/NA	Solid	Fill_Geo-21	277740

TestAmerica St. Louis

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-19909-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan



Authorized for release by:
12/5/2016 2:13:04 PM

Erika Gish, Project Manager II
(314)298-8566
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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-2

Job ID: 160-19909-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-19909-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-2

Job ID: 160-19909-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 11/9/2016 8:30 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 19.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-NP-SU5-SWFSS-5-13-S001 (160-19909-1), TITO04-NP-SU5-SWFSS-5-16-S002 (160-19909-2) and TITO04-NP-SU5-SWFSS-5-17-S003 (160-19909-3) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/09/2016, prepared on 11/11/2016 and analyzed on 12/02/2016.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-19909-2

Login Number: 19909

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-19909-1	TITO04-NP-SU5-SWFSS-5-13-S001	Solid	10/24/16 09:45	11/09/16 08:30
160-19909-2	TITO04-NP-SU5-SWFSS-5-16-S002	Solid	10/26/16 10:32	11/09/16 08:30
160-19909-3	TITO04-NP-SU5-SWFSS-5-17-S003	Solid	11/07/16 15:41	11/09/16 08:30

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-2

Client Sample ID: TITO04-NP-SU5-SWFSS-5-13-S001

Lab Sample ID: 160-19909-1

Date Collected: 10/24/16 09:45

Matrix: Solid

Date Received: 11/09/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.06		0.232	0.256		0.362	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Actinium-227	0.119	U	0.258	0.258		1.27	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Bismuth-212	0.000	U	0.915	0.915		1.95	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Bismuth-214	1.13		0.197	0.230		0.127	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Cesium-137	-0.0413	U	0.0857	0.0858		0.145	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Lead-210	-0.0770	U	1.91	1.91		3.25	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Lead-212	0.878		0.138	0.179		0.143	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Lead-214	1.11		0.180	0.214		0.148	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Potassium-40	5.61		1.25	1.38		0.774	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Protactinium-231	-1.15	U	3.63	3.63		6.09	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Radium-226	1.13		0.197	0.230	0.500	0.127	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Radium-228	1.06		0.232	0.256		0.362	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Thallium-208	0.409		0.0845	0.0946		0.0450	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Thorium-228	0.878		0.138	0.179		0.143	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Thorium-232	1.06		0.232	0.256		0.362	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Thorium-234	0.157	U	1.59	1.59		2.68	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Uranium-235	0.109	U	0.255	0.255		0.782	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Uranium-238	0.157	U	1.59	1.59		2.68	pCi/g	11/11/16 13:26	12/02/16 08:01	1

Client Sample ID: TITO04-NP-SU5-SWFSS-5-16-S002

Lab Sample ID: 160-19909-2

Date Collected: 10/26/16 10:32

Matrix: Solid

Date Received: 11/09/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.474		0.133	0.141		0.0769	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Actinium-227	0.166	U	0.471	0.472		1.20	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Bismuth-212	0.000	U	0.533	0.533		1.30	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Bismuth-214	0.345		0.112	0.117		0.115	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Cesium-137	-0.0233	U	0.0651	0.0652		0.123	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Lead-210	0.399	U	1.13	1.13		1.66	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Lead-212	0.384		0.0850	0.0985		0.0990	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Lead-214	0.466		0.125	0.134		0.113	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Potassium-40	11.1		1.39	1.80		0.689	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Protactinium-231	-0.802	U	2.52	2.53		4.24	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Radium-226	0.345		0.112	0.117	0.500	0.115	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Radium-228	0.474		0.133	0.141		0.0769	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Thallium-208	0.131		0.0482	0.0501		0.0469	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Thorium-228	0.384		0.0850	0.0985		0.0990	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Thorium-232	0.474		0.133	0.141		0.0769	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Thorium-234	0.905	U	0.956	0.961		1.31	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Uranium-235	-0.193	U	0.276	0.277		0.983	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Uranium-238	0.905	U	0.956	0.961		1.31	pCi/g	11/11/16 13:26	12/02/16 08:03	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-2

Client Sample ID: TITO04-NP-SU5-SWFSS-5-17-S003

Lab Sample ID: 160-19909-3

Date Collected: 11/07/16 15:41

Matrix: Solid

Date Received: 11/09/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.516		0.185	0.192		0.306	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Actinium-227	0.170	U	0.618	0.618		0.896	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Bismuth-212	-0.159	U	0.669	0.669		1.18	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Bismuth-214	0.323		0.106	0.112		0.113	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Cesium-137	-0.000158	U	0.0766	0.0766		0.135	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Lead-210	-0.0592	U	1.53	1.53		2.34	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Lead-212	0.301		0.0834	0.0921		0.101	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Lead-214	0.370		0.0953	0.103		0.126	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Potassium-40	11.9		1.55	1.97		0.715	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Protactinium-231	-0.486	U	2.33	2.33		3.94	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Radium-226	0.323		0.106	0.112	0.500	0.113	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Radium-228	0.516		0.185	0.192		0.306	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Thallium-208	0.174		0.0557	0.0586		0.0483	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Thorium-228	0.301		0.0834	0.0921		0.101	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Thorium-232	0.516		0.185	0.192		0.306	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Thorium-234	0.427	U	0.898	0.899		1.50	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Uranium-235	0.147	U	0.308	0.308		0.581	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Uranium-238	0.427	U	0.898	0.899		1.50	pCi/g	11/11/16 13:26	12/02/16 08:06	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-278933/1-A
Matrix: Solid
Analysis Batch: 282158

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 278933

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.05015	U	0.181	0.181		0.219	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Actinium-227	-0.2566	U	0.562	0.562		0.951	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Bismuth-212	0.0000	U	0.0810	0.0810		0.299	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Bismuth-214	0.06999	U	0.0669	0.0673		0.248	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Cesium-137	-0.02341	U	0.0505	0.0505		0.0870	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Lead-210	0.3767	U	0.970	0.971		1.66	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Lead-212	0.01413	U	0.0706	0.0706		0.122	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Lead-214	-0.01364	U	0.0613	0.0613		0.113	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Potassium-40	-0.03408	U	0.394	0.394		0.775	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Protactinium-231	-0.1579	U	2.36	2.36		4.03	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Radium-226	0.06999	U	0.0669	0.0673	0.500	0.248	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Radium-228	-0.05015	U	0.181	0.181		0.219	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Thallium-208	-0.0008689	U	0.00650	0.00650		0.0701	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Thorium-228	0.01413	U	0.0706	0.0706		0.122	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Thorium-232	-0.05015	U	0.181	0.181		0.219	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Thorium-234	0.2602	U	0.517	0.518		0.882	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Uranium-235	-0.1168	U	0.150	0.150		0.530	pCi/g	11/11/16 13:26	12/02/16 17:09	1
Uranium-238	0.2602	U	0.517	0.518		0.882	pCi/g	11/11/16 13:26	12/02/16 17:09	1

Lab Sample ID: LCS 160-278933/2-A
Matrix: Solid
Analysis Batch: 282159

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 278933

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	98.69		10.4		1.22	pCi/g	102	87 - 116
Cesium-137	29.3	29.13		3.11		0.271	pCi/g	99	87 - 120
Cobalt-60	16.1	15.61		1.62		0.165	pCi/g	97	87 - 115

Lab Sample ID: 160-19909-1 DU
Matrix: Solid
Analysis Batch: 282160

Client Sample ID: TITO04-NP-SU5-SWFSS-5-13-S001
Prep Type: Total/NA
Prep Batch: 278933

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	1.06		0.9656		0.187		0.0768	pCi/g	0.21	1
Actinium-227	0.119	U	-0.00432	U	0.777		1.32	pCi/g	0.12	1
Bismuth-212	0.000	U	-0.04428	U	0.734		1.28	pCi/g	0.03	1
Bismuth-214	1.13		0.9273		0.174		0.106	pCi/g	0.51	1
Cesium-137	-0.0413	U	-0.04054	U	0.0836		0.103	pCi/g	0	1
Lead-210	-0.0770	U	-0.8112	U	1.49		2.48	pCi/g	0.22	1
Lead-212	0.878		1.116		0.186		0.101	pCi/g	0.66	1
Lead-214	1.11		0.8686		0.147		0.103	pCi/g	0.66	1
Potassium-40	5.61		6.143		1.15		0.461	pCi/g	0.21	1
Protactinium-231	-1.15	U	-0.8362	U	2.73		4.57	pCi/g	0.05	1
Radium-226	1.13		0.9273		0.174	0.500	0.106	pCi/g	0.51	1
Radium-228	1.06		0.9656		0.187		0.0768	pCi/g	0.21	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-19909-1 DU

Matrix: Solid

Analysis Batch: 282160

Client Sample ID: TITO04-NP-SU5-SWFSS-5-13-S001

Prep Type: Total/NA

Prep Batch: 278933

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.409		0.3339		0.0724		0.0415	pCi/g	0.45	1
Thorium-228	0.878		1.116		0.186		0.101	pCi/g	0.66	1
Thorium-232	1.06		0.9656		0.187		0.0768	pCi/g	0.21	1
Thorium-234	0.157	U	-0.4879	U	1.47		2.47	pCi/g	0.21	1
Uranium-235	0.109	U	-0.2089	U	0.571		0.950	pCi/g	0.38	1
Uranium-238	0.157	U	-0.4879	U	1.47		2.47	pCi/g	0.21	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-2

Rad

Leach Batch: 278461

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19909-1	TITO04-NP-SU5-SWFSS-5-13-S001	Total/NA	Solid	Dry and Grind	
160-19909-2	TITO04-NP-SU5-SWFSS-5-16-S002	Total/NA	Solid	Dry and Grind	
160-19909-3	TITO04-NP-SU5-SWFSS-5-17-S003	Total/NA	Solid	Dry and Grind	
160-19909-1 DU	TITO04-NP-SU5-SWFSS-5-13-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 278933

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19909-1	TITO04-NP-SU5-SWFSS-5-13-S001	Total/NA	Solid	Fill_Geo-21	278461
160-19909-2	TITO04-NP-SU5-SWFSS-5-16-S002	Total/NA	Solid	Fill_Geo-21	278461
160-19909-3	TITO04-NP-SU5-SWFSS-5-17-S003	Total/NA	Solid	Fill_Geo-21	278461
MB 160-278933/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-278933/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-19909-1 DU	TITO04-NP-SU5-SWFSS-5-13-S001	Total/NA	Solid	Fill_Geo-21	278461

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-19909-3

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan



Authorized for release by:
1/13/2017 11:55:09 AM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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Results relate only to the items tested and the sample(s) as received by the laboratory.

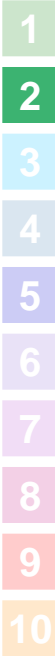


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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-3

Job ID: 160-19909-3

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-19909-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-3

Job ID: 160-19909-3 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 11/9/2016 8:30 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 19.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Sample TITO04-NP-SU5-SWFSS-5-13-S001 (160-19909-1) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/09/2016, and prepared and analyzed on 01/12/2017.

Sample was recounted in duplicate to confirm original results.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-19909-3

Login Number: 19909

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-3

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-3

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-19909-1	TITO04-NP-SU5-SWFSS-5-13-S001	Solid	10/24/16 09:45	11/09/16 08:30

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-3

Client Sample ID: TITO04-NP-SU5-SWFSS-5-13-S001

Lab Sample ID: 160-19909-1

Date Collected: 10/24/16 09:45

Matrix: Solid

Date Received: 11/09/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.506		0.139	0.148		0.0704	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Actinium-227	0.0570	U	0.664	0.664		1.14	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Bismuth-212	0.421	U	0.703	0.705		1.18	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Bismuth-214	0.431		0.121	0.129		0.114	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Cesium-137	0.0307	U	0.0510	0.0511		0.0857	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Lead-210	0.597	U	1.32	1.32		2.22	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Lead-212	0.467		0.0775	0.0983		0.0696	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Lead-214	0.551		0.100	0.115		0.0946	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Potassium-40	11.6		1.36	1.81		0.560	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Protactinium-231	0.000	U	0.365	0.365		3.98	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Radium-226	0.431		0.121	0.129	0.500	0.114	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Radium-228	0.506		0.139	0.148		0.0704	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Thallium-208	0.177		0.0462	0.0497		0.0314	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Thorium-228	0.467		0.0775	0.0983		0.0696	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Thorium-232	0.506		0.139	0.148		0.0704	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Thorium-234	0.379	U	1.28	1.28		2.16	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Uranium-235	0.139	U	0.254	0.254		0.848	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Uranium-238	0.379	U	1.28	1.28		2.16	pCi/g	01/12/17 11:51	01/12/17 12:30	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-3

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-287675/1-A
Matrix: Solid
Analysis Batch: 287695

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 287675

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.01479	U	0.294	0.294		0.402	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Actinium-227	-0.03204	U	0.498	0.498		0.771	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Bismuth-212	0.0000	U	0.211	0.211		1.50	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Bismuth-214	0.1025	U	0.111	0.111		0.327	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Cesium-137	-0.03051	U	0.110	0.110		0.103	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Lead-210	-0.3547	U	1.36	1.36		2.19	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Lead-212	-0.07286	U	0.0895	0.0900		0.210	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Lead-214	-0.06578	U	0.181	0.181		0.241	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Potassium-40	-0.2892	U	1.14	1.14		1.03	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Protactinium-231	0.5165	U	1.22	1.22		2.99	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Radium-226	0.1025	U	0.111	0.111	0.500	0.327	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Radium-228	-0.01479	U	0.294	0.294		0.402	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Thallium-208	-0.07512	U	0.0631	0.0636		0.148	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Thorium-228	-0.07286	U	0.0895	0.0900		0.210	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Thorium-232	-0.01479	U	0.294	0.294		0.402	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Thorium-234	-0.4579	U	0.885	0.886		1.66	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Uranium-235	0.08628	U	0.237	0.237		0.418	pCi/g	01/12/17 11:51	01/12/17 13:58	1
Uranium-238	-0.4579	U	0.885	0.886		1.66	pCi/g	01/12/17 11:51	01/12/17 13:58	1

Lab Sample ID: LCS 160-287675/2-A
Matrix: Solid
Analysis Batch: 287696

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 287675

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.0	91.77		9.65		1.47	pCi/g	95	87 - 116
Cesium-137	29.3	28.79		3.09		0.272	pCi/g	98	87 - 120
Cobalt-60	15.8	16.20		1.69		0.109	pCi/g	102	87 - 115

Lab Sample ID: 160-19909-1 DU
Matrix: Solid
Analysis Batch: 287647

Client Sample ID: TITO04-NP-SU5-SWFSS-5-13-S001
Prep Type: Total/NA
Prep Batch: 287675

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.506		0.5063		0.151		0.162	pCi/g	0	1
Actinium-227	0.0570	U	-0.3427	U	0.928		1.56	pCi/g	0.25	1
Bismuth-212	0.421	U	-0.02698	U	0.733		1.31	pCi/g	0.31	1
Bismuth-214	0.431		0.3823		0.123		0.114	pCi/g	0.19	1
Cesium-137	0.0307	U	-0.00777	U	0.0672		0.154	pCi/g	0.33	1
Lead-210	0.597	U	0.4261	U	1.33		2.03	pCi/g	0.06	1
Lead-212	0.467		0.4745		0.118		0.113	pCi/g	0.03	1
Lead-214	0.551		0.5203		0.133		0.144	pCi/g	0.13	1
Potassium-40	11.6		10.48		1.82		0.651	pCi/g	0.32	1
Protactinium-231	0.000	U	-0.7358	U	2.39		4.03	pCi/g	0.27	1
Radium-226	0.431		0.3823		0.123	0.500	0.114	pCi/g	0.19	1
Radium-228	0.506		0.5063		0.151		0.162	pCi/g	0	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-3

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-19909-1 DU

Matrix: Solid

Analysis Batch: 287647

Client Sample ID: TITO04-NP-SU5-SWFSS-5-13-S001

Prep Type: Total/NA

Prep Batch: 287675

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.177		0.1754		0.0604		0.0555	pCi/g	0.01	1
Thorium-228	0.467		0.4745		0.118		0.113	pCi/g	0.03	1
Thorium-232	0.506		0.5063		0.151		0.162	pCi/g	0	1
Thorium-234	0.379	U	1.579	U	1.27		1.64	pCi/g	0.47	1
Uranium-235	0.139	U	0.1164	U	0.269		0.618	pCi/g	0.04	1
Uranium-238	0.379	U	1.579	U	1.27		1.64	pCi/g	0.47	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-3

Rad

Leach Batch: 278461

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19909-1	TITO04-NP-SU5-SWFSS-5-13-S001	Total/NA	Solid	Dry and Grind	
160-19909-1 DU	TITO04-NP-SU5-SWFSS-5-13-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 287675

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-19909-1	TITO04-NP-SU5-SWFSS-5-13-S001	Total/NA	Solid	Fill_Geo-21	278461
MB 160-287675/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-287675/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-19909-1 DU	TITO04-NP-SU5-SWFSS-5-13-S001	Total/NA	Solid	Fill_Geo-21	278461

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-14443-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
11/20/2015 2:27:21 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14443-2

Job ID: 160-14443-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-14443-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14443-2

Job ID: 160-14443-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/23/2015 8:45 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI_TO04-BS-R-SU8-S017 (160-14443-1), TI_TO04-BS-R-SU8-S018 (160-14443-2), TI_TO04-BS-R-SU8-S020 (160-14443-3) and TI_TO04-BS-R-SU8-S021 (160-14443-4) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/23/2015, prepared on 10/26/2015 and analyzed on 11/16/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Shaw Environmental and Infrastructure Inc. (a CBI company)
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL P3_FSS_SU8_BS_133

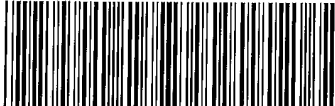


Page 1 of 1

Project Number: 500060
Project Name / Location: CTO-04 Phase III Bayside
FSS SU8
Purchase Order #: 201455

Shipment Date: 10/22/15
Waybill Number: 12820462019501479
Lab Destination: Earth Toxics Inc To Test America
Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Patricia Flynn
Phone/Fax Number: 925-288-2037
Address: 4005 Port Chicago Hwy
City: Concord, CA, 94520

Sample ID Number		Sample Description	Collection Information		Matrix	# of Containers	Preservative (water)	Preservative (soil)	Container Type	Gamma Scan	Dose Rate μ R/h
Date	Time	Method									
10/14/15	1337	G	SO	1	16 oz Plastic	X					
10/14/15	1340	G	SO	1	16 oz Plastic	X					
10/14/15	1350	G	SO	1	16 oz Plastic	X					
10/15/15	1430	G	SO	1	16 oz Plastic	X					
<div style="text-align: center;">  160-14443 Chain of Custody </div>											
Special Instructions: 7 days ingrown draft and follow with 21 days final											
Level Of QC Required: <input type="checkbox"/> 24-hr <input type="checkbox"/> 3-day <input type="checkbox"/> 7-day											
Standard TAT <input type="checkbox"/>											
Method Codes C = Composite G = Grab											
Matrix Codes DW = Drinking Water GW = Ground Water WW = Waste Water A = Air SO = Soil SL = Sludge CP = Chip Samples ABS=Asbestos, PO=Pipe Opening											
Relinquished By:  Date: 10/22/15 Time: 12:30 Received By:  Date: 10/23/15 Time: 08:45											

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-14443-2

Login Number: 14443

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14443-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14443-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14443-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-14443-1	TI_TO04-BS-R-SU8-S017	Solid	10/14/15 13:37	10/23/15 08:45
160-14443-2	TI_TO04-BS-R-SU8-S018	Solid	10/14/15 13:40	10/23/15 08:45
160-14443-3	TI_TO04-BS-R-SU8-S020	Solid	10/14/15 13:50	10/23/15 08:45
160-14443-4	TI_TO04-BS-R-SU8-S021	Solid	10/15/15 14:30	10/23/15 08:45

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14443-2

Client Sample ID: TI_TO04-BS-R-SU8-S017

Date Collected: 10/14/15 13:37

Date Received: 10/23/15 08:45

Lab Sample ID: 160-14443-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.330		0.166	0.169		0.205	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Actinium-227	0.0263	U	0.428	0.428		0.760	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Bismuth-212	0.671	U	0.613	0.617		0.961	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Bismuth-214	0.464		0.161	0.169		0.161	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Cesium-137	-0.00823	U	0.0472	0.0472		0.0851	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Lead-210	1.29	U	1.43	1.44		2.15	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Lead-212	0.574		0.106	0.129		0.103	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Lead-214	0.456		0.114	0.123		0.124	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Potassium-40	10.6		1.47	1.83		0.633	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Protactinium-231	0.362	U	0.597	0.599		1.67	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Radium-226	0.464		0.161	0.169	0.500	0.161	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Radium-228	0.330		0.166	0.169		0.205	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Thallium-208	0.208		0.0572	0.0611		0.0498	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Thorium-228	0.574		0.106	0.129		0.103	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Thorium-232	0.330		0.166	0.169		0.205	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Thorium-234	1.01	U	0.917	0.923		1.44	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Uranium-235	0.0600	U	0.218	0.218		0.386	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Uranium-238	1.01	U	0.917	0.923		1.44	pCi/g	10/26/15 15:31	11/16/15 20:47	1

Client Sample ID: TI_TO04-BS-R-SU8-S018

Date Collected: 10/14/15 13:40

Date Received: 10/23/15 08:45

Lab Sample ID: 160-14443-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.716		0.181	0.195		0.216	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Actinium-227	0.0428	U	0.175	0.175		0.843	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Bismuth-212	0.000	U	0.641	0.641		0.957	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Bismuth-214	0.604		0.146	0.159		0.122	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Cesium-137	-0.00831	U	0.0464	0.0464		0.0847	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Lead-210	0.446	U	1.19	1.19		2.17	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Lead-212	0.828		0.132	0.170		0.120	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Lead-214	0.702		0.141	0.159		0.126	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Potassium-40	8.53		1.44	1.69		0.761	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Protactinium-231	0.254	U	0.531	0.532		2.36	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Radium-226	0.604		0.146	0.159	0.500	0.122	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Radium-228	0.716		0.181	0.195		0.216	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Thallium-208	0.282		0.0716	0.0774		0.0571	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Thorium-228	0.828		0.132	0.170		0.120	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Thorium-232	0.716		0.181	0.195		0.216	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Thorium-234	0.859	U	0.970	0.974		1.66	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Uranium-235	0.156	U	0.224	0.224		0.482	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Uranium-238	0.859	U	0.970	0.974		1.66	pCi/g	10/26/15 15:31	11/16/15 20:49	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14443-2

Client Sample ID: TI_TO04-BS-R-SU8-S020

Lab Sample ID: 160-14443-3

Date Collected: 10/14/15 13:50

Matrix: Solid

Date Received: 10/23/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.515		0.147	0.156		0.0774	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Actinium-227	0.178	U	0.400	0.400		0.680	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Bismuth-212	0.0872	U	0.452	0.452		0.842	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Bismuth-214	0.436		0.124	0.132		0.117	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Cesium-137	-0.0106	U	0.0407	0.0407		0.0721	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Lead-210	0.186	U	0.911	0.911		1.70	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Lead-212	0.253		0.0800	0.0865		0.0925	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Lead-214	0.361		0.0885	0.0961		0.123	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Potassium-40	10.8		1.35	1.74		0.659	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Protactinium-231	0.335	U	0.213	0.216		1.70	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Radium-226	0.436		0.124	0.132	0.500	0.117	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Radium-228	0.515		0.147	0.156		0.0774	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Thallium-208	0.0463	U	0.0459	0.0462		0.0622	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Thorium-228	0.253		0.0800	0.0865		0.0925	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Thorium-232	0.515		0.147	0.156		0.0774	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Thorium-234	0.301	U	0.434	0.435		1.52	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Uranium-235	0.179	U	0.165	0.166		0.305	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Uranium-238	0.301	U	0.434	0.435		1.52	pCi/g	10/26/15 15:31	11/16/15 21:33	1

Client Sample ID: TI_TO04-BS-R-SU8-S021

Lab Sample ID: 160-14443-4

Date Collected: 10/15/15 14:30

Matrix: Solid

Date Received: 10/23/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.191	U	0.107	0.109		0.267	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Actinium-227	-0.0195	U	0.386	0.386		0.693	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Bismuth-212	0.000	U	0.546	0.546		1.05	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Bismuth-214	0.391		0.137	0.143		0.157	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Cesium-137	-0.0414	U	0.250	0.250		0.121	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Lead-210	0.638	U	1.08	1.08		1.91	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Lead-212	0.499		0.113	0.130		0.106	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Lead-214	0.279		0.107	0.111		0.177	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Potassium-40	12.0		1.79	2.17		0.678	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Protactinium-231	-0.349	U	1.17	1.17		2.04	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Radium-226	0.391		0.137	0.143	0.500	0.157	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Radium-228	0.191	U	0.107	0.109		0.267	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Thallium-208	0.249		0.0707	0.0753		0.0461	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Thorium-228	0.499		0.113	0.130		0.106	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Thorium-232	0.191	U	0.107	0.109		0.267	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Thorium-234	0.525	U	0.366	0.370		1.73	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Uranium-235	0.130	U	0.192	0.192		0.319	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Uranium-238	0.525	U	0.366	0.370		1.73	pCi/g	10/26/15 15:31	11/16/15 21:34	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14443-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-218750/1-A

Matrix: Solid

Analysis Batch: 222236

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 218750

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0000	U	0.0468	0.0468		0.173	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Actinium-227	0.09088	U	0.152	0.153		0.589	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Bismuth-212	0.0000	U	0.149	0.149		0.549	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Bismuth-214	-0.03463	U	0.195	0.195		0.219	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Cesium-137	0.0005329	U	0.0394	0.0394		0.0976	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Lead-210	0.6833	U	0.924	0.927		1.60	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Lead-212	-0.005334	U	0.0784	0.0784		0.104	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Lead-214	-0.07632	U	0.530	0.530		0.194	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Potassium-40	-0.08118	U	1.23	1.23		1.45	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Protactinium-231	0.1208	U	0.553	0.553		1.44	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Radium-226	-0.03463	U	0.195	0.195	0.500	0.219	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Radium-228	0.0000	U	0.0468	0.0468		0.173	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Thallium-208	0.01254	U	0.0275	0.0276		0.0772	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Thorium-228	-0.005334	U	0.0784	0.0784		0.104	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Thorium-232	0.0000	U	0.0468	0.0468		0.173	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Thorium-234	0.1169	U	0.343	0.344		1.34	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Uranium-235	0.03120	U	0.146	0.146		0.268	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Uranium-238	0.1169	U	0.343	0.344		1.34	pCi/g	10/26/15 15:31	11/16/15 20:45	1

Lab Sample ID: LCS 160-218750/2-A

Matrix: Solid

Analysis Batch: 222238

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 218750

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.2	101.3		10.7		1.38	pCi/g	104	87 - 116
Cesium-137	30.0	29.93		3.20		0.262	pCi/g	100	87 - 120
Cobalt-60	18.5	17.91		1.86		0.115	pCi/g	97	87 - 115

Lab Sample ID: 160-14443-1 DU

Matrix: Solid

Analysis Batch: 222243

Client Sample ID: TI_TO04-BS-R-SU8-S017

Prep Type: Total/NA

Prep Batch: 218750

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.330		0.6700		0.155		0.0822	pCi/g	1.05	1
Actinium-227	0.0263	U	0.09748	U	0.311		0.851	pCi/g	0.1	1
Bismuth-212	0.671	U	0.3136	U	0.484		0.813	pCi/g	0.32	1
Bismuth-214	0.464		0.4275		0.153		0.144	pCi/g	0.11	1
Cesium-137	-0.00823	U	-0.00614	U	0.0377		0.0686	pCi/g	0.02	1
Lead-210	1.29	U	0.1605	U	1.16		2.14	pCi/g	0.44	1
Lead-212	0.574		0.4897		0.125		0.111	pCi/g	0.33	1
Lead-214	0.456		0.4459		0.126		0.143	pCi/g	0.04	1
Potassium-40	10.6		10.98		1.80		0.645	pCi/g	0.09	1
Protactinium-231	0.362	U	0.3450	U	0.326		1.81	pCi/g	0.02	1
Radium-226	0.464		0.4275		0.153	0.500	0.144	pCi/g	0.11	1
Radium-228	0.330		0.6700		0.155		0.0822	pCi/g	1.05	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14443-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-14443-1 DU

Matrix: Solid

Analysis Batch: 222243

Client Sample ID: TI_TO04-BS-R-SU8-S017

Prep Type: Total/NA

Prep Batch: 218750

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.208		0.1859		0.0582		0.0523	pCi/g	0.19	1
Thorium-228	0.574		0.4897		0.125		0.111	pCi/g	0.33	1
Thorium-232	0.330		0.6700		0.155		0.0822	pCi/g	1.05	1
Thorium-234	1.01	U	0.4557	U	0.407		1.41	pCi/g	0.42	1
Uranium-235	0.0600	U	0.09291	U	0.183		0.317	pCi/g	0.08	1
Uranium-238	1.01	U	0.4557	U	0.407		1.41	pCi/g	0.42	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14443-2

Rad

Leach Batch: 218124

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14443-1	TI_TO04-BS-R-SU8-S017	Total/NA	Solid	Dry and Grind	
160-14443-1 DU	TI_TO04-BS-R-SU8-S017	Total/NA	Solid	Dry and Grind	
160-14443-2	TI_TO04-BS-R-SU8-S018	Total/NA	Solid	Dry and Grind	
160-14443-3	TI_TO04-BS-R-SU8-S020	Total/NA	Solid	Dry and Grind	
160-14443-4	TI_TO04-BS-R-SU8-S021	Total/NA	Solid	Dry and Grind	

Prep Batch: 218750

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14443-1	TI_TO04-BS-R-SU8-S017	Total/NA	Solid	Fill_Geo-21	218124
160-14443-1 DU	TI_TO04-BS-R-SU8-S017	Total/NA	Solid	Fill_Geo-21	218124
160-14443-2	TI_TO04-BS-R-SU8-S018	Total/NA	Solid	Fill_Geo-21	218124
160-14443-3	TI_TO04-BS-R-SU8-S020	Total/NA	Solid	Fill_Geo-21	218124
160-14443-4	TI_TO04-BS-R-SU8-S021	Total/NA	Solid	Fill_Geo-21	218124
LCS 160-218750/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-218750/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-14512-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn

Rhonda Ridenhower

Authorized for release by:

11/25/2015 9:01:41 AM

Rhonda Ridenhower, Manager of Project Management
rhonda.ridenhower@testamericainc.com

Designee for

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14512-2

Job ID: 160-14512-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-14512-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14512-2

Job ID: 160-14512-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/28/2015; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 20.2 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-FSS-BISU8-S001 (160-14512-1), TI-TO04-FSS-BISU8-S002 (160-14512-2), TI-TO04-FSS-BISU8-S003 (160-14512-3) and TI-TO04-FSS-BISU8-S004 (160-14512-4) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/28/2015, prepared on 10/30/2015 and analyzed on 11/20/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Shaw Environmental and Infrastructure Inc. (a CB&I company)
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TI_P3_FSS_SU8_BIASED_141

Page 1 of 1

Project Number: **500060**

Project Name / Location: CTO-04 Phase III BIASED

FSS SU8 BAYSIDE

Purchase Order #: 201455

Shipment Date: 10/27/15

Waybill Number: 1289V4620196610486

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Sampler's Name(s): T. WELLS

Sample ID Number	Sample Description
TI-TO04-FSS-BISU8-S001	Bayside Biased Survey Unit 8 FSS
TI-TO04-FSS-BISU8-S002	Bayside Biased Survey Unit 8 FSS
TI-TO04-FSS-BISU8-S003	Bayside Biased Survey Unit 8 FSS
TI-TO04-FSS-BISU8-S004	Bayside Biased Survey Unit 8 FSS

Collection Information

Date	Time	Method
10/26/15	1322	G
10/26/15	1325	G
10/26/15	1327	G
10/26/15	1324	G

Matrix

of containers

Preservative (water)

Preservative (soil)

Container Type

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

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16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

16 oz Plastic

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

I II III

G = Grab

C = Composite

Method Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

ABS=Asbestos, PO=Pipe Opening

Relinquished By:

Date: 10/27/15

Time: 1200

Relinquished By:

Date: 10/28/15

Time: 0840

Date: 10/28/15

Time: 0840

Received By: Patricia Flynn

Received By:

Date: 10/28/15

Time: 0840

Date: 10/28/15

Time: 0840

160-14512 Chain of Custody



Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-14512-2

Login Number: 14512

List Number: 1

Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14512-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14512-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14512-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-14512-1	TI-TO04-FSS-BISU8-S001	Solid	10/26/15 13:22	10/28/15 08:40
160-14512-2	TI-TO04-FSS-BISU8-S002	Solid	10/26/15 13:25	10/28/15 08:40
160-14512-3	TI-TO04-FSS-BISU8-S003	Solid	10/26/15 13:27	10/28/15 08:40
160-14512-4	TI-TO04-FSS-BISU8-S004	Solid	10/26/15 13:24	10/28/15 08:40

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14512-2

Client Sample ID: TI-TO04-FSS-BISU8-S001

Date Collected: 10/26/15 13:22

Date Received: 10/28/15 08:40

Lab Sample ID: 160-14512-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.679		0.153	0.168		0.134	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Actinium-227	0.0754	U	0.126	0.126		0.904	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Bismuth-212	0.198	U	0.586	0.586		1.02	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Bismuth-214	0.613		0.133	0.147		0.111	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Cesium-137	0.00206	U	0.0399	0.0399		0.0736	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Lead-210	0.731	U	1.25	1.26		1.99	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Lead-212	0.487		0.101	0.119		0.104	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Lead-214	0.612		0.132	0.146		0.137	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Potassium-40	13.9		1.60	2.14		0.666	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Protactinium-231	0.170	U	0.186	0.187		2.09	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Radium-226	0.613		0.133	0.147	0.500	0.111	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Radium-228	0.679		0.153	0.168		0.134	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Thallium-208	0.189		0.0558	0.0592		0.0527	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Thorium-228	0.487		0.101	0.119		0.104	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Thorium-232	0.679		0.153	0.168		0.134	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Thorium-234	0.412	U	0.522	0.524		1.91	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Uranium-235	0.151	U	0.163	0.164		0.439	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Uranium-238	0.412	U	0.522	0.524		1.91	pCi/g	10/30/15 13:09	11/20/15 12:02	1

Client Sample ID: TI-TO04-FSS-BISU8-S002

Date Collected: 10/26/15 13:25

Date Received: 10/28/15 08:40

Lab Sample ID: 160-14512-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.669		0.217	0.228		0.189	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Actinium-227	-0.171	U	0.639	0.639		1.10	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Bismuth-212	0.637	U	0.620	0.623		0.967	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Bismuth-214	0.656		0.168	0.181		0.163	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Cesium-137	0.0109	U	0.0524	0.0524		0.0949	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Lead-210	1.23	U	1.51	1.51		2.24	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Lead-212	0.752		0.142	0.172		0.141	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Lead-214	0.761		0.138	0.159		0.144	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Potassium-40	15.5		2.03	2.58		0.835	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Protactinium-231	0.538	U	0.528	0.531		2.10	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Radium-226	0.656		0.168	0.181	0.500	0.163	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Radium-228	0.669		0.217	0.228		0.189	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Thallium-208	0.295		0.0896	0.0947		0.0816	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Thorium-228	0.752		0.142	0.172		0.141	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Thorium-232	0.669		0.217	0.228		0.189	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Thorium-234	0.993	U	1.18	1.19		2.01	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Uranium-235	0.230	U	0.227	0.228		0.407	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Uranium-238	0.993	U	1.18	1.19		2.01	pCi/g	10/30/15 13:09	11/20/15 12:03	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14512-2

Client Sample ID: TI-TO04-FSS-BISU8-S003

Lab Sample ID: 160-14512-3

Date Collected: 10/26/15 13:27

Matrix: Solid

Date Received: 10/28/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.674		0.135	0.152		0.124	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Actinium-227	0.0105	U	0.390	0.390		0.689	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Bismuth-212	0.277	U	0.489	0.490		0.833	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Bismuth-214	0.366		0.124	0.130		0.131	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Cesium-137	-0.000243	U	0.0401	0.0401		0.0737	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Lead-210	-0.155	U	1.29	1.29		2.05	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Lead-212	0.412		0.107	0.120		0.113	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Lead-214	0.455		0.103	0.113		0.118	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Potassium-40	9.89		1.33	1.67		0.854	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Protactinium-231	-0.00605	U	0.824	0.824		1.49	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Radium-226	0.366		0.124	0.130	0.500	0.131	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Radium-228	0.674		0.135	0.152		0.124	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Thallium-208	0.121		0.0525	0.0539		0.0742	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Thorium-228	0.412		0.107	0.120		0.113	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Thorium-232	0.674		0.135	0.152		0.124	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Thorium-234	0.421	U	1.01	1.01		1.77	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Uranium-235	0.200	U	0.203	0.204		0.330	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Uranium-238	0.421	U	1.01	1.01		1.77	pCi/g	10/30/15 13:09	11/20/15 12:11	1

Client Sample ID: TI-TO04-FSS-BISU8-S004

Lab Sample ID: 160-14512-4

Date Collected: 10/26/15 13:24

Matrix: Solid

Date Received: 10/28/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.573		0.136	0.148		0.215	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Actinium-227	-0.0308	U	0.599	0.599		1.04	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Bismuth-212	0.571	U	0.489	0.493		0.742	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Bismuth-214	0.556		0.137	0.149		0.133	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Cesium-137	-0.0192	U	0.0472	0.0472		0.0821	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Lead-210	-0.0392	U	1.28	1.28		2.31	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Lead-212	0.568		0.106	0.129		0.102	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Lead-214	0.547		0.106	0.120		0.119	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Potassium-40	7.09		1.18	1.39		0.621	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Protactinium-231	0.604	U	0.535	0.539		1.97	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Radium-226	0.556		0.137	0.149	0.500	0.133	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Radium-228	0.573		0.136	0.148		0.215	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Thallium-208	0.261		0.0624	0.0680		0.0483	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Thorium-228	0.568		0.106	0.129		0.102	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Thorium-232	0.573		0.136	0.148		0.215	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Thorium-234	0.460	U	0.537	0.539		1.92	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Uranium-235	0.0421	U	0.122	0.122		0.278	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Uranium-238	0.460	U	0.537	0.539		1.92	pCi/g	10/30/15 13:09	11/20/15 12:04	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14512-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-219528/1-A

Matrix: Solid

Analysis Batch: 222932

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 219528

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0000	U	0.0938	0.0938		0.0924	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Actinium-227	-0.05873	U	0.311	0.312		0.559	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Bismuth-212	-0.05369	U	0.352	0.352		0.669	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Bismuth-214	-0.01429	U	0.105	0.105		0.149	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Cesium-137	-0.008633	U	0.0334	0.0334		0.0612	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Lead-210	0.0000	U	0.231	0.231		1.13	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Lead-212	-0.004558	U	0.0682	0.0682		0.0730	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Lead-214	-0.02713	U	0.149	0.149		0.129	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Potassium-40	-0.3852	U	15.4	15.4		0.778	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Protactinium-231	0.1030	U	0.432	0.432		1.26	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Radium-226	-0.01429	U	0.105	0.105	0.500	0.149	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Radium-228	0.0000	U	0.0938	0.0938		0.0924	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Thallium-208	-0.007701	U	0.0650	0.0650		0.0565	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Thorium-228	-0.004558	U	0.0682	0.0682		0.0730	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Thorium-232	0.0000	U	0.0938	0.0938		0.0924	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Thorium-234	0.006437	U	0.406	0.406		0.760	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Uranium-235	0.03627	U	0.120	0.120		0.231	pCi/g	10/30/15 13:09	11/20/15 12:01	1
Uranium-238	0.006437	U	0.406	0.406		0.760	pCi/g	10/30/15 13:09	11/20/15 12:01	1

Lab Sample ID: LCS 160-219528/2-A

Matrix: Solid

Analysis Batch: 222933

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 219528

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.2	95.76		10.1		1.26	pCi/g	99	87 - 116
Cesium-137	30.0	29.36		3.14		0.248	pCi/g	98	87 - 120
Cobalt-60	18.4	18.06		1.87		0.119	pCi/g	98	87 - 115

Lab Sample ID: 160-14512-1 DU

Matrix: Solid

Analysis Batch: 222932

Client Sample ID: TI-TO04-FSS-BISU8-S001

Prep Type: Total/NA

Prep Batch: 219528

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.679		0.5141		0.187		0.130	pCi/g	0.47	1
Actinium-227	0.0754	U	-0.1542	U	0.432		0.739	pCi/g	0.41	1
Bismuth-212	0.198	U	0.4110	U	0.418		0.658	pCi/g	0.21	1
Bismuth-214	0.613		0.4303		0.127		0.114	pCi/g	0.66	1
Cesium-137	0.00206	U	-0.00351	U	0.0382		0.0693	pCi/g	0.07	1
Lead-210	0.731	U	0.8789	U	0.935		1.51	pCi/g	0.07	1
Lead-212	0.487		0.4570		0.118		0.100	pCi/g	0.13	1
Lead-214	0.612		0.5484		0.125		0.127	pCi/g	0.24	1
Potassium-40	13.9		13.91		2.07		0.624	pCi/g	0	1
Protactinium-231	0.170	U	0.1662	U	0.251		1.77	pCi/g	0.01	1
Radium-226	0.613		0.4303		0.127	0.500	0.114	pCi/g	0.66	1
Radium-228	0.679		0.5141		0.187		0.130	pCi/g	0.47	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14512-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-14512-1 DU

Matrix: Solid

Analysis Batch: 222932

Client Sample ID: TI-TO04-FSS-BISU8-S001

Prep Type: Total/NA

Prep Batch: 219528

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.189		0.1758		0.0535		0.0433	pCi/g	0.12	1
Thorium-228	0.487		0.4570		0.118		0.100	pCi/g	0.13	1
Thorium-232	0.679		0.5141		0.187		0.130	pCi/g	0.47	1
Thorium-234	0.412	U	0.4051	U	0.354		1.54	pCi/g	0.01	1
Uranium-235	0.151	U	0.1229	U	0.116		0.360	pCi/g	0.1	1
Uranium-238	0.412	U	0.4051	U	0.354		1.54	pCi/g	0.01	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14512-2

Rad

Leach Batch: 218910

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14512-1	TI-TO04-FSS-BISU8-S001	Total/NA	Solid	Dry and Grind	
160-14512-1 DU	TI-TO04-FSS-BISU8-S001	Total/NA	Solid	Dry and Grind	
160-14512-2	TI-TO04-FSS-BISU8-S002	Total/NA	Solid	Dry and Grind	
160-14512-3	TI-TO04-FSS-BISU8-S003	Total/NA	Solid	Dry and Grind	
160-14512-4	TI-TO04-FSS-BISU8-S004	Total/NA	Solid	Dry and Grind	

Prep Batch: 219528

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14512-1	TI-TO04-FSS-BISU8-S001	Total/NA	Solid	Fill_Geo-21	218910
160-14512-1 DU	TI-TO04-FSS-BISU8-S001	Total/NA	Solid	Fill_Geo-21	218910
160-14512-2	TI-TO04-FSS-BISU8-S002	Total/NA	Solid	Fill_Geo-21	218910
160-14512-3	TI-TO04-FSS-BISU8-S003	Total/NA	Solid	Fill_Geo-21	218910
160-14512-4	TI-TO04-FSS-BISU8-S004	Total/NA	Solid	Fill_Geo-21	218910
LCS 160-219528/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-219528/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-14445-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
11/20/2015 2:45:05 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14445-2

Job ID: 160-14445-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-14445-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14445-2

Job ID: 160-14445-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/23/2015 8:45 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-BS-R-SU9-S008 (160-14445-1), TI-TO04-BS-R-SU9-S009 (160-14445-2), TI-TO04-BS-R-SU9-S010 (160-14445-3), TI-TO04-BS-R-SU9-S011 (160-14445-4), TI-TO04-BS-R-SU9-S019 (160-14445-5) and TI-TO04-BS-R-SU9-S020 (160-14445-6) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/23/2015, prepared on 10/26/2015 and analyzed on 11/16/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-14445-2

Login Number: 14445

List Number: 1

Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14445-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14445-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14445-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-14445-1	TI-TO04-BS-R-SU9-S008	Solid	10/16/15 10:29	10/23/15 08:45
160-14445-2	TI-TO04-BS-R-SU9-S009	Solid	10/16/15 10:07	10/23/15 08:45
160-14445-3	TI-TO04-BS-R-SU9-S010	Solid	10/16/15 09:10	10/23/15 08:45
160-14445-4	TI-TO04-BS-R-SU9-S011	Solid	10/16/15 09:35	10/23/15 08:45
160-14445-5	TI-TO04-BS-R-SU9-S019	Solid	10/16/15 09:29	10/23/15 08:45
160-14445-6	TI-TO04-BS-R-SU9-S020	Solid	10/16/15 09:36	10/23/15 08:45

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14445-2

Client Sample ID: TI-TO04-BS-R-SU9-S008

Date Collected: 10/16/15 10:29

Date Received: 10/23/15 08:45

Lab Sample ID: 160-14445-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.257		0.128	0.131		0.206	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Actinium-227	0.130	U	0.152	0.153		1.46	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Bismuth-212	0.226	U	0.498	0.499		0.867	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Bismuth-214	0.339		0.107	0.113		0.119	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Cesium-137	0.000	U	0.00931	0.00931		0.109	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Lead-210	1.49	U	1.82	1.83		2.42	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Lead-212	0.291		0.0828	0.0909		0.0949	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Lead-214	0.223		0.0755	0.0790		0.122	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Potassium-40	11.6		1.51	1.92		0.613	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Protactinium-231	0.210	U	0.708	0.708		1.26	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Radium-226	0.339		0.107	0.113	0.500	0.119	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Radium-228	0.257		0.128	0.131		0.206	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Thallium-208	0.0708		0.0463	0.0469		0.0692	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Thorium-228	0.291		0.0828	0.0909		0.0949	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Thorium-232	0.257		0.128	0.131		0.206	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Thorium-234	0.585	U	0.489	0.493		1.50	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Uranium-235	-0.0276	U	0.0649	0.0650		0.326	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Uranium-238	0.585	U	0.489	0.493		1.50	pCi/g	10/26/15 15:31	11/16/15 21:37	1

Client Sample ID: TI-TO04-BS-R-SU9-S009

Date Collected: 10/16/15 10:07

Date Received: 10/23/15 08:45

Lab Sample ID: 160-14445-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.160	U	0.152	0.153		0.251	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Actinium-227	-0.112	U	0.390	0.390		0.676	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Bismuth-212	0.191	U	0.431	0.431		0.758	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Bismuth-214	0.343		0.106	0.111		0.104	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Cesium-137	0.000281	U	0.0318	0.0318		0.0614	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Lead-210	-0.129	U	1.07	1.07		1.63	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Lead-212	0.270		0.0766	0.0842		0.0830	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Lead-214	0.226		0.0875	0.0906		0.121	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Potassium-40	10.8		1.51	1.87		0.657	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Protactinium-231	0.0627	U	0.408	0.408		1.37	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Radium-226	0.343		0.106	0.111	0.500	0.104	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Radium-228	0.160	U	0.152	0.153		0.251	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thallium-208	0.0712		0.0593	0.0597		0.0671	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thorium-228	0.270		0.0766	0.0842		0.0830	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thorium-232	0.160	U	0.152	0.153		0.251	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thorium-234	0.452	U	0.654	0.656		1.17	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Uranium-235	0.117	U	0.148	0.148		0.260	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Uranium-238	0.452	U	0.654	0.656		1.17	pCi/g	10/26/15 15:31	11/16/15 21:38	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14445-2

Client Sample ID: TI-TO04-BS-R-SU9-S010

Lab Sample ID: 160-14445-3

Date Collected: 10/16/15 09:10

Matrix: Solid

Date Received: 10/23/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.882		0.209	0.227		0.136	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Actinium-227	0.0391	U	0.134	0.134		1.01	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Bismuth-212	0.429	U	0.510	0.512		0.831	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Bismuth-214	0.526		0.155	0.164		0.157	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Cesium-137	0.00753	U	0.0357	0.0357		0.0646	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Lead-210	0.844	U	1.36	1.36		2.00	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Lead-212	0.712		0.149	0.175		0.146	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Lead-214	0.603		0.147	0.160		0.154	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Potassium-40	17.4		1.72	2.47		0.783	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Protactinium-231	0.615	U	0.832	0.834		1.68	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Radium-226	0.526		0.155	0.164	0.500	0.157	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Radium-228	0.882		0.209	0.227		0.136	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thallium-208	0.219		0.0592	0.0634		0.0559	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thorium-228	0.712		0.149	0.175		0.146	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thorium-232	0.882		0.209	0.227		0.136	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thorium-234	0.302	U	0.612	0.613		2.00	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Uranium-235	0.134	U	0.238	0.238		0.398	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Uranium-238	0.302	U	0.612	0.613		2.00	pCi/g	10/26/15 15:31	11/16/15 21:38	1

Client Sample ID: TI-TO04-BS-R-SU9-S011

Lab Sample ID: 160-14445-4

Date Collected: 10/16/15 09:35

Matrix: Solid

Date Received: 10/23/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.531		0.180	0.188		0.285	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Actinium-227	0.154	U	0.408	0.409		1.22	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Bismuth-212	0.696	U	0.673	0.677		1.06	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Bismuth-214	0.509		0.134	0.144		0.121	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Cesium-137	-0.0195	U	0.0603	0.0603		0.106	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Lead-210	-0.202	U	1.91	1.91		2.94	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Lead-212	0.760		0.139	0.171		0.127	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Lead-214	0.503		0.125	0.136		0.169	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Potassium-40	19.1		2.26	2.99		1.05	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Protactinium-231	0.626	U	0.505	0.510		2.06	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Radium-226	0.509		0.134	0.144	0.500	0.121	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Radium-228	0.531		0.180	0.188		0.285	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Thallium-208	0.241		0.0863	0.0899		0.0803	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Thorium-228	0.760		0.139	0.171		0.127	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Thorium-232	0.531		0.180	0.188		0.285	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Thorium-234	0.0567	U	0.297	0.297		2.63	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Uranium-235	0.120	U	0.270	0.270		0.468	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Uranium-238	0.0567	U	0.297	0.297		2.63	pCi/g	10/26/15 15:31	11/16/15 21:39	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14445-2

Client Sample ID: TI-TO04-BS-R-SU9-S019

Lab Sample ID: 160-14445-5

Date Collected: 10/16/15 09:29

Matrix: Solid

Date Received: 10/23/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.598		0.200	0.209		0.157	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Actinium-227	-0.245	U	0.443	0.444		0.743	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Bismuth-212	0.380	U	0.452	0.454		0.738	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Bismuth-214	0.319		0.108	0.113		0.114	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Cesium-137	0.000	U	0.0156	0.0156		0.0706	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Lead-210	0.946	U	0.852	0.859		1.36	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Lead-212	0.424		0.0929	0.108		0.0917	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Lead-214	0.337		0.0943	0.101		0.104	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Potassium-40	9.14		1.21	1.53		0.773	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Protactinium-231	0.161	U	0.625	0.625		1.27	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Radium-226	0.319		0.108	0.113	0.500	0.114	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Radium-228	0.598		0.200	0.209		0.157	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Thallium-208	0.131		0.0414	0.0436		0.0417	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Thorium-228	0.424		0.0929	0.108		0.0917	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Thorium-232	0.598		0.200	0.209		0.157	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Thorium-234	0.681	U	0.394	0.401		1.23	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Uranium-235	0.0784	U	0.166	0.166		0.334	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Uranium-238	0.681	U	0.394	0.401		1.23	pCi/g	10/26/15 15:31	11/16/15 22:11	1

Client Sample ID: TI-TO04-BS-R-SU9-S020

Lab Sample ID: 160-14445-6

Date Collected: 10/16/15 09:36

Matrix: Solid

Date Received: 10/23/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.476		0.145	0.153		0.125	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Actinium-227	0.400	U	0.351	0.354		1.57	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Bismuth-212	0.362	U	0.476	0.477		0.786	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Bismuth-214	0.473		0.114	0.125		0.110	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Cesium-137	0.0208	U	0.0323	0.0324		0.0545	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Lead-210	0.390	U	1.30	1.30		2.12	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Lead-212	0.395		0.106	0.117		0.114	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Lead-214	0.404		0.0975	0.106		0.106	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Potassium-40	9.90		1.33	1.67		0.555	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Protactinium-231	-0.0167	U	0.836	0.836		1.51	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Radium-226	0.473		0.114	0.125	0.500	0.110	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Radium-228	0.476		0.145	0.153		0.125	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Thallium-208	0.166		0.0592	0.0617		0.0538	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Thorium-228	0.395		0.106	0.117		0.114	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Thorium-232	0.476		0.145	0.153		0.125	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Thorium-234	0.777	U	0.865	0.869		1.52	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Uranium-235	-0.0108	U	0.0253	0.0253		0.379	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Uranium-238	0.777	U	0.865	0.869		1.52	pCi/g	10/26/15 15:31	11/16/15 22:12	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14445-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-218750/1-A

Matrix: Solid

Analysis Batch: 222236

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 218750

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0000	U	0.0468	0.0468		0.173	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Actinium-227	0.09088	U	0.152	0.153		0.589	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Bismuth-212	0.0000	U	0.149	0.149		0.549	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Bismuth-214	-0.03463	U	0.195	0.195		0.219	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Cesium-137	0.0005329	U	0.0394	0.0394		0.0976	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Lead-210	0.6833	U	0.924	0.927		1.60	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Lead-212	-0.005334	U	0.0784	0.0784		0.104	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Lead-214	-0.07632	U	0.530	0.530		0.194	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Potassium-40	-0.08118	U	1.23	1.23		1.45	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Protactinium-231	0.1208	U	0.553	0.553		1.44	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Radium-226	-0.03463	U	0.195	0.195	0.500	0.219	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Radium-228	0.0000	U	0.0468	0.0468		0.173	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Thallium-208	0.01254	U	0.0275	0.0276		0.0772	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Thorium-228	-0.005334	U	0.0784	0.0784		0.104	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Thorium-232	0.0000	U	0.0468	0.0468		0.173	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Thorium-234	0.1169	U	0.343	0.344		1.34	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Uranium-235	0.03120	U	0.146	0.146		0.268	pCi/g	10/26/15 15:31	11/16/15 20:45	1
Uranium-238	0.1169	U	0.343	0.344		1.34	pCi/g	10/26/15 15:31	11/16/15 20:45	1

Lab Sample ID: LCS 160-218750/2-A

Matrix: Solid

Analysis Batch: 222238

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 218750

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.2	101.3		10.7		1.38	pCi/g	104	87 - 116
Cesium-137	30.0	29.93		3.20		0.262	pCi/g	100	87 - 120
Cobalt-60	18.5	17.91		1.86		0.115	pCi/g	97	87 - 115

Lab Sample ID: 160-14443-A-1-E DU

Matrix: Solid

Analysis Batch: 222243

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 218750

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.330		0.6700		0.155		0.0822	pCi/g	1.05	1
Actinium-227	0.0263	U	0.09748	U	0.311		0.851	pCi/g	0.1	1
Bismuth-212	0.671	U	0.3136	U	0.484		0.813	pCi/g	0.32	1
Bismuth-214	0.464		0.4275		0.153		0.144	pCi/g	0.11	1
Cesium-137	-0.00823	U	-0.00614	U	0.0377		0.0686	pCi/g	0.02	1
Lead-210	1.29	U	0.1605	U	1.16		2.14	pCi/g	0.44	1
Lead-212	0.574		0.4897		0.125		0.111	pCi/g	0.33	1
Lead-214	0.456		0.4459		0.126		0.143	pCi/g	0.04	1
Potassium-40	10.6		10.98		1.80		0.645	pCi/g	0.09	1
Protactinium-231	0.362	U	0.3450	U	0.326		1.81	pCi/g	0.02	1
Radium-226	0.464		0.4275		0.153	0.500	0.144	pCi/g	0.11	1
Radium-228	0.330		0.6700		0.155		0.0822	pCi/g	1.05	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14445-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-14443-A-1-E DU
Matrix: Solid
Analysis Batch: 222243

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 218750

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.208		0.1859		0.0582		0.0523	pCi/g	0.19	1
Thorium-228	0.574		0.4897		0.125		0.111	pCi/g	0.33	1
Thorium-232	0.330		0.6700		0.155		0.0822	pCi/g	1.05	1
Thorium-234	1.01	U	0.4557	U	0.407		1.41	pCi/g	0.42	1
Uranium-235	0.0600	U	0.09291	U	0.183		0.317	pCi/g	0.08	1
Uranium-238	1.01	U	0.4557	U	0.407		1.41	pCi/g	0.42	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14445-2

Rad

Leach Batch: 218124

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14443-A-1-E DU	Duplicate	Total/NA	Solid	Dry and Grind	
160-14445-1	TI-TO04-BS-R-SU9-S008	Total/NA	Solid	Dry and Grind	
160-14445-2	TI-TO04-BS-R-SU9-S009	Total/NA	Solid	Dry and Grind	
160-14445-3	TI-TO04-BS-R-SU9-S010	Total/NA	Solid	Dry and Grind	
160-14445-4	TI-TO04-BS-R-SU9-S011	Total/NA	Solid	Dry and Grind	
160-14445-5	TI-TO04-BS-R-SU9-S019	Total/NA	Solid	Dry and Grind	
160-14445-6	TI-TO04-BS-R-SU9-S020	Total/NA	Solid	Dry and Grind	

Prep Batch: 218750

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14443-A-1-E DU	Duplicate	Total/NA	Solid	Fill_Geo-21	218124
160-14445-1	TI-TO04-BS-R-SU9-S008	Total/NA	Solid	Fill_Geo-21	218124
160-14445-2	TI-TO04-BS-R-SU9-S009	Total/NA	Solid	Fill_Geo-21	218124
160-14445-3	TI-TO04-BS-R-SU9-S010	Total/NA	Solid	Fill_Geo-21	218124
160-14445-4	TI-TO04-BS-R-SU9-S011	Total/NA	Solid	Fill_Geo-21	218124
160-14445-5	TI-TO04-BS-R-SU9-S019	Total/NA	Solid	Fill_Geo-21	218124
160-14445-6	TI-TO04-BS-R-SU9-S020	Total/NA	Solid	Fill_Geo-21	218124
LCS 160-218750/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-218750/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
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Earth City, MO 63045
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TestAmerica Job ID: 160-17266-2

Client Project/Site: Treasure Island - 500060
Revision: 1

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
1/6/2017 3:36:22 PM

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Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17266-2

Job ID: 160-17266-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-17266-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17266-2

Job ID: 160-17266-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

Revision 1: Sample ID was logged in incorrectly: TI-TO04-BS-R-FSS-SWSU9-S9-18 (160-17266-3). The error was not caught during login review. The reports and EDDs have been revised.

RECEIPT

The samples were received on 5/6/2016 8:30 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-BS-R-FSS-SWSU9-S9-16 (160-17266-1), TI-TO04-BS-R-FSS-SWSU9-S9-17 (160-17266-2) and TI-TO04-BS-R-FSS-SWSU9-S9-18 (160-17266-3) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 05/06/2016, prepared on 05/11/2016 and analyzed on 06/01/2016.

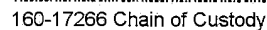
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Ref. Document # TI P3 FSS SU9 BS 251
Page 1 of 1

[illegible]

ABS=Asbestos, PO=Pipe Opening



Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-17266-2

Login Number: 17266

List Number: 1

Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17266-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17266-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17266-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-17266-1	TI-TO04-BS-R-FSS-SWSU9-S9-16	Solid	05/03/16 16:10	05/06/16 08:30
160-17266-2	TI-TO04-BS-R-FSS-SWSU9-S9-17	Solid	05/03/16 16:20	05/06/16 08:30
160-17266-3	TI-TO04-BS-R-FSS-SWSU9-S9-18	Solid	05/03/16 16:30	05/06/16 08:30

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17266-2

Client Sample ID: TI-TO04-BS-R-FSS-SWSU9-S9-16

Date Collected: 05/03/16 16:10

Date Received: 05/06/16 08:30

Lab Sample ID: 160-17266-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.540		0.155	0.164		0.134	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Actinium-227	-0.170	U	0.752	0.752		1.27	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Bismuth-212	1.43		0.514	0.535		0.384	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Bismuth-214	0.580		0.132	0.145		0.129	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Cesium-137	0.0172	U	0.0685	0.0685		0.118	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Lead-210	0.705	U	1.56	1.56		2.61	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Lead-212	0.520		0.0905	0.113		0.0930	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Lead-214	0.679		0.113	0.133		0.112	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Potassium-40	12.7		1.47	1.97		0.632	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Protactinium-231	-0.839	U	2.74	2.74		4.59	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Radium-226	0.580		0.132	0.145	0.500	0.129	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Radium-228	0.540		0.155	0.164		0.134	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Thallium-208	0.186		0.0529	0.0563		0.0411	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Thorium-228	0.520		0.0905	0.113		0.0930	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Thorium-232	0.540		0.155	0.164		0.134	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Thorium-234	-0.634	U	1.45	1.45		2.43	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Uranium-235	-0.171	U	0.486	0.487		0.813	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Uranium-238	-0.634	U	1.45	1.45		2.43	pCi/g	05/11/16 09:07	06/01/16 10:54	1

Client Sample ID: TI-TO04-BS-R-FSS-SWSU9-S9-17

Date Collected: 05/03/16 16:20

Date Received: 05/06/16 08:30

Lab Sample ID: 160-17266-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.564		0.146	0.156		0.0708	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Actinium-227	0.0589	U	0.630	0.630		1.08	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Bismuth-212	-0.0850	U	0.639	0.639		1.12	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Bismuth-214	0.415		0.0991	0.108		0.0795	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Cesium-137	0.0293	U	0.0529	0.0530		0.0891	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Lead-210	-0.668	U	1.15	1.15		2.40	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Lead-212	0.504		0.0764	0.100		0.0645	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Lead-214	0.413		0.0822	0.0927		0.0924	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Potassium-40	9.99		1.21	1.58		0.454	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Protactinium-231	-0.0927	U	2.17	2.17		3.68	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Radium-226	0.415		0.0991	0.108	0.500	0.0795	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Radium-228	0.564		0.146	0.156		0.0708	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Thallium-208	0.174		0.0470	0.0503		0.0414	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Thorium-228	0.504		0.0764	0.100		0.0645	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Thorium-232	0.564		0.146	0.156		0.0708	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Thorium-234	0.881		0.559	0.566		0.848	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Uranium-235	0.0587	U	0.198	0.199		0.668	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Uranium-238	0.881		0.559	0.566		0.848	pCi/g	05/11/16 09:07	06/01/16 10:55	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17266-2

Client Sample ID: TI-TO04-BS-R-FSS-SWSU9-S9-18

Lab Sample ID: 160-17266-3

Date Collected: 05/03/16 16:30

Matrix: Solid

Date Received: 05/06/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.166	U	0.235	0.236		0.340	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Actinium-227	-0.472	U	0.978	0.979		1.64	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Bismuth-212	-0.427	U	0.831	0.832		1.62	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Bismuth-214	0.386		0.125	0.131		0.104	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Cesium-137	0.00728	U	0.0674	0.0674		0.119	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Lead-210	0.656	U	1.79	1.79		3.01	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Lead-212	0.383		0.0866	0.0997		0.0880	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Lead-214	0.429		0.101	0.110		0.100	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Potassium-40	11.4		1.70	2.06		0.738	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Protactinium-231	0.000	U	0.750	0.750		4.55	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Radium-226	0.386		0.125	0.131	0.500	0.104	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Radium-228	0.166	U	0.235	0.236		0.340	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Thallium-208	0.0845	U	0.0773	0.0777		0.0927	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Thorium-228	0.383		0.0866	0.0997		0.0880	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Thorium-232	0.166	U	0.235	0.236		0.340	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Thorium-234	-0.208	U	1.58	1.58		2.71	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Uranium-235	0.0264	U	0.448	0.448		0.762	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Uranium-238	-0.208	U	1.58	1.58		2.71	pCi/g	05/11/16 09:07	06/01/16 11:11	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17266-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-250742/1-A

Matrix: Solid

Analysis Batch: 254167

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 250742

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.03762	U	0.131	0.131		0.165	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Actinium-227	-0.3189	U	0.669	0.670		1.13	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Bismuth-212	0.3174	U	0.713	0.714		1.22	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Bismuth-214	-0.04844	U	0.0950	0.0951		0.328	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Cesium-137	0.0009919	U	0.0339	0.0339		0.0646	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Lead-210	-0.1884	U	1.01	1.01		1.77	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Lead-212	0.01546	U	0.0702	0.0703		0.121	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Lead-214	0.01222	U	0.0261	0.0262		0.155	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Potassium-40	0.1642	U	0.436	0.436		0.775	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Protactinium-231	-0.7275	U	2.27	2.27		3.84	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Radium-226	-0.04844	U	0.0950	0.0951	0.500	0.328	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Radium-228	0.03762	U	0.131	0.131		0.165	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Thallium-208	-0.002010	U	0.0409	0.0409		0.0550	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Thorium-228	0.01546	U	0.0702	0.0703		0.121	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Thorium-232	0.03762	U	0.131	0.131		0.165	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Thorium-234	0.3441	U	0.810	0.811		1.38	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Uranium-235	0.1001	U	0.284	0.284		0.482	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Uranium-238	0.3441	U	0.810	0.811		1.38	pCi/g	05/11/16 09:07	06/01/16 08:17	1

Lab Sample ID: LCS 160-250742/2-A

Matrix: Solid

Analysis Batch: 254161

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 250742

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	94.83		9.96		1.11	pCi/g	98	87 - 116
Cesium-137	29.7	28.62		3.04		0.215	pCi/g	96	87 - 120
Cobalt-60	17.2	15.83		1.63		0.152	pCi/g	92	87 - 115

Lab Sample ID: 160-17264-A-1-E DU

Matrix: Solid

Analysis Batch: 254167

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 250742

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.582		0.2901		0.226		0.263	pCi/g	0.66	1
Actinium-227	-0.456	U	-0.4310	U	0.915		1.53	pCi/g	0.01	1
Bismuth-212	-0.383	U	0.1823	U	0.968		1.67	pCi/g	0.24	1
Bismuth-214	0.807		0.7484		0.162		0.100	pCi/g	0.16	1
Cesium-137	-0.0449	U	0.002608	U	0.0685		0.121	pCi/g	0.26	1
Lead-210	0.849	U	-0.8619	U	1.59		2.66	pCi/g	0.54	1
Lead-212	0.323		0.3986		0.101		0.0967	pCi/g	0.36	1
Lead-214	0.698		0.7252		0.162		0.157	pCi/g	0.08	1
Potassium-40	10.3		9.345		1.64		0.691	pCi/g	0.25	1
Protactinium-231	-1.06	U	0.6974	U	2.02		4.55	pCi/g	0.32	1
Radium-226	0.807		0.7484		0.162	0.500	0.100	pCi/g	0.16	1
Radium-228	0.582		0.2901		0.226		0.263	pCi/g	0.66	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17266-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-17264-A-1-E DU

Matrix: Solid

Analysis Batch: 254167

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 250742

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.196		0.1614		0.0579		0.0449	pCi/g	0.25	1
Thorium-228	0.323		0.3986		0.101		0.0967	pCi/g	0.36	1
Thorium-232	0.582		0.2901		0.226		0.263	pCi/g	0.66	1
Thorium-234	0.660	U	0.5742	U	1.41		2.35	pCi/g	0.04	1
Uranium-235	-0.285	U	0.1323	U	0.413		0.722	pCi/g	0.68	1
Uranium-238	0.660	U	0.5742	U	1.41		2.35	pCi/g	0.04	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17266-2

Rad

Leach Batch: 249816

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17266-1	TI-TO04-BS-R-FSS-SWSU9-S9-16	Total/NA	Solid	Dry and Grind	
160-17266-2	TI-TO04-BS-R-FSS-SWSU9-S9-17	Total/NA	Solid	Dry and Grind	
160-17266-3	TI-TO04-BS-R-FSS-SWSU9-S9-18	Total/NA	Solid	Dry and Grind	
160-17264-A-1-E DU	Duplicate	Total/NA	Solid	Dry and Grind	

Prep Batch: 250742

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17266-1	TI-TO04-BS-R-FSS-SWSU9-S9-16	Total/NA	Solid	Fill_Geo-21	249816
160-17266-2	TI-TO04-BS-R-FSS-SWSU9-S9-17	Total/NA	Solid	Fill_Geo-21	249816
160-17266-3	TI-TO04-BS-R-FSS-SWSU9-S9-18	Total/NA	Solid	Fill_Geo-21	249816
MB 160-250742/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-250742/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-17264-A-1-E DU	Duplicate	Total/NA	Solid	Fill_Geo-21	249816

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-14498-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn

Rhonda Ridenhower

Authorized for release by:

11/24/2015 11:21:00 AM

Rhonda Ridenhower, Manager of Project Management
rhonda.ridenhower@testamericainc.com

Designee for

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Job ID: 160-14498-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-14498-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Job ID: 160-14498-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/27/2015; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 20.1 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-BS-FSS-SU1-S001 (160-14498-1), TI-TO04-BS-FSS-SU1-S002 (160-14498-2), TI-TO04-BS-FSS-SU1-S003 (160-14498-3), TI-TO04-BS-FSS-SU1-S004 (160-14498-4), TI-TO04-BS-FSS-SU1-S005 (160-14498-5), TI-TO04-BS-FSS-SU1-S006 (160-14498-6), TI-TO04-BS-FSS-SU1-S007 (160-14498-7), TI-TO04-BS-FSS-SU1-S008 (160-14498-8), TI-TO04-BS-FSS-SU1-S009 (160-14498-9), TI-TO04-BS-FSS-SU1-S010 (160-14498-10), TI-TO04-BS-FSS-SU1-S011 (160-14498-11), TI-TO04-BS-FSS-SU1-S012 (160-14498-12), TI-TO04-BS-FSS-SU1-S013 (160-14498-13), TI-TO04-BS-FSS-SU1-S014 (160-14498-14), TI-TO04-BS-FSS-SU1-S015 (160-14498-15), TI-TO04-BS-FSS-SU1-S016 (160-14498-16), TI-TO04-BS-FSS-SU1-S017 (160-14498-17), TI-TO04-BS-FSS-SU1-S018 (160-14498-18), TI-TO04-BS-FSS-SU1-S019 (160-14498-19) and TI-TO04-BS-FSS-SU1-S020 (160-14498-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/27/2015, prepared on 10/29/2015 and analyzed on 11/19/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Shaw Environmental and Infrastructure Inc. (a CBI company)
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TI_P3_FSS_SU1_BS_134 Page 1 of 3

Project Number: **500060**
Project Name / Location: **CTO-04 Phase III BAYSIDE**
Purchase Order #: **201455**

Shipment Date: **10-23-2015**
Waybill Number: **126625454499033552**
Lab Destination: **Earth Toxics Inc To Test America**
Lab Contact Name / ph. #: **Mike Dryden**

Project Manager: **Ulrika Messer**
(Name & phone #)
Send Report To: **Patricia Flynn**
Phone/Fax Number: **925-288-2037**
Address: **4005 Port Chicago Hwy**
City: **Concord, CA, 94520**

Sampler's Name(s): **T. WELLS**

Sample ID Number	Sample Description
TI-TO04-BS-FSS-SU1-S001	BAYSIDE FSS Survey Unit 1
TI-TO04-BS-FSS-SU1-S002	BAYSIDE FSS Survey Unit 1
TI-TO04-BS-FSS-SU1-S003	BAYSIDE FSS Survey Unit 1
TI-TO04-BS-FSS-SU1-S004	BAYSIDE FSS Survey Unit 1
TI-TO04-BS-FSS-SU1-S005	BAYSIDE FSS Survey Unit 1
TI-TO04-BS-FSS-SU1-S006	BAYSIDE FSS Survey Unit 1
TI-TO04-BS-FSS-SU1-S007	BAYSIDE FSS Survey Unit 1
TI-TO04-BS-FSS-SU1-S008	BAYSIDE FSS Survey Unit 1
TI-TO04-BS-FSS-SU1-S009	BAYSIDE FSS Survey Unit 1

Collection Information			Matrix #	Containers	Preservative (water)	
Date	Time	Method			Preservative (soil)	Container Type
10-21-15	1102	G	SO 1	1	16 oz Plastic	
10-21-15	1103	G	SO 1	1	16 oz Plastic	
10-21-15	1107	G	SO 1	1	16 oz Plastic	
10-21-15	1108	G	SO 1	1	16 oz Plastic	
10-21-15	1114	G	SO 1	1	16 oz Plastic	
10-21-15	1117	G	SO 1	1	16 oz Plastic	
10-21-15	1119	G	SO 1	1	16 oz Plastic	
10-21-15	1221	G	SO 1	1	16 oz Plastic	
10-21-15	1227	G	SO 1	1	16 oz Plastic	

Special Instructions: 7 days ingrown draft and follow with 21 days final

Level Of QC Required: ☐ 24-hr ☐ 3-day ☐ 7-day

Standard TAT ☐ ☐ 3-day ☐ 7-day

Relinquished By: Date: 10/23/15 Time: 12:00

Relinquished By: Date: 10/23/15 Time: 0900

Received By: Date: 10-27-15 Time: 0900

Received By: Date: Time:

Project Specific: ☐ I ☐ II ☒ III

Method Codes
C = Composite G = Grab
Matrix Codes
DW = Drinking Water SO = Soil
GW = Ground Water SL = Sludge
WW = Waste Water CP = Chip Samples
A = Air ABS=Asbestos, PO=Pipe Opening



160-14498 Chain of Custody

Analyses Requested									
Gamma Scan									Dose Rate μ R/h
N/A									
X									5
X									5
X									5
X									5
X									5
X									5
X									5
X									5



Shaw Environmental and Infrastructure Inc. (a CB&I company)
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TI_P3_FSS_SU1_BS_134

Page 2 of 3

Project Number: 500060
Project Name / Location: CTO-04 Phase III BAYSIDE
Purchase Order #: 201455

Shipment Date: 10/23/15
Waybill Number: 126654344903352
Lab Destination: Earth Toxics Inc To Test America
Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Patricia Flynn
Phone/Fax Number: 925-288-2037
Address: 4005 Port Chicago Hwy
City: Concord, CA, 94520

Sampler's Name(s): T. W. Ellis

Sample ID Number	Sample Description	Collection Information			Matrix	# of containers	Preservative (water)			Gamma Scan	Analyses Requested					Dose Rate μ R/hr
		Date	Time	Method			Preservative (soil)	Container Type								
TI-TO04-BS-FSS-SU1-S010	BAYSIDE FSS Survey Unit 1	10-21-15	1226	G	SO	1		16 oz Plastic		X						S
TI-TO04-BS-FSS-SU1-S011	BAYSIDE FSS Survey Unit 1	10-21-15	1233	G	SO	1		16 oz Plastic		X						S
TI-TO04-BS-FSS-SU1-S012	BAYSIDE FSS Survey Unit 1	10-21-15	1232	G	SO	1		16 oz Plastic		X						S
TI-TO04-BS-FSS-SU1-S013	BAYSIDE FSS Survey Unit 1	10-21-15	1239	G	SO	1		16 oz Plastic		X						S
TI-TO04-BS-FSS-SU1-S014	BAYSIDE FSS Survey Unit 1	10-21-15	1245	G	SO	1		16 oz Plastic		X						S
TI-TO04-BS-FSS-SU1-S015	BAYSIDE FSS Survey Unit 1	10-21-15	1244	G	SO	1		16 oz Plastic		X						S
TI-TO04-BS-FSS-SU1-S016	BAYSIDE FSS Survey Unit 1	10-21-15	1238	G	SO	1		16 oz Plastic		X						S
TI-TO04-BS-FSS-SU1-S017	BAYSIDE FSS Survey Unit 1	10-21-15	1252	G	SO	1		16 oz Plastic		X						S
TI-TO04-BS-FSS-SU1-S018	BAYSIDE FSS Survey Unit 1	10-21-15	1253	G	SO	1		16 oz Plastic		X						S

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr ☐ 3-day ☐ 7-day

Project Specific:

III

C = Composite G = Grab

Matrix Codes

DW = Drinking Water
GW = Ground Water
WW = Waste Water

A = Air

ABS=Asbestos, PO=Pipe Opening

Relinquished By:

Date: 10/23/15

Received By:

Joe Clark

Date: 10-27-15

Time: 0900

Relinquished By:

Date: 12-00

Received By:

Date:

Time:



Ref. Document # TI P3 FSS SU1 BS 134

Page 3 of 3

Project Number: **500060**
 Project Name / Location: **CTO-04 Phase III BAYSIDE
 FSS SU1**
 Purchase Order #: **201455**

Project Manager: Ulrika Messer (Name & phone)

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago

City: Concord, CA, 94520

[illegible]

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-14498-2

Login Number: 14498

List Number: 1

Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-14498-1	TI-TO04-BS-FSS-SU1-S001	Solid	10/21/15 11:02	10/27/15 09:00
160-14498-2	TI-TO04-BS-FSS-SU1-S002	Solid	10/21/15 11:03	10/27/15 09:00
160-14498-3	TI-TO04-BS-FSS-SU1-S003	Solid	10/21/15 11:07	10/27/15 09:00
160-14498-4	TI-TO04-BS-FSS-SU1-S004	Solid	10/21/15 11:08	10/27/15 09:00
160-14498-5	TI-TO04-BS-FSS-SU1-S005	Solid	10/21/15 11:14	10/27/15 09:00
160-14498-6	TI-TO04-BS-FSS-SU1-S006	Solid	10/21/15 11:17	10/27/15 09:00
160-14498-7	TI-TO04-BS-FSS-SU1-S007	Solid	10/21/15 11:19	10/27/15 09:00
160-14498-8	TI-TO04-BS-FSS-SU1-S008	Solid	10/21/15 12:21	10/27/15 09:00
160-14498-9	TI-TO04-BS-FSS-SU1-S009	Solid	10/21/15 12:27	10/27/15 09:00
160-14498-10	TI-TO04-BS-FSS-SU1-S010	Solid	10/21/15 12:26	10/27/15 09:00
160-14498-11	TI-TO04-BS-FSS-SU1-S011	Solid	10/21/15 12:33	10/27/15 09:00
160-14498-12	TI-TO04-BS-FSS-SU1-S012	Solid	10/21/15 12:32	10/27/15 09:00
160-14498-13	TI-TO04-BS-FSS-SU1-S013	Solid	10/21/15 12:39	10/27/15 09:00
160-14498-14	TI-TO04-BS-FSS-SU1-S014	Solid	10/21/15 12:45	10/27/15 09:00
160-14498-15	TI-TO04-BS-FSS-SU1-S015	Solid	10/21/15 12:44	10/27/15 09:00
160-14498-16	TI-TO04-BS-FSS-SU1-S016	Solid	10/21/15 12:38	10/27/15 09:00
160-14498-17	TI-TO04-BS-FSS-SU1-S017	Solid	10/21/15 12:52	10/27/15 09:00
160-14498-18	TI-TO04-BS-FSS-SU1-S018	Solid	10/21/15 12:53	10/27/15 09:00
160-14498-19	TI-TO04-BS-FSS-SU1-S019	Solid	10/21/15 12:59	10/27/15 09:00
160-14498-20	TI-TO04-BS-FSS-SU1-S020	Solid	10/21/15 13:00	10/27/15 09:00

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S001

Lab Sample ID: 160-14498-1

Date Collected: 10/21/15 11:02

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.433		0.158	0.164		0.152	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Actinium-227	0.340		0.232	0.235		0.325	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Bismuth-212	0.0529	U	0.440	0.440		0.822	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Bismuth-214	0.274		0.113	0.117		0.129	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Cesium-137	0.00536	U	0.0371	0.0371		0.0688	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Lead-210	0.367	U	0.860	0.861		1.53	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Lead-212	0.274		0.0943	0.101		0.105	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Lead-214	0.235		0.0871	0.0904		0.117	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Potassium-40	11.0		1.53	1.90		0.669	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Protactinium-231	0.218	U	0.616	0.617		1.10	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Radium-226	0.274		0.113	0.117	0.500	0.129	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Radium-228	0.433		0.158	0.164		0.152	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Thallium-208	0.102		0.0427	0.0440		0.0472	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Thorium-228	0.274		0.0943	0.101		0.105	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Thorium-232	0.433		0.158	0.164		0.152	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Thorium-234	0.000882	U	0.804	0.804		1.47	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Uranium-235	0.152	U	0.183	0.183		0.299	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Uranium-238	0.000882	U	0.804	0.804		1.47	pCi/g	10/29/15 09:48	11/19/15 15:47	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S002

Lab Sample ID: 160-14498-2

Date Collected: 10/21/15 11:03

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.410		0.152	0.158		0.116	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Actinium-227	-0.00538	U	0.351	0.351		0.629	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Bismuth-212	0.291	U	0.416	0.417		0.695	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Bismuth-214	0.202		0.0846	0.0872		0.0972	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Cesium-137	-0.00856	U	0.0388	0.0388		0.0696	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-210	0.337	U	1.04	1.04		1.71	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-212	0.276		0.0764	0.0843		0.0814	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-214	0.412		0.125	0.132		0.121	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Potassium-40	9.49		1.28	1.61		0.547	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Protactinium-231	0.423	U	0.461	0.464		0.971	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Radium-226	0.202		0.0846	0.0872	0.500	0.0972	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Radium-228	0.410		0.152	0.158		0.116	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thallium-208	0.142		0.0461	0.0484		0.0429	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-228	0.276		0.0764	0.0843		0.0814	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-232	0.410		0.152	0.158		0.116	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-234	0.127	U	0.243	0.243		1.33	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Uranium-235	0.0401	U	0.185	0.185		0.348	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Uranium-238	0.127	U	0.243	0.243		1.33	pCi/g	10/29/15 09:48	11/19/15 15:48	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S003

Lab Sample ID: 160-14498-3

Date Collected: 10/21/15 11:07

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.295		0.126	0.130		0.234	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Actinium-227	0.0147	U	0.398	0.398		0.708	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Bismuth-212	0.303	U	0.487	0.488		0.823	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Bismuth-214	0.337		0.129	0.134		0.145	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Cesium-137	-0.0000995	U	0.0329	0.0329		0.0625	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-210	0.399	U	1.23	1.23		1.91	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-212	0.282		0.0808	0.0887		0.0945	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-214	0.253		0.0963	0.0999		0.139	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Potassium-40	10.4		1.39	1.75		0.579	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Protactinium-231	0.456	U	0.482	0.484		1.63	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Radium-226	0.337		0.129	0.134	0.500	0.145	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Radium-228	0.295		0.126	0.130		0.234	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thallium-208	0.0646		0.0465	0.0470		0.0598	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-228	0.282		0.0808	0.0887		0.0945	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-232	0.295		0.126	0.130		0.234	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-234	0.339	U	0.424	0.426		1.38	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Uranium-235	0.0811	U	0.182	0.182		0.308	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Uranium-238	0.339	U	0.424	0.426		1.38	pCi/g	10/29/15 09:48	11/19/15 16:20	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S004

Lab Sample ID: 160-14498-4

Date Collected: 10/21/15 11:08

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.190	U	0.131	0.132		0.303	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Actinium-227	-0.00905	U	0.336	0.336		0.605	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Bismuth-212	0.261	U	0.482	0.482		0.828	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Bismuth-214	0.391		0.101	0.109		0.0888	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Cesium-137	-0.00588	U	0.0370	0.0370		0.0683	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-210	1.23	U	0.990	1.00		1.55	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-212	0.0155	U	0.0979	0.0979		0.170	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-214	0.332		0.0938	0.100		0.124	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Potassium-40	9.88		1.45	1.77		0.671	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Protactinium-231	-0.183	U	0.788	0.788		1.40	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Radium-226	0.391		0.101	0.109	0.500	0.0888	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Radium-228	0.190	U	0.131	0.132		0.303	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thallium-208	0.153		0.0585	0.0606		0.0584	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-228	0.0155	U	0.0979	0.0979		0.170	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-232	0.190	U	0.131	0.132		0.303	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-234	0.349	U	0.462	0.464		1.41	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Uranium-235	0.132	U	0.142	0.142		0.291	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Uranium-238	0.349	U	0.462	0.464		1.41	pCi/g	10/29/15 09:48	11/19/15 16:20	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S005

Lab Sample ID: 160-14498-5

Date Collected: 10/21/15 11:14

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.290		0.117	0.121		0.196	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Actinium-227	0.270	U	0.242	0.243		0.614	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Bismuth-212	0.318	U	0.462	0.464		0.773	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Bismuth-214	0.185		0.0738	0.0763		0.0861	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Cesium-137	0.0120	U	0.0280	0.0280		0.0497	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Lead-210	0.00551	U	0.931	0.931		1.71	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Lead-212	0.311		0.0760	0.0860		0.0774	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Lead-214	0.356		0.0876	0.0951		0.102	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Potassium-40	9.95		1.31	1.66		0.551	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Protactinium-231	0.0742	U	0.308	0.308		1.26	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Radium-226	0.185		0.0738	0.0763	0.500	0.0861	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Radium-228	0.290		0.117	0.121		0.196	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Thallium-208	0.0850		0.0418	0.0427		0.0585	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Thorium-228	0.311		0.0760	0.0860		0.0774	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Thorium-232	0.290		0.117	0.121		0.196	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Thorium-234	0.182	U	0.431	0.432		1.43	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Uranium-235	0.0856	U	0.150	0.150		0.288	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Uranium-238	0.182	U	0.431	0.432		1.43	pCi/g	10/29/15 09:48	11/19/15 16:21	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S006

Lab Sample ID: 160-14498-6

Date Collected: 10/21/15 11:17

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.418		0.146	0.152		0.189	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Actinium-227	0.158	U	0.173	0.174		0.662	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Bismuth-212	0.0275	U	0.421	0.421		0.807	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Bismuth-214	0.384		0.114	0.121		0.114	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Cesium-137	-0.00651	U	0.0314	0.0314		0.0573	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-210	0.554	U	1.09	1.09		1.62	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-212	0.263		0.0892	0.0955		0.102	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-214	0.310		0.0946	0.0999		0.125	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Potassium-40	12.1		1.48	1.93		0.790	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Protactinium-231	0.0107	U	0.735	0.735		1.34	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Radium-226	0.384		0.114	0.121	0.500	0.114	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Radium-228	0.418		0.146	0.152		0.189	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thallium-208	0.118		0.0480	0.0495		0.0545	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-228	0.263		0.0892	0.0955		0.102	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-232	0.418		0.146	0.152		0.189	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-234	0.163	U	0.787	0.788		1.41	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Uranium-235	0.0960	U	0.150	0.150		0.295	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Uranium-238	0.163	U	0.787	0.788		1.41	pCi/g	10/29/15 09:48	11/19/15 17:23	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S007

Lab Sample ID: 160-14498-7

Date Collected: 10/21/15 11:19

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.321		0.160	0.163		0.242	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Actinium-227	-0.207	U	0.464	0.464		0.791	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Bismuth-212	0.189	U	0.459	0.460		0.824	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Bismuth-214	0.211		0.0986	0.101		0.134	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Cesium-137	-0.0253	U	9.13	9.13		0.0942	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Lead-210	0.375	U	0.947	0.948		1.73	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Lead-212	0.230		0.0897	0.0945		0.105	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Lead-214	0.293		0.106	0.110		0.131	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Potassium-40	12.1		1.80	2.19		0.680	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Protactinium-231	0.0405	U	0.604	0.604		1.16	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Radium-226	0.211		0.0986	0.101	0.500	0.134	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Radium-228	0.321		0.160	0.163		0.242	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Thallium-208	0.0618	U	0.0589	0.0592		0.0882	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Thorium-228	0.230		0.0897	0.0945		0.105	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Thorium-232	0.321		0.160	0.163		0.242	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Thorium-234	0.887	U	0.975	0.979		1.34	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Uranium-235	0.113	U	0.159	0.159		0.243	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Uranium-238	0.887	U	0.975	0.979		1.34	pCi/g	10/29/15 09:48	11/19/15 17:22	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S008

Lab Sample ID: 160-14498-8

Date Collected: 10/21/15 12:21

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.408		0.190	0.194		0.162	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Actinium-227	0.197	U	0.287	0.287		0.882	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Bismuth-212	0.325	U	0.537	0.538		0.911	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Bismuth-214	0.259		0.0931	0.0969		0.102	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Cesium-137	0.0111	U	0.0435	0.0435		0.0850	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-210	0.552	U	1.03	1.03		1.74	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-212	0.264		0.0813	0.0882		0.0913	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-214	0.219		0.0853	0.0883		0.132	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Potassium-40	10.9		1.59	1.94		0.663	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Protactinium-231	0.156	U	0.785	0.786		1.41	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Radium-226	0.259		0.0931	0.0969	0.500	0.102	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Radium-228	0.408		0.190	0.194		0.162	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thallium-208	0.114		0.0445	0.0460		0.0474	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-228	0.264		0.0813	0.0882		0.0913	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-232	0.408		0.190	0.194		0.162	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-234	0.170	U	0.458	0.458		1.42	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Uranium-235	0.0231	U	0.0410	0.0411		0.372	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Uranium-238	0.170	U	0.458	0.458		1.42	pCi/g	10/29/15 09:48	11/19/15 17:23	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S009

Lab Sample ID: 160-14498-9

Date Collected: 10/21/15 12:27

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.225		0.104	0.107		0.212	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Actinium-227	0.114	U	0.209	0.209		0.651	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-212	0.201	U	0.366	0.367		0.627	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-214	0.303		0.115	0.119		0.109	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Cesium-137	0.00517	U	0.0260	0.0260		0.0477	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-210	-0.0568	U	0.748	0.748		1.31	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-212	0.272		0.0755	0.0833		0.0796	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-214	0.242		0.0728	0.0771		0.0918	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Potassium-40	10.3		1.21	1.60		0.546	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Protactinium-231	0.0708	U	0.166	0.167		1.37	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-226	0.303		0.115	0.119	0.500	0.109	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-228	0.225		0.104	0.107		0.212	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thallium-208	0.131		0.0444	0.0464		0.0426	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-228	0.272		0.0755	0.0833		0.0796	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-232	0.225		0.104	0.107		0.212	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-234	0.403	U	0.716	0.718		1.20	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-235	0.163	U	0.147	0.148		0.258	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-238	0.403	U	0.716	0.718		1.20	pCi/g	10/29/15 09:48	11/19/15 17:20	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S010

Lab Sample ID: 160-14498-10

Date Collected: 10/21/15 12:26

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.224	U	0.130	0.132		0.250	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Actinium-227	0.0708	U	0.230	0.230		0.644	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-212	0.000	U	0.451	0.451		0.907	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-214	0.277		0.109	0.113		0.130	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Cesium-137	-0.0241	U	0.0458	0.0459		0.0783	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-210	0.910	U	1.28	1.28		1.97	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-212	0.266		0.0923	0.0986		0.109	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-214	0.283		0.0921	0.0967		0.138	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Potassium-40	9.18		1.29	1.60		0.567	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Protactinium-231	0.143	U	0.185	0.185		1.69	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-226	0.277		0.109	0.113	0.500	0.130	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-228	0.224	U	0.130	0.132		0.250	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thallium-208	0.102		0.0485	0.0497		0.0559	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-228	0.266		0.0923	0.0986		0.109	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-232	0.224	U	0.130	0.132		0.250	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-234	1.01	U	0.985	0.990		1.40	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-235	0.0863	U	0.146	0.147		0.257	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-238	1.01	U	0.985	0.990		1.40	pCi/g	10/29/15 09:48	11/19/15 17:20	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S011

Lab Sample ID: 160-14498-11

Date Collected: 10/21/15 12:33

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.160	U	0.114	0.115		0.232	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Actinium-227	0.136	U	0.234	0.235		0.694	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Bismuth-212	0.0781	U	0.413	0.413		0.751	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Bismuth-214	0.348		0.0968	0.103		0.0975	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Cesium-137	0.00621	U	0.0359	0.0359		0.0651	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-210	1.05	U	1.36	1.37		1.84	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-212	0.268		0.0843	0.0911		0.0973	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-214	0.345		0.0906	0.0974		0.0884	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Potassium-40	10.7		1.41	1.79		0.755	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Protactinium-231	0.237	U	0.639	0.640		1.55	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Radium-226	0.348		0.0968	0.103	0.500	0.0975	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Radium-228	0.160	U	0.114	0.115		0.232	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thallium-208	0.0541	U	0.0424	0.0428		0.0672	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-228	0.268		0.0843	0.0911		0.0973	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-232	0.160	U	0.114	0.115		0.232	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-234	0.109	U	0.243	0.244		1.53	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Uranium-235	0.0843	U	0.177	0.177		0.262	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Uranium-238	0.109	U	0.243	0.244		1.53	pCi/g	10/29/15 09:48	11/19/15 17:21	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S012

Lab Sample ID: 160-14498-12

Date Collected: 10/21/15 12:32

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0860	U	0.0974	0.0978		0.262	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Actinium-227	0.0539	U	0.125	0.125		0.701	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-212	0.178	U	0.489	0.489		0.866	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-214	0.268		0.108	0.111		0.119	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Cesium-137	-0.00209	U	0.0341	0.0341		0.0647	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-210	0.527	U	1.01	1.01		1.62	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-212	0.307		0.0832	0.0922		0.0913	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-214	0.241		0.120	0.123		0.140	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Potassium-40	12.4		1.61	2.05		0.663	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Protactinium-231	0.0820	U	0.695	0.695		1.27	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-226	0.268		0.108	0.111	0.500	0.119	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-228	0.0860	U	0.0974	0.0978		0.262	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thallium-208	0.0447	U	0.0509	0.0511		0.0704	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-228	0.307		0.0832	0.0922		0.0913	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-232	0.0860	U	0.0974	0.0978		0.262	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-234	0.233	U	0.435	0.436		1.40	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-235	0.171	U	0.164	0.165		0.263	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-238	0.233	U	0.435	0.436		1.40	pCi/g	10/29/15 09:48	11/19/15 17:20	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S013

Lab Sample ID: 160-14498-13

Date Collected: 10/21/15 12:39

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.240		0.0993	0.102		0.225	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Actinium-227	0.000	U	0.418	0.418		0.778	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Bismuth-212	0.141	U	0.542	0.543		0.962	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Bismuth-214	0.309		0.0959	0.101		0.0990	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Cesium-137	-0.00890	U	0.0434	0.0434		0.0777	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-210	1.08	U	1.27	1.28		1.87	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-212	0.316		0.0921	0.101		0.0998	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-214	0.280		0.0833	0.0882		0.135	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Potassium-40	10.8		1.41	1.79		0.584	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Protactinium-231	0.0299	U	0.0474	0.0475		1.64	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Radium-226	0.309		0.0959	0.101	0.500	0.0990	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Radium-228	0.240		0.0993	0.102		0.225	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thallium-208	0.123		0.0435	0.0453		0.0435	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-228	0.316		0.0921	0.101		0.0998	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-232	0.240		0.0993	0.102		0.225	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-234	0.433	U	0.509	0.511		1.51	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Uranium-235	0.0128	U	0.171	0.172		0.311	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Uranium-238	0.433	U	0.509	0.511		1.51	pCi/g	10/29/15 09:48	11/19/15 17:21	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S014

Lab Sample ID: 160-14498-14

Date Collected: 10/21/15 12:45

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.241		0.155	0.157		0.222	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Actinium-227	0.0782	U	0.413	0.413		0.718	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Bismuth-212	0.151	U	0.428	0.429		0.789	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Bismuth-214	0.155		0.0882	0.0896		0.139	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Cesium-137	0.00219	U	0.0382	0.0382		0.0701	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-210	0.653	U	0.951	0.954		1.48	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-212	0.261		0.0811	0.0879		0.0917	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-214	0.246		0.0909	0.0945		0.107	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Potassium-40	10.7		1.36	1.74		0.670	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Protactinium-231	0.0996	U	0.442	0.442		1.39	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Radium-226	0.155		0.0882	0.0896	0.500	0.139	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Radium-228	0.241		0.155	0.157		0.222	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thallium-208	0.115		0.0514	0.0527		0.0532	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-228	0.261		0.0811	0.0879		0.0917	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-232	0.241		0.155	0.157		0.222	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-234	0.456	U	0.361	0.364		1.11	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Uranium-235	0.102	U	0.143	0.144		0.256	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Uranium-238	0.456	U	0.361	0.364		1.11	pCi/g	10/29/15 09:48	11/19/15 17:55	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S015

Lab Sample ID: 160-14498-15

Date Collected: 10/21/15 12:44

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.180	U	0.166	0.167		0.295	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Actinium-227	-0.126	U	0.426	0.427		0.743	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Bismuth-212	0.0561	U	0.569	0.569		1.07	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Bismuth-214	0.119	U	0.127	0.127		0.173	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Cesium-137	0.00293	U	0.0491	0.0491		0.0997	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Lead-210	-0.0400	U	0.883	0.883		1.55	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Lead-212	0.370		0.0973	0.108		0.0912	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Lead-214	0.252		0.0958	0.0993		0.154	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Potassium-40	9.92		1.67	1.96		0.715	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Protactinium-231	-0.00944	U	0.0195	0.0196		1.83	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Radium-226	0.119	U	0.127	0.127	0.500	0.173	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Radium-228	0.180	U	0.166	0.167		0.295	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Thallium-208	0.0516	U	0.0488	0.0491		0.0757	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Thorium-228	0.370		0.0973	0.108		0.0912	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Thorium-232	0.180	U	0.166	0.167		0.295	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Thorium-234	0.280	U	0.387	0.388		1.20	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Uranium-235	0.148	U	0.163	0.163		0.265	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Uranium-238	0.280	U	0.387	0.388		1.20	pCi/g	10/29/15 09:48	11/19/15 17:54	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S016

Lab Sample ID: 160-14498-16

Date Collected: 10/21/15 12:38

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.336		0.124	0.129		0.215	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Actinium-227	0.143	U	0.154	0.155		0.570	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Bismuth-212	-0.00294	U	0.337	0.337		0.651	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Bismuth-214	0.244		0.0895	0.0930		0.0857	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Cesium-137	0.0194	U	0.0278	0.0278		0.0464	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-210	0.317	U	0.747	0.748		1.37	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-212	0.319		0.0706	0.0818		0.0713	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-214	0.292		0.0843	0.0896		0.0753	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Potassium-40	10.9		1.48	1.86		0.768	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Protactinium-231	0.350	U	0.434	0.435		1.72	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Radium-226	0.244		0.0895	0.0930	0.500	0.0857	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Radium-228	0.336		0.124	0.129		0.215	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thallium-208	0.101		0.0437	0.0449		0.0492	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-228	0.319		0.0706	0.0818		0.0713	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-232	0.336		0.124	0.129		0.215	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-234	0.243	U	0.324	0.325		1.07	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Uranium-235	0.0407	U	0.0538	0.0539		0.249	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Uranium-238	0.243	U	0.324	0.325		1.07	pCi/g	10/29/15 09:48	11/19/15 17:55	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S017

Lab Sample ID: 160-14498-17

Date Collected: 10/21/15 12:52

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.252		0.125	0.128		0.245	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Actinium-227	0.209	U	0.290	0.291		0.814	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Bismuth-212	0.000	U	0.557	0.557		0.967	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Bismuth-214	0.328		0.0944	0.100		0.0914	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Cesium-137	0.00566	U	0.0429	0.0429		0.0860	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Lead-210	0.363	U	0.972	0.973		1.67	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Lead-212	0.397		0.120	0.131		0.122	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Lead-214	0.222		0.0929	0.0957		0.127	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Potassium-40	10.2		1.55	1.87		0.677	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Protactinium-231	0.239	U	0.534	0.534		2.32	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Radium-226	0.328		0.0944	0.100	0.500	0.0914	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Radium-228	0.252		0.125	0.128		0.245	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Thallium-208	0.142		0.0530	0.0550		0.0524	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Thorium-228	0.397		0.120	0.131		0.122	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Thorium-232	0.252		0.125	0.128		0.245	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Thorium-234	1.12	U	0.882	0.890		1.32	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Uranium-235	0.0797	U	0.193	0.193		0.312	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Uranium-238	1.12	U	0.882	0.890		1.32	pCi/g	10/29/15 09:48	11/19/15 17:56	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S018

Lab Sample ID: 160-14498-18

Date Collected: 10/21/15 12:53

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.310		0.120	0.124		0.0932	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Actinium-227	0.0573	U	0.382	0.382		0.665	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Bismuth-212	0.329	U	0.430	0.431		0.710	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Bismuth-214	0.317		0.101	0.106		0.103	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Cesium-137	0.00617	U	0.0297	0.0297		0.0538	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Lead-210	0.252	U	0.771	0.772		1.33	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Lead-212	0.365		0.0810	0.0938		0.0774	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Lead-214	0.262		0.0840	0.0883		0.0951	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Potassium-40	10.4		1.25	1.64		0.574	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Protactinium-231	0.142	U	0.206	0.206		1.23	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Radium-226	0.317		0.101	0.106	0.500	0.103	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Radium-228	0.310		0.120	0.124		0.0932	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Thallium-208	0.168		0.0457	0.0489		0.0387	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Thorium-228	0.365		0.0810	0.0938		0.0774	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Thorium-232	0.310		0.120	0.124		0.0932	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Thorium-234	0.424	U	0.366	0.369		1.17	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Uranium-235	0.0551	U	0.164	0.164		0.267	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Uranium-238	0.424	U	0.366	0.369		1.17	pCi/g	10/29/15 09:48	11/19/15 17:51	1

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Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S019

Lab Sample ID: 160-14498-19

Date Collected: 10/21/15 12:59

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.247		0.160	0.162		0.226	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Actinium-227	0.0211	U	0.245	0.245		0.811	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Bismuth-212	-0.0101	U	0.376	0.376		0.722	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Bismuth-214	0.321		0.0937	0.0994		0.106	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Cesium-137	0.00876	U	0.0339	0.0339		0.0618	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Lead-210	1.22	U	1.10	1.11		1.78	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Lead-212	0.282		0.0873	0.0946		0.105	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Lead-214	0.321		0.0926	0.0984		0.149	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Potassium-40	10.4		1.42	1.77		0.603	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Protactinium-231	-0.0234	U	0.690	0.690		1.28	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Radium-226	0.321		0.0937	0.0994	0.500	0.106	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Radium-228	0.247		0.160	0.162		0.226	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Thallium-208	0.0891		0.0498	0.0506		0.0688	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Thorium-228	0.282		0.0873	0.0946		0.105	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Thorium-232	0.247		0.160	0.162		0.226	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Thorium-234	0.164	U	0.361	0.361		1.83	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Uranium-235	0.147	U	0.198	0.199		0.351	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Uranium-238	0.164	U	0.361	0.361		1.83	pCi/g	10/29/15 09:48	11/19/15 17:52	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S020

Lab Sample ID: 160-14498-20

Date Collected: 10/21/15 13:00

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.445		0.134	0.142		0.0740	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Actinium-227	0.00860	U	0.403	0.403		0.712	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Bismuth-212	-0.00300	U	0.412	0.412		0.766	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Bismuth-214	0.299		0.0999	0.105		0.105	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Cesium-137	0.00760	U	0.0259	0.0259		0.0473	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Lead-210	0.137	U	0.851	0.852		1.64	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Lead-212	0.343		0.0862	0.0970		0.0894	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Lead-214	0.270		0.108	0.112		0.111	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Potassium-40	9.89		1.26	1.62		0.580	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Protactinium-231	0.189	U	0.392	0.392		1.20	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Radium-226	0.299		0.0999	0.105	0.500	0.105	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Radium-228	0.445		0.134	0.142		0.0740	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Thallium-208	0.0586	U	0.0394	0.0398		0.0617	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Thorium-228	0.343		0.0862	0.0970		0.0894	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Thorium-232	0.445		0.134	0.142		0.0740	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Thorium-234	0.169	U	0.450	0.450		1.42	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Uranium-235	0.0524	U	0.0960	0.0962		0.340	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Uranium-238	0.169	U	0.450	0.450		1.42	pCi/g	10/29/15 09:48	11/19/15 17:53	1

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QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-219385/1-A

Matrix: Solid

Analysis Batch: 222784

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 219385

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.08059	U	0.115	0.116		0.269	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Actinium-227	0.02847	U	0.346	0.346		1.49	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Bismuth-212	0.1148	U	0.366	0.366		0.689	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Bismuth-214	-0.03998	U	0.186	0.186		0.180	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Cesium-137	0.01344	U	0.0461	0.0462		0.0836	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-210	0.6642	U	2.05	2.05		2.91	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-212	-0.04493	U	0.455	0.455		0.118	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-214	-0.06436	U	0.444	0.444		0.178	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Potassium-40	-0.2975	U	11.9	11.9		0.817	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Protactinium-231	-0.08920	U	0.823	0.823		1.53	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Radium-226	-0.03998	U	0.186	0.186	0.500	0.180	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Radium-228	0.08059	U	0.115	0.116		0.269	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thallium-208	-0.007865	U	0.0268	0.0268		0.0930	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-228	-0.04493	U	0.455	0.455		0.118	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-232	0.08059	U	0.115	0.116		0.269	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-234	0.7365	U	0.499	0.505		1.66	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Uranium-235	-0.06805	U	2.92	2.92		0.341	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Uranium-238	0.7365	U	0.499	0.505		1.66	pCi/g	10/29/15 09:48	11/19/15 15:48	1

Lab Sample ID: LCS 160-219385/2-A

Matrix: Solid

Analysis Batch: 222780

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 219385

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.2	97.12		10.2		1.12	pCi/g	100	87 - 116
Cesium-137	30.0	29.44		3.14		0.284	pCi/g	98	87 - 120
Cobalt-60	18.4	17.86		1.84		0.110	pCi/g	97	87 - 115

Lab Sample ID: 160-14498-1 DU

Matrix: Solid

Analysis Batch: 222780

Client Sample ID: TI-TO04-BS-FSS-SU1-S001

Prep Type: Total/NA

Prep Batch: 219385

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.433		0.4986		0.154		0.126	pCi/g	0.21	1
Actinium-227	0.340		-0.1437	U	0.483		0.828	pCi/g	0.67	1
Bismuth-212	0.0529	U	0.1807	U	0.369		0.643	pCi/g	0.16	1
Bismuth-214	0.274		0.2155		0.0815		0.0955	pCi/g	0.30	1
Cesium-137	0.00536	U	0.0000	U	0.0228		0.119	pCi/g	0.09	1
Lead-210	0.367	U	-0.04737	U	1.07		1.89	pCi/g	0.21	1
Lead-212	0.274		0.2823		0.123		0.129	pCi/g	0.04	1
Lead-214	0.235		0.3791		0.100		0.106	pCi/g	0.75	1
Potassium-40	11.0		11.99		1.89		0.616	pCi/g	0.26	1
Protactinium-231	0.218	U	0.1120	U	0.367		1.27	pCi/g	0.11	1
Radium-226	0.274		0.2155		0.0815	0.500	0.0955	pCi/g	0.30	1
Radium-228	0.433		0.4986		0.154		0.126	pCi/g	0.21	1

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QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-14498-1 DU

Matrix: Solid

Analysis Batch: 222780

Client Sample ID: TI-TO04-BS-FSS-SU1-S001

Prep Type: Total/NA

Prep Batch: 219385

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.102		0.1228		0.0639		0.0626	pCi/g	0.19	1
Thorium-228	0.274		0.2823		0.123		0.129	pCi/g	0.04	1
Thorium-232	0.433		0.4986		0.154		0.126	pCi/g	0.21	1
Thorium-234	0.000882	U	0.2833	U	0.426		1.57	pCi/g	0.23	1
Uranium-235	0.152	U	-0.06223	U	0.425		0.331	pCi/g	0.35	1
Uranium-238	0.000882	U	0.2833	U	0.426		1.57	pCi/g	0.23	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Rad

Leach Batch: 218695

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14498-1	TI-TO04-BS-FSS-SU1-S001	Total/NA	Solid	Dry and Grind	
160-14498-1 DU	TI-TO04-BS-FSS-SU1-S001	Total/NA	Solid	Dry and Grind	
160-14498-2	TI-TO04-BS-FSS-SU1-S002	Total/NA	Solid	Dry and Grind	
160-14498-3	TI-TO04-BS-FSS-SU1-S003	Total/NA	Solid	Dry and Grind	
160-14498-4	TI-TO04-BS-FSS-SU1-S004	Total/NA	Solid	Dry and Grind	
160-14498-5	TI-TO04-BS-FSS-SU1-S005	Total/NA	Solid	Dry and Grind	
160-14498-6	TI-TO04-BS-FSS-SU1-S006	Total/NA	Solid	Dry and Grind	
160-14498-7	TI-TO04-BS-FSS-SU1-S007	Total/NA	Solid	Dry and Grind	
160-14498-8	TI-TO04-BS-FSS-SU1-S008	Total/NA	Solid	Dry and Grind	
160-14498-9	TI-TO04-BS-FSS-SU1-S009	Total/NA	Solid	Dry and Grind	
160-14498-10	TI-TO04-BS-FSS-SU1-S010	Total/NA	Solid	Dry and Grind	
160-14498-11	TI-TO04-BS-FSS-SU1-S011	Total/NA	Solid	Dry and Grind	
160-14498-12	TI-TO04-BS-FSS-SU1-S012	Total/NA	Solid	Dry and Grind	
160-14498-13	TI-TO04-BS-FSS-SU1-S013	Total/NA	Solid	Dry and Grind	
160-14498-14	TI-TO04-BS-FSS-SU1-S014	Total/NA	Solid	Dry and Grind	
160-14498-15	TI-TO04-BS-FSS-SU1-S015	Total/NA	Solid	Dry and Grind	
160-14498-16	TI-TO04-BS-FSS-SU1-S016	Total/NA	Solid	Dry and Grind	
160-14498-17	TI-TO04-BS-FSS-SU1-S017	Total/NA	Solid	Dry and Grind	
160-14498-18	TI-TO04-BS-FSS-SU1-S018	Total/NA	Solid	Dry and Grind	
160-14498-19	TI-TO04-BS-FSS-SU1-S019	Total/NA	Solid	Dry and Grind	
160-14498-20	TI-TO04-BS-FSS-SU1-S020	Total/NA	Solid	Dry and Grind	

Prep Batch: 219385

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14498-1	TI-TO04-BS-FSS-SU1-S001	Total/NA	Solid	Fill_Geo-21	218695
160-14498-1 DU	TI-TO04-BS-FSS-SU1-S001	Total/NA	Solid	Fill_Geo-21	218695
160-14498-2	TI-TO04-BS-FSS-SU1-S002	Total/NA	Solid	Fill_Geo-21	218695
160-14498-3	TI-TO04-BS-FSS-SU1-S003	Total/NA	Solid	Fill_Geo-21	218695
160-14498-4	TI-TO04-BS-FSS-SU1-S004	Total/NA	Solid	Fill_Geo-21	218695
160-14498-5	TI-TO04-BS-FSS-SU1-S005	Total/NA	Solid	Fill_Geo-21	218695
160-14498-6	TI-TO04-BS-FSS-SU1-S006	Total/NA	Solid	Fill_Geo-21	218695
160-14498-7	TI-TO04-BS-FSS-SU1-S007	Total/NA	Solid	Fill_Geo-21	218695
160-14498-8	TI-TO04-BS-FSS-SU1-S008	Total/NA	Solid	Fill_Geo-21	218695
160-14498-9	TI-TO04-BS-FSS-SU1-S009	Total/NA	Solid	Fill_Geo-21	218695
160-14498-10	TI-TO04-BS-FSS-SU1-S010	Total/NA	Solid	Fill_Geo-21	218695
160-14498-11	TI-TO04-BS-FSS-SU1-S011	Total/NA	Solid	Fill_Geo-21	218695
160-14498-12	TI-TO04-BS-FSS-SU1-S012	Total/NA	Solid	Fill_Geo-21	218695
160-14498-13	TI-TO04-BS-FSS-SU1-S013	Total/NA	Solid	Fill_Geo-21	218695
160-14498-14	TI-TO04-BS-FSS-SU1-S014	Total/NA	Solid	Fill_Geo-21	218695
160-14498-15	TI-TO04-BS-FSS-SU1-S015	Total/NA	Solid	Fill_Geo-21	218695
160-14498-16	TI-TO04-BS-FSS-SU1-S016	Total/NA	Solid	Fill_Geo-21	218695
160-14498-17	TI-TO04-BS-FSS-SU1-S017	Total/NA	Solid	Fill_Geo-21	218695
160-14498-18	TI-TO04-BS-FSS-SU1-S018	Total/NA	Solid	Fill_Geo-21	218695
160-14498-19	TI-TO04-BS-FSS-SU1-S019	Total/NA	Solid	Fill_Geo-21	218695
160-14498-20	TI-TO04-BS-FSS-SU1-S020	Total/NA	Solid	Fill_Geo-21	218695
LCS 160-219385/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-219385/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica St. Louis

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THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-21509-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan



Authorized for release by:
4/17/2017 10:06:49 AM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Job ID: 160-21509-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-21509-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Job ID: 160-21509-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 3/17/2017 8:45 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-RSY15-U8-BS-FSSSU6-S001 (160-21509-1), TITO04-RSY15-U8-BS-FSSSU6-S002 (160-21509-2), TITO04-RSY15-U8-BS-FSSSU6-S003 (160-21509-3), TITO04-RSY15-U8-BS-FSSSU6-S004 (160-21509-4), TITO04-RSY15-U8-BS-FSSSU6-S005 (160-21509-5), TITO04-RSY15-U8-BS-FSSSU6-S006 (160-21509-6), TITO04-RSY15-U8-BS-FSSSU6-S007 (160-21509-7), TITO04-RSY15-U8-BS-FSSSU6-S008 (160-21509-8), TITO04-RSY15-U8-BS-FSSSU6-S009 (160-21509-9), TITO04-RSY15-U8-BS-FSSSU6-S010 (160-21509-10), TITO04-RSY15-U8-BS-FSSSU6-S011 (160-21509-11) and TITO04-RSY15-U8-BS-FSSSU6-S012 (160-21509-12) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 03/17/2017, prepared on 03/20/2017 and analyzed on 04/11/2017 and 04/12/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520



160-21509 Chain of Custody

CHAIN OF CUSTODY

Ref. Document # TL P3 RSY15 U8 BS FSSU6 #377

Page 1 of 2

Project Number: 500060

CTO-04 Phase III Site 32 RSY15

Project Name / Location: USE 8 From Bayside FSS SU6 Systematic

Purchase Order #: 201455

Project Manager: *Ulrika Messer*

(Name & phone #)

Send Report To: *Renata Vidovic*

Phone/Fax Number: 408-505-7319

Address: *renata.vidovic@cbifederalservices.com*

City:

Shipment Date: 3/16/17

Waybill Number: 17-89V462 01 9056 6232

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Sampler's Name(s): *Mark Star*

Collection Information

Date Time Method

Matrix # of containers

Preservative (water)

Preservative (soil)

Container Type

Dose Rate $\mu\text{R}/\text{hr}$

Analyses Requested

Method Codes

Matrix Codes

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening

A = Air

DW = Drinking Water

GW = Ground Water

WW = Waste Water

G = Grab

C = Composite

Level Of QC Required

Standard TAT

Relinquished By

Relinquished By

Relinquished By

Relinquished By

Relinquished By

Relinquished By

Relinquished By

Relinquished By

Relinquished By

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CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL P3 RSY15 U8 BS FSSU6 #377

Page 2 of 2

Project Number: 500060

CTO-04 Phase III Site 32 RSY15

Project Name / Location: USE 8 From Bayside FSS SU6 Systematic

Purchase Order #: 201455

Shipment Date: 3/16/17

Waybill Number: 1Z 89V 462 01 90566232

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Project Manager: **Ulrika Messer**

(Name & Phone #)

Send Report To: **Renata Vidovic**

Phone/Fax Number: 408-505-7319

Address: renata.vidovic@cbifederalservices.com

City:

Sampler's Name(s): **Mark Star**

Preservative (water)

Preservative (soil)

Container Type

Matrix

of containers

Collection Information

Date

Time

Method

Sample Description

Sample ID Number

Matrix

of containers

Method

Container Type

Preservative (water)

Preservative (soil)

Container Type

Matrix

of containers

Method

Container Type

Preservative (water)

Preservative (soil)

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of containers

Method

Container Type

Preservative (water)

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-21509-2

Login Number: 21509

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-21509-1	TITO04-RSY15-U8-BS-FSSSU6-S001	Solid	03/15/17 14:31	03/17/17 08:45
160-21509-2	TITO04-RSY15-U8-BS-FSSSU6-S002	Solid	03/15/17 14:39	03/17/17 08:45
160-21509-3	TITO04-RSY15-U8-BS-FSSSU6-S003	Solid	03/15/17 14:39	03/17/17 08:45
160-21509-4	TITO04-RSY15-U8-BS-FSSSU6-S004	Solid	03/15/17 14:40	03/17/17 08:45
160-21509-5	TITO04-RSY15-U8-BS-FSSSU6-S005	Solid	03/15/17 14:45	03/17/17 08:45
160-21509-6	TITO04-RSY15-U8-BS-FSSSU6-S006	Solid	03/15/17 15:02	03/17/17 08:45
160-21509-7	TITO04-RSY15-U8-BS-FSSSU6-S007	Solid	03/15/17 15:01	03/17/17 08:45
160-21509-8	TITO04-RSY15-U8-BS-FSSSU6-S008	Solid	03/15/17 15:17	03/17/17 08:45
160-21509-9	TITO04-RSY15-U8-BS-FSSSU6-S009	Solid	03/15/17 15:07	03/17/17 08:45
160-21509-10	TITO04-RSY15-U8-BS-FSSSU6-S010	Solid	03/15/17 15:06	03/17/17 08:45
160-21509-11	TITO04-RSY15-U8-BS-FSSSU6-S011	Solid	03/15/17 15:11	03/17/17 08:45
160-21509-12	TITO04-RSY15-U8-BS-FSSSU6-S012	Solid	03/15/17 15:09	03/17/17 08:45

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S001

Lab Sample ID: 160-21509-1

Date Collected: 03/15/17 14:31

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.368		0.111	0.117		0.0661	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Actinium-227	-0.294	U	0.625	0.626		1.05	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Bismuth-212	0.133	U	0.373	0.373		0.655	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Bismuth-214	0.379		0.0993	0.107		0.0857	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Cesium-137	-0.0189	U	0.0564	0.0565		0.0968	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Lead-210	-0.151	U	1.13	1.13		1.94	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Lead-212	0.329		0.0664	0.0789		0.0681	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Lead-214	0.433		0.123	0.131		0.106	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Potassium-40	10.0		1.19	1.57		0.261	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Protactinium-231	-0.357	U	2.06	2.06		3.48	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Radium-226	0.379		0.0993	0.107	0.500	0.0857	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Radium-228	0.368		0.111	0.117		0.0661	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Thallium-208	0.116		0.0398	0.0416		0.0350	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Thorium-228	0.329		0.0664	0.0789		0.0681	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Thorium-232	0.368		0.111	0.117		0.0661	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Thorium-234	0.489	U	1.03	1.03		1.73	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Uranium-235	-0.140	U	0.414	0.414		0.693	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Uranium-238	0.489	U	1.03	1.03		1.73	pCi/g	03/20/17 21:59	04/11/17 19:16	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S002

Lab Sample ID: 160-21509-2

Date Collected: 03/15/17 14:39

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.425		0.145	0.152		0.0866	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Actinium-227	0.312	U	0.777	0.778		1.31	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Bismuth-212	0.000	U	0.285	0.285		0.985	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Bismuth-214	0.305		0.110	0.115		0.132	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Cesium-137	-0.0122	U	0.0609	0.0609		0.107	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Lead-210	-1.02	U	1.75	1.75		3.05	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Lead-212	0.255		0.0842	0.0905		0.111	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Lead-214	0.377		0.117	0.123		0.128	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Potassium-40	9.24		1.34	1.64		0.646	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Protactinium-231	0.000	U	0.367	0.367		4.16	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Radium-226	0.305		0.110	0.115	0.500	0.132	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Radium-228	0.425		0.145	0.152		0.0866	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Thallium-208	0.111		0.0525	0.0538		0.0570	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Thorium-228	0.255		0.0842	0.0905		0.111	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Thorium-232	0.425		0.145	0.152		0.0866	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Thorium-234	-0.569	U	1.09	1.09		1.92	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Uranium-235	-0.0255	U	0.178	0.178		0.554	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Uranium-238	-0.569	U	1.09	1.09		1.92	pCi/g	03/20/17 21:59	04/11/17 20:01	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S003

Lab Sample ID: 160-21509-3

Date Collected: 03/15/17 14:39

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.348		0.131	0.135		0.109	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Actinium-227	-0.0576	U	0.100	0.100		1.20	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Bismuth-212	0.245	U	0.599	0.599		1.03	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Bismuth-214	0.473		0.131	0.140		0.121	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Cesium-137	0.0188	U	0.0481	0.0482		0.0832	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Lead-210	0.488	U	1.13	1.13		1.61	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Lead-212	0.388		0.0812	0.0955		0.0860	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Lead-214	0.376		0.0985	0.106		0.126	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Potassium-40	10.6		1.39	1.76		0.701	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Protactinium-231	0.000	U	0.276	0.276		4.05	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Radium-226	0.473		0.131	0.140	0.500	0.121	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Radium-228	0.348		0.131	0.135		0.109	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Thallium-208	0.106		0.0407	0.0422		0.0395	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Thorium-228	0.388		0.0812	0.0955		0.0860	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Thorium-232	0.348		0.131	0.135		0.109	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Thorium-234	-0.189	U	1.18	1.18		2.02	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Uranium-235	0.0376	U	0.0824	0.0825		0.606	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Uranium-238	-0.189	U	1.18	1.18		2.02	pCi/g	03/20/17 21:59	04/12/17 11:37	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S004

Lab Sample ID: 160-21509-4

Date Collected: 03/15/17 14:40

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.423		0.127	0.135		0.0708	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Actinium-227	-0.296	U	0.626	0.627		1.05	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Bismuth-212	-0.489	U	0.754	0.756		1.26	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Bismuth-214	0.296		0.0864	0.0917		0.0762	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Cesium-137	0.000	U	0.0178	0.0178		0.0879	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Lead-210	0.361	U	1.26	1.26		2.14	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Lead-212	0.385		0.0739	0.0892		0.0745	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Lead-214	0.402		0.108	0.116		0.105	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Potassium-40	11.3		1.35	1.78		0.624	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Protactinium-231	0.000	U	0.423	0.423		3.80	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Radium-226	0.296		0.0864	0.0917	0.500	0.0762	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Radium-228	0.423		0.127	0.135		0.0708	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Thallium-208	0.101		0.0598	0.0607		0.0656	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Thorium-228	0.385		0.0739	0.0892		0.0745	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Thorium-232	0.423		0.127	0.135		0.0708	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Thorium-234	0.182	U	1.21	1.21		2.05	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Uranium-235	-0.0281	U	0.0493	0.0494		0.795	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Uranium-238	0.182	U	1.21	1.21		2.05	pCi/g	03/20/17 21:59	04/11/17 20:47	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S005

Lab Sample ID: 160-21509-5

Date Collected: 03/15/17 14:45

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.539		0.162	0.171		0.0861	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Actinium-227	-0.299	U	0.866	0.867		1.46	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Bismuth-212	-0.227	U	0.643	0.643		1.12	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Bismuth-214	0.382		0.121	0.128		0.120	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Cesium-137	0.0310	U	0.0587	0.0588		0.0996	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Lead-210	0.946	U	1.40	1.41		1.93	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Lead-212	0.310		0.0792	0.0888		0.0899	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Lead-214	0.365		0.113	0.119		0.114	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Potassium-40	10.1		1.40	1.74		0.642	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Protactinium-231	-0.629	U	2.20	2.20		3.72	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Radium-226	0.382		0.121	0.128	0.500	0.120	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Radium-228	0.539		0.162	0.171		0.0861	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Thallium-208	0.133		0.0538	0.0556		0.0573	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Thorium-228	0.310		0.0792	0.0888		0.0899	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Thorium-232	0.539		0.162	0.171		0.0861	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Thorium-234	-0.608	U	1.39	1.40		2.01	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Uranium-235	0.0887	U	0.291	0.291		0.491	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Uranium-238	-0.608	U	1.39	1.40		2.01	pCi/g	03/20/17 21:59	04/11/17 20:48	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S006

Lab Sample ID: 160-21509-6

Date Collected: 03/15/17 15:02

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.269		0.187	0.189		0.193	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Actinium-227	-0.579	U	1.35	1.35		2.25	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Bismuth-212	0.208	U	0.460	0.460		0.791	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Bismuth-214	0.353		0.110	0.116		0.101	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Cesium-137	0.0182	U	0.0472	0.0472		0.0812	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Lead-210	-1.22	U	2.98	2.98		4.95	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Lead-212	0.360		0.0717	0.0856		0.0754	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Lead-214	0.395		0.0937	0.102		0.102	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Potassium-40	10.9		1.26	1.69		0.270	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Protactinium-231	0.578	U	1.68	1.68		3.67	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Radium-226	0.353		0.110	0.116	0.500	0.101	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Radium-228	0.269		0.187	0.189		0.193	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Thallium-208	0.108		0.0613	0.0623		0.0616	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Thorium-228	0.360		0.0717	0.0856		0.0754	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Thorium-232	0.269		0.187	0.189		0.193	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Thorium-234	0.340	U	0.689	0.690		1.72	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Uranium-235	0.0852	U	0.192	0.192		0.662	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Uranium-238	0.340	U	0.689	0.690		1.72	pCi/g	03/20/17 21:59	04/11/17 20:50	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S007

Lab Sample ID: 160-21509-7

Date Collected: 03/15/17 15:01

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.452		0.128	0.136		0.123	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Actinium-227	0.183	U	0.275	0.276		0.629	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Bismuth-212	0.351	U	0.677	0.678		1.15	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Bismuth-214	0.310		0.110	0.115		0.122	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Cesium-137	-0.0454	U	0.0679	0.0680		0.131	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-210	0.186	U	1.01	1.01		1.73	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-212	0.335		0.118	0.126		0.174	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-214	0.418		0.0998	0.109		0.126	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Potassium-40	10.7		1.38	1.76		0.563	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Protactinium-231	0.284	U	1.08	1.08		3.49	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Radium-226	0.310		0.110	0.115	0.500	0.122	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Radium-228	0.452		0.128	0.136		0.123	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thallium-208	0.164		0.0533	0.0559		0.0492	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-228	0.335		0.118	0.126		0.174	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-232	0.452		0.128	0.136		0.123	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-234	0.209	U	0.385	0.386		1.31	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Uranium-235	-0.0429	U	0.365	0.365		0.736	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Uranium-238	0.209	U	0.385	0.386		1.31	pCi/g	03/20/17 21:59	04/11/17 20:49	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S008

Lab Sample ID: 160-21509-8

Date Collected: 03/15/17 15:17

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.140	U	0.226	0.226		0.298	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Actinium-227	-0.387	U	0.828	0.829		1.39	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Bismuth-212	0.968		0.380	0.393		0.274	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Bismuth-214	0.311		0.115	0.120		0.119	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Cesium-137	-0.0323	U	0.0673	0.0673		0.114	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-210	-1.07	U	1.45	1.46		2.57	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-212	0.315		0.0852	0.0944		0.105	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-214	0.466		0.130	0.139		0.137	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Potassium-40	9.65		1.39	1.71		0.874	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Protactinium-231	-0.932	U	2.92	2.92		4.90	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Radium-226	0.311		0.115	0.120	0.500	0.119	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Radium-228	0.140	U	0.226	0.226		0.298	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thallium-208	0.136		0.0562	0.0580		0.0568	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-228	0.315		0.0852	0.0944		0.105	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-232	0.140	U	0.226	0.226		0.298	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-234	0.609	U	0.910	0.913		1.34	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Uranium-235	0.135	U	0.284	0.285		0.805	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Uranium-238	0.609	U	0.910	0.913		1.34	pCi/g	03/20/17 21:59	04/11/17 20:49	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S009

Lab Sample ID: 160-21509-9

Date Collected: 03/15/17 15:07

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.262		0.130	0.132		0.153	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Actinium-227	-0.0623	U	0.554	0.554		0.949	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Bismuth-212	0.213	U	0.463	0.464		0.796	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Bismuth-214	0.383		0.104	0.111		0.0867	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Cesium-137	0.0160	U	0.0322	0.0322		0.0554	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Lead-210	0.198	U	1.05	1.05		1.80	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Lead-212	0.379		0.0688	0.0845		0.0665	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Lead-214	0.417		0.0947	0.104		0.0898	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Potassium-40	10.6		1.30	1.69		0.693	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Protactinium-231	0.000	U	0.581	0.581		3.51	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Radium-226	0.383		0.104	0.111	0.500	0.0867	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Radium-228	0.262		0.130	0.132		0.153	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Thallium-208	0.149		0.0498	0.0521		0.0470	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Thorium-228	0.379		0.0688	0.0845		0.0665	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Thorium-232	0.262		0.130	0.132		0.153	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Thorium-234	-0.526	U	1.11	1.11		1.86	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Uranium-235	-0.131	U	0.224	0.225		0.375	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Uranium-238	-0.526	U	1.11	1.11		1.86	pCi/g	03/20/17 21:59	04/11/17 21:40	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S010

Lab Sample ID: 160-21509-10

Date Collected: 03/15/17 15:06

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.391		0.140	0.146		0.233	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Actinium-227	-0.261	U	0.877	0.877		1.48	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Bismuth-212	0.0348	U	0.761	0.761		1.36	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Bismuth-214	0.439		0.132	0.140		0.127	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Cesium-137	0.0241	U	0.0539	0.0539		0.0928	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Lead-210	0.709	U	1.52	1.52		2.17	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Lead-212	0.304		0.0942	0.102		0.122	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Lead-214	0.480		0.105	0.116		0.0978	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Potassium-40	12.3		1.61	2.05		0.707	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Protactinium-231	0.389	U	1.28	1.28		4.17	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Radium-226	0.439		0.132	0.140	0.500	0.127	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Radium-228	0.391		0.140	0.146		0.233	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Thallium-208	0.125		0.0538	0.0553		0.0608	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Thorium-228	0.304		0.0942	0.102		0.122	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Thorium-232	0.391		0.140	0.146		0.233	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Thorium-234	0.737	U	1.20	1.20		1.70	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Uranium-235	-0.0601	U	0.380	0.380		0.662	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Uranium-238	0.737	U	1.20	1.20		1.70	pCi/g	03/20/17 21:59	04/11/17 21:41	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S011

Lab Sample ID: 160-21509-11

Date Collected: 03/15/17 15:11

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.392		0.118	0.124		0.120	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Actinium-227	0.185	U	0.743	0.743		1.26	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Bismuth-212	-0.244	U	0.556	0.556		1.20	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Bismuth-214	0.410		0.109	0.117		0.0954	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Cesium-137	-0.0110	U	0.0448	0.0448		0.0969	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Lead-210	0.444	U	1.17	1.17		1.76	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Lead-212	0.335		0.0827	0.0934		0.0994	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Lead-214	0.420		0.102	0.111		0.103	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Potassium-40	8.02		1.19	1.45		0.550	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Protactinium-231	0.578	U	1.35	1.35		3.10	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Radium-226	0.410		0.109	0.117	0.500	0.0954	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Radium-228	0.392		0.118	0.124		0.120	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Thallium-208	0.161		0.0461	0.0490		0.0395	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Thorium-228	0.335		0.0827	0.0934		0.0994	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Thorium-232	0.392		0.118	0.124		0.120	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Thorium-234	0.879	U	0.895	0.900		1.24	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Uranium-235	-0.0524	U	0.0855	0.0856		0.752	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Uranium-238	0.879	U	0.895	0.900		1.24	pCi/g	03/20/17 21:59	04/11/17 21:42	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S012

Lab Sample ID: 160-21509-12

Date Collected: 03/15/17 15:09

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.484		0.130	0.139		0.0659	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Actinium-227	-0.0118	U	0.0802	0.0802		0.941	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Bismuth-212	-0.0206	U	0.526	0.526		0.948	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Bismuth-214	0.489		0.120	0.130		0.0956	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Cesium-137	0.0175	U	0.0377	0.0378		0.0649	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Lead-210	0.529	U	0.967	0.969		1.62	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Lead-212	0.279		0.107	0.113		0.163	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Lead-214	0.426		0.0837	0.0947		0.0854	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Potassium-40	11.6		1.28	1.75		0.260	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Protactinium-231	-0.676	U	2.28	2.28		3.82	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Radium-226	0.489		0.120	0.130	0.500	0.0956	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Radium-228	0.484		0.130	0.139		0.0659	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Thallium-208	0.0299	U	0.0900	0.0900		0.0908	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Thorium-228	0.279		0.107	0.113		0.163	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Thorium-232	0.484		0.130	0.139		0.0659	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Thorium-234	0.344	U	0.321	0.323		1.79	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Uranium-235	0.0173	U	0.202	0.202		0.765	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Uranium-238	0.344	U	0.321	0.323		1.79	pCi/g	03/20/17 21:59	04/11/17 21:43	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-298819/1-A
Matrix: Solid
Analysis Batch: 303018

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 298819

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.02508	U	0.128	0.128		0.165	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Actinium-227	0.09917	U	0.201	0.201		0.846	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Bismuth-212	-0.2769	U	0.644	0.645		1.11	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Bismuth-214	-0.03807	U	0.126	0.127		0.232	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Cesium-137	0.02341	U	0.0563	0.0564		0.0972	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Lead-210	-0.4473	U	0.925	0.927		1.57	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Lead-212	0.004255	U	0.0621	0.0621		0.110	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Lead-214	0.005493	U	0.0395	0.0395		0.125	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Potassium-40	-0.2809	U	0.683	0.684		1.02	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Protactinium-231	0.0000	U	0.113	0.113		2.90	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Radium-226	-0.03807	U	0.126	0.127	0.500	0.232	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Radium-228	-0.02508	U	0.128	0.128		0.165	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Thallium-208	0.01867	U	0.0273	0.0273		0.0431	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Thorium-228	0.004255	U	0.0621	0.0621		0.110	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Thorium-232	-0.02508	U	0.128	0.128		0.165	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Thorium-234	-0.3847	U	0.867	0.868		1.47	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Uranium-235	0.06131	U	0.250	0.250		0.429	pCi/g	03/20/17 21:59	04/11/17 19:13	1
Uranium-238	-0.3847	U	0.867	0.868		1.47	pCi/g	03/20/17 21:59	04/11/17 19:13	1

Lab Sample ID: LCS 160-298819/2-A
Matrix: Solid
Analysis Batch: 303015

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 298819

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.0	95.16		10.0		1.10	pCi/g	98	87 - 116
Cesium-137	29.1	29.08		3.10		0.205	pCi/g	100	87 - 120
Cobalt-60	15.3	14.85		1.55		0.0815	pCi/g	97	87 - 115

Lab Sample ID: 160-21509-1 DU
Matrix: Solid
Analysis Batch: 303018

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S001
Prep Type: Total/NA
Prep Batch: 298819

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.368		0.5052		0.146		0.0691	pCi/g	0.52	1
Actinium-227	-0.294	U	-0.3060	U	0.653		1.09	pCi/g	0.01	1
Bismuth-212	0.133	U	0.2272	U	0.544		0.935	pCi/g	0.10	1
Bismuth-214	0.379		0.3424		0.106		0.0881	pCi/g	0.17	1
Cesium-137	-0.0189	U	0.001666	U	0.0422		0.0760	pCi/g	0.21	1
Lead-210	-0.151	U	0.5398	U	1.07		1.79	pCi/g	0.31	1
Lead-212	0.329		0.2949		0.0758		0.0697	pCi/g	0.22	1
Lead-214	0.433		0.3790		0.119		0.108	pCi/g	0.22	1
Potassium-40	10.0		11.17		1.75		0.609	pCi/g	0.34	1
Protactinium-231	-0.357	U	0.08871	U	1.05		3.61	pCi/g	0.14	1
Radium-226	0.379		0.3424		0.106	0.500	0.0881	pCi/g	0.17	1
Radium-228	0.368		0.5052		0.146		0.0691	pCi/g	0.52	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-21509-1 DU

Matrix: Solid

Analysis Batch: 303018

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S001

Prep Type: Total/NA

Prep Batch: 298819

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.116		0.1447		0.0429		0.0322	pCi/g	0.34	1
Thorium-228	0.329		0.2949		0.0758		0.0697	pCi/g	0.22	1
Thorium-232	0.368		0.5052		0.146		0.0691	pCi/g	0.52	1
Thorium-234	0.489	U	0.0000	U	0.700		2.02	pCi/g	0.28	1
Uranium-235	-0.140	U	0.08254	U	0.182		0.645	pCi/g	0.37	1
Uranium-238	0.489	U	0.0000	U	0.700		2.02	pCi/g	0.28	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Rad

Leach Batch: 298219

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21509-1	TITO04-RSY15-U8-BS-FSSSU6-S001	Total/NA	Solid	Dry and Grind	
160-21509-2	TITO04-RSY15-U8-BS-FSSSU6-S002	Total/NA	Solid	Dry and Grind	
160-21509-3	TITO04-RSY15-U8-BS-FSSSU6-S003	Total/NA	Solid	Dry and Grind	
160-21509-4	TITO04-RSY15-U8-BS-FSSSU6-S004	Total/NA	Solid	Dry and Grind	
160-21509-5	TITO04-RSY15-U8-BS-FSSSU6-S005	Total/NA	Solid	Dry and Grind	
160-21509-6	TITO04-RSY15-U8-BS-FSSSU6-S006	Total/NA	Solid	Dry and Grind	
160-21509-7	TITO04-RSY15-U8-BS-FSSSU6-S007	Total/NA	Solid	Dry and Grind	
160-21509-8	TITO04-RSY15-U8-BS-FSSSU6-S008	Total/NA	Solid	Dry and Grind	
160-21509-9	TITO04-RSY15-U8-BS-FSSSU6-S009	Total/NA	Solid	Dry and Grind	
160-21509-10	TITO04-RSY15-U8-BS-FSSSU6-S010	Total/NA	Solid	Dry and Grind	
160-21509-11	TITO04-RSY15-U8-BS-FSSSU6-S011	Total/NA	Solid	Dry and Grind	
160-21509-12	TITO04-RSY15-U8-BS-FSSSU6-S012	Total/NA	Solid	Dry and Grind	
160-21509-1 DU	TITO04-RSY15-U8-BS-FSSSU6-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 298819

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21509-1	TITO04-RSY15-U8-BS-FSSSU6-S001	Total/NA	Solid	Fill_Geo-21	298219
160-21509-2	TITO04-RSY15-U8-BS-FSSSU6-S002	Total/NA	Solid	Fill_Geo-21	298219
160-21509-3	TITO04-RSY15-U8-BS-FSSSU6-S003	Total/NA	Solid	Fill_Geo-21	298219
160-21509-4	TITO04-RSY15-U8-BS-FSSSU6-S004	Total/NA	Solid	Fill_Geo-21	298219
160-21509-5	TITO04-RSY15-U8-BS-FSSSU6-S005	Total/NA	Solid	Fill_Geo-21	298219
160-21509-6	TITO04-RSY15-U8-BS-FSSSU6-S006	Total/NA	Solid	Fill_Geo-21	298219
160-21509-7	TITO04-RSY15-U8-BS-FSSSU6-S007	Total/NA	Solid	Fill_Geo-21	298219
160-21509-8	TITO04-RSY15-U8-BS-FSSSU6-S008	Total/NA	Solid	Fill_Geo-21	298219
160-21509-9	TITO04-RSY15-U8-BS-FSSSU6-S009	Total/NA	Solid	Fill_Geo-21	298219
160-21509-10	TITO04-RSY15-U8-BS-FSSSU6-S010	Total/NA	Solid	Fill_Geo-21	298219
160-21509-11	TITO04-RSY15-U8-BS-FSSSU6-S011	Total/NA	Solid	Fill_Geo-21	298219
160-21509-12	TITO04-RSY15-U8-BS-FSSSU6-S012	Total/NA	Solid	Fill_Geo-21	298219
MB 160-298819/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-298819/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-21509-1 DU	TITO04-RSY15-U8-BS-FSSSU6-S001	Total/NA	Solid	Fill_Geo-21	298219

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-24995-2

Client Project/Site: Treasure Island - 500060

For:

Aptim Federal Services LLC
420 Exchange, Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

11/8/2017 11:49:39 AM

Micha Korinhizer, Project Management Assistant II
(314)298-8566

micha.korinhizer@testamericainc.com

Designee for

Rhonda Ridenhower, Manager of Project Management
(314)298-8566

rhonda.ridenhower@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Job ID: 160-24995-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-24995-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Job ID: 160-24995-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/13/2017; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 16.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSS-SU7A-U1-S007 (160-24995-1), TITO04-BS-FSS-SU7A-U1-S008 (160-24995-2), TITO04-BS-FSS-SU7A-U1-S009 (160-24995-3), TITO04-BS-FSS-SU7A-U1-S010 (160-24995-4), TITO04-BS-FSS-SU7A-U1-S011 (160-24995-5) and TITO04-BS-FSS-SU7A-U1-S012 (160-24995-6) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/13/2017, prepared on 10/16/2017 and analyzed on 11/06/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_BS_FSS_SU7A_U1_#422

Page 1 of 1

Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside SU7
Quadrant A Use 1 Systematic

Purchase Order #: 201455

Project Manager: **Ulrika Messer**
(Name & phone #)

Send Report To: **Renata Vidovic**
Phone/Fax Number: **408-505-7319**
Address: **renata.vidovic@cbifederalservices.com**

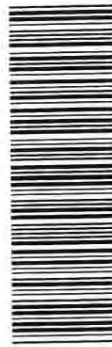
City:

Shipment Date: 10/12/17

Waybill Number: 1266V5451393605904

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden



160-24995 Chain of Custody

Analyses Requested

Gamma Scan - Gamma Spec. Ra-226

Sampler's Name(s): **R. George**

Sample ID Number	Sample Description	Date	Time	Method	Matrix	# of containers	Preservative (water) Preservative (soil)	Container Type	Dose Rate μ R/h
TITO04-BS-FSS-SU7A-U1-S007	Bayside FSS SU7 Quadrant A Lift 1 Systematic	10/11/17	1313	G	SO	1		16 oz Plastic	5
TITO04-BS-FSS-SU7A-U1-S008	Bayside FSS SU7 Quadrant A Lift 1 Systematic	10/11/17	1311	G	SO	1		16 oz Plastic	5
TITO04-BS-FSS-SU7A-U1-S009	Bayside FSS SU7 Quadrant A Lift 1 Systematic	10/11/17	1316	G	SO	1		16 oz Plastic	5
TITO04-BS-FSS-SU7A-U1-S010	Bayside FSS SU7 Quadrant A Lift 1 Systematic	10/11/17	1314	G	SO	1		16 oz Plastic	5
TITO04-BS-FSS-SU7A-U1-S011	Bayside FSS SU7 Quadrant A Lift 1 Systematic	10/11/17	1322	G	SO	1		16 oz Plastic	5
TITO04-BS-FSS-SU7A-U1-S012	Bayside FSS SU7 Quadrant A Lift 1 Systematic	10/11/17	1323	G	SO	1		16 oz Plastic	5

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

III

Relinquished By: Ulrika Messer	Date: 10/11/17 Time: 1500	Received By: Renata Vidovic	Date: 10/11/17 Time: 1500
Relinquished By: Renata Vidovic	Date: 10/12/17 Time: 1200	Received By: UPS	Date: 10/12/17 Time: 1200
Relinquished By: UPS	Date: 10/13/17 Time: 0830	Received By: Kristen Taylor	Date: 10/13/17 Time: 0830

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-24995-2

Login Number: 24995

List Source: TestAmerica St. Louis

List Number: 1

Creator: Taylor, Kristene N

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-24995-1	TITO04-BS-FSS-SU7A-U1-S007	Solid	10/11/17 13:13	10/13/17 08:30
160-24995-2	TITO04-BS-FSS-SU7A-U1-S008	Solid	10/11/17 13:11	10/13/17 08:30
160-24995-3	TITO04-BS-FSS-SU7A-U1-S009	Solid	10/11/17 13:16	10/13/17 08:30
160-24995-4	TITO04-BS-FSS-SU7A-U1-S010	Solid	10/11/17 13:14	10/13/17 08:30
160-24995-5	TITO04-BS-FSS-SU7A-U1-S011	Solid	10/11/17 13:22	10/13/17 08:30
160-24995-6	TITO04-BS-FSS-SU7A-U1-S012	Solid	10/11/17 13:23	10/13/17 08:30

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S007

Date Collected: 10/11/17 13:13

Date Received: 10/13/17 08:30

Lab Sample ID: 160-24995-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.481		0.210	0.215		0.224	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Actinium-227	-0.327	U	0.717	0.718		1.02	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Bismuth-212	0.265	U	0.868	0.869		1.52	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Bismuth-214	0.394		0.124	0.131		0.115	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Cesium-137	0.000343	U	0.0678	0.0678		0.122	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-210	-0.0646	U	1.14	1.14		1.76	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-212	0.294		0.0833	0.0915		0.0962	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-214	0.441		0.125	0.133		0.134	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Potassium-40	10.6		1.70	2.02		0.721	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Protactinium-231	0.000	U	0.843	0.843		4.15	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Radium-226	0.394		0.124	0.131	0.500	0.115	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Radium-228	0.481		0.210	0.215		0.224	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thallium-208	0.109		0.0616	0.0626		0.0698	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-228	0.294		0.0833	0.0915		0.0962	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-232	0.481		0.210	0.215		0.224	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-234	-0.881	U	0.957	0.961		1.85	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Uranium-235	0.140	U	0.273	0.274		0.488	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Uranium-238	-0.881	U	0.957	0.961		1.85	pCi/g	10/16/17 21:43	11/06/17 14:10	1

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S008

Date Collected: 10/11/17 13:11

Date Received: 10/13/17 08:30

Lab Sample ID: 160-24995-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.366		0.200	0.204		0.216	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Actinium-227	0.266	U	0.418	0.419		1.08	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Bismuth-212	0.269	U	0.698	0.699		1.21	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Bismuth-214	0.359		0.0980	0.105		0.0652	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Cesium-137	-0.0192	U	0.0538	0.0538		0.101	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Lead-210	-0.775	U	1.16	1.17		2.74	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Lead-212	0.0235	U	0.107	0.107		0.181	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Lead-214	0.332		0.115	0.120		0.118	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Potassium-40	10.7		1.55	1.90		0.573	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Protactinium-231	0.599	U	1.54	1.54		3.52	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Radium-226	0.359		0.0980	0.105	0.500	0.0652	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Radium-228	0.366		0.200	0.204		0.216	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thallium-208	0.132		0.0481	0.0500		0.0445	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thorium-228	0.0235	U	0.107	0.107		0.181	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thorium-232	0.366		0.200	0.204		0.216	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thorium-234	0.375	U	0.804	0.805		1.22	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Uranium-235	0.0344	U	0.0930	0.0930		0.757	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Uranium-238	0.375	U	0.804	0.805		1.22	pCi/g	10/16/17 21:43	11/06/17 14:11	1

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S009

Lab Sample ID: 160-24995-3

Date Collected: 10/11/17 13:16

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.419		0.123	0.130		0.156	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Actinium-227	0.138	U	0.391	0.391		0.958	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Bismuth-212	0.220	U	0.510	0.511		0.876	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Bismuth-214	0.286		0.0971	0.102		0.100	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Cesium-137	0.00155	U	0.0408	0.0408		0.0733	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-210	-0.431	U	0.748	0.750		2.23	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-212	0.230		0.0625	0.0692		0.0768	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-214	0.305		0.0704	0.0773		0.0644	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Potassium-40	9.94		1.20	1.57		0.529	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Protactinium-231	0.000	U	0.429	0.429		3.14	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Radium-226	0.286		0.0971	0.102	0.500	0.100	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Radium-228	0.419		0.123	0.130		0.156	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thallium-208	0.123		0.0411	0.0431		0.0364	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-228	0.230		0.0625	0.0692		0.0768	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-232	0.419		0.123	0.130		0.156	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-234	0.0980	U	1.01	1.01		1.73	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Uranium-235	0.156	U	0.276	0.276		0.576	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Uranium-238	0.0980	U	1.01	1.01		1.73	pCi/g	10/16/17 21:43	11/06/17 14:10	1

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S010

Lab Sample ID: 160-24995-4

Date Collected: 10/11/17 13:14

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.197		0.130	0.132		0.148	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Actinium-227	0.169	U	0.417	0.417		0.707	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Bismuth-212	0.155	U	0.274	0.275		0.472	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Bismuth-214	0.335		0.0837	0.0906		0.0509	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Cesium-137	0.0156	U	0.0336	0.0336		0.0579	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Lead-210	0.804	U	0.845	0.850		1.02	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Lead-212	0.279		0.0602	0.0702		0.0636	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Lead-214	0.406		0.0829	0.0930		0.0853	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Potassium-40	9.88		1.15	1.53		0.247	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Protactinium-231	-0.682	U	2.08	2.08		3.48	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Radium-226	0.335		0.0837	0.0906	0.500	0.0509	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Radium-228	0.197		0.130	0.132		0.148	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Thallium-208	0.0836		0.0315	0.0326		0.0237	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Thorium-228	0.279		0.0602	0.0702		0.0636	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Thorium-232	0.197		0.130	0.132		0.148	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Thorium-234	0.334	U	1.04	1.05		1.76	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Uranium-235	0.0210	U	0.198	0.198		0.580	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Uranium-238	0.334	U	1.04	1.05		1.76	pCi/g	10/16/17 21:43	11/06/17 14:12	1

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S011

Lab Sample ID: 160-24995-5

Date Collected: 10/11/17 13:22

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.415		0.141	0.147		0.195	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Actinium-227	-0.0617	U	0.101	0.102		1.26	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Bismuth-212	0.180	U	0.585	0.586		1.02	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Bismuth-214	0.0268	U	0.118	0.118		0.283	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Cesium-137	0.0273	U	0.0489	0.0490		0.0827	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-210	0.273	U	0.871	0.872		1.38	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-212	0.237		0.0708	0.0772		0.0889	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-214	0.353		0.0937	0.101		0.0878	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Potassium-40	10.3		1.35	1.71		0.693	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Protactinium-231	-0.603	U	2.32	2.32		3.91	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Radium-226	0.0268	U	0.118	0.118	0.500	0.283	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Radium-228	0.415		0.141	0.147		0.195	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thallium-208	0.0913		0.0389	0.0400		0.0418	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-228	0.237		0.0708	0.0772		0.0889	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-232	0.415		0.141	0.147		0.195	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-234	0.734	U	1.04	1.04		1.72	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Uranium-235	-0.0345	U	0.337	0.337		0.563	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Uranium-238	0.734	U	1.04	1.04		1.72	pCi/g	10/16/17 21:43	11/06/17 15:19	1

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S012

Lab Sample ID: 160-24995-6

Date Collected: 10/11/17 13:23

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.229	U	0.182	0.184		0.365	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Actinium-227	0.168	U	0.591	0.591		0.864	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Bismuth-212	-0.513	U	0.762	0.764		2.19	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Bismuth-214	0.343		0.156	0.160		0.166	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Cesium-137	-0.0480	U	0.0595	0.0598		0.153	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-210	-0.0134	U	1.37	1.37		2.09	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-212	0.285		0.0930	0.100		0.118	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-214	0.377		0.119	0.125		0.148	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Potassium-40	9.64		1.69	1.96		0.781	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Protactinium-231	0.000	U	0.345	0.345		4.69	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Radium-226	0.343		0.156	0.160	0.500	0.166	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Radium-228	0.229	U	0.182	0.184		0.365	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thallium-208	0.0991	U	0.114	0.114		0.112	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-228	0.285		0.0930	0.100		0.118	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-232	0.229	U	0.182	0.184		0.365	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-234	-0.313	U	1.07	1.07		1.90	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Uranium-235	0.108	U	0.336	0.336		0.503	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Uranium-238	-0.313	U	1.07	1.07		1.90	pCi/g	10/16/17 21:43	11/06/17 15:19	1

TestAmerica St. Louis

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-332173/1-A

Matrix: Solid

Analysis Batch: 335900

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 332173

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Actinium-227	0.0000	U	0.406	0.406		1.29	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-212	-0.6171	U	0.642	0.645		1.48	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-214	-0.07514	U	0.0806	0.0809		0.210	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Cesium-137	-0.04555	U	0.0471	0.0474		0.129	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-210	1.132	U	1.32	1.33		1.79	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-212	-0.09664	U	0.0901	0.0909		0.205	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-214	0.002476	U	0.108	0.108		0.191	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Potassium-40	-0.4904	U	1.06	1.06		1.43	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Protactinium-231	0.2012	U	1.28	1.28		4.16	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-226	-0.07514	U	0.0806	0.0809	0.500	0.210	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-228	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thallium-208	0.007674	U	0.0172	0.0172		0.0657	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-228	-0.09664	U	0.0901	0.0909		0.205	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-232	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-234	-0.9046	U	1.10	1.10		2.01	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-235	0.03409	U	0.0937	0.0938		0.481	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-238	-0.9046	U	1.10	1.10		2.01	pCi/g	10/16/17 21:43	11/06/17 12:53	1

Lab Sample ID: LCS 160-332173/2-A

Matrix: Solid

Analysis Batch: 335894

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.9	100.2		10.5		0.882	pCi/g	103	87 - 116
Cesium-137	28.7	26.66		2.84		0.217	pCi/g	93	87 - 120
Cobalt-60	14.2	13.04		1.35		0.131	pCi/g	92	87 - 115

Lab Sample ID: 160-24992-A-1-E DU

Matrix: Solid

Analysis Batch: 335902

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1
Actinium-227	0.227	U	0.1468	U	0.710		1.21	pCi/g	0.07	1
Bismuth-212	-0.0280	U	-0.2606	U	0.864		1.81	pCi/g	0.14	1
Bismuth-214	0.279		0.3160		0.117		0.0955	pCi/g	0.15	1
Cesium-137	-0.0226	U	-0.07625	U	0.0705		0.156	pCi/g	0.41	1
Lead-210	-0.132	U	0.6555	U	1.49		2.51	pCi/g	0.29	1
Lead-212	0.238		0.2624		0.0854		0.0960	pCi/g	0.14	1
Lead-214	0.218		0.3577		0.100		0.0781	pCi/g	0.60	1
Potassium-40	10.4		11.69		2.03		0.594	pCi/g	0.33	1
Protactinium-231	-0.912	U	0.0000	U	0.159		3.90	pCi/g	0.39	1
Radium-226	0.279		0.3160		0.117	0.500	0.0955	pCi/g	0.15	1
Radium-228	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1

TestAmerica St. Louis

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-24992-A-1-E DU
Matrix: Solid
Analysis Batch: 335902

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 332173

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.0350	U	0.1089		0.0698		0.0782	pCi/g	0.47	1
Thorium-228	0.238		0.2624		0.0854		0.0960	pCi/g	0.14	1
Thorium-232	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1
Thorium-234	-0.113	U	0.1822	U	0.198		2.33	pCi/g	0.26	1
Uranium-235	-0.00738	U	0.1270	U	0.340		0.703	pCi/g	0.37	1
Uranium-238	-0.113	U	0.1822	U	0.198		2.33	pCi/g	0.26	1

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Rad

Leach Batch: 331792

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24995-1	TITO04-BS-FSS-SU7A-U1-S007	Total/NA	Solid	Dry and Grind	
160-24995-2	TITO04-BS-FSS-SU7A-U1-S008	Total/NA	Solid	Dry and Grind	
160-24995-3	TITO04-BS-FSS-SU7A-U1-S009	Total/NA	Solid	Dry and Grind	
160-24995-4	TITO04-BS-FSS-SU7A-U1-S010	Total/NA	Solid	Dry and Grind	
160-24995-5	TITO04-BS-FSS-SU7A-U1-S011	Total/NA	Solid	Dry and Grind	
160-24995-6	TITO04-BS-FSS-SU7A-U1-S012	Total/NA	Solid	Dry and Grind	
160-24992-A-1-E DU	Duplicate	Total/NA	Solid	Dry and Grind	

Prep Batch: 332173

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24995-1	TITO04-BS-FSS-SU7A-U1-S007	Total/NA	Solid	Fill_Geo-21	331792
160-24995-2	TITO04-BS-FSS-SU7A-U1-S008	Total/NA	Solid	Fill_Geo-21	331792
160-24995-3	TITO04-BS-FSS-SU7A-U1-S009	Total/NA	Solid	Fill_Geo-21	331792
160-24995-4	TITO04-BS-FSS-SU7A-U1-S010	Total/NA	Solid	Fill_Geo-21	331792
160-24995-5	TITO04-BS-FSS-SU7A-U1-S011	Total/NA	Solid	Fill_Geo-21	331792
160-24995-6	TITO04-BS-FSS-SU7A-U1-S012	Total/NA	Solid	Fill_Geo-21	331792
MB 160-332173/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-332173/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-24992-A-1-E DU	Duplicate	Total/NA	Solid	Fill_Geo-21	331792

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-24996-2

Client Project/Site: Treasure Island - 500060

For:

Aptim Federal Services LLC
420 Exchange, Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

11/8/2017 11:52:58 AM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Job ID: 160-24996-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-24996-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Job ID: 160-24996-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/13/2017; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 16.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSS-SU7B-LANE1-U1-S013 (160-24996-1), TITO04-BS-FSS-SU7B-LANE1-U1-S014 (160-24996-2), TITO04-BS-FSS-SU7B-LANE1-U1-S015 (160-24996-3), TITO04-BS-FSS-SU7B-LANE2-U1-S016 (160-24996-4), TITO04-BS-FSS-SU7B-LANE2-U1-S017 (160-24996-5) and TITO04-BS-FSS-SU7B-LANE2-U1-S018 (160-24996-6) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/13/2017, prepared on 10/16/2017 and analyzed on 11/06/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-24996-2

Login Number: 24996

List Source: TestAmerica St. Louis

List Number: 1

Creator: Taylor, Kristene N

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-24996-1	TITO04-BS-FSS-SU7B-LANE1-U1-S013	Solid	10/11/17 13:27	10/13/17 08:30
160-24996-2	TITO04-BS-FSS-SU7B-LANE1-U1-S014	Solid	10/11/17 13:29	10/13/17 08:30
160-24996-3	TITO04-BS-FSS-SU7B-LANE1-U1-S015	Solid	10/11/17 13:31	10/13/17 08:30
160-24996-4	TITO04-BS-FSS-SU7B-LANE2-U1-S016	Solid	10/11/17 13:33	10/13/17 08:30
160-24996-5	TITO04-BS-FSS-SU7B-LANE2-U1-S017	Solid	10/11/17 13:36	10/13/17 08:30
160-24996-6	TITO04-BS-FSS-SU7B-LANE2-U1-S018	Solid	10/11/17 13:38	10/13/17 08:30

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Client Sample ID: TITO04-BS-FSS-SU7B-LANE1-U1-S013

Lab Sample ID: 160-24996-1

Date Collected: 10/11/17 13:27

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.100	U	0.204	0.204		0.339	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Actinium-227	0.320	U	0.692	0.693		1.16	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Bismuth-212	0.406	U	0.707	0.708		1.19	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Bismuth-214	0.272		0.0970	0.101		0.0847	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Cesium-137	0.00360	U	0.0495	0.0495		0.0890	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-210	-0.824	U	1.32	1.33		2.91	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-212	0.302		0.107	0.114		0.155	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-214	0.285		0.105	0.109		0.138	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Potassium-40	10.7		1.50	1.86		0.542	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Protactinium-231	-0.778	U	2.52	2.52		4.24	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Radium-226	0.272		0.0970	0.101	0.500	0.0847	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Radium-228	0.100	U	0.204	0.204		0.339	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thallium-208	0.0751	U	0.0703	0.0707		0.0834	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-228	0.302		0.107	0.114		0.155	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-232	0.100	U	0.204	0.204		0.339	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-234	0.550	U	0.470	0.474		1.42	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Uranium-235	0.249	U	0.149	0.151		0.784	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Uranium-238	0.550	U	0.470	0.474		1.42	pCi/g	10/16/17 21:43	11/06/17 15:21	1

Client Sample ID: TITO04-BS-FSS-SU7B-LANE1-U1-S014

Lab Sample ID: 160-24996-2

Date Collected: 10/11/17 13:29

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.274		0.140	0.142		0.152	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Actinium-227	-0.0200	U	0.576	0.576		0.988	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Bismuth-212	0.266	U	0.430	0.431		0.725	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Bismuth-214	0.339		0.0826	0.0899		0.0692	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Cesium-137	-0.0144	U	0.0512	0.0513		0.0884	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-210	-0.635	U	0.676	0.680		1.86	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-212	0.285		0.0648	0.0746		0.0740	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-214	0.347		0.0741	0.0825		0.0801	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Potassium-40	9.02		1.13	1.46		0.518	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Protactinium-231	-0.639	U	2.01	2.01		3.37	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Radium-226	0.339		0.0826	0.0899	0.500	0.0692	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Radium-228	0.274		0.140	0.142		0.152	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thallium-208	0.0998		0.0408	0.0421		0.0356	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-228	0.285		0.0648	0.0746		0.0740	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-232	0.274		0.140	0.142		0.152	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-234	0.445	U	0.946	0.947		1.58	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Uranium-235	0.000	U	0.0539	0.0539		0.561	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Uranium-238	0.445	U	0.946	0.947		1.58	pCi/g	10/16/17 21:43	11/06/17 15:21	1

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Client Sample ID: TITO04-BS-FSS-SU7B-LANE1-U1-S015

Lab Sample ID: 160-24996-3

Date Collected: 10/11/17 13:31

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.409		0.0959	0.105		0.107	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Actinium-227	-0.147	U	0.534	0.534		0.905	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Bismuth-212	0.210	U	0.348	0.349		0.590	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Bismuth-214	0.251		0.0798	0.0839		0.0671	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Cesium-137	-0.0410	U	0.0661	0.0663		0.110	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Lead-210	0.493	U	0.943	0.945		1.58	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Lead-212	0.312		0.0958	0.104		0.140	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Lead-214	0.346		0.0713	0.0799		0.0808	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Potassium-40	10.1		1.14	1.54		0.237	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Protactinium-231	0.502	U	1.71	1.71		2.88	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Radium-226	0.251		0.0798	0.0839	0.500	0.0671	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Radium-228	0.409		0.0959	0.105		0.107	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Thallium-208	0.0925		0.0296	0.0311		0.0200	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Thorium-228	0.312		0.0958	0.104		0.140	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Thorium-232	0.409		0.0959	0.105		0.107	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Thorium-234	0.405	U	0.844	0.845		1.42	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Uranium-235	0.0352	U	0.165	0.165		0.569	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Uranium-238	0.405	U	0.844	0.845		1.42	pCi/g	10/16/17 21:43	11/06/17 15:18	1

Client Sample ID: TITO04-BS-FSS-SU7B-LANE2-U1-S016

Lab Sample ID: 160-24996-4

Date Collected: 10/11/17 13:33

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0954	U	0.0531	0.0540		0.363	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Actinium-227	0.0779	U	0.610	0.610		1.04	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-212	-0.400	U	1.22	1.22		1.12	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-214	0.00893	U	0.173	0.173		0.296	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Cesium-137	-0.0285	U	0.0996	0.0997		0.102	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-210	-0.213	U	1.22	1.22		2.11	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-212	0.251		0.0711	0.0782		0.0895	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-214	0.325		0.0980	0.104		0.116	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Potassium-40	11.1		1.34	1.76		0.647	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Protactinium-231	-0.175	U	2.25	2.25		3.81	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-226	0.00893	U	0.173	0.173	0.500	0.296	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-228	0.0954	U	0.0531	0.0540		0.363	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thallium-208	0.0960		0.0386	0.0399		0.0399	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-228	0.251		0.0711	0.0782		0.0895	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-232	0.0954	U	0.0531	0.0540		0.363	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-234	-0.0499	U	0.902	0.902		1.55	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-235	-0.0156	U	0.290	0.290		0.498	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-238	-0.0499	U	0.902	0.902		1.55	pCi/g	10/16/17 21:43	11/06/17 16:41	1

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Client Sample ID: TITO04-BS-FSS-SU7B-LANE2-U1-S017

Lab Sample ID: 160-24996-5

Date Collected: 10/11/17 13:36

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.208	U	0.273	0.273		0.397	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Actinium-227	-0.311	U	0.684	0.685		0.980	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-212	0.321	U	0.781	0.782		1.36	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-214	0.384		0.157	0.162		0.169	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Cesium-137	-0.00824	U	0.0699	0.0699		0.128	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-210	-0.915	U	1.41	1.41		2.32	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-212	0.242		0.0863	0.0918		0.112	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-214	0.306		0.129	0.132		0.167	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Potassium-40	11.6		1.82	2.17		0.754	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Protactinium-231	-0.0000000	U	2.44	2.44		4.20	pCi/g	10/16/17 21:43	11/06/17 16:41	1
	243									
Radium-226	0.384		0.157	0.162	0.500	0.169	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-228	0.208	U	0.273	0.273		0.397	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thallium-208	0.0615	U	0.0802	0.0804		0.101	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-228	0.242		0.0863	0.0918		0.112	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-232	0.208	U	0.273	0.273		0.397	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-234	0.0266	U	1.22	1.22		1.82	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-235	0.110	U	0.309	0.309		0.511	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-238	0.0266	U	1.22	1.22		1.82	pCi/g	10/16/17 21:43	11/06/17 16:41	1

Client Sample ID: TITO04-BS-FSS-SU7B-LANE2-U1-S018

Lab Sample ID: 160-24996-6

Date Collected: 10/11/17 13:38

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.321		0.191	0.194		0.212	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Actinium-227	-0.201	U	0.649	0.650		1.25	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-212	0.167	U	0.621	0.621		1.10	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-214	0.350		0.118	0.124		0.0888	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Cesium-137	-0.0279	U	0.113	0.113		0.111	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-210	0.605	U	1.38	1.38		2.32	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-212	0.0199	U	0.101	0.101		0.171	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-214	0.343		0.123	0.128		0.117	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Potassium-40	10.5		1.52	1.86		0.563	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Protactinium-231	-0.867	U	3.04	3.04		5.11	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-226	0.350		0.118	0.124	0.500	0.0888	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-228	0.321		0.191	0.194		0.212	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thallium-208	0.152		0.0569	0.0590		0.0487	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-228	0.0199	U	0.101	0.101		0.171	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-232	0.321		0.191	0.194		0.212	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-234	1.82		1.26	1.27		1.49	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-235	-0.224	U	0.256	0.257		0.886	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-238	1.82		1.26	1.27		1.49	pCi/g	10/16/17 21:43	11/06/17 16:41	1

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QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-332173/1-A
Matrix: Solid
Analysis Batch: 335900

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 332173

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Actinium-227	0.0000	U	0.406	0.406		1.29	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-212	-0.6171	U	0.642	0.645		1.48	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-214	-0.07514	U	0.0806	0.0809		0.210	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Cesium-137	-0.04555	U	0.0471	0.0474		0.129	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-210	1.132	U	1.32	1.33		1.79	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-212	-0.09664	U	0.0901	0.0909		0.205	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-214	0.002476	U	0.108	0.108		0.191	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Potassium-40	-0.4904	U	1.06	1.06		1.43	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Protactinium-231	0.2012	U	1.28	1.28		4.16	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-226	-0.07514	U	0.0806	0.0809	0.500	0.210	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-228	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thallium-208	0.007674	U	0.0172	0.0172		0.0657	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-228	-0.09664	U	0.0901	0.0909		0.205	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-232	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-234	-0.9046	U	1.10	1.10		2.01	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-235	0.03409	U	0.0937	0.0938		0.481	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-238	-0.9046	U	1.10	1.10		2.01	pCi/g	10/16/17 21:43	11/06/17 12:53	1

Lab Sample ID: LCS 160-332173/2-A
Matrix: Solid
Analysis Batch: 335894

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 332173

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.9	100.2		10.5		0.882	pCi/g	103	87 - 116
Cesium-137	28.7	26.66		2.84		0.217	pCi/g	93	87 - 120
Cobalt-60	14.2	13.04		1.35		0.131	pCi/g	92	87 - 115

Lab Sample ID: 160-24992-A-1-E DU
Matrix: Solid
Analysis Batch: 335902

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 332173

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1
Actinium-227	0.227	U	0.1468	U	0.710		1.21	pCi/g	0.07	1
Bismuth-212	-0.0280	U	-0.2606	U	0.864		1.81	pCi/g	0.14	1
Bismuth-214	0.279		0.3160		0.117		0.0955	pCi/g	0.15	1
Cesium-137	-0.0226	U	-0.07625	U	0.0705		0.156	pCi/g	0.41	1
Lead-210	-0.132	U	0.6555	U	1.49		2.51	pCi/g	0.29	1
Lead-212	0.238		0.2624		0.0854		0.0960	pCi/g	0.14	1
Lead-214	0.218		0.3577		0.100		0.0781	pCi/g	0.60	1
Potassium-40	10.4		11.69		2.03		0.594	pCi/g	0.33	1
Protactinium-231	-0.912	U	0.0000	U	0.159		3.90	pCi/g	0.39	1
Radium-226	0.279		0.3160		0.117	0.500	0.0955	pCi/g	0.15	1
Radium-228	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1

TestAmerica St. Louis

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-24992-A-1-E DU

Matrix: Solid

Analysis Batch: 335902

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.0350	U	0.1089		0.0698		0.0782	pCi/g	0.47	1
Thorium-228	0.238		0.2624		0.0854		0.0960	pCi/g	0.14	1
Thorium-232	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1
Thorium-234	-0.113	U	0.1822	U	0.198		2.33	pCi/g	0.26	1
Uranium-235	-0.00738	U	0.1270	U	0.340		0.703	pCi/g	0.37	1
Uranium-238	-0.113	U	0.1822	U	0.198		2.33	pCi/g	0.26	1

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Rad

Leach Batch: 331792

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24996-1	TITO04-BS-FSS-SU7B-LANE1-U1-S013	Total/NA	Solid	Dry and Grind	
160-24996-2	TITO04-BS-FSS-SU7B-LANE1-U1-S014	Total/NA	Solid	Dry and Grind	
160-24996-3	TITO04-BS-FSS-SU7B-LANE1-U1-S015	Total/NA	Solid	Dry and Grind	
160-24996-4	TITO04-BS-FSS-SU7B-LANE2-U1-S016	Total/NA	Solid	Dry and Grind	
160-24996-5	TITO04-BS-FSS-SU7B-LANE2-U1-S017	Total/NA	Solid	Dry and Grind	
160-24996-6	TITO04-BS-FSS-SU7B-LANE2-U1-S018	Total/NA	Solid	Dry and Grind	
160-24992-A-1-E DU	Duplicate	Total/NA	Solid	Dry and Grind	

Prep Batch: 332173

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24996-1	TITO04-BS-FSS-SU7B-LANE1-U1-S013	Total/NA	Solid	Fill_Geo-21	331792
160-24996-2	TITO04-BS-FSS-SU7B-LANE1-U1-S014	Total/NA	Solid	Fill_Geo-21	331792
160-24996-3	TITO04-BS-FSS-SU7B-LANE1-U1-S015	Total/NA	Solid	Fill_Geo-21	331792
160-24996-4	TITO04-BS-FSS-SU7B-LANE2-U1-S016	Total/NA	Solid	Fill_Geo-21	331792
160-24996-5	TITO04-BS-FSS-SU7B-LANE2-U1-S017	Total/NA	Solid	Fill_Geo-21	331792
160-24996-6	TITO04-BS-FSS-SU7B-LANE2-U1-S018	Total/NA	Solid	Fill_Geo-21	331792
MB 160-332173/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-332173/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-24992-A-1-E DU	Duplicate	Total/NA	Solid	Fill_Geo-21	331792

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-24829-2

Client Project/Site: Treasure Island - 500060

For:

Aptim Federal Services LLC
420 Exchange, Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Rhonda Ridenhower

Authorized for release by:

10/30/2017 9:37:53 AM

Rhonda Ridenhower, Manager of Project Management
(314)298-8566

rhonda.ridenhower@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Job ID: 160-24829-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-24829-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Job ID: 160-24829-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/04/2017; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 19.0 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSS-SU7C-RSY13-U15-S001 (160-24829-1), TITO04-BS-FSS-SU7C-RSY13-U15-S002 (160-24829-2), TITO04-BS-FSS-SU7C-RSY13-U15-S003 (160-24829-3), TITO04-BS-FSS-SU7C-RSY13-U15-S004 (160-24829-4), TITO04-BS-FSS-SU7C-RSY13-U15-S005 (160-24829-5), TITO04-BS-FSS-SU7C-RSY13-U15-S006 (160-24829-6) and TITO04-BS-FSS-SU7C-RSY13-U15-S007 (160-24829-7) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/05/2017, prepared on 10/06/2017 and analyzed on 10/27/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-24829-2

Login Number: 24829

List Source: TestAmerica St. Louis

List Number: 1

Creator: Daniels, Brian J

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-24829-1	TITO04-BS-FSS-SU7C-RSY13-U15-S001	Solid	10/03/17 09:13	10/04/17 08:30
160-24829-2	TITO04-BS-FSS-SU7C-RSY13-U15-S002	Solid	10/03/17 09:14	10/04/17 08:30
160-24829-3	TITO04-BS-FSS-SU7C-RSY13-U15-S003	Solid	10/03/17 09:16	10/04/17 08:30
160-24829-4	TITO04-BS-FSS-SU7C-RSY13-U15-S004	Solid	10/03/17 09:18	10/04/17 08:30
160-24829-5	TITO04-BS-FSS-SU7C-RSY13-U15-S005	Solid	10/03/17 09:19	10/04/17 08:30
160-24829-6	TITO04-BS-FSS-SU7C-RSY13-U15-S006	Solid	10/03/17 09:21	10/04/17 08:30
160-24829-7	TITO04-BS-FSS-SU7C-RSY13-U15-S007	Solid	10/03/17 09:22	10/04/17 08:30

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S001

Lab Sample ID: 160-24829-1

Date Collected: 10/03/17 09:13

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.147	U	0.181	0.182		0.273	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Actinium-227	0.0212	U	0.312	0.312		1.18	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Bismuth-212	0.000	U	0.395	0.395		0.626	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Bismuth-214	0.432		0.111	0.120		0.0771	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Cesium-137	-0.0127	U	0.0603	0.0603		0.104	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Lead-210	-0.713	U	1.54	1.54		2.58	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Lead-212	0.325		0.0689	0.0807		0.0718	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Lead-214	0.418		0.101	0.110		0.0994	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Potassium-40	11.0		1.29	1.71		0.281	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Protactinium-231	-0.731	U	2.27	2.27		3.80	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Radium-226	0.432		0.111	0.120	0.500	0.0771	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Radium-228	0.147	U	0.181	0.182		0.273	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Thallium-208	0.0884		0.0395	0.0405		0.0386	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Thorium-228	0.325		0.0689	0.0807		0.0718	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Thorium-232	0.147	U	0.181	0.182		0.273	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Thorium-234	0.587	U	1.23	1.23		2.06	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Uranium-235	0.000	U	0.120	0.120		0.661	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Uranium-238	0.587	U	1.23	1.23		2.06	pCi/g	10/06/17 21:19	10/27/17 12:10	1

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S002

Lab Sample ID: 160-24829-2

Date Collected: 10/03/17 09:14

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.482		0.165	0.172		0.0984	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Actinium-227	-0.126	U	0.431	0.432		0.945	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Bismuth-212	0.360	U	0.677	0.678		1.15	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Bismuth-214	0.409		0.149	0.155		0.141	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Cesium-137	-0.0234	U	0.0543	0.0544		0.0939	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Lead-210	0.747	U	0.908	0.912		1.36	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Lead-212	0.279		0.0765	0.0847		0.0881	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Lead-214	0.357		0.120	0.126		0.121	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Potassium-40	11.7		1.62	2.02		0.667	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Protactinium-231	-0.650	U	1.70	1.71		2.89	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Radium-226	0.409		0.149	0.155	0.500	0.141	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Radium-228	0.482		0.165	0.172		0.0984	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Thallium-208	0.132		0.0596	0.0612		0.0546	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Thorium-228	0.279		0.0765	0.0847		0.0881	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Thorium-232	0.482		0.165	0.172		0.0984	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Thorium-234	0.153	U	0.260	0.261		1.82	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Uranium-235	0.114	U	0.261	0.261		0.475	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Uranium-238	0.153	U	0.260	0.261		1.82	pCi/g	10/06/17 21:19	10/27/17 12:30	1

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S003

Lab Sample ID: 160-24829-3

Date Collected: 10/03/17 09:16

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.340		0.300	0.302		0.320	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Actinium-227	0.00979	U	0.0200	0.0201		1.45	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Bismuth-212	0.000	U	0.692	0.692		0.751	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Bismuth-214	0.537		0.146	0.157		0.0884	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Cesium-137	-0.0543	U	0.0903	0.0905		0.151	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-210	-1.29	U	1.80	1.81		2.98	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-212	0.186		0.0985	0.101		0.147	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-214	0.397		0.135	0.142		0.119	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Potassium-40	10.9		1.70	2.04		0.722	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Protactinium-231	0.206	U	2.74	2.74		4.66	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Radium-226	0.537		0.146	0.157	0.500	0.0884	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Radium-228	0.340		0.300	0.302		0.320	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thallium-208	0.103		0.0668	0.0676		0.0724	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-228	0.186		0.0985	0.101		0.147	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-232	0.340		0.300	0.302		0.320	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-234	-0.0426	U	1.33	1.33		2.27	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Uranium-235	-0.229	U	0.412	0.412		1.08	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Uranium-238	-0.0426	U	1.33	1.33		2.27	pCi/g	10/06/17 21:19	10/27/17 12:25	1

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S004

Lab Sample ID: 160-24829-4

Date Collected: 10/03/17 09:18

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.509		0.181	0.189		0.233	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Actinium-227	-0.299	U	0.810	0.811		1.36	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Bismuth-212	0.231	U	0.626	0.627		1.09	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Bismuth-214	0.386		0.141	0.147		0.130	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Cesium-137	-0.0284	U	0.0377	0.0378		0.102	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Lead-210	1.42	U	1.38	1.39		1.82	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Lead-212	0.293		0.0853	0.0934		0.109	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Lead-214	0.447		0.117	0.126		0.112	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Potassium-40	9.74		1.38	1.70		0.842	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Protactinium-231	0.636	U	1.40	1.41		3.23	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Radium-226	0.386		0.141	0.147	0.500	0.130	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Radium-228	0.509		0.181	0.189		0.233	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Thallium-208	0.157		0.0533	0.0558		0.0486	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Thorium-228	0.293		0.0853	0.0934		0.109	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Thorium-232	0.509		0.181	0.189		0.233	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Thorium-234	-0.0680	U	0.370	0.370		2.35	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Uranium-235	0.0615	U	0.417	0.417		0.703	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Uranium-238	-0.0680	U	0.370	0.370		2.35	pCi/g	10/06/17 21:19	10/27/17 12:23	1

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S005

Lab Sample ID: 160-24829-5

Date Collected: 10/03/17 09:19

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.535		0.144	0.154		0.118	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Actinium-227	0.110	U	0.275	0.275		0.948	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Bismuth-212	0.319	U	0.591	0.592		1.01	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Bismuth-214	0.399		0.126	0.132		0.120	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Cesium-137	0.00653	U	0.0661	0.0661		0.116	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Lead-210	1.17	U	1.39	1.40		1.92	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Lead-212	0.438		0.0955	0.111		0.110	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Lead-214	0.438		0.111	0.120		0.116	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Potassium-40	11.0		1.46	1.84		0.661	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Protactinium-231	0.000	U	0.212	0.212		3.70	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Radium-226	0.399		0.126	0.132	0.500	0.120	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Radium-228	0.535		0.144	0.154		0.118	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Thallium-208	0.149		0.0629	0.0648		0.0592	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Thorium-228	0.438		0.0955	0.111		0.110	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Thorium-232	0.535		0.144	0.154		0.118	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Thorium-234	1.56		0.862	0.878		1.30	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Uranium-235	0.0768	U	0.267	0.268		0.526	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Uranium-238	1.56		0.862	0.878		1.30	pCi/g	10/06/17 21:19	10/27/17 12:21	1

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S006

Lab Sample ID: 160-24829-6

Date Collected: 10/03/17 09:21

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.502		0.184	0.191		0.288	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Actinium-227	0.00599	U	0.826	0.826		1.42	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Bismuth-212	0.325	U	0.775	0.776		1.34	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Bismuth-214	0.634		0.132	0.148		0.0508	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Cesium-137	-0.0239	U	0.0699	0.0700		0.130	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Lead-210	0.703	U	1.44	1.45		2.43	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Lead-212	0.384		0.0923	0.105		0.102	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Lead-214	0.217	U	0.0952	0.0978		0.254	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Potassium-40	9.94		1.61	1.90		0.663	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Protactinium-231	0.235	U	1.52	1.52		4.88	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Radium-226	0.634		0.132	0.148	0.500	0.0508	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Radium-228	0.502		0.184	0.191		0.288	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Thallium-208	0.125		0.0540	0.0555		0.0512	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Thorium-228	0.384		0.0923	0.105		0.102	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Thorium-232	0.502		0.184	0.191		0.288	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Thorium-234	-0.986	U	1.69	1.69		2.94	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Uranium-235	-0.282	U	0.494	0.495		0.931	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Uranium-238	-0.986	U	1.69	1.69		2.94	pCi/g	10/06/17 21:19	10/27/17 12:22	1

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S007

Lab Sample ID: 160-24829-7

Date Collected: 10/03/17 09:22

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.440		0.262	0.266		0.266	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Actinium-227	-0.225	U	0.689	0.689		1.16	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Bismuth-212	-0.301	U	1.00	1.00		1.72	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Bismuth-214	0.386		0.125	0.131		0.117	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Cesium-137	-0.0362	U	0.0606	0.0607		0.102	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-210	0.0809	U	1.23	1.23		2.11	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-212	0.289		0.0784	0.0869		0.0982	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-214	0.447		0.102	0.112		0.0967	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Potassium-40	8.17		1.33	1.57		0.529	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Protactinium-231	-0.128	U	2.30	2.30		3.91	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Radium-226	0.386		0.125	0.131	0.500	0.117	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Radium-228	0.440		0.262	0.266		0.266	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thallium-208	0.145		0.0450	0.0474		0.0368	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-228	0.289		0.0784	0.0869		0.0982	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-232	0.440		0.262	0.266		0.266	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-234	0.533	U	0.355	0.359		1.29	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Uranium-235	0.0568	U	0.393	0.393		0.663	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Uranium-238	0.533	U	0.355	0.359		1.29	pCi/g	10/06/17 21:19	10/27/17 12:25	1

TestAmerica St. Louis

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-330775/1-A
Matrix: Solid
Analysis Batch: 334219

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 330775

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.07562	U	0.166	0.166		0.304	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Actinium-227	-0.04958	U	0.0968	0.0970		1.15	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Bismuth-212	0.4377	U	0.905	0.906		1.54	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Bismuth-214	-0.1189	U	0.156	0.157		0.297	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Cesium-137	0.02884	U	0.0585	0.0586		0.101	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Lead-210	0.2977	U	0.928	0.929		1.51	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Lead-212	0.02763	U	0.0815	0.0815		0.139	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Lead-214	0.01614	U	0.124	0.124		0.164	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Potassium-40	0.008088	U	0.505	0.505		0.975	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Protactinium-231	0.5708	U	1.84	1.84		3.14	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Radium-226	-0.1189	U	0.156	0.157	0.500	0.297	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Radium-228	0.07562	U	0.166	0.166		0.304	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Thallium-208	-0.03635	U	0.0747	0.0748		0.0941	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Thorium-228	0.02763	U	0.0815	0.0815		0.139	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Thorium-232	0.07562	U	0.166	0.166		0.304	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Thorium-234	0.7180	U	0.726	0.730		1.06	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Uranium-235	0.1127	U	0.261	0.262		0.421	pCi/g	10/06/17 21:19	10/27/17 11:36	1
Uranium-238	0.7180	U	0.726	0.730		1.06	pCi/g	10/06/17 21:19	10/27/17 11:36	1

Lab Sample ID: LCS 160-330775/2-A
Matrix: Solid
Analysis Batch: 334218

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 330775

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.9	91.96		9.67		1.13	pCi/g	95	87 - 116
Cesium-137	28.7	27.71		2.94		0.162	pCi/g	96	87 - 120
Cobalt-60	14.3	13.43		1.39		0.0587	pCi/g	94	87 - 115

Lab Sample ID: 160-24829-1 DU
Matrix: Solid
Analysis Batch: 334218

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S001
Prep Type: Total/NA
Prep Batch: 330775

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.147	U	0.2935		0.206		0.210	pCi/g	0.38	1
Actinium-227	0.0212	U	0.2705	U	0.652		1.10	pCi/g	0.26	1
Bismuth-212	0.000	U	-0.01090	U	0.637		1.14	pCi/g	0.01	1
Bismuth-214	0.432		0.4184		0.117		0.0919	pCi/g	0.06	1
Cesium-137	-0.0127	U	-0.00303	U	0.0621		0.109	pCi/g	0.08	1
Lead-210	-0.713	U	0.6677	U	1.29		2.16	pCi/g	0.49	1
Lead-212	0.325		0.3513		0.0875		0.0790	pCi/g	0.15	1
Lead-214	0.418		0.4510		0.124		0.106	pCi/g	0.14	1
Potassium-40	11.0		12.26		1.91		0.652	pCi/g	0.36	1
Protactinium-231	-0.731	U	0.5564	U	1.62		3.66	pCi/g	0.33	1
Radium-226	0.432		0.4184		0.117	0.500	0.0919	pCi/g	0.06	1
Radium-228	0.147	U	0.2935		0.206		0.210	pCi/g	0.38	1

TestAmerica St. Louis

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-24829-1 DU

Matrix: Solid

Analysis Batch: 334218

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S001

Prep Type: Total/NA

Prep Batch: 330775

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.0884		0.1097		0.0545		0.0553	pCi/g	0.22	1
Thorium-228	0.325		0.3513		0.0875		0.0790	pCi/g	0.15	1
Thorium-232	0.147	U	0.2935		0.206		0.210	pCi/g	0.38	1
Thorium-234	0.587	U	0.0000	U	0.557		2.10	pCi/g	0.33	1
Uranium-235	0.000	U	-0.1591	U	0.445		0.743	pCi/g	0.28	1
Uranium-238	0.587	U	0.0000	U	0.557		2.10	pCi/g	0.33	1

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Rad

Leach Batch: 330397

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24829-1	TITO04-BS-FSS-SU7C-RSY13-U15-S001	Total/NA	Solid	Dry and Grind	
160-24829-2	TITO04-BS-FSS-SU7C-RSY13-U15-S002	Total/NA	Solid	Dry and Grind	
160-24829-3	TITO04-BS-FSS-SU7C-RSY13-U15-S003	Total/NA	Solid	Dry and Grind	
160-24829-4	TITO04-BS-FSS-SU7C-RSY13-U15-S004	Total/NA	Solid	Dry and Grind	
160-24829-5	TITO04-BS-FSS-SU7C-RSY13-U15-S005	Total/NA	Solid	Dry and Grind	
160-24829-6	TITO04-BS-FSS-SU7C-RSY13-U15-S006	Total/NA	Solid	Dry and Grind	
160-24829-7	TITO04-BS-FSS-SU7C-RSY13-U15-S007	Total/NA	Solid	Dry and Grind	
160-24829-1 DU	TITO04-BS-FSS-SU7C-RSY13-U15-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 330775

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24829-1	TITO04-BS-FSS-SU7C-RSY13-U15-S001	Total/NA	Solid	Fill_Geo-21	330397
160-24829-2	TITO04-BS-FSS-SU7C-RSY13-U15-S002	Total/NA	Solid	Fill_Geo-21	330397
160-24829-3	TITO04-BS-FSS-SU7C-RSY13-U15-S003	Total/NA	Solid	Fill_Geo-21	330397
160-24829-4	TITO04-BS-FSS-SU7C-RSY13-U15-S004	Total/NA	Solid	Fill_Geo-21	330397
160-24829-5	TITO04-BS-FSS-SU7C-RSY13-U15-S005	Total/NA	Solid	Fill_Geo-21	330397
160-24829-6	TITO04-BS-FSS-SU7C-RSY13-U15-S006	Total/NA	Solid	Fill_Geo-21	330397
160-24829-7	TITO04-BS-FSS-SU7C-RSY13-U15-S007	Total/NA	Solid	Fill_Geo-21	330397
MB 160-330775/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-330775/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-24829-1 DU	TITO04-BS-FSS-SU7C-RSY13-U15-S001	Total/NA	Solid	Fill_Geo-21	330397

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-24992-2

Client Project/Site: Treasure Island - 500060

For:

Aptim Federal Services LLC
420 Exchange, Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

11/9/2017 10:35:05 AM

Micha Korinhizer, Project Management Assistant II
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Designee for

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Job ID: 160-24992-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-24992-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Job ID: 160-24992-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/13/2017; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 16.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSS-SU7D-U1-S001 (160-24992-1), TITO04-BS-FSS-SU7D-U1-S002 (160-24992-2), TITO04-BS-FSS-SU7D-U1-S003 (160-24992-3), TITO04-BS-FSS-SU7D-U1-S004 (160-24992-4), TITO04-BS-FSS-SU7D-U1-S005 (160-24992-5) and TITO04-BS-FSS-SU7D-U1-S006 (160-24992-6) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/13/2017, prepared on 10/16/2017 and analyzed on 11/06/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-24992-2

Login Number: 24992

List Source: TestAmerica St. Louis

List Number: 1

Creator: Taylor, Kristene N

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-24992-1	TITO04-BS-FSS-SU7D-U1-S001	Solid	10/11/17 12:15	10/13/17 08:30
160-24992-2	TITO04-BS-FSS-SU7D-U1-S002	Solid	10/11/17 12:18	10/13/17 08:30
160-24992-3	TITO04-BS-FSS-SU7D-U1-S003	Solid	10/11/17 12:21	10/13/17 08:30
160-24992-4	TITO04-BS-FSS-SU7D-U1-S004	Solid	10/11/17 12:23	10/13/17 08:30
160-24992-5	TITO04-BS-FSS-SU7D-U1-S005	Solid	10/11/17 12:26	10/13/17 08:30
160-24992-6	TITO04-BS-FSS-SU7D-U1-S006	Solid	10/11/17 12:29	10/13/17 08:30

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S001

Lab Sample ID: 160-24992-1

Date Collected: 10/11/17 12:15

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.290		0.213	0.216		0.232	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Actinium-227	0.227	U	0.504	0.504		0.730	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-212	-0.0280	U	0.744	0.744		1.38	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-214	0.279		0.124	0.127		0.137	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Cesium-137	-0.0226	U	0.0608	0.0608		0.118	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-210	-0.132	U	1.24	1.24		1.91	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-212	0.238		0.0803	0.0860		0.0994	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-214	0.218		0.129	0.131		0.151	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Potassium-40	10.4		1.71	2.02		0.746	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Protactinium-231	-0.912	U	2.17	2.17		3.66	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-226	0.279		0.124	0.127	0.500	0.137	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-228	0.290		0.213	0.216		0.232	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thallium-208	0.0350	U	0.0879	0.0879		0.114	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-228	0.238		0.0803	0.0860		0.0994	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-232	0.290		0.213	0.216		0.232	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-234	-0.113	U	0.936	0.936		1.65	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-235	-0.00738	U	0.0196	0.0196		0.566	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-238	-0.113	U	0.936	0.936		1.65	pCi/g	10/16/17 21:43	11/06/17 12:53	1

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S002

Lab Sample ID: 160-24992-2

Date Collected: 10/11/17 12:18

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.285		0.188	0.190		0.214	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Actinium-227	-0.346	U	0.408	0.410		1.23	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Bismuth-212	-0.292	U	0.573	0.574		1.24	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Bismuth-214	0.323		0.133	0.137		0.127	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Cesium-137	-0.0306	U	0.102	0.103		0.107	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Lead-210	1.01	U	0.865	0.873		1.11	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Lead-212	0.311		0.0728	0.0832		0.0729	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Lead-214	0.418		0.122	0.129		0.0921	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Potassium-40	10.3		1.51	1.84		0.569	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Protactinium-231	0.544	U	1.64	1.65		3.75	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Radium-226	0.323		0.133	0.137	0.500	0.127	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Radium-228	0.285		0.188	0.190		0.214	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Thallium-208	0.113		0.0493	0.0506		0.0493	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Thorium-228	0.311		0.0728	0.0832		0.0729	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Thorium-232	0.285		0.188	0.190		0.214	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Thorium-234	0.521	U	0.856	0.858		1.43	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Uranium-235	0.0150	U	0.0556	0.0556		0.691	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Uranium-238	0.521	U	0.856	0.858		1.43	pCi/g	10/16/17 21:43	11/06/17 12:54	1

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S003

Lab Sample ID: 160-24992-3

Date Collected: 10/11/17 12:21

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.316		0.0978	0.103		0.150	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Actinium-227	-0.264	U	0.566	0.567		0.950	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Bismuth-212	0.302	U	0.550	0.551		0.930	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Bismuth-214	0.318		0.0929	0.0986		0.0890	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Cesium-137	-0.0361	U	0.0555	0.0557		0.0926	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Lead-210	0.476	U	1.14	1.14		1.91	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Lead-212	0.306		0.0606	0.0723		0.0591	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Lead-214	0.304		0.0715	0.0782		0.0679	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Potassium-40	10.1		1.18	1.57		0.509	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Protactinium-231	0.000	U	0.320	0.320		3.21	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Radium-226	0.318		0.0929	0.0986	0.500	0.0890	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Radium-228	0.316		0.0978	0.103		0.150	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Thallium-208	0.135		0.0414	0.0437		0.0309	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Thorium-228	0.306		0.0606	0.0723		0.0591	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Thorium-232	0.316		0.0978	0.103		0.150	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Thorium-234	-0.377	U	0.840	0.841		1.41	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Uranium-235	-0.0366	U	0.0690	0.0691		0.629	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Uranium-238	-0.377	U	0.840	0.841		1.41	pCi/g	10/16/17 21:43	11/06/17 12:52	1

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S004

Lab Sample ID: 160-24992-4

Date Collected: 10/11/17 12:23

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.478		0.108	0.118		0.171	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Actinium-227	0.0621	U	0.278	0.279		1.12	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Bismuth-212	0.225	U	0.892	0.892		1.53	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Bismuth-214	0.382		0.118	0.125		0.113	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Cesium-137	0.00152	U	0.0486	0.0486		0.0872	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-210	-0.203	U	1.47	1.47		2.53	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-212	0.290		0.0797	0.0880		0.101	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-214	0.341		0.104	0.110		0.105	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Potassium-40	10.5		1.36	1.73		0.692	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Protactinium-231	0.000	U	0.421	0.421		3.93	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Radium-226	0.382		0.118	0.125	0.500	0.113	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Radium-228	0.478		0.108	0.118		0.171	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thallium-208	0.0836		0.0735	0.0740		0.0747	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-228	0.290		0.0797	0.0880		0.101	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-232	0.478		0.108	0.118		0.171	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-234	-0.133	U	1.01	1.01		1.74	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Uranium-235	-0.174	U	0.310	0.311		0.592	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Uranium-238	-0.133	U	1.01	1.01		1.74	pCi/g	10/16/17 21:43	11/06/17 13:30	1

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S005

Lab Sample ID: 160-24992-5

Date Collected: 10/11/17 12:26

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.458		0.190	0.196		0.125	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Actinium-227	0.281	U	0.620	0.621		0.892	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Bismuth-212	-0.00138	U	0.814	0.814		1.49	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Bismuth-214	0.423		0.170	0.175		0.155	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Cesium-137	-0.0213	U	0.0650	0.0650		0.127	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-210	0.0954	U	1.19	1.19		1.82	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-212	0.200		0.0826	0.0865		0.113	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-214	0.364		0.112	0.119		0.111	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Potassium-40	11.3		1.78	2.12		0.747	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Protactinium-231	-0.876	U	2.82	2.82		4.75	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Radium-226	0.423		0.170	0.175	0.500	0.155	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Radium-228	0.458		0.190	0.196		0.125	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thallium-208	0.0948		0.0694	0.0701		0.0826	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-228	0.200		0.0826	0.0865		0.113	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-232	0.458		0.190	0.196		0.125	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-234	0.122	U	0.258	0.258		1.71	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Uranium-235	0.0450	U	0.320	0.320		0.614	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Uranium-238	0.122	U	0.258	0.258		1.71	pCi/g	10/16/17 21:43	11/06/17 13:30	1

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S006

Lab Sample ID: 160-24992-6

Date Collected: 10/11/17 12:29

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.337		0.186	0.189		0.185	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Actinium-227	0.216	U	0.502	0.503		0.847	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Bismuth-212	0.000	U	0.417	0.417		0.964	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Bismuth-214	0.323		0.0887	0.0948		0.0810	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Cesium-137	0.0252	U	0.0463	0.0464		0.0784	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Lead-210	0.460	U	1.11	1.11		1.87	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Lead-212	0.329		0.0653	0.0780		0.0658	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Lead-214	0.316		0.0829	0.0891		0.0756	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Potassium-40	9.40		1.17	1.52		0.534	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Protactinium-231	0.000	U	0.274	0.274		3.51	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Radium-226	0.323		0.0887	0.0948	0.500	0.0810	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Radium-228	0.337		0.186	0.189		0.185	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Thallium-208	0.116		0.0328	0.0350		0.0194	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Thorium-228	0.329		0.0653	0.0780		0.0658	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Thorium-232	0.337		0.186	0.189		0.185	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Thorium-234	0.362	U	0.884	0.884		1.49	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Uranium-235	0.0719	U	0.147	0.147		0.582	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Uranium-238	0.362	U	0.884	0.884		1.49	pCi/g	10/16/17 21:43	11/06/17 13:29	1

TestAmerica St. Louis

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-332173/1-A
Matrix: Solid
Analysis Batch: 335900

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 332173

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Actinium-227	0.0000	U	0.406	0.406		1.29	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-212	-0.6171	U	0.642	0.645		1.48	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-214	-0.07514	U	0.0806	0.0809		0.210	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Cesium-137	-0.04555	U	0.0471	0.0474		0.129	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-210	1.132	U	1.32	1.33		1.79	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-212	-0.09664	U	0.0901	0.0909		0.205	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-214	0.002476	U	0.108	0.108		0.191	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Potassium-40	-0.4904	U	1.06	1.06		1.43	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Protactinium-231	0.2012	U	1.28	1.28		4.16	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-226	-0.07514	U	0.0806	0.0809	0.500	0.210	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-228	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thallium-208	0.007674	U	0.0172	0.0172		0.0657	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-228	-0.09664	U	0.0901	0.0909		0.205	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-232	0.05066	U	0.117	0.118		0.312	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-234	-0.9046	U	1.10	1.10		2.01	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-235	0.03409	U	0.0937	0.0938		0.481	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-238	-0.9046	U	1.10	1.10		2.01	pCi/g	10/16/17 21:43	11/06/17 12:53	1

Lab Sample ID: LCS 160-332173/2-A
Matrix: Solid
Analysis Batch: 335894

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 332173

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.9	100.2		10.5		0.882	pCi/g	103	87 - 116
Cesium-137	28.7	26.66		2.84		0.217	pCi/g	93	87 - 120
Cobalt-60	14.2	13.04		1.35		0.131	pCi/g	92	87 - 115

Lab Sample ID: 160-24992-1 DU
Matrix: Solid
Analysis Batch: 335902

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S001
Prep Type: Total/NA
Prep Batch: 332173

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1
Actinium-227	0.227	U	0.1468	U	0.710		1.21	pCi/g	0.07	1
Bismuth-212	-0.0280	U	-0.2606	U	0.864		1.81	pCi/g	0.14	1
Bismuth-214	0.279		0.3160		0.117		0.0955	pCi/g	0.15	1
Cesium-137	-0.0226	U	-0.07625	U	0.0705		0.156	pCi/g	0.41	1
Lead-210	-0.132	U	0.6555	U	1.49		2.51	pCi/g	0.29	1
Lead-212	0.238		0.2624		0.0854		0.0960	pCi/g	0.14	1
Lead-214	0.218		0.3577		0.100		0.0781	pCi/g	0.60	1
Potassium-40	10.4		11.69		2.03		0.594	pCi/g	0.33	1
Protactinium-231	-0.912	U	0.0000	U	0.159		3.90	pCi/g	0.39	1
Radium-226	0.279		0.3160		0.117	0.500	0.0955	pCi/g	0.15	1
Radium-228	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1

TestAmerica St. Louis

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-24992-1 DU

Matrix: Solid

Analysis Batch: 335902

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S001

Prep Type: Total/NA

Prep Batch: 332173

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.0350	U	0.1089		0.0698		0.0782	pCi/g	0.47	1
Thorium-228	0.238		0.2624		0.0854		0.0960	pCi/g	0.14	1
Thorium-232	0.290		0.2779	U	0.158		0.308	pCi/g	0.03	1
Thorium-234	-0.113	U	0.1822	U	0.198		2.33	pCi/g	0.26	1
Uranium-235	-0.00738	U	0.1270	U	0.340		0.703	pCi/g	0.37	1
Uranium-238	-0.113	U	0.1822	U	0.198		2.33	pCi/g	0.26	1

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Rad

Leach Batch: 331792

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24992-1	TITO04-BS-FSS-SU7D-U1-S001	Total/NA	Solid	Dry and Grind	
160-24992-2	TITO04-BS-FSS-SU7D-U1-S002	Total/NA	Solid	Dry and Grind	
160-24992-3	TITO04-BS-FSS-SU7D-U1-S003	Total/NA	Solid	Dry and Grind	
160-24992-4	TITO04-BS-FSS-SU7D-U1-S004	Total/NA	Solid	Dry and Grind	
160-24992-5	TITO04-BS-FSS-SU7D-U1-S005	Total/NA	Solid	Dry and Grind	
160-24992-6	TITO04-BS-FSS-SU7D-U1-S006	Total/NA	Solid	Dry and Grind	
160-24992-1 DU	TITO04-BS-FSS-SU7D-U1-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 332173

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-24992-1	TITO04-BS-FSS-SU7D-U1-S001	Total/NA	Solid	Fill_Geo-21	331792
160-24992-2	TITO04-BS-FSS-SU7D-U1-S002	Total/NA	Solid	Fill_Geo-21	331792
160-24992-3	TITO04-BS-FSS-SU7D-U1-S003	Total/NA	Solid	Fill_Geo-21	331792
160-24992-4	TITO04-BS-FSS-SU7D-U1-S004	Total/NA	Solid	Fill_Geo-21	331792
160-24992-5	TITO04-BS-FSS-SU7D-U1-S005	Total/NA	Solid	Fill_Geo-21	331792
160-24992-6	TITO04-BS-FSS-SU7D-U1-S006	Total/NA	Solid	Fill_Geo-21	331792
MB 160-332173/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-332173/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-24992-1 DU	TITO04-BS-FSS-SU7D-U1-S001	Total/NA	Solid	Fill_Geo-21	331792

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-21651-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan



Authorized for release by:
4/27/2017 2:48:46 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21651-2

Job ID: 160-21651-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-21651-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21651-2

Job ID: 160-21651-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 3/30/2017 8:40 AM; the samples arrived in good condition, properly preserved. The temperatures of the 3 coolers at receipt time were 20.0° C, 20.0° C and 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSSSU09-9-12 (160-21651-1), TITO04-BS-FSSSU09-9-13 (160-21651-2), TITO04-BS-FSSSU09-9-14 (160-21651-3) and TITO04-BS-FSSSU09-9-15 (160-21651-4) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 03/30/2017, prepared on 04/05/2017 and analyzed on 04/25/2017 and 04/26/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_BS_FSSSU09_9-12 to 9-15_#382

Page 1 of 1

Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside FSS
SU9 (9-12 to 9-15)

Purchase Order #: 201455

Shipment Date: 3/24/17

Waybill Number: 12 99V 402 01 9696 2730

Lab Destination: Earth Toxics Inc To Test America

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Renata Vidovic

Phone/Fax Number: 408-505-7319

Address: renata.vidovic@cbifederalservices.com Contact Name / ph. #: Mike Dryden

City:

Sampler's Name(s): J. Ramirez

Sample ID Number	Sample Description	Collection Information		Matrix	# of containers	Preservative (water)		Dose Rate $\mu\text{R/hr}$
		Date	Time			Preservative (soil)	Container Type	
TITO04-BS-FSSSU09-9-12	Bayside FSS SU9 9-12	3/28/17	1604	SO	1		16 oz Plastic	5
TITO04-BS-FSSSU09-9-13	Bayside FSS SU9 9-13	3/28/17	1610	SO	1		16 oz Plastic	5
TITO04-BS-FSSSU09-9-14	Bayside FSS SU9 9-14	3/28/17	1634	SO	1		16 oz Plastic	5
TITO04-BS-FSSSU09-9-15	Bayside FSS SU9 9-15	3/28/17	1641	SO	1		16 oz Plastic	5

Special Instructions: 7 days ingrown draft and follow with 21 days final

Level Of QC Required: ☐ 24-hr ☐ 3-day ☐ 7-day

Standard TAT ☐ ☐ 24-hr ☐ 3-day ☐ 7-day

Relinquished By: [Signature] Date: 3/28/17 Time: 1719 Received By: [Signature] Date: 3-28-17 Time: 1719

Relinquished By: [Signature] Date: 3-29-17 Time: 0735 Received By: [Signature] Date: 5/29/2017 Time: 0735

Relinquished By: [Signature] Date: 3/29/17 Time: 1105 Received By: [Signature] Date: 3/29/17 Time: 1105

Relinquished By: [Signature] Date: 3-30-17 Time: 0840 Received By: [Signature] Date: 3-30-17 Time: 0840

Method Codes: C = Composite G = Grab

Matrix Codes: DW = Drinking Water SO = Soil
GW = Ground Water SL = Sludge
WW = Waste Water CP = Chip Samples
A = Air ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-21651-2

Login Number: 21651

List Source: TestAmerica St. Louis

List Number: 1

Creator: Taylor, Kristene N

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21651-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21651-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21651-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-21651-1	TITO04-BS-FSSSU09-9-12	Solid	03/28/17 16:04	03/30/17 08:40
160-21651-2	TITO04-BS-FSSSU09-9-13	Solid	03/28/17 16:10	03/30/17 08:40
160-21651-3	TITO04-BS-FSSSU09-9-14	Solid	03/28/17 16:34	03/30/17 08:40
160-21651-4	TITO04-BS-FSSSU09-9-15	Solid	03/28/17 16:41	03/30/17 08:40

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21651-2

Client Sample ID: TITO04-BS-FSSSU09-9-12

Date Collected: 03/28/17 16:04

Date Received: 03/30/17 08:40

Lab Sample ID: 160-21651-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.498		0.143	0.152		0.0716	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Actinium-227	-0.222	U	0.650	0.651		1.10	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Bismuth-212	0.223	U	0.600	0.600		1.03	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Bismuth-214	0.409		0.105	0.113		0.0885	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Cesium-137	0.0241	U	0.0484	0.0484		0.0824	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Lead-210	0.580	U	1.10	1.10		1.84	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Lead-212	0.393		0.0751	0.0907		0.0759	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Lead-214	0.459		0.107	0.117		0.0882	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Potassium-40	11.9		1.39	1.85		0.631	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Protactinium-231	0.000	U	0.579	0.579		4.12	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Radium-226	0.409		0.105	0.113	0.500	0.0885	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Radium-228	0.498		0.143	0.152		0.0716	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Thallium-208	0.156		0.0434	0.0464		0.0334	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Thorium-228	0.393		0.0751	0.0907		0.0759	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Thorium-232	0.498		0.143	0.152		0.0716	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Thorium-234	0.000	U	0.786	0.786		2.14	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Uranium-235	0.0530	U	0.222	0.222		0.734	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Uranium-238	0.000	U	0.786	0.786		2.14	pCi/g	04/05/17 09:50	04/26/17 06:16	1

Client Sample ID: TITO04-BS-FSSSU09-9-13

Date Collected: 03/28/17 16:10

Date Received: 03/30/17 08:40

Lab Sample ID: 160-21651-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.933		0.272	0.289		0.142	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Actinium-227	-0.533	U	1.21	1.21		2.03	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Bismuth-212	-0.480	U	1.18	1.19		2.03	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Bismuth-214	0.640		0.188	0.199		0.153	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Cesium-137	0.0444	U	0.0832	0.0833		0.142	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Lead-210	0.787	U	2.19	2.19		3.67	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Lead-212	0.652		0.130	0.155		0.132	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Lead-214	0.655		0.142	0.158		0.135	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Potassium-40	11.1		1.93	2.24		0.937	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Protactinium-231	0.778	U	1.91	1.91		4.44	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Radium-226	0.640		0.188	0.199	0.500	0.153	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Radium-228	0.933		0.272	0.289		0.142	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Thallium-208	0.227		0.0722	0.0760		0.0553	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Thorium-228	0.652		0.130	0.155		0.132	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Thorium-232	0.933		0.272	0.289		0.142	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Thorium-234	-0.672	U	1.97	1.97		3.40	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Uranium-235	-0.0230	U	0.604	0.604		1.10	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Uranium-238	-0.672	U	1.97	1.97		3.40	pCi/g	04/05/17 09:50	04/25/17 16:40	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21651-2

Client Sample ID: TITO04-BS-FSSSU09-9-14

Lab Sample ID: 160-21651-3

Date Collected: 03/28/17 16:34

Matrix: Solid

Date Received: 03/30/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.542		0.154	0.164		0.0788	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Actinium-227	0.331	U	0.718	0.719		1.20	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Bismuth-212	-0.116	U	0.891	0.891		1.55	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Bismuth-214	0.340		0.103	0.109		0.0973	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Cesium-137	0.0148	U	0.0528	0.0529		0.0921	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Lead-210	-0.890	U	1.72	1.72		2.98	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Lead-212	0.315		0.0797	0.0895		0.0953	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Lead-214	0.355		0.102	0.108		0.108	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Potassium-40	10.4		1.39	1.75		0.815	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Protactinium-231	0.606	U	1.41	1.41		3.22	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Radium-226	0.340		0.103	0.109	0.500	0.0973	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Radium-228	0.542		0.154	0.164		0.0788	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Thallium-208	0.131		0.0568	0.0584		0.0551	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Thorium-228	0.315		0.0797	0.0895		0.0953	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Thorium-232	0.542		0.154	0.164		0.0788	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Thorium-234	-0.256	U	1.28	1.28		2.19	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Uranium-235	-0.0497	U	0.391	0.391		0.869	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Uranium-238	-0.256	U	1.28	1.28		2.19	pCi/g	04/05/17 09:50	04/25/17 16:41	1

Client Sample ID: TITO04-BS-FSSSU09-9-15

Lab Sample ID: 160-21651-4

Date Collected: 03/28/17 16:41

Matrix: Solid

Date Received: 03/30/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.370		0.148	0.153		0.173	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Actinium-227	0.229	U	0.526	0.527		0.757	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Bismuth-212	-0.0174	U	0.643	0.643		1.16	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Bismuth-214	0.435		0.132	0.140		0.129	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Cesium-137	-0.0332	U	0.0611	0.0612		0.103	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Lead-210	0.395	U	0.988	0.989		1.59	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Lead-212	0.270		0.0755	0.0831		0.0923	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Lead-214	0.240		0.0879	0.0914		0.111	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Potassium-40	9.66		1.33	1.66		0.661	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Protactinium-231	0.000	U	0.311	0.311		2.91	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Radium-226	0.435		0.132	0.140	0.500	0.129	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Radium-228	0.370		0.148	0.153		0.173	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Thallium-208	0.117		0.0489	0.0503		0.0478	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Thorium-228	0.270		0.0755	0.0831		0.0923	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Thorium-232	0.370		0.148	0.153		0.173	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Thorium-234	-0.661	U	1.26	1.26		2.21	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Uranium-235	-0.0476	U	0.464	0.464		0.569	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Uranium-238	-0.661	U	1.26	1.26		2.21	pCi/g	04/05/17 09:50	04/25/17 16:44	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21651-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-301595/1-A
Matrix: Solid
Analysis Batch: 305337

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 301595

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.06562	U	0.146	0.146		0.157	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Actinium-227	-0.2921	U	0.626	0.627		1.06	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Bismuth-212	-0.04060	U	0.726	0.726		0.614	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Bismuth-214	0.01967	U	0.0424	0.0424		0.183	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Cesium-137	-0.03488	U	0.0543	0.0545		0.0911	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Lead-210	-0.5263	U	1.15	1.16		1.96	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Lead-212	0.02559	U	0.0705	0.0705		0.120	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Lead-214	-0.08841	U	0.147	0.147		0.207	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Potassium-40	-0.1420	U	0.809	0.809		0.892	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Protactinium-231	0.0000	U	0.371	0.371		2.92	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Radium-226	0.01967	U	0.0424	0.0424	0.500	0.183	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Radium-228	0.06562	U	0.146	0.146		0.157	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Thallium-208	0.02842	U	0.0489	0.0490		0.0484	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Thorium-228	0.02559	U	0.0705	0.0705		0.120	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Thorium-232	0.06562	U	0.146	0.146		0.157	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Thorium-234	0.0000	U	0.352	0.352		1.46	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Uranium-235	-0.08888	U	0.293	0.293		0.498	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Uranium-238	0.0000	U	0.352	0.352		1.46	pCi/g	04/05/17 09:50	04/25/17 16:21	1

Lab Sample ID: LCS 160-301595/2-A
Matrix: Solid
Analysis Batch: 305339

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 301595

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.0	97.54		10.3		1.30	pCi/g	101	87 - 116
Cesium-137	29.1	29.16		3.15		0.324	pCi/g	100	87 - 120
Cobalt-60	15.3	14.83		1.57		0.107	pCi/g	97	87 - 115

Lab Sample ID: 160-21651-1 DU
Matrix: Solid
Analysis Batch: 305335

Client Sample ID: TITO04-BS-FSSSU09-9-12
Prep Type: Total/NA
Prep Batch: 301595

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.498		0.5241		0.165		0.156	pCi/g	0.08	1
Actinium-227	-0.222	U	-0.2402	U	0.897		1.52	pCi/g	0.01	1
Bismuth-212	0.223	U	-0.5612	U	0.940		1.57	pCi/g	0.51	1
Bismuth-214	0.409		0.4555		0.145		0.123	pCi/g	0.18	1
Cesium-137	0.0241	U	-0.01034	U	0.0710		0.125	pCi/g	0.29	1
Lead-210	0.580	U	0.7572	U	1.80		2.99	pCi/g	0.06	1
Lead-212	0.393		0.3416		0.101		0.109	pCi/g	0.27	1
Lead-214	0.459		0.4691		0.148		0.133	pCi/g	0.04	1
Potassium-40	11.9		10.32		1.81		0.697	pCi/g	0.44	1
Protactinium-231	0.000	U	0.000000	U	2.82		4.80	pCi/g	0	1
Radium-226	0.409		0.4555		0.145	0.500	0.123	pCi/g	0.18	1
Radium-228	0.498		0.5241		0.165		0.156	pCi/g	0.08	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21651-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-21651-1 DU
Matrix: Solid
Analysis Batch: 305335

Client Sample ID: TITO04-BS-FSSSU09-9-12
Prep Type: Total/NA
Prep Batch: 301595

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.156		0.1451		0.0636		0.0675	pCi/g	0.10	1
Thorium-228	0.393		0.3416		0.101		0.109	pCi/g	0.27	1
Thorium-232	0.498		0.5241		0.165		0.156	pCi/g	0.08	1
Thorium-234	0.000	U	0.7933	U	1.33		1.86	pCi/g	0.37	1
Uranium-235	0.0530	U	0.04507	U	0.126		0.598	pCi/g	0.02	1
Uranium-238	0.000	U	0.7933	U	1.33		1.86	pCi/g	0.37	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21651-2

Rad

Leach Batch: 300798

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21651-1	TITO04-BS-FSSSU09-9-12	Total/NA	Solid	Dry and Grind	
160-21651-2	TITO04-BS-FSSSU09-9-13	Total/NA	Solid	Dry and Grind	
160-21651-3	TITO04-BS-FSSSU09-9-14	Total/NA	Solid	Dry and Grind	
160-21651-4	TITO04-BS-FSSSU09-9-15	Total/NA	Solid	Dry and Grind	
160-21651-1 DU	TITO04-BS-FSSSU09-9-12	Total/NA	Solid	Dry and Grind	

Prep Batch: 301595

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21651-1	TITO04-BS-FSSSU09-9-12	Total/NA	Solid	Fill_Geo-21	300798
160-21651-2	TITO04-BS-FSSSU09-9-13	Total/NA	Solid	Fill_Geo-21	300798
160-21651-3	TITO04-BS-FSSSU09-9-14	Total/NA	Solid	Fill_Geo-21	300798
160-21651-4	TITO04-BS-FSSSU09-9-15	Total/NA	Solid	Fill_Geo-21	300798
MB 160-301595/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-301595/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-21651-1 DU	TITO04-BS-FSSSU09-9-12	Total/NA	Solid	Fill_Geo-21	300798

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-21652-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan



Authorized for release by:
4/27/2017 2:49:30 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21652-2

Job ID: 160-21652-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-21652-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21652-2

Job ID: 160-21652-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 3/30/2017 8:40 AM; the samples arrived in good condition, properly preserved. The temperatures of the 3 coolers at receipt time were 20.0° C, 20.0° C and 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Sample TITO04-BS-FSSSU9-B001 (160-21652-1) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 03/30/2017, prepared on 04/05/2017 and analyzed on 04/25/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



CBI Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_BS_FSSSU9_#383

Page 1 of 1

Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside FSS
SUG Biased

Purchase Order #: 201455

Shipment Date: 3/29/17

Waybill Number: 1233V 462 01 9696 2738

Lab Destination: Earth Toxics Inc To Test America

Address: renata.vidovic@cbifederalservices.com Contact Name / ph. #: Mike Dryden

City:

Project Manager: Ulrika Messer

(Name & Phone #)

Send Report To: Renata Vidovic

Phone/Fax Number: 408-505-7319

Address: renata.vidovic@cbifederalservices.com

Sampler's Name(s): J RAMIREZ

Collection Information

Date Time Method

3/29/17 1625 G

16 oz Plastic

SO 1

Matrix

of containers

Preservative (water)

Preservative (soil)

Container Type

N/A

X

Dose Rate μ R/hr

Gamma Scan - Gamma Spec. Ra-226

Analyses Requested

160-21652 Chain of Custody

Barcode

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

SO = Soil

SL = Sludge

CP = Chip Samples

A = Air

ABS=Asbestos, PO=Pipe Opening

Special Instructions: 7 days ingrown draft and follow with 21 days final

Level Of QC Required

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

I

II

III

Relinquished By

Date 3/28/17

Time 1719

Received By

Date 3-28-17

Time 1719

Relinquished By

Date 3-29-17

Time 0735

Received By

Date 3/29/17

Time 0735

Relinquished By

Date 3/29/17

Time 1105

Received By

Date 3-29-17

Time 1105

Relinquished By

Date 3-29-17

Time 0846

Received By

Date 3-29-17

Time 0846

Relinquished By

Date 3-29-17

Time 0846

Received By

Date 3-29-17

Time 0846

Relinquished By

Date 3-29-17

Time 0846

Received By

Date 3-29-17

Time 0846

Relinquished By

Date 3-29-17

Time 0846

Received By

Date 3-29-17

Time 0846

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-21652-2

Login Number: 21652

List Source: TestAmerica St. Louis

List Number: 1

Creator: Taylor, Kristene N

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21652-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21652-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21652-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-21652-1	TITO04-BS-FSSSU9-B001	Solid	03/28/17 16:25	03/30/17 08:40

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21652-2

Client Sample ID: TITO04-BS-FSSSU9-B001

Lab Sample ID: 160-21652-1

Date Collected: 03/28/17 16:25

Matrix: Solid

Date Received: 03/30/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.658		0.192	0.203		0.127	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Actinium-227	0.109	U	0.286	0.286		1.46	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Bismuth-212	1.50		0.532	0.555		0.395	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Bismuth-214	0.796		0.154	0.175		0.115	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Cesium-137	0.00429	U	0.0788	0.0788		0.137	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Lead-210	0.164	U	1.63	1.63		2.78	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Lead-212	0.756		0.108	0.146		0.103	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Lead-214	0.782		0.124	0.148		0.122	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Potassium-40	14.9		1.65	2.25		0.708	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Protactinium-231	-0.919	U	3.14	3.14		5.26	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Radium-226	0.796		0.154	0.175	0.500	0.115	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Radium-228	0.658		0.192	0.203		0.127	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Thallium-208	0.264		0.0720	0.0771		0.0613	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Thorium-228	0.756		0.108	0.146		0.103	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Thorium-232	0.658		0.192	0.203		0.127	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Thorium-234	-0.544	U	1.52	1.52		2.56	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Uranium-235	-0.209	U	0.380	0.380		0.633	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Uranium-238	-0.544	U	1.52	1.52		2.56	pCi/g	04/05/17 09:50	04/25/17 16:55	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21652-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-301595/1-A
Matrix: Solid
Analysis Batch: 305337

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 301595

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.06562	U	0.146	0.146		0.157	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Actinium-227	-0.2921	U	0.626	0.627		1.06	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Bismuth-212	-0.04060	U	0.726	0.726		0.614	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Bismuth-214	0.01967	U	0.0424	0.0424		0.183	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Cesium-137	-0.03488	U	0.0543	0.0545		0.0911	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Lead-210	-0.5263	U	1.15	1.16		1.96	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Lead-212	0.02559	U	0.0705	0.0705		0.120	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Lead-214	-0.08841	U	0.147	0.147		0.207	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Potassium-40	-0.1420	U	0.809	0.809		0.892	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Protactinium-231	0.0000	U	0.371	0.371		2.92	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Radium-226	0.01967	U	0.0424	0.0424	0.500	0.183	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Radium-228	0.06562	U	0.146	0.146		0.157	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Thallium-208	0.02842	U	0.0489	0.0490		0.0484	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Thorium-228	0.02559	U	0.0705	0.0705		0.120	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Thorium-232	0.06562	U	0.146	0.146		0.157	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Thorium-234	0.0000	U	0.352	0.352		1.46	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Uranium-235	-0.08888	U	0.293	0.293		0.498	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Uranium-238	0.0000	U	0.352	0.352		1.46	pCi/g	04/05/17 09:50	04/25/17 16:21	1

Lab Sample ID: LCS 160-301595/2-A
Matrix: Solid
Analysis Batch: 305339

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 301595

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.0	97.54		10.3		1.30	pCi/g	101	87 - 116
Cesium-137	29.1	29.16		3.15		0.324	pCi/g	100	87 - 120
Cobalt-60	15.3	14.83		1.57		0.107	pCi/g	97	87 - 115

Lab Sample ID: 160-21651-A-1-F DU
Matrix: Solid
Analysis Batch: 305335

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 301595

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.498		0.5241		0.165		0.156	pCi/g	0.08	1
Actinium-227	-0.222	U	-0.2402	U	0.897		1.52	pCi/g	0.01	1
Bismuth-212	0.223	U	-0.5612	U	0.940		1.57	pCi/g	0.51	1
Bismuth-214	0.409		0.4555		0.145		0.123	pCi/g	0.18	1
Cesium-137	0.0241	U	-0.01034	U	0.0710		0.125	pCi/g	0.29	1
Lead-210	0.580	U	0.7572	U	1.80		2.99	pCi/g	0.06	1
Lead-212	0.393		0.3416		0.101		0.109	pCi/g	0.27	1
Lead-214	0.459		0.4691		0.148		0.133	pCi/g	0.04	1
Potassium-40	11.9		10.32		1.81		0.697	pCi/g	0.44	1
Protactinium-231	0.000	U	0.000000	U	2.82		4.80	pCi/g	0	1
			218							
Radium-226	0.409		0.4555		0.145	0.500	0.123	pCi/g	0.18	1
Radium-228	0.498		0.5241		0.165		0.156	pCi/g	0.08	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21652-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-21651-A-1-F DU
Matrix: Solid
Analysis Batch: 305335

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 301595

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.156		0.1451		0.0636		0.0675	pCi/g	0.10	1
Thorium-228	0.393		0.3416		0.101		0.109	pCi/g	0.27	1
Thorium-232	0.498		0.5241		0.165		0.156	pCi/g	0.08	1
Thorium-234	0.000	U	0.7933	U	1.33		1.86	pCi/g	0.37	1
Uranium-235	0.0530	U	0.04507	U	0.126		0.598	pCi/g	0.02	1
Uranium-238	0.000	U	0.7933	U	1.33		1.86	pCi/g	0.37	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21652-2

Rad

Leach Batch: 300798

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21652-1	TITO04-BS-FSSSU9-B001	Total/NA	Solid	Dry and Grind	
160-21651-A-1-F DU	Duplicate	Total/NA	Solid	Dry and Grind	

Prep Batch: 301595

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21652-1	TITO04-BS-FSSSU9-B001	Total/NA	Solid	Fill_Geo-21	300798
MB 160-301595/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-301595/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-21651-A-1-F DU	Duplicate	Total/NA	Solid	Fill_Geo-21	300798

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-21668-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan



Authorized for release by:
4/27/2017 3:21:28 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21668-2

Job ID: 160-21668-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-21668-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21668-2

Job ID: 160-21668-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The sample was received on 3/31/2017 8:30 AM; the sample arrived in good condition, properly preserved. The temperature of the cooler at receipt was 18.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Sample TITO04-BS-FSSSU9-B002 (160-21668-1) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 04/01/2017, prepared on 04/05/2017 and analyzed on 04/25/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TI_P3_BS_FSSSU9_#387

Page 1 of 1

Project Number: 500060

Project Name / Location: CTO-04 Phase III Bayside FSS
SUG Bayside

Purchase Order #: 201455

Shipment Date: 3/30/17

Waybill Number: 1289V462017060748

Lab Destination: Earth Toxics Inc To Test America

Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer

(Name & Phone #)

Send Report To: Renata Vidovic

Phone/Fax Number: 408-505-7319

Address: renata.vidovic@cbifederalservices.com

City:

Sampler's Name(s): J. RAMIREZ

Sample ID Number

Sample Description

TITO04-BS-FSSSU9-B002

Bayside FSS SUG Bayside

Collection Information

Date

Time

Method

3/29/17

1335

G

Matrix

of containers

Matrix

SO

1

16 oz Plastic

Preservative (water)

Preservative (soil)

Container Type

N/A

X

Analyses Requested

Gamma Scan - Gamma Spec. Ra-226

Dose Rate μ R/hr

5



160-21668 Chain of Custody

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

I

II

III

Relinquished By

Date

Time

3/29/17

1655

Received By

Date

Time

3/29/17

1655

Relinquished By

Date

Time

3/30/17

0933

Received By

Date

Time

3/30/17

0933

Relinquished By

Date

Time

3/30/17

1035

Received By

Date

Time

3/30/17

1035

Relinquished By

Date

Time

3/31/17

0830

Received By

Date

Time

3/31/17

0830

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-21668-2

Login Number: 21668

List Source: TestAmerica St. Louis

List Number: 1

Creator: Taylor, Kristene N

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21668-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21668-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21668-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-21668-1	TITO04-BS-FSSSU9-B002	Solid	03/29/17 13:35	03/31/17 08:30

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21668-2

Client Sample ID: TITO04-BS-FSSSU9-B002

Lab Sample ID: 160-21668-1

Date Collected: 03/29/17 13:35

Matrix: Solid

Date Received: 03/31/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.736		0.275	0.285		0.250	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Actinium-227	0.203	U	1.21	1.21		2.05	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Bismuth-212	0.343	U	0.637	0.638		1.09	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Bismuth-214	0.824		0.185	0.204		0.139	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Cesium-137	0.0255	U	0.0715	0.0716		0.124	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Lead-210	1.79	U	2.15	2.16		2.87	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Lead-212	0.883		0.140	0.181		0.133	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Lead-214	0.783		0.163	0.182		0.173	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Potassium-40	13.8		1.87	2.34		0.796	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Protactinium-231	0.511	U	1.62	1.62		5.27	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Radium-226	0.824		0.185	0.204	0.500	0.139	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Radium-228	0.736		0.275	0.285		0.250	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Thallium-208	0.326		0.0905	0.0966		0.0848	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Thorium-228	0.883		0.140	0.181		0.133	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Thorium-232	0.736		0.275	0.285		0.250	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Thorium-234	0.199	U	2.17	2.17		3.68	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Uranium-235	0.0737	U	0.187	0.187		1.36	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Uranium-238	0.199	U	2.17	2.17		3.68	pCi/g	04/05/17 09:50	04/25/17 16:57	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21668-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-301595/1-A
Matrix: Solid
Analysis Batch: 305337

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 301595

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.06562	U	0.146	0.146		0.157	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Actinium-227	-0.2921	U	0.626	0.627		1.06	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Bismuth-212	-0.04060	U	0.726	0.726		0.614	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Bismuth-214	0.01967	U	0.0424	0.0424		0.183	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Cesium-137	-0.03488	U	0.0543	0.0545		0.0911	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Lead-210	-0.5263	U	1.15	1.16		1.96	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Lead-212	0.02559	U	0.0705	0.0705		0.120	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Lead-214	-0.08841	U	0.147	0.147		0.207	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Potassium-40	-0.1420	U	0.809	0.809		0.892	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Protactinium-231	0.0000	U	0.371	0.371		2.92	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Radium-226	0.01967	U	0.0424	0.0424	0.500	0.183	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Radium-228	0.06562	U	0.146	0.146		0.157	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Thallium-208	0.02842	U	0.0489	0.0490		0.0484	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Thorium-228	0.02559	U	0.0705	0.0705		0.120	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Thorium-232	0.06562	U	0.146	0.146		0.157	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Thorium-234	0.0000	U	0.352	0.352		1.46	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Uranium-235	-0.08888	U	0.293	0.293		0.498	pCi/g	04/05/17 09:50	04/25/17 16:21	1
Uranium-238	0.0000	U	0.352	0.352		1.46	pCi/g	04/05/17 09:50	04/25/17 16:21	1

Lab Sample ID: LCS 160-301595/2-A
Matrix: Solid
Analysis Batch: 305339

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 301595

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.0	97.54		10.3		1.30	pCi/g	101	87 - 116
Cesium-137	29.1	29.16		3.15		0.324	pCi/g	100	87 - 120
Cobalt-60	15.3	14.83		1.57		0.107	pCi/g	97	87 - 115

Lab Sample ID: 160-21651-A-1-F DU
Matrix: Solid
Analysis Batch: 305335

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 301595

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.498		0.5241		0.165		0.156	pCi/g	0.08	1
Actinium-227	-0.222	U	-0.2402	U	0.897		1.52	pCi/g	0.01	1
Bismuth-212	0.223	U	-0.5612	U	0.940		1.57	pCi/g	0.51	1
Bismuth-214	0.409		0.4555		0.145		0.123	pCi/g	0.18	1
Cesium-137	0.0241	U	-0.01034	U	0.0710		0.125	pCi/g	0.29	1
Lead-210	0.580	U	0.7572	U	1.80		2.99	pCi/g	0.06	1
Lead-212	0.393		0.3416		0.101		0.109	pCi/g	0.27	1
Lead-214	0.459		0.4691		0.148		0.133	pCi/g	0.04	1
Potassium-40	11.9		10.32		1.81		0.697	pCi/g	0.44	1
Protactinium-231	0.000	U	0.000000	U	2.82		4.80	pCi/g	0	1
			218							
Radium-226	0.409		0.4555		0.145	0.500	0.123	pCi/g	0.18	1
Radium-228	0.498		0.5241		0.165		0.156	pCi/g	0.08	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21668-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-21651-A-1-F DU
Matrix: Solid
Analysis Batch: 305335

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 301595

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.156		0.1451		0.0636		0.0675	pCi/g	0.10	1
Thorium-228	0.393		0.3416		0.101		0.109	pCi/g	0.27	1
Thorium-232	0.498		0.5241		0.165		0.156	pCi/g	0.08	1
Thorium-234	0.000	U	0.7933	U	1.33		1.86	pCi/g	0.37	1
Uranium-235	0.0530	U	0.04507	U	0.126		0.598	pCi/g	0.02	1
Uranium-238	0.000	U	0.7933	U	1.33		1.86	pCi/g	0.37	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21668-2

Rad

Leach Batch: 300798

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21651-A-1-F DU	Duplicate	Total/NA	Solid	Dry and Grind	

Leach Batch: 300995

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21668-1	TITO04-BS-FSSSU9-B002	Total/NA	Solid	Dry and Grind	

Prep Batch: 301595

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21668-1	TITO04-BS-FSSSU9-B002	Total/NA	Solid	Fill_Geo-21	300995
MB 160-301595/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-301595/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-21651-A-1-F DU	Duplicate	Total/NA	Solid	Fill_Geo-21	300798

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-21129-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan



Authorized for release by:

3/16/2017 5:30:31 PM

Ivan Vania, Project Manager II
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Designee for

Erika Gish, Project Manager II
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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21129-2

Job ID: 160-21129-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-21129-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21129-2

Job ID: 160-21129-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 2/20/2017 8:31 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 20.0° C, 20.0° C and 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSSSU9-LLRO#711-SWSU2-B001 (160-21129-1), TITO04-BS-FSSSU9-LLRO#711-SWSU2-B002 (160-21129-2), TITO04-BS-FSSSU9-LLRO#711-SWSU2-B003 (160-21129-3), TITO04-BS-FSSSU9-LLRO#711-SWSU2-B004 (160-21129-4) and TITO04-BS-FSSSU9-LLRO#711-SWSU2-B005 (160-21129-5) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were leached on 02/20/2017, prepared on 02/22/2017 and analyzed on 03/15/2017.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-21129-2

Login Number: 21129

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21129-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21129-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:
DOE = U.S. Department of Energy

Laboratory References:
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21129-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-21129-1	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B001	Solid	02/14/17 10:48	02/20/17 08:31
160-21129-2	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B002	Solid	02/14/17 10:49	02/20/17 08:31
160-21129-3	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B003	Solid	02/14/17 10:56	02/20/17 08:31
160-21129-4	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B004	Solid	02/14/17 10:55	02/20/17 08:31
160-21129-5	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B005	Solid	02/14/17 11:00	02/20/17 08:31

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21129-2

Client Sample ID:
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B001

Lab Sample ID: 160-21129-1

Date Collected: 02/14/17 10:48

Matrix: Solid

Date Received: 02/20/17 08:31

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.586		0.150	0.162		0.0708	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Actinium-227	-0.326	U	0.672	0.673		1.13	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Bismuth-212	0.175	U	0.543	0.544		0.946	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Bismuth-214	0.556		0.115	0.129		0.0810	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Cesium-137	0.0313	U	0.0482	0.0483		0.0807	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Lead-210	0.578	U	0.726	0.729		1.19	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Lead-212	0.403		0.0761	0.0923		0.0770	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Lead-214	0.531		0.119	0.132		0.103	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Potassium-40	8.90		1.19	1.50		0.516	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Protactinium-231	-0.0000001	U	2.59	2.59		4.39	pCi/g	02/22/17 14:19	03/15/17 09:09	1
	64									
Radium-226	0.556		0.115	0.129	0.500	0.0810	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Radium-228	0.586		0.150	0.162		0.0708	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Thallium-208	0.152		0.0526	0.0549		0.0482	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Thorium-228	0.403		0.0761	0.0923		0.0770	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Thorium-232	0.586		0.150	0.162		0.0708	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Thorium-234	0.582	U	1.07	1.08		1.79	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Uranium-235	-0.00984	U	0.0208	0.0208		0.740	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Uranium-238	0.582	U	1.07	1.08		1.79	pCi/g	02/22/17 14:19	03/15/17 09:09	1

Client Sample ID:
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B002

Lab Sample ID: 160-21129-2

Date Collected: 02/14/17 10:49

Matrix: Solid

Date Received: 02/20/17 08:31

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.295	U	0.150	0.153		0.369	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Actinium-227	0.172	U	0.389	0.390		0.930	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Bismuth-212	0.387	U	0.709	0.710		1.21	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Bismuth-214	0.487		0.136	0.145		0.115	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Cesium-137	-0.0188	U	0.0779	0.0779		0.136	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Lead-210	0.686	U	1.17	1.17		1.69	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Lead-212	0.346		0.0850	0.0961		0.0919	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Lead-214	0.321		0.137	0.141		0.212	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Potassium-40	11.5		1.67	2.05		0.791	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Protactinium-231	-0.0000000	U	2.20	2.20		3.78	pCi/g	02/22/17 14:19	03/15/17 09:06	1
	57									
Radium-226	0.487		0.136	0.145	0.500	0.115	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Radium-228	0.295	U	0.150	0.153		0.369	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Thallium-208	0.128		0.0559	0.0574		0.0588	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Thorium-228	0.346		0.0850	0.0961		0.0919	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Thorium-232	0.295	U	0.150	0.153		0.369	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Thorium-234	0.746	U	0.542	0.548		1.45	pCi/g	02/22/17 14:19	03/15/17 09:06	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21129-2

Client Sample ID:
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B002

Lab Sample ID: 160-21129-2

Date Collected: 02/14/17 10:49

Matrix: Solid

Date Received: 02/20/17 08:31

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-235	-0.0176	U	0.129	0.129		0.575	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Uranium-238	0.746	U	0.542	0.548		1.45	pCi/g	02/22/17 14:19	03/15/17 09:06	1

Client Sample ID:
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B003

Lab Sample ID: 160-21129-3

Date Collected: 02/14/17 10:56

Matrix: Solid

Date Received: 02/20/17 08:31

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.166	U	0.262	0.263		0.426	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Actinium-227	0.283	U	0.798	0.798		1.35	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Bismuth-212	-0.546	U	0.963	0.964		1.63	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Bismuth-214	0.431		0.125	0.133		0.105	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Cesium-137	-0.000812	U	0.0578	0.0578		0.107	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Lead-210	-0.891	U	1.71	1.71		3.01	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Lead-212	0.336		0.0943	0.104		0.110	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Lead-214	0.394		0.120	0.126		0.156	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Potassium-40	10.2		1.69	1.99		0.767	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Protactinium-231	0.661	U	1.53	1.53		3.57	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Radium-226	0.431		0.125	0.133	0.500	0.105	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Radium-228	0.166	U	0.262	0.263		0.426	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Thallium-208	0.173		0.0649	0.0673		0.0529	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Thorium-228	0.336		0.0943	0.104		0.110	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Thorium-232	0.166	U	0.262	0.263		0.426	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Thorium-234	0.503	U	0.396	0.399		2.67	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Uranium-235	0.0698	U	0.221	0.222		0.876	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Uranium-238	0.503	U	0.396	0.399		2.67	pCi/g	02/22/17 14:19	03/15/17 09:07	1

Client Sample ID:
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B004

Lab Sample ID: 160-21129-4

Date Collected: 02/14/17 10:55

Matrix: Solid

Date Received: 02/20/17 08:31

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.423		0.229	0.233		0.225	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Actinium-227	-0.357	U	0.838	0.839		1.40	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Bismuth-212	0.322	U	0.564	0.565		0.954	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Bismuth-214	0.476		0.127	0.136		0.111	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Cesium-137	0.0121	U	0.0533	0.0533		0.0935	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Lead-210	0.840	U	1.05	1.05		1.55	pCi/g	02/22/17 14:19	03/15/17 09:08	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21129-2

Client Sample ID:
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B004

Lab Sample ID: 160-21129-4

Date Collected: 02/14/17 10:55

Matrix: Solid

Date Received: 02/20/17 08:31

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Lead-212	0.322		0.0834	0.0932		0.101	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Lead-214	0.424		0.101	0.110		0.0977	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Potassium-40	8.29		1.26	1.52		0.801	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Protactinium-231	0.688	U	1.52	1.53		3.49	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Radium-226	0.476		0.127	0.136	0.500	0.111	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Radium-228	0.423		0.229	0.233		0.225	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Thallium-208	0.116		0.0499	0.0513		0.0532	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Thorium-228	0.322		0.0834	0.0932		0.101	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Thorium-232	0.423		0.229	0.233		0.225	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Thorium-234	0.458	U	0.884	0.885		1.47	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Uranium-235	0.110	U	0.210	0.210		0.839	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Uranium-238	0.458	U	0.884	0.885		1.47	pCi/g	02/22/17 14:19	03/15/17 09:08	1

Client Sample ID:
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B005

Lab Sample ID: 160-21129-5

Date Collected: 02/14/17 11:00

Matrix: Solid

Date Received: 02/20/17 08:31

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.437		0.173	0.179		0.149	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Actinium-227	-0.265	U	0.785	0.786		1.12	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Bismuth-212	-0.410	U	0.759	0.760		1.28	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Bismuth-214	0.931		0.160	0.187		0.113	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Cesium-137	-0.00815	U	0.0694	0.0694		0.122	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Lead-210	1.55	U	1.67	1.68		2.24	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Lead-212	0.387		0.0881	0.101		0.0997	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Lead-214	1.20		0.170	0.211		0.116	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Potassium-40	9.03		1.33	1.62		0.666	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Protactinium-231	0.671	U	1.49	1.50		3.43	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Radium-226	0.931		0.160	0.187	0.500	0.113	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Radium-228	0.437		0.173	0.179		0.149	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Thallium-208	0.124		0.0489	0.0506		0.0458	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Thorium-228	0.387		0.0881	0.101		0.0997	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Thorium-232	0.437		0.173	0.179		0.149	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Thorium-234	0.818	U	0.548	0.555		1.61	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Uranium-235	0.171	U	0.373	0.373		0.629	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Uranium-238	0.818	U	0.548	0.555		1.61	pCi/g	02/22/17 14:19	03/15/17 09:10	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21129-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-294258/1-A
Matrix: Solid
Analysis Batch: 297774

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 294258

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.08349	U	0.122	0.122		0.195	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Actinium-227	0.3601	U	0.332	0.335		1.28	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Bismuth-212	0.0000	U	0.336	0.336		0.522	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Bismuth-214	0.001772	U	0.00238	0.00239		0.339	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Cesium-137	0.004387	U	0.0739	0.0739		0.133	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Lead-210	-2.656	U	1.80	1.83		3.35	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Lead-212	0.1249	U	0.0990	0.100		0.154	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Lead-214	-0.008941	U	0.0136	0.0136		0.216	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Potassium-40	0.08450	U	0.467	0.467		0.885	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Protactinium-231	-0.7853	U	2.93	2.93		4.96	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Radium-226	0.001772	U	0.00238	0.00239	0.500	0.339	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Radium-228	0.08349	U	0.122	0.122		0.195	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Thallium-208	-0.04057	U	0.0655	0.0656		0.112	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Thorium-228	0.1249	U	0.0990	0.100		0.154	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Thorium-232	0.08349	U	0.122	0.122		0.195	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Thorium-234	0.4759	U	0.568	0.570		1.71	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Uranium-235	0.06156	U	0.262	0.262		0.430	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Uranium-238	0.4759	U	0.568	0.570		1.71	pCi/g	02/22/17 14:19	03/15/17 09:06	1

Lab Sample ID: LCS 160-294258/2-A
Matrix: Solid
Analysis Batch: 297775

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 294258

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.0	99.33		10.4		1.20	pCi/g	102	87 - 116
Cesium-137	29.1	28.67		3.06		0.290	pCi/g	98	87 - 120
Cobalt-60	15.5	14.96		1.55		0.140	pCi/g	97	87 - 115

Lab Sample ID: 160-21129-1 DU
Matrix: Solid
Analysis Batch: 297776

Client Sample ID: TITO04-BS-FSSSU9-LLRO#711-SWSU2-B001
Prep Type: Total/NA
Prep Batch: 294258

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.586		0.4032		0.158		0.209	pCi/g	0.57	1
Actinium-227	-0.326	U	0.2683	U	0.402		1.11	pCi/g	0.55	1
Bismuth-212	0.175	U	-0.1002	U	0.525		1.10	pCi/g	0.26	1
Bismuth-214	0.556		0.5649		0.139		0.0988	pCi/g	0.03	1
Cesium-137	0.0313	U	0.02040	U	0.0356		0.0605	pCi/g	0.13	1
Lead-210	0.578	U	-0.7699	U	1.46		2.78	pCi/g	0.61	1
Lead-212	0.403		0.3668		0.0938		0.0934	pCi/g	0.20	1
Lead-214	0.531		0.6129		0.162		0.127	pCi/g	0.28	1
Potassium-40	8.90		10.37		1.70		0.630	pCi/g	0.46	1
Protactinium-231	-0.00000	U	0.5497	U	2.16		3.64	pCi/g	0.12	1
	0164									
Radium-226	0.556		0.5649		0.139	0.500	0.0988	pCi/g	0.03	1
Radium-228	0.586		0.4032		0.158		0.209	pCi/g	0.57	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21129-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-21129-1 DU

Matrix: Solid

Analysis Batch: 297776

Client Sample ID: TITO04-BS-FSSSU9-LLRO#711-SWSU2-B001

Prep Type: Total/NA

Prep Batch: 294258

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.152		0.1491		0.0482		0.0332	pCi/g	0.03	1
Thorium-228	0.403		0.3668		0.0938		0.0934	pCi/g	0.20	1
Thorium-232	0.586		0.4032		0.158		0.209	pCi/g	0.57	1
Thorium-234	0.582	U	0.1876	U	1.26		2.14	pCi/g	0.17	1
Uranium-235	-0.00984	U	-0.00404	U	0.180		0.675	pCi/g	0.03	1
Uranium-238	0.582	U	0.1876	U	1.26		2.14	pCi/g	0.17	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21129-2

Rad

Leach Batch: 293396

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21129-1	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B001	Total/NA	Solid	Dry and Grind	
160-21129-2	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B002	Total/NA	Solid	Dry and Grind	
160-21129-3	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B003	Total/NA	Solid	Dry and Grind	
160-21129-4	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B004	Total/NA	Solid	Dry and Grind	
160-21129-5	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B005	Total/NA	Solid	Dry and Grind	
160-21129-1 DU	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B001	Total/NA	Solid	Dry and Grind	

Prep Batch: 294258

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21129-1	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B001	Total/NA	Solid	Fill_Geo-21	293396
160-21129-2	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B002	Total/NA	Solid	Fill_Geo-21	293396
160-21129-3	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B003	Total/NA	Solid	Fill_Geo-21	293396
160-21129-4	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B004	Total/NA	Solid	Fill_Geo-21	293396
160-21129-5	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B005	Total/NA	Solid	Fill_Geo-21	293396
MB 160-294258/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-294258/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-21129-1 DU	TITO04-BS-FSSSU9-LLRO#711-SWSU2-B001	Total/NA	Solid	Fill_Geo-21	293396

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-21561-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Federal Services LLC
420 Exchange Road
Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

4/18/2017 3:00:35 PM

Micha Korinhizer, Project Management Assistant I
(314)298-8566

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Designee for

Erika Gish, Project Manager II
(314)298-8566

erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Job ID: 160-21561-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-21561-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Job ID: 160-21561-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 3/22/2017 8:40 AM; the samples arrived in good condition and properly preserved. The temperatures of the 2 coolers at receipt time were 19.0° C and 19.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-RSY15-U9-BS-FSSSU5-S001 (160-21561-1), TITO04-RSY15-U9-BS-FSSSU5-S002 (160-21561-2), TITO04-RSY15-U9-BS-FSSSU5-S003 (160-21561-3), TITO04-RSY15-U9-BS-FSSSU5-S004 (160-21561-4), TITO04-RSY15-U9-BS-FSSSU5-S005 (160-21561-5), TITO04-RSY15-U9-BS-FSSSU5-S006 (160-21561-6), TITO04-RSY15-U9-BS-FSSSU5-S007 (160-21561-7), TITO04-RSY15-U9-BS-FSSSU5-S008 (160-21561-8), TITO04-RSY15-U9-BS-FSSSU5-S009 (160-21561-9), TITO04-RSY15-U9-BS-FSSSU5-S010 (160-21561-10), TITO04-RSY15-U9-BS-FSSSU5-S011 (160-21561-11) and TITO04-RSY15-U9-BS-FSSSU5-S012 (160-21561-12) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 03/22/2017, prepared on 03/27/2017 and analyzed on 04/18/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



CBI Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520



160-21561 Chain of Custody

CHAIN OF CUSTODY

Ref. Document # TL_P3_RSY15_U9_BS_FSSSU5_#379

Page 1 of 2

Project Number: **500060**

CTO-04 Phase III Site 32 RSY15

Project Name / Location: USE 9 From Bayside SU5

Systematic

Purchase Order #: 201455

Shipment Date: 3-21-17

Waybill Number: 1229V467.019468124

Lab Destination: Earth Toxics Inc To Test America

Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Renata Vidovic

Phone/Fax Number: 408-505-7319

Address: renata.vidovic@cbifederalservices.com

City:

Sampler's Name(s): M. Star

Sample ID Number	Sample Description	Collection Information		Matrix	# of containers	Preservative (water)		Dose Rate $\mu\text{R}/\text{Hr}$
		Date	Time			Preservative (soil)	Container Type	
TITO04-RSY15-U9-BS-FSSSU5-S001	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1412	SO	1		16 oz Plastic	5
TITO04-RSY15-U9-BS-FSSSU5-S002	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1409	SO	1		16 oz Plastic	5
TITO04-RSY15-U9-BS-FSSSU5-S003	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1413	SO	1		16 oz Plastic	5
TITO04-RSY15-U9-BS-FSSSU5-S004	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1417	SO	1		16 oz Plastic	5
TITO04-RSY15-U9-BS-FSSSU5-S005	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1426	SO	1		16 oz Plastic	5
TITO04-RSY15-U9-BS-FSSSU5-S006	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1418	SO	1		16 oz Plastic	5
TITO04-RSY15-U9-BS-FSSSU5-S007	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1425	SO	1		16 oz Plastic	5
TITO04-RSY15-U9-BS-FSSSU5-S008	Site 32 RSY 15 Lift 9 From Bayside FSS SU5 Systematic	3-20-17	1430	SO	1		16 oz Plastic	5

Special Instructions:

7 days ingrown draft and follow with 21 days final

Method Codes

C = Composite
G = Grab

Standard TAT <input type="checkbox"/> 24-hr <input type="checkbox"/> 3-day <input type="checkbox"/> 7-day	Level Of QC Required: <input type="checkbox"/> I <input type="checkbox"/> II <input checked="" type="checkbox"/> III	Project Specific:
Relinquished By: <u>[Signature]</u>	Date: <u>3-20-17</u> Time: <u>1715</u>	Received By: <u>[Signature]</u> Date: <u>3-20-17</u> Time: <u>1715</u>
Relinquished By: <u>[Signature]</u>	Date: <u>3-21-17</u> Time: <u>0855</u>	Received By: <u>[Signature]</u> Date: <u>3-21-17</u> Time: <u>0855</u>
Relinquished By: <u>[Signature]</u>	Date: <u>3-21-17</u> Time: <u>1010</u>	Received By: <u>[Signature]</u> Date: <u>3-21-17</u> Time: <u>1010</u>
Relinquished By: <u>[Signature]</u>	Date: <u>3-21-17</u> Time: <u>0840</u>	Received By: <u>[Signature]</u> Date: <u>3-21-17</u> Time: <u>0840</u>

Matrix Codes

DW = Drinking Water
GW = Ground Water
WW = Waste Water
A = Air
SO = Soil
SL = Sludge
CP = Chip Samples
ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: CB&I Federal Services LLC

Job Number: 160-21561-2

Login Number: 21561

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-21561-1	TITO04-RSY15-U9-BS-FSSSU5-S001	Solid	03/20/17 14:12	03/22/17 08:40
160-21561-2	TITO04-RSY15-U9-BS-FSSSU5-S002	Solid	03/20/17 14:09	03/22/17 08:40
160-21561-3	TITO04-RSY15-U9-BS-FSSSU5-S003	Solid	03/20/17 14:13	03/22/17 08:40
160-21561-4	TITO04-RSY15-U9-BS-FSSSU5-S004	Solid	03/20/17 14:17	03/22/17 08:40
160-21561-5	TITO04-RSY15-U9-BS-FSSSU5-S005	Solid	03/20/17 14:26	03/22/17 08:40
160-21561-6	TITO04-RSY15-U9-BS-FSSSU5-S006	Solid	03/20/17 14:18	03/22/17 08:40
160-21561-7	TITO04-RSY15-U9-BS-FSSSU5-S007	Solid	03/20/17 14:25	03/22/17 08:40
160-21561-8	TITO04-RSY15-U9-BS-FSSSU5-S008	Solid	03/20/17 14:30	03/22/17 08:40
160-21561-9	TITO04-RSY15-U9-BS-FSSSU5-S009	Solid	03/20/17 14:32	03/22/17 08:40
160-21561-10	TITO04-RSY15-U9-BS-FSSSU5-S010	Solid	03/20/17 14:28	03/22/17 08:40
160-21561-11	TITO04-RSY15-U9-BS-FSSSU5-S011	Solid	03/20/17 14:19	03/22/17 08:40
160-21561-12	TITO04-RSY15-U9-BS-FSSSU5-S012	Solid	03/20/17 14:23	03/22/17 08:40

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S001

Lab Sample ID: 160-21561-1

Date Collected: 03/20/17 14:12

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.515		0.147	0.156		0.0775	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Actinium-227	-0.291	U	0.728	0.728		1.22	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Bismuth-212	0.306	U	0.547	0.548		0.928	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Bismuth-214	0.361		0.123	0.128		0.130	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Cesium-137	0.0242	U	0.0438	0.0439		0.0743	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Lead-210	-0.0875	U	1.27	1.27		2.20	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Lead-212	0.323		0.0772	0.0878		0.0890	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Lead-214	0.355		0.113	0.119		0.121	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Potassium-40	11.0		1.39	1.78		0.682	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Protactinium-231	0.000	U	0.446	0.446		3.51	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Radium-226	0.361		0.123	0.128	0.500	0.130	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Radium-228	0.515		0.147	0.156		0.0775	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Thallium-208	0.173		0.0597	0.0624		0.0512	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Thorium-228	0.323		0.0772	0.0878		0.0890	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Thorium-232	0.515		0.147	0.156		0.0775	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Thorium-234	-0.167	U	0.836	0.837		1.46	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Uranium-235	0.0576	U	0.142	0.142		0.516	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Uranium-238	-0.167	U	0.836	0.837		1.46	pCi/g	03/27/17 20:40	04/18/17 07:17	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S002

Lab Sample ID: 160-21561-2

Date Collected: 03/20/17 14:09

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.253		0.135	0.138		0.162	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Actinium-227	0.185	U	0.766	0.767		1.00	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Bismuth-212	0.00782	U	0.636	0.636		1.17	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Bismuth-214	0.397		0.123	0.130		0.106	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Cesium-137	-0.0163	U	0.0702	0.0702		0.128	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Lead-210	-0.0243	U	1.75	1.75		3.00	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Lead-212	0.313		0.0813	0.0909		0.0898	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Lead-214	0.364		0.106	0.113		0.120	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Potassium-40	11.9		1.72	2.11		0.620	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Protactinium-231	0.000	U	2.35	2.35		4.00	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Radium-226	0.397		0.123	0.130	0.500	0.106	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Radium-228	0.253		0.135	0.138		0.162	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Thallium-208	0.198		0.0571	0.0607		0.0420	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Thorium-228	0.313		0.0813	0.0909		0.0898	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Thorium-232	0.253		0.135	0.138		0.162	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Thorium-234	-0.441	U	1.30	1.30		2.26	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Uranium-235	-0.0902	U	0.187	0.187		0.772	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Uranium-238	-0.441	U	1.30	1.30		2.26	pCi/g	03/27/17 20:40	04/18/17 07:27	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S003

Lab Sample ID: 160-21561-3

Date Collected: 03/20/17 14:13

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.282		0.163	0.166		0.155	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Actinium-227	0.203	U	0.528	0.528		0.893	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Bismuth-212	0.0370	U	0.528	0.528		0.961	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Bismuth-214	0.292		0.105	0.109		0.0850	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Cesium-137	0.0305	U	0.0561	0.0562		0.0950	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Lead-210	0.302	U	1.06	1.06		1.79	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Lead-212	0.315		0.0929	0.101		0.0920	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Lead-214	0.266		0.0954	0.0993		0.134	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Potassium-40	10.8		1.47	1.84		0.370	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Protactinium-231	-0.141	U	2.11	2.11		3.59	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Radium-226	0.292		0.105	0.109	0.500	0.0850	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Radium-228	0.282		0.163	0.166		0.155	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Thallium-208	0.0629	U	0.0680	0.0684		0.0731	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Thorium-228	0.315		0.0929	0.101		0.0920	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Thorium-232	0.282		0.163	0.166		0.155	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Thorium-234	0.268	U	0.404	0.405		1.14	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Uranium-235	-0.0638	U	0.224	0.224		0.562	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Uranium-238	0.268	U	0.404	0.405		1.14	pCi/g	03/27/17 20:40	04/18/17 07:29	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S004

Lab Sample ID: 160-21561-4

Date Collected: 03/20/17 14:17

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.132	U	0.205	0.205		0.284	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Actinium-227	0.245	U	0.542	0.542		0.782	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Bismuth-212	-0.00355	U	0.830	0.830		1.49	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Bismuth-214	0.360		0.161	0.165		0.154	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Cesium-137	-0.0351	U	0.0897	0.0897		0.182	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Lead-210	1.40		1.03	1.04		1.35	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Lead-212	0.238		0.0745	0.0806		0.0852	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Lead-214	0.328		0.105	0.111		0.105	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Potassium-40	10.9		1.73	2.06		0.731	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Protactinium-231	0.000	U	0.371	0.371		3.09	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Radium-226	0.360		0.161	0.165	0.500	0.154	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Radium-228	0.132	U	0.205	0.205		0.284	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Thallium-208	0.120		0.0535	0.0549		0.0454	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Thorium-228	0.238		0.0745	0.0806		0.0852	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Thorium-232	0.132	U	0.205	0.205		0.284	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Thorium-234	0.651	U	0.343	0.349		1.66	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Uranium-235	0.0325	U	0.0504	0.0505		0.547	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Uranium-238	0.651	U	0.343	0.349		1.66	pCi/g	03/27/17 20:40	04/18/17 07:31	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S005

Lab Sample ID: 160-21561-5

Date Collected: 03/20/17 14:26

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.379		0.213	0.217		0.213	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Actinium-227	0.132	U	0.513	0.513		1.29	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Bismuth-212	-0.0163	U	0.835	0.835		1.51	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Bismuth-214	0.125	U	0.251	0.252		0.330	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Cesium-137	0.00801	U	0.0588	0.0588		0.106	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Lead-210	-0.614	U	1.78	1.78		3.10	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Lead-212	0.349		0.0932	0.104		0.110	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Lead-214	0.394		0.123	0.129		0.120	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Potassium-40	9.95		1.63	1.92		0.748	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Protactinium-231	-0.932	U	3.01	3.01		5.07	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Radium-226	0.125	U	0.251	0.252	0.500	0.330	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Radium-228	0.379		0.213	0.217		0.213	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Thallium-208	0.107		0.0678	0.0687		0.0742	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Thorium-228	0.349		0.0932	0.104		0.110	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Thorium-232	0.379		0.213	0.217		0.213	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Thorium-234	0.0369	U	1.56	1.56		2.65	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Uranium-235	-0.0146	U	0.0575	0.0575		1.12	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Uranium-238	0.0369	U	1.56	1.56		2.65	pCi/g	03/27/17 20:40	04/18/17 07:35	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S006

Lab Sample ID: 160-21561-6

Date Collected: 03/20/17 14:18

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.410		0.145	0.151		0.107	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Actinium-227	0.270	U	0.575	0.576		0.964	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Bismuth-212	-0.0198	U	0.743	0.743		1.30	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Bismuth-214	0.350		0.102	0.108		0.0830	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Cesium-137	0.000	U	0.0215	0.0215		0.0712	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-210	-0.611	U	1.13	1.13		1.89	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-212	0.341		0.0644	0.0781		0.0622	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-214	0.391		0.0779	0.0878		0.0719	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Potassium-40	11.8		1.27	1.75		0.250	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Protactinium-231	0.000	U	0.554	0.554		3.39	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Radium-226	0.350		0.102	0.108	0.500	0.0830	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Radium-228	0.410		0.145	0.151		0.107	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thallium-208	0.183		0.0410	0.0452		0.0255	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-228	0.341		0.0644	0.0781		0.0622	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-232	0.410		0.145	0.151		0.107	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-234	0.288	U	0.668	0.669		1.63	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Uranium-235	-0.157	U	0.418	0.419		0.699	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Uranium-238	0.288	U	0.668	0.669		1.63	pCi/g	03/27/17 20:40	04/18/17 08:00	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S007

Lab Sample ID: 160-21561-7

Date Collected: 03/20/17 14:25

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.446		0.124	0.132		0.0798	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Actinium-227	-0.0486	U	0.0853	0.0855		1.28	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Bismuth-212	0.0351	U	0.583	0.583		1.05	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Bismuth-214	0.370		0.119	0.125		0.108	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Cesium-137	0.0204	U	0.0404	0.0405		0.0694	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Lead-210	0.818	U	1.02	1.02		1.48	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Lead-212	0.295		0.0747	0.0839		0.0862	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Lead-214	0.333		0.0907	0.0971		0.125	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Potassium-40	10.2		1.36	1.72		0.703	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Protactinium-231	-0.388	U	2.42	2.42		4.09	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Radium-226	0.370		0.119	0.125	0.500	0.108	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Radium-228	0.446		0.124	0.132		0.0798	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Thallium-208	0.124		0.0453	0.0471		0.0426	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Thorium-228	0.295		0.0747	0.0839		0.0862	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Thorium-232	0.446		0.124	0.132		0.0798	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Thorium-234	0.270	U	0.397	0.398		1.22	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Uranium-235	0.0849	U	0.283	0.283		0.479	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Uranium-238	0.270	U	0.397	0.398		1.22	pCi/g	03/27/17 20:40	04/18/17 07:57	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S008

Lab Sample ID: 160-21561-8

Date Collected: 03/20/17 14:30

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.132	U	0.0627	0.0642		0.313	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Actinium-227	-0.330	U	0.783	0.784		1.31	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Bismuth-212	0.409	U	0.689	0.690		1.16	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Bismuth-214	0.326		0.104	0.110		0.0980	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Cesium-137	0.000	U	0.0323	0.0323		0.0882	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-210	0.745	U	1.28	1.28		1.76	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-212	0.264		0.0798	0.0868		0.105	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-214	0.415		0.0983	0.107		0.109	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Potassium-40	10.2		1.35	1.70		0.787	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Protactinium-231	0.000	U	0.455	0.455		3.49	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Radium-226	0.326		0.104	0.110	0.500	0.0980	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Radium-228	0.132	U	0.0627	0.0642		0.313	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thallium-208	0.0986		0.0749	0.0756		0.0742	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-228	0.264		0.0798	0.0868		0.105	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-232	0.132	U	0.0627	0.0642		0.313	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-234	0.180	U	0.197	0.198		2.30	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Uranium-235	-0.223	U	0.257	0.258		0.957	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Uranium-238	0.180	U	0.197	0.198		2.30	pCi/g	03/27/17 20:40	04/18/17 08:00	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S009

Lab Sample ID: 160-21561-9

Date Collected: 03/20/17 14:32

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0899	U	0.173	0.173		0.368	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Actinium-227	-0.344	U	0.323	0.325		1.37	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Bismuth-212	0.000	U	0.392	0.392		1.36	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Bismuth-214	0.324		0.107	0.113		0.0994	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Cesium-137	-0.0609	U	0.114	0.114		0.128	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Lead-210	-0.858	U	0.681	0.688		2.91	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Lead-212	0.313		0.0786	0.0885		0.0867	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Lead-214	0.315		0.112	0.116		0.112	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Potassium-40	11.6		1.64	2.03		0.578	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Protactinium-231	0.181	U	1.27	1.27		4.07	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Radium-226	0.324		0.107	0.113	0.500	0.0994	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Radium-228	0.0899	U	0.173	0.173		0.368	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Thallium-208	0.108		0.0873	0.0880		0.0789	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Thorium-228	0.313		0.0786	0.0885		0.0867	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Thorium-232	0.0899	U	0.173	0.173		0.368	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Thorium-234	0.870	U	0.774	0.779		1.15	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Uranium-235	0.0274	U	0.0956	0.0956		0.687	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Uranium-238	0.870	U	0.774	0.779		1.15	pCi/g	03/27/17 20:40	04/18/17 08:04	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S010

Lab Sample ID: 160-21561-10

Date Collected: 03/20/17 14:28

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.225	U	0.216	0.217		0.283	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Actinium-227	-0.0287	U	0.592	0.592		1.02	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Bismuth-212	0.000	U	0.400	0.400		1.08	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Bismuth-214	0.524		0.106	0.119		0.0390	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Cesium-137	0.0220	U	0.0430	0.0431		0.0738	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Lead-210	-0.255	U	1.21	1.21		2.12	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Lead-212	0.269		0.0748	0.0825		0.0951	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Lead-214	0.323		0.0888	0.0949		0.0819	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Potassium-40	10.6		1.47	1.82		0.378	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Protactinium-231	-0.420	U	2.08	2.08		3.53	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Radium-226	0.524		0.106	0.119	0.500	0.0390	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Radium-228	0.225	U	0.216	0.217		0.283	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Thallium-208	0.108		0.0542	0.0554		0.0559	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Thorium-228	0.269		0.0748	0.0825		0.0951	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Thorium-232	0.225	U	0.216	0.217		0.283	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Thorium-234	0.391	U	0.395	0.397		1.10	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Uranium-235	-0.119	U	0.210	0.210		0.633	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Uranium-238	0.391	U	0.395	0.397		1.10	pCi/g	03/27/17 20:40	04/18/17 08:10	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S011

Lab Sample ID: 160-21561-11

Date Collected: 03/20/17 14:19

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.243	U	0.212	0.214		0.406	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Actinium-227	0.216	U	0.577	0.578		0.839	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Bismuth-212	0.547	U	1.14	1.15		1.94	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Bismuth-214	0.396		0.147	0.152		0.145	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Cesium-137	0.00874	U	0.0643	0.0643		0.0913	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Lead-210	0.483	U	1.31	1.32		1.96	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Lead-212	0.235		0.0801	0.0857		0.0968	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Lead-214	0.348		0.122	0.127		0.140	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Potassium-40	11.1		1.81	2.14		0.784	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Protactinium-231	0.306	U	1.11	1.11		3.67	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Radium-226	0.396		0.147	0.152	0.500	0.145	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Radium-228	0.243	U	0.212	0.214		0.406	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Thallium-208	0.0562	U	0.0803	0.0805		0.108	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Thorium-228	0.235		0.0801	0.0857		0.0968	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Thorium-232	0.243	U	0.212	0.214		0.406	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Thorium-234	-0.0498	U	1.37	1.37		2.03	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Uranium-235	0.137	U	0.307	0.307		0.545	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Uranium-238	-0.0498	U	1.37	1.37		2.03	pCi/g	03/27/17 20:40	04/18/17 08:29	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S012

Lab Sample ID: 160-21561-12

Date Collected: 03/20/17 14:23

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.390		0.172	0.176		0.229	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Actinium-227	-0.208	U	0.692	0.693		0.943	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Bismuth-212	0.0119	U	0.632	0.632		1.14	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Bismuth-214	0.271		0.106	0.110		0.122	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Cesium-137	-0.0201	U	0.0428	0.0428		0.0982	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Lead-210	-0.0591	U	1.62	1.62		2.77	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Lead-212	0.324		0.0799	0.0902		0.0930	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Lead-214	0.310		0.103	0.108		0.118	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Potassium-40	10.2		1.38	1.73		0.717	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Protactinium-231	-0.819	U	2.79	2.79		4.68	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Radium-226	0.271		0.106	0.110	0.500	0.122	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Radium-228	0.390		0.172	0.176		0.229	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Thallium-208	0.157		0.0447	0.0475		0.0341	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Thorium-228	0.324		0.0799	0.0902		0.0930	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Thorium-232	0.390		0.172	0.176		0.229	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Thorium-234	-0.129	U	1.07	1.07		1.85	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Uranium-235	0.00805	U	0.0466	0.0466		0.561	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Uranium-238	-0.129	U	1.07	1.07		1.85	pCi/g	03/27/17 20:40	04/18/17 08:31	1

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QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-300414/1-A
Matrix: Solid
Analysis Batch: 304064

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 300414

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.09733	U	0.126	0.126		0.157	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Actinium-227	0.03484	U	0.434	0.434		0.767	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Bismuth-212	0.05625	U	0.386	0.386		0.718	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Bismuth-214	0.002071	U	0.130	0.130		0.227	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Cesium-137	-0.04272	U	0.0684	0.0685		0.115	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Lead-210	0.4198	U	0.845	0.846		1.44	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Lead-212	-0.01075	U	0.0624	0.0624		0.0911	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Lead-214	0.1147	U	0.0807	0.0816		0.121	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Potassium-40	0.09465	U	0.803	0.803		0.892	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Protactinium-231	0.2655	U	0.881	0.881		2.85	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Radium-226	0.002071	U	0.130	0.130	0.500	0.227	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Radium-228	0.09733	U	0.126	0.126		0.157	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Thallium-208	0.005934	U	0.0195	0.0195		0.0580	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Thorium-228	-0.01075	U	0.0624	0.0624		0.0911	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Thorium-232	0.09733	U	0.126	0.126		0.157	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Thorium-234	-0.3246	U	1.02	1.02		1.74	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Uranium-235	0.0000	U	0.0435	0.0435		0.489	pCi/g	03/27/17 20:40	04/18/17 07:15	1
Uranium-238	-0.3246	U	1.02	1.02		1.74	pCi/g	03/27/17 20:40	04/18/17 07:15	1

Lab Sample ID: LCS 160-300414/2-A
Matrix: Solid
Analysis Batch: 304062

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 300414

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.0	97.44		10.2		1.19	pCi/g	100	87 - 116
Cesium-137	29.1	28.46		3.04		0.212	pCi/g	98	87 - 120
Cobalt-60	15.3	14.83		1.54		0.0757	pCi/g	97	87 - 115

Lab Sample ID: 160-21561-1 DU
Matrix: Solid
Analysis Batch: 304063

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S001
Prep Type: Total/NA
Prep Batch: 300414

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.515		0.4086		0.145		0.113	pCi/g	0.35	1
Actinium-227	-0.291	U	-0.3543	U	0.805		1.35	pCi/g	0.04	1
Bismuth-212	0.306	U	-0.4705	U	0.557		1.30	pCi/g	0.70	1
Bismuth-214	0.361		0.3172		0.101		0.0895	pCi/g	0.19	1
Cesium-137	0.0242	U	0.01705	U	0.0461		0.0798	pCi/g	0.08	1
Lead-210	-0.0875	U	-0.6853	U	1.39		2.44	pCi/g	0.22	1
Lead-212	0.323		0.3769		0.0900		0.0767	pCi/g	0.30	1
Lead-214	0.355		0.3793		0.109		0.0928	pCi/g	0.11	1
Potassium-40	11.0		10.84		1.73		0.518	pCi/g	0.03	1
Protactinium-231	0.000	U	-0.6719	U	2.06		3.46	pCi/g	0.27	1
Radium-226	0.361		0.3172		0.101	0.500	0.0895	pCi/g	0.19	1
Radium-228	0.515		0.4086		0.145		0.113	pCi/g	0.35	1

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QC Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-21561-1 DU

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S001

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 304063

Prep Batch: 300414

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.173		0.1090		0.0596		0.0621	pCi/g	0.53	1
Thorium-228	0.323		0.3769		0.0900		0.0767	pCi/g	0.30	1
Thorium-232	0.515		0.4086		0.145		0.113	pCi/g	0.35	1
Thorium-234	-0.167	U	0.02933	U	1.20		2.05	pCi/g	0.1	1
Uranium-235	0.0576	U	-0.03951	U	0.427		0.725	pCi/g	0.17	1
Uranium-238	-0.167	U	0.02933	U	1.20		2.05	pCi/g	0.1	1

QC Association Summary

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Rad

Leach Batch: 299075

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21561-1	TITO04-RSY15-U9-BS-FSSSU5-S001	Total/NA	Solid	Dry and Grind	
160-21561-2	TITO04-RSY15-U9-BS-FSSSU5-S002	Total/NA	Solid	Dry and Grind	
160-21561-3	TITO04-RSY15-U9-BS-FSSSU5-S003	Total/NA	Solid	Dry and Grind	
160-21561-4	TITO04-RSY15-U9-BS-FSSSU5-S004	Total/NA	Solid	Dry and Grind	
160-21561-5	TITO04-RSY15-U9-BS-FSSSU5-S005	Total/NA	Solid	Dry and Grind	
160-21561-6	TITO04-RSY15-U9-BS-FSSSU5-S006	Total/NA	Solid	Dry and Grind	
160-21561-7	TITO04-RSY15-U9-BS-FSSSU5-S007	Total/NA	Solid	Dry and Grind	
160-21561-8	TITO04-RSY15-U9-BS-FSSSU5-S008	Total/NA	Solid	Dry and Grind	
160-21561-9	TITO04-RSY15-U9-BS-FSSSU5-S009	Total/NA	Solid	Dry and Grind	
160-21561-10	TITO04-RSY15-U9-BS-FSSSU5-S010	Total/NA	Solid	Dry and Grind	
160-21561-11	TITO04-RSY15-U9-BS-FSSSU5-S011	Total/NA	Solid	Dry and Grind	
160-21561-12	TITO04-RSY15-U9-BS-FSSSU5-S012	Total/NA	Solid	Dry and Grind	
160-21561-1 DU	TITO04-RSY15-U9-BS-FSSSU5-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 300414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21561-1	TITO04-RSY15-U9-BS-FSSSU5-S001	Total/NA	Solid	Fill_Geo-21	299075
160-21561-2	TITO04-RSY15-U9-BS-FSSSU5-S002	Total/NA	Solid	Fill_Geo-21	299075
160-21561-3	TITO04-RSY15-U9-BS-FSSSU5-S003	Total/NA	Solid	Fill_Geo-21	299075
160-21561-4	TITO04-RSY15-U9-BS-FSSSU5-S004	Total/NA	Solid	Fill_Geo-21	299075
160-21561-5	TITO04-RSY15-U9-BS-FSSSU5-S005	Total/NA	Solid	Fill_Geo-21	299075
160-21561-6	TITO04-RSY15-U9-BS-FSSSU5-S006	Total/NA	Solid	Fill_Geo-21	299075
160-21561-7	TITO04-RSY15-U9-BS-FSSSU5-S007	Total/NA	Solid	Fill_Geo-21	299075
160-21561-8	TITO04-RSY15-U9-BS-FSSSU5-S008	Total/NA	Solid	Fill_Geo-21	299075
160-21561-9	TITO04-RSY15-U9-BS-FSSSU5-S009	Total/NA	Solid	Fill_Geo-21	299075
160-21561-10	TITO04-RSY15-U9-BS-FSSSU5-S010	Total/NA	Solid	Fill_Geo-21	299075
160-21561-11	TITO04-RSY15-U9-BS-FSSSU5-S011	Total/NA	Solid	Fill_Geo-21	299075
160-21561-12	TITO04-RSY15-U9-BS-FSSSU5-S012	Total/NA	Solid	Fill_Geo-21	299075
MB 160-300414/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-300414/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-21561-1 DU	TITO04-RSY15-U9-BS-FSSSU5-S001	Total/NA	Solid	Fill_Geo-21	299075

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-25032-2

Client Project/Site: Treasure Island - 500060

For:

Aptim Federal Services LLC
420 Exchange, Suite 150
Irvine, California 92602

Attn: Lynn Caragan

Micha Korinhizer

Authorized for release by:

11/10/2017 8:30:32 AM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Job ID: 160-25032-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: Treasure Island - 500060

Report Number: 160-25032-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Job ID: 160-25032-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/16/2017; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-BS-FSS-SU7B-LANE3-U2-S021 (160-25032-1) and TITO04-BS-FSS-SU7B-LANE3-U2-S022 (160-25032-2) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/16/2017, prepared on 10/17/2017 and analyzed on 11/07/2017.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-25032-2

Login Number: 25032

List Source: TestAmerica St. Louis

List Number: 1

Creator: Daniels, Brian J

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-25032-1	TITO04-BS-FSS-SU7B-LANE3-U2-S021	Solid	10/13/17 08:39	10/16/17 08:40
160-25032-2	TITO04-BS-FSS-SU7B-LANE3-U2-S022	Solid	10/13/17 08:38	10/16/17 08:40

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Client Sample ID: TITO04-BS-FSS-SU7B-LANE3-U2-S021

Lab Sample ID: 160-25032-1

Date Collected: 10/13/17 08:39

Matrix: Solid

Date Received: 10/16/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.405		0.143	0.149		0.267	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Actinium-227	-0.293	U	0.724	0.725		0.977	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Bismuth-212	-0.111	U	0.618	0.618		1.12	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Bismuth-214	0.372		0.127	0.132		0.123	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Cesium-137	0.0268	U	0.0463	0.0464		0.0782	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Lead-210	-0.0749	U	1.50	1.50		2.57	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Lead-212	0.325		0.0843	0.0942		0.107	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Lead-214	0.413		0.100	0.109		0.0843	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Potassium-40	10.5		1.39	1.76		0.792	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Protactinium-231	0.000	U	0.262	0.262		4.03	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Radium-226	0.372		0.127	0.132	0.500	0.123	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Radium-228	0.405		0.143	0.149		0.267	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Thallium-208	0.155		0.0618	0.0638		0.0613	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Thorium-228	0.325		0.0843	0.0942		0.107	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Thorium-232	0.405		0.143	0.149		0.267	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Thorium-234	0.785	U	1.14	1.14		1.55	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Uranium-235	0.0760	U	0.281	0.281		0.475	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Uranium-238	0.785	U	1.14	1.14		1.55	pCi/g	10/17/17 22:41	11/07/17 09:28	1

Client Sample ID: TITO04-BS-FSS-SU7B-LANE3-U2-S022

Lab Sample ID: 160-25032-2

Date Collected: 10/13/17 08:38

Matrix: Solid

Date Received: 10/16/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.127	U	0.180	0.181		0.321	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Actinium-227	-0.0430	U	0.0729	0.0731		0.824	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Bismuth-212	-0.211	U	0.663	0.663		1.15	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Bismuth-214	0.377		0.116	0.122		0.0981	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Cesium-137	0.0259	U	0.0556	0.0557		0.0949	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Lead-210	-0.657	U	1.30	1.30		1.98	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Lead-212	0.284		0.0749	0.0834		0.0896	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Lead-214	0.318		0.0904	0.0963		0.109	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Potassium-40	10.7		1.44	1.81		0.546	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Protactinium-231	-0.662	U	2.15	2.15		3.62	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Radium-226	0.377		0.116	0.122	0.500	0.0981	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Radium-228	0.127	U	0.180	0.181		0.321	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Thallium-208	0.0919		0.0449	0.0459		0.0466	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Thorium-228	0.284		0.0749	0.0834		0.0896	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Thorium-232	0.127	U	0.180	0.181		0.321	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Thorium-234	0.608	U	0.451	0.455		1.08	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Uranium-235	-0.00770	U	0.286	0.286		0.513	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Uranium-238	0.608	U	0.451	0.455		1.08	pCi/g	10/17/17 22:41	11/07/17 09:51	1

TestAmerica St. Louis

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-332289/1-A
Matrix: Solid
Analysis Batch: 335965

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 332289

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.08985	U	0.146	0.146		0.172	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Actinium-227	-0.2566	U	0.536	0.537		0.908	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Bismuth-212	0.01351	U	0.456	0.456		0.857	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Bismuth-214	-0.02833	U	0.109	0.109		0.197	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Cesium-137	0.01102	U	0.0358	0.0358		0.0646	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Lead-210	-0.1019	U	0.176	0.176		1.68	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Lead-212	-0.03448	U	0.0687	0.0688		0.118	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Lead-214	-0.003396	U	0.0960	0.0960		0.171	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Potassium-40	0.3284	U	0.749	0.750		0.979	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Protactinium-231	0.0000	U	0.391	0.391		3.84	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Radium-226	-0.02833	U	0.109	0.109	0.500	0.197	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Radium-228	0.08985	U	0.146	0.146		0.172	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Thallium-208	-0.008705	U	0.0481	0.0481		0.0652	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Thorium-228	-0.03448	U	0.0687	0.0688		0.118	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Thorium-232	0.08985	U	0.146	0.146		0.172	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Thorium-234	-0.4035	U	0.889	0.890		1.51	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Uranium-235	0.07079	U	0.269	0.269		0.460	pCi/g	10/17/17 22:41	11/07/17 17:37	1
Uranium-238	-0.4035	U	0.889	0.890		1.51	pCi/g	10/17/17 22:41	11/07/17 17:37	1

Lab Sample ID: LCS 160-332289/2-A
Matrix: Solid
Analysis Batch: 335959

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 332289

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.9	95.39		10.0		0.990	pCi/g	98	87 - 116
Cesium-137	28.7	26.88		2.85		0.180	pCi/g	94	87 - 120
Cobalt-60	14.2	13.09		1.36		0.0612	pCi/g	92	87 - 115

Lab Sample ID: 160-25032-1 DU
Matrix: Solid
Analysis Batch: 335961

Client Sample ID: TITO04-BS-FSS-SU7B-LANE3-U2-S021
Prep Type: Total/NA
Prep Batch: 332289

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.405		0.1700		0.130		0.149	pCi/g	0.84	1
Actinium-227	-0.293	U	0.3378	U	0.740		1.24	pCi/g	0.43	1
Bismuth-212	-0.111	U	0.0000	U	0.175		1.62	pCi/g	0.14	1
Bismuth-214	0.372		0.3090		0.112		0.0911	pCi/g	0.26	1
Cesium-137	0.0268	U	-0.02465	U	0.0635		0.110	pCi/g	0.47	1
Lead-210	-0.0749	U	-0.1147	U	1.74		2.97	pCi/g	0.01	1
Lead-212	0.325		0.4048		0.148		0.133	pCi/g	0.33	1
Lead-214	0.413		0.2314		0.137		0.204	pCi/g	0.74	1
Potassium-40	10.5		9.322		1.84		0.918	pCi/g	0.32	1
Protactinium-231	0.000	U	0.3708	U	1.31		4.29	pCi/g	0.24	1
Radium-226	0.372		0.3090		0.112	0.500	0.0911	pCi/g	0.26	1
Radium-228	0.405		0.1700		0.130		0.149	pCi/g	0.84	1

TestAmerica St. Louis

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-25032-1 DU

Matrix: Solid

Analysis Batch: 335961

Client Sample ID: TITO04-BS-FSS-SU7B-LANE3-U2-S021

Prep Type: Total/NA

Prep Batch: 332289

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.155		0.1269		0.0757		0.0784	pCi/g	0.20	1
Thorium-228	0.325		0.4048		0.148		0.133	pCi/g	0.33	1
Thorium-232	0.405		0.1700		0.130		0.149	pCi/g	0.84	1
Thorium-234	0.785	U	-0.4419	U	1.36		2.95	pCi/g	0.49	1
Uranium-235	0.0760	U	0.1923	U	0.340		0.674	pCi/g	0.19	1
Uranium-238	0.785	U	-0.4419	U	1.36		2.95	pCi/g	0.49	1

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Rad

Leach Batch: 332144

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-25032-1	TITO04-BS-FSS-SU7B-LANE3-U2-S021	Total/NA	Solid	Dry and Grind	
160-25032-2	TITO04-BS-FSS-SU7B-LANE3-U2-S022	Total/NA	Solid	Dry and Grind	
160-25032-1 DU	TITO04-BS-FSS-SU7B-LANE3-U2-S021	Total/NA	Solid	Dry and Grind	

Prep Batch: 332289

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-25032-1	TITO04-BS-FSS-SU7B-LANE3-U2-S021	Total/NA	Solid	Fill_Geo-21	332144
160-25032-2	TITO04-BS-FSS-SU7B-LANE3-U2-S022	Total/NA	Solid	Fill_Geo-21	332144
MB 160-332289/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-332289/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-25032-1 DU	TITO04-BS-FSS-SU7B-LANE3-U2-S021	Total/NA	Solid	Fill_Geo-21	332144

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-17136-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn

Micha Korinhizer

Authorized for release by:

5/24/2016 10:10:04 AM

Micha Korinhizer, Project Management Assistant I
(314)298-8566

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Designee for

Erika Gish, Project Manager II
(314)298-8566

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Job ID: 160-17136-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-17136-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Job ID: 160-17136-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 04/27/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 18.7° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04_NP-R-FSSSU4-S421 (160-17136-1), TITO04_NP-R-FSSSU4-S422 (160-17136-2), TITO04_NP-R-FSSSU4-S423 (160-17136-3), TITO04_NP-R-FSSSU4-S424 (160-17136-4), TITO04_NP-R-FSSSU4-S425 (160-17136-5), TITO04_NP-R-FSSSU4-S426 (160-17136-6), TITO04_NP-R-FSSSU4-S427 (160-17136-7), TITO04_NP-R-FSSSU4-S428 (160-17136-8), TITO04_NP-R-FSSSU4-S429 (160-17136-9), TITO04_NP-R-FSSSU4-S430 (160-17136-10), TITO04_NP-R-FSSSU4-S431 (160-17136-11) and TITO04_NP-R-FSSSU4-S432 (160-17136-12) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 04/27/2016, prepared on 04/28/2016 and analyzed on 05/19/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # T1_P3_RSY11 USE1 P3 225

Page 1 of 2

Project Number: 500060

Project Name / Location: CTO-04 Phase III
RSY11 USE 1 Part 3

Purchase Order #: 201455

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date: 4-26-16

Waybill Number: 12 5146 201455 331740

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Collection Information				Matrix		Preservative (water)		Preservative (soil)		Container Type		Gamma Scan	Analyses Requested					
Sample ID Number	Sample Description	Date	Time	Method	# of containers	Preservative (water)	Preservative (soil)	Container Type										
TITO04_NP-R-FSSSU4-S421	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1436	G	SO 1	16 oz Plastic												
TITO04_NP-R-FSSSU4-S422	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1439	G	SO 1	16 oz Plastic												
TITO04_NP-R-FSSSU4-S423	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1442	G	SO 1	16 oz Plastic												
TITO04_NP-R-FSSSU4-S424	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1445	G	SO 1	16 oz Plastic												
TITO04_NP-R-FSSSU4-S425	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1448	G	SO 1	16 oz Plastic												
TITO04_NP-R-FSSSU4-S426	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1451	G	SO 1	16 oz Plastic												
TITO04_NP-R-FSSSU4-S427	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1453	G	SO 1	16 oz Plastic												
TITO04_NP-R-FSSSU4-S428	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1454	G	SO 1	16 oz Plastic												
TITO04_NP-R-FSSSU4-S429	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1455	G	SO 1	16 oz Plastic												
TITO04_NP-R-FSSSU4-S430	RSY11 USE 1 Part3 North Point FSS SU4	4/25/16	1457	G	SO 1	16 oz Plastic												
Special Instructions: 7 days ingrown draft and follow with 21 days final																		
Level Of QC Required:																		
Standard TAT <input type="checkbox"/> 24-hr <input type="checkbox"/> 3-day <input type="checkbox"/> 7-day																		
Relinquished By: <i>[Signature]</i> Date: 4-26-16 Time: 1230																		
Relinquished By: <i>[Signature]</i> Date: 4-26-16 Time: 1230																		
Project Specific: I II III																		
Method Codes																		
C = Composite																		
Matrix Codes																		
DW = Drinking Water																		
GW = Ground Water																		
WW = Waste Water																		
A = Air																		
ABS=Asbestos, PO=Pipe Opening																		

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-17136-2

Login Number: 17136

List Source: TestAmerica St. Louis

List Number: 1

Creator: McKinney, Gerrod E

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-17136-1	TITO04_NP-R-FSSSU4-S421	Solid	04/25/16 14:36	04/27/16 08:30
160-17136-2	TITO04_NP-R-FSSSU4-S422	Solid	04/25/16 14:39	04/27/16 08:30
160-17136-3	TITO04_NP-R-FSSSU4-S423	Solid	04/25/16 14:42	04/27/16 08:30
160-17136-4	TITO04_NP-R-FSSSU4-S424	Solid	04/25/16 14:45	04/27/16 08:30
160-17136-5	TITO04_NP-R-FSSSU4-S425	Solid	04/25/16 14:48	04/27/16 08:30
160-17136-6	TITO04_NP-R-FSSSU4-S426	Solid	04/25/16 14:51	04/27/16 08:30
160-17136-7	TITO04_NP-R-FSSSU4-S427	Solid	04/25/16 14:53	04/27/16 08:30
160-17136-8	TITO04_NP-R-FSSSU4-S428	Solid	04/25/16 14:59	04/27/16 08:30
160-17136-9	TITO04_NP-R-FSSSU4-S429	Solid	04/25/16 14:55	04/27/16 08:30
160-17136-10	TITO04_NP-R-FSSSU4-S430	Solid	04/25/16 14:57	04/27/16 08:30
160-17136-11	TITO04_NP-R-FSSSU4-S431	Solid	04/25/16 14:50	04/27/16 08:30
160-17136-12	TITO04_NP-R-FSSSU4-S432	Solid	04/25/16 15:01	04/27/16 08:30

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S421

Lab Sample ID: 160-17136-1

Date Collected: 04/25/16 14:36

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.356		0.131	0.136		0.128	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Actinium-227	-0.0295	U	0.0550	0.0551		0.983	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Bismuth-212	0.000	U	0.518	0.518		1.38	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Bismuth-214	0.251		0.110	0.113		0.122	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Cesium-137	0.0533	U	0.0529	0.0532		0.0804	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Lead-210	1.03	U	1.32	1.32		1.90	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Lead-212	0.319		0.0826	0.0923		0.0815	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Lead-214	0.292		0.117	0.121		0.135	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Potassium-40	9.26		1.65	1.90		0.758	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Protactinium-231	0.416	U	1.39	1.39		3.17	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Radium-226	0.251		0.110	0.113	0.500	0.122	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Radium-228	0.356		0.131	0.136		0.128	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Thallium-208	0.117		0.0537	0.0550		0.0511	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Thorium-228	0.319		0.0826	0.0923		0.0815	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Thorium-232	0.356		0.131	0.136		0.128	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Thorium-234	-0.616	U	1.16	1.16		1.92	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Uranium-235	0.0940	U	0.295	0.295		0.541	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Uranium-238	-0.616	U	1.16	1.16		1.92	pCi/g	04/28/16 09:26	05/19/16 09:21	1

Client Sample ID: TITO04_NP-R-FSSSU4-S422

Lab Sample ID: 160-17136-2

Date Collected: 04/25/16 14:39

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.451		0.174	0.180		0.181	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Actinium-227	-0.305	U	0.741	0.742		1.25	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Bismuth-212	0.182	U	0.432	0.433		0.757	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Bismuth-214	0.334		0.136	0.140		0.131	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Cesium-137	-0.0331	U	0.0549	0.0550		0.0895	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Lead-210	-0.978	U	1.54	1.55		2.44	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Lead-212	0.302		0.0850	0.0936		0.109	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Lead-214	0.274		0.0915	0.0958		0.110	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Potassium-40	10.7		1.41	1.78		0.753	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Protactinium-231	-0.713	U	2.32	2.32		3.91	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Radium-226	0.334		0.136	0.140	0.500	0.131	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Radium-228	0.451		0.174	0.180		0.181	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Thallium-208	0.119		0.0509	0.0524		0.0561	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Thorium-228	0.302		0.0850	0.0936		0.109	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Thorium-232	0.451		0.174	0.180		0.181	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Thorium-234	0.397	U	0.892	0.893		1.28	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Uranium-235	-0.0343	U	0.122	0.122		0.573	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Uranium-238	0.397	U	0.892	0.893		1.28	pCi/g	04/28/16 09:26	05/19/16 09:18	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S423

Lab Sample ID: 160-17136-3

Date Collected: 04/25/16 14:42

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.421		0.126	0.133		0.0690	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Actinium-227	0.265	U	0.582	0.583		0.978	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Bismuth-212	0.292	U	0.520	0.521		0.881	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Bismuth-214	0.254		0.0843	0.0884		0.0939	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Cesium-137	0.0137	U	0.0300	0.0301		0.0523	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Lead-210	-0.690	U	1.52	1.52		2.55	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Lead-212	0.241		0.0652	0.0722		0.0785	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Lead-214	0.372		0.0803	0.0891		0.0977	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Potassium-40	11.2		1.32	1.75		0.579	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Protactinium-231	0.346	U	1.27	1.28		3.70	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Radium-226	0.254		0.0843	0.0884	0.500	0.0939	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Radium-228	0.421		0.126	0.133		0.0690	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Thallium-208	0.131		0.0363	0.0388		0.0185	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Thorium-228	0.241		0.0652	0.0722		0.0785	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Thorium-232	0.421		0.126	0.133		0.0690	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Thorium-234	0.000	U	0.680	0.680		2.14	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Uranium-235	0.000	U	0.155	0.155		0.682	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Uranium-238	0.000	U	0.680	0.680		2.14	pCi/g	04/28/16 09:26	05/19/16 10:13	1

Client Sample ID: TITO04_NP-R-FSSSU4-S424

Lab Sample ID: 160-17136-4

Date Collected: 04/25/16 14:45

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.374		0.145	0.150		0.114	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Actinium-227	-0.283	U	0.766	0.767		1.29	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Bismuth-212	-0.210	U	0.625	0.625		1.08	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Bismuth-214	0.238		0.0867	0.0901		0.0903	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Cesium-137	0.0181	U	0.0397	0.0398		0.0685	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Lead-210	1.24	U	1.04	1.05		1.42	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Lead-212	0.286		0.0732	0.0820		0.0876	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Lead-214	0.367		0.0997	0.107		0.124	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Potassium-40	9.92		1.27	1.63		0.517	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Protactinium-231	-0.712	U	2.34	2.34		3.94	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Radium-226	0.238		0.0867	0.0901	0.500	0.0903	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Radium-228	0.374		0.145	0.150		0.114	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Thallium-208	0.132		0.0408	0.0430		0.0354	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Thorium-228	0.286		0.0732	0.0820		0.0876	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Thorium-232	0.374		0.145	0.150		0.114	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Thorium-234	1.07	U	1.09	1.09		1.35	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Uranium-235	0.143	U	0.271	0.271		0.460	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Uranium-238	1.07	U	1.09	1.09		1.35	pCi/g	04/28/16 09:26	05/19/16 10:14	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S425

Lab Sample ID: 160-17136-5

Date Collected: 04/25/16 14:48

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.327		0.154	0.157		0.147	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Actinium-227	0.170	U	0.442	0.442		0.748	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Bismuth-212	-0.177	U	0.554	0.554		0.955	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Bismuth-214	0.330		0.0840	0.0907		0.0679	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Cesium-137	0.0165	U	0.0269	0.0270		0.0456	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Lead-210	-0.0351	U	0.651	0.651		1.78	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Lead-212	0.295		0.0537	0.0659		0.0420	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Lead-214	0.327		0.0734	0.0809		0.0561	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Potassium-40	9.59		1.12	1.49		0.404	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Protactinium-231	0.265	U	0.941	0.942		3.02	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Radium-226	0.330		0.0840	0.0907	0.500	0.0679	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Radium-228	0.327		0.154	0.157		0.147	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Thallium-208	0.108		0.0320	0.0339		0.0257	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Thorium-228	0.295		0.0537	0.0659		0.0420	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Thorium-232	0.327		0.154	0.157		0.147	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Thorium-234	0.289	U	0.614	0.615		1.50	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Uranium-235	0.0671	U	0.160	0.160		0.633	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Uranium-238	0.289	U	0.614	0.615		1.50	pCi/g	04/28/16 09:26	05/19/16 10:45	1

Client Sample ID: TITO04_NP-R-FSSSU4-S426

Lab Sample ID: 160-17136-6

Date Collected: 04/25/16 14:51

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.393		0.143	0.148		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Actinium-227	0.186	U	0.432	0.433		0.626	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Bismuth-212	-0.330	U	0.748	0.749		1.28	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Bismuth-214	0.271		0.0947	0.0989		0.0918	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Cesium-137	-0.0424	U	0.0733	0.0734		0.123	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Lead-210	0.295	U	1.05	1.05		1.57	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Lead-212	0.303		0.0741	0.0838		0.0824	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Lead-214	0.432		0.104	0.113		0.0888	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Potassium-40	11.9		1.55	1.97		0.583	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Protactinium-231	0.000	U	0.679	0.679		2.95	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Radium-226	0.271		0.0947	0.0989	0.500	0.0918	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Radium-228	0.393		0.143	0.148		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Thallium-208	0.102		0.0460	0.0472		0.0422	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Thorium-228	0.303		0.0741	0.0838		0.0824	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Thorium-232	0.393		0.143	0.148		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Thorium-234	-0.0797	U	0.964	0.964		1.66	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Uranium-235	-0.0214	U	0.287	0.287		0.552	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Uranium-238	-0.0797	U	0.964	0.964		1.66	pCi/g	04/28/16 09:26	05/19/16 10:16	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S427

Lab Sample ID: 160-17136-7

Date Collected: 04/25/16 14:53

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.101	U	0.208	0.208		0.382	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Actinium-227	0.332	U	0.341	0.343		1.18	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Bismuth-212	0.0155	U	0.657	0.657		1.20	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Bismuth-214	0.383		0.142	0.147		0.134	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Cesium-137	-0.00923	U	0.0751	0.0751		0.133	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Lead-210	-0.221	U	1.50	1.50		2.60	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Lead-212	0.250		0.0811	0.0873		0.100	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Lead-214	0.392		0.108	0.115		0.139	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Potassium-40	11.0		1.63	1.99		0.445	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Protactinium-231	-0.922	U	2.97	2.97		4.99	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Radium-226	0.383		0.142	0.147	0.500	0.134	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Radium-228	0.101	U	0.208	0.208		0.382	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Thallium-208	0.105		0.0897	0.0904		0.0915	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Thorium-228	0.250		0.0811	0.0873		0.100	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Thorium-232	0.101	U	0.208	0.208		0.382	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Thorium-234	-0.539	U	1.20	1.20		2.90	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Uranium-235	0.0958	U	0.186	0.186		0.835	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Uranium-238	-0.539	U	1.20	1.20		2.90	pCi/g	04/28/16 09:26	05/19/16 10:17	1

Client Sample ID: TITO04_NP-R-FSSSU4-S428

Lab Sample ID: 160-17136-8

Date Collected: 04/25/16 14:59

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.234		0.0997	0.103		0.0782	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Actinium-227	-0.0595	U	0.0975	0.0978		1.39	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Bismuth-212	0.000	U	0.525	0.525		1.25	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Bismuth-214	0.397		0.106	0.113		0.0928	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Cesium-137	-0.00249	U	0.0661	0.0661		0.117	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Lead-210	1.68	U	1.37	1.38		1.78	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Lead-212	0.265		0.0750	0.0825		0.0917	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Lead-214	0.332		0.0905	0.0968		0.0852	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Potassium-40	10.1		1.35	1.70		0.728	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Protactinium-231	0.638	U	1.42	1.42		3.25	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Radium-226	0.397		0.106	0.113	0.500	0.0928	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Radium-228	0.234		0.0997	0.103		0.0782	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Thallium-208	0.105		0.0687	0.0695		0.0724	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Thorium-228	0.265		0.0750	0.0825		0.0917	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Thorium-232	0.234		0.0997	0.103		0.0782	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Thorium-234	0.736	U	0.759	0.763		1.22	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Uranium-235	0.121	U	0.260	0.260		0.777	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Uranium-238	0.736	U	0.759	0.763		1.22	pCi/g	04/28/16 09:26	05/19/16 10:19	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S429

Lab Sample ID: 160-17136-9

Date Collected: 04/25/16 14:55

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.260		0.204	0.206		0.245	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Actinium-227	0.206	U	0.518	0.519		0.877	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Bismuth-212	-0.356	U	0.676	0.677		1.46	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Bismuth-214	0.271		0.0927	0.0969		0.0812	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Cesium-137	-0.0384	U	0.0759	0.0760		0.101	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Lead-210	-0.145	U	1.17	1.17		2.02	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Lead-212	0.265		0.0619	0.0707		0.0639	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Lead-214	0.257		0.0661	0.0712		0.0913	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Potassium-40	11.0		1.49	1.87		0.605	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Protactinium-231	0.000	U	0.218	0.218		2.81	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Radium-226	0.271		0.0927	0.0969	0.500	0.0812	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Radium-228	0.260		0.204	0.206		0.245	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Thallium-208	0.0827		0.0419	0.0427		0.0825	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Thorium-228	0.265		0.0619	0.0707		0.0639	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Thorium-232	0.260		0.204	0.206		0.245	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Thorium-234	0.340	U	0.314	0.316		0.915	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Uranium-235	0.0967	U	0.205	0.205		0.348	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Uranium-238	0.340	U	0.314	0.316		0.915	pCi/g	04/28/16 09:26	05/19/16 19:26	1

Client Sample ID: TITO04_NP-R-FSSSU4-S430

Lab Sample ID: 160-17136-10

Date Collected: 04/25/16 14:57

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.481		0.188	0.195		0.319	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Actinium-227	-0.263	U	0.823	0.824		1.39	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Bismuth-212	0.297	U	0.604	0.604		1.04	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Bismuth-214	0.365		0.124	0.130		0.120	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Cesium-137	0.0161	U	0.0795	0.0795		0.138	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Lead-210	-0.803	U	1.60	1.60		2.67	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Lead-212	0.321		0.0766	0.0871		0.0778	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Lead-214	0.397		0.104	0.112		0.0801	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Potassium-40	10.4		1.57	1.90		0.692	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Protactinium-231	0.000	U	0.280	0.280		4.57	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Radium-226	0.365		0.124	0.130	0.500	0.120	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Radium-228	0.481		0.188	0.195		0.319	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Thallium-208	0.123		0.0448	0.0466		0.0399	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Thorium-228	0.321		0.0766	0.0871		0.0778	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Thorium-232	0.481		0.188	0.195		0.319	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Thorium-234	1.14	U	1.13	1.14		1.45	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Uranium-235	0.157	U	0.343	0.343		0.877	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Uranium-238	1.14	U	1.13	1.14		1.45	pCi/g	04/28/16 09:26	05/19/16 19:25	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S431

Lab Sample ID: 160-17136-11

Date Collected: 04/25/16 14:50

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.395		0.190	0.195		0.370	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Actinium-227	-0.0166	U	0.0540	0.0541		0.937	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Bismuth-212	-0.0258	U	0.782	0.782		1.42	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Bismuth-214	0.402		0.144	0.150		0.135	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Cesium-137	0.0253	U	0.0451	0.0452		0.0751	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Lead-210	0.796	U	0.894	0.899		1.35	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Lead-212	0.371		0.0880	0.100		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Lead-214	0.346		0.106	0.112		0.142	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Potassium-40	10.0		1.65	1.95		0.708	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Protactinium-231	0.000	U	0.713	0.713		3.40	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Radium-226	0.402		0.144	0.150	0.500	0.135	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Radium-228	0.395		0.190	0.195		0.370	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Thallium-208	0.0997		0.102	0.103		0.0932	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Thorium-228	0.371		0.0880	0.100		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Thorium-232	0.395		0.190	0.195		0.370	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Thorium-234	-0.886	U	0.777	0.783		1.84	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Uranium-235	0.0362	U	0.179	0.179		0.520	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Uranium-238	-0.886	U	0.777	0.783		1.84	pCi/g	04/28/16 09:26	05/19/16 10:29	1

Client Sample ID: TITO04_NP-R-FSSSU4-S432

Lab Sample ID: 160-17136-12

Date Collected: 04/25/16 15:01

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.389		0.117	0.123		0.186	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Actinium-227	0.0939	U	0.439	0.439		1.09	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Bismuth-212	0.310	U	0.576	0.577		0.979	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Bismuth-214	0.349		0.0928	0.0997		0.0770	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Cesium-137	-0.0130	U	0.0551	0.0551		0.119	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Lead-210	-0.508	U	1.33	1.33		2.33	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Lead-212	0.250		0.0748	0.0815		0.0942	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Lead-214	0.365		0.0945	0.102		0.122	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Potassium-40	11.3		1.43	1.84		0.740	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Protactinium-231	0.262	U	1.01	1.01		3.28	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Radium-226	0.349		0.0928	0.0997	0.500	0.0770	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Radium-228	0.389		0.117	0.123		0.186	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Thallium-208	0.118		0.0500	0.0515		0.0499	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Thorium-228	0.250		0.0748	0.0815		0.0942	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Thorium-232	0.389		0.117	0.123		0.186	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Thorium-234	-0.0808	U	1.06	1.06		1.82	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Uranium-235	0.111	U	0.264	0.264		0.452	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Uranium-238	-0.0808	U	1.06	1.06		1.82	pCi/g	04/28/16 09:26	05/19/16 10:27	1

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QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-248507/1-A

Matrix: Solid

Analysis Batch: 252063

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 248507

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0000	U	0.0385	0.0385		0.142	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Actinium-227	-0.1510	U	0.682	0.683		1.18	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Bismuth-212	0.1384	U	0.690	0.690		1.26	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Bismuth-214	-0.02374	U	0.148	0.148		0.271	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Cesium-137	-0.02617	U	0.0768	0.0768		0.145	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Lead-210	0.5632	U	1.14	1.14		1.94	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Lead-212	-0.007974	U	0.0752	0.0752		0.136	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Lead-214	-0.03351	U	0.110	0.110		0.194	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Potassium-40	-0.1917	U	0.910	0.910		1.34	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Protactinium-231	0.0000	U	0.497	0.497		3.49	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Radium-226	-0.02374	U	0.148	0.148	0.500	0.271	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Radium-228	0.0000	U	0.0385	0.0385		0.142	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Thallium-208	-0.04114	U	0.0638	0.0640		0.0998	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Thorium-228	-0.007974	U	0.0752	0.0752		0.136	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Thorium-232	0.0000	U	0.0385	0.0385		0.142	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Thorium-234	0.2838	U	0.516	0.516		1.28	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Uranium-235	-0.01397	U	0.277	0.277		0.490	pCi/g	04/28/16 09:26	05/19/16 09:19	1
Uranium-238	0.2838	U	0.516	0.516		1.28	pCi/g	04/28/16 09:26	05/19/16 09:19	1

Lab Sample ID: LCS 160-248507/2-A

Matrix: Solid

Analysis Batch: 252065

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 248507

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	95.35		10.0		1.07	pCi/g	98	87 - 116
Cesium-137	29.7	28.20		3.00		0.269	pCi/g	95	87 - 120
Cobalt-60	17.3	16.10		1.67		0.104	pCi/g	93	87 - 115

Lab Sample ID: 160-17136-1 DU

Matrix: Solid

Analysis Batch: 252059

Client Sample ID: TITO04_NP-R-FSSSU4-S421

Prep Type: Total/NA

Prep Batch: 248507

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.356		0.2826		0.154		0.193	pCi/g	0.25	1
Actinium-227	-0.0295	U	0.1697	U	0.367		0.885	pCi/g	0.47	1
Bismuth-212	0.000	U	0.4094	U	0.737		1.24	pCi/g	0.33	1
Bismuth-214	0.251		0.3015		0.105		0.0944	pCi/g	0.23	1
Cesium-137	0.0533	U	-0.01693	U	0.0445		0.0768	pCi/g	0.72	1
Lead-210	1.03	U	0.4187	U	1.25		2.11	pCi/g	0.24	1
Lead-212	0.319		0.2750		0.0701		0.0587	pCi/g	0.27	1
Lead-214	0.292		0.3643		0.0891		0.0821	pCi/g	0.35	1
Potassium-40	9.26		9.782		1.59		0.574	pCi/g	0.15	1
Protactinium-231	0.416	U	0.0000	U	0.334		3.46	pCi/g	0.24	1
Radium-226	0.251		0.3015		0.105	0.500	0.0944	pCi/g	0.23	1
Radium-228	0.356		0.2826		0.154		0.193	pCi/g	0.25	1

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QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-17136-1 DU

Matrix: Solid

Analysis Batch: 252059

Client Sample ID: TITO04_NP-R-FSSSU4-S421

Prep Type: Total/NA

Prep Batch: 248507

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.117		0.1238		0.0523		0.0441	pCi/g	0.06	1
Thorium-228	0.319		0.2750		0.0701		0.0587	pCi/g	0.27	1
Thorium-232	0.356		0.2826		0.154		0.193	pCi/g	0.25	1
Thorium-234	-0.616	U	0.0000	U	0.416		2.06	pCi/g	0.39	1
Uranium-235	0.0940	U	0.0000	U	0.171		0.720	pCi/g	0.20	1
Uranium-238	-0.616	U	0.0000	U	0.416		2.06	pCi/g	0.39	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Rad

Leach Batch: 248122

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17136-1	TITO04_NP-R-FSSSU4-S421	Total/NA	Solid	Dry and Grind	
160-17136-1 DU	TITO04_NP-R-FSSSU4-S421	Total/NA	Solid	Dry and Grind	
160-17136-2	TITO04_NP-R-FSSSU4-S422	Total/NA	Solid	Dry and Grind	
160-17136-3	TITO04_NP-R-FSSSU4-S423	Total/NA	Solid	Dry and Grind	
160-17136-4	TITO04_NP-R-FSSSU4-S424	Total/NA	Solid	Dry and Grind	
160-17136-5	TITO04_NP-R-FSSSU4-S425	Total/NA	Solid	Dry and Grind	
160-17136-6	TITO04_NP-R-FSSSU4-S426	Total/NA	Solid	Dry and Grind	
160-17136-7	TITO04_NP-R-FSSSU4-S427	Total/NA	Solid	Dry and Grind	
160-17136-8	TITO04_NP-R-FSSSU4-S428	Total/NA	Solid	Dry and Grind	
160-17136-9	TITO04_NP-R-FSSSU4-S429	Total/NA	Solid	Dry and Grind	
160-17136-10	TITO04_NP-R-FSSSU4-S430	Total/NA	Solid	Dry and Grind	
160-17136-11	TITO04_NP-R-FSSSU4-S431	Total/NA	Solid	Dry and Grind	
160-17136-12	TITO04_NP-R-FSSSU4-S432	Total/NA	Solid	Dry and Grind	

Prep Batch: 248507

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17136-1	TITO04_NP-R-FSSSU4-S421	Total/NA	Solid	Fill_Geo-21	248122
160-17136-1 DU	TITO04_NP-R-FSSSU4-S421	Total/NA	Solid	Fill_Geo-21	248122
160-17136-2	TITO04_NP-R-FSSSU4-S422	Total/NA	Solid	Fill_Geo-21	248122
160-17136-3	TITO04_NP-R-FSSSU4-S423	Total/NA	Solid	Fill_Geo-21	248122
160-17136-4	TITO04_NP-R-FSSSU4-S424	Total/NA	Solid	Fill_Geo-21	248122
160-17136-5	TITO04_NP-R-FSSSU4-S425	Total/NA	Solid	Fill_Geo-21	248122
160-17136-6	TITO04_NP-R-FSSSU4-S426	Total/NA	Solid	Fill_Geo-21	248122
160-17136-7	TITO04_NP-R-FSSSU4-S427	Total/NA	Solid	Fill_Geo-21	248122
160-17136-8	TITO04_NP-R-FSSSU4-S428	Total/NA	Solid	Fill_Geo-21	248122
160-17136-9	TITO04_NP-R-FSSSU4-S429	Total/NA	Solid	Fill_Geo-21	248122
160-17136-10	TITO04_NP-R-FSSSU4-S430	Total/NA	Solid	Fill_Geo-21	248122
160-17136-11	TITO04_NP-R-FSSSU4-S431	Total/NA	Solid	Fill_Geo-21	248122
160-17136-12	TITO04_NP-R-FSSSU4-S432	Total/NA	Solid	Fill_Geo-21	248122
LCS 160-248507/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-248507/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-16804-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn

Micha Korinhizer

Authorized for release by:

5/2/2016 3:22:09 PM

Micha Korinhizer, Project Management Assistant I
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Designee for

Erika Gish, Project Manager II
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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Job ID: 160-16804-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-16804-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Job ID: 160-16804-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 04/06/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 19.3° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-NP-R-FSSSU4-S401 (160-16804-1), TI-TO04-NP-R-FSSSU4-S402 (160-16804-2), TI-TO04-NP-R-FSSSU4-S403 (160-16804-3), TI-TO04-NP-R-FSSSU4-S404 (160-16804-4), TI-TO04-NP-R-FSSSU4-S405 (160-16804-5), TI-TO04-NP-R-FSSSU4-S406 (160-16804-6), TI-TO04-NP-R-FSSSU4-S407 (160-16804-7), TI-TO04-NP-R-FSSSU4-S408 (160-16804-8), TI-TO04-NP-R-FSSSU4-S409 (160-16804-9), TI-TO04-NP-R-FSSSU4-S410 (160-16804-10), TI-TO04-NP-R-FSSSU4-S411 (160-16804-11), TI-TO04-NP-R-FSSSU4-S412 (160-16804-12), TI-TO04-NP-R-FSSSU4-S413 (160-16804-13), TI-TO04-NP-R-FSSSU4-S414 (160-16804-14), TI-TO04-NP-R-FSSSU4-S415 (160-16804-15), TI-TO04-NP-R-FSSSU4-S416 (160-16804-16), TI-TO04-NP-R-FSSSU4-S417 (160-16804-17), TI-TO04-NP-R-FSSSU4-S418 (160-16804-18), TI-TO04-NP-R-FSSSU4-S419 (160-16804-19) and TI-TO04-NP-R-FSSSU4-S420 (160-16804-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 04/06/2016, prepared on 04/07/2016 and analyzed on 04/28/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Staw Environmental and Infrastructure Inc. (a C&I company)
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

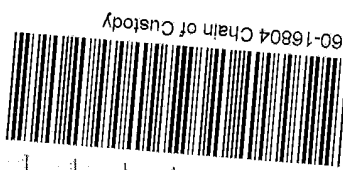
Rel. Document # TL P3 NP FSS SU4 210
Page 1 of 2

Project Number: 500060
Project Name / Location: CTO-04 Phase III NP FSS
SU4 RSY10 U5 Part I
Purchase Order #: 261455

Project Manager: Ulrika Messer
(Name & phone)
Send Report To: Patricia Flynn
Phone/Fax Number: 925-288-2037
Address: 4005 Port Chicago Hwy
City: Concord, CA 94520

Shipment Date: 4/5/2016
Waybill Number: 12 50074201 9735 9141
Lab Destination: Earth Toxics Inc To Test America
Lab Contact Name / ph. #: Mike Dryden

Sample ID Number	Sample Description	Sampler's Name(s)	Collection Information			# of containers	Preservative (water)		Container Type	Preservative (soil)	N/A	Dose Rate (Mg/L)
			Date	Time	Method		Preservative	Container				
TL-T004-NP-R-FSSSU4-S401	North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic	TW	04/04/16	1215	G	SO 1			10 oz Plastic			5
TL-T004-NP-R-FSSSU4-S402	North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic		04/04/16	1210	G	SO 1			15 oz Plastic			5
TL-T004-NP-R-FSSSU4-S403	North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic		04/04/16	1222	G	SO 1			15 oz Plastic			5
TL-T004-NP-R-FSSSU4-S404	North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic		04/04/16	1225	G	SO 1			15 oz Plastic			5
TL-T004-NP-R-FSSSU4-S405	North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic		04/04/16	1229	G	SO 1			15 oz Plastic			5
TL-T004-NP-R-FSSSU4-S406	North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic		04/04/16	1232	G	SO 1			15 oz Plastic			5
TL-T004-NP-R-FSSSU4-S407	North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic		04/04/16	1234	G	SO 1			15 oz Plastic			5
TL-T004-NP-R-FSSSU4-S408	North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic		04/04/16	1237	G	SO 1			15 oz Plastic			5
TL-T004-NP-R-FSSSU4-S409	North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic		04/04/16	1240	G	SO 1			15 oz Plastic			5
TL-T004-NP-R-FSSSU4-S410	North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic		04/04/16	1244	G	SO 1			15 oz Plastic			5



Special Instructions: 7 days ingrown draft and follow with 21 days final

Level OIQC Required:

☐ 24-hr ☒ 3-day ☐ 7-day

Standard YATF ☐

Relinquished By: Bryan Rogers
Relinquished By: Bryan Rogers

Date: 4/5/2016
Time: 12:50

Date: 04/06/16
Time: 08:55

Date: 04/06/16
Time: 08:55

Method Codes

G = Grab

Matrix Codes

SO = Soil
DW = Drinking Water
GW = Ground Water
WW = Waste Water
A = Air

SO = Soil
DW = Drinking Water
GW = Ground Water
WW = Waste Water
A = Air



Shaw Environmental and Infrastructure Inc. (a CB&I company)

Federal Services Division

14005 Port Chicago Hwy

Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TLPD NP FSS SU4 210

Page 2 of 2

Project Number: 500060
C10-04 Phase III NP FSS
Project Name / Location: SU4 RSY10 US Part1
Purchase Order #: 201455

Shipment Date: 4/5/2016
Waybill Number: 1294V 46101 9145 9141
Lab Destination: Earth Toxics Inc To Test America
Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer
(Name & phone #)
Send Report To: Patricia Flynn
Phone/Fax Number: 925-288-2037
Address: 4005 Port Chicago Hwy
Concord, CA 94520

Sample ID Number	Sampler's Name(s)	TW	Collection Information		Matrix	# of Containers	Preservative (water)		Gamma Scan	Analyse Requested					Dose Rate μ R/hr
			Date	Time			Preservative (soil)	Container Type							
TL-T004-NP-R-FSSSU4-S411		North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic	04/04/16	1247	G	SO	1	16 oz Plastic	X						5
TL-T004-NP-R-FSSSU4-S412		North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic	04/04/16	1300	G	SO	1	16 oz Plastic	X						5
TL-T004-NP-R-FSSSU4-S413		North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic	04/04/16	1305	G	SO	1	16 oz Plastic	X						5
TL-T004-NP-R-FSSSU4-S414		North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic	04/04/16	1307	G	SO	1	16 oz Plastic	X						5
TL-T004-NP-R-FSSSU4-S415		North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic	04/04/16	1309	G	SO	1	16 oz Plastic	X						5
TL-T004-NP-R-FSSSU4-S416		North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic	04/04/16	1314	G	SO	1	16 oz Plastic	X						5
TL-T004-NP-R-FSSSU4-S417		North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic	04/04/16	1318	G	SO	1	16 oz Plastic	X						5
TL-T004-NP-R-FSSSU4-S418		North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic	04/04/16	1322	G	SO	1	16 oz Plastic	X						5
TL-T004-NP-R-FSSSU4-S419		North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic	04/04/16	1325	G	SO	1	16 oz Plastic	X						5
TL-T004-NP-R-FSSSU4-S420		North Point RSY 10 USE 5 Part 1 FSS SU4 Systematic	04/04/16	1328	G	SO	1	16 oz Plastic	X						5

Special Instructions: 7 days ingrown draft and follow with 21 days final

Level Of QC Required: ☐ 24 hr ☐ 3-day ☐ 7-day

Standard TAT ☐

Requisitioned By: Bryan Rogers Date: 4/5/2016 Time: 1230

Requisitioned By: [Signature] Date: 4/5/2016 Time: 1230

Received By: [Signature] Date: 4/5/2016 Time: 1230

Received By: [Signature] Date: 4/5/2016 Time: 1230

Method Codes: C = Composite G = Grab

Matrix Codes: SO = Soil DW = Drinking Water SL = Sludge GW = Ground Water WW = Wastewater OP = Chip Samples A = Air ABS = Asbestos PO = Pipe Opening

Form FRM-TI-03-3
Sample Shipment Checklist

Project Name <u>Treasure Island</u>	Project Number <u>500060</u>
Address <u>950 Avenue M Building 570</u>	Date <u>4-5-2016</u> Time <u>1230</u>
City, State, Zip <u>San Francisco, CA 94130</u>	
UPS Tracking No. <u>1Z89V46201 9425 9141</u>	

Sample Checklist	Yes	No	Comments
Sample lids are tight and custody seals in place?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are all sample numbers, dates, times, and other label information legible and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have all sample numbers, dates, times, and sampling data been logged into the sample log book?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Do sample numbers and sample descriptions on the labels match those on the COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have the COCs been filled out completely and correctly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Does the analytical specified on the COC match the analytical specified in the scope of work?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have the COCs been properly signed in the transfer section?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Packaging Checklist	Yes	No	Comments
Has each sample been placed into an individually plastic bag?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the drain plug of the cooler been taped closed with water proof tape from the inside?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>no drain plug</u>
Have all the samples been placed into the cooler in an upright position?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is there adequate spacing of samples so that they will not touch during shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the cooler been filled with additional cushioning material?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the COC been placed in a Ziploc® bag and taped to the inside of the lid of the cooler?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have custody seals been placed onto the lid?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the cooler been labeled "This Side Up"?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
If required, has the cooler been labeled with the DOT proper shipping name, UN number, and label?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>UN 2910</u>
Has the laboratory performing the analyses been notified of the shipment of samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Review Checklist	Yes	No	Comments
Has smear data been verified?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has survey data been reviewed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Problems/Resolutions:

Prepared by: N. Morrison

Reviewed by: Takesh Imai

Survey #:

CoC #: TI-P3-NP-FSS-Sub-210 — TIRS-04042016-12P3-FSS-2067
TI-P3-BS-FSS-Sub-211 — TIRS-04042016-12P3-FSS-2068

Revised as of 08/20/2015

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Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-16804-2

Login Number: 16804

List Source: TestAmerica St. Louis

List Number: 1

Creator: McKinney, Gerrod E

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-16804-1	TI-TO04-NP-R-FSSSU4-S401	Solid	04/04/16 12:15	04/06/16 08:35
160-16804-2	TI-TO04-NP-R-FSSSU4-S402	Solid	04/04/16 12:18	04/06/16 08:35
160-16804-3	TI-TO04-NP-R-FSSSU4-S403	Solid	04/04/16 12:22	04/06/16 08:35
160-16804-4	TI-TO04-NP-R-FSSSU4-S404	Solid	04/04/16 12:25	04/06/16 08:35
160-16804-5	TI-TO04-NP-R-FSSSU4-S405	Solid	04/04/16 12:29	04/06/16 08:35
160-16804-6	TI-TO04-NP-R-FSSSU4-S406	Solid	04/04/16 12:32	04/06/16 08:35
160-16804-7	TI-TO04-NP-R-FSSSU4-S407	Solid	04/04/16 12:34	04/06/16 08:35
160-16804-8	TI-TO04-NP-R-FSSSU4-S408	Solid	04/04/16 12:37	04/06/16 08:35
160-16804-9	TI-TO04-NP-R-FSSSU4-S409	Solid	04/04/16 12:40	04/06/16 08:35
160-16804-10	TI-TO04-NP-R-FSSSU4-S410	Solid	04/04/16 12:44	04/06/16 08:35
160-16804-11	TI-TO04-NP-R-FSSSU4-S411	Solid	04/04/16 12:47	04/06/16 08:35
160-16804-12	TI-TO04-NP-R-FSSSU4-S412	Solid	04/04/16 13:00	04/06/16 08:35
160-16804-13	TI-TO04-NP-R-FSSSU4-S413	Solid	04/04/16 13:05	04/06/16 08:35
160-16804-14	TI-TO04-NP-R-FSSSU4-S414	Solid	04/04/16 13:07	04/06/16 08:35
160-16804-15	TI-TO04-NP-R-FSSSU4-S415	Solid	04/04/16 13:09	04/06/16 08:35
160-16804-16	TI-TO04-NP-R-FSSSU4-S416	Solid	04/04/16 13:14	04/06/16 08:35
160-16804-17	TI-TO04-NP-R-FSSSU4-S417	Solid	04/04/16 13:18	04/06/16 08:35
160-16804-18	TI-TO04-NP-R-FSSSU4-S418	Solid	04/04/16 13:22	04/06/16 08:35
160-16804-19	TI-TO04-NP-R-FSSSU4-S419	Solid	04/04/16 13:25	04/06/16 08:35
160-16804-20	TI-TO04-NP-R-FSSSU4-S420	Solid	04/04/16 13:28	04/06/16 08:35

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S401

Lab Sample ID: 160-16804-1

Date Collected: 04/04/16 12:15

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.182	U	0.126	0.127		0.330	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Actinium-227	0.287	U	0.393	0.394		0.652	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Bismuth-212	0.000	U	0.585	0.585		1.16	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Bismuth-214	0.324		0.129	0.134		0.140	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Cesium-137	-0.00693	U	0.0994	0.0994		0.106	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Lead-210	0.792	U	0.996	1.00		1.78	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Lead-212	0.369		0.114	0.123		0.119	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Lead-214	0.274		0.102	0.105		0.128	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Potassium-40	8.58		1.71	1.92		1.35	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Protactinium-231	0.0694	U	0.707	0.707		2.05	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Radium-226	0.324		0.129	0.134	0.500	0.140	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Radium-228	0.182	U	0.126	0.127		0.330	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Thallium-208	0.129		0.0470	0.0489		0.0314	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Thorium-228	0.369		0.114	0.123		0.119	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Thorium-232	0.182	U	0.126	0.127		0.330	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Thorium-234	0.0609	U	0.447	0.447		1.47	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Uranium-235	0.150	U	0.228	0.228		0.349	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Uranium-238	0.0609	U	0.447	0.447		1.47	pCi/g	04/07/16 12:21	04/28/16 16:01	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S402

Lab Sample ID: 160-16804-2

Date Collected: 04/04/16 12:18

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.198	U	0.143	0.144		0.252	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Actinium-227	0.0979	U	0.179	0.180		0.611	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Bismuth-212	0.386	U	0.419	0.421		0.668	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Bismuth-214	0.337		0.0850	0.0920		0.0380	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Cesium-137	-0.0103	U	0.0425	0.0425		0.0757	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Lead-210	0.582	U	0.910	0.913		1.59	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Lead-212	0.297		0.0886	0.0966		0.0917	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Lead-214	0.355		0.0778	0.0861		0.0839	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Potassium-40	9.67		1.39	1.70		0.491	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Protactinium-231	0.332	U	0.260	0.263		1.40	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Radium-226	0.337		0.0850	0.0920	0.500	0.0380	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Radium-228	0.198	U	0.143	0.144		0.252	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Thallium-208	0.125		0.0477	0.0494		0.0407	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Thorium-228	0.297		0.0886	0.0966		0.0917	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Thorium-232	0.198	U	0.143	0.144		0.252	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Thorium-234	0.590	U	0.651	0.654		1.13	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Uranium-235	0.00250	U	0.151	0.151		0.271	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Uranium-238	0.590	U	0.651	0.654		1.13	pCi/g	04/07/16 12:21	04/28/16 15:59	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S403

Lab Sample ID: 160-16804-3

Date Collected: 04/04/16 12:22

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.287		0.126	0.129		0.241	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Actinium-227	0.0381	U	0.469	0.469		0.824	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Bismuth-212	0.222	U	0.499	0.500		0.875	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Bismuth-214	0.326		0.128	0.133		0.148	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Cesium-137	-0.00587	U	0.0721	0.0721		0.0821	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Lead-210	0.000	U	0.714	0.714		1.76	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Lead-212	0.408		0.103	0.116		0.0976	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Lead-214	0.334		0.0956	0.102		0.0712	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Potassium-40	11.9		1.65	2.05		0.566	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Protactinium-231	-0.166	U	0.865	0.865		1.54	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Radium-226	0.326		0.128	0.133	0.500	0.148	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Radium-228	0.287		0.126	0.129		0.241	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Thallium-208	0.128		0.0495	0.0512		0.0475	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Thorium-228	0.408		0.103	0.116		0.0976	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Thorium-232	0.287		0.126	0.129		0.241	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Thorium-234	0.219	U	0.471	0.472		1.73	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Uranium-235	0.186	U	0.184	0.185		0.258	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Uranium-238	0.219	U	0.471	0.472		1.73	pCi/g	04/07/16 12:21	04/28/16 15:57	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S404

Lab Sample ID: 160-16804-4

Date Collected: 04/04/16 12:25

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.165	U	0.0998	0.101		0.195	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Actinium-227	0.000	U	0.289	0.289		0.716	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Bismuth-212	0.350	U	0.361	0.362		0.572	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Bismuth-214	0.284		0.0882	0.0930		0.0632	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Cesium-137	0.00492	U	0.0219	0.0219		0.0408	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Lead-210	0.783	U	0.618	0.625		0.958	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Lead-212	0.317		0.0687	0.0800		0.0661	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Lead-214	0.465		0.110	0.120		0.0809	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Potassium-40	10.6		1.23	1.64		0.417	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Protactinium-231	0.195	U	0.518	0.519		1.45	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Radium-226	0.284		0.0882	0.0930	0.500	0.0632	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Radium-228	0.165	U	0.0998	0.101		0.195	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Thallium-208	0.110		0.0377	0.0394		0.0314	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Thorium-228	0.317		0.0687	0.0800		0.0661	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Thorium-232	0.165	U	0.0998	0.101		0.195	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Thorium-234	0.448	U	0.650	0.651		1.08	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Uranium-235	0.0848	U	0.137	0.138		0.193	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Uranium-238	0.448	U	0.650	0.651		1.08	pCi/g	04/07/16 12:21	04/28/16 16:06	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S405

Lab Sample ID: 160-16804-5

Date Collected: 04/04/16 12:29

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.346		0.123	0.128		0.205	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Actinium-227	-0.172	U	0.427	0.427		0.728	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Bismuth-212	0.000	U	0.434	0.434		1.07	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Bismuth-214	0.350		0.104	0.110		0.0851	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Cesium-137	-0.00952	U	0.0396	0.0396		0.0712	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Lead-210	-0.0320	U	0.961	0.961		1.67	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Lead-212	0.298		0.0952	0.103		0.109	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Lead-214	0.349		0.0928	0.0997		0.0858	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Potassium-40	10.9		1.46	1.84		0.559	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Protactinium-231	0.0249	U	0.692	0.692		1.27	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Radium-226	0.350		0.104	0.110	0.500	0.0851	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Radium-228	0.346		0.123	0.128		0.205	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Thallium-208	0.155		0.0493	0.0519		0.0465	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Thorium-228	0.298		0.0952	0.103		0.109	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Thorium-232	0.346		0.123	0.128		0.205	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Thorium-234	0.131	U	0.291	0.292		1.39	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Uranium-235	0.127	U	0.169	0.170		0.304	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Uranium-238	0.131	U	0.291	0.292		1.39	pCi/g	04/07/16 12:21	04/28/16 15:55	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S406

Lab Sample ID: 160-16804-6

Date Collected: 04/04/16 12:32

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.303		0.111	0.115		0.105	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Actinium-227	0.0171	U	0.104	0.104		0.749	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Bismuth-212	0.550	U	0.466	0.470		0.714	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Bismuth-214	0.337		0.109	0.115		0.114	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Cesium-137	0.000	U	0.00792	0.00792		0.0845	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Lead-210	0.718	U	0.950	0.954		1.60	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Lead-212	0.287		0.0903	0.0976		0.0996	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Lead-214	0.353		0.0947	0.102		0.120	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Potassium-40	11.3		1.37	1.80		0.507	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Protactinium-231	0.438	U	0.299	0.303		1.47	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Radium-226	0.337		0.109	0.115	0.500	0.114	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Radium-228	0.303		0.111	0.115		0.105	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Thallium-208	0.0932		0.0487	0.0497		0.0721	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Thorium-228	0.287		0.0903	0.0976		0.0996	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Thorium-232	0.303		0.111	0.115		0.105	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Thorium-234	0.946	U	0.417	0.429		1.35	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Uranium-235	0.125	U	0.161	0.162		0.289	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Uranium-238	0.946	U	0.417	0.429		1.35	pCi/g	04/07/16 12:21	04/28/16 15:56	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S407

Lab Sample ID: 160-16804-7

Date Collected: 04/04/16 12:34

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.265		0.135	0.138		0.206	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Actinium-227	-0.223	U	0.464	0.465		0.784	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Bismuth-212	0.194	U	0.416	0.417		0.725	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Bismuth-214	0.429		0.118	0.126		0.113	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Cesium-137	-0.00645	U	0.0385	0.0385		0.0696	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Lead-210	1.15	U	0.937	0.947		1.54	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Lead-212	0.406		0.0850	0.0999		0.0877	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Lead-214	0.458		0.102	0.113		0.133	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Potassium-40	13.7		1.58	2.11		0.981	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Protactinium-231	0.561	U	0.928	0.930		1.56	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Radium-226	0.429		0.118	0.126	0.500	0.113	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Radium-228	0.265		0.135	0.138		0.206	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Thallium-208	0.0603	U	0.0473	0.0477		0.0755	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Thorium-228	0.406		0.0850	0.0999		0.0877	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Thorium-232	0.265		0.135	0.138		0.206	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Thorium-234	0.0967	U	0.381	0.381		1.62	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Uranium-235	0.245	U	0.182	0.184		0.307	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Uranium-238	0.0967	U	0.381	0.381		1.62	pCi/g	04/07/16 12:21	04/28/16 16:05	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S408

Lab Sample ID: 160-16804-8

Date Collected: 04/04/16 12:37

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.374		0.137	0.143		0.149	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Actinium-227	0.156	U	0.350	0.350		0.599	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Bismuth-212	0.244	U	0.424	0.425		0.724	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Bismuth-214	0.307		0.0922	0.0976		0.103	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Cesium-137	0.000336	U	0.0370	0.0370		0.0688	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Lead-210	0.593	U	1.02	1.02		1.56	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Lead-212	0.287		0.0891	0.0965		0.0993	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Lead-214	0.415		0.115	0.123		0.116	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Potassium-40	10.4		1.36	1.73		0.743	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Protactinium-231	0.247	U	0.438	0.439		1.41	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Radium-226	0.307		0.0922	0.0976	0.500	0.103	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Radium-228	0.374		0.137	0.143		0.149	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Thallium-208	0.137		0.0506	0.0526		0.0512	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Thorium-228	0.287		0.0891	0.0965		0.0993	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Thorium-232	0.374		0.137	0.143		0.149	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Thorium-234	0.432	U	0.362	0.364		1.25	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Uranium-235	0.115	U	0.168	0.168		0.295	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Uranium-238	0.432	U	0.362	0.364		1.25	pCi/g	04/07/16 12:21	04/28/16 16:34	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S409

Lab Sample ID: 160-16804-9

Date Collected: 04/04/16 12:40

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.485		0.156	0.164		0.186	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Actinium-227	0.158	U	0.267	0.268		0.695	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Bismuth-212	-0.0225	U	0.387	0.387		0.724	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Bismuth-214	0.279		0.119	0.122		0.145	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Cesium-137	-0.000412	U	0.0356	0.0356		0.0663	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-210	-0.281	U	1.81	1.81		1.71	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-212	0.334		0.0981	0.107		0.105	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-214	0.362		0.0897	0.0972		0.0966	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Potassium-40	7.37		1.17	1.39		0.865	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Protactinium-231	0.255	U	0.513	0.514		1.47	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Radium-226	0.279		0.119	0.122	0.500	0.145	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Radium-228	0.485		0.156	0.164		0.186	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thallium-208	0.199		0.0552	0.0590		0.0473	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-228	0.334		0.0981	0.107		0.105	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-232	0.485		0.156	0.164		0.186	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-234	0.144	U	0.196	0.197		1.37	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Uranium-235	0.133	U	0.176	0.177		0.276	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Uranium-238	0.144	U	0.196	0.197		1.37	pCi/g	04/07/16 12:21	04/28/16 18:36	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S410

Lab Sample ID: 160-16804-10

Date Collected: 04/04/16 12:44

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.159	U	0.117	0.118		0.236	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Actinium-227	0.0285	U	0.0639	0.0640		0.691	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Bismuth-212	0.382	U	0.383	0.385		0.604	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Bismuth-214	0.377		0.117	0.123		0.106	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Cesium-137	0.00813	U	0.0314	0.0314		0.0564	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-210	0.605	U	0.846	0.849		1.40	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-212	0.341		0.0840	0.0948		0.0790	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-214	0.381		0.0925	0.101		0.0722	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Potassium-40	11.3		1.38	1.80		0.758	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Protactinium-231	0.164	U	0.589	0.589		1.05	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Radium-226	0.377		0.117	0.123	0.500	0.106	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Radium-228	0.159	U	0.117	0.118		0.236	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thallium-208	0.0725		0.0495	0.0501		0.0664	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-228	0.341		0.0840	0.0948		0.0790	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-232	0.159	U	0.117	0.118		0.236	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-234	0.348	U	0.408	0.409		1.35	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Uranium-235	0.146	U	0.158	0.159		0.257	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Uranium-238	0.348	U	0.408	0.409		1.35	pCi/g	04/07/16 12:21	04/28/16 18:36	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S411

Lab Sample ID: 160-16804-11

Date Collected: 04/04/16 12:47

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.317		0.137	0.141		0.111	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Actinium-227	0.145	U	0.294	0.295		0.675	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Bismuth-212	0.0457	U	0.391	0.391		0.722	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Bismuth-214	0.397		0.100	0.108		0.0885	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Cesium-137	-0.0122	U	0.0369	0.0370		0.0652	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Lead-210	0.277	U	0.795	0.796		1.37	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Lead-212	0.306		0.0893	0.0976		0.0931	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Lead-214	0.447		0.0871	0.0987		0.0791	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Potassium-40	10.9		1.35	1.75		0.686	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Protactinium-231	0.384	U	0.410	0.413		1.40	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Radium-226	0.397		0.100	0.108	0.500	0.0885	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Radium-228	0.317		0.137	0.141		0.111	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Thallium-208	0.0505	U	0.0386	0.0389		0.0640	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Thorium-228	0.306		0.0893	0.0976		0.0931	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Thorium-232	0.317		0.137	0.141		0.111	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Thorium-234	0.365	U	0.709	0.710		1.20	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Uranium-235	-0.0205	U	0.165	0.165		0.290	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Uranium-238	0.365	U	0.709	0.710		1.20	pCi/g	04/07/16 12:21	04/28/16 16:32	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S412

Lab Sample ID: 160-16804-12

Date Collected: 04/04/16 13:00

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.252		0.125	0.127		0.220	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Actinium-227	-0.243	U	0.500	0.501		0.845	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Bismuth-212	0.140	U	0.405	0.405		0.721	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Bismuth-214	0.275		0.0934	0.0977		0.0911	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Cesium-137	0.0141	U	0.0357	0.0357		0.0628	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Lead-210	0.900	U	1.35	1.35		1.86	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Lead-212	0.330		0.102	0.111		0.109	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Lead-214	0.454		0.0971	0.108		0.122	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Potassium-40	10.5		1.41	1.77		0.695	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Protactinium-231	1.13		0.525	0.539		0.918	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Radium-226	0.275		0.0934	0.0977	0.500	0.0911	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Radium-228	0.252		0.125	0.127		0.220	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Thallium-208	0.0391	U	0.0379	0.0381		0.0650	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Thorium-228	0.330		0.102	0.111		0.109	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Thorium-232	0.252		0.125	0.127		0.220	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Thorium-234	0.217	U	0.145	0.146		1.61	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Uranium-235	0.0570	U	0.108	0.108		0.307	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Uranium-238	0.217	U	0.145	0.146		1.61	pCi/g	04/07/16 12:21	04/28/16 16:36	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S413

Lab Sample ID: 160-16804-13

Date Collected: 04/04/16 13:05

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.251		0.112	0.114		0.143	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Actinium-227	0.0317	U	0.135	0.135		0.623	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-212	0.769		0.296	0.306		0.210	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-214	0.351		0.0855	0.0930		0.0536	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Cesium-137	-0.00514	U	0.0320	0.0320		0.0578	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-210	0.198	U	0.787	0.787		1.36	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-212	0.254		0.0841	0.0903		0.0861	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-214	0.361		0.0787	0.0872		0.0533	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Potassium-40	9.76		1.22	1.58		0.563	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Protactinium-231	0.310	U	0.604	0.605		1.27	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-226	0.351		0.0855	0.0930	0.500	0.0536	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-228	0.251		0.112	0.114		0.143	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thallium-208	0.115		0.0450	0.0466		0.0365	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-228	0.254		0.0841	0.0903		0.0861	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-232	0.251		0.112	0.114		0.143	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-234	0.420	U	0.341	0.344		1.10	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-235	0.127	U	0.150	0.150		0.263	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-238	0.420	U	0.341	0.344		1.10	pCi/g	04/07/16 12:21	04/28/16 16:41	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S414

Lab Sample ID: 160-16804-14

Date Collected: 04/04/16 13:07

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.136	U	0.0963	0.0973		0.325	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Actinium-227	0.0287	U	0.132	0.132		0.876	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-212	0.250	U	0.499	0.500		0.863	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-214	0.305		0.115	0.120		0.123	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Cesium-137	-0.000589	U	0.0432	0.0432		0.0803	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-210	0.600	U	1.26	1.26		1.80	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-212	0.241		0.102	0.106		0.114	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-214	0.383		0.108	0.115		0.102	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Potassium-40	10.5		1.55	1.89		0.920	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Protactinium-231	0.0325	U	0.108	0.108		1.48	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-226	0.305		0.115	0.120	0.500	0.123	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-228	0.136	U	0.0963	0.0973		0.325	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thallium-208	0.126		0.0433	0.0452		0.0426	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-228	0.241		0.102	0.106		0.114	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-232	0.136	U	0.0963	0.0973		0.325	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-234	0.597	U	0.460	0.464		1.41	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-235	0.0855	U	0.171	0.171		0.283	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-238	0.597	U	0.460	0.464		1.41	pCi/g	04/07/16 12:21	04/28/16 16:41	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S415

Lab Sample ID: 160-16804-15

Date Collected: 04/04/16 13:09

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.471		0.169	0.176		0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Actinium-227	0.110	U	0.183	0.183		0.823	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-212	0.372	U	0.549	0.550		0.917	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-214	0.435		0.130	0.138		0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Cesium-137	0.00918	U	0.0405	0.0405		0.0726	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-210	-0.480	U	1.96	1.96		2.03	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-212	0.256		0.0752	0.0822		0.0923	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-214	0.360		0.109	0.115		0.126	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Potassium-40	10.1		1.40	1.74		0.881	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Protactinium-231	0.350	U	0.320	0.322		1.69	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-226	0.435		0.130	0.138	0.500	0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-228	0.471		0.169	0.176		0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thallium-208	0.0550	U	0.0604	0.0607		0.0840	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-228	0.256		0.0752	0.0822		0.0923	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-232	0.471		0.169	0.176		0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-234	0.973	U	1.22	1.23		1.60	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-235	0.160	U	0.180	0.180		0.329	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-238	0.973	U	1.22	1.23		1.60	pCi/g	04/07/16 12:21	04/28/16 16:41	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S416

Lab Sample ID: 160-16804-16

Date Collected: 04/04/16 13:14

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.345		0.109	0.114		0.0634	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Actinium-227	0.191	U	0.287	0.288		0.480	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Bismuth-212	0.152	U	0.306	0.306		0.532	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Bismuth-214	0.309		0.0829	0.0890		0.0709	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Cesium-137	0.00287	U	0.0307	0.0307		0.0561	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Lead-210	-0.253	U	0.763	0.763		1.31	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Lead-212	0.243		0.0780	0.0841		0.0808	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Lead-214	0.354		0.0692	0.0784		0.0757	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Potassium-40	11.7		1.28	1.75		0.575	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Protactinium-231	0.331	U	0.444	0.445		1.04	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Radium-226	0.309		0.0829	0.0890	0.500	0.0709	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Radium-228	0.345		0.109	0.114		0.0634	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Thallium-208	0.112		0.0353	0.0372		0.0309	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Thorium-228	0.243		0.0780	0.0841		0.0808	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Thorium-232	0.345		0.109	0.114		0.0634	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Thorium-234	0.198	U	0.718	0.719		1.23	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Uranium-235	-0.0709	U	0.194	0.194		0.329	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Uranium-238	0.198	U	0.718	0.719		1.23	pCi/g	04/07/16 12:21	04/28/16 18:04	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S417

Lab Sample ID: 160-16804-17

Date Collected: 04/04/16 13:18

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.293		0.135	0.138		0.116	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Actinium-227	-0.000588	U	0.00218	0.00218		0.750	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Bismuth-212	0.116	U	0.389	0.389		0.699	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Bismuth-214	0.304		0.0928	0.0980		0.0962	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Cesium-137	-0.0151	U	0.0392	0.0392		0.0685	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Lead-210	0.763	U	0.999	1.00		1.66	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Lead-212	0.345		0.0852	0.0962		0.0859	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Lead-214	0.290		0.0832	0.0885		0.0952	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Potassium-40	10.7		1.34	1.73		0.511	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Protactinium-231	0.0735	U	0.151	0.152		1.45	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Radium-226	0.304		0.0928	0.0980	0.500	0.0962	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Radium-228	0.293		0.135	0.138		0.116	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Thallium-208	0.0731		0.0442	0.0448		0.0615	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Thorium-228	0.345		0.0852	0.0962		0.0859	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Thorium-232	0.293		0.135	0.138		0.116	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Thorium-234	0.334	U	0.371	0.373		1.46	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Uranium-235	0.0646	U	0.117	0.117		0.312	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Uranium-238	0.334	U	0.371	0.373		1.46	pCi/g	04/07/16 12:21	04/28/16 18:05	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S418

Lab Sample ID: 160-16804-18

Date Collected: 04/04/16 13:22

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.327		0.109	0.114		0.0670	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Actinium-227	-0.0158	U	0.0509	0.0509		0.719	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Bismuth-212	0.227	U	0.381	0.382		0.647	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Bismuth-214	0.226		0.0778	0.0812		0.0878	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Cesium-137	0.00951	U	0.0289	0.0289		0.0515	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-210	0.585	U	0.836	0.839		1.39	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-212	0.261		0.0703	0.0780		0.0781	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-214	0.400		0.0872	0.0966		0.0604	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Potassium-40	9.53		1.20	1.55		0.624	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Protactinium-231	0.0858	U	0.128	0.129		1.21	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Radium-226	0.226		0.0778	0.0812	0.500	0.0878	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Radium-228	0.327		0.109	0.114		0.0670	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thallium-208	0.136		0.0406	0.0430		0.0263	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-228	0.261		0.0703	0.0780		0.0781	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-232	0.327		0.109	0.114		0.0670	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-234	0.0304	U	0.743	0.743		1.29	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Uranium-235	0.0817	U	0.150	0.150		0.253	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Uranium-238	0.0304	U	0.743	0.743		1.29	pCi/g	04/07/16 12:21	04/28/16 18:06	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S419

Lab Sample ID: 160-16804-19

Date Collected: 04/04/16 13:25

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.241		0.130	0.132		0.230	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Actinium-227	-0.000577	U	0.00327	0.00327		0.671	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Bismuth-212	0.0678	U	0.467	0.467		0.861	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Bismuth-214	0.361		0.0982	0.105		0.0749	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Cesium-137	-0.00136	U	0.0340	0.0340		0.0647	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-210	-0.101	U	0.982	0.982		1.52	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-212	0.200		0.0908	0.0944		0.103	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-214	0.325		0.0957	0.102		0.0966	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Potassium-40	11.3		1.54	1.92		0.602	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Protactinium-231	0.281	U	0.326	0.328		1.58	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Radium-226	0.361		0.0982	0.105	0.500	0.0749	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Radium-228	0.241		0.130	0.132		0.230	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thallium-208	0.135		0.0432	0.0454		0.0418	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-228	0.200		0.0908	0.0944		0.103	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-232	0.241		0.130	0.132		0.230	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-234	0.217	U	0.251	0.252		1.39	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Uranium-235	-0.00617	U	0.160	0.160		0.285	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Uranium-238	0.217	U	0.251	0.252		1.39	pCi/g	04/07/16 12:21	04/28/16 18:06	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S420

Lab Sample ID: 160-16804-20

Date Collected: 04/04/16 13:28

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.184	U	0.124	0.126		0.265	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Actinium-227	0.220	U	0.280	0.281		0.757	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Bismuth-212	0.000	U	0.417	0.417		1.02	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Bismuth-214	0.431		0.121	0.129		0.116	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Cesium-137	0.0166	U	0.0417	0.0417		0.0727	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Lead-210	0.528	U	1.02	1.03		1.91	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Lead-212	0.373		0.111	0.121		0.121	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Lead-214	0.408		0.0951	0.104		0.109	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Potassium-40	11.6		1.43	1.86		0.767	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Protactinium-231	0.340	U	0.429	0.431		1.66	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Radium-226	0.431		0.121	0.129	0.500	0.116	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Radium-228	0.184	U	0.124	0.126		0.265	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Thallium-208	0.0771	U	0.0601	0.0606		0.0822	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Thorium-228	0.373		0.111	0.121		0.121	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Thorium-232	0.184	U	0.124	0.126		0.265	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Thorium-234	0.695	U	0.522	0.527		1.29	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Uranium-235	0.113	U	0.205	0.206		0.380	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Uranium-238	0.695	U	0.522	0.527		1.29	pCi/g	04/07/16 12:21	04/28/16 18:07	1

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QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-244938/1-A

Matrix: Solid

Analysis Batch: 248193

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 244938

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.002582	U	0.0352	0.0352		0.288	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Actinium-227	0.03405	U	0.147	0.147		0.672	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Bismuth-212	0.1864	U	0.531	0.531		0.959	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Bismuth-214	0.01585	U	0.0794	0.0794		0.159	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Cesium-137	-0.007261	U	0.0385	0.0385		0.0729	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Lead-210	-1.099	U	44.0	44.0		1.90	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Lead-212	0.009090	U	0.0491	0.0491		0.0981	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Lead-214	-0.01062	U	0.149	0.149		0.151	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Potassium-40	-0.2586	U	10.3	10.3		0.818	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Protactinium-231	-0.01416	U	0.119	0.119		1.56	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Radium-226	0.01585	U	0.0794	0.0794	0.500	0.159	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Radium-228	0.002582	U	0.0352	0.0352		0.288	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Thallium-208	-0.009743	U	0.0659	0.0659		0.0761	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Thorium-228	0.009090	U	0.0491	0.0491		0.0981	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Thorium-232	0.002582	U	0.0352	0.0352		0.288	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Thorium-234	-0.1034	U	0.786	0.786		1.22	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Uranium-235	0.1002	U	0.131	0.131		0.256	pCi/g	04/07/16 12:21	04/28/16 15:23	1
Uranium-238	-0.1034	U	0.786	0.786		1.22	pCi/g	04/07/16 12:21	04/28/16 15:23	1

Lab Sample ID: LCS 160-244938/2-A

Matrix: Solid

Analysis Batch: 248183

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 244938

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	101.7		10.7		1.10	pCi/g	105	87 - 116
Cesium-137	29.7	29.83		3.18		0.259	pCi/g	100	87 - 120
Cobalt-60	17.4	16.98		1.76		0.162	pCi/g	98	87 - 115

Lab Sample ID: 160-16804-1 DU

Matrix: Solid

Analysis Batch: 248183

Client Sample ID: TI-TO04-NP-R-FSSSU4-S401

Prep Type: Total/NA

Prep Batch: 244938

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.182	U	0.2315	U	0.156		0.312	pCi/g	0.17	1
Actinium-227	0.287	U	-0.01991	U	0.0341		0.767	pCi/g	0.72	1
Bismuth-212	0.000	U	0.4416	U	0.453		0.711	pCi/g	0.43	1
Bismuth-214	0.324		0.2841		0.0969		0.110	pCi/g	0.17	1
Cesium-137	-0.00693	U	-0.00929	U	0.0421		0.0754	pCi/g	0.02	1
Lead-210	0.792	U	1.609	U	1.22		1.65	pCi/g	0.37	1
Lead-212	0.369		0.2828		0.0935		0.102	pCi/g	0.40	1
Lead-214	0.274		0.2268		0.0916		0.125	pCi/g	0.24	1
Potassium-40	8.58		11.14		1.84		0.791	pCi/g	0.68	1
Protactinium-231	0.0694	U	0.1791	U	0.274		1.60	pCi/g	0.11	1
Radium-226	0.324		0.2841		0.0969	0.500	0.110	pCi/g	0.17	1
Radium-228	0.182	U	0.2315	U	0.156		0.312	pCi/g	0.17	1

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QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-16804-1 DU

Matrix: Solid

Analysis Batch: 248183

Client Sample ID: TI-TO04-NP-R-FSSSU4-S401

Prep Type: Total/NA

Prep Batch: 244938

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.129		0.1031		0.0516		0.0698	pCi/g	0.25	1
Thorium-228	0.369		0.2828		0.0935		0.102	pCi/g	0.40	1
Thorium-232	0.182	U	0.2315	U	0.156		0.312	pCi/g	0.17	1
Thorium-234	0.0609	U	0.4316	U	0.450		1.39	pCi/g	0.41	1
Uranium-235	0.150	U	-0.01712	U	0.0875		0.320	pCi/g	0.53	1
Uranium-238	0.0609	U	0.4316	U	0.450		1.39	pCi/g	0.41	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Rad

Leach Batch: 244636

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16804-1	TI-TO04-NP-R-FSSSU4-S401	Total/NA	Solid	Dry and Grind	
160-16804-1 DU	TI-TO04-NP-R-FSSSU4-S401	Total/NA	Solid	Dry and Grind	
160-16804-2	TI-TO04-NP-R-FSSSU4-S402	Total/NA	Solid	Dry and Grind	
160-16804-3	TI-TO04-NP-R-FSSSU4-S403	Total/NA	Solid	Dry and Grind	
160-16804-4	TI-TO04-NP-R-FSSSU4-S404	Total/NA	Solid	Dry and Grind	
160-16804-5	TI-TO04-NP-R-FSSSU4-S405	Total/NA	Solid	Dry and Grind	
160-16804-6	TI-TO04-NP-R-FSSSU4-S406	Total/NA	Solid	Dry and Grind	
160-16804-7	TI-TO04-NP-R-FSSSU4-S407	Total/NA	Solid	Dry and Grind	
160-16804-8	TI-TO04-NP-R-FSSSU4-S408	Total/NA	Solid	Dry and Grind	
160-16804-9	TI-TO04-NP-R-FSSSU4-S409	Total/NA	Solid	Dry and Grind	
160-16804-10	TI-TO04-NP-R-FSSSU4-S410	Total/NA	Solid	Dry and Grind	
160-16804-11	TI-TO04-NP-R-FSSSU4-S411	Total/NA	Solid	Dry and Grind	
160-16804-12	TI-TO04-NP-R-FSSSU4-S412	Total/NA	Solid	Dry and Grind	
160-16804-13	TI-TO04-NP-R-FSSSU4-S413	Total/NA	Solid	Dry and Grind	
160-16804-14	TI-TO04-NP-R-FSSSU4-S414	Total/NA	Solid	Dry and Grind	
160-16804-15	TI-TO04-NP-R-FSSSU4-S415	Total/NA	Solid	Dry and Grind	
160-16804-16	TI-TO04-NP-R-FSSSU4-S416	Total/NA	Solid	Dry and Grind	
160-16804-17	TI-TO04-NP-R-FSSSU4-S417	Total/NA	Solid	Dry and Grind	
160-16804-18	TI-TO04-NP-R-FSSSU4-S418	Total/NA	Solid	Dry and Grind	
160-16804-19	TI-TO04-NP-R-FSSSU4-S419	Total/NA	Solid	Dry and Grind	
160-16804-20	TI-TO04-NP-R-FSSSU4-S420	Total/NA	Solid	Dry and Grind	

Prep Batch: 244938

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16804-1	TI-TO04-NP-R-FSSSU4-S401	Total/NA	Solid	Fill_Geo-21	244636
160-16804-1 DU	TI-TO04-NP-R-FSSSU4-S401	Total/NA	Solid	Fill_Geo-21	244636
160-16804-2	TI-TO04-NP-R-FSSSU4-S402	Total/NA	Solid	Fill_Geo-21	244636
160-16804-3	TI-TO04-NP-R-FSSSU4-S403	Total/NA	Solid	Fill_Geo-21	244636
160-16804-4	TI-TO04-NP-R-FSSSU4-S404	Total/NA	Solid	Fill_Geo-21	244636
160-16804-5	TI-TO04-NP-R-FSSSU4-S405	Total/NA	Solid	Fill_Geo-21	244636
160-16804-6	TI-TO04-NP-R-FSSSU4-S406	Total/NA	Solid	Fill_Geo-21	244636
160-16804-7	TI-TO04-NP-R-FSSSU4-S407	Total/NA	Solid	Fill_Geo-21	244636
160-16804-8	TI-TO04-NP-R-FSSSU4-S408	Total/NA	Solid	Fill_Geo-21	244636
160-16804-9	TI-TO04-NP-R-FSSSU4-S409	Total/NA	Solid	Fill_Geo-21	244636
160-16804-10	TI-TO04-NP-R-FSSSU4-S410	Total/NA	Solid	Fill_Geo-21	244636
160-16804-11	TI-TO04-NP-R-FSSSU4-S411	Total/NA	Solid	Fill_Geo-21	244636
160-16804-12	TI-TO04-NP-R-FSSSU4-S412	Total/NA	Solid	Fill_Geo-21	244636
160-16804-13	TI-TO04-NP-R-FSSSU4-S413	Total/NA	Solid	Fill_Geo-21	244636
160-16804-14	TI-TO04-NP-R-FSSSU4-S414	Total/NA	Solid	Fill_Geo-21	244636
160-16804-15	TI-TO04-NP-R-FSSSU4-S415	Total/NA	Solid	Fill_Geo-21	244636
160-16804-16	TI-TO04-NP-R-FSSSU4-S416	Total/NA	Solid	Fill_Geo-21	244636
160-16804-17	TI-TO04-NP-R-FSSSU4-S417	Total/NA	Solid	Fill_Geo-21	244636
160-16804-18	TI-TO04-NP-R-FSSSU4-S418	Total/NA	Solid	Fill_Geo-21	244636
160-16804-19	TI-TO04-NP-R-FSSSU4-S419	Total/NA	Solid	Fill_Geo-21	244636
160-16804-20	TI-TO04-NP-R-FSSSU4-S420	Total/NA	Solid	Fill_Geo-21	244636
LCS 160-244938/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-244938/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica St. Louis

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THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-16805-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn

Micha Korinhizer

Authorized for release by:

5/2/2016 3:41:13 PM

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Designee for

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Job ID: 160-16805-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-16805-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Job ID: 160-16805-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

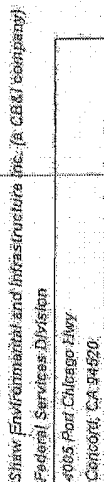
The samples were received on 04/06/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 19.3 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TITO04-BS-R-FSSSU6-S601 (160-16805-1), TI-TITO04-BS-R-FSSSU6-S602 (160-16805-2), TI-TITO04-BS-R-FSSSU6-S603 (160-16805-3), TI-TITO04-BS-R-FSSSU6-S604 (160-16805-4), TI-TITO04-BS-R-FSSSU6-S605 (160-16805-5), TI-TITO04-BS-R-FSSSU6-S606 (160-16805-6), TI-TITO04-BS-R-FSSSU6-S607 (160-16805-7), TI-TITO04-BS-R-FSSSU6-S608 (160-16805-8), TI-TITO04-BS-R-FSSSU6-S609 (160-16805-9), TI-TITO04-BS-R-FSSSU6-S610 (160-16805-10), TI-TITO04-BS-R-FSSSU6-S611 (160-16805-11), TI-TITO04-BS-R-FSSSU6-S612 (160-16805-12), TI-TITO04-BS-R-FSSSU6-S613 (160-16805-13), TI-TITO04-BS-R-FSSSU6-S614 (160-16805-14), TI-TITO04-BS-R-FSSSU6-S615 (160-16805-15), TI-TITO04-BS-R-FSSSU6-S616 (160-16805-16), TI-TITO04-BS-R-FSSSU6-S617 (160-16805-17), TI-TITO04-BS-R-FSSSU6-S618 (160-16805-18), TI-TITO04-BS-R-FSSSU6-S619 (160-16805-19) and TI-TITO04-BS-R-FSSSU6-S620 (160-16805-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were leached on 04/06/2016, prepared on 04/07/2016 and analyzed on 04/28/2016.

Several analytes exceeded the RPD limit for the duplicate of sample TI-TITO04-BS-R-FSSSU6-S601DU (160-16805-1). Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Ref. Document#	TI P1 85 FSS SUB 211
Page	1 of 2

160-16805 Chain of Custody



Shaw Environmental and Infrastructure Inc. (a DBE company)
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL P3 BS FSS SUB 241
Page 2 of 2

Project Number: 500060
CTO-04 Phase III BaySide
Project Name / Location: FSS SUB RSY11 U1 Part I
Purchase Order #: 201455

Project Manager: Unika Messer
(name & phone #)

Send Report To: Patricia Flynn
Phone/Fax Number: 925-388-2037
Address: 4005 Port Chicago Hwy
City: Concord, CA 94520

Shipment Date: 4/9/2016
Waybill Number: 128746201 9735 9141
Lab Destination: Earth Toxics Inc To Test Analytic
Lab Contact Name / Phone #: Mike Dwyer

Sampler's Name(s): TW

Sample ID Number	Sample Description	Collection Information		Matrix	Container #	Preservative (water)		Dose Rate (ppm)
		Date	Time			Preservative (water)	Preservative (soil)	
TL-T004-BS-R-FSSSUB-S611	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1509	G	1	16 oz Plastic		6
TL-T004-BS-R-FSSSUB-S612	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1511	G	1	16 oz Plastic		6
TL-T004-BS-R-FSSSUB-S613	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1515	G	1	16 oz Plastic		6
TL-T004-BS-R-FSSSUB-S614	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1519	G	1	16 oz Plastic		6
TL-T004-BS-R-FSSSUB-S615	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1521	G	1	16 oz Plastic		6
TL-T004-BS-R-FSSSUB-S616	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1525	G	1	16 oz Plastic		6
TL-T004-BS-R-FSSSUB-S617	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1528	G	1	16 oz Plastic		6
TL-T004-BS-R-FSSSUB-S618	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1532	G	1	16 oz Plastic		6
TL-T004-BS-R-FSSSUB-S619	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1536	G	1	16 oz Plastic		6
TL-T004-BS-R-FSSSUB-S620	BaySide RSY 11 USE 1 Part I FSS SUB Systematic	04/04/16	1540	G	1	16 oz Plastic		6

Special Instructions: 7 days ingrown draft and follow with 21 days final

Level Of QC Required:

Standard TAT ☐ 24-hr ☐ 3-day ☐ 7-day

Project Specifier:

Relinquished By:
Ryan Rogers

Relinquished By:
mc18

Date:
Time:

Date:
Time:

Date:
Time:

Date:
Time:

Date:
Time:

Date:
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Date:
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Date:
Time:

Date:
Time:

Date:
Time:

Method Codes:

C = Composite

G = Grab

Matrix Codes:

SO = Soil

DW = Drinking Water

SL = Sludge

GW = Ground Water

WW = Wastewater

A = Air

ABS = Asbestos, PO = Pipe Opening

**Form FRM-TI-03-3
Sample Shipment Checklist**

Project Name <u>Treasure Island</u>	Project Number <u>500060</u>
Address <u>950 Avenue M Building 570</u>	Date <u>4-9-2016</u> Time <u>1230</u>
City, State, Zip <u>San Francisco, CA 94130</u>	
UPS Tracking No. <u>1Z89V46201 9425 9141</u>	

Sample Checklist	Yes	No	Comments
Sample lids are tight and custody seals in place?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are all sample numbers, dates, times, and other label information legible and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have all sample numbers, dates, times, and sampling data been logged into the sample log book?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Do sample numbers and sample descriptions on the labels match those on the COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have the COCs been filled out completely and correctly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Does the analytical specified on the COC match the analytical specified in the scope of work?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have the COCs been properly signed in the transfer section?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Packaging Checklist	Yes	No	Comments
Has each sample been placed into an individually plastic bag?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the drain plug of the cooler been taped closed with water proof tape from the inside?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>no drain plug</u>
Have all the samples been placed into the cooler in an upright position?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is there adequate spacing of samples so that they will not touch during shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the cooler been filled with additional cushioning material?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the COC been placed in a Ziploc® bag and taped to the inside of the lid of the cooler?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have custody seals been placed onto the lid?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the cooler been labeled "This Side Up"?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
If required, has the cooler been labeled with the DOT proper shipping name, UN number, and label?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>UN 2910</u>
Has the laboratory performing the analyses been notified of the shipment of samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Review Checklist	Yes	No	Comments
Has smear data been verified?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has survey data been reviewed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Problems/Resolutions:			
Prepared by: <u>N. Morrison</u>			
Reviewed by: <u>Takeshi Iwaki</u> <i>[Signature]</i>			

CoC #: TI-P3-NP-FSS-544-210 — Survey #: TIRS-04042016-12P3-FSS-2067

TI-P3-B5-FSS-546-211 — TIRS-04042016-12P3-FSS-2068

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-16805-2

Login Number: 16805

List Source: TestAmerica St. Louis

List Number: 1

Creator: McKinney, Gerrod E

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-16805-1	TI-TITO04-BS-R-FSSSU6-S601	Solid	04/04/16 14:30	04/06/16 08:35
160-16805-2	TI-TITO04-BS-R-FSSSU6-S602	Solid	04/04/16 14:32	04/06/16 08:35
160-16805-3	TI-TITO04-BS-R-FSSSU6-S603	Solid	04/04/16 14:36	04/06/16 08:35
160-16805-4	TI-TITO04-BS-R-FSSSU6-S604	Solid	04/04/16 14:39	04/06/16 08:35
160-16805-5	TI-TITO04-BS-R-FSSSU6-S605	Solid	04/04/16 14:42	04/06/16 08:35
160-16805-6	TI-TITO04-BS-R-FSSSU6-S606	Solid	04/04/16 14:45	04/06/16 08:35
160-16805-7	TI-TITO04-BS-R-FSSSU6-S607	Solid	04/04/16 14:49	04/06/16 08:35
160-16805-8	TI-TITO04-BS-R-FSSSU6-S608	Solid	04/04/16 14:55	04/06/16 08:35
160-16805-9	TI-TITO04-BS-R-FSSSU6-S609	Solid	04/04/16 15:01	04/06/16 08:35
160-16805-10	TI-TITO04-BS-R-FSSSU6-S610	Solid	04/04/16 15:05	04/06/16 08:35
160-16805-11	TI-TITO04-BS-R-FSSSU6-S611	Solid	04/04/16 15:09	04/06/16 08:35
160-16805-12	TI-TITO04-BS-R-FSSSU6-S612	Solid	04/04/16 15:11	04/06/16 08:35
160-16805-13	TI-TITO04-BS-R-FSSSU6-S613	Solid	04/04/16 15:15	04/06/16 08:35
160-16805-14	TI-TITO04-BS-R-FSSSU6-S614	Solid	04/04/16 15:18	04/06/16 08:35
160-16805-15	TI-TITO04-BS-R-FSSSU6-S615	Solid	04/04/16 15:21	04/06/16 08:35
160-16805-16	TI-TITO04-BS-R-FSSSU6-S616	Solid	04/04/16 15:25	04/06/16 08:35
160-16805-17	TI-TITO04-BS-R-FSSSU6-S617	Solid	04/04/16 15:28	04/06/16 08:35
160-16805-18	TI-TITO04-BS-R-FSSSU6-S618	Solid	04/04/16 15:32	04/06/16 08:35
160-16805-19	TI-TITO04-BS-R-FSSSU6-S619	Solid	04/04/16 15:36	04/06/16 08:35
160-16805-20	TI-TITO04-BS-R-FSSSU6-S620	Solid	04/04/16 15:40	04/06/16 08:35

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S601

Lab Sample ID: 160-16805-1

Date Collected: 04/04/16 14:30

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.602		0.170	0.181		0.0887	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Actinium-227	-0.160	U	0.432	0.432		0.738	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Bismuth-212	0.0867	U	0.459	0.459		0.836	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Bismuth-214	0.472		0.130	0.139		0.108	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Cesium-137	-0.0000343	U	0.0301	0.0301		0.0582	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Lead-210	-0.577	U	6.21	6.21		1.66	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Lead-212	0.384		0.0955	0.108		0.102	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Lead-214	0.473		0.112	0.122		0.0928	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Potassium-40	10.4		1.50	1.84		0.760	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Protactinium-231	0.192	U	0.344	0.345		1.52	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Radium-226	0.472		0.130	0.139	0.500	0.108	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Radium-228	0.602		0.170	0.181		0.0887	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Thallium-208	0.153		0.0545	0.0568		0.0551	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Thorium-228	0.384		0.0955	0.108		0.102	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Thorium-232	0.602		0.170	0.181		0.0887	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Thorium-234	-0.0127	U	0.0208	0.0208		1.48	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Uranium-235	0.0854	U	0.181	0.181		0.212	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Uranium-238	-0.0127	U	0.0208	0.0208		1.48	pCi/g	04/07/16 12:29	04/28/16 18:39	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S602

Lab Sample ID: 160-16805-2

Date Collected: 04/04/16 14:32

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.501		0.146	0.154		0.0759	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Actinium-227	0.275	U	0.282	0.283		0.661	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Bismuth-212	-0.00673	U	0.469	0.469		0.862	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Bismuth-214	0.398		0.111	0.118		0.107	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Cesium-137	-0.00311	U	0.0408	0.0408		0.0740	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Lead-210	0.962	U	0.978	0.985		1.57	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Lead-212	0.372		0.0900	0.102		0.0981	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Lead-214	0.363		0.116	0.122		0.121	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Potassium-40	12.1		1.42	1.88		0.717	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Protactinium-231	0.222	U	0.475	0.475		2.03	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Radium-226	0.398		0.111	0.118	0.500	0.107	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Radium-228	0.501		0.146	0.154		0.0759	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Thallium-208	0.122		0.0508	0.0523		0.0583	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Thorium-228	0.372		0.0900	0.102		0.0981	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Thorium-232	0.501		0.146	0.154		0.0759	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Thorium-234	0.422	U	0.471	0.473		1.57	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Uranium-235	0.124	U	0.217	0.217		0.350	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Uranium-238	0.422	U	0.471	0.473		1.57	pCi/g	04/07/16 12:29	04/28/16 18:43	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S603

Lab Sample ID: 160-16805-3

Date Collected: 04/04/16 14:36

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.209	U	0.124	0.125		0.283	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Actinium-227	0.000	U	0.383	0.383		0.793	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Bismuth-212	0.257	U	0.437	0.438		0.743	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Bismuth-214	0.490		0.124	0.134		0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Cesium-137	0.00985	U	0.0329	0.0330		0.0590	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Lead-210	-0.224	U	1.74	1.74		1.84	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Lead-212	0.328		0.107	0.115		0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Lead-214	0.441		0.113	0.122		0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Potassium-40	11.9		1.42	1.87		0.715	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Protactinium-231	0.0105	U	0.631	0.631		1.16	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Radium-226	0.490		0.124	0.134	0.500	0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Radium-228	0.209	U	0.124	0.125		0.283	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Thallium-208	0.128		0.0412	0.0433		0.0418	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Thorium-228	0.328		0.107	0.115		0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Thorium-232	0.209	U	0.124	0.125		0.283	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Thorium-234	0.271	U	0.374	0.375		1.59	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Uranium-235	0.126	U	0.173	0.173		0.297	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Uranium-238	0.271	U	0.374	0.375		1.59	pCi/g	04/07/16 12:29	04/28/16 19:10	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S604

Lab Sample ID: 160-16805-4

Date Collected: 04/04/16 14:39

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.441		0.121	0.129		0.0629	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Actinium-227	0.000	U	0.128	0.128		0.646	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Bismuth-212	0.272	U	0.403	0.404		0.674	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Bismuth-214	0.411		0.102	0.111		0.0805	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Cesium-137	-0.0137	U	0.0359	0.0359		0.0623	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Lead-210	0.0406	U	0.724	0.724		1.27	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Lead-212	0.331		0.0744	0.0859		0.0673	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Lead-214	0.385		0.0952	0.103		0.0786	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Potassium-40	11.3		1.25	1.70		0.571	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Protactinium-231	0.0595	U	0.715	0.715		1.27	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Radium-226	0.411		0.102	0.111	0.500	0.0805	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Radium-228	0.441		0.121	0.129		0.0629	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Thallium-208	0.155		0.0433	0.0462		0.0340	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Thorium-228	0.331		0.0744	0.0859		0.0673	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Thorium-232	0.441		0.121	0.129		0.0629	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Thorium-234	0.518	U	0.351	0.355		1.20	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Uranium-235	0.0598	U	0.0994	0.0995		0.318	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Uranium-238	0.518	U	0.351	0.355		1.20	pCi/g	04/07/16 12:29	04/28/16 19:11	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S605

Lab Sample ID: 160-16805-5

Date Collected: 04/04/16 14:42

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.423		0.150	0.156		0.124	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Actinium-227	-0.135	U	0.347	0.348		0.593	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Bismuth-212	0.00536	U	0.344	0.344		0.639	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Bismuth-214	0.399		0.101	0.109		0.0747	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Cesium-137	0.000	U	0.00896	0.00896		0.0494	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Lead-210	0.742	U	0.670	0.676		1.07	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Lead-212	0.291		0.0676	0.0774		0.0697	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Lead-214	0.339		0.0873	0.0942		0.0683	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Potassium-40	12.2		1.28	1.79		0.394	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Protactinium-231	0.146	U	0.431	0.432		1.00	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Radium-226	0.399		0.101	0.109	0.500	0.0747	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Radium-228	0.423		0.150	0.156		0.124	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Thallium-208	0.158		0.0390	0.0423		0.0231	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Thorium-228	0.291		0.0676	0.0774		0.0697	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Thorium-232	0.423		0.150	0.156		0.124	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Thorium-234	0.693	U	0.337	0.345		1.33	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Uranium-235	-0.00506	U	0.0113	0.0113		0.325	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Uranium-238	0.693	U	0.337	0.345		1.33	pCi/g	04/07/16 12:29	04/28/16 19:12	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S606

Lab Sample ID: 160-16805-6

Date Collected: 04/04/16 14:45

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0997	U	0.0926	0.0931		0.351	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Actinium-227	0.167	U	0.466	0.466		0.795	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Bismuth-212	0.265	U	0.521	0.522		0.897	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Bismuth-214	0.468		0.124	0.133		0.105	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Cesium-137	0.000	U	0.00911	0.00911		0.117	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Lead-210	-0.809	U	43.2	43.2		2.14	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Lead-212	0.359		0.109	0.119		0.123	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Lead-214	0.389		0.0879	0.0967		0.125	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Potassium-40	13.6		1.64	2.15		0.572	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Protactinium-231	-0.0281	U	0.0677	0.0678		1.21	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Radium-226	0.468		0.124	0.133	0.500	0.105	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Radium-228	0.0997	U	0.0926	0.0931		0.351	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Thallium-208	0.145		0.0480	0.0503		0.0476	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Thorium-228	0.359		0.109	0.119		0.123	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Thorium-232	0.0997	U	0.0926	0.0931		0.351	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Thorium-234	0.367	U	0.477	0.478		1.51	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Uranium-235	0.0583	U	0.170	0.170		0.266	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Uranium-238	0.367	U	0.477	0.478		1.51	pCi/g	04/07/16 12:29	04/28/16 19:13	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S607

Lab Sample ID: 160-16805-7

Date Collected: 04/04/16 14:49

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.231	U	0.146	0.148		0.267	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Actinium-227	0.314	U	0.419	0.420		0.693	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Bismuth-212	0.330	U	0.457	0.458		0.759	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Bismuth-214	0.398		0.113	0.120		0.115	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Cesium-137	-0.00242	U	0.0390	0.0390		0.0713	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Lead-210	0.805	U	1.32	1.32		1.82	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Lead-212	0.378		0.100	0.112		0.109	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Lead-214	0.373		0.0955	0.103		0.0984	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Potassium-40	13.2		1.48	2.01		0.723	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Protactinium-231	0.133	U	0.218	0.219		1.85	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Radium-226	0.398		0.113	0.120	0.500	0.115	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Radium-228	0.231	U	0.146	0.148		0.267	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Thallium-208	0.159		0.0434	0.0464		0.0481	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Thorium-228	0.378		0.100	0.112		0.109	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Thorium-232	0.231	U	0.146	0.148		0.267	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Thorium-234	0.255	U	0.486	0.486		1.66	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Uranium-235	0.161	U	0.197	0.197		0.307	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Uranium-238	0.255	U	0.486	0.486		1.66	pCi/g	04/07/16 12:29	04/28/16 19:17	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S608

Lab Sample ID: 160-16805-8

Date Collected: 04/04/16 14:55

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.225	U	0.125	0.127		0.264	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Actinium-227	-0.0656	U	0.447	0.448		0.777	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Bismuth-212	0.390	U	0.454	0.456		0.738	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Bismuth-214	0.365		0.115	0.121		0.114	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Cesium-137	-0.00401	U	0.0334	0.0334		0.0615	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Lead-210	0.255	U	1.00	1.00		1.82	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Lead-212	0.378		0.0986	0.110		0.107	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Lead-214	0.387		0.122	0.129		0.120	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Potassium-40	13.0		1.48	1.99		0.715	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Protactinium-231	0.479	U	0.387	0.391		1.62	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Radium-226	0.365		0.115	0.121	0.500	0.114	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Radium-228	0.225	U	0.125	0.127		0.264	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Thallium-208	0.181		0.0529	0.0562		0.0463	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Thorium-228	0.378		0.0986	0.110		0.107	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Thorium-232	0.225	U	0.125	0.127		0.264	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Thorium-234	0.430	U	0.459	0.462		1.43	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Uranium-235	0.106	U	0.189	0.190		0.304	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Uranium-238	0.430	U	0.459	0.462		1.43	pCi/g	04/07/16 12:29	04/28/16 19:47	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S609

Lab Sample ID: 160-16805-9

Date Collected: 04/04/16 15:01

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.311		0.0959	0.101		0.227	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Actinium-227	0.0339	U	0.337	0.337		0.594	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Bismuth-212	0.184	U	0.369	0.369		0.637	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Bismuth-214	0.390		0.0950	0.103		0.0762	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Cesium-137	-0.0120	U	0.0399	0.0399		0.0698	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Lead-210	0.684	U	0.852	0.856		1.40	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Lead-212	0.396		0.105	0.117		0.0989	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Lead-214	0.446		0.101	0.111		0.0744	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Potassium-40	12.6		1.36	1.88		0.610	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Protactinium-231	0.366	U	0.471	0.473		1.10	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Radium-226	0.390		0.0950	0.103	0.500	0.0762	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Radium-228	0.311		0.0959	0.101		0.227	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Thallium-208	0.125		0.0381	0.0403		0.0331	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Thorium-228	0.396		0.105	0.117		0.0989	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Thorium-232	0.311		0.0959	0.101		0.227	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Thorium-234	0.649	U	0.437	0.443		1.34	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Uranium-235	0.0928	U	0.176	0.176		0.292	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Uranium-238	0.649	U	0.437	0.443		1.34	pCi/g	04/07/16 12:29	04/28/16 19:48	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S610

Lab Sample ID: 160-16805-10

Date Collected: 04/04/16 15:05

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.502		0.153	0.162		0.176	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Actinium-227	-0.0378	U	0.0924	0.0925		0.807	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Bismuth-212	0.214	U	0.405	0.406		0.697	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Bismuth-214	0.451		0.101	0.111		0.0871	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Cesium-137	-0.0114	U	0.0379	0.0380		0.0672	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-210	0.122	U	0.965	0.965		1.67	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-212	0.372		0.0906	0.103		0.0960	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-214	0.443		0.107	0.117		0.102	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Potassium-40	13.4		1.48	2.02		0.500	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Protactinium-231	0.150	U	0.281	0.281		1.33	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Radium-226	0.451		0.101	0.111	0.500	0.0871	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Radium-228	0.502		0.153	0.162		0.176	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thallium-208	0.134		0.0493	0.0512		0.0536	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-228	0.372		0.0906	0.103		0.0960	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-232	0.502		0.153	0.162		0.176	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-234	0.362	U	0.312	0.315		1.74	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Uranium-235	0.0737	U	0.213	0.213		0.365	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Uranium-238	0.362	U	0.312	0.315		1.74	pCi/g	04/07/16 12:29	04/28/16 19:49	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S611

Lab Sample ID: 160-16805-11

Date Collected: 04/04/16 15:09

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.658		0.154	0.168		0.0664	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Actinium-227	0.125	U	0.424	0.424		0.726	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Bismuth-212	0.242	U	0.419	0.419		0.711	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Bismuth-214	0.484		0.0899	0.103		0.0308	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Cesium-137	-0.00244	U	0.0311	0.0311		0.0571	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-210	0.561	U	0.820	0.823		1.36	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-212	0.412		0.0739	0.0911		0.0652	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-214	0.444		0.0821	0.0942		0.0692	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Potassium-40	12.3		1.33	1.83		0.422	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Protactinium-231	0.256	U	0.239	0.241		1.61	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Radium-226	0.484		0.0899	0.103	0.500	0.0308	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Radium-228	0.658		0.154	0.168		0.0664	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thallium-208	0.109		0.0443	0.0457		0.0574	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-228	0.412		0.0739	0.0911		0.0652	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-232	0.658		0.154	0.168		0.0664	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-234	0.0607	U	0.242	0.242		1.44	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Uranium-235	-0.00714	U	0.0141	0.0141		0.341	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Uranium-238	0.0607	U	0.242	0.242		1.44	pCi/g	04/07/16 12:29	04/28/16 19:49	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S612

Lab Sample ID: 160-16805-12

Date Collected: 04/04/16 15:11

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.710		0.145	0.162		0.0950	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Actinium-227	-0.0108	U	0.0292	0.0292		0.804	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Bismuth-212	0.410	U	0.514	0.515		0.841	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Bismuth-214	0.231		0.107	0.109		0.128	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Cesium-137	0.000	U	0.00958	0.00958		0.0810	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-210	0.821	U	0.978	0.983		1.57	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-212	0.493		0.116	0.132		0.119	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-214	0.435		0.112	0.121		0.0979	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Potassium-40	12.5		1.62	2.06		0.601	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Protactinium-231	0.184	U	0.308	0.309		1.40	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Radium-226	0.231		0.107	0.109	0.500	0.128	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Radium-228	0.710		0.145	0.162		0.0950	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thallium-208	0.139		0.0627	0.0643		0.0695	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-228	0.493		0.116	0.132		0.119	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-232	0.710		0.145	0.162		0.0950	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-234	0.299	U	0.476	0.477		1.50	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Uranium-235	0.0510	U	0.157	0.157		0.368	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Uranium-238	0.299	U	0.476	0.477		1.50	pCi/g	04/07/16 12:29	04/28/16 19:50	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S613

Lab Sample ID: 160-16805-13

Date Collected: 04/04/16 15:15

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.439		0.149	0.156		0.108	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Actinium-227	0.0708	U	0.411	0.411		0.712	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Bismuth-212	0.334	U	0.432	0.434		0.713	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Bismuth-214	0.387		0.0942	0.102		0.0871	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Cesium-137	0.000	U	0.0253	0.0253		0.0877	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-210	0.961	U	1.43	1.43		1.84	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-212	0.372		0.107	0.117		0.115	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-214	0.427		0.0986	0.108		0.117	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Potassium-40	12.3		1.38	1.86		0.670	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Protactinium-231	0.0696	U	0.122	0.122		1.29	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Radium-226	0.387		0.0942	0.102	0.500	0.0871	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Radium-228	0.439		0.149	0.156		0.108	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thallium-208	0.144		0.0575	0.0594		0.0641	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-228	0.372		0.107	0.117		0.115	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-232	0.439		0.149	0.156		0.108	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-234	0.474	U	0.425	0.428		1.43	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Uranium-235	0.0615	U	0.162	0.162		0.320	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Uranium-238	0.474	U	0.425	0.428		1.43	pCi/g	04/07/16 12:29	04/28/16 19:50	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S614

Lab Sample ID: 160-16805-14

Date Collected: 04/04/16 15:18

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.413		0.205	0.209		0.298	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Actinium-227	0.00154	U	0.413	0.413		0.732	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Bismuth-212	0.135	U	0.473	0.473		0.841	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Bismuth-214	0.384		0.121	0.127		0.128	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Cesium-137	0.0155	U	0.0404	0.0404		0.0707	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Lead-210	1.30	U	1.37	1.38		1.84	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Lead-212	0.433		0.109	0.122		0.114	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Lead-214	0.389		0.0951	0.103		0.0997	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Potassium-40	11.4		1.43	1.84		0.758	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Protactinium-231	0.0282	U	0.0609	0.0610		1.56	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Radium-226	0.384		0.121	0.127	0.500	0.128	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Radium-228	0.413		0.205	0.209		0.298	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Thallium-208	0.154		0.0678	0.0696		0.0653	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Thorium-228	0.433		0.109	0.122		0.114	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Thorium-232	0.413		0.205	0.209		0.298	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Thorium-234	0.574	U	0.374	0.379		1.64	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Uranium-235	0.0990	U	0.202	0.202		0.308	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Uranium-238	0.574	U	0.374	0.379		1.64	pCi/g	04/07/16 12:29	04/28/16 20:20	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S615

Lab Sample ID: 160-16805-15

Date Collected: 04/04/16 15:21

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.287		0.137	0.140		0.207	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Actinium-227	0.0448	U	0.125	0.125		0.548	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Bismuth-212	0.304	U	0.388	0.389		0.636	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Bismuth-214	0.459		0.107	0.117		0.0702	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Cesium-137	-0.0193	U	0.0419	0.0420		0.0723	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Lead-210	-0.195	U	2.18	2.18		1.66	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Lead-212	0.395		0.0876	0.101		0.0897	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Lead-214	0.442		0.0786	0.0910		0.0789	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Potassium-40	10.9		1.41	1.79		0.453	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Protactinium-231	0.659	U	0.385	0.392		1.49	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Radium-226	0.459		0.107	0.117	0.500	0.0702	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Radium-228	0.287		0.137	0.140		0.207	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Thallium-208	0.201		0.0513	0.0554		0.0315	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Thorium-228	0.395		0.0876	0.101		0.0897	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Thorium-232	0.287		0.137	0.140		0.207	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Thorium-234	0.288	U	0.291	0.292		1.34	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Uranium-235	0.0557	U	0.130	0.131		0.228	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Uranium-238	0.288	U	0.291	0.292		1.34	pCi/g	04/07/16 12:29	04/28/16 20:33	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S616

Lab Sample ID: 160-16805-16

Date Collected: 04/04/16 15:25

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.554		0.132	0.144		0.105	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Actinium-227	0.194	U	0.351	0.352		0.592	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Bismuth-212	0.295	U	0.366	0.368		0.600	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Bismuth-214	0.367		0.100	0.107		0.0939	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Cesium-137	0.00361	U	0.0300	0.0300		0.0548	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Lead-210	0.439	U	0.708	0.710		1.19	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Lead-212	0.324		0.0914	0.101		0.0905	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Lead-214	0.489		0.100	0.112		0.0837	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Potassium-40	10.8		1.24	1.66		0.584	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Protactinium-231	0.132	U	0.180	0.181		1.41	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Radium-226	0.367		0.100	0.107	0.500	0.0939	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Radium-228	0.554		0.132	0.144		0.105	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Thallium-208	0.118		0.0328	0.0351		0.0248	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Thorium-228	0.324		0.0914	0.101		0.0905	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Thorium-232	0.554		0.132	0.144		0.105	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Thorium-234	0.408	U	0.694	0.695		1.16	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Uranium-235	0.0197	U	0.0918	0.0918		0.355	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Uranium-238	0.408	U	0.694	0.695		1.16	pCi/g	04/07/16 12:29	04/28/16 20:23	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S617

Lab Sample ID: 160-16805-17

Date Collected: 04/04/16 15:28

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.603		0.163	0.174		0.0747	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Actinium-227	0.106	U	0.513	0.513		0.883	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Bismuth-212	0.155	U	0.518	0.518		0.909	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Bismuth-214	0.422		0.137	0.144		0.136	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Cesium-137	-0.00694	U	0.0365	0.0365		0.0658	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Lead-210	0.450	U	0.920	0.921		1.74	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Lead-212	0.359		0.110	0.119		0.121	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Lead-214	0.455		0.0991	0.110		0.124	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Potassium-40	12.9		1.44	1.96		0.491	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Protactinium-231	0.0882	U	0.390	0.390		1.42	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Radium-226	0.422		0.137	0.144	0.500	0.136	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Radium-228	0.603		0.163	0.174		0.0747	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Thallium-208	0.136		0.0516	0.0535		0.0527	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Thorium-228	0.359		0.110	0.119		0.121	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Thorium-232	0.603		0.163	0.174		0.0747	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Thorium-234	0.293	U	0.485	0.486		1.79	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Uranium-235	0.0442	U	0.178	0.178		0.380	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Uranium-238	0.293	U	0.485	0.486		1.79	pCi/g	04/07/16 12:29	04/28/16 20:24	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S618

Lab Sample ID: 160-16805-18

Date Collected: 04/04/16 15:32

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.458		0.148	0.155		0.155	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Actinium-227	0.0390	U	0.149	0.149		0.591	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Bismuth-212	0.182	U	0.390	0.391		0.674	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Bismuth-214	0.445		0.0899	0.101		0.0462	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Cesium-137	0.00896	U	0.0275	0.0276		0.0490	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-210	-0.206	U	0.897	0.897		1.54	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-212	0.395		0.0834	0.0978		0.0794	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-214	0.410		0.0871	0.0969		0.0649	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Potassium-40	12.6		1.30	1.83		0.394	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Protactinium-231	0.177	U	0.413	0.414		1.27	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Radium-226	0.445		0.0899	0.101	0.500	0.0462	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Radium-228	0.458		0.148	0.155		0.155	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thallium-208	0.0928		0.0391	0.0403		0.0511	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-228	0.395		0.0834	0.0978		0.0794	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-232	0.458		0.148	0.155		0.155	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-234	0.940	U	0.673	0.680		1.06	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Uranium-235	0.0493	U	0.114	0.115		0.329	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Uranium-238	0.940	U	0.673	0.680		1.06	pCi/g	04/07/16 12:29	04/28/16 20:25	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S619

Lab Sample ID: 160-16805-19

Date Collected: 04/04/16 15:36

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.226		0.139	0.141		0.221	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Actinium-227	0.120	U	0.248	0.249		0.655	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Bismuth-212	0.388	U	0.493	0.494		0.809	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Bismuth-214	0.396		0.134	0.141		0.134	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Cesium-137	0.00212	U	0.0402	0.0402		0.0744	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-210	0.924	U	0.994	0.999		1.48	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-212	0.260		0.0836	0.0902		0.116	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-214	0.356		0.115	0.121		0.135	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Potassium-40	11.7		1.53	1.94		0.576	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Protactinium-231	0.364	U	0.489	0.491		1.58	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Radium-226	0.396		0.134	0.141	0.500	0.134	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Radium-228	0.226		0.139	0.141		0.221	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thallium-208	0.106		0.0422	0.0436		0.0471	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-228	0.260		0.0836	0.0902		0.116	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-232	0.226		0.139	0.141		0.221	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-234	0.199	U	0.452	0.453		1.52	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Uranium-235	0.0801	U	0.139	0.140		0.276	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Uranium-238	0.199	U	0.452	0.453		1.52	pCi/g	04/07/16 12:29	04/28/16 20:25	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S620

Lab Sample ID: 160-16805-20

Date Collected: 04/04/16 15:40

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.608		0.161	0.173		0.122	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Actinium-227	0.221	U	0.286	0.287		0.620	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Bismuth-212	0.641	U	0.523	0.527		0.807	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Bismuth-214	0.365		0.108	0.114		0.106	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Cesium-137	0.00378	U	0.0394	0.0394		0.0711	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Lead-210	0.944	U	1.05	1.05		1.63	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Lead-212	0.467		0.0925	0.110		0.0975	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Lead-214	0.456		0.0995	0.110		0.0981	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Potassium-40	13.4		1.45	1.99		0.683	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Protactinium-231	0.672	U	0.669	0.673		1.69	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Radium-226	0.365		0.108	0.114	0.500	0.106	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Radium-228	0.608		0.161	0.173		0.122	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Thallium-208	0.103		0.0522	0.0533		0.0752	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Thorium-228	0.467		0.0925	0.110		0.0975	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Thorium-232	0.608		0.161	0.173		0.122	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Thorium-234	0.437	U	0.382	0.385		1.72	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Uranium-235	0.122	U	0.142	0.142		0.310	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Uranium-238	0.437	U	0.382	0.385		1.72	pCi/g	04/07/16 12:29	04/28/16 20:26	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-244942/1-A

Matrix: Solid

Analysis Batch: 248185

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 244942

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.08056	U	0.0997	0.100		0.248	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Actinium-227	-0.1848	U	0.415	0.416		0.715	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Bismuth-212	-0.07975	U	0.364	0.364		0.691	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Bismuth-214	-0.01092	U	0.119	0.119		0.164	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Cesium-137	0.0000	U	0.0109	0.0109		0.0577	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Lead-210	0.2245	U	1.06	1.06		2.01	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Lead-212	-0.01125	U	0.0965	0.0965		0.114	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Lead-214	-0.03650	U	0.362	0.362		0.151	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Potassium-40	0.01145	U	0.419	0.419		0.939	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Protactinium-231	-0.07439	U	0.827	0.827		1.52	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Radium-226	-0.01092	U	0.119	0.119	0.500	0.164	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Radium-228	0.08056	U	0.0997	0.100		0.248	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Thallium-208	0.002905	U	0.0392	0.0392		0.0791	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Thorium-228	-0.01125	U	0.0965	0.0965		0.114	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Thorium-232	0.08056	U	0.0997	0.100		0.248	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Thorium-234	0.1666	U	0.381	0.382		1.47	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Uranium-235	0.06334	U	0.100	0.100		0.295	pCi/g	04/07/16 12:29	04/28/16 18:37	1
Uranium-238	0.1666	U	0.381	0.382		1.47	pCi/g	04/07/16 12:29	04/28/16 18:37	1

Lab Sample ID: LCS 160-244942/2-A

Matrix: Solid

Analysis Batch: 248186

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 244942

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	95.78		10.1		1.05	pCi/g	99	87 - 116
Cesium-137	29.7	28.28		3.00		0.203	pCi/g	95	87 - 120
Cobalt-60	17.4	15.84		1.63		0.117	pCi/g	91	87 - 115

Lab Sample ID: 160-16805-1 DU

Matrix: Solid

Analysis Batch: 248185

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S601

Prep Type: Total/NA

Prep Batch: 244942

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.602		0.4122		0.161		0.178	pCi/g	0.56	1
Actinium-227	-0.160	U	0.01047	U	0.0292		0.792	pCi/g	0.37	1
Bismuth-212	0.0867	U	0.5386	U	0.419		0.618	pCi/g	0.51	1
Bismuth-214	0.472		0.4002		0.100		0.0723	pCi/g	0.30	1
Cesium-137	-0.00003	U	-0.01404	U	0.0414		0.0722	pCi/g	0.20	1
Lead-210	-0.577	U	0.7519	U	1.31		1.83	pCi/g	0.18	1
Lead-212	0.384		0.4324		0.104		0.0833	pCi/g	0.23	1
Lead-214	0.473		0.4382		0.113		0.0956	pCi/g	0.15	1
Potassium-40	10.4		11.55		1.79		0.479	pCi/g	0.31	1
Protactinium-231	0.192	U	0.1427	U	0.617		1.10	pCi/g	0.05	1
Radium-226	0.472		0.4002		0.100	0.500	0.0723	pCi/g	0.30	1
Radium-228	0.602		0.4122		0.161		0.178	pCi/g	0.56	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-16805-1 DU

Matrix: Solid

Analysis Batch: 248185

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S601

Prep Type: Total/NA

Prep Batch: 244942

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.153		0.1466		0.0471		0.0417	pCi/g	0.07	1
Thorium-228	0.384		0.4324		0.104		0.0833	pCi/g	0.23	1
Thorium-232	0.602		0.4122		0.161		0.178	pCi/g	0.56	1
Thorium-234	-0.0127	U	0.2002	U	0.465		1.47	pCi/g	0.44	1
Uranium-235	0.0854	U	-0.03081	U	1.70		0.355	pCi/g	0.06	1
Uranium-238	-0.0127	U	0.2002	U	0.465		1.47	pCi/g	0.44	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Rad

Leach Batch: 244636

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16805-1	TI-TITO04-BS-R-FSSSU6-S601	Total/NA	Solid	Dry and Grind	
160-16805-1 DU	TI-TITO04-BS-R-FSSSU6-S601	Total/NA	Solid	Dry and Grind	
160-16805-2	TI-TITO04-BS-R-FSSSU6-S602	Total/NA	Solid	Dry and Grind	
160-16805-3	TI-TITO04-BS-R-FSSSU6-S603	Total/NA	Solid	Dry and Grind	
160-16805-4	TI-TITO04-BS-R-FSSSU6-S604	Total/NA	Solid	Dry and Grind	
160-16805-5	TI-TITO04-BS-R-FSSSU6-S605	Total/NA	Solid	Dry and Grind	
160-16805-6	TI-TITO04-BS-R-FSSSU6-S606	Total/NA	Solid	Dry and Grind	
160-16805-7	TI-TITO04-BS-R-FSSSU6-S607	Total/NA	Solid	Dry and Grind	
160-16805-8	TI-TITO04-BS-R-FSSSU6-S608	Total/NA	Solid	Dry and Grind	
160-16805-9	TI-TITO04-BS-R-FSSSU6-S609	Total/NA	Solid	Dry and Grind	
160-16805-10	TI-TITO04-BS-R-FSSSU6-S610	Total/NA	Solid	Dry and Grind	
160-16805-11	TI-TITO04-BS-R-FSSSU6-S611	Total/NA	Solid	Dry and Grind	
160-16805-12	TI-TITO04-BS-R-FSSSU6-S612	Total/NA	Solid	Dry and Grind	
160-16805-13	TI-TITO04-BS-R-FSSSU6-S613	Total/NA	Solid	Dry and Grind	
160-16805-14	TI-TITO04-BS-R-FSSSU6-S614	Total/NA	Solid	Dry and Grind	
160-16805-15	TI-TITO04-BS-R-FSSSU6-S615	Total/NA	Solid	Dry and Grind	
160-16805-16	TI-TITO04-BS-R-FSSSU6-S616	Total/NA	Solid	Dry and Grind	
160-16805-17	TI-TITO04-BS-R-FSSSU6-S617	Total/NA	Solid	Dry and Grind	
160-16805-18	TI-TITO04-BS-R-FSSSU6-S618	Total/NA	Solid	Dry and Grind	
160-16805-19	TI-TITO04-BS-R-FSSSU6-S619	Total/NA	Solid	Dry and Grind	
160-16805-20	TI-TITO04-BS-R-FSSSU6-S620	Total/NA	Solid	Dry and Grind	

Prep Batch: 244942

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16805-1	TI-TITO04-BS-R-FSSSU6-S601	Total/NA	Solid	Fill_Geo-21	244636
160-16805-1 DU	TI-TITO04-BS-R-FSSSU6-S601	Total/NA	Solid	Fill_Geo-21	244636
160-16805-2	TI-TITO04-BS-R-FSSSU6-S602	Total/NA	Solid	Fill_Geo-21	244636
160-16805-3	TI-TITO04-BS-R-FSSSU6-S603	Total/NA	Solid	Fill_Geo-21	244636
160-16805-4	TI-TITO04-BS-R-FSSSU6-S604	Total/NA	Solid	Fill_Geo-21	244636
160-16805-5	TI-TITO04-BS-R-FSSSU6-S605	Total/NA	Solid	Fill_Geo-21	244636
160-16805-6	TI-TITO04-BS-R-FSSSU6-S606	Total/NA	Solid	Fill_Geo-21	244636
160-16805-7	TI-TITO04-BS-R-FSSSU6-S607	Total/NA	Solid	Fill_Geo-21	244636
160-16805-8	TI-TITO04-BS-R-FSSSU6-S608	Total/NA	Solid	Fill_Geo-21	244636
160-16805-9	TI-TITO04-BS-R-FSSSU6-S609	Total/NA	Solid	Fill_Geo-21	244636
160-16805-10	TI-TITO04-BS-R-FSSSU6-S610	Total/NA	Solid	Fill_Geo-21	244636
160-16805-11	TI-TITO04-BS-R-FSSSU6-S611	Total/NA	Solid	Fill_Geo-21	244636
160-16805-12	TI-TITO04-BS-R-FSSSU6-S612	Total/NA	Solid	Fill_Geo-21	244636
160-16805-13	TI-TITO04-BS-R-FSSSU6-S613	Total/NA	Solid	Fill_Geo-21	244636
160-16805-14	TI-TITO04-BS-R-FSSSU6-S614	Total/NA	Solid	Fill_Geo-21	244636
160-16805-15	TI-TITO04-BS-R-FSSSU6-S615	Total/NA	Solid	Fill_Geo-21	244636
160-16805-16	TI-TITO04-BS-R-FSSSU6-S616	Total/NA	Solid	Fill_Geo-21	244636
160-16805-17	TI-TITO04-BS-R-FSSSU6-S617	Total/NA	Solid	Fill_Geo-21	244636
160-16805-18	TI-TITO04-BS-R-FSSSU6-S618	Total/NA	Solid	Fill_Geo-21	244636
160-16805-19	TI-TITO04-BS-R-FSSSU6-S619	Total/NA	Solid	Fill_Geo-21	244636
160-16805-20	TI-TITO04-BS-R-FSSSU6-S620	Total/NA	Solid	Fill_Geo-21	244636
LCS 160-244942/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-244942/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica St. Louis

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-14097-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
10/30/2015 5:54:01 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Job ID: 160-14097-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-14097-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Job ID: 160-14097-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/5/2015 8:20 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-NP-R-SU1-S002 (160-14097-1), TI-TO04-NP-R-SU1-S003 (160-14097-2), TI-TO04-NP-R-SU1-S005 (160-14097-3), TI-TO04-NP-R-SU1-S007 (160-14097-4), TI-TO04-NP-R-SU1-S010 (160-14097-5), TI-TO04-NP-R-SU1-S012 (160-14097-6), TI-TO04-NP-R-SU1-S013 (160-14097-7), TI-TO04-NP-R-SU1-S015 (160-14097-8), TI-TO04-NP-R-SU1-S016 (160-14097-9), TI-TO04-NP-R-SU1-S017 (160-14097-10) and TI-TO04-NP-R-SU1-S019 (160-14097-11) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/05/2015, prepared on 10/08/2015 and analyzed on 10/29/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Shaw Environmental and Infrastructure Inc. (a CBI company)
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL P3_FSS_SU1 NP_113

Page 1 of 3

Project Number: **500060**
Project Name / Location: **CTO-04 Phase III NorthPoint**
FSS SU1
Purchase Order #: **201455**

Shipment Date: **10-2-2015**
Waybill Number: **128944620195106425**
Lab Destination: **Earth Toxics Inc To Test America**
Lab Contact Name / ph. #: **Mike Dryden**

Project Manager: **Ulrika Messer**
(Name & phone #)
Send Report To: **Patricia Flynn**
Phone/Fax Number: **925-288-2037**
Address: **4005 Port Chicago Hwy**
City: **Concord, CA, 94520**

Sampler's Name(s): **N MARRISAN**

Sample ID Number	Sample Description	Collection Information			Matrix #	Containers	Preservative (water)		Gamma Scan	Analyses Requested					Dose Rate μ R/hr
		Date	Time	Method			Preservative (soil)	Container Type							
TI-TO04-NP-R-SU1-S001	North Point FSS Survey Unit 1	9-25-15	1322	G	SO 1	1	16 oz Plastic	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S002	North Point FSS Survey Unit 1	9-25-15	1322	G	SO 1	1	16 oz Plastic	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S003	North Point FSS Survey Unit 1	9-25-15	1318	G	SO 1	1	16 oz Plastic	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S004	North Point FSS Survey Unit 1	9-25-15	1313	G	SO 1	1	16 oz Plastic	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S005	North Point FSS Survey Unit 1	9-25-15	1313	G	SO 1	1	16 oz Plastic	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S006	North Point FSS Survey Unit 1	9-25-15	1329	G	SO 1	1	16 oz Plastic	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S007	North Point FSS Survey Unit 1	9-25-15	1329	G	SO 1	1	16 oz Plastic	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S008	North Point FSS Survey Unit 1	9-25-15	1329	G	SO 1	1	16 oz Plastic	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S009	North Point FSS Survey Unit 1	9-25-15	1329	G	SO 1	1	16 oz Plastic	16 oz Plastic	X						

Special Instructions: **7 days ingrown draft and follow with 21 days final**

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

I II III

Method Codes

C = Composite G = Grab

Matrix Codes

DW = Drinking Water
GW = Ground Water
WW = Waste Water

ABS = Asbestos, PO = Pipe Opening

Date: **10/5/15**
Time: **0820**

Date:

Time:



160-14097 Chain of Custody



Shaw Environmental and Infrastructure Inc. (a CB&I company)
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TI P3_FSS_SU1 NP_113

Page 2 of 3

Project Number: 500060

Project Name / Location: CTO-04 Phase III NorthPoint

FSS SU1

Purchase Order #: 201455

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date: 10-2-2015

Waybill Number: 125944620155106425

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Sample ID Number		Sample Description	Collection Information		Matrix	# of Containers	Preservative (water) Preservative (soil)	Container Type	Gamma Scan	Analyses Requested				Dose Rate R/Hr
Date	Time	Method												
TI-TO04-NP-R-SU1-S010	9-25-15	North Point FSS Survey Unit 1	1334	G	SO	1	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S011		North Point FSS Survey Unit 1		G	SO	1	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S012	9-25-15	North Point FSS Survey Unit 1	1315	G	SO	1	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S013	9-25-15	North Point FSS Survey Unit 1	1310	G	SO	1	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S014		North Point FSS Survey Unit 1		G	SO	1	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S015	9-25-15	North Point FSS Survey Unit 1	1355	G	SO	1	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S016	9-25-15	North Point FSS Survey Unit 1	1307	G	SO	1	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S017	9-25-15	North Point FSS Survey Unit 1	1305	G	SO	1	16 oz Plastic	X						
TI-TO04-NP-R-SU1-S018		North Point FSS Survey Unit 1		G	SO	1	16 oz Plastic	X						
Special Instructions: 7 days ingrown draft and follow with 21 days final														
Level Of QC Required:														
<input type="checkbox"/> 24-hr <input type="checkbox"/> 3-day <input type="checkbox"/> 7-day <input checked="" type="checkbox"/> III														
Project Specific:														
Method Codes: C = Composite G = Grab Matrix Codes: DW = Drinking Water SO = Soil GW = Ground Water SL = Sludge WW = Waste Water CP = Chip Samples A = Air ABS=Asbestos, PO=Pipe Opening														
Relinquished By: <u>24</u> Date: 10-2-15 Time: 1330 Received By: <u>[Signature]</u> Date: 10-2-15 Time: 0800 Relinquished By: Date: Time: Received By: Date: Time:														



Shaw Environmental and Infrastructure Inc. (a CBI company)
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TI P3 FSS_SU1 NP 113

Page 3 of 3

Project Number: **500060**

Project Name / Location: CTO-04 Phase III NorthPoint

Purchase Order #: FSS SU1

201455

Shipment Date: 10-2-2015

Waybill Number: 128944620195106425

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Sampler's Name(s): N Molyneux

Collection Information

Date Time Method

9-25-15 1300 G

9-25-15 1300 G

Preservative (water)

Preservative (soil)

Container Type

16 oz Plastic

16 oz Plastic

Matrix

of

containers

SO 1

SO 1

Gamma Scan

N/A

Sample ID Number

Sample Description

North Point FSS Survey Unit 1

North Point FSS Survey Unit 1

Dose Rate μ R/hr

Special Instructions: 7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

☒ III

Project Specific:

Received By: B

Date: 10-2-15

Time: 1230

Received By: B

Date: 10-5-15

Time: 0800

Date: 10-5-15

Time: 0800

Date: 10-5-15

Time: 0800

G = Grab

C = Composite

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-14097-2

Login Number: 14097

List Source: TestAmerica St. Louis

List Number: 1

Creator: Daniels, Brian J

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-14097-1	TI-TO04-NP-R-SU1-S002	Solid	09/25/15 13:22	10/05/15 08:20
160-14097-2	TI-TO04-NP-R-SU1-S003	Solid	09/25/15 13:18	10/05/15 08:20
160-14097-3	TI-TO04-NP-R-SU1-S005	Solid	09/25/15 13:13	10/05/15 08:20
160-14097-4	TI-TO04-NP-R-SU1-S007	Solid	09/25/15 13:29	10/05/15 08:20
160-14097-5	TI-TO04-NP-R-SU1-S010	Solid	09/25/15 13:31	10/05/15 08:20
160-14097-6	TI-TO04-NP-R-SU1-S012	Solid	09/25/15 13:15	10/05/15 08:20
160-14097-7	TI-TO04-NP-R-SU1-S013	Solid	09/25/15 13:10	10/05/15 08:20
160-14097-8	TI-TO04-NP-R-SU1-S015	Solid	09/25/15 13:55	10/05/15 08:20
160-14097-9	TI-TO04-NP-R-SU1-S016	Solid	09/25/15 13:07	10/05/15 08:20
160-14097-10	TI-TO04-NP-R-SU1-S017	Solid	09/25/15 13:05	10/05/15 08:20
160-14097-11	TI-TO04-NP-R-SU1-S019	Solid	09/25/15 13:00	10/05/15 08:20

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Client Sample ID: TI-TO04-NP-R-SU1-S002

Lab Sample ID: 160-14097-1

Date Collected: 09/25/15 13:22

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.573		0.127	0.140		0.112	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Actinium-227	-0.0578	U	0.429	0.429		0.742	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Bismuth-212	0.398	U	0.379	0.382		0.636	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Bismuth-214	0.287		0.0905	0.0953		0.100	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Cesium-137	0.000726	U	0.0297	0.0297		0.0555	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Lead-210	0.683	U	1.25	1.25		1.73	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Lead-212	0.367		0.0913	0.103		0.0980	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Lead-214	0.239		0.0846	0.0882		0.116	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Potassium-40	8.84		1.16	1.47		0.668	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Protactinium-231	0.308	U	0.628	0.629		1.08	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Radium-226	0.287		0.0905	0.0953	0.500	0.100	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Radium-228	0.573		0.127	0.140		0.112	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Thallium-208	0.129		0.0536	0.0553		0.0540	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Thorium-228	0.367		0.0913	0.103		0.0980	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Thorium-232	0.573		0.127	0.140		0.112	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Thorium-234	0.324	U	0.423	0.425		1.39	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Uranium-235	0.171	U	0.163	0.164		0.357	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Uranium-238	0.324	U	0.423	0.425		1.39	pCi/g	10/08/15 09:27	10/29/15 07:56	1

Client Sample ID: TI-TO04-NP-R-SU1-S003

Lab Sample ID: 160-14097-2

Date Collected: 09/25/15 13:18

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.263		0.0838	0.0880		0.212	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Actinium-227	0.198	U	0.415	0.416		0.706	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Bismuth-212	0.243	U	0.492	0.493		0.848	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Bismuth-214	0.313		0.0976	0.103		0.108	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Cesium-137	-0.00454	U	0.0443	0.0443		0.0800	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Lead-210	0.210	U	1.00	1.01		1.92	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Lead-212	0.374		0.0843	0.0972		0.0851	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Lead-214	0.411		0.113	0.121		0.112	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Potassium-40	11.2		1.40	1.81		0.592	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Protactinium-231	0.224	U	0.261	0.262		1.64	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Radium-226	0.313		0.0976	0.103	0.500	0.108	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Radium-228	0.263		0.0838	0.0880		0.212	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Thallium-208	0.158		0.0518	0.0543		0.0515	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Thorium-228	0.374		0.0843	0.0972		0.0851	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Thorium-232	0.263		0.0838	0.0880		0.212	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Thorium-234	0.752	U	0.871	0.875		1.39	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Uranium-235	-0.0243	U	0.675	0.675		0.294	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Uranium-238	0.752	U	0.871	0.875		1.39	pCi/g	10/08/15 09:27	10/29/15 07:58	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Client Sample ID: TI-TO04-NP-R-SU1-S005

Lab Sample ID: 160-14097-3

Date Collected: 09/25/15 13:13

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.271		0.0916	0.0957		0.240	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Actinium-227	0.132	U	0.307	0.307		0.525	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Bismuth-212	0.288	U	0.453	0.454		0.764	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Bismuth-214	0.346		0.0868	0.0940		0.0495	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Cesium-137	-0.0133	U	0.0370	0.0370		0.0651	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Lead-210	1.44		0.941	0.956		1.24	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Lead-212	0.438		0.0884	0.105		0.0859	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Lead-214	0.371		0.0921	0.0999		0.0720	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Potassium-40	6.46		1.17	1.35		0.911	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Protactinium-231	0.198	U	0.415	0.416		1.00	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Radium-226	0.346		0.0868	0.0940	0.500	0.0495	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Radium-228	0.271		0.0916	0.0957		0.240	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Thallium-208	0.177		0.0453	0.0489		0.0266	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Thorium-228	0.438		0.0884	0.105		0.0859	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Thorium-232	0.271		0.0916	0.0957		0.240	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Thorium-234	0.554	U	0.654	0.656		1.13	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Uranium-235	0.00821	U	0.176	0.176		0.306	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Uranium-238	0.554	U	0.654	0.656		1.13	pCi/g	10/08/15 09:27	10/29/15 08:00	1

Client Sample ID: TI-TO04-NP-R-SU1-S007

Lab Sample ID: 160-14097-4

Date Collected: 09/25/15 13:29

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.223	U	0.135	0.137		0.292	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Actinium-227	0.137	U	0.275	0.276		0.711	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Bismuth-212	0.127	U	0.588	0.589		1.07	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Bismuth-214	0.209		0.111	0.113		0.161	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Cesium-137	-0.0200	U	0.350	0.350		0.104	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Lead-210	-0.255	U	1.82	1.82		1.84	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Lead-212	0.284		0.0850	0.0926		0.0926	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Lead-214	0.276		0.0921	0.0965		0.130	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Potassium-40	10.1		1.64	1.94		0.804	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Protactinium-231	-0.274	U	0.997	0.998		1.76	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Radium-226	0.209		0.111	0.113	0.500	0.161	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Radium-228	0.223	U	0.135	0.137		0.292	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Thallium-208	0.131		0.0627	0.0641		0.0579	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Thorium-228	0.284		0.0850	0.0926		0.0926	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Thorium-232	0.223	U	0.135	0.137		0.292	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Thorium-234	0.253	U	0.472	0.473		1.46	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Uranium-235	0.188	U	0.205	0.206		0.294	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Uranium-238	0.253	U	0.472	0.473		1.46	pCi/g	10/08/15 09:27	10/29/15 07:59	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Client Sample ID: TI-TO04-NP-R-SU1-S010

Lab Sample ID: 160-14097-5

Date Collected: 09/25/15 13:31

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.176	U	0.113	0.114		0.226	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Actinium-227	0.00646	U	0.399	0.399		0.707	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Bismuth-212	0.231	U	0.338	0.339		0.566	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Bismuth-214	0.342		0.0896	0.0964		0.0889	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Cesium-137	-0.0105	U	0.0446	0.0446		0.0791	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Lead-210	-0.344	U	1.44	1.44		1.87	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Lead-212	0.404		0.0871	0.102		0.0890	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Lead-214	0.346		0.0924	0.0991		0.121	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Potassium-40	8.92		1.29	1.58		0.805	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Protactinium-231	-0.0244	U	0.737	0.737		1.34	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Radium-226	0.342		0.0896	0.0964	0.500	0.0889	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Radium-228	0.176	U	0.113	0.114		0.226	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Thallium-208	0.130		0.0499	0.0517		0.0511	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Thorium-228	0.404		0.0871	0.102		0.0890	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Thorium-232	0.176	U	0.113	0.114		0.226	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Thorium-234	0.150	U	0.838	0.838		1.56	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Uranium-235	0.0918	U	0.186	0.187		0.332	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Uranium-238	0.150	U	0.838	0.838		1.56	pCi/g	10/08/15 09:27	10/29/15 08:44	1

Client Sample ID: TI-TO04-NP-R-SU1-S012

Lab Sample ID: 160-14097-6

Date Collected: 09/25/15 13:15

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.486		0.103	0.114		0.0767	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Actinium-227	0.0164	U	0.140	0.140		0.644	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Bismuth-212	-0.00343	U	0.482	0.482		0.889	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Bismuth-214	0.325		0.105	0.110		0.106	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Cesium-137	-0.00766	U	0.0408	0.0408		0.0730	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Lead-210	1.21	U	1.22	1.23		1.75	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Lead-212	0.223		0.106	0.110		0.118	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Lead-214	0.337		0.111	0.117		0.103	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Potassium-40	10.5		1.33	1.71		0.736	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Protactinium-231	0.212	U	0.276	0.277		1.67	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Radium-226	0.325		0.105	0.110	0.500	0.106	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Radium-228	0.486		0.103	0.114		0.0767	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Thallium-208	0.152		0.0515	0.0539		0.0527	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Thorium-228	0.223		0.106	0.110		0.118	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Thorium-232	0.486		0.103	0.114		0.0767	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Thorium-234	0.916	U	1.07	1.07		1.46	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Uranium-235	0.0544	U	0.191	0.191		0.351	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Uranium-238	0.916	U	1.07	1.07		1.46	pCi/g	10/08/15 09:27	10/29/15 08:46	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Client Sample ID: TI-TO04-NP-R-SU1-S013

Lab Sample ID: 160-14097-7

Date Collected: 09/25/15 13:10

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.575		0.145	0.156		0.0744	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Actinium-227	-0.0252	U	0.152	0.152		0.623	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Bismuth-212	0.0819	U	0.357	0.357		0.651	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Bismuth-214	0.323		0.0979	0.104		0.0949	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Cesium-137	0.00849	U	0.0312	0.0312		0.0563	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Lead-210	1.65	U	1.25	1.27		1.74	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Lead-212	0.334		0.0823	0.0929		0.0836	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Lead-214	0.346		0.0939	0.101		0.0971	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Potassium-40	7.95		1.14	1.40		0.540	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Protactinium-231	0.137	U	0.206	0.206		1.30	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Radium-226	0.323		0.0979	0.104	0.500	0.0949	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Radium-228	0.575		0.145	0.156		0.0744	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Thallium-208	0.111		0.0458	0.0472		0.0487	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Thorium-228	0.334		0.0823	0.0929		0.0836	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Thorium-232	0.575		0.145	0.156		0.0744	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Thorium-234	0.458	U	0.372	0.375		1.25	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Uranium-235	0.0920	U	0.176	0.176		0.298	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Uranium-238	0.458	U	0.372	0.375		1.25	pCi/g	10/08/15 09:27	10/29/15 08:47	1

Client Sample ID: TI-TO04-NP-R-SU1-S015

Lab Sample ID: 160-14097-8

Date Collected: 09/25/15 13:55

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.155	U	0.113	0.115		0.233	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Actinium-227	0.0376	U	0.279	0.279		0.495	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Bismuth-212	0.160	U	0.448	0.449		0.791	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Bismuth-214	0.365		0.0843	0.0925		0.0359	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Cesium-137	-0.00977	U	0.0364	0.0364		0.0651	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Lead-210	0.0175	U	0.735	0.735		1.38	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Lead-212	0.306		0.0685	0.0792		0.0626	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Lead-214	0.290		0.0725	0.0785		0.0603	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Potassium-40	10.9		1.43	1.81		0.515	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Protactinium-231	0.243	U	0.297	0.299		1.21	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Radium-226	0.365		0.0843	0.0925	0.500	0.0359	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Radium-228	0.155	U	0.113	0.115		0.233	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Thallium-208	0.128		0.0361	0.0385		0.0188	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Thorium-228	0.306		0.0685	0.0792		0.0626	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Thorium-232	0.155	U	0.113	0.115		0.233	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Thorium-234	0.204	U	0.185	0.186		1.14	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Uranium-235	0.00247	U	0.0434	0.0434		0.198	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Uranium-238	0.204	U	0.185	0.186		1.14	pCi/g	10/08/15 09:27	10/29/15 08:48	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Client Sample ID: TI-TO04-NP-R-SU1-S016

Lab Sample ID: 160-14097-9

Date Collected: 09/25/15 13:07

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.183	U	0.124	0.125		0.278	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Actinium-227	0.0891	U	0.240	0.240		0.635	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Bismuth-212	0.0579	U	0.550	0.550		1.03	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Bismuth-214	0.290		0.129	0.133		0.159	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Cesium-137	-0.0309	U	0.652	0.652		0.100	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Lead-210	1.15	U	1.12	1.13		1.64	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Lead-212	0.354		0.0863	0.0977		0.0848	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Lead-214	0.325		0.0956	0.101		0.0922	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Potassium-40	11.4		1.75	2.10		0.816	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Protactinium-231	0.347	U	0.694	0.695		1.52	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Radium-226	0.290		0.129	0.133	0.500	0.159	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Radium-228	0.183	U	0.124	0.125		0.278	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Thallium-208	0.137		0.0604	0.0621		0.0554	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Thorium-228	0.354		0.0863	0.0977		0.0848	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Thorium-232	0.183	U	0.124	0.125		0.278	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Thorium-234	0.607	U	0.495	0.499		1.31	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Uranium-235	0.143	U	0.174	0.174		0.256	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Uranium-238	0.607	U	0.495	0.499		1.31	pCi/g	10/08/15 09:27	10/29/15 08:49	1

Client Sample ID: TI-TO04-NP-R-SU1-S017

Lab Sample ID: 160-14097-10

Date Collected: 09/25/15 13:05

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.306		0.135	0.139		0.224	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Actinium-227	0.0291	U	0.442	0.442		0.779	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Bismuth-212	-0.131	U	0.532	0.532		0.958	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Bismuth-214	0.298		0.108	0.112		0.118	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Cesium-137	0.0215	U	0.0404	0.0405		0.0697	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Lead-210	0.266	U	0.958	0.959		1.80	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Lead-212	0.257		0.101	0.107		0.112	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Lead-214	0.244		0.101	0.104		0.139	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Potassium-40	9.62		1.56	1.85		1.01	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Protactinium-231	0.0210	U	0.324	0.324		1.13	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Radium-226	0.298		0.108	0.112	0.500	0.118	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Radium-228	0.306		0.135	0.139		0.224	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Thallium-208	0.0497	U	0.0433	0.0436		0.0635	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Thorium-228	0.257		0.101	0.107		0.112	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Thorium-232	0.306		0.135	0.139		0.224	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Thorium-234	0.130	U	0.507	0.507		1.59	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Uranium-235	0.177	U	0.154	0.155		0.262	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Uranium-238	0.130	U	0.507	0.507		1.59	pCi/g	10/08/15 09:27	10/29/15 08:45	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Client Sample ID: TI-TO04-NP-R-SU1-S019

Lab Sample ID: 160-14097-11

Date Collected: 09/25/15 13:00

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.233		0.116	0.118		0.175	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Actinium-227	0.211	U	0.432	0.433		0.730	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Bismuth-212	0.205	U	0.319	0.319		0.538	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Bismuth-214	0.282		0.0849	0.0898		0.0822	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Cesium-137	0.00616	U	0.0331	0.0331		0.0597	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Lead-210	0.464	U	0.791	0.793		1.33	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Lead-212	0.335		0.0809	0.0918		0.0710	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Lead-214	0.301		0.0763	0.0825		0.0978	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Potassium-40	10.4		1.31	1.69		0.847	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Protactinium-231	0.0526	U	0.110	0.111		1.56	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Radium-226	0.282		0.0849	0.0898	0.500	0.0822	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Radium-228	0.233		0.116	0.118		0.175	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Thallium-208	0.142		0.0488	0.0510		0.0391	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Thorium-228	0.335		0.0809	0.0918		0.0710	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Thorium-232	0.233		0.116	0.118		0.175	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Thorium-234	0.255	U	0.784	0.784		1.33	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Uranium-235	0.0109	U	0.158	0.158		0.327	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Uranium-238	0.255	U	0.784	0.784		1.33	pCi/g	10/08/15 09:27	10/29/15 09:26	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-215328/1-A

Matrix: Solid

Analysis Batch: 218952

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 215328

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.04665	U	0.0905	0.0906		0.160	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Actinium-227	0.007969	U	0.0950	0.0950		0.581	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Bismuth-212	0.0000	U	0.115	0.115		0.299	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Bismuth-214	-0.007408	U	0.0234	0.0235		0.140	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Cesium-137	-0.008018	U	0.0392	0.0392		0.0714	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Lead-210	-0.07329	U	0.771	0.771		1.38	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Lead-212	0.02590	U	0.0403	0.0405		0.0680	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Lead-214	-0.03097	U	1.24	1.24		0.118	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Potassium-40	-0.1681	U	0.736	0.736		0.910	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Protactinium-231	-0.05768	U	0.662	0.662		1.23	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Radium-226	-0.007408	U	0.0234	0.0235	0.500	0.140	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Radium-228	0.04665	U	0.0905	0.0906		0.160	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Thallium-208	0.003102	U	0.0276	0.0276		0.0526	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Thorium-228	0.02590	U	0.0403	0.0405		0.0680	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Thorium-232	0.04665	U	0.0905	0.0906		0.160	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Thorium-234	0.06055	U	0.456	0.456		0.829	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Uranium-235	0.001907	U	0.140	0.140		0.255	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Uranium-238	0.06055	U	0.456	0.456		0.829	pCi/g	10/08/15 09:27	10/29/15 07:52	1

Lab Sample ID: LCS 160-215328/2-A

Matrix: Solid

Analysis Batch: 218950

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 215328

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.2	98.55		10.4		1.21	pCi/g	101	87 - 116
Cesium-137	30.1	30.18		3.22		0.236	pCi/g	100	87 - 120
Cobalt-60	18.6	18.20		1.88		0.122	pCi/g	98	87 - 115

Lab Sample ID: 160-14097-1 DU

Matrix: Solid

Analysis Batch: 218952

Client Sample ID: TI-TO04-NP-R-SU1-S002

Prep Type: Total/NA

Prep Batch: 215328

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.573		0.4521		0.112		0.0595	pCi/g	0.48	1
Actinium-227	-0.0578	U	0.04850	U	0.268		0.472	pCi/g	0.15	1
Bismuth-212	0.398	U	0.1569	U	0.358		0.621	pCi/g	0.33	1
Bismuth-214	0.287		0.3094		0.0941		0.0830	pCi/g	0.12	1
Cesium-137	0.000726	U	-0.00616	U	0.0323		0.0576	pCi/g	0.11	1
Lead-210	0.683	U	0.02435	U	0.706		1.24	pCi/g	0.34	1
Lead-212	0.367		0.3647		0.0896		0.0716	pCi/g	0.01	1
Lead-214	0.239		0.3862		0.0943		0.0916	pCi/g	0.81	1
Potassium-40	8.84		8.503		1.37		0.524	pCi/g	0.12	1
Protactinium-231	0.308	U	0.3196	U	0.369		1.42	pCi/g	0.01	1
Radium-226	0.287		0.3094		0.0941	0.500	0.0830	pCi/g	0.12	1
Radium-228	0.573		0.4521		0.112		0.0595	pCi/g	0.48	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-14097-1 DU

Matrix: Solid

Analysis Batch: 218952

Client Sample ID: TI-TO04-NP-R-SU1-S002

Prep Type: Total/NA

Prep Batch: 215328

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.129		0.1528		0.0484		0.0340	pCi/g	0.23	1
Thorium-228	0.367		0.3647		0.0896		0.0716	pCi/g	0.01	1
Thorium-232	0.573		0.4521		0.112		0.0595	pCi/g	0.48	1
Thorium-234	0.324	U	0.8672	U	0.412		0.923	pCi/g	0.65	1
Uranium-235	0.171	U	0.02086	U	0.0510		0.279	pCi/g	0.70	1
Uranium-238	0.324	U	0.8672	U	0.412		0.923	pCi/g	0.65	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Rad

Leach Batch: 214457

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14097-1	TI-TO04-NP-R-SU1-S002	Total/NA	Solid	Dry and Grind	
160-14097-1 DU	TI-TO04-NP-R-SU1-S002	Total/NA	Solid	Dry and Grind	
160-14097-2	TI-TO04-NP-R-SU1-S003	Total/NA	Solid	Dry and Grind	
160-14097-3	TI-TO04-NP-R-SU1-S005	Total/NA	Solid	Dry and Grind	
160-14097-4	TI-TO04-NP-R-SU1-S007	Total/NA	Solid	Dry and Grind	
160-14097-5	TI-TO04-NP-R-SU1-S010	Total/NA	Solid	Dry and Grind	
160-14097-6	TI-TO04-NP-R-SU1-S012	Total/NA	Solid	Dry and Grind	
160-14097-7	TI-TO04-NP-R-SU1-S013	Total/NA	Solid	Dry and Grind	
160-14097-8	TI-TO04-NP-R-SU1-S015	Total/NA	Solid	Dry and Grind	
160-14097-9	TI-TO04-NP-R-SU1-S016	Total/NA	Solid	Dry and Grind	
160-14097-10	TI-TO04-NP-R-SU1-S017	Total/NA	Solid	Dry and Grind	
160-14097-11	TI-TO04-NP-R-SU1-S019	Total/NA	Solid	Dry and Grind	

Prep Batch: 215328

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14097-1	TI-TO04-NP-R-SU1-S002	Total/NA	Solid	Fill_Geo-21	214457
160-14097-1 DU	TI-TO04-NP-R-SU1-S002	Total/NA	Solid	Fill_Geo-21	214457
160-14097-2	TI-TO04-NP-R-SU1-S003	Total/NA	Solid	Fill_Geo-21	214457
160-14097-3	TI-TO04-NP-R-SU1-S005	Total/NA	Solid	Fill_Geo-21	214457
160-14097-4	TI-TO04-NP-R-SU1-S007	Total/NA	Solid	Fill_Geo-21	214457
160-14097-5	TI-TO04-NP-R-SU1-S010	Total/NA	Solid	Fill_Geo-21	214457
160-14097-6	TI-TO04-NP-R-SU1-S012	Total/NA	Solid	Fill_Geo-21	214457
160-14097-7	TI-TO04-NP-R-SU1-S013	Total/NA	Solid	Fill_Geo-21	214457
160-14097-8	TI-TO04-NP-R-SU1-S015	Total/NA	Solid	Fill_Geo-21	214457
160-14097-9	TI-TO04-NP-R-SU1-S016	Total/NA	Solid	Fill_Geo-21	214457
160-14097-10	TI-TO04-NP-R-SU1-S017	Total/NA	Solid	Fill_Geo-21	214457
160-14097-11	TI-TO04-NP-R-SU1-S019	Total/NA	Solid	Fill_Geo-21	214457
LCS 160-215328/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-215328/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-14255-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
11/12/2015 3:14:17 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Job ID: 160-14255-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-14255-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Job ID: 160-14255-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/14/2015 8:45 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04_SU1_FSS_NP-S001 (160-14255-1), TI-TO04_SU1_FSS_NP-S004 (160-14255-2), TI-TO04_SU1_FSS_NP-S006 (160-14255-3), TI-TO04_SU1_FSS_NP-S008 (160-14255-4), TI-TO04_SU1_FSS_NP-S009 (160-14255-5), TI-TO04_SU1_FSS_NP-S011 (160-14255-6), TI-TO04_SU1_FSS_NP-S014 (160-14255-7), TI-TO04_SU1_FSS_NP-S018 (160-14255-8) and TI-TO04_SU1_FSS_NP-S020 (160-14255-9) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/14/2015, prepared on 10/15/2015 and analyzed on 11/06/2015 and 11/10/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Shaw Environmental and Infrastructure Inc. (a CB&I company)
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_FSS_SU1 NP_113

Page 1 of 3

Project Number: 500060
Project Name / Location: CTO-04 Phase III NorthPoint
FSS SU1
Purchase Order #: 201455

Shipment Date: 10-13-2015
Waybill Number: 12894620102012697
Lab Destination: Earth Toxics Inc To Test America
Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Patricia Flynn
Phone/Fax Number: 925-288-2037
Address: 4005 Port Chicago Hwy
City: Concord, CA, 94520

Collection Information			Matrix	# of containers	Preservative (water) Preservative (soil) Container Type	Gamma Scan	Dose Rate μ R/hr	
Date	Time	Method						
TI-T004_SU1_FSS_NP-S001	North Point FSS Survey Unit 1	10-9-15	1307	G	SO 1	16 oz Plastic	X	5
TI-T004_SU1_FSS_NP-S002	North Point FSS Survey Unit 1	10-9-15	1306	G	SO 1	16 oz Plastic	X	5
TI-T004_SU1_FSS_NP-S003	North Point FSS Survey Unit 1	10-9-15	1306	G	SO 1	16 oz Plastic	X	5
TI-T004_SU1_FSS_NP-S004	North Point FSS Survey Unit 1	10-9-15	1306	G	SO 1	16 oz Plastic	X	5
TI-T004_SU1_FSS_NP-S005	North Point FSS Survey Unit 1	10-9-15	1303	G	SO 1	16 oz Plastic	X	5
TI-T004_SU1_FSS_NP-S006	North Point FSS Survey Unit 1	10-9-15	1303	G	SO 1	16 oz Plastic	X	5
TI-T004_SU1_FSS_NP-S007	North Point FSS Survey Unit 1	10-9-15	1309	G	SO 1	16 oz Plastic	X	5
TI-T004_SU1_FSS_NP-S008	North Point FSS Survey Unit 1	10-9-15	1315	G	SO 1	16 oz Plastic	X	5
TI-T004_SU1_FSS_NP-S009	North Point FSS Survey Unit 1	10-9-15	1315	G	SO 1	16 oz Plastic	X	5

Special Instructions: 7 days ingrown draft and follow with 21 days final

Level Of QC Required: ☐ 24-hr ☐ 3-day ☐ 7-day

Standard TAT ☐

Relinquished By: 77 Date: 10-13-15 Time: 1330 Received By: Die Clark Date: 10-14-15 Time: 0845

Relinquished By: Date: Time: Received By: Date: Time:

Method Codes: C = Composite G = Grab
Matrix Codes: DW = Drinking Water SO = Soil
GW = Ground Water SL = Sludge
WW = Waste Water CP = Chip Samples
A = Air ABS = Asbestos, PO = Pipe Opening



160-14255 Chain of Custody



Shaw Environmental and Infrastructure Inc. (a CB&I company)
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_FSS_SU1 NP_113

Page 3 of 3

Project Number: 500060
Project Name / Location: CTO-04 Phase III NorthPoint
FSS SU1
Purchase Order #: 201455

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Patricia Flynn
Phone/Fax Number: 925-288-2037
Address: 4005 Port Chicago Hwy
City: Concord, CA, 94520

Shipment Date: 10-13-2015
Waybill Number: 128944620092612697
Lab Destination: Earth Toxics Inc To Test America
Lab Contact Name / ph. #: Mike Dryden

Sample ID Number	Sample Description	Collection Information			Matrix	# of containers	Preservative (water)			Gamma Scan	Analyses Requested	Dose Rate μ R/hr
		Date	Time	Method			Preservative (soil)	Container Type				
TI-TO04_SU1_FSS_NP-S019	North Point FSS Survey Unit 1	<u>10-9-15</u>	<u>1322</u>	<u>G</u>	<u>SO</u>	<u>1</u>	<u>16-oz Plastic</u>	<u>X</u>	<u>X</u>			
TI-TO04_SU1_FSS_NP-S020	North Point FSS Survey Unit 1	<u>10-9-15</u>	<u>1322</u>	<u>G</u>	<u>SO</u>	<u>1</u>	<u>16 oz Plastic</u>	<u>X</u>	<u>X</u>			
<u>N</u>												
<u>A</u>												
<u>7 days ingrown draft and follow with 21 days final</u>												

Special Instructions:		Level Of QC Required:		Project Specific:	
<input type="checkbox"/> 24-hr	<input type="checkbox"/> 3-day	<input type="checkbox"/> 7-day	I	II	III
Relinquished By: <u>29</u>	Date: <u>10-13-15</u>	Received By: <u>Patricia Flynn</u>	Date: <u>10-14-15</u>		
Relinquished By:	Date:	Received By:	Date:		

Standard TAT <input type="checkbox"/>	Method Codes	Matrix Codes
	C = Composite	DW = Drinking Water
	G = Grab	GW = Ground Water
		WW = Waste Water
		A = Air
		SO = Soil
		SL = Sludge
		CP = Chip Samples
		ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-14255-2

Login Number: 14255

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-14255-1	TI-TO04_SU1_FSS_NP-S001	Solid	10/09/15 13:07	10/14/15 08:45
160-14255-2	TI-TO04_SU1_FSS_NP-S004	Solid	10/09/15 13:06	10/14/15 08:45
160-14255-3	TI-TO04_SU1_FSS_NP-S006	Solid	10/09/15 13:03	10/14/15 08:45
160-14255-4	TI-TO04_SU1_FSS_NP-S008	Solid	10/09/15 13:09	10/14/15 08:45
160-14255-5	TI-TO04_SU1_FSS_NP-S009	Solid	10/09/15 13:15	10/14/15 08:45
160-14255-6	TI-TO04_SU1_FSS_NP-S011	Solid	10/09/15 13:12	10/14/15 08:45
160-14255-7	TI-TO04_SU1_FSS_NP-S014	Solid	10/09/15 13:15	10/14/15 08:45
160-14255-8	TI-TO04_SU1_FSS_NP-S018	Solid	10/09/15 13:26	10/14/15 08:45
160-14255-9	TI-TO04_SU1_FSS_NP-S020	Solid	10/09/15 13:22	10/14/15 08:45

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S001

Lab Sample ID: 160-14255-1

Date Collected: 10/09/15 13:07

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.192	U	0.144	0.146		0.211	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Actinium-227	0.0993	U	0.524	0.524		0.905	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Bismuth-212	0.371	U	0.451	0.452		0.734	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Bismuth-214	0.380		0.132	0.138		0.145	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Cesium-137	0.00281	U	0.0412	0.0412		0.0757	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Lead-210	1.22	U	1.19	1.20		1.91	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Lead-212	0.324		0.0907	0.0999		0.0994	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Lead-214	0.335		0.101	0.107		0.133	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Potassium-40	10.5		1.40	1.77		0.587	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Protactinium-231	-0.0316	U	0.0770	0.0771		1.84	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Radium-226	0.380		0.132	0.138	0.500	0.145	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Radium-228	0.192	U	0.144	0.146		0.211	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Thallium-208	0.107		0.0422	0.0436		0.0457	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Thorium-228	0.324		0.0907	0.0999		0.0994	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Thorium-232	0.192	U	0.144	0.146		0.211	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Thorium-234	0.150	U	0.485	0.485		1.72	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Uranium-235	0.0518	U	0.177	0.177		0.336	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Uranium-238	0.150	U	0.485	0.485		1.72	pCi/g	10/15/15 14:22	11/10/15 19:43	1

Client Sample ID: TI-TO04_SU1_FSS_NP-S004

Lab Sample ID: 160-14255-2

Date Collected: 10/09/15 13:06

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.300		0.162	0.165		0.232	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Actinium-227	-0.127	U	0.433	0.433		0.750	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Bismuth-212	0.332	U	0.556	0.557		0.945	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Bismuth-214	0.383		0.117	0.123		0.0979	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Cesium-137	-0.0220	U	1.05	1.05		0.0949	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-210	0.746	U	0.944	0.948		1.55	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-212	0.307		0.105	0.113		0.110	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-214	0.392		0.124	0.131		0.115	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Potassium-40	11.9		1.69	2.08		0.675	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Protactinium-231	-0.269	U	1.00	1.00		1.76	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Radium-226	0.383		0.117	0.123	0.500	0.0979	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Radium-228	0.300		0.162	0.165		0.232	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thallium-208	0.162		0.0471	0.0500		0.0252	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-228	0.307		0.105	0.113		0.110	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-232	0.300		0.162	0.165		0.232	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-234	0.637	U	1.12	1.12		1.56	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Uranium-235	0.0560	U	0.183	0.183		0.369	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Uranium-238	0.637	U	1.12	1.12		1.56	pCi/g	10/15/15 14:22	11/06/15 18:00	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S006

Lab Sample ID: 160-14255-3

Date Collected: 10/09/15 13:03

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.406		0.105	0.113		0.0673	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Actinium-227	0.000	U	0.314	0.314		0.626	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Bismuth-212	0.0864	U	0.373	0.373		0.671	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Bismuth-214	0.325		0.0877	0.0940		0.0833	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Cesium-137	-0.00268	U	0.0284	0.0284		0.0526	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-210	0.362	U	0.773	0.774		1.31	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-212	0.353		0.0892	0.100		0.0829	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-214	0.245		0.0796	0.0836		0.103	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Potassium-40	9.43		1.19	1.53		0.592	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Protactinium-231	0.0130	U	0.0242	0.0243		1.44	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Radium-226	0.325		0.0877	0.0940	0.500	0.0833	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Radium-228	0.406		0.105	0.113		0.0673	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thallium-208	0.125		0.0403	0.0423		0.0316	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-228	0.353		0.0892	0.100		0.0829	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-232	0.406		0.105	0.113		0.0673	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-234	0.369	U	0.371	0.373		1.18	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Uranium-235	0.00197	U	0.00589	0.00589		0.298	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Uranium-238	0.369	U	0.371	0.373		1.18	pCi/g	10/15/15 14:22	11/06/15 18:00	1

Client Sample ID: TI-TO04_SU1_FSS_NP-S008

Lab Sample ID: 160-14255-4

Date Collected: 10/09/15 13:09

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.235	U	0.154	0.156		0.259	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Actinium-227	0.819	U	1.04	1.04		1.71	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Bismuth-212	0.295	U	0.490	0.491		0.831	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Bismuth-214	0.351		0.0959	0.103		0.0983	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Cesium-137	0.00465	U	0.0403	0.0403		0.0740	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-210	1.03	U	1.35	1.35		2.10	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-212	0.351		0.103	0.112		0.116	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-214	0.355		0.0993	0.106		0.102	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Potassium-40	10.1		1.40	1.74		0.648	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Protactinium-231	-0.0522	U	0.789	0.789		1.44	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Radium-226	0.351		0.0959	0.103	0.500	0.0983	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Radium-228	0.235	U	0.154	0.156		0.259	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thallium-208	0.0929		0.0536	0.0545		0.0802	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-228	0.351		0.103	0.112		0.116	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-232	0.235	U	0.154	0.156		0.259	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-234	1.15	U	1.10	1.11		1.57	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Uranium-235	0.0783	U	0.217	0.217		0.354	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Uranium-238	1.15	U	1.10	1.11		1.57	pCi/g	10/15/15 14:22	11/06/15 18:01	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S009

Lab Sample ID: 160-14255-5

Date Collected: 10/09/15 13:15

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.165	U	0.107	0.108		0.237	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Actinium-227	0.0583	U	0.152	0.152		0.721	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Bismuth-212	0.0903	U	0.441	0.441		0.792	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Bismuth-214	0.280		0.0923	0.0968		0.105	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Cesium-137	-0.00828	U	0.0371	0.0371		0.0663	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-210	0.819	U	0.961	0.966		1.55	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-212	0.295		0.0809	0.0894		0.0850	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-214	0.302		0.0843	0.0899		0.106	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Potassium-40	10.7		1.36	1.75		0.680	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Protactinium-231	-0.239	U	0.758	0.759		1.32	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Radium-226	0.280		0.0923	0.0968	0.500	0.105	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Radium-228	0.165	U	0.107	0.108		0.237	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thallium-208	0.119		0.0397	0.0415		0.0374	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-228	0.295		0.0809	0.0894		0.0850	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-232	0.165	U	0.107	0.108		0.237	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-234	0.603	U	0.879	0.881		1.52	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Uranium-235	-0.114	U	0.459	0.460		0.358	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Uranium-238	0.603	U	0.879	0.881		1.52	pCi/g	10/15/15 14:22	11/06/15 18:01	1

Client Sample ID: TI-TO04_SU1_FSS_NP-S011

Lab Sample ID: 160-14255-6

Date Collected: 10/09/15 13:12

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.513		0.133	0.143		0.127	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Actinium-227	-0.000693	U	0.396	0.396		0.704	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Bismuth-212	-0.123	U	0.516	0.517		0.928	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Bismuth-214	0.338		0.106	0.112		0.105	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Cesium-137	-0.00658	U	0.0375	0.0375		0.0689	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Lead-210	-0.424	U	2.18	2.18		1.71	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Lead-212	0.0574	U	0.0938	0.0941		0.159	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Lead-214	0.296		0.0923	0.0973		0.122	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Potassium-40	11.9		1.55	1.97		0.373	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Protactinium-231	0.556	U	0.531	0.534		1.44	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Radium-226	0.338		0.106	0.112	0.500	0.105	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Radium-228	0.513		0.133	0.143		0.127	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Thallium-208	0.0654	U	0.0518	0.0522		0.0752	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Thorium-228	0.0574	U	0.0938	0.0941		0.159	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Thorium-232	0.513		0.133	0.143		0.127	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Thorium-234	0.288	U	0.448	0.449		1.43	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Uranium-235	0.0177	U	0.0484	0.0484		0.308	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Uranium-238	0.288	U	0.448	0.449		1.43	pCi/g	10/15/15 14:22	11/06/15 18:02	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S014

Lab Sample ID: 160-14255-7

Date Collected: 10/09/15 13:15

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.199	U	0.131	0.133		0.253	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Actinium-227	0.226	U	0.423	0.423		0.712	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Bismuth-212	0.0320	U	0.492	0.492		0.930	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Bismuth-214	0.295		0.144	0.147		0.153	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Cesium-137	-0.0146	U	0.0459	0.0460		0.0802	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Lead-210	0.0641	U	1.05	1.05		1.99	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Lead-212	0.328		0.107	0.115		0.120	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Lead-214	0.460		0.105	0.115		0.0918	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Potassium-40	11.5		1.39	1.82		0.735	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Protactinium-231	0.165	U	0.640	0.641		1.55	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Radium-226	0.295		0.144	0.147	0.500	0.153	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Radium-228	0.199	U	0.131	0.133		0.253	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Thallium-208	0.169		0.0565	0.0592		0.0557	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Thorium-228	0.328		0.107	0.115		0.120	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Thorium-232	0.199	U	0.131	0.133		0.253	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Thorium-234	0.943	U	0.777	0.783		1.33	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Uranium-235	0.0496	U	0.205	0.206		0.365	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Uranium-238	0.943	U	0.777	0.783		1.33	pCi/g	10/15/15 14:22	11/06/15 18:03	1

Client Sample ID: TI-TO04_SU1_FSS_NP-S018

Lab Sample ID: 160-14255-8

Date Collected: 10/09/15 13:26

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.442		0.135	0.142		0.0831	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Actinium-227	0.0953	U	0.477	0.477		0.827	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Bismuth-212	0.170	U	0.449	0.449		0.792	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Bismuth-214	0.319		0.101	0.107		0.0944	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Cesium-137	0.0147	U	0.0287	0.0288		0.0501	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Lead-210	0.456	U	1.24	1.24		1.95	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Lead-212	0.348		0.0921	0.103		0.0961	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Lead-214	0.373		0.100	0.107		0.0989	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Potassium-40	10.6		1.38	1.76		0.604	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Protactinium-231	0.267	U	0.444	0.444		1.43	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Radium-226	0.319		0.101	0.107	0.500	0.0944	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Radium-228	0.442		0.135	0.142		0.0831	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Thallium-208	0.125		0.0396	0.0417		0.0386	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Thorium-228	0.348		0.0921	0.103		0.0961	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Thorium-232	0.442		0.135	0.142		0.0831	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Thorium-234	0.256	U	0.361	0.362		1.70	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Uranium-235	0.0406	U	0.188	0.188		0.332	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Uranium-238	0.256	U	0.361	0.362		1.70	pCi/g	10/15/15 14:22	11/06/15 18:04	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S020

Lab Sample ID: 160-14255-9

Date Collected: 10/09/15 13:22

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.193	U	0.130	0.131		0.324	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Actinium-227	0.137	U	0.389	0.389		0.675	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Bismuth-212	0.000	U	0.418	0.418		1.27	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Bismuth-214	0.538		0.130	0.142		0.0982	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Cesium-137	-0.0197	U	0.272	0.272		0.0974	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Lead-210	0.243	U	1.12	1.12		2.05	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Lead-212	0.285		0.109	0.115		0.118	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Lead-214	0.451		0.104	0.114		0.111	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Potassium-40	10.2		1.77	2.05		1.33	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Protactinium-231	0.136	U	0.552	0.552		1.69	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Radium-226	0.538		0.130	0.142	0.500	0.0982	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Radium-228	0.193	U	0.130	0.131		0.324	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Thallium-208	0.138		0.0570	0.0588		0.0427	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Thorium-228	0.285		0.109	0.115		0.118	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Thorium-232	0.193	U	0.130	0.131		0.324	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Thorium-234	-0.0274	U	0.0458	0.0459		1.67	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Uranium-235	0.000411	U	0.00189	0.00189		0.365	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Uranium-238	-0.0274	U	0.0458	0.0459		1.67	pCi/g	10/15/15 14:22	11/06/15 18:34	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-216722/1-A

Matrix: Solid

Analysis Batch: 220522

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 216722

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.09145	U	0.139	0.139		0.235	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Actinium-227	-0.08146	U	0.394	0.394		0.713	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Bismuth-212	0.0000	U	0.298	0.298		1.15	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Bismuth-214	-0.01082	U	0.114	0.114		0.181	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Cesium-137	-0.01192	U	0.0966	0.0966		0.119	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Lead-210	-0.1111	U	1.15	1.15		2.03	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Lead-212	-0.03897	U	0.364	0.364		0.108	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Lead-214	-0.02351	U	0.193	0.193		0.163	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Potassium-40	-0.4119	U	16.5	16.5		1.18	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Protactinium-231	-0.03712	U	0.0723	0.0725		2.08	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Radium-226	-0.01082	U	0.114	0.114	0.500	0.181	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Radium-228	0.09145	U	0.139	0.139		0.235	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Thallium-208	-0.004964	U	0.0463	0.0463		0.0893	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Thorium-228	-0.03897	U	0.364	0.364		0.108	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Thorium-232	0.09145	U	0.139	0.139		0.235	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Thorium-234	0.8720	U	0.989	0.993		1.42	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Uranium-235	-0.02962	U	0.145	0.145		0.267	pCi/g	10/15/15 14:22	11/06/15 17:58	1
Uranium-238	0.8720	U	0.989	0.993		1.42	pCi/g	10/15/15 14:22	11/06/15 17:58	1

Lab Sample ID: LCS 160-216722/2-A

Matrix: Solid

Analysis Batch: 220512

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 216722

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.2	94.31		9.90		1.05	pCi/g	97	87 - 116
Cesium-137	30.1	29.28		3.12		0.226	pCi/g	97	87 - 120
Cobalt-60	18.5	17.74		1.83		0.0657	pCi/g	96	87 - 115

Lab Sample ID: 160-14255-1 DU

Matrix: Solid

Analysis Batch: 221048

Client Sample ID: TI-TO04_SU1_FSS_NP-S001

Prep Type: Total/NA

Prep Batch: 216722

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.192	U	0.4441		0.144		0.118	pCi/g	0.87	1
Actinium-227	0.0993	U	-0.00961	4	0.404		0.707	pCi/g	0.12	1
Bismuth-212	0.371	U	-0.1816	U	0.442		0.766	pCi/g	0.62	1
Bismuth-214	0.380		0.4305		0.111		0.0960	pCi/g	0.20	1
Cesium-137	0.00281	U	0.01610	U	0.0188		0.0297	pCi/g	0.22	1
Lead-210	1.22	U	0.6210	U	0.674		1.09	pCi/g	0.32	1
Lead-212	0.324		0.4003		0.133		0.111	pCi/g	0.33	1
Lead-214	0.335		0.3502		0.0947		0.0934	pCi/g	0.07	1
Potassium-40	10.5		10.91		1.69		0.559	pCi/g	0.12	1
Protactinium-231	-0.0316	U	-0.2083	U	0.717		1.25	pCi/g	0.22	1
Radium-226	0.380		0.4305		0.111	0.500	0.0960	pCi/g	0.20	1
Radium-228	0.192	U	0.4441		0.144		0.118	pCi/g	0.87	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-14255-1 DU

Matrix: Solid

Analysis Batch: 221048

Client Sample ID: TI-TO04_SU1_FSS_NP-S001

Prep Type: Total/NA

Prep Batch: 216722

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.107		0.1392		0.0450		0.0383	pCi/g	0.37	1
Thorium-228	0.324		0.4003		0.133		0.111	pCi/g	0.33	1
Thorium-232	0.192	U	0.4441		0.144		0.118	pCi/g	0.87	1
Thorium-234	0.150	U	0.3745	U	0.737		1.24	pCi/g	0.18	1
Uranium-235	0.0518	U	-0.04839	U	0.180		0.309	pCi/g	0.28	1
Uranium-238	0.150	U	0.3745	U	0.737		1.24	pCi/g	0.18	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Rad

Leach Batch: 216474

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14255-1	TI-TO04_SU1_FSS_NP-S001	Total/NA	Solid	Dry and Grind	
160-14255-1 DU	TI-TO04_SU1_FSS_NP-S001	Total/NA	Solid	Dry and Grind	
160-14255-2	TI-TO04_SU1_FSS_NP-S004	Total/NA	Solid	Dry and Grind	
160-14255-3	TI-TO04_SU1_FSS_NP-S006	Total/NA	Solid	Dry and Grind	
160-14255-4	TI-TO04_SU1_FSS_NP-S008	Total/NA	Solid	Dry and Grind	
160-14255-5	TI-TO04_SU1_FSS_NP-S009	Total/NA	Solid	Dry and Grind	
160-14255-6	TI-TO04_SU1_FSS_NP-S011	Total/NA	Solid	Dry and Grind	
160-14255-7	TI-TO04_SU1_FSS_NP-S014	Total/NA	Solid	Dry and Grind	
160-14255-8	TI-TO04_SU1_FSS_NP-S018	Total/NA	Solid	Dry and Grind	
160-14255-9	TI-TO04_SU1_FSS_NP-S020	Total/NA	Solid	Dry and Grind	

Prep Batch: 216722

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14255-1	TI-TO04_SU1_FSS_NP-S001	Total/NA	Solid	Fill_Geo-21	216474
160-14255-1 DU	TI-TO04_SU1_FSS_NP-S001	Total/NA	Solid	Fill_Geo-21	216474
160-14255-2	TI-TO04_SU1_FSS_NP-S004	Total/NA	Solid	Fill_Geo-21	216474
160-14255-3	TI-TO04_SU1_FSS_NP-S006	Total/NA	Solid	Fill_Geo-21	216474
160-14255-4	TI-TO04_SU1_FSS_NP-S008	Total/NA	Solid	Fill_Geo-21	216474
160-14255-5	TI-TO04_SU1_FSS_NP-S009	Total/NA	Solid	Fill_Geo-21	216474
160-14255-6	TI-TO04_SU1_FSS_NP-S011	Total/NA	Solid	Fill_Geo-21	216474
160-14255-7	TI-TO04_SU1_FSS_NP-S014	Total/NA	Solid	Fill_Geo-21	216474
160-14255-8	TI-TO04_SU1_FSS_NP-S018	Total/NA	Solid	Fill_Geo-21	216474
160-14255-9	TI-TO04_SU1_FSS_NP-S020	Total/NA	Solid	Fill_Geo-21	216474
LCS 160-216722/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-216722/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-14100-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
10/30/2015 5:33:40 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14100-2

Job ID: 160-14100-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-14100-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14100-2

Job ID: 160-14100-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/5/2015 8:20 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-NP-R-SU5-S010 (160-14100-1), TI-TO04-NP-R-SU5-S011 (160-14100-2) and TI-TO04-NP-R-SU5-S012 (160-14100-3) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/05/2015, prepared on 10/08/2015 and analyzed on 10/29/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Shaw Environmental and Infrastructure Inc. (a CB&I company)
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TI_P3_FSS_SU5 NP_115

Page 1 of 1

Project Number: **500060**
Project Name / Location: **CTO-04 Phase III NorthPoint**
Purchase Order #: **201455**

Shipment Date: **10-2-2015**
Waybill Number: **12890462018506425**
Lab Destination: **Earth Toxics Inc To Test America**
Lab Contact Name / ph. #: **Mike Dryden**

Project Manager: **Ulrika Messer**
(Name & phone #)

Send Report To: **Patricia Flynn**

Phone/Fax Number: **925-288-2037**

Address: **4005 Port Chicago Hwy**

City: **Concord, CA, 94520**

Sampler's Name(s): **U. R. S. L. S.**

Collection Information

Date Time Method

9/28/15 1320 G

9/28/15 1341 G

9/28/15 1356 G

Preservative (water)

Preservative (soil)

Container Type

16 oz Plastic

16 oz Plastic

16 oz Plastic

of containers

Matrix

SO

SO

SO

Gamma Scan

N/A

X

X

X

North Point FSS Survey Unit 5 Sidewall

North Point FSS Survey Unit 5 Sidewall

North Point FSS Survey Unit 5 Sidewall

TI-TO04-NP-R-SU5-S010

TI-TO04-NP-R-SU5-S011

TI-TO04-NP-R-SU5-S012

TI-TO04-NP-R-SU5-S010

TI-TO04-NP-R-SU5-S011

TI-TO04-NP-R-SU5-S012

TI-TO04-NP-R-SU5-S010

TI-TO04-NP-R-SU5-S011

TI-TO04-NP-R-SU5-S012

TI-TO04-NP-R-SU5-S010

TI-TO04-NP-R-SU5-S011

TI-TO04-NP-R-SU5-S012

TI-TO04-NP-R-SU5-S010

TI-TO04-NP-R-SU5-S011

TI-TO04-NP-R-SU5-S012

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-14100-2

Login Number: 14100

List Source: TestAmerica St. Louis

List Number: 1

Creator: Daniels, Brian J

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14100-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14100-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14100-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-14100-1	TI-TO04-NP-R-SU5-S010	Solid	09/28/15 13:20	10/05/15 08:20
160-14100-2	TI-TO04-NP-R-SU5-S011	Solid	09/28/15 13:41	10/05/15 08:20
160-14100-3	TI-TO04-NP-R-SU5-S012	Solid	09/28/15 13:56	10/05/15 08:20

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14100-2

Client Sample ID: TI-TO04-NP-R-SU5-S010

Date Collected: 09/28/15 13:20

Date Received: 10/05/15 08:20

Lab Sample ID: 160-14100-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.221		0.146	0.148		0.219	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Actinium-227	0.0319	U	0.181	0.181		0.553	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Bismuth-212	0.224	U	0.389	0.390		0.667	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Bismuth-214	0.246		0.0927	0.0962		0.0775	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Cesium-137	0.000696	U	0.0230	0.0230		0.0454	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Lead-210	0.218	U	0.791	0.791		1.45	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Lead-212	0.299		0.0808	0.0895		0.0801	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Lead-214	0.285		0.0709	0.0769		0.0686	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Potassium-40	10.3		1.41	1.76		0.524	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Protactinium-231	0.0390	U	0.671	0.671		1.22	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Radium-226	0.246		0.0927	0.0962	0.500	0.0775	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Radium-228	0.221		0.146	0.148		0.219	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Thallium-208	0.117		0.0420	0.0437		0.0313	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Thorium-228	0.299		0.0808	0.0895		0.0801	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Thorium-232	0.221		0.146	0.148		0.219	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Thorium-234	0.539	U	0.616	0.619		1.07	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Uranium-235	0.0689	U	0.0983	0.0985		0.164	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Uranium-238	0.539	U	0.616	0.619		1.07	pCi/g	10/08/15 09:27	10/29/15 09:32	1

Client Sample ID: TI-TO04-NP-R-SU5-S011

Date Collected: 09/28/15 13:41

Date Received: 10/05/15 08:20

Lab Sample ID: 160-14100-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.911		0.292	0.306		0.172	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Actinium-227	0.214	U	0.604	0.605		1.04	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Bismuth-212	0.350	U	0.865	0.866		1.52	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Bismuth-214	0.560		0.158	0.169		0.140	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Cesium-137	0.0182	U	0.0633	0.0633		0.127	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Lead-210	0.926	U	1.49	1.49		2.35	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Lead-212	0.533		0.131	0.148		0.130	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Lead-214	0.721		0.174	0.190		0.151	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Potassium-40	10.4		2.16	2.41		1.81	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Protactinium-231	0.275	U	0.312	0.314		2.63	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Radium-226	0.560		0.158	0.169	0.500	0.140	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Radium-228	0.911		0.292	0.306		0.172	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Thallium-208	0.116		0.0723	0.0732		0.100	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Thorium-228	0.533		0.131	0.148		0.130	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Thorium-232	0.911		0.292	0.306		0.172	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Thorium-234	1.40	U	1.27	1.28		1.88	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Uranium-235	0.252	U	0.227	0.228		0.376	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Uranium-238	1.40	U	1.27	1.28		1.88	pCi/g	10/08/15 09:27	10/29/15 09:31	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14100-2

Client Sample ID: TI-TO04-NP-R-SU5-S012

Lab Sample ID: 160-14100-3

Date Collected: 09/28/15 13:56

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.568		0.161	0.171		0.116	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Actinium-227	0.0793	U	0.367	0.367		0.639	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Bismuth-212	0.178	U	0.454	0.455		0.792	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Bismuth-214	0.366		0.112	0.119		0.104	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Cesium-137	-0.00372	U	0.0324	0.0324		0.0594	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Lead-210	0.692	U	0.824	0.828		1.35	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Lead-212	0.407		0.0812	0.0968		0.0737	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Lead-214	0.361		0.0953	0.102		0.103	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Potassium-40	10.2		1.27	1.64		0.623	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Protactinium-231	0.220	U	0.587	0.588		1.26	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Radium-226	0.366		0.112	0.119	0.500	0.104	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Radium-228	0.568		0.161	0.171		0.116	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Thallium-208	0.212		0.0446	0.0497		0.0173	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Thorium-228	0.407		0.0812	0.0968		0.0737	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Thorium-232	0.568		0.161	0.171		0.116	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Thorium-234	1.10	U	0.744	0.753		1.16	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Uranium-235	0.0447	U	0.117	0.117		0.384	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Uranium-238	1.10	U	0.744	0.753		1.16	pCi/g	10/08/15 09:27	10/29/15 10:05	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14100-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-215328/1-A

Matrix: Solid

Analysis Batch: 218952

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 215328

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.04665	U	0.0905	0.0906		0.160	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Actinium-227	0.007969	U	0.0950	0.0950		0.581	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Bismuth-212	0.0000	U	0.115	0.115		0.299	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Bismuth-214	-0.007408	U	0.0234	0.0235		0.140	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Cesium-137	-0.008018	U	0.0392	0.0392		0.0714	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Lead-210	-0.07329	U	0.771	0.771		1.38	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Lead-212	0.02590	U	0.0403	0.0405		0.0680	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Lead-214	-0.03097	U	1.24	1.24		0.118	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Potassium-40	-0.1681	U	0.736	0.736		0.910	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Protactinium-231	-0.05768	U	0.662	0.662		1.23	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Radium-226	-0.007408	U	0.0234	0.0235	0.500	0.140	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Radium-228	0.04665	U	0.0905	0.0906		0.160	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Thallium-208	0.003102	U	0.0276	0.0276		0.0526	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Thorium-228	0.02590	U	0.0403	0.0405		0.0680	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Thorium-232	0.04665	U	0.0905	0.0906		0.160	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Thorium-234	0.06055	U	0.456	0.456		0.829	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Uranium-235	0.001907	U	0.140	0.140		0.255	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Uranium-238	0.06055	U	0.456	0.456		0.829	pCi/g	10/08/15 09:27	10/29/15 07:52	1

Lab Sample ID: LCS 160-215328/2-A

Matrix: Solid

Analysis Batch: 218950

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 215328

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.2	98.55		10.4		1.21	pCi/g	101	87 - 116
Cesium-137	30.1	30.18		3.22		0.236	pCi/g	100	87 - 120
Cobalt-60	18.6	18.20		1.88		0.122	pCi/g	98	87 - 115

Lab Sample ID: 160-14097-A-1-E DU

Matrix: Solid

Analysis Batch: 218952

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 215328

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.573		0.4521		0.112		0.0595	pCi/g	0.48	1
Actinium-227	-0.0578	U	0.04850	U	0.268		0.472	pCi/g	0.15	1
Bismuth-212	0.398	U	0.1569	U	0.358		0.621	pCi/g	0.33	1
Bismuth-214	0.287		0.3094		0.0941		0.0830	pCi/g	0.12	1
Cesium-137	0.000726	U	-0.00616	U	0.0323		0.0576	pCi/g	0.11	1
Lead-210	0.683	U	0.02435	U	0.706		1.24	pCi/g	0.34	1
Lead-212	0.367		0.3647		0.0896		0.0716	pCi/g	0.01	1
Lead-214	0.239		0.3862		0.0943		0.0916	pCi/g	0.81	1
Potassium-40	8.84		8.503		1.37		0.524	pCi/g	0.12	1
Protactinium-231	0.308	U	0.3196	U	0.369		1.42	pCi/g	0.01	1
Radium-226	0.287		0.3094		0.0941	0.500	0.0830	pCi/g	0.12	1
Radium-228	0.573		0.4521		0.112		0.0595	pCi/g	0.48	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14100-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-14097-A-1-E DU

Matrix: Solid

Analysis Batch: 218952

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 215328

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.129		0.1528		0.0484		0.0340	pCi/g	0.23	1
Thorium-228	0.367		0.3647		0.0896		0.0716	pCi/g	0.01	1
Thorium-232	0.573		0.4521		0.112		0.0595	pCi/g	0.48	1
Thorium-234	0.324	U	0.8672	U	0.412		0.923	pCi/g	0.65	1
Uranium-235	0.171	U	0.02086	U	0.0510		0.279	pCi/g	0.70	1
Uranium-238	0.324	U	0.8672	U	0.412		0.923	pCi/g	0.65	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14100-2

Rad

Leach Batch: 214457

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14097-A-1-E DU	Duplicate	Total/NA	Solid	Dry and Grind	
160-14100-1	TI-TO04-NP-R-SU5-S010	Total/NA	Solid	Dry and Grind	
160-14100-2	TI-TO04-NP-R-SU5-S011	Total/NA	Solid	Dry and Grind	
160-14100-3	TI-TO04-NP-R-SU5-S012	Total/NA	Solid	Dry and Grind	

Prep Batch: 215328

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14097-A-1-E DU	Duplicate	Total/NA	Solid	Fill_Geo-21	214457
160-14100-1	TI-TO04-NP-R-SU5-S010	Total/NA	Solid	Fill_Geo-21	214457
160-14100-2	TI-TO04-NP-R-SU5-S011	Total/NA	Solid	Fill_Geo-21	214457
160-14100-3	TI-TO04-NP-R-SU5-S012	Total/NA	Solid	Fill_Geo-21	214457
LCS 160-215328/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-215328/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-17267-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
6/6/2016 6:06:08 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17267-2

Job ID: 160-17267-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-17267-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17267-2

Job ID: 160-17267-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 5/6/2016 8:30 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-NP-R-FSS-SWSU5-S5-14 (160-17267-1) and TI-TO04-NP-R-FSS-SWSU5-S5-15 (160-17267-2) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 05/06/2016, prepared on 05/11/2016 and analyzed on 06/01/2016.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



CB&I Capital Services
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # T1 P3_FSS_SU5 SW_252

Page 1 of 1

Project Number: 500060

Project Name / Location: CTO-04 Phase III Northpoint
FSS SU5 SIDEWALL

Purchase Order #: 201455

Shipment Date: 5/5/2016

Waybill Number: 28904620199451385

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Sampler's Name(s): N. Monahan

Sample ID Number

Sample Description

NorthPoint FSS Survey Unit 5
Sidewall located in SU7
Sidewall

NorthPoint FSS Survey Unit 5
Sidewall located in SU7
Sidewall

Collection Information

Date

Time

Method

Matrix

of containers

Preservative (water)

Preservative (soil)

Container Type

16 oz Plastic

16 oz Plastic

5

5

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

Standard TAT ☐

Relinquished By:

Relinquished By:

Date: 5-5-16

Time: 1330

Date:

Time:

Project Specific:

I II III

Date: 5-6-16

Time: 0838

Date:

Time:



160-17267 Chain of Custody

G = Grab

C = Composite

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-17267-2

Login Number: 17267

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17267-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17267-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17267-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-17267-1	TI-TO04-NP-R-FSS-SWSU5-S5-14	Solid	05/03/16 15:20	05/06/16 08:30
160-17267-2	TI-TO04-NP-R-FSS-SWSU5-S5-15	Solid	05/03/16 15:27	05/06/16 08:30

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17267-2

Client Sample ID: TI-TO04-NP-R-FSS-SWSU5-S5-14

Lab Sample ID: 160-17267-1

Date Collected: 05/03/16 15:20

Matrix: Solid

Date Received: 05/06/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.279	U	0.256	0.258		0.308	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Actinium-227	0.142	U	0.457	0.457		0.871	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Bismuth-212	0.000	U	0.231	0.231		1.36	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Bismuth-214	0.476		0.173	0.180		0.172	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Cesium-137	-0.0000549	U	0.0694	0.0694		0.125	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Lead-210	-0.313	U	1.11	1.11		1.78	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Lead-212	0.235		0.0785	0.0842		0.0897	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Lead-214	0.275		0.111	0.114		0.122	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Potassium-40	7.36		1.52	1.69		0.795	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Protactinium-231	0.0000000	U	2.08	2.08		3.62	pCi/g	05/11/16 09:07	06/01/16 11:12	1
	35									
Radium-226	0.476		0.173	0.180	0.500	0.172	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Radium-228	0.279	U	0.256	0.258		0.308	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thallium-208	0.0930	U	0.104	0.104		0.105	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thorium-228	0.235		0.0785	0.0842		0.0897	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thorium-232	0.279	U	0.256	0.258		0.308	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thorium-234	-0.180	U	1.09	1.09		1.91	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Uranium-235	0.139	U	0.320	0.320		0.507	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Uranium-238	-0.180	U	1.09	1.09		1.91	pCi/g	05/11/16 09:07	06/01/16 11:12	1

Client Sample ID: TI-TO04-NP-R-FSS-SWSU5-S5-15

Lab Sample ID: 160-17267-2

Date Collected: 05/03/16 15:27

Matrix: Solid

Date Received: 05/06/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.426		0.155	0.161		0.144	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Actinium-227	-0.0637	U	0.105	0.106		1.37	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Bismuth-212	0.318	U	0.574	0.575		0.975	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Bismuth-214	0.460		0.120	0.129		0.104	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Cesium-137	0.0230	U	0.0433	0.0434		0.0737	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Lead-210	0.654	U	1.16	1.16		1.67	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Lead-212	0.420		0.0873	0.103		0.0952	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Lead-214	0.406		0.0870	0.0967		0.105	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Potassium-40	10.1		1.37	1.72		0.760	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Protactinium-231	0.000	U	0.419	0.419		3.67	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Radium-226	0.460		0.120	0.129	0.500	0.104	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Radium-228	0.426		0.155	0.161		0.144	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thallium-208	0.113		0.0507	0.0521		0.0519	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thorium-228	0.420		0.0873	0.103		0.0952	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thorium-232	0.426		0.155	0.161		0.144	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thorium-234	-0.0229	U	1.30	1.30		1.81	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Uranium-235	0.0441	U	0.114	0.114		0.593	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Uranium-238	-0.0229	U	1.30	1.30		1.81	pCi/g	05/11/16 09:07	06/01/16 11:12	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17267-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-250742/1-A

Matrix: Solid

Analysis Batch: 254167

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 250742

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.03762	U	0.131	0.131		0.165	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Actinium-227	-0.3189	U	0.669	0.670		1.13	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Bismuth-212	0.3174	U	0.713	0.714		1.22	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Bismuth-214	-0.04844	U	0.0950	0.0951		0.328	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Cesium-137	0.0009919	U	0.0339	0.0339		0.0646	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Lead-210	-0.1884	U	1.01	1.01		1.77	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Lead-212	0.01546	U	0.0702	0.0703		0.121	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Lead-214	0.01222	U	0.0261	0.0262		0.155	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Potassium-40	0.1642	U	0.436	0.436		0.775	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Protactinium-231	-0.7275	U	2.27	2.27		3.84	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Radium-226	-0.04844	U	0.0950	0.0951	0.500	0.328	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Radium-228	0.03762	U	0.131	0.131		0.165	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Thallium-208	-0.002010	U	0.0409	0.0409		0.0550	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Thorium-228	0.01546	U	0.0702	0.0703		0.121	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Thorium-232	0.03762	U	0.131	0.131		0.165	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Thorium-234	0.3441	U	0.810	0.811		1.38	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Uranium-235	0.1001	U	0.284	0.284		0.482	pCi/g	05/11/16 09:07	06/01/16 08:17	1
Uranium-238	0.3441	U	0.810	0.811		1.38	pCi/g	05/11/16 09:07	06/01/16 08:17	1

Lab Sample ID: LCS 160-250742/2-A

Matrix: Solid

Analysis Batch: 254161

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 250742

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	94.83		9.96		1.11	pCi/g	98	87 - 116
Cesium-137	29.7	28.62		3.04		0.215	pCi/g	96	87 - 120
Cobalt-60	17.2	15.83		1.63		0.152	pCi/g	92	87 - 115

Lab Sample ID: 160-17264-A-1-E DU

Matrix: Solid

Analysis Batch: 254167

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 250742

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.582		0.2901		0.226		0.263	pCi/g	0.66	1
Actinium-227	-0.456	U	-0.4310	U	0.915		1.53	pCi/g	0.01	1
Bismuth-212	-0.383	U	0.1823	U	0.968		1.67	pCi/g	0.24	1
Bismuth-214	0.807		0.7484		0.162		0.100	pCi/g	0.16	1
Cesium-137	-0.0449	U	0.002608	U	0.0685		0.121	pCi/g	0.26	1
Lead-210	0.849	U	-0.8619	U	1.59		2.66	pCi/g	0.54	1
Lead-212	0.323		0.3986		0.101		0.0967	pCi/g	0.36	1
Lead-214	0.698		0.7252		0.162		0.157	pCi/g	0.08	1
Potassium-40	10.3		9.345		1.64		0.691	pCi/g	0.25	1
Protactinium-231	-1.06	U	0.6974	U	2.02		4.55	pCi/g	0.32	1
Radium-226	0.807		0.7484		0.162	0.500	0.100	pCi/g	0.16	1
Radium-228	0.582		0.2901		0.226		0.263	pCi/g	0.66	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17267-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-17264-A-1-E DU

Matrix: Solid

Analysis Batch: 254167

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 250742

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.196		0.1614		0.0579		0.0449	pCi/g	0.25	1
Thorium-228	0.323		0.3986		0.101		0.0967	pCi/g	0.36	1
Thorium-232	0.582		0.2901		0.226		0.263	pCi/g	0.66	1
Thorium-234	0.660	U	0.5742	U	1.41		2.35	pCi/g	0.04	1
Uranium-235	-0.285	U	0.1323	U	0.413		0.722	pCi/g	0.68	1
Uranium-238	0.660	U	0.5742	U	1.41		2.35	pCi/g	0.04	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17267-2

Rad

Leach Batch: 249816

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17264-A-1-E DU	Duplicate	Total/NA	Solid	Dry and Grind	
160-17267-1	TI-TO04-NP-R-FSS-SWSU5-S5-14	Total/NA	Solid	Dry and Grind	
160-17267-2	TI-TO04-NP-R-FSS-SWSU5-S5-15	Total/NA	Solid	Dry and Grind	

Prep Batch: 250742

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17264-A-1-E DU	Duplicate	Total/NA	Solid	Fill_Geo-21	249816
160-17267-1	TI-TO04-NP-R-FSS-SWSU5-S5-14	Total/NA	Solid	Fill_Geo-21	249816
160-17267-2	TI-TO04-NP-R-FSS-SWSU5-S5-15	Total/NA	Solid	Fill_Geo-21	249816
LCS 160-250742/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-250742/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-17479-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn

Micha Korinhizer

Authorized for release by:

6/16/2016 11:59:59 AM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17479-2

Job ID: 160-17479-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-17479-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17479-2

Job ID: 160-17479-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 05/21/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 11.5° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-NP-R-FSS-SWSU5-S5-01 (160-17479-1), TI-TO04-NP-R-FSS-SWSU5-S5-02 (160-17479-2) and TI-TO04-NP-R-FSS-SWSU5-S5-23 (160-17479-3) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 05/23/2016, prepared on 05/24/2016 and analyzed on 06/14/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-17479-2

Login Number: 17479

List Source: TestAmerica St. Louis

List Number: 1

Creator: McKinney, Gerrod E

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17479-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17479-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17479-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-17479-1	TI-TO04-NP-R-FSS-SWSU5-S5-01	Solid	05/19/16 13:36	05/21/16 09:05
160-17479-2	TI-TO04-NP-R-FSS-SWSU5-S5-02	Solid	05/19/16 13:28	05/21/16 09:05
160-17479-3	TI-TO04-NP-R-FSS-SWSU5-S5-23	Solid	05/19/16 13:17	05/21/16 09:05

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17479-2

Client Sample ID: TI-TO04-NP-R-FSS-SWSU5-S5-01

Lab Sample ID: 160-17479-1

Date Collected: 05/19/16 13:36

Matrix: Solid

Date Received: 05/21/16 09:05

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.518		0.166	0.174		0.131	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Actinium-227	0.00800	U	0.0144	0.0145		0.984	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Bismuth-212	0.479	U	0.938	0.939		1.60	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Bismuth-214	0.440		0.135	0.143		0.0936	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Cesium-137	-0.00549	U	0.0572	0.0572		0.107	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Lead-210	1.36	U	1.31	1.32		1.71	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Lead-212	0.398		0.101	0.113		0.114	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Lead-214	0.524		0.119	0.131		0.0948	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Potassium-40	9.18		1.68	1.93		0.945	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Protactinium-231	0.320	U	1.13	1.13		3.74	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Radium-226	0.440		0.135	0.143	0.500	0.0936	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Radium-228	0.518		0.166	0.174		0.131	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Thallium-208	0.132		0.0567	0.0583		0.0510	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Thorium-228	0.398		0.101	0.113		0.114	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Thorium-232	0.518		0.166	0.174		0.131	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Thorium-234	-0.396	U	1.03	1.03		1.83	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Uranium-235	0.0824	U	0.165	0.166		0.687	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Uranium-238	-0.396	U	1.03	1.03		1.83	pCi/g	05/24/16 09:32	06/14/16 10:23	1

Client Sample ID: TI-TO04-NP-R-FSS-SWSU5-S5-02

Lab Sample ID: 160-17479-2

Date Collected: 05/19/16 13:28

Matrix: Solid

Date Received: 05/21/16 09:05

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.687		0.168	0.182		0.0747	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Actinium-227	-0.138	U	0.585	0.585		1.14	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Bismuth-212	0.000	U	0.347	0.347		1.05	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Bismuth-214	0.136	U	0.0802	0.0814		0.273	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Cesium-137	0.0252	U	0.0458	0.0459		0.0778	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Lead-210	0.395	U	1.23	1.23		2.08	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Lead-212	0.385		0.0776	0.0922		0.0810	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Lead-214	0.344		0.112	0.118		0.112	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Potassium-40	9.59		1.28	1.61		0.588	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Protactinium-231	0.543	U	1.97	1.97		4.09	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Radium-226	0.136	U	0.0802	0.0814	0.500	0.273	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Radium-228	0.687		0.168	0.182		0.0747	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thallium-208	0.151		0.0499	0.0523		0.0425	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thorium-228	0.385		0.0776	0.0922		0.0810	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thorium-232	0.687		0.168	0.182		0.0747	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thorium-234	0.472	U	1.02	1.02		1.72	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Uranium-235	-0.169	U	0.457	0.457		0.763	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Uranium-238	0.472	U	1.02	1.02		1.72	pCi/g	05/24/16 09:32	06/14/16 10:39	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17479-2

Client Sample ID: TI-TO04-NP-R-FSS-SWSU5-S5-23

Lab Sample ID: 160-17479-3

Date Collected: 05/19/16 13:17

Matrix: Solid

Date Received: 05/21/16 09:05

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.375		0.149	0.154		0.118	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Actinium-227	0.215	U	0.334	0.335		0.922	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Bismuth-212	0.00360	U	0.633	0.633		1.13	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Bismuth-214	0.303		0.0977	0.103		0.0994	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Cesium-137	0.000912	U	0.0583	0.0583		0.104	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Lead-210	-1.04	U	1.52	1.53		2.69	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Lead-212	0.424		0.0843	0.101		0.0894	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Lead-214	0.434		0.0967	0.107		0.113	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Potassium-40	10.2		1.32	1.69		0.520	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Protactinium-231	0.000	U	0.270	0.270		3.09	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Radium-226	0.303		0.0977	0.103	0.500	0.0994	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Radium-228	0.375		0.149	0.154		0.118	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thallium-208	0.133		0.0509	0.0527		0.0503	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thorium-228	0.424		0.0843	0.101		0.0894	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thorium-232	0.375		0.149	0.154		0.118	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thorium-234	-0.122	U	1.40	1.40		2.39	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Uranium-235	-0.0293	U	0.0538	0.0539		0.763	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Uranium-238	-0.122	U	1.40	1.40		2.39	pCi/g	05/24/16 09:32	06/14/16 10:39	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17479-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-253010/1-A

Matrix: Solid

Analysis Batch: 256386

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 253010

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.1157	U	0.290	0.290		0.375	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Actinium-227	-0.01896	U	0.578	0.578		1.03	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Bismuth-212	-0.006440	U	1.02	1.02		1.02	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Bismuth-214	0.01737	U	0.0489	0.0489		0.300	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Cesium-137	-0.08501	U	0.0825	0.0830		0.161	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Lead-210	-0.2029	U	1.30	1.30		1.98	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Lead-212	-0.05696	U	0.224	0.224		0.176	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Lead-214	-0.04790	U	0.125	0.125		0.167	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Potassium-40	0.2682	U	0.465	0.466		0.799	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Protactinium-231	0.0000	U	0.497	0.497		4.36	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Radium-226	0.01737	U	0.0489	0.0489	0.500	0.300	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Radium-228	-0.1157	U	0.290	0.290		0.375	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Thallium-208	0.02625	U	0.0487	0.0488		0.0847	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Thorium-228	-0.05696	U	0.224	0.224		0.176	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Thorium-232	-0.1157	U	0.290	0.290		0.375	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Thorium-234	0.2767	U	0.779	0.779		1.28	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Uranium-235	-0.07241	U	0.611	0.611		0.589	pCi/g	05/20/16 10:12	06/14/16 21:32	1
Uranium-238	0.2767	U	0.779	0.779		1.28	pCi/g	05/20/16 10:12	06/14/16 21:32	1

Lab Sample ID: LCS 160-253010/2-A

Matrix: Solid

Analysis Batch: 256380

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 253010

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	96.72		10.1		1.03	pCi/g	100	87 - 116
Cesium-137	29.6	27.78		2.95		0.230	pCi/g	94	87 - 120
Cobalt-60	17.1	15.55		1.60		0.114	pCi/g	91	87 - 115

Lab Sample ID: 160-17429-A-1-E DU

Matrix: Solid

Analysis Batch: 256378

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 253010

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.421		0.4092		0.225		0.218	pCi/g	0.03	1
Actinium-227	0.177	U	-0.06545	U	0.232		1.25	pCi/g	0.31	1
Bismuth-212	-0.324	U	0.2669	U	0.495		0.844	pCi/g	0.48	1
Bismuth-214	0.735		0.5407		0.137		0.106	pCi/g	0.62	1
Cesium-137	-0.0509	U	-0.04761	U	0.0785		0.131	pCi/g	0.02	1
Lead-210	0.199	U	0.6450	U	1.49		2.49	pCi/g	0.15	1
Lead-212	0.315		0.4382		0.100		0.0838	pCi/g	0.49	1
Lead-214	0.534		0.5963		0.131		0.104	pCi/g	0.20	1
Potassium-40	9.67		9.059		1.57		0.609	pCi/g	0.18	1
Protactinium-231	0.211	U	-0.8366	U	2.67		4.48	pCi/g	0.23	1
Radium-226	0.735		0.5407		0.137	0.500	0.106	pCi/g	0.62	1
Radium-228	0.421		0.4092		0.225		0.218	pCi/g	0.03	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17479-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-17429-A-1-E DU

Matrix: Solid

Analysis Batch: 256378

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 253010

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.173		0.1603		0.0581		0.0510	pCi/g	0.11	1
Thorium-228	0.315		0.4382		0.100		0.0838	pCi/g	0.49	1
Thorium-232	0.421		0.4092		0.225		0.218	pCi/g	0.03	1
Thorium-234	0.998	U	0.5439	U	1.18		1.98	pCi/g	0.20	1
Uranium-235	-0.0219	U	0.05200	U	0.0678		0.828	pCi/g	0.72	1
Uranium-238	0.998	U	0.5439	U	1.18		1.98	pCi/g	0.20	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17479-2

Rad

Leach Batch: 251784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17429-A-1-E DU	Duplicate	Total/NA	Solid	Dry and Grind	

Leach Batch: 252427

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17479-1	TI-TO04-NP-R-FSS-SWSU5-S5-01	Total/NA	Solid	Dry and Grind	
160-17479-2	TI-TO04-NP-R-FSS-SWSU5-S5-02	Total/NA	Solid	Dry and Grind	
160-17479-3	TI-TO04-NP-R-FSS-SWSU5-S5-23	Total/NA	Solid	Dry and Grind	

Prep Batch: 253010

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17429-A-1-E DU	Duplicate	Total/NA	Solid	Fill_Geo-21	251784
160-17479-1	TI-TO04-NP-R-FSS-SWSU5-S5-01	Total/NA	Solid	Fill_Geo-21	252427
160-17479-2	TI-TO04-NP-R-FSS-SWSU5-S5-02	Total/NA	Solid	Fill_Geo-21	252427
160-17479-3	TI-TO04-NP-R-FSS-SWSU5-S5-23	Total/NA	Solid	Fill_Geo-21	252427
LCS 160-253010/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-253010/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-17240-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
6/2/2016 12:02:24 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-2

Job ID: 160-17240-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-17240-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-2

Job ID: 160-17240-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 5/5/2016 8:40 AM; the samples arrived in good condition, properly preserved. The temperatures of the 2 coolers at receipt time were 19.0° C and 19.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-NP-FSS SU5-LLRO518CH-S001 (160-17240-1), TITO04-NP-FSS SU5-LLRO518CH-S002 (160-17240-2), TITO04-NP-FSS SU5-LLRO518CH-S003 (160-17240-3), TITO04-NP-FSS SU5-LLRO518CH-S004 (160-17240-4) and TITO04-NP-FSS SU5-LLRO518CH-S005 (160-17240-5) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 05/05/2016, prepared on 05/06/2016 and analyzed on 05/30/2016.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-17240-2

Login Number: 17240

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-17240-1	TITO04-NP-FSS SU5-LLRO518CH-S001	Solid	05/03/16 09:18	05/05/16 08:40
160-17240-2	TITO04-NP-FSS SU5-LLRO518CH-S002	Solid	05/03/16 09:26	05/05/16 08:40
160-17240-3	TITO04-NP-FSS SU5-LLRO518CH-S003	Solid	05/03/16 09:35	05/05/16 08:40
160-17240-4	TITO04-NP-FSS SU5-LLRO518CH-S004	Solid	05/03/16 09:48	05/05/16 08:40
160-17240-5	TITO04-NP-FSS SU5-LLRO518CH-S005	Solid	05/03/16 09:58	05/05/16 08:40

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-2

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S001

Lab Sample ID: 160-17240-1

Date Collected: 05/03/16 09:18

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.388	U	0.323	0.326		0.404	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Actinium-227	-0.186	U	0.900	0.901		1.30	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Bismuth-212	0.432	U	1.01	1.01		1.74	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Bismuth-214	0.846		0.207	0.225		0.173	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Cesium-137	0.00154	U	0.0802	0.0802		0.144	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Lead-210	1.45	U	1.60	1.61		2.18	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Lead-212	0.721		0.134	0.163		0.138	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Lead-214	0.627		0.135	0.150		0.160	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Potassium-40	13.8		2.01	2.46		0.841	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Protactinium-231	0.000	U	0.511	0.511		4.69	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Radium-226	0.846		0.207	0.225	0.500	0.173	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Radium-228	0.388	U	0.323	0.326		0.404	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Thallium-208	0.302		0.0756	0.0818		0.0425	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Thorium-228	0.721		0.134	0.163		0.138	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Thorium-232	0.388	U	0.323	0.326		0.404	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Thorium-234	0.392	U	1.40	1.40		2.36	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Uranium-235	0.0999	U	0.339	0.339		0.707	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Uranium-238	0.392	U	1.40	1.40		2.36	pCi/g	05/06/16 09:55	05/30/16 20:54	1

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S002

Lab Sample ID: 160-17240-2

Date Collected: 05/03/16 09:26

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.05		0.281	0.301		0.138	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Actinium-227	-0.495	U	1.22	1.22		2.04	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Bismuth-212	0.315	U	0.810	0.810		1.42	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Bismuth-214	0.629		0.166	0.179		0.121	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Cesium-137	0.00488	U	0.0779	0.0779		0.140	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Lead-210	1.66	U	1.81	1.82		2.31	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Lead-212	0.662		0.132	0.157		0.137	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Lead-214	0.752		0.176	0.193		0.183	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Potassium-40	14.4		2.11	2.58		0.569	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Protactinium-231	0.392	U	1.64	1.65		5.33	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Radium-226	0.629		0.166	0.179	0.500	0.121	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Radium-228	1.05		0.281	0.301		0.138	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Thallium-208	0.218		0.0748	0.0782		0.0681	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Thorium-228	0.662		0.132	0.157		0.137	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Thorium-232	1.05		0.281	0.301		0.138	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Thorium-234	-0.982	U	1.45	1.45		3.49	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Uranium-235	0.115	U	0.242	0.242		1.15	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Uranium-238	-0.982	U	1.45	1.45		3.49	pCi/g	05/06/16 09:55	05/30/16 20:55	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-2

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S003

Lab Sample ID: 160-17240-3

Date Collected: 05/03/16 09:35

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.352		0.191	0.194		0.350	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Actinium-227	-0.422	U	1.05	1.05		1.76	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Bismuth-212	0.226	U	0.836	0.837		1.46	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Bismuth-214	0.629		0.167	0.179		0.146	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Cesium-137	-0.0648	U	0.0639	0.0643		0.178	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Lead-210	-0.195	U	1.89	1.89		3.24	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Lead-212	0.614		0.174	0.192		0.181	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Lead-214	0.800		0.191	0.208		0.244	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Potassium-40	14.6		1.82	2.36		0.935	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Protactinium-231	0.0000001	U	2.98	2.98		5.07	pCi/g	05/06/16 09:55	05/30/16 20:58	1
	16									
Radium-226	0.629		0.167	0.179	0.500	0.146	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Radium-228	0.352		0.191	0.194		0.350	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Thallium-208	0.285		0.0960	0.100		0.0975	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Thorium-228	0.614		0.174	0.192		0.181	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Thorium-232	0.352		0.191	0.194		0.350	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Thorium-234	0.761	U	1.43	1.43		2.38	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Uranium-235	0.131	U	0.391	0.391		0.688	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Uranium-238	0.761	U	1.43	1.43		2.38	pCi/g	05/06/16 09:55	05/30/16 20:58	1

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S004

Lab Sample ID: 160-17240-4

Date Collected: 05/03/16 09:48

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.720		0.456	0.462		0.479	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Actinium-227	0.209	U	0.600	0.600		1.19	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Bismuth-212	-0.411	U	1.32	1.32		2.29	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Bismuth-214	0.624		0.226	0.235		0.221	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Cesium-137	0.00648	U	0.104	0.104		0.183	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Lead-210	-0.00848	U	2.00	2.00		2.97	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Lead-212	0.628		0.134	0.156		0.142	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Lead-214	0.920		0.187	0.210		0.179	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Potassium-40	12.1		2.07	2.41		0.915	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Protactinium-231	0.000	U	0.532	0.532		5.01	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Radium-226	0.624		0.226	0.235	0.500	0.221	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Radium-228	0.720		0.456	0.462		0.479	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Thallium-208	0.311		0.0928	0.0983		0.0754	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Thorium-228	0.628		0.134	0.156		0.142	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Thorium-232	0.720		0.456	0.462		0.479	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Thorium-234	-0.0406	U	1.38	1.38		2.39	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Uranium-235	-0.0857	U	0.630	0.630		0.866	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Uranium-238	-0.0406	U	1.38	1.38		2.39	pCi/g	05/06/16 09:55	05/30/16 20:56	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-2

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S005

Lab Sample ID: 160-17240-5

Date Collected: 05/03/16 09:58

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.864		0.199	0.217		0.318	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Actinium-227	-0.394	U	1.00	1.00		1.68	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Bismuth-212	0.229	U	0.826	0.827		1.44	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Bismuth-214	0.593		0.137	0.150		0.0772	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Cesium-137	-0.00103	U	0.0674	0.0674		0.0881	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Lead-210	1.01	U	1.25	1.25		1.77	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Lead-212	0.572		0.112	0.134		0.128	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Lead-214	0.657		0.138	0.154		0.101	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Potassium-40	12.0		1.78	2.16		0.787	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Protactinium-231	0.757	U	1.78	1.79		4.08	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Radium-226	0.593		0.137	0.150	0.500	0.0772	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Radium-228	0.864		0.199	0.217		0.318	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Thallium-208	0.256		0.0681	0.0731		0.0473	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Thorium-228	0.572		0.112	0.134		0.128	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Thorium-232	0.864		0.199	0.217		0.318	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Thorium-234	-0.708	U	1.43	1.44		2.20	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Uranium-235	-0.181	U	0.268	0.268		0.962	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Uranium-238	-0.708	U	1.43	1.44		2.20	pCi/g	05/06/16 09:55	05/30/16 20:57	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-250337/1-A

Matrix: Solid

Analysis Batch: 253811

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 250337

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.1136	U	0.0904	0.0911		0.129	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Actinium-227	0.09998	U	0.211	0.212		0.636	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Bismuth-212	0.3864	U	0.729	0.730		1.25	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Bismuth-214	0.02959	U	0.0690	0.0690		0.185	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Cesium-137	0.01067	U	0.0731	0.0731		0.131	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Lead-210	0.08732	U	1.28	1.28		2.00	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Lead-212	-0.07859	U	0.0563	0.0572		0.188	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Lead-214	-0.03784	U	0.0933	0.0934		0.176	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Potassium-40	0.1005	U	0.897	0.897		1.20	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Protactinium-231	0.0000	U	0.415	0.415		2.71	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Radium-226	0.02959	U	0.0690	0.0690	0.500	0.185	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Radium-228	0.1136	U	0.0904	0.0911		0.129	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Thallium-208	0.01400	U	0.0576	0.0576		0.0505	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Thorium-228	-0.07859	U	0.0563	0.0572		0.188	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Thorium-232	0.1136	U	0.0904	0.0911		0.129	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Thorium-234	-0.8569	U	1.10	1.10		1.75	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Uranium-235	-0.03066	U	0.260	0.260		0.503	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Uranium-238	-0.8569	U	1.10	1.10		1.75	pCi/g	05/06/16 09:55	05/31/16 13:22	1

Lab Sample ID: LCS 160-250337/2-A

Matrix: Solid

Analysis Batch: 253765

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 250337

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	96.77		10.2		1.16	pCi/g	100	87 - 116
Cesium-137	29.7	29.38		3.13		0.229	pCi/g	99	87 - 120
Cobalt-60	17.2	16.76		1.73		0.0747	pCi/g	97	87 - 115

Lab Sample ID: 160-17240-1 DU

Matrix: Solid

Analysis Batch: 253764

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S001

Prep Type: Total/NA

Prep Batch: 250337

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.388	U	0.6284		0.463		0.477	pCi/g	0.30	1
Actinium-227	-0.186	U	-0.4872	U	1.20		2.01	pCi/g	0.14	1
Bismuth-212	0.432	U	0.3402	U	0.817		1.43	pCi/g	0.05	1
Bismuth-214	0.846		0.5815		0.185		0.153	pCi/g	0.65	1
Cesium-137	0.00154	U	0.03159	U	0.0910		0.158	pCi/g	0.18	1
Lead-210	1.45	U	2.303	U	2.08		3.31	pCi/g	0.23	1
Lead-212	0.721		0.7108		0.163		0.126	pCi/g	0.03	1
Lead-214	0.627		0.7339		0.185		0.167	pCi/g	0.32	1
Potassium-40	13.8		14.16		2.61		0.614	pCi/g	0.08	1
Protactinium-231	0.000	U	0.4605	U	1.68		5.45	pCi/g	0.21	1
Radium-226	0.846		0.5815		0.185	0.500	0.153	pCi/g	0.65	1
Radium-228	0.388	U	0.6284		0.463		0.477	pCi/g	0.30	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-17240-1 DU

Matrix: Solid

Analysis Batch: 253764

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S001

Prep Type: Total/NA

Prep Batch: 250337

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.302		0.2667		0.0919		0.0748	pCi/g	0.20	1
Thorium-228	0.721		0.7108		0.163		0.126	pCi/g	0.03	1
Thorium-232	0.388	U	0.6284		0.463		0.477	pCi/g	0.30	1
Thorium-234	0.392	U	1.380	U	0.834		2.16	pCi/g	0.44	1
Uranium-235	0.0999	U	-0.2990	U	0.460		1.42	pCi/g	0.50	1
Uranium-238	0.392	U	1.380	U	0.834		2.16	pCi/g	0.44	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-2

Rad

Leach Batch: 249625

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17240-1	TITO04-NP-FSS SU5-LLRO518CH-S001	Total/NA	Solid	Dry and Grind	
160-17240-1 DU	TITO04-NP-FSS SU5-LLRO518CH-S001	Total/NA	Solid	Dry and Grind	
160-17240-2	TITO04-NP-FSS SU5-LLRO518CH-S002	Total/NA	Solid	Dry and Grind	
160-17240-3	TITO04-NP-FSS SU5-LLRO518CH-S003	Total/NA	Solid	Dry and Grind	
160-17240-4	TITO04-NP-FSS SU5-LLRO518CH-S004	Total/NA	Solid	Dry and Grind	
160-17240-5	TITO04-NP-FSS SU5-LLRO518CH-S005	Total/NA	Solid	Dry and Grind	

Prep Batch: 250337

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17240-1	TITO04-NP-FSS SU5-LLRO518CH-S001	Total/NA	Solid	Fill_Geo-21	249625
160-17240-1 DU	TITO04-NP-FSS SU5-LLRO518CH-S001	Total/NA	Solid	Fill_Geo-21	249625
160-17240-2	TITO04-NP-FSS SU5-LLRO518CH-S002	Total/NA	Solid	Fill_Geo-21	249625
160-17240-3	TITO04-NP-FSS SU5-LLRO518CH-S003	Total/NA	Solid	Fill_Geo-21	249625
160-17240-4	TITO04-NP-FSS SU5-LLRO518CH-S004	Total/NA	Solid	Fill_Geo-21	249625
160-17240-5	TITO04-NP-FSS SU5-LLRO518CH-S005	Total/NA	Solid	Fill_Geo-21	249625
LCS 160-250337/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-250337/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-17243-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
6/2/2016 1:42:34 PM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Job ID: 160-17243-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-17243-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Job ID: 160-17243-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 5/5/2016 8:40 AM; the samples arrived in good condition, properly preserved. The temperatures of the 2 coolers at receipt time were 19.0° C and 19.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-NP-R-FSS-SU7-S001 (160-17243-1), TI-TO04-NP-R-FSS-SU7-S002 (160-17243-2), TI-TO04-NP-R-FSS-SU7-S003 (160-17243-3), TI-TO04-NP-R-FSS-SU7-S004 (160-17243-4), TI-TO04-NP-R-FSS-SU7-S005 (160-17243-5), TI-TO04-NP-R-FSS-SU7-S006 (160-17243-6), TI-TO04-NP-R-FSS-SU7-S007 (160-17243-7), TI-TO04-NP-R-FSS-SU7-S008 (160-17243-8), TI-TO04-NP-R-FSS-SU7-S009 (160-17243-9), TI-TO04-NP-R-FSS-SU7-S010 (160-17243-10), TI-TO04-NP-R-FSS-SU7-S011 (160-17243-11), TI-TO04-NP-R-FSS-SU7-S012 (160-17243-12), TI-TO04-NP-R-FSS-SU7-S013 (160-17243-13), TI-TO04-NP-R-FSS-SU7-S014 (160-17243-14), TI-TO04-NP-R-FSS-SU7-S015 (160-17243-15), TI-TO04-NP-R-FSS-SU7-S016 (160-17243-16), TI-TO04-NP-R-FSS-SU7-S017 (160-17243-17), TI-TO04-NP-R-FSS-SU7-S018 (160-17243-18), TI-TO04-NP-R-FSS-SU7-S019 (160-17243-19) and TI-TO04-NP-R-FSS-SU7-S020 (160-17243-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 05/05/2016, prepared on 05/06/2016 and analyzed on 05/30/2016 and 05/31/2016.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



CB&I Capital Services
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_FSS_SU7 NP_235

Page 1 of 2

Project Number: 500060
Project Name / Location: CTO-04 Phase III Northpoint
FSS SU7 SYSTEMATIC
Purchase Order #: 201455

Shipment Date: 5-4-16
Waybill Number: 1289446201900 3147
Lab Destination: Earth Toxics Inc To Test America
Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer
(Name & phone #)
Send Report To: Patricia Flynn
Phone/Fax Number: 925-288-2037
Address: 4005 Port Chicago Hwy
City: Concord, CA, 94520

Sampler's Name(s): <i>W. Morrison</i>		Collection Information		Matrix # of containers	Preservative (water) Preservative (soil) Container Type	Gamma Scan	Analyses Requested
Sample ID Number	Sample Description	Date	Time				
TI-TO04-NP-R-FSS-SU7-S001	Northpoint FSS Survey Unit 7 Systematic	5/3/16	1250	G	SO 1	16 oz Plastic	X
TI-TO04-NP-R-FSS-SU7-S002	Northpoint FSS Survey Unit 7 Systematic	5/3/16	1252	G	SO 1	16 oz Plastic	X
TI-TO04-NP-R-FSS-SU7-S003	Northpoint FSS Survey Unit 7 Systematic	5/3/16	1254	G	SO 1	16 oz Plastic	X
TI-TO04-NP-R-FSS-SU7-S004	Northpoint FSS Survey Unit 7 Systematic	5/3/16	1257	G	SO 1	16 oz Plastic	X
TI-TO04-NP-R-FSS-SU7-S005	Northpoint FSS Survey Unit 7 Systematic	5/3/16	1300	G	SO 1	16 oz Plastic	X
TI-TO04-NP-R-FSS-SU7-S006	Northpoint FSS Survey Unit 7 Systematic	5/3/16	1302	G	SO 1	16 oz Plastic	X
TI-TO04-NP-R-FSS-SU7-S007	Northpoint FSS Survey Unit 7 Systematic	5/3/16	1303	G	SO 1	16 oz Plastic	X
TI-TO04-NP-R-FSS-SU7-S008	Northpoint FSS Survey Unit 7 Systematic	5/3/16	1305	G	SO 1	16 oz Plastic	X
TI-TO04-NP-R-FSS-SU7-S009	Northpoint FSS Survey Unit 7 Systematic	5/3/16	1304	G	SO 1	16 oz Plastic	X
TI-TO04-NP-R-FSS-SU7-S010	Northpoint FSS Survey Unit 7 Systematic	5/3/16	1306	G	SO 1	16 oz Plastic	X

Dose Rate μ R/hr

Special Instructions: 7 days ingrown draft and follow with 21 days final

Level Of QC Required: ☐ 24-hr ☐ 3-day ☐ 7-day

Standard TAT ☐

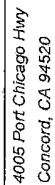
Relinquished By: *[Signature]* Date: 5-4-16 Time: 1230
Relinquished By: *[Signature]* Date: 5-4-16 Time: 0800

Project Specific: I II III

Method Codes: C = Composite G = Grab
Matrix Codes: DW = Drinking Water SO = Soil
GW = Ground Water SL = Sludge
WW = Waste Water CP = Chip Samples
A = Air ABS-Asbestos, PO=Pipe Opening



160-17243 Chain of Custody



Page 2 of 2

ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-17243-2

Login Number: 17243

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-17243-1	TI-TO04-NP-R-FSS-SU7-S001	Solid	05/03/16 12:50	05/05/16 08:40
160-17243-2	TI-TO04-NP-R-FSS-SU7-S002	Solid	05/03/16 12:52	05/05/16 08:40
160-17243-3	TI-TO04-NP-R-FSS-SU7-S003	Solid	05/03/16 12:54	05/05/16 08:40
160-17243-4	TI-TO04-NP-R-FSS-SU7-S004	Solid	05/03/16 12:57	05/05/16 08:40
160-17243-5	TI-TO04-NP-R-FSS-SU7-S005	Solid	05/03/16 13:00	05/05/16 08:40
160-17243-6	TI-TO04-NP-R-FSS-SU7-S006	Solid	05/03/16 13:02	05/05/16 08:40
160-17243-7	TI-TO04-NP-R-FSS-SU7-S007	Solid	05/03/16 13:03	05/05/16 08:40
160-17243-8	TI-TO04-NP-R-FSS-SU7-S008	Solid	05/03/16 13:05	05/05/16 08:40
160-17243-9	TI-TO04-NP-R-FSS-SU7-S009	Solid	05/03/16 13:04	05/05/16 08:40
160-17243-10	TI-TO04-NP-R-FSS-SU7-S010	Solid	05/03/16 13:06	05/05/16 08:40
160-17243-11	TI-TO04-NP-R-FSS-SU7-S011	Solid	05/03/16 13:09	05/05/16 08:40
160-17243-12	TI-TO04-NP-R-FSS-SU7-S012	Solid	05/03/16 13:11	05/05/16 08:40
160-17243-13	TI-TO04-NP-R-FSS-SU7-S013	Solid	05/03/16 13:14	05/05/16 08:40
160-17243-14	TI-TO04-NP-R-FSS-SU7-S014	Solid	05/03/16 13:16	05/05/16 08:40
160-17243-15	TI-TO04-NP-R-FSS-SU7-S015	Solid	05/03/16 13:18	05/05/16 08:40
160-17243-16	TI-TO04-NP-R-FSS-SU7-S016	Solid	05/03/16 13:19	05/05/16 08:40
160-17243-17	TI-TO04-NP-R-FSS-SU7-S017	Solid	05/03/16 13:21	05/05/16 08:40
160-17243-18	TI-TO04-NP-R-FSS-SU7-S018	Solid	05/03/16 13:23	05/05/16 08:40
160-17243-19	TI-TO04-NP-R-FSS-SU7-S019	Solid	05/03/16 13:24	05/05/16 08:40
160-17243-20	TI-TO04-NP-R-FSS-SU7-S020	Solid	05/03/16 13:26	05/05/16 08:40

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S001

Lab Sample ID: 160-17243-1

Date Collected: 05/03/16 12:50

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.478		0.228	0.234		0.313	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Actinium-227	0.133	U	0.362	0.363		1.34	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Bismuth-212	0.481	U	0.809	0.811		1.36	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Bismuth-214	0.467		0.129	0.138		0.113	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Cesium-137	-0.0183	U	0.0397	0.0397		0.0936	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Lead-210	0.422	U	1.04	1.04		1.65	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Lead-212	0.463		0.0975	0.114		0.114	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Lead-214	0.420		0.116	0.124		0.121	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Potassium-40	11.3		1.45	1.85		0.760	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Protactinium-231	0.704	U	1.72	1.72		3.86	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Radium-226	0.467		0.129	0.138	0.500	0.113	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Radium-228	0.478		0.228	0.234		0.313	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Thallium-208	0.194		0.0663	0.0693		0.0600	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Thorium-228	0.463		0.0975	0.114		0.114	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Thorium-232	0.478		0.228	0.234		0.313	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Thorium-234	0.455	U	0.387	0.390		2.84	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Uranium-235	0.202	U	0.166	0.167		0.261	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Uranium-238	0.455	U	0.387	0.390		2.84	pCi/g	05/06/16 10:27	05/30/16 22:02	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S002

Lab Sample ID: 160-17243-2

Date Collected: 05/03/16 12:52

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.445		0.277	0.280		0.296	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Actinium-227	0.279	U	0.682	0.683		1.15	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Bismuth-212	-0.234	U	0.826	0.827		1.43	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Bismuth-214	0.500		0.152	0.160		0.138	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Cesium-137	-0.0374	U	0.0883	0.0884		0.138	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Lead-210	-1.01	U	1.07	1.08		3.01	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Lead-212	0.327		0.105	0.113		0.147	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Lead-214	0.458		0.130	0.139		0.149	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Potassium-40	9.48		1.37	1.68		0.793	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Protactinium-231	0.0000000	U	2.53	2.53		4.31	pCi/g	05/06/16 10:27	05/30/16 22:04	1
	98									
Radium-226	0.500		0.152	0.160	0.500	0.138	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Radium-228	0.445		0.277	0.280		0.296	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Thallium-208	0.165		0.0586	0.0611		0.0570	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Thorium-228	0.327		0.105	0.113		0.147	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Thorium-232	0.445		0.277	0.280		0.296	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Thorium-234	-0.0108	U	1.29	1.29		2.19	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Uranium-235	-0.0608	U	0.394	0.394		0.595	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Uranium-238	-0.0108	U	1.29	1.29		2.19	pCi/g	05/06/16 10:27	05/30/16 22:04	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S003

Lab Sample ID: 160-17243-3

Date Collected: 05/03/16 12:54

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.299	U	0.173	0.175		0.373	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Actinium-227	0.188	U	0.418	0.418		0.759	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Bismuth-212	-0.320	U	0.935	0.936		1.62	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Bismuth-214	0.371		0.158	0.162		0.156	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Cesium-137	0.00454	U	0.0646	0.0646		0.115	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Lead-210	-0.127	U	1.31	1.31		1.99	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Lead-212	0.411		0.0973	0.111		0.107	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Lead-214	0.374		0.109	0.115		0.115	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Potassium-40	8.91		1.57	1.81		0.713	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Protactinium-231	0.335	U	0.990	0.991		3.40	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Radium-226	0.371		0.158	0.162	0.500	0.156	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Radium-228	0.299	U	0.173	0.175		0.373	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Thallium-208	0.0432	U	0.0904	0.0905		0.115	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Thorium-228	0.411		0.0973	0.111		0.107	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Thorium-232	0.299	U	0.173	0.175		0.373	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Thorium-234	-0.266	U	1.02	1.02		1.80	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Uranium-235	-0.0136	U	0.335	0.335		0.580	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Uranium-238	-0.266	U	1.02	1.02		1.80	pCi/g	05/06/16 10:27	05/30/16 22:03	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S004

Lab Sample ID: 160-17243-4

Date Collected: 05/03/16 12:57

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.183	U	0.258	0.259		0.366	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Actinium-227	0.331	U	0.482	0.483		1.41	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Bismuth-212	-0.583	U	1.21	1.21		2.04	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Bismuth-214	0.407		0.132	0.139		0.124	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Cesium-137	-0.0309	U	0.0938	0.0938		0.161	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Lead-210	-0.131	U	1.81	1.81		3.10	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Lead-212	0.406		0.0946	0.108		0.100	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Lead-214	0.545		0.112	0.126		0.137	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Potassium-40	11.1		1.68	2.03		0.471	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Protactinium-231	0.686	U	1.57	1.58		3.65	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Radium-226	0.407		0.132	0.139	0.500	0.124	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Radium-228	0.183	U	0.258	0.259		0.366	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Thallium-208	0.196		0.0587	0.0621		0.0449	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Thorium-228	0.406		0.0946	0.108		0.100	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Thorium-232	0.183	U	0.258	0.259		0.366	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Thorium-234	-0.190	U	1.83	1.83		3.12	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Uranium-235	-0.213	U	0.540	0.540		0.951	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Uranium-238	-0.190	U	1.83	1.83		3.12	pCi/g	05/06/16 10:27	05/30/16 22:35	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S005

Lab Sample ID: 160-17243-5

Date Collected: 05/03/16 13:00

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.446		0.143	0.151		0.184	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Actinium-227	-0.357	U	0.869	0.870		1.46	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Bismuth-212	1.16		0.470	0.485		0.377	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Bismuth-214	0.665		0.133	0.150		0.0992	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Cesium-137	0.0197	U	0.0517	0.0518		0.0891	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Lead-210	1.34	U	1.38	1.39		1.77	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Lead-212	0.430		0.0882	0.104		0.0981	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Lead-214	0.498		0.112	0.123		0.125	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Potassium-40	12.0		1.45	1.90		0.724	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Protactinium-231	0.762	U	1.60	1.60		3.53	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Radium-226	0.665		0.133	0.150	0.500	0.0992	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Radium-228	0.446		0.143	0.151		0.184	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Thallium-208	0.225		0.0585	0.0630		0.0480	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Thorium-228	0.430		0.0882	0.104		0.0981	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Thorium-232	0.446		0.143	0.151		0.184	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Thorium-234	0.148	U	0.218	0.219		2.60	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Uranium-235	-0.203	U	0.598	0.598		0.997	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Uranium-238	0.148	U	0.218	0.219		2.60	pCi/g	05/06/16 10:27	05/30/16 22:36	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S006

Lab Sample ID: 160-17243-6

Date Collected: 05/03/16 13:02

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.499		0.194	0.201		0.185	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Actinium-227	0.312	U	0.787	0.788		1.32	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Bismuth-212	0.457	U	0.899	0.900		1.52	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Bismuth-214	0.460		0.132	0.140		0.118	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Cesium-137	-0.00127	U	0.0514	0.0514		0.0928	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Lead-210	-1.59	U	0.949	0.967		3.34	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Lead-212	0.252		0.127	0.132		0.144	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Lead-214	0.278		0.112	0.115		0.162	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Potassium-40	10.5		1.41	1.77		0.772	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Protactinium-231	0.405	U	1.16	1.16		2.68	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Radium-226	0.460		0.132	0.140	0.500	0.118	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Radium-228	0.499		0.194	0.201		0.185	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Thallium-208	0.175		0.0724	0.0747		0.0735	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Thorium-228	0.252		0.127	0.132		0.144	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Thorium-232	0.499		0.194	0.201		0.185	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Thorium-234	0.319	U	0.853	0.853		1.32	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Uranium-235	0.0740	U	0.309	0.309		0.522	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Uranium-238	0.319	U	0.853	0.853		1.32	pCi/g	05/06/16 10:27	05/30/16 22:40	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S007

Lab Sample ID: 160-17243-7

Date Collected: 05/03/16 13:03

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.358		0.211	0.214		0.205	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Actinium-227	-0.241	U	0.631	0.631		0.909	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Bismuth-212	-0.251	U	1.26	1.26		2.18	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Bismuth-214	0.297		0.110	0.114		0.113	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Cesium-137	0.00446	U	0.0560	0.0560		0.101	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Lead-210	-0.677	U	1.04	1.04		2.14	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Lead-212	0.287		0.0821	0.0901		0.0938	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Lead-214	0.364		0.107	0.114		0.135	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Potassium-40	9.99		1.64	1.93		0.701	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Protactinium-231	0.000	U	0.657	0.657		3.34	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Radium-226	0.297		0.110	0.114	0.500	0.113	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Radium-228	0.358		0.211	0.214		0.205	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Thallium-208	0.110		0.0481	0.0494		0.0451	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Thorium-228	0.287		0.0821	0.0901		0.0938	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Thorium-232	0.358		0.211	0.214		0.205	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Thorium-234	-0.00522	U	1.06	1.06		1.84	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Uranium-235	0.125	U	0.264	0.264		0.548	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Uranium-238	-0.00522	U	1.06	1.06		1.84	pCi/g	05/06/16 10:27	05/30/16 22:37	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S008

Lab Sample ID: 160-17243-8

Date Collected: 05/03/16 13:05

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.537		0.160	0.169		0.0903	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Actinium-227	0.256	U	0.635	0.636		1.07	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Bismuth-212	0.265	U	0.711	0.712		1.23	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Bismuth-214	0.487		0.122	0.132		0.0842	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Cesium-137	-0.00659	U	0.0594	0.0594		0.106	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Lead-210	-0.0964	U	1.26	1.26		2.18	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Lead-212	0.444		0.0878	0.105		0.0987	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Lead-214	0.529		0.109	0.122		0.110	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Potassium-40	10.4		1.49	1.83		0.639	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Protactinium-231	-0.477	U	1.99	1.99		3.37	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Radium-226	0.487		0.122	0.132	0.500	0.0842	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Radium-228	0.537		0.160	0.169		0.0903	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Thallium-208	0.183		0.0526	0.0559		0.0384	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Thorium-228	0.444		0.0878	0.105		0.0987	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Thorium-232	0.537		0.160	0.169		0.0903	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Thorium-234	0.00651	U	0.0226	0.0226		1.74	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Uranium-235	0.105	U	0.368	0.368		0.618	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Uranium-238	0.00651	U	0.0226	0.0226		1.74	pCi/g	05/06/16 10:27	05/30/16 22:38	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S009

Lab Sample ID: 160-17243-9

Date Collected: 05/03/16 13:04

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.356		0.169	0.173		0.228	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Actinium-227	-0.427	U	0.892	0.893		1.49	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Bismuth-212	-0.0296	U	1.01	1.01		1.11	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Bismuth-214	0.280		0.120	0.124		0.159	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Cesium-137	-0.0236	U	0.0819	0.0819		0.147	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Lead-210	0.760	U	1.66	1.66		2.78	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Lead-212	0.267		0.0921	0.0984		0.127	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Lead-214	0.437		0.114	0.123		0.145	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Potassium-40	9.22		1.46	1.74		0.668	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Protactinium-231	-0.293	U	2.67	2.67		4.53	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Radium-226	0.280		0.120	0.124	0.500	0.159	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Radium-228	0.356		0.169	0.173		0.228	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Thallium-208	0.139		0.0532	0.0551		0.0507	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Thorium-228	0.267		0.0921	0.0984		0.127	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Thorium-232	0.356		0.169	0.173		0.228	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Thorium-234	-0.150	U	1.36	1.36		2.34	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Uranium-235	-0.241	U	0.307	0.308		0.849	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Uranium-238	-0.150	U	1.36	1.36		2.34	pCi/g	05/06/16 10:27	05/30/16 22:39	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S010

Lab Sample ID: 160-17243-10

Date Collected: 05/03/16 13:06

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.282		0.126	0.129		0.107	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Actinium-227	0.0478	U	0.0975	0.0976		1.04	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Bismuth-212	-0.0563	U	0.656	0.656		1.16	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Bismuth-214	0.314		0.0985	0.104		0.0932	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Cesium-137	-0.0251	U	0.0669	0.0669		0.114	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Lead-210	0.554	U	1.03	1.03		1.73	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Lead-212	0.306		0.0726	0.0827		0.0850	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Lead-214	0.366		0.103	0.110		0.0981	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Potassium-40	10.8		1.31	1.72		0.587	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Protactinium-231	0.559	U	1.38	1.39		3.15	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Radium-226	0.314		0.0985	0.104	0.500	0.0932	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Radium-228	0.282		0.126	0.129		0.107	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thallium-208	0.125		0.0457	0.0475		0.0394	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thorium-228	0.306		0.0726	0.0827		0.0850	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thorium-232	0.282		0.126	0.129		0.107	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thorium-234	0.628	U	0.690	0.693		0.933	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Uranium-235	0.0838	U	0.152	0.152		0.726	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Uranium-238	0.628	U	0.690	0.693		0.933	pCi/g	05/06/16 10:27	05/31/16 08:36	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S011

Lab Sample ID: 160-17243-11

Date Collected: 05/03/16 13:09

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.361		0.141	0.146		0.102	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Actinium-227	0.402	U	0.426	0.428		1.14	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Bismuth-212	-0.0599	U	0.884	0.884		1.42	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Bismuth-214	0.481		0.126	0.136		0.0926	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Cesium-137	0.0117	U	0.0718	0.0718		0.126	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Lead-210	-0.393	U	1.75	1.75		2.96	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Lead-212	0.480		0.0871	0.107		0.0729	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Lead-214	0.457		0.122	0.131		0.116	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Potassium-40	11.1		1.62	1.97		0.687	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Protactinium-231	0.360	U	1.34	1.34		4.34	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Radium-226	0.481		0.126	0.136	0.500	0.0926	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Radium-228	0.361		0.141	0.146		0.102	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thallium-208	0.193		0.0680	0.0709		0.0619	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thorium-228	0.480		0.0871	0.107		0.0729	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thorium-232	0.361		0.141	0.146		0.102	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thorium-234	-0.145	U	1.44	1.44		2.46	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Uranium-235	-0.0566	U	0.294	0.294		0.736	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Uranium-238	-0.145	U	1.44	1.44		2.46	pCi/g	05/06/16 10:27	05/31/16 08:39	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S012

Lab Sample ID: 160-17243-12

Date Collected: 05/03/16 13:11

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.426		0.129	0.136		0.152	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Actinium-227	0.211	U	0.576	0.576		0.972	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Bismuth-212	0.246	U	0.546	0.547		0.939	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Bismuth-214	0.437		0.105	0.114		0.0598	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Cesium-137	-0.0305	U	0.0658	0.0659		0.0922	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Lead-210	-0.0778	U	1.33	1.33		2.29	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Lead-212	0.345		0.0709	0.0838		0.0758	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Lead-214	0.382		0.0852	0.0941		0.0833	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Potassium-40	8.01		1.25	1.50		0.580	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Protactinium-231	-0.545	U	1.73	1.73		2.92	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Radium-226	0.437		0.105	0.114	0.500	0.0598	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Radium-228	0.426		0.129	0.136		0.152	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Thallium-208	0.155		0.0604	0.0625		0.0552	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Thorium-228	0.345		0.0709	0.0838		0.0758	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Thorium-232	0.426		0.129	0.136		0.152	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Thorium-234	-0.0418	U	0.985	0.985		1.39	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Uranium-235	-0.121	U	0.239	0.239		0.616	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Uranium-238	-0.0418	U	0.985	0.985		1.39	pCi/g	05/06/16 10:27	05/31/16 08:37	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S013

Lab Sample ID: 160-17243-13

Date Collected: 05/03/16 13:14

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.405		0.265	0.269		0.391	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Actinium-227	-0.345	U	0.756	0.757		1.08	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Bismuth-212	-0.335	U	0.951	0.952		1.65	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Bismuth-214	0.382		0.150	0.156		0.141	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Cesium-137	-0.0541	U	0.0879	0.0881		0.156	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Lead-210	-0.573	U	1.51	1.51		2.32	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Lead-212	0.388		0.0959	0.108		0.105	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Lead-214	0.436		0.144	0.151		0.143	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Potassium-40	9.47		1.82	2.06		1.10	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Protactinium-231	0.000	U	0.644	0.644		4.34	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Radium-226	0.382		0.150	0.156	0.500	0.141	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Radium-228	0.405		0.265	0.269		0.391	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thallium-208	0.0382	U	0.0885	0.0886		0.113	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thorium-228	0.388		0.0959	0.108		0.105	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thorium-232	0.405		0.265	0.269		0.391	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thorium-234	0.362	U	0.588	0.589		1.45	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Uranium-235	0.0169	U	0.131	0.131		0.614	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Uranium-238	0.362	U	0.588	0.589		1.45	pCi/g	05/06/16 10:27	05/31/16 08:36	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S014

Lab Sample ID: 160-17243-14

Date Collected: 05/03/16 13:16

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.359		0.148	0.153		0.147	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Actinium-227	0.256	U	0.664	0.665		1.12	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Bismuth-212	0.000	U	0.291	0.291		1.27	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Bismuth-214	0.0595	U	0.177	0.177		0.270	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Cesium-137	-0.0471	U	0.0576	0.0578		0.124	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Lead-210	-0.337	U	1.35	1.35		2.34	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Lead-212	0.307		0.0794	0.0888		0.0931	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Lead-214	0.417		0.109	0.118		0.0989	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Potassium-40	11.7		1.49	1.91		0.780	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Protactinium-231	-0.786	U	2.69	2.69		4.52	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Radium-226	0.0595	U	0.177	0.177	0.500	0.270	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Radium-228	0.359		0.148	0.153		0.147	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thallium-208	0.0902		0.0731	0.0737		0.0860	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thorium-228	0.307		0.0794	0.0888		0.0931	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thorium-232	0.359		0.148	0.153		0.147	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thorium-234	0.581	U	0.777	0.779		1.27	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Uranium-235	0.196		0.149	0.150		0.192	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Uranium-238	0.581	U	0.777	0.779		1.27	pCi/g	05/06/16 10:27	05/31/16 08:39	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S015

Lab Sample ID: 160-17243-15

Date Collected: 05/03/16 13:18

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.477		0.103	0.114		0.0706	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Actinium-227	0.122	U	0.601	0.601		1.02	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Bismuth-212	0.172	U	0.285	0.286		0.488	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Bismuth-214	0.357		0.104	0.111		0.0948	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Cesium-137	0.0170	U	0.0504	0.0504		0.0871	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Lead-210	0.318	U	1.18	1.18		2.00	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Lead-212	0.303		0.0732	0.0831		0.0867	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Lead-214	0.399		0.0931	0.102		0.104	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Potassium-40	11.1		1.33	1.75		0.592	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Protactinium-231	0.597	U	1.60	1.61		3.63	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Radium-226	0.357		0.104	0.111	0.500	0.0948	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Radium-228	0.477		0.103	0.114		0.0706	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thallium-208	0.152		0.0500	0.0524		0.0409	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thorium-228	0.303		0.0732	0.0831		0.0867	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thorium-232	0.477		0.103	0.114		0.0706	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thorium-234	0.350	U	0.752	0.753		1.95	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Uranium-235	0.168	U	0.354	0.354		0.767	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Uranium-238	0.350	U	0.752	0.753		1.95	pCi/g	05/06/16 10:27	05/31/16 09:15	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S016

Lab Sample ID: 160-17243-16

Date Collected: 05/03/16 13:19

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.219	U	0.113	0.116		0.351	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Actinium-227	0.206	U	0.507	0.508		1.28	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Bismuth-212	-0.247	U	0.696	0.696		1.20	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Bismuth-214	0.320		0.114	0.119		0.118	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Cesium-137	0.0244	U	0.0467	0.0467		0.0795	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Lead-210	-0.731	U	1.64	1.64		2.85	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Lead-212	0.306		0.0793	0.0886		0.0950	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Lead-214	0.372		0.111	0.117		0.102	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Potassium-40	11.5		1.43	1.85		0.565	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Protactinium-231	0.0000000	U	2.08	2.08		3.56	pCi/g	05/06/16 10:27	05/31/16 09:15	1
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Radium-226	0.320		0.114	0.119	0.500	0.118	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Radium-228	0.219	U	0.113	0.116		0.351	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thallium-208	0.106		0.0392	0.0407		0.0387	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thorium-228	0.306		0.0793	0.0886		0.0950	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thorium-232	0.219	U	0.113	0.116		0.351	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thorium-234	-0.157	U	1.44	1.44		2.46	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Uranium-235	0.000	U	0.134	0.134		0.831	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Uranium-238	-0.157	U	1.44	1.44		2.46	pCi/g	05/06/16 10:27	05/31/16 09:15	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S017

Lab Sample ID: 160-17243-17

Date Collected: 05/03/16 13:21

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.197	U	0.208	0.209		0.270	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Actinium-227	-0.0363	U	0.593	0.593		0.778	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Bismuth-212	-0.194	U	0.662	0.662		1.14	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Bismuth-214	0.390		0.104	0.112		0.0883	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Cesium-137	0.000	U	0.0331	0.0331		0.0744	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Lead-210	0.0163	U	1.08	1.08		1.87	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Lead-212	0.414		0.0715	0.0894		0.0687	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Lead-214	0.420		0.0831	0.0938		0.0901	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Potassium-40	10.0		1.20	1.58		0.443	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Protactinium-231	-0.706	U	2.21	2.21		3.70	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Radium-226	0.390		0.104	0.112	0.500	0.0883	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Radium-228	0.197	U	0.208	0.209		0.270	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Thallium-208	0.149		0.0445	0.0472		0.0394	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Thorium-228	0.414		0.0715	0.0894		0.0687	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Thorium-232	0.197	U	0.208	0.209		0.270	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Thorium-234	-0.0730	U	1.16	1.16		1.97	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Uranium-235	0.0735	U	0.204	0.204		0.713	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Uranium-238	-0.0730	U	1.16	1.16		1.97	pCi/g	05/06/16 10:27	05/31/16 09:16	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S018

Lab Sample ID: 160-17243-18

Date Collected: 05/03/16 13:23

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.300		0.115	0.119		0.209	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Actinium-227	0.210	U	0.486	0.487		0.700	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Bismuth-212	-0.0523	U	0.690	0.690		1.23	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Bismuth-214	0.314		0.137	0.141		0.131	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Cesium-137	-0.0247	U	0.0736	0.0736		0.126	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Lead-210	-0.366	U	1.07	1.07		1.68	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Lead-212	0.284		0.0776	0.0859		0.0934	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Lead-214	0.323		0.0873	0.0936		0.108	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Potassium-40	10.3		1.45	1.80		0.586	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Protactinium-231	-0.278	U	2.09	2.09		3.57	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Radium-226	0.314		0.137	0.141	0.500	0.131	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Radium-228	0.300		0.115	0.119		0.209	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Thallium-208	0.0956		0.0666	0.0673		0.0627	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Thorium-228	0.284		0.0776	0.0859		0.0934	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Thorium-232	0.300		0.115	0.119		0.209	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Thorium-234	0.0603	U	0.600	0.600		1.04	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Uranium-235	0.00740	U	0.0625	0.0625		0.510	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Uranium-238	0.0603	U	0.600	0.600		1.04	pCi/g	05/06/16 10:27	05/31/16 09:17	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S019

Lab Sample ID: 160-17243-19

Date Collected: 05/03/16 13:24

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0868	U	0.306	0.306		0.405	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Actinium-227	0.323	U	0.817	0.817		1.37	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Bismuth-212	0.417	U	0.837	0.838		1.43	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Bismuth-214	0.425		0.143	0.150		0.117	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Cesium-137	0.0257	U	0.0635	0.0636		0.110	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Lead-210	1.11	U	1.53	1.54		1.99	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Lead-212	0.357		0.0915	0.102		0.107	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Lead-214	0.390		0.110	0.118		0.128	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Potassium-40	10.4		1.56	1.89		0.434	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Protactinium-231	-0.899	U	2.68	2.69		4.52	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Radium-226	0.425		0.143	0.150	0.500	0.117	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Radium-228	0.0868	U	0.306	0.306		0.405	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Thallium-208	0.163		0.0620	0.0642		0.0561	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Thorium-228	0.357		0.0915	0.102		0.107	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Thorium-232	0.0868	U	0.306	0.306		0.405	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Thorium-234	-0.299	U	1.50	1.50		2.57	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Uranium-235	0.180	U	0.192	0.193		0.310	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Uranium-238	-0.299	U	1.50	1.50		2.57	pCi/g	05/06/16 10:27	05/31/16 09:18	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S020

Lab Sample ID: 160-17243-20

Date Collected: 05/03/16 13:26

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.216	U	0.111	0.113		0.239	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Actinium-227	-0.0597	U	0.0978	0.0980		1.36	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Bismuth-212	0.225	U	0.623	0.623		1.08	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Bismuth-214	0.410		0.114	0.122		0.103	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Cesium-137	0.00258	U	0.0666	0.0666		0.117	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Lead-210	1.89		1.25	1.27		1.59	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Lead-212	0.452		0.0859	0.104		0.0909	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Lead-214	0.488		0.124	0.134		0.114	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Potassium-40	11.9		1.41	1.86		0.696	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Protactinium-231	0.000	U	0.671	0.671		3.81	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Radium-226	0.410		0.114	0.122	0.500	0.103	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Radium-228	0.216	U	0.111	0.113		0.239	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Thallium-208	0.102		0.0742	0.0750		0.0860	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Thorium-228	0.452		0.0859	0.104		0.0909	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Thorium-232	0.216	U	0.111	0.113		0.239	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Thorium-234	0.889	U	0.872	0.877		1.25	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Uranium-235	0.000	U	0.134	0.134		0.924	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Uranium-238	0.889	U	0.872	0.877		1.25	pCi/g	05/06/16 10:27	05/31/16 09:19	1

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QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-250343/1-A

Matrix: Solid

Analysis Batch: 253757

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 250343

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.02474	U	0.0370	0.0371		0.283	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Actinium-227	0.1325	U	0.347	0.347		0.604	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Bismuth-212	-0.02217	U	0.603	0.603		0.676	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Bismuth-214	0.03410	U	0.118	0.118		0.207	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Cesium-137	-0.01393	U	0.0472	0.0472		0.0899	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Lead-210	-0.6699	U	0.974	0.977		1.82	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Lead-212	-0.007548	U	0.0455	0.0455		0.0840	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Lead-214	0.01202	U	0.0421	0.0421		0.129	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Potassium-40	-0.2911	U	0.553	0.553		0.826	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Protactinium-231	0.4624	U	0.476	0.479		1.23	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Radium-226	0.03410	U	0.118	0.118	0.500	0.207	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Radium-228	-0.02474	U	0.0370	0.0371		0.283	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Thallium-208	-0.02292	U	0.0541	0.0542		0.0921	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Thorium-228	-0.007548	U	0.0455	0.0455		0.0840	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Thorium-232	-0.02474	U	0.0370	0.0371		0.283	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Thorium-234	-0.3691	U	0.647	0.648		1.20	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Uranium-235	0.1760	U	0.108	0.109		0.389	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Uranium-238	-0.3691	U	0.647	0.648		1.20	pCi/g	05/06/16 10:27	05/30/16 22:04	1

Lab Sample ID: LCS 160-250343/2-A

Matrix: Solid

Analysis Batch: 253758

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 250343

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	101.1		10.7		1.35	pCi/g	104	87 - 116
Cesium-137	29.7	29.14		3.12		0.260	pCi/g	98	87 - 120
Cobalt-60	17.2	16.88		1.76		0.113	pCi/g	98	87 - 115

Lab Sample ID: 160-17243-20 DU

Matrix: Solid

Analysis Batch: 253818

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S020

Prep Type: Total/NA

Prep Batch: 250343

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.216	U	0.2797		0.135		0.226	pCi/g	0.26	1
Actinium-227	-0.0597	U	-0.1230	U	0.597		1.01	pCi/g	0.09	1
Bismuth-212	0.225	U	0.3823	U	0.661		1.11	pCi/g	0.12	1
Bismuth-214	0.410		0.4450		0.115		0.0866	pCi/g	0.15	1
Cesium-137	0.00258	U	0.02490	U	0.0395		0.0663	pCi/g	0.21	1
Lead-210	1.89		0.5212	U	1.06		1.79	pCi/g	0.58	1
Lead-212	0.452		0.4431		0.0955		0.0775	pCi/g	0.05	1
Lead-214	0.488		0.4622		0.0991		0.0950	pCi/g	0.11	1
Potassium-40	11.9		10.40		1.62		0.536	pCi/g	0.42	1
Protactinium-231	0.000	U	0.2978	U	1.12		3.63	pCi/g	0.17	1
Radium-226	0.410		0.4450		0.115	0.500	0.0866	pCi/g	0.15	1
Radium-228	0.216	U	0.2797		0.135		0.226	pCi/g	0.26	1

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QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-17243-20 DU

Matrix: Solid

Analysis Batch: 253818

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S020

Prep Type: Total/NA

Prep Batch: 250343

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.102		0.1564		0.0406		0.0171	pCi/g	0.47	1
Thorium-228	0.452		0.4431		0.0955		0.0775	pCi/g	0.05	1
Thorium-232	0.216	U	0.2797		0.135		0.226	pCi/g	0.26	1
Thorium-234	0.889	U	0.5518	U	1.15		1.92	pCi/g	0.17	1
Uranium-235	0.000	U	0.08601	U	0.158		0.672	pCi/g	0.29	1
Uranium-238	0.889	U	0.5518	U	1.15		1.92	pCi/g	0.17	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Rad

Leach Batch: 249625

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17243-1	TI-TO04-NP-R-FSS-SU7-S001	Total/NA	Solid	Dry and Grind	
160-17243-2	TI-TO04-NP-R-FSS-SU7-S002	Total/NA	Solid	Dry and Grind	
160-17243-3	TI-TO04-NP-R-FSS-SU7-S003	Total/NA	Solid	Dry and Grind	
160-17243-4	TI-TO04-NP-R-FSS-SU7-S004	Total/NA	Solid	Dry and Grind	
160-17243-5	TI-TO04-NP-R-FSS-SU7-S005	Total/NA	Solid	Dry and Grind	
160-17243-6	TI-TO04-NP-R-FSS-SU7-S006	Total/NA	Solid	Dry and Grind	
160-17243-7	TI-TO04-NP-R-FSS-SU7-S007	Total/NA	Solid	Dry and Grind	
160-17243-8	TI-TO04-NP-R-FSS-SU7-S008	Total/NA	Solid	Dry and Grind	
160-17243-9	TI-TO04-NP-R-FSS-SU7-S009	Total/NA	Solid	Dry and Grind	
160-17243-10	TI-TO04-NP-R-FSS-SU7-S010	Total/NA	Solid	Dry and Grind	
160-17243-11	TI-TO04-NP-R-FSS-SU7-S011	Total/NA	Solid	Dry and Grind	
160-17243-12	TI-TO04-NP-R-FSS-SU7-S012	Total/NA	Solid	Dry and Grind	
160-17243-13	TI-TO04-NP-R-FSS-SU7-S013	Total/NA	Solid	Dry and Grind	
160-17243-14	TI-TO04-NP-R-FSS-SU7-S014	Total/NA	Solid	Dry and Grind	
160-17243-15	TI-TO04-NP-R-FSS-SU7-S015	Total/NA	Solid	Dry and Grind	
160-17243-16	TI-TO04-NP-R-FSS-SU7-S016	Total/NA	Solid	Dry and Grind	
160-17243-17	TI-TO04-NP-R-FSS-SU7-S017	Total/NA	Solid	Dry and Grind	
160-17243-18	TI-TO04-NP-R-FSS-SU7-S018	Total/NA	Solid	Dry and Grind	
160-17243-19	TI-TO04-NP-R-FSS-SU7-S019	Total/NA	Solid	Dry and Grind	
160-17243-20	TI-TO04-NP-R-FSS-SU7-S020	Total/NA	Solid	Dry and Grind	
160-17243-20 DU	TI-TO04-NP-R-FSS-SU7-S020	Total/NA	Solid	Dry and Grind	

Prep Batch: 250343

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17243-1	TI-TO04-NP-R-FSS-SU7-S001	Total/NA	Solid	Fill_Geo-21	249625
160-17243-2	TI-TO04-NP-R-FSS-SU7-S002	Total/NA	Solid	Fill_Geo-21	249625
160-17243-3	TI-TO04-NP-R-FSS-SU7-S003	Total/NA	Solid	Fill_Geo-21	249625
160-17243-4	TI-TO04-NP-R-FSS-SU7-S004	Total/NA	Solid	Fill_Geo-21	249625
160-17243-5	TI-TO04-NP-R-FSS-SU7-S005	Total/NA	Solid	Fill_Geo-21	249625
160-17243-6	TI-TO04-NP-R-FSS-SU7-S006	Total/NA	Solid	Fill_Geo-21	249625
160-17243-7	TI-TO04-NP-R-FSS-SU7-S007	Total/NA	Solid	Fill_Geo-21	249625
160-17243-8	TI-TO04-NP-R-FSS-SU7-S008	Total/NA	Solid	Fill_Geo-21	249625
160-17243-9	TI-TO04-NP-R-FSS-SU7-S009	Total/NA	Solid	Fill_Geo-21	249625
160-17243-10	TI-TO04-NP-R-FSS-SU7-S010	Total/NA	Solid	Fill_Geo-21	249625
160-17243-11	TI-TO04-NP-R-FSS-SU7-S011	Total/NA	Solid	Fill_Geo-21	249625
160-17243-12	TI-TO04-NP-R-FSS-SU7-S012	Total/NA	Solid	Fill_Geo-21	249625
160-17243-13	TI-TO04-NP-R-FSS-SU7-S013	Total/NA	Solid	Fill_Geo-21	249625
160-17243-14	TI-TO04-NP-R-FSS-SU7-S014	Total/NA	Solid	Fill_Geo-21	249625
160-17243-15	TI-TO04-NP-R-FSS-SU7-S015	Total/NA	Solid	Fill_Geo-21	249625
160-17243-16	TI-TO04-NP-R-FSS-SU7-S016	Total/NA	Solid	Fill_Geo-21	249625
160-17243-17	TI-TO04-NP-R-FSS-SU7-S017	Total/NA	Solid	Fill_Geo-21	249625
160-17243-18	TI-TO04-NP-R-FSS-SU7-S018	Total/NA	Solid	Fill_Geo-21	249625
160-17243-19	TI-TO04-NP-R-FSS-SU7-S019	Total/NA	Solid	Fill_Geo-21	249625
160-17243-20	TI-TO04-NP-R-FSS-SU7-S020	Total/NA	Solid	Fill_Geo-21	249625
160-17243-20 DU	TI-TO04-NP-R-FSS-SU7-S020	Total/NA	Solid	Fill_Geo-21	249625
LCS 160-250343/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-250343/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica St. Louis

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THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-17238-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn

Micha Korinhizer

Authorized for release by:

6/1/2016 10:37:35 AM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17238-2

Job ID: 160-17238-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-17238-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17238-2

Job ID: 160-17238-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 05/05/2016; the samples arrived in good condition, properly preserved. The temperatures of the 2 coolers at receipt time were 19.0° C and 19.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Sample TI-TO04-NP-R-FSS-BISU7-S001 (160-17238-1) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 05/05/2016, prepared on 05/06/2016 and analyzed on 05/30/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-17238-2

Login Number: 17238

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17238-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17238-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17238-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-17238-1	TI-TO04-NP-R-FSS-BISU7-S001	Solid	05/03/16 09:45	05/05/16 08:40

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17238-2

Client Sample ID: TI-TO04-NP-R-FSS-BISU7-S001

Lab Sample ID: 160-17238-1

Date Collected: 05/03/16 09:45

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.591		0.136	0.149		0.0732	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Actinium-227	0.0989	U	0.643	0.643		1.10	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Bismuth-212	0.240	U	0.508	0.509		0.870	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Bismuth-214	0.565		0.112	0.126		0.0807	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Cesium-137	0.0303	U	0.0490	0.0491		0.0822	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Lead-210	0.446	U	1.45	1.45		2.44	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Lead-212	0.632		0.0903	0.122		0.0840	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Lead-214	0.575		0.127	0.140		0.112	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Potassium-40	11.7		1.40	1.85		0.645	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Protactinium-231	0.396	U	1.33	1.33		4.23	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Radium-226	0.565		0.112	0.126	0.500	0.0807	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Radium-228	0.591		0.136	0.149		0.0732	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Thallium-208	0.187		0.0632	0.0661		0.0570	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Thorium-228	0.632		0.0903	0.122		0.0840	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Thorium-232	0.591		0.136	0.149		0.0732	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Thorium-234	0.549	U	1.26	1.27		2.12	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Uranium-235	0.000	U	0.0827	0.0827		0.889	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Uranium-238	0.549	U	1.26	1.27		2.12	pCi/g	05/06/16 10:08	05/30/16 16:20	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17238-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-250341/1-A

Matrix: Solid

Analysis Batch: 253820

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 250341

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.06918	U	0.0697	0.0701		0.0944	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Actinium-227	0.007013	U	0.0783	0.0783		0.812	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Bismuth-212	0.2712	U	0.776	0.777		1.34	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Bismuth-214	-0.007843	U	0.0110	0.0110		0.219	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Cesium-137	0.0000	U	0.0202	0.0202		0.0434	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Lead-210	-0.1871	U	0.433	0.434		1.78	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Lead-212	0.03084	U	0.0647	0.0648		0.110	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Lead-214	0.003195	U	0.0709	0.0709		0.126	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Potassium-40	-0.07920	U	0.622	0.622		0.849	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Protactinium-231	0.0000	U	0.214	0.214		2.71	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Radium-226	-0.007843	U	0.0110	0.0110	0.500	0.219	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Radium-228	0.06918	U	0.0697	0.0701		0.0944	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Thallium-208	0.03975	U	0.0193	0.0198		0.0504	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Thorium-228	0.03084	U	0.0647	0.0648		0.110	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Thorium-232	0.06918	U	0.0697	0.0701		0.0944	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Thorium-234	-0.4141	U	0.861	0.862		1.45	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Uranium-235	0.0000	U	0.0906	0.0906		0.533	pCi/g	05/06/16 10:08	05/31/16 08:24	1
Uranium-238	-0.4141	U	0.861	0.862		1.45	pCi/g	05/06/16 10:08	05/31/16 08:24	1

Lab Sample ID: LCS 160-250341/2-A

Matrix: Solid

Analysis Batch: 253758

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 250341

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	101.8		10.7		1.34	pCi/g	105	87 - 116
Cesium-137	29.7	28.98		3.11		0.292	pCi/g	98	87 - 120
Cobalt-60	17.2	16.17		1.69		0.129	pCi/g	94	87 - 115

Lab Sample ID: 160-17238-1 DU

Matrix: Solid

Analysis Batch: 253769

Client Sample ID: TI-TO04-NP-R-FSS-BISU7-S001

Prep Type: Total/NA

Prep Batch: 250341

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.591		0.6425		0.184		0.128	pCi/g	0.15	1
Actinium-227	0.0989	U	-0.3935	U	0.810		1.35	pCi/g	0.34	1
Bismuth-212	0.240	U	-0.2619	U	0.714		1.22	pCi/g	0.41	1
Bismuth-214	0.565		0.6452		0.141		0.0865	pCi/g	0.30	1
Cesium-137	0.0303	U	-0.01329	U	0.0606		0.105	pCi/g	0.40	1
Lead-210	0.446	U	0.2191	U	1.34		2.29	pCi/g	0.08	1
Lead-212	0.632		0.5979		0.119		0.0845	pCi/g	0.14	1
Lead-214	0.575		0.7222		0.169		0.123	pCi/g	0.48	1
Potassium-40	11.7		11.16		1.77		0.601	pCi/g	0.16	1
Protactinium-231	0.396	U	-0.7524	U	2.55		4.27	pCi/g	0.30	1
Radium-226	0.565		0.6452		0.141	0.500	0.0865	pCi/g	0.30	1
Radium-228	0.591		0.6425		0.184		0.128	pCi/g	0.15	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17238-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-17238-1 DU

Matrix: Solid

Analysis Batch: 253769

Client Sample ID: TI-TO04-NP-R-FSS-BISU7-S001

Prep Type: Total/NA

Prep Batch: 250341

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.187		0.1746		0.0532		0.0391	pCi/g	0.10	1
Thorium-228	0.632		0.5979		0.119		0.0845	pCi/g	0.14	1
Thorium-232	0.591		0.6425		0.184		0.128	pCi/g	0.15	1
Thorium-234	0.549	U	0.4993	U	1.15		1.92	pCi/g	0.02	1
Uranium-235	0.000	U	0.1088	U	0.202		0.909	pCi/g	0.38	1
Uranium-238	0.549	U	0.4993	U	1.15		1.92	pCi/g	0.02	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17238-2

Rad

Leach Batch: 249625

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17238-1	TI-TO04-NP-R-FSS-BISU7-S001	Total/NA	Solid	Dry and Grind	
160-17238-1 DU	TI-TO04-NP-R-FSS-BISU7-S001	Total/NA	Solid	Dry and Grind	

Prep Batch: 250341

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17238-1	TI-TO04-NP-R-FSS-BISU7-S001	Total/NA	Solid	Fill_Geo-21	249625
160-17238-1 DU	TI-TO04-NP-R-FSS-BISU7-S001	Total/NA	Solid	Fill_Geo-21	249625
LCS 160-250341/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-250341/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-17242-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
6/2/2016 12:44:49 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17242-2

Job ID: 160-17242-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-17242-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17242-2

Job ID: 160-17242-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 5/5/2016 8:40 AM; the samples arrived in good condition, properly preserved. The temperatures of the 2 coolers at receipt time were 19.0° C and 19.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-NP-FSS SU7-LLRO505CH-S001 (160-17242-1), TITO04-NP-FSS SU7-LLRO505CH-S002 (160-17242-2), TITO04-NP-FSS SU7-LLRO505CH-S003 (160-17242-3), TITO04-NP-FSS SU7-LLRO505CH-S004 (160-17242-4) and TITO04-NP-FSS SU7-LLRO505CH-S005 (160-17242-5) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 05/05/2016, prepared on 05/06/2016 and analyzed on 05/30/2016.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL P3 NP FSS SU7 LLRO 505 #237

Page 1 of 1

Project Manager: Ulrika Messer
(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Project Number: 500060

Project Name / Location: CTO-04 Phase III Northpoint FSS SU7
Low Level Radiological Object # 505

Purchase Order #: 201455

Shipment Date: 5-4-16

Waybill Number: 12 890 4402 019126 317

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Sampler's Name(s): A. Morris

Sample ID Number	Sample Description	Date	Time	Method
TITO04-NP-FSS SU7-LLRO505CH-S001	Northpoint FSS SU7 surrounding Commodity #505	5/3/2016	0920	G
TITO04-NP-FSS SU7-LLRO505CH-S002	Northpoint FSS SU7 surrounding Commodity #505	5/3/2016	0922	G
TITO04-NP-FSS SU7-LLRO505CH-S003	Northpoint FSS SU7 surrounding Commodity #505	5/3/2016	0925	G
TITO04-NP-FSS SU7-LLRO505CH-S004	Northpoint FSS SU7 surrounding Commodity #505	5/3/2016	0928	G
TITO04-NP-FSS SU7-LLRO505CH-S005	Northpoint FSS SU7 UNDERNEATH Commodity #505	5/3/2016	0930	G

Preservative (water)

Preservative (soil)

Container Type

of containers

Matrix

Preservative (water)

Preservative (soil)

Container Type

of containers

Matrix

Preservative (water)

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of containers

Matrix

Preservative (water)

Preservative (soil)

Container Type

of containers

Matrix

Preservative (water)

Preservative (soil)

Container Type

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-17242-2

Login Number: 17242

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17242-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17242-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17242-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-17242-1	TITO04-NP-FSS SU7-LLRO505CH-S001	Solid	05/03/16 09:20	05/05/16 08:40
160-17242-2	TITO04-NP-FSS SU7-LLRO505CH-S002	Solid	05/03/16 09:22	05/05/16 08:40
160-17242-3	TITO04-NP-FSS SU7-LLRO505CH-S003	Solid	05/03/16 09:25	05/05/16 08:40
160-17242-4	TITO04-NP-FSS SU7-LLRO505CH-S004	Solid	05/03/16 09:30	05/05/16 08:40
160-17242-5	TITO04-NP-FSS SU7-LLRO505CH-S005	Solid	05/03/16 09:28	05/05/16 08:40

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17242-2

Client Sample ID: TITO04-NP-FSS SU7-LLRO505CH-S001

Lab Sample ID: 160-17242-1

Date Collected: 05/03/16 09:20

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.320		0.141	0.145		0.227	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Actinium-227	-0.309	U	0.650	0.651		1.09	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Bismuth-212	0.000	U	0.374	0.374		0.796	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Bismuth-214	0.355		0.118	0.124		0.104	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Cesium-137	-0.0366	U	0.0561	0.0562		0.0936	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Lead-210	0.362	U	1.29	1.29		2.19	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Lead-212	0.265		0.0647	0.0732		0.0712	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Lead-214	0.366		0.0943	0.102		0.109	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Potassium-40	10.1		1.28	1.64		0.596	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Protactinium-231	-0.769	U	2.43	2.43		4.07	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Radium-226	0.355		0.118	0.124	0.500	0.104	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Radium-228	0.320		0.141	0.145		0.227	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Thallium-208	0.0897		0.0528	0.0536		0.0555	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Thorium-228	0.265		0.0647	0.0732		0.0712	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Thorium-232	0.320		0.141	0.145		0.227	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Thorium-234	0.0954	U	1.12	1.12		1.90	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Uranium-235	0.000	U	0.0812	0.0812		0.614	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Uranium-238	0.0954	U	1.12	1.12		1.90	pCi/g	05/06/16 09:55	05/30/16 21:57	1

Client Sample ID: TITO04-NP-FSS SU7-LLRO505CH-S002

Lab Sample ID: 160-17242-2

Date Collected: 05/03/16 09:22

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.369		0.129	0.135		0.126	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Actinium-227	0.312	U	0.701	0.702		1.18	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Bismuth-212	0.322	U	0.764	0.765		1.30	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Bismuth-214	0.289		0.101	0.105		0.102	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Cesium-137	-0.000137	U	0.0471	0.0471		0.0856	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Lead-210	-1.45	U	1.18	1.19		2.99	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Lead-212	0.443		0.110	0.124		0.145	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Lead-214	0.212		0.100	0.103		0.155	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Potassium-40	10.9		1.76	2.09		1.28	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Protactinium-231	-0.734	U	2.26	2.26		3.80	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Radium-226	0.289		0.101	0.105	0.500	0.102	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Radium-228	0.369		0.129	0.135		0.126	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Thallium-208	0.0771		0.0429	0.0436		0.0485	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Thorium-228	0.443		0.110	0.124		0.145	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Thorium-232	0.369		0.129	0.135		0.126	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Thorium-234	0.343	U	0.992	0.993		1.44	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Uranium-235	-0.0775	U	0.242	0.242		0.782	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Uranium-238	0.343	U	0.992	0.993		1.44	pCi/g	05/06/16 09:55	05/30/16 21:58	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17242-2

Client Sample ID: TITO04-NP-FSS SU7-LLRO505CH-S003

Lab Sample ID: 160-17242-3

Date Collected: 05/03/16 09:25

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.376		0.117	0.123		0.0676	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Actinium-227	0.000	U	0.355	0.355		0.916	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Bismuth-212	0.254	U	0.480	0.481		0.816	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Bismuth-214	0.134	U	0.0751	0.0764		0.315	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Cesium-137	0.000774	U	0.0491	0.0491		0.0870	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Lead-210	-0.0697	U	1.10	1.10		1.92	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Lead-212	0.316		0.0637	0.0757		0.0656	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Lead-214	0.346		0.0875	0.0946		0.0772	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Potassium-40	10.9		1.24	1.67		0.433	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Protactinium-231	-0.670	U	2.05	2.06		3.45	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Radium-226	0.134	U	0.0751	0.0764	0.500	0.315	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Radium-228	0.376		0.117	0.123		0.0676	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Thallium-208	0.0284	U	0.0721	0.0721		0.0821	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Thorium-228	0.316		0.0637	0.0757		0.0656	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Thorium-232	0.376		0.117	0.123		0.0676	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Thorium-234	0.514	U	1.08	1.08		1.80	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Uranium-235	0.000	U	0.157	0.157		0.606	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Uranium-238	0.514	U	1.08	1.08		1.80	pCi/g	05/06/16 09:55	05/30/16 21:59	1

Client Sample ID: TITO04-NP-FSS SU7-LLRO505CH-S004

Lab Sample ID: 160-17242-4

Date Collected: 05/03/16 09:30

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.238	U	0.0983	0.101		0.282	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Actinium-227	0.167	U	0.592	0.593		0.856	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Bismuth-212	0.383	U	0.796	0.797		1.35	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Bismuth-214	0.392		0.102	0.110		0.0786	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Cesium-137	0.0261	U	0.0541	0.0542		0.0926	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Lead-210	-0.331	U	1.24	1.24		1.89	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Lead-212	0.231		0.0918	0.0966		0.109	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Lead-214	0.195		0.0844	0.0868		0.0972	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Potassium-40	9.17		1.37	1.66		0.587	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Protactinium-231	0.138	U	0.853	0.853		2.79	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Radium-226	0.392		0.102	0.110	0.500	0.0786	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Radium-228	0.238	U	0.0983	0.101		0.282	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thallium-208	0.197		0.0482	0.0524		0.0217	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thorium-228	0.231		0.0918	0.0966		0.109	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thorium-232	0.238	U	0.0983	0.101		0.282	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thorium-234	1.72		0.976	0.993		1.19	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Uranium-235	0.105	U	0.164	0.164		0.424	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Uranium-238	1.72		0.976	0.993		1.19	pCi/g	05/06/16 09:55	05/30/16 22:00	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17242-2

Client Sample ID: TITO04-NP-FSS SU7-LLRO505CH-S005

Lab Sample ID: 160-17242-5

Date Collected: 05/03/16 09:28

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.304	U	0.121	0.125		0.355	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Actinium-227	0.298	U	0.760	0.761		1.28	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Bismuth-212	0.438	U	0.813	0.815		1.38	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Bismuth-214	0.367		0.115	0.121		0.0967	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Cesium-137	0.0241	U	0.0529	0.0530		0.0918	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Lead-210	0.901	U	1.21	1.21		1.67	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Lead-212	0.338		0.0913	0.101		0.107	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Lead-214	0.334		0.105	0.110		0.142	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Potassium-40	11.2		2.05	2.35		1.36	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Protactinium-231	0.373	U	1.25	1.25		4.07	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Radium-226	0.367		0.115	0.121	0.500	0.0967	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Radium-228	0.304	U	0.121	0.125		0.355	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thallium-208	0.127		0.0580	0.0594		0.0560	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thorium-228	0.338		0.0913	0.101		0.107	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thorium-232	0.304	U	0.121	0.125		0.355	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thorium-234	0.547	U	0.808	0.810		1.33	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Uranium-235	0.0564	U	0.179	0.179		0.791	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Uranium-238	0.547	U	0.808	0.810		1.33	pCi/g	05/06/16 09:55	05/30/16 22:00	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17242-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-250337/1-A

Matrix: Solid

Analysis Batch: 253811

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 250337

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.1136	U	0.0904	0.0911		0.129	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Actinium-227	0.09998	U	0.211	0.212		0.636	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Bismuth-212	0.3864	U	0.729	0.730		1.25	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Bismuth-214	0.02959	U	0.0690	0.0690		0.185	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Cesium-137	0.01067	U	0.0731	0.0731		0.131	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Lead-210	0.08732	U	1.28	1.28		2.00	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Lead-212	-0.07859	U	0.0563	0.0572		0.188	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Lead-214	-0.03784	U	0.0933	0.0934		0.176	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Potassium-40	0.1005	U	0.897	0.897		1.20	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Protactinium-231	0.0000	U	0.415	0.415		2.71	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Radium-226	0.02959	U	0.0690	0.0690	0.500	0.185	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Radium-228	0.1136	U	0.0904	0.0911		0.129	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Thallium-208	0.01400	U	0.0576	0.0576		0.0505	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Thorium-228	-0.07859	U	0.0563	0.0572		0.188	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Thorium-232	0.1136	U	0.0904	0.0911		0.129	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Thorium-234	-0.8569	U	1.10	1.10		1.75	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Uranium-235	-0.03066	U	0.260	0.260		0.503	pCi/g	05/06/16 09:55	05/31/16 13:22	1
Uranium-238	-0.8569	U	1.10	1.10		1.75	pCi/g	05/06/16 09:55	05/31/16 13:22	1

Lab Sample ID: LCS 160-250337/2-A

Matrix: Solid

Analysis Batch: 253765

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 250337

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	96.77		10.2		1.16	pCi/g	100	87 - 116
Cesium-137	29.7	29.38		3.13		0.229	pCi/g	99	87 - 120
Cobalt-60	17.2	16.76		1.73		0.0747	pCi/g	97	87 - 115

Lab Sample ID: 160-17240-A-1-E DU

Matrix: Solid

Analysis Batch: 253764

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 250337

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.388	U	0.6284		0.463		0.477	pCi/g	0.30	1
Actinium-227	-0.186	U	-0.4872	U	1.20		2.01	pCi/g	0.14	1
Bismuth-212	0.432	U	0.3402	U	0.817		1.43	pCi/g	0.05	1
Bismuth-214	0.846		0.5815		0.185		0.153	pCi/g	0.65	1
Cesium-137	0.00154	U	0.03159	U	0.0910		0.158	pCi/g	0.18	1
Lead-210	1.45	U	2.303	U	2.08		3.31	pCi/g	0.23	1
Lead-212	0.721		0.7108		0.163		0.126	pCi/g	0.03	1
Lead-214	0.627		0.7339		0.185		0.167	pCi/g	0.32	1
Potassium-40	13.8		14.16		2.61		0.614	pCi/g	0.08	1
Protactinium-231	0.000	U	0.4605	U	1.68		5.45	pCi/g	0.21	1
Radium-226	0.846		0.5815		0.185	0.500	0.153	pCi/g	0.65	1
Radium-228	0.388	U	0.6284		0.463		0.477	pCi/g	0.30	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17242-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-17240-A-1-E DU
Matrix: Solid
Analysis Batch: 253764

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 250337

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.302		0.2667		0.0919		0.0748	pCi/g	0.20	1
Thorium-228	0.721		0.7108		0.163		0.126	pCi/g	0.03	1
Thorium-232	0.388	U	0.6284		0.463		0.477	pCi/g	0.30	1
Thorium-234	0.392	U	1.380	U	0.834		2.16	pCi/g	0.44	1
Uranium-235	0.0999	U	-0.2990	U	0.460		1.42	pCi/g	0.50	1
Uranium-238	0.392	U	1.380	U	0.834		2.16	pCi/g	0.44	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17242-2

Rad

Leach Batch: 249625

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17240-A-1-E DU	Duplicate	Total/NA	Solid	Dry and Grind	
160-17242-1	TITO04-NP-FSS SU7-LLRO505CH-S001	Total/NA	Solid	Dry and Grind	
160-17242-2	TITO04-NP-FSS SU7-LLRO505CH-S002	Total/NA	Solid	Dry and Grind	
160-17242-3	TITO04-NP-FSS SU7-LLRO505CH-S003	Total/NA	Solid	Dry and Grind	
160-17242-4	TITO04-NP-FSS SU7-LLRO505CH-S004	Total/NA	Solid	Dry and Grind	
160-17242-5	TITO04-NP-FSS SU7-LLRO505CH-S005	Total/NA	Solid	Dry and Grind	

Prep Batch: 250337

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17240-A-1-E DU	Duplicate	Total/NA	Solid	Fill_Geo-21	249625
160-17242-1	TITO04-NP-FSS SU7-LLRO505CH-S001	Total/NA	Solid	Fill_Geo-21	249625
160-17242-2	TITO04-NP-FSS SU7-LLRO505CH-S002	Total/NA	Solid	Fill_Geo-21	249625
160-17242-3	TITO04-NP-FSS SU7-LLRO505CH-S003	Total/NA	Solid	Fill_Geo-21	249625
160-17242-4	TITO04-NP-FSS SU7-LLRO505CH-S004	Total/NA	Solid	Fill_Geo-21	249625
160-17242-5	TITO04-NP-FSS SU7-LLRO505CH-S005	Total/NA	Solid	Fill_Geo-21	249625
LCS 160-250337/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-250337/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-13114-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn

Elizabeth M. Hoerchler

Authorized for release by:

8/31/2015 4:35:52 PM

Elizabeth Hoerchler, Project Mgmt. Assistant
elizabeth.hoerchler@testamericainc.com

Designee for

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Job ID: 160-13114-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-13114-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Job ID: 160-13114-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 08/03/2015; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 22.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04_RSY14_2-CH-S201 (160-13114-1), TITO04_RSY14_2-CH-S202 (160-13114-2), TITO04_RSY14_2-CH-S203 (160-13114-3), TITO04_RSY14_2-CH-S204 (160-13114-4), TITO04_RSY14_2-CH-S205 (160-13114-5), TITO04_RSY14_2-CH-S206 (160-13114-6), TITO04_RSY14_2-CH-S207 (160-13114-7), TITO04_RSY14_2-CH-S208 (160-13114-8), TITO04_RSY14_2-CH-S209 (160-13114-9), TITO04_RSY14_2-CH-S210 (160-13114-10), TITO04_RSY14_2-CH-S211 (160-13114-11), TITO04_RSY14_2-CH-S212 (160-13114-12), TITO04_RSY14_2-CH-S213 (160-13114-13), TITO04_RSY14_2-CH-S214 (160-13114-14), TITO04_RSY14_2-CH-S215 (160-13114-15), TITO04_RSY14_2-CH-S216 (160-13114-16), TITO04_RSY14_2-CH-S217 (160-13114-17), TITO04_RSY14_2-CH-S218 (160-13114-18), TITO04_RSY14_2-CH-S219 (160-13114-19) and TITO04_RSY14_2-CH-S220 (160-13114-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 08/03/2015, prepared on 08/05/2015 and analyzed on 08/27/2015.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TI_P3_RSY14_USE2_068

Page 2 of 3

Project Number: 500060

Project Name / Location: CTO-04 Phase III RSY14

USED 2

Purchase Order #: 201455

Project Manager: **Ulrika Messer**

(Name & phone #)

Send Report To: **Patricia Flynn**

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date: 7/24/15

Waybill Number: 1766V S45 13 9113 824

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Sampler's Name(s):

Sample ID Number	Sample Description	Collection Information			Matrix	# of containers	Preservative (water)		Gamma Scan	Analyses Requested										Dose Rate μ R/Hr
		Date	Time	Method			Preservative (soil)	Container Type												
TITO04_RSY14_2-CH-S210	Site 32 RSY14 USE 2	7-29-15	1636	G	SO	1		16 oz Plastic	X											5
TITO04_RSY14_2-CH-S211	Site 32 RSY14 USE 2	7-29-15	1631	G	SO	1		16 oz Plastic	X											5
TITO04_RSY14_2-CH-S212	Site 32 RSY14 USE 2	7-29-15	1641	G	SO	1		16 oz Plastic	X											5
TITO04_RSY14_2-CH-S213	Site 32 RSY14 USE 2	7-29-15	1639	G	SO	1		16 oz Plastic	X											5
TITO04_RSY14_2-CH-S214	Site 32 RSY14 USE 2	7-29-15	1613	G	SO	1		16 oz Plastic	X											5
TITO04_RSY14_2-CH-S215	Site 32 RSY14 USE 2	7-29-15	1445	G	SO	1		16 oz Plastic	X											5
TITO04_RSY14_2-CH-S216	Site 32 RSY14 USE 2	7/30/15	0936	G	SO	1		16 oz Plastic	X											5
TITO04_RSY14_2-CH-S217	Site 32 RSY14 USE 2	7/30/15	0840	G	SO	1		16 oz Plastic	X											5
TITO04_RSY14_2-CH-S218	Site 32 RSY14 USE 2	7/30/15	0843	G	SO	1		16 oz Plastic	X											5

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

III

Method Codes

C = Composite

G = Grab

Relinquished By:

Edwin Brindley

Received By:

Ali Clark

Date:

7/30/15

Time:

8:30

Date:

7/30/15

Time:

8:40

Date:

8/3/15

Time:

8:40

SO = Soil

DW = Drinking Water

GW = Ground Water

VW = Waste Water

A = Air

ABS=Asbestos, PO=Pipe Opening



CB&I Federal Services LLC
Federal Services Division
4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_RSY14_USE2_068

Page 3 of 3

Project Number: 500060
Project Name / Location: CTO-04 Phase III RSY14
Purchase Order #: 201455

Shipment Date: 7/30/15
Waybill Number: 1266VS451391138289
Lab Destination: Earth Toxics Inc To Test America
Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer
(Name or phone #)

Send Report To: Patricia Flynn
Phone/Fax Number: 925-288-2037
Address: 4005 Port Chicago Hwy
City: Concord, CA, 94520

Sampler's Name(s):

Sample ID Number	Sample Description
TITO04_RSY14_2-CH-S219	Site 32 RSY14 USE 2
TITO04_RSY14_2-CH-S220	Site 32 RSY14 USE 2

Collection Information	
Date	Time
7/30/15	0846
7/30/15	0850

Matrix	# of Containers	Preservative (water)	Preservative (soil)	Container Type
SO	1			16 oz Plastic
SO	1			16 oz Plastic

Analyses Requested		Gamma Scan	Dose Rate $\mu\text{R/hr}$
		N/A	
		X	5
		X	5

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr ☐ 3-day ☐ 7-day

Project Specific:

III

Standard TAT ☐

Relinquished By: *Evan Dabney*

Date: 8/3/15

Received By: *Jill Clark*

Date: 8-3-15

Time: 0840

Relinquished By:

Date:

Received By:

Date:

Time:

G = Grab

C = Composite

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-13114-2

Login Number: 13114

List Number: 1

Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-13114-1	TITO04_RSY14_2-CH-S201	Solid	07/29/15 16:27	08/03/15 08:40
160-13114-2	TITO04_RSY14_2-CH-S202	Solid	07/29/15 15:54	08/03/15 08:40
160-13114-3	TITO04_RSY14_2-CH-S203	Solid	07/29/15 16:07	08/03/15 08:40
160-13114-4	TITO04_RSY14_2-CH-S204	Solid	07/29/15 15:57	08/03/15 08:40
160-13114-5	TITO04_RSY14_2-CH-S205	Solid	07/29/15 16:00	08/03/15 08:40
160-13114-6	TITO04_RSY14_2-CH-S206	Solid	07/29/15 16:26	08/03/15 08:40
160-13114-7	TITO04_RSY14_2-CH-S207	Solid	07/29/15 16:09	08/03/15 08:40
160-13114-8	TITO04_RSY14_2-CH-S208	Solid	07/29/15 16:27	08/03/15 08:40
160-13114-9	TITO04_RSY14_2-CH-S209	Solid	07/29/15 16:32	08/03/15 08:40
160-13114-10	TITO04_RSY14_2-CH-S210	Solid	07/29/15 16:36	08/03/15 08:40
160-13114-11	TITO04_RSY14_2-CH-S211	Solid	07/29/15 16:31	08/03/15 08:40
160-13114-12	TITO04_RSY14_2-CH-S212	Solid	07/29/15 16:41	08/03/15 08:40
160-13114-13	TITO04_RSY14_2-CH-S213	Solid	07/29/15 16:39	08/03/15 08:40
160-13114-14	TITO04_RSY14_2-CH-S214	Solid	07/29/15 16:13	08/03/15 08:40
160-13114-15	TITO04_RSY14_2-CH-S215	Solid	07/29/15 14:45	08/03/15 08:40
160-13114-16	TITO04_RSY14_2-CH-S216	Solid	07/30/15 08:36	08/03/15 08:40
160-13114-17	TITO04_RSY14_2-CH-S217	Solid	07/30/15 08:40	08/03/15 08:40
160-13114-18	TITO04_RSY14_2-CH-S218	Solid	07/30/15 08:43	08/03/15 08:40
160-13114-19	TITO04_RSY14_2-CH-S219	Solid	07/30/15 08:46	08/03/15 08:40
160-13114-20	TITO04_RSY14_2-CH-S220	Solid	07/30/15 08:50	08/03/15 08:40

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S201

Date Collected: 07/29/15 16:27

Date Received: 08/03/15 08:40

Lab Sample ID: 160-13114-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.182	U	0.135	0.136		0.214	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Actinium-227	0.264	U	0.392	0.393		0.653	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Bismuth-212	0.415	U	0.355	0.358		0.532	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Bismuth-214	0.375		0.0996	0.107		0.0948	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Cesium-137	0.00442	U	0.0329	0.0329		0.0601	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Lead-210	0.366	U	0.866	0.867		1.47	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Lead-212	0.336		0.0873	0.0976		0.0814	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Lead-214	0.343		0.0852	0.0924		0.0564	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Potassium-40	10.5		1.29	1.68		0.599	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Protactinium-231	0.273	U	0.370	0.372		1.42	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Radium-226	0.375		0.0996	0.107	0.500	0.0948	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Radium-228	0.182	U	0.135	0.136		0.214	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thallium-208	0.0752		0.0409	0.0417		0.0578	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thorium-228	0.336		0.0873	0.0976		0.0814	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thorium-232	0.182	U	0.135	0.136		0.214	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thorium-234	0.634	U	0.353	0.359		1.22	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Uranium-235	0.178	U	0.169	0.170		0.244	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Uranium-238	0.634	U	0.353	0.359		1.22	pCi/g	08/05/15 10:30	08/27/15 16:35	1

Client Sample ID: TITO04_RSY14_2-CH-S202

Date Collected: 07/29/15 15:54

Date Received: 08/03/15 08:40

Lab Sample ID: 160-13114-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.561		0.119	0.132		0.0867	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Actinium-227	0.0272	U	0.172	0.172		0.652	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Bismuth-212	0.208	U	0.396	0.396		0.685	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Bismuth-214	0.347		0.101	0.107		0.0670	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Cesium-137	0.0262	U	0.0336	0.0337		0.0551	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Lead-210	1.07	U	1.07	1.08		1.40	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Lead-212	0.341		0.0738	0.0860		0.0702	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Lead-214	0.348		0.0813	0.0890		0.0741	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Potassium-40	12.3		1.55	2.00		0.362	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Protactinium-231	0.0812	U	0.230	0.230		1.31	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Radium-226	0.347		0.101	0.107	0.500	0.0670	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Radium-228	0.561		0.119	0.132		0.0867	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thallium-208	0.135		0.0401	0.0424		0.0336	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thorium-228	0.341		0.0738	0.0860		0.0702	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thorium-232	0.561		0.119	0.132		0.0867	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thorium-234	0.592	U	0.728	0.730		1.25	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Uranium-235	0.0921	U	0.143	0.143		0.259	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Uranium-238	0.592	U	0.728	0.730		1.25	pCi/g	08/05/15 10:30	08/27/15 16:38	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S203

Lab Sample ID: 160-13114-3

Date Collected: 07/29/15 16:07

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.522		0.168	0.176		0.103	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Actinium-227	0.0472	U	0.146	0.147		0.989	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Bismuth-212	0.164	U	0.491	0.491		0.878	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Bismuth-214	0.214		0.0970	0.0995		0.119	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Cesium-137	0.0120	U	0.0435	0.0435		0.0846	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Lead-210	0.492	U	1.06	1.06		1.79	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Lead-212	0.254		0.0789	0.0854		0.104	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Lead-214	0.365		0.0824	0.0907		0.105	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Potassium-40	12.2		1.68	2.09		0.663	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Protactinium-231	0.143	U	0.215	0.216		1.72	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Radium-226	0.214		0.0970	0.0995	0.500	0.119	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Radium-228	0.522		0.168	0.176		0.103	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Thallium-208	0.0270	U	0.0449	0.0450		0.0797	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Thorium-228	0.254		0.0789	0.0854		0.104	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Thorium-232	0.522		0.168	0.176		0.103	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Thorium-234	0.960	U	0.820	0.826		1.41	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Uranium-235	0.0872	U	0.110	0.111		0.377	pCi/g	08/05/15 10:30	08/27/15 16:39	1
Uranium-238	0.960	U	0.820	0.826		1.41	pCi/g	08/05/15 10:30	08/27/15 16:39	1

Client Sample ID: TITO04_RSY14_2-CH-S204

Lab Sample ID: 160-13114-4

Date Collected: 07/29/15 15:57

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.210	U	0.143	0.144		0.248	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Actinium-227	0.000	U	0.343	0.343		0.815	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Bismuth-212	0.0198	U	0.537	0.537		0.982	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Bismuth-214	0.237		0.0946	0.0978		0.110	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Cesium-137	0.00996	U	0.0385	0.0385		0.0692	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Lead-210	0.125	U	1.09	1.09		2.07	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Lead-212	0.330		0.0959	0.105		0.106	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Lead-214	0.282		0.0975	0.102		0.121	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Potassium-40	11.9		1.49	1.92		0.563	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Protactinium-231	0.263	U	0.350	0.351		1.58	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Radium-226	0.237		0.0946	0.0978	0.500	0.110	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Radium-228	0.210	U	0.143	0.144		0.248	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thallium-208	0.101		0.0490	0.0501		0.0587	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thorium-228	0.330		0.0959	0.105		0.106	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thorium-232	0.210	U	0.143	0.144		0.248	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thorium-234	0.722	U	0.935	0.938		1.65	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Uranium-235	0.0341	U	0.0657	0.0658		0.406	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Uranium-238	0.722	U	0.935	0.938		1.65	pCi/g	08/05/15 10:30	08/27/15 16:36	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S205

Lab Sample ID: 160-13114-5

Date Collected: 07/29/15 16:00

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0919	U	0.0893	0.0898		0.293	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Actinium-227	0.0343	U	0.303	0.303		0.542	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Bismuth-212	0.170	U	0.486	0.486		0.861	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Bismuth-214	0.355		0.108	0.114		0.102	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Cesium-137	-0.00647	U	0.0353	0.0353		0.0650	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Lead-210	-0.247	U	1.70	1.70		1.69	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Lead-212	0.337		0.104	0.113		0.103	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Lead-214	0.298		0.0872	0.0925		0.122	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Potassium-40	9.89		1.43	1.75		0.744	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Protactinium-231	0.309	U	0.570	0.571		1.58	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Radium-226	0.355		0.108	0.114	0.500	0.102	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Radium-228	0.0919	U	0.0893	0.0898		0.293	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Thallium-208	0.0851		0.0341	0.0352		0.0367	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Thorium-228	0.337		0.104	0.113		0.103	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Thorium-232	0.0919	U	0.0893	0.0898		0.293	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Thorium-234	0.710	U	0.704	0.708		1.20	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Uranium-235	0.0691	U	0.164	0.164		0.281	pCi/g	08/05/15 10:30	08/27/15 16:34	1
Uranium-238	0.710	U	0.704	0.708		1.20	pCi/g	08/05/15 10:30	08/27/15 16:34	1

Client Sample ID: TITO04_RSY14_2-CH-S206

Lab Sample ID: 160-13114-6

Date Collected: 07/29/15 16:26

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.196	U	0.171	0.172		0.262	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Actinium-227	0.148	U	0.368	0.368		0.633	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Bismuth-212	0.167	U	0.522	0.523		0.931	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Bismuth-214	0.403		0.103	0.111		0.0765	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Cesium-137	0.00490	U	0.0404	0.0404		0.0747	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Lead-210	-0.393	U	2.38	2.38		1.71	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Lead-212	0.299		0.112	0.119		0.118	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Lead-214	0.128	U	0.0792	0.0803		0.139	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Potassium-40	8.36		1.46	1.69		1.07	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Protactinium-231	0.153	U	0.460	0.460		1.57	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Radium-226	0.403		0.103	0.111	0.500	0.0765	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Radium-228	0.196	U	0.171	0.172		0.262	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thallium-208	0.115		0.0480	0.0494		0.0522	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thorium-228	0.299		0.112	0.119		0.118	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thorium-232	0.196	U	0.171	0.172		0.262	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Thorium-234	0.264	U	0.439	0.440		1.38	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Uranium-235	0.0841	U	0.185	0.185		0.308	pCi/g	08/05/15 10:30	08/27/15 16:35	1
Uranium-238	0.264	U	0.439	0.440		1.38	pCi/g	08/05/15 10:30	08/27/15 16:35	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S207

Lab Sample ID: 160-13114-7

Date Collected: 07/29/15 16:09

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.238		0.132	0.134		0.161	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Actinium-227	0.0445	U	0.162	0.162		0.899	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Bismuth-212	0.293	U	0.465	0.466		0.784	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Bismuth-214	0.280		0.122	0.125		0.131	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Cesium-137	0.00316	U	0.0370	0.0370		0.0678	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Lead-210	-0.474	U	1.95	1.95		2.17	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Lead-212	0.286		0.0811	0.0891		0.0951	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Lead-214	0.406		0.117	0.125		0.117	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Potassium-40	9.11		1.25	1.56		0.741	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Protactinium-231	0.331	U	0.720	0.721		1.24	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Radium-226	0.280		0.122	0.125	0.500	0.131	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Radium-228	0.238		0.132	0.134		0.161	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thallium-208	0.0691		0.0456	0.0462		0.0678	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thorium-228	0.286		0.0811	0.0891		0.0951	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thorium-232	0.238		0.132	0.134		0.161	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Thorium-234	0.237	U	0.805	0.805		1.45	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Uranium-235	0.0112	U	0.239	0.239		0.414	pCi/g	08/05/15 10:30	08/27/15 16:36	1
Uranium-238	0.237	U	0.805	0.805		1.45	pCi/g	08/05/15 10:30	08/27/15 16:36	1

Client Sample ID: TITO04_RSY14_2-CH-S208

Lab Sample ID: 160-13114-8

Date Collected: 07/29/15 16:27

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.386		0.159	0.164		0.144	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Actinium-227	0.100	U	0.394	0.394		0.686	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Bismuth-212	0.554	U	0.428	0.432		0.626	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Bismuth-214	0.388		0.113	0.120		0.109	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Cesium-137	0.000	U	0.0295	0.0295		0.0972	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Lead-210	0.266	U	0.948	0.949		1.71	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Lead-212	0.351		0.0877	0.0987		0.0936	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Lead-214	0.305		0.104	0.109		0.109	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Potassium-40	10.3		1.41	1.76		0.723	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Protactinium-231	0.155	U	0.426	0.426		1.72	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Radium-226	0.388		0.113	0.120	0.500	0.109	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Radium-228	0.386		0.159	0.164		0.144	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Thallium-208	0.0622	U	0.0510	0.0514		0.0730	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Thorium-228	0.351		0.0877	0.0987		0.0936	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Thorium-232	0.386		0.159	0.164		0.144	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Thorium-234	0.214	U	0.422	0.422		1.65	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Uranium-235	0.104	U	0.133	0.134		0.297	pCi/g	08/05/15 10:30	08/27/15 16:37	1
Uranium-238	0.214	U	0.422	0.422		1.65	pCi/g	08/05/15 10:30	08/27/15 16:37	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S209

Lab Sample ID: 160-13114-9

Date Collected: 07/29/15 16:32

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.191	U	0.162	0.163		0.368	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Actinium-227	0.332	U	0.298	0.301		0.627	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Bismuth-212	0.215	U	0.603	0.603		1.07	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Bismuth-214	0.222		0.144	0.146		0.157	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Cesium-137	0.000718	U	0.0511	0.0511		0.103	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Lead-210	-0.337	U	2.98	2.98		2.11	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Lead-212	0.303		0.129	0.135		0.137	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Lead-214	0.380		0.0911	0.0993		0.0975	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Potassium-40	10.9		1.74	2.07		0.761	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Protactinium-231	-0.182	U	1.03	1.03		1.84	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Radium-226	0.222		0.144	0.146	0.500	0.157	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Radium-228	0.191	U	0.162	0.163		0.368	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Thallium-208	0.120		0.0607	0.0620		0.0775	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Thorium-228	0.303		0.129	0.135		0.137	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Thorium-232	0.191	U	0.162	0.163		0.368	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Thorium-234	0.588	U	0.365	0.370		1.22	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Uranium-235	0.102	U	0.207	0.207		0.328	pCi/g	08/05/15 10:30	08/27/15 17:11	1
Uranium-238	0.588	U	0.365	0.370		1.22	pCi/g	08/05/15 10:30	08/27/15 17:11	1

Client Sample ID: TITO04_RSY14_2-CH-S210

Lab Sample ID: 160-13114-10

Date Collected: 07/29/15 16:36

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.167	U	0.110	0.111		0.237	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Actinium-227	0.275	U	0.385	0.387		0.640	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Bismuth-212	0.0956	U	0.437	0.437		0.787	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Bismuth-214	0.243		0.0833	0.0871		0.0937	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Cesium-137	-0.0104	U	0.0412	0.0412		0.0730	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Lead-210	0.967	U	0.920	0.927		1.37	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Lead-212	0.329		0.0970	0.106		0.103	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Lead-214	0.342		0.0992	0.105		0.126	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Potassium-40	9.62		1.33	1.66		0.830	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Protactinium-231	0.256	U	0.281	0.282		1.72	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Radium-226	0.243		0.0833	0.0871	0.500	0.0937	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Radium-228	0.167	U	0.110	0.111		0.237	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Thallium-208	0.141		0.0459	0.0482		0.0441	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Thorium-228	0.329		0.0970	0.106		0.103	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Thorium-232	0.167	U	0.110	0.111		0.237	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Thorium-234	0.297	U	0.744	0.745		1.32	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Uranium-235	0.0519	U	0.140	0.140		0.209	pCi/g	08/05/15 10:30	08/27/15 17:12	1
Uranium-238	0.297	U	0.744	0.745		1.32	pCi/g	08/05/15 10:30	08/27/15 17:12	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S211

Lab Sample ID: 160-13114-11

Date Collected: 07/29/15 16:31

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.275		0.155	0.157		0.252	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Actinium-227	0.0522	U	0.125	0.125		0.897	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Bismuth-212	0.538	U	0.472	0.475		0.710	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Bismuth-214	0.362		0.0944	0.102		0.0669	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Cesium-137	-0.00113	U	0.0541	0.0541		0.0961	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Lead-210	-0.167	U	0.969	0.970		1.69	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Lead-212	0.258		0.0895	0.0955		0.0967	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Lead-214	0.261		0.0992	0.103		0.105	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Potassium-40	10.3		1.53	1.85		0.648	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Protactinium-231	-0.0811	U	0.867	0.867		1.56	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Radium-226	0.362		0.0944	0.102	0.500	0.0669	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Radium-228	0.275		0.155	0.157		0.252	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Thallium-208	0.123		0.0422	0.0441		0.0400	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Thorium-228	0.258		0.0895	0.0955		0.0967	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Thorium-232	0.275		0.155	0.157		0.252	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Thorium-234	0.590	U	0.412	0.417		1.19	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Uranium-235	0.0785	U	0.112	0.112		0.360	pCi/g	08/05/15 10:30	08/27/15 17:13	1
Uranium-238	0.590	U	0.412	0.417		1.19	pCi/g	08/05/15 10:30	08/27/15 17:13	1

Client Sample ID: TITO04_RSY14_2-CH-S212

Lab Sample ID: 160-13114-12

Date Collected: 07/29/15 16:41

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.343		0.124	0.129		0.173	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Actinium-227	0.000	U	0.236	0.236		0.701	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Bismuth-212	0.388	U	0.356	0.358		0.549	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Bismuth-214	0.275		0.0805	0.0854		0.0833	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Cesium-137	0.0111	U	0.0257	0.0257		0.0453	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Lead-210	0.178	U	0.680	0.680		1.18	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Lead-212	0.317		0.0713	0.0823		0.0663	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Lead-214	0.236		0.0703	0.0745		0.0943	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Potassium-40	11.4		1.28	1.73		0.542	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Protactinium-231	0.149	U	0.259	0.259		1.33	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Radium-226	0.275		0.0805	0.0854	0.500	0.0833	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Radium-228	0.343		0.124	0.129		0.173	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thallium-208	0.155		0.0437	0.0466		0.0281	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thorium-228	0.317		0.0713	0.0823		0.0663	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thorium-232	0.343		0.124	0.129		0.173	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thorium-234	0.633	U	0.696	0.699		1.14	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Uranium-235	0.0881	U	0.112	0.113		0.296	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Uranium-238	0.633	U	0.696	0.699		1.14	pCi/g	08/05/15 10:30	08/27/15 17:08	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S213

Lab Sample ID: 160-13114-13

Date Collected: 07/29/15 16:39

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.291		0.125	0.129		0.219	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Actinium-227	-0.171	U	0.398	0.398		0.678	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Bismuth-212	0.0804	U	0.448	0.448		0.820	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Bismuth-214	0.364		0.0940	0.101		0.0816	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Cesium-137	0.00946	U	0.0335	0.0335		0.0608	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Lead-210	0.241	U	0.879	0.879		1.62	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Lead-212	0.282		0.0864	0.0938		0.0935	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Lead-214	0.276		0.0852	0.0899		0.118	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Potassium-40	9.74		1.39	1.71		0.633	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Protactinium-231	0.157	U	0.222	0.223		1.36	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Radium-226	0.364		0.0940	0.101	0.500	0.0816	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Radium-228	0.291		0.125	0.129		0.219	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Thallium-208	0.0682	U	0.0509	0.0514		0.0696	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Thorium-228	0.282		0.0864	0.0938		0.0935	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Thorium-232	0.291		0.125	0.129		0.219	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Thorium-234	0.441	U	0.912	0.913		1.31	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Uranium-235	0.170	U	0.146	0.147		0.227	pCi/g	08/05/15 10:30	08/27/15 17:07	1
Uranium-238	0.441	U	0.912	0.913		1.31	pCi/g	08/05/15 10:30	08/27/15 17:07	1

Client Sample ID: TITO04_RSY14_2-CH-S214

Lab Sample ID: 160-13114-14

Date Collected: 07/29/15 16:13

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.252	U	0.134	0.136		0.258	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Actinium-227	0.0638	U	0.398	0.398		0.699	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Bismuth-212	0.125	U	0.488	0.489		0.885	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Bismuth-214	0.367		0.117	0.123		0.102	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Cesium-137	0.0136	U	0.0397	0.0397		0.0708	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Lead-210	-0.203	U	1.30	1.30		1.59	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Lead-212	0.262		0.0921	0.0982		0.103	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Lead-214	0.182		0.0850	0.0871		0.133	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Potassium-40	8.96		1.55	1.80		1.26	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Protactinium-231	0.104	U	0.243	0.243		1.69	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Radium-226	0.367		0.117	0.123	0.500	0.102	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Radium-228	0.252	U	0.134	0.136		0.258	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thallium-208	0.111		0.0679	0.0689		0.0697	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thorium-228	0.262		0.0921	0.0982		0.103	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thorium-232	0.252	U	0.134	0.136		0.258	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Thorium-234	0.373	U	0.769	0.770		1.39	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Uranium-235	0.178	U	0.201	0.202		0.334	pCi/g	08/05/15 10:30	08/27/15 17:08	1
Uranium-238	0.373	U	0.769	0.770		1.39	pCi/g	08/05/15 10:30	08/27/15 17:08	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S215

Lab Sample ID: 160-13114-15

Date Collected: 07/29/15 14:45

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.195	U	0.131	0.133		0.231	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Actinium-227	0.0447	U	0.113	0.113		0.468	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Bismuth-212	0.271	U	0.377	0.378		0.627	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Bismuth-214	0.300		0.0972	0.102		0.109	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Cesium-137	-0.00115	U	0.0378	0.0378		0.0695	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Lead-210	0.519	U	0.859	0.861		1.58	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Lead-212	0.322		0.0936	0.102		0.105	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Lead-214	0.201		0.0783	0.0811		0.139	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Potassium-40	9.72		1.32	1.65		0.936	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Protactinium-231	0.247	U	0.833	0.834		1.45	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Radium-226	0.300		0.0972	0.102	0.500	0.109	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Radium-228	0.195	U	0.131	0.133		0.231	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Thallium-208	0.117		0.0585	0.0597		0.0565	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Thorium-228	0.322		0.0936	0.102		0.105	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Thorium-232	0.195	U	0.131	0.133		0.231	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Thorium-234	0.114	U	0.456	0.457		1.57	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Uranium-235	0.134	U	0.183	0.184		0.298	pCi/g	08/05/15 10:30	08/27/15 17:09	1
Uranium-238	0.114	U	0.456	0.457		1.57	pCi/g	08/05/15 10:30	08/27/15 17:09	1

Client Sample ID: TITO04_RSY14_2-CH-S216

Lab Sample ID: 160-13114-16

Date Collected: 07/30/15 08:36

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0983	U	0.126	0.126		0.235	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Actinium-227	0.0317	U	0.387	0.387		0.681	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Bismuth-212	0.130	U	0.394	0.394		0.702	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Bismuth-214	0.318		0.0903	0.0961		0.0872	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Cesium-137	0.00334	U	0.0329	0.0329		0.0608	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Lead-210	1.46	U	1.13	1.15		1.67	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Lead-212	0.260		0.0838	0.0903		0.0927	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Lead-214	0.304		0.0913	0.0966		0.103	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Potassium-40	9.49		1.25	1.58		0.523	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Protactinium-231	0.0713	U	0.720	0.720		1.30	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Radium-226	0.318		0.0903	0.0961	0.500	0.0872	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Radium-228	0.0983	U	0.126	0.126		0.235	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Thallium-208	0.0990		0.0469	0.0480		0.0520	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Thorium-228	0.260		0.0838	0.0903		0.0927	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Thorium-232	0.0983	U	0.126	0.126		0.235	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Thorium-234	0.632	U	0.493	0.497		1.41	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Uranium-235	0.159	U	0.162	0.163		0.239	pCi/g	08/05/15 10:30	08/27/15 17:10	1
Uranium-238	0.632	U	0.493	0.497		1.41	pCi/g	08/05/15 10:30	08/27/15 17:10	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S217

Lab Sample ID: 160-13114-17

Date Collected: 07/30/15 08:40

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.204	U	0.136	0.138		0.270	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Actinium-227	-0.380	U	0.454	0.456		0.745	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Bismuth-212	0.0482	U	0.481	0.481		0.891	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Bismuth-214	0.403		0.100	0.108		0.0649	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Cesium-137	-0.0226	U	0.904	0.904		0.131	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Lead-210	0.500	U	0.990	0.992		1.67	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Lead-212	0.346		0.0888	0.0994		0.0899	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Lead-214	0.344		0.0861	0.0932		0.120	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Potassium-40	11.8		1.61	2.01		0.629	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Protactinium-231	0.313	U	0.584	0.585		1.15	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Radium-226	0.403		0.100	0.108	0.500	0.0649	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Radium-228	0.204	U	0.136	0.138		0.270	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Thallium-208	0.0963		0.0453	0.0464		0.0615	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Thorium-228	0.346		0.0888	0.0994		0.0899	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Thorium-232	0.204	U	0.136	0.138		0.270	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Thorium-234	0.578	U	0.780	0.782		1.38	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Uranium-235	0.0482	U	0.192	0.192		0.341	pCi/g	08/05/15 10:30	08/27/15 17:46	1
Uranium-238	0.578	U	0.780	0.782		1.38	pCi/g	08/05/15 10:30	08/27/15 17:46	1

Client Sample ID: TITO04_RSY14_2-CH-S218

Lab Sample ID: 160-13114-18

Date Collected: 07/30/15 08:43

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.305		0.0944	0.0994		0.214	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Actinium-227	-0.180	U	0.367	0.367		0.621	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Bismuth-212	0.268	U	0.299	0.300		0.477	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Bismuth-214	0.310		0.0883	0.0940		0.0840	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Cesium-137	-0.00776	U	0.0294	0.0294		0.0528	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Lead-210	-0.0197	U	0.666	0.666		1.18	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Lead-212	0.250		0.0737	0.0805		0.0718	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Lead-214	0.450		0.0787	0.0916		0.0654	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Potassium-40	10.6		1.23	1.64		0.541	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Protactinium-231	0.186	U	0.229	0.230		1.29	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Radium-226	0.310		0.0883	0.0940	0.500	0.0840	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Radium-228	0.305		0.0944	0.0994		0.214	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Thallium-208	0.0951		0.0328	0.0342		0.0239	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Thorium-228	0.250		0.0737	0.0805		0.0718	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Thorium-232	0.305		0.0944	0.0994		0.214	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Thorium-234	0.360	U	0.253	0.256		0.899	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Uranium-235	0.110	U	0.155	0.155		0.265	pCi/g	08/05/15 10:30	08/27/15 17:42	1
Uranium-238	0.360	U	0.253	0.256		0.899	pCi/g	08/05/15 10:30	08/27/15 17:42	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Client Sample ID: TITO04_RSY14_2-CH-S219

Lab Sample ID: 160-13114-19

Date Collected: 07/30/15 08:46

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.464		0.118	0.128		0.0865	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Actinium-227	-0.148	U	0.478	0.478		0.821	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Bismuth-212	0.416	U	0.465	0.467		0.747	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Bismuth-214	0.324		0.0877	0.0939		0.0879	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Cesium-137	-0.000104	U	0.0354	0.0354		0.0669	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Lead-210	-0.114	U	1.31	1.31		2.14	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Lead-212	0.308		0.0978	0.106		0.109	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Lead-214	0.379		0.115	0.121		0.134	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Potassium-40	8.08		1.28	1.52		0.850	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Protactinium-231	0.272	U	0.457	0.458		1.70	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Radium-226	0.324		0.0877	0.0939	0.500	0.0879	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Radium-228	0.464		0.118	0.128		0.0865	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Thallium-208	0.103		0.0428	0.0442		0.0486	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Thorium-228	0.308		0.0978	0.106		0.109	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Thorium-232	0.464		0.118	0.128		0.0865	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Thorium-234	0.163	U	0.328	0.329		1.66	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Uranium-235	0.0438	U	0.195	0.195		0.329	pCi/g	08/05/15 10:30	08/27/15 17:43	1
Uranium-238	0.163	U	0.328	0.329		1.66	pCi/g	08/05/15 10:30	08/27/15 17:43	1

Client Sample ID: TITO04_RSY14_2-CH-S220

Lab Sample ID: 160-13114-20

Date Collected: 07/30/15 08:50

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.402		0.158	0.163		0.248	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Actinium-227	-0.168	U	0.387	0.388		0.662	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Bismuth-212	0.533	U	0.538	0.541		0.851	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Bismuth-214	0.351		0.123	0.128		0.120	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Cesium-137	0.00120	U	0.0401	0.0401		0.0749	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Lead-210	1.41	U	1.02	1.04		1.46	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Lead-212	0.449		0.0885	0.106		0.0729	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Lead-214	0.398		0.0986	0.107		0.134	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Potassium-40	11.0		1.52	1.89		0.675	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Protactinium-231	0.119	U	0.563	0.563		1.45	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Radium-226	0.351		0.123	0.128	0.500	0.120	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Radium-228	0.402		0.158	0.163		0.248	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Thallium-208	0.161		0.0570	0.0594		0.0561	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Thorium-228	0.449		0.0885	0.106		0.0729	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Thorium-232	0.402		0.158	0.163		0.248	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Thorium-234	0.269	U	0.925	0.925		1.63	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Uranium-235	0.111	U	0.188	0.189		0.310	pCi/g	08/05/15 10:30	08/27/15 17:41	1
Uranium-238	0.269	U	0.925	0.925		1.63	pCi/g	08/05/15 10:30	08/27/15 17:41	1

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QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-204116/1-A

Matrix: Solid

Analysis Batch: 208135

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 204116

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.001436	U	0.144	0.144		0.278	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Actinium-227	0.2625	U	0.346	0.347		0.571	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Bismuth-212	0.2306	U	0.436	0.436		0.759	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Bismuth-214	-0.02765	U	0.196	0.196		0.176	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Cesium-137	0.0000	U	0.00805	0.00805		0.0603	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Lead-210	0.06291	U	0.880	0.880		1.79	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Lead-212	-0.03963	U	0.608	0.608		0.119	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Lead-214	-0.05978	U	1.54	1.54		0.165	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Potassium-40	-0.004692	U	0.398	0.398		1.06	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Protactinium-231	0.06346	U	0.130	0.131		1.64	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Radium-226	-0.02765	U	0.196	0.196	0.500	0.176	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Radium-228	0.001436	U	0.144	0.144		0.278	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thallium-208	-0.02743	U	0.191	0.191		0.0867	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thorium-228	-0.03963	U	0.608	0.608		0.119	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thorium-232	0.001436	U	0.144	0.144		0.278	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Thorium-234	-0.05263	U	0.731	0.731		1.29	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Uranium-235	0.1072	U	0.144	0.144		0.235	pCi/g	08/05/15 10:30	08/27/15 16:38	1
Uranium-238	-0.05263	U	0.731	0.731		1.29	pCi/g	08/05/15 10:30	08/27/15 16:38	1

Lab Sample ID: LCS 160-204116/2-A

Matrix: Solid

Analysis Batch: 208136

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 204116

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.3	101.5		10.7		1.23	pCi/g	104	87 - 116
Cesium-137	30.2	30.57		3.30		0.338	pCi/g	101	87 - 120
Cobalt-60	19.0	19.19		2.01		0.163	pCi/g	101	87 - 115

Lab Sample ID: 160-13114-1 DU

Matrix: Solid

Analysis Batch: 208139

Client Sample ID: TITO04_RSY14_2-CH-S201

Prep Type: Total/NA

Prep Batch: 204116

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.182	U	0.2924		0.141		0.249	pCi/g	0.40	1
Actinium-227	0.264	U	-0.01846	U	0.434		0.772	pCi/g	0.34	1
Bismuth-212	0.415	U	0.2262	U	0.447		0.776	pCi/g	0.23	1
Bismuth-214	0.375		0.4023		0.121		0.111	pCi/g	0.12	1
Cesium-137	0.00442	U	-0.00947	U	0.0401		0.0727	pCi/g	0.19	1
Lead-210	0.366	U	1.250	U	1.22		1.91	pCi/g	0.42	1
Lead-212	0.336		0.3457		0.104		0.0998	pCi/g	0.05	1
Lead-214	0.343		0.3138		0.0974		0.130	pCi/g	0.15	1
Potassium-40	10.5		9.900		1.75		0.619	pCi/g	0.17	1
Protactinium-231	0.273	U	0.4333	U	0.497		1.58	pCi/g	0.18	1
Radium-226	0.375		0.4023		0.121	0.500	0.111	pCi/g	0.12	1
Radium-228	0.182	U	0.2924		0.141		0.249	pCi/g	0.40	1

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QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-13114-1 DU

Matrix: Solid

Analysis Batch: 208139

Client Sample ID: TITO04_RSY14_2-CH-S201

Prep Type: Total/NA

Prep Batch: 204116

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2 σ +/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.0752		0.1213		0.0487		0.0527	pCi/g	0.51	1
Thorium-228	0.336		0.3457		0.104		0.0998	pCi/g	0.05	1
Thorium-232	0.182	U	0.2924		0.141		0.249	pCi/g	0.40	1
Thorium-234	0.634	U	0.5483	U	0.546		1.61	pCi/g	0.09	1
Uranium-235	0.178	U	0.01826	U	0.180		0.326	pCi/g	0.46	1
Uranium-238	0.634	U	0.5483	U	0.546		1.61	pCi/g	0.09	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13114-2

Rad

Leach Batch: 203648

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13114-1	TITO04_RSY14_2-CH-S201	Total/NA	Solid	Dry and Grind	
160-13114-1 DU	TITO04_RSY14_2-CH-S201	Total/NA	Solid	Dry and Grind	
160-13114-2	TITO04_RSY14_2-CH-S202	Total/NA	Solid	Dry and Grind	
160-13114-3	TITO04_RSY14_2-CH-S203	Total/NA	Solid	Dry and Grind	
160-13114-4	TITO04_RSY14_2-CH-S204	Total/NA	Solid	Dry and Grind	
160-13114-5	TITO04_RSY14_2-CH-S205	Total/NA	Solid	Dry and Grind	
160-13114-6	TITO04_RSY14_2-CH-S206	Total/NA	Solid	Dry and Grind	
160-13114-7	TITO04_RSY14_2-CH-S207	Total/NA	Solid	Dry and Grind	
160-13114-8	TITO04_RSY14_2-CH-S208	Total/NA	Solid	Dry and Grind	
160-13114-9	TITO04_RSY14_2-CH-S209	Total/NA	Solid	Dry and Grind	
160-13114-10	TITO04_RSY14_2-CH-S210	Total/NA	Solid	Dry and Grind	
160-13114-11	TITO04_RSY14_2-CH-S211	Total/NA	Solid	Dry and Grind	
160-13114-12	TITO04_RSY14_2-CH-S212	Total/NA	Solid	Dry and Grind	
160-13114-13	TITO04_RSY14_2-CH-S213	Total/NA	Solid	Dry and Grind	
160-13114-14	TITO04_RSY14_2-CH-S214	Total/NA	Solid	Dry and Grind	
160-13114-15	TITO04_RSY14_2-CH-S215	Total/NA	Solid	Dry and Grind	
160-13114-16	TITO04_RSY14_2-CH-S216	Total/NA	Solid	Dry and Grind	
160-13114-17	TITO04_RSY14_2-CH-S217	Total/NA	Solid	Dry and Grind	
160-13114-18	TITO04_RSY14_2-CH-S218	Total/NA	Solid	Dry and Grind	
160-13114-19	TITO04_RSY14_2-CH-S219	Total/NA	Solid	Dry and Grind	
160-13114-20	TITO04_RSY14_2-CH-S220	Total/NA	Solid	Dry and Grind	

Prep Batch: 204116

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13114-1	TITO04_RSY14_2-CH-S201	Total/NA	Solid	Fill_Geo-21	203648
160-13114-1 DU	TITO04_RSY14_2-CH-S201	Total/NA	Solid	Fill_Geo-21	203648
160-13114-2	TITO04_RSY14_2-CH-S202	Total/NA	Solid	Fill_Geo-21	203648
160-13114-3	TITO04_RSY14_2-CH-S203	Total/NA	Solid	Fill_Geo-21	203648
160-13114-4	TITO04_RSY14_2-CH-S204	Total/NA	Solid	Fill_Geo-21	203648
160-13114-5	TITO04_RSY14_2-CH-S205	Total/NA	Solid	Fill_Geo-21	203648
160-13114-6	TITO04_RSY14_2-CH-S206	Total/NA	Solid	Fill_Geo-21	203648
160-13114-7	TITO04_RSY14_2-CH-S207	Total/NA	Solid	Fill_Geo-21	203648
160-13114-8	TITO04_RSY14_2-CH-S208	Total/NA	Solid	Fill_Geo-21	203648
160-13114-9	TITO04_RSY14_2-CH-S209	Total/NA	Solid	Fill_Geo-21	203648
160-13114-10	TITO04_RSY14_2-CH-S210	Total/NA	Solid	Fill_Geo-21	203648
160-13114-11	TITO04_RSY14_2-CH-S211	Total/NA	Solid	Fill_Geo-21	203648
160-13114-12	TITO04_RSY14_2-CH-S212	Total/NA	Solid	Fill_Geo-21	203648
160-13114-13	TITO04_RSY14_2-CH-S213	Total/NA	Solid	Fill_Geo-21	203648
160-13114-14	TITO04_RSY14_2-CH-S214	Total/NA	Solid	Fill_Geo-21	203648
160-13114-15	TITO04_RSY14_2-CH-S215	Total/NA	Solid	Fill_Geo-21	203648
160-13114-16	TITO04_RSY14_2-CH-S216	Total/NA	Solid	Fill_Geo-21	203648
160-13114-17	TITO04_RSY14_2-CH-S217	Total/NA	Solid	Fill_Geo-21	203648
160-13114-18	TITO04_RSY14_2-CH-S218	Total/NA	Solid	Fill_Geo-21	203648
160-13114-19	TITO04_RSY14_2-CH-S219	Total/NA	Solid	Fill_Geo-21	203648
160-13114-20	TITO04_RSY14_2-CH-S220	Total/NA	Solid	Fill_Geo-21	203648
LCS 160-204116/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-204116/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-13119-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
9/3/2015 3:10:50 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Job ID: 160-13119-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-13119-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Job ID: 160-13119-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 8/3/2015 8:40 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 22.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04_RSY17_2-CH-S201 (160-13119-1), TITO04_RSY17_2-CH-S202 (160-13119-2), TITO04_RSY17_2-CH-S203 (160-13119-3), TITO04_RSY17_2-CH-S204 (160-13119-4), TITO04_RSY17_2-CH-S205 (160-13119-5), TITO04_RSY17_2-CH-S206 (160-13119-6), TITO04_RSY17_2-CH-S207 (160-13119-7), TITO04_RSY17_2-CH-S208 (160-13119-8), TITO04_RSY17_2-CH-S209 (160-13119-9), TITO04_RSY17_2-CH-S210 (160-13119-10), TITO04_RSY17_2-CH-S211 (160-13119-11), TITO04_RSY17_2-CH-S212 (160-13119-12), TITO04_RSY17_2-CH-S213 (160-13119-13), TITO04_RSY17_2-CH-S214 (160-13119-14), TITO04_RSY17_2-CH-S215 (160-13119-15), TITO04_RSY17_2-CH-S216 (160-13119-16), TITO04_RSY17_2-CH-S217 (160-13119-17), TITO04_RSY17_2-CH-S218 (160-13119-18), TITO04_RSY17_2-CH-S219 (160-13119-19) and TITO04_RSY17_2-CH-S220 (160-13119-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 08/04/2015, prepared on 08/05/2015 and analyzed on 08/27/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



CBI
Federal Services LLC
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_RSY17 USE2_070

Page 2 of 3

Project Number: 500060

Project Name / Location: CTO-04 Phase III RSY17

Purchase Order #: 201455

Shipment Date: 7/31/15

Waybill Number: 1266543139327396

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Sampler's Name(s): Edna G. Balaban

Sample ID Number	Sample Description	Date	Time	Method	Matrix	# of containers	Preservative (water) Preservative (soil)	Container Type	Dose Rate $\mu\text{R}/\text{hr}$
TITO04_RSY17_2-CH-S210	Site 32 RSY17 USE 2	7/30/15	0944	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S211	Site 32 RSY17 USE 2	7/30/15	0942	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S212	Site 32 RSY17 USE 2	7/30/15	0954	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S213	Site 32 RSY17 USE 2	7/30/15	0952	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S214	Site 32 RSY17 USE 2	7/30/15	0958	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S215	Site 32 RSY17 USE 2	7/30/15	1003	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S216	Site 32 RSY17 USE 2	7/30/15	0954	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S217	Site 32 RSY17 USE 2	7/30/15	1007	G	SO	1		16 oz Plastic	X
TITO04_RSY17_2-CH-S218	Site 32 RSY17 USE 2	7/30/15	1011	G	SO	1		16 oz Plastic	X

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day ☐ 7-day

Project Specific:

I II III

Standard TAT ☐

Relinquished By: Edna G. Balaban

Relinquished By: Edna G. Balaban

Date: 7/30/15

Time: 1245

Date: 7/31/15

Time: 0940

Method Codes

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

ABS=Asbestos, PO=Pipe Opening

SO = Soil

SL = Sludge

CP = Chip Samples

Analyses Requested

Gamma Scan

N/A



CB&I Federal Services LLC
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_RSY17 USE2_070

Page 3 of 3

Project Number: 500060

Project Name / Location: CTO-04 Phase III RSY17

USED 2

Purchase Order #: 201455

Shipment Date: 7/26/15

Waybill Number: 176645451393273906

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Sampler's Name(s): Edson B. B. B.

Sample Description

Site 32 RSY17 USE 2

Site 32 RSY17 USE 2

Collection Information

Date

Time

Method

G

G

Matrix

SO

SO

of containers

1

1

Preservative (water)

Preservative (soil)

Container Type

16 oz Plastic

16 oz Plastic

Gamma Scan

N/A

Dose Rate μ R/h

5

3

Analyses Requested

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

III

Relinquished By:

[Signature]

Date: 7-30-15

Time: 12:45

Received By:

[Signature]

Date: 8-3-15

Time: 08:10

Relinquished By:

[Signature]

Date:

Time:

C = Composite

G = Grab

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

A = Air

SO = Soil

SL = Sludge

CP = Chip Samples

ABS=Asbestos, PO=Pipe Opening

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-13119-2

Login Number: 13119

List Number: 1

Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:
DOE = U.S. Department of Energy

Laboratory References:
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-13119-1	TITO04_RSY17_2-CH-S201	Solid	07/30/15 09:14	08/03/15 08:40
160-13119-2	TITO04_RSY17_2-CH-S202	Solid	07/30/15 09:17	08/03/15 08:40
160-13119-3	TITO04_RSY17_2-CH-S203	Solid	07/30/15 09:21	08/03/15 08:40
160-13119-4	TITO04_RSY17_2-CH-S204	Solid	07/30/15 09:24	08/03/15 08:40
160-13119-5	TITO04_RSY17_2-CH-S205	Solid	07/30/15 09:27	08/03/15 08:40
160-13119-6	TITO04_RSY17_2-CH-S206	Solid	07/30/15 09:30	08/03/15 08:40
160-13119-7	TITO04_RSY17_2-CH-S207	Solid	07/30/15 09:35	08/03/15 08:40
160-13119-8	TITO04_RSY17_2-CH-S208	Solid	07/30/15 09:39	08/03/15 08:40
160-13119-9	TITO04_RSY17_2-CH-S209	Solid	07/30/15 09:35	08/03/15 08:40
160-13119-10	TITO04_RSY17_2-CH-S210	Solid	07/30/15 09:44	08/03/15 08:40
160-13119-11	TITO04_RSY17_2-CH-S211	Solid	07/30/15 09:42	08/03/15 08:40
160-13119-12	TITO04_RSY17_2-CH-S212	Solid	07/30/15 09:54	08/03/15 08:40
160-13119-13	TITO04_RSY17_2-CH-S213	Solid	07/30/15 09:52	08/03/15 08:40
160-13119-14	TITO04_RSY17_2-CH-S214	Solid	07/30/15 09:58	08/03/15 08:40
160-13119-15	TITO04_RSY17_2-CH-S215	Solid	07/30/15 10:03	08/03/15 08:40
160-13119-16	TITO04_RSY17_2-CH-S216	Solid	07/30/15 09:54	08/03/15 08:40
160-13119-17	TITO04_RSY17_2-CH-S217	Solid	07/30/15 10:07	08/03/15 08:40
160-13119-18	TITO04_RSY17_2-CH-S218	Solid	07/30/15 10:11	08/03/15 08:40
160-13119-19	TITO04_RSY17_2-CH-S219	Solid	07/30/15 10:05	08/03/15 08:40
160-13119-20	TITO04_RSY17_2-CH-S220	Solid	07/30/15 10:10	08/03/15 08:40

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S201

Date Collected: 07/30/15 09:14

Date Received: 08/03/15 08:40

Lab Sample ID: 160-13119-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.283		0.121	0.124		0.212	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Actinium-227	0.171	U	0.202	0.203		0.526	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Bismuth-212	0.262	U	0.390	0.391		0.654	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Bismuth-214	0.367		0.108	0.114		0.100	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Cesium-137	-0.00916	U	0.0387	0.0388		0.0694	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Lead-210	0.455	U	0.801	0.803		1.32	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Lead-212	0.452		0.0883	0.106		0.0773	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Lead-214	0.464		0.0863	0.0989		0.123	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Potassium-40	8.56		1.24	1.52		0.576	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Protactinium-231	0.105	U	0.165	0.165		1.40	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Radium-226	0.367		0.108	0.114	0.500	0.100	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Radium-228	0.283		0.121	0.124		0.212	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Thallium-208	0.182		0.0522	0.0555		0.0436	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Thorium-228	0.452		0.0883	0.106		0.0773	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Thorium-232	0.283		0.121	0.124		0.212	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Thorium-234	0.343	U	0.307	0.309		1.32	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Uranium-235	0.130	U	0.116	0.116		0.279	pCi/g	08/05/15 17:56	08/27/15 19:36	1
Uranium-238	0.343	U	0.307	0.309		1.32	pCi/g	08/05/15 17:56	08/27/15 19:36	1

Client Sample ID: TITO04_RSY17_2-CH-S202

Date Collected: 07/30/15 09:17

Date Received: 08/03/15 08:40

Lab Sample ID: 160-13119-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.313		0.136	0.140		0.213	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Actinium-227	-0.0249	U	0.342	0.342		0.601	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Bismuth-212	0.311	U	0.400	0.401		0.658	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Bismuth-214	0.386		0.117	0.123		0.121	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Cesium-137	0.00444	U	0.0314	0.0314		0.0573	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Lead-210	-0.113	U	1.06	1.06		1.79	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Lead-212	0.379		0.105	0.116		0.111	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Lead-214	0.448		0.0929	0.104		0.116	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Potassium-40	8.68		1.16	1.46		0.726	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Protactinium-231	0.153	U	0.611	0.611		1.34	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Radium-226	0.386		0.117	0.123	0.500	0.121	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Radium-228	0.313		0.136	0.140		0.213	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Thallium-208	0.138		0.0421	0.0445		0.0385	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Thorium-228	0.379		0.105	0.116		0.111	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Thorium-232	0.313		0.136	0.140		0.213	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Thorium-234	0.153	U	0.212	0.213		1.59	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Uranium-235	0.205	U	0.176	0.177		0.288	pCi/g	08/05/15 17:56	08/27/15 19:38	1
Uranium-238	0.153	U	0.212	0.213		1.59	pCi/g	08/05/15 17:56	08/27/15 19:38	1

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S203

Lab Sample ID: 160-13119-3

Date Collected: 07/30/15 09:21

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.428		0.162	0.168		0.178	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Actinium-227	-0.206	U	0.490	0.491		0.832	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Bismuth-212	0.329	U	0.455	0.456		0.755	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Bismuth-214	0.512		0.124	0.135		0.108	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Cesium-137	0.000	U	0.0253	0.0253		0.0671	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Lead-210	-0.0173	U	1.00	1.00		1.89	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Lead-212	0.449		0.105	0.120		0.106	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Lead-214	0.419		0.106	0.115		0.0973	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Potassium-40	9.15		1.24	1.56		0.534	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Protactinium-231	0.274	U	0.264	0.266		1.63	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Radium-226	0.512		0.124	0.135	0.500	0.108	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Radium-228	0.428		0.162	0.168		0.178	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Thallium-208	0.0760		0.0446	0.0453		0.0674	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Thorium-228	0.449		0.105	0.120		0.106	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Thorium-232	0.428		0.162	0.168		0.178	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Thorium-234	0.501	U	0.955	0.956		1.46	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Uranium-235	0.104	U	0.196	0.196		0.298	pCi/g	08/05/15 17:56	08/27/15 19:39	1
Uranium-238	0.501	U	0.955	0.956		1.46	pCi/g	08/05/15 17:56	08/27/15 19:39	1

Client Sample ID: TITO04_RSY17_2-CH-S204

Lab Sample ID: 160-13119-4

Date Collected: 07/30/15 09:24

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.214	U	0.119	0.121		0.248	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Actinium-227	0.131	U	0.423	0.423		0.728	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Bismuth-212	0.317	U	0.454	0.455		0.758	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Bismuth-214	0.366		0.101	0.108		0.101	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Cesium-137	-0.00321	U	0.0406	0.0406		0.0739	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Lead-210	1.50	U	1.27	1.29		1.78	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Lead-212	0.390		0.0967	0.109		0.106	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Lead-214	0.400		0.106	0.114		0.126	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Potassium-40	8.88		1.24	1.53		0.521	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Protactinium-231	0.337	U	0.308	0.310		1.70	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Radium-226	0.366		0.101	0.108	0.500	0.101	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Radium-228	0.214	U	0.119	0.121		0.248	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thallium-208	0.136		0.0546	0.0564		0.0529	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thorium-228	0.390		0.0967	0.109		0.106	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thorium-232	0.214	U	0.119	0.121		0.248	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thorium-234	0.0757	U	0.392	0.393		1.34	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Uranium-235	0.0430	U	0.169	0.169		0.299	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Uranium-238	0.0757	U	0.392	0.393		1.34	pCi/g	08/05/15 17:56	08/27/15 20:14	1

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S205

Lab Sample ID: 160-13119-5

Date Collected: 07/30/15 09:27

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.257		0.154	0.156		0.221	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Actinium-227	0.435	U	0.375	0.378		0.592	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Bismuth-212	0.233	U	0.447	0.448		0.774	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Bismuth-214	0.394		0.110	0.117		0.0927	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Cesium-137	-0.000408	U	0.0350	0.0350		0.0667	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Lead-210	0.674	U	0.899	0.902		1.61	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Lead-212	0.442		0.112	0.126		0.112	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Lead-214	0.432		0.0966	0.107		0.106	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Potassium-40	9.80		1.47	1.78		0.640	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Protactinium-231	0.0689	U	0.153	0.154		1.61	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Radium-226	0.394		0.110	0.117	0.500	0.0927	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Radium-228	0.257		0.154	0.156		0.221	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thallium-208	0.139		0.0433	0.0456		0.0405	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thorium-228	0.442		0.112	0.126		0.112	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thorium-232	0.257		0.154	0.156		0.221	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thorium-234	0.297	U	0.910	0.911		1.62	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Uranium-235	0.169	U	0.198	0.198		0.319	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Uranium-238	0.297	U	0.910	0.911		1.62	pCi/g	08/05/15 17:56	08/27/15 20:13	1

Client Sample ID: TITO04_RSY17_2-CH-S206

Lab Sample ID: 160-13119-6

Date Collected: 07/30/15 09:30

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.452		0.174	0.180		0.141	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Actinium-227	0.000	U	0.346	0.346		0.790	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Bismuth-212	0.251	U	0.579	0.580		1.00	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Bismuth-214	0.443		0.122	0.131		0.118	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Cesium-137	-0.00510	U	0.0406	0.0406		0.0743	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Lead-210	0.876	U	0.948	0.954		1.65	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Lead-212	0.470		0.102	0.118		0.102	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Lead-214	0.564		0.152	0.163		0.148	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Potassium-40	12.4		1.58	2.03		0.647	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Protactinium-231	0.354	U	0.448	0.450		1.32	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Radium-226	0.443		0.122	0.131	0.500	0.118	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Radium-228	0.452		0.174	0.180		0.141	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thallium-208	0.202		0.0553	0.0592		0.0462	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thorium-228	0.470		0.102	0.118		0.102	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thorium-232	0.452		0.174	0.180		0.141	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Thorium-234	0.946	U	0.963	0.969		1.34	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Uranium-235	0.112	U	0.151	0.152		0.350	pCi/g	08/05/15 17:56	08/27/15 20:13	1
Uranium-238	0.946	U	0.963	0.969		1.34	pCi/g	08/05/15 17:56	08/27/15 20:13	1

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S207

Lab Sample ID: 160-13119-7

Date Collected: 07/30/15 09:35

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.286	U	0.183	0.186		0.302	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Actinium-227	0.0695	U	0.196	0.196		0.669	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Bismuth-212	0.233	U	0.489	0.489		0.845	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Bismuth-214	0.406		0.120	0.128		0.125	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Cesium-137	0.00297	U	0.0331	0.0331		0.0619	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Lead-210	-0.129	U	1.25	1.25		2.14	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Lead-212	0.336		0.101	0.110		0.119	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Lead-214	0.405		0.114	0.122		0.147	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Potassium-40	10.7		1.40	1.78		0.806	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Protactinium-231	0.783	U	0.763	0.768		1.65	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Radium-226	0.406		0.120	0.128	0.500	0.125	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Radium-228	0.286	U	0.183	0.186		0.302	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thallium-208	0.149		0.0593	0.0613		0.0585	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thorium-228	0.336		0.101	0.110		0.119	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thorium-232	0.286	U	0.183	0.186		0.302	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Thorium-234	0.143	U	0.493	0.493		1.61	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Uranium-235	0.155	U	0.222	0.222		0.368	pCi/g	08/05/15 17:56	08/27/15 20:14	1
Uranium-238	0.143	U	0.493	0.493		1.61	pCi/g	08/05/15 17:56	08/27/15 20:14	1

Client Sample ID: TITO04_RSY17_2-CH-S208

Lab Sample ID: 160-13119-8

Date Collected: 07/30/15 09:39

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.224	U	0.115	0.118		0.238	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Actinium-227	0.397	U	0.449	0.451		0.733	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Bismuth-212	0.232	U	0.525	0.526		0.911	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Bismuth-214	0.200		0.0991	0.101		0.124	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Cesium-137	0.00398	U	0.0379	0.0379		0.0698	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Lead-210	0.560	U	1.21	1.21		1.93	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Lead-212	0.357		0.0952	0.106		0.0980	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Lead-214	0.432		0.103	0.113		0.0940	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Potassium-40	11.2		1.44	1.84		0.587	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Protactinium-231	-0.319	U	1.05	1.05		1.82	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Radium-226	0.200		0.0991	0.101	0.500	0.124	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Radium-228	0.224	U	0.115	0.118		0.238	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Thallium-208	0.122		0.0430	0.0448		0.0451	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Thorium-228	0.357		0.0952	0.106		0.0980	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Thorium-232	0.224	U	0.115	0.118		0.238	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Thorium-234	0.412	U	0.437	0.439		1.63	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Uranium-235	0.00537	U	0.0758	0.0758		0.299	pCi/g	08/05/15 17:56	08/27/15 20:15	1
Uranium-238	0.412	U	0.437	0.439		1.63	pCi/g	08/05/15 17:56	08/27/15 20:15	1

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S209

Lab Sample ID: 160-13119-9

Date Collected: 07/30/15 09:35

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.152	U	0.0804	0.0818		0.231	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Actinium-227	0.166	U	0.271	0.271		0.678	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Bismuth-212	0.485	U	0.426	0.429		0.650	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Bismuth-214	0.399		0.117	0.124		0.114	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Cesium-137	0.0210	U	0.0344	0.0345		0.0585	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Lead-210	0.0887	U	0.880	0.880		1.65	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Lead-212	0.270		0.107	0.113		0.122	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Lead-214	0.226		0.0903	0.0933		0.132	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Potassium-40	9.93		1.40	1.73		1.10	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Protactinium-231	-0.0294	U	0.0498	0.0499		1.62	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Radium-226	0.399		0.117	0.124	0.500	0.114	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Radium-228	0.152	U	0.0804	0.0818		0.231	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thallium-208	0.0802		0.0481	0.0488		0.0730	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thorium-228	0.270		0.107	0.113		0.122	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thorium-232	0.152	U	0.0804	0.0818		0.231	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thorium-234	0.318	U	0.881	0.882		1.55	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Uranium-235	0.103	U	0.159	0.159		0.303	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Uranium-238	0.318	U	0.881	0.882		1.55	pCi/g	08/05/15 17:56	08/27/15 20:16	1

Client Sample ID: TITO04_RSY17_2-CH-S210

Lab Sample ID: 160-13119-10

Date Collected: 07/30/15 09:44

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.312		0.163	0.166		0.286	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Actinium-227	-0.157	U	0.464	0.465		0.807	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Bismuth-212	0.677	U	0.677	0.680		1.06	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Bismuth-214	0.494		0.155	0.163		0.142	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Cesium-137	-0.00244	U	0.0634	0.0635		0.110	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Lead-210	0.0235	U	1.09	1.09		2.08	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Lead-212	0.369		0.123	0.132		0.129	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Lead-214	0.519		0.143	0.153		0.171	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Potassium-40	9.48		1.75	2.00		0.875	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Protactinium-231	0.464	U	0.879	0.880		1.96	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Radium-226	0.494		0.155	0.163	0.500	0.142	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Radium-228	0.312		0.163	0.166		0.286	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thallium-208	0.199		0.0672	0.0703		0.0462	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thorium-228	0.369		0.123	0.132		0.129	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thorium-232	0.312		0.163	0.166		0.286	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Thorium-234	0.488	U	1.06	1.06		1.88	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Uranium-235	0.0587	U	0.222	0.222		0.376	pCi/g	08/05/15 17:56	08/27/15 20:16	1
Uranium-238	0.488	U	1.06	1.06		1.88	pCi/g	08/05/15 17:56	08/27/15 20:16	1

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S211

Lab Sample ID: 160-13119-11

Date Collected: 07/30/15 09:42

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.234	U	0.145	0.147		0.284	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Actinium-227	-0.209	U	0.576	0.576		0.979	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Bismuth-212	0.218	U	0.567	0.568		0.996	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Bismuth-214	0.430		0.115	0.124		0.0902	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Cesium-137	-0.0119	U	0.153	0.153		0.101	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Lead-210	0.799	U	1.14	1.15		1.90	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Lead-212	0.405		0.110	0.122		0.109	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Lead-214	0.470		0.120	0.129		0.0898	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Potassium-40	11.8		1.65	2.04		0.657	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Protactinium-231	-0.0154	U	0.0278	0.0279		1.78	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Radium-226	0.430		0.115	0.124	0.500	0.0902	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Radium-228	0.234	U	0.145	0.147		0.284	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Thallium-208	0.159		0.0635	0.0656		0.0615	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Thorium-228	0.405		0.110	0.122		0.109	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Thorium-232	0.234	U	0.145	0.147		0.284	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Thorium-234	0.400	U	0.502	0.504		1.76	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Uranium-235	-0.0498	U	1.84	1.84		0.397	pCi/g	08/05/15 17:56	08/27/15 20:17	1
Uranium-238	0.400	U	0.502	0.504		1.76	pCi/g	08/05/15 17:56	08/27/15 20:17	1

Client Sample ID: TITO04_RSY17_2-CH-S212

Lab Sample ID: 160-13119-12

Date Collected: 07/30/15 09:54

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.426		0.166	0.172		0.130	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Actinium-227	0.129	U	0.487	0.487		0.838	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Bismuth-212	0.379	U	0.406	0.408		0.642	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Bismuth-214	0.426		0.111	0.119		0.108	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Cesium-137	0.000863	U	0.0347	0.0347		0.0653	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Lead-210	0.579	U	1.28	1.28		1.85	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Lead-212	0.315		0.117	0.124		0.128	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Lead-214	0.471		0.116	0.126		0.111	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Potassium-40	11.8		1.55	1.96		0.923	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Protactinium-231	-0.00966	U	0.851	0.851		1.54	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Radium-226	0.426		0.111	0.119	0.500	0.108	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Radium-228	0.426		0.166	0.172		0.130	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Thallium-208	0.0800	U	0.0529	0.0535		0.0805	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Thorium-228	0.315		0.117	0.124		0.128	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Thorium-232	0.426		0.166	0.172		0.130	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Thorium-234	0.262	U	0.975	0.976		1.46	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Uranium-235	0.0913	U	0.154	0.154		0.297	pCi/g	08/05/15 17:56	08/27/15 20:50	1
Uranium-238	0.262	U	0.975	0.976		1.46	pCi/g	08/05/15 17:56	08/27/15 20:50	1

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S213

Lab Sample ID: 160-13119-13

Date Collected: 07/30/15 09:52

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.294		0.139	0.142		0.282	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Actinium-227	0.0289	U	0.155	0.155		0.691	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Bismuth-212	0.0499	U	0.474	0.474		0.906	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Bismuth-214	0.172		0.102	0.103		0.150	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Cesium-137	-0.0169	U	0.287	0.287		0.103	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Lead-210	-0.724	U	29.0	29.0		1.75	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Lead-212	0.338		0.110	0.118		0.113	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Lead-214	0.298		0.0880	0.0933		0.0843	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Potassium-40	9.38		1.67	1.93		1.15	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Protactinium-231	0.000	U	0.377	0.377		1.72	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Radium-226	0.172		0.102	0.103	0.500	0.150	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Radium-228	0.294		0.139	0.142		0.282	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Thallium-208	0.109		0.0502	0.0514		0.0431	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Thorium-228	0.338		0.110	0.118		0.113	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Thorium-232	0.294		0.139	0.142		0.282	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Thorium-234	0.338	U	0.432	0.433		1.53	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Uranium-235	0.0235	U	0.0773	0.0773		0.302	pCi/g	08/05/15 17:56	08/27/15 20:49	1
Uranium-238	0.338	U	0.432	0.433		1.53	pCi/g	08/05/15 17:56	08/27/15 20:49	1

Client Sample ID: TITO04_RSY17_2-CH-S214

Lab Sample ID: 160-13119-14

Date Collected: 07/30/15 09:58

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.381		0.188	0.192		0.241	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Actinium-227	0.0658	U	0.275	0.275		0.730	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Bismuth-212	0.441	U	0.457	0.459		0.719	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Bismuth-214	0.261		0.0966	0.100		0.115	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Cesium-137	-0.0353	U	0.190	0.191		0.0872	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Lead-210	0.342	U	0.943	0.944		1.61	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Lead-212	0.243		0.0767	0.0829		0.0902	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Lead-214	0.369		0.0871	0.0952		0.0796	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Potassium-40	10.2		1.49	1.82		0.623	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Protactinium-231	0.301	U	0.435	0.436		1.33	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Radium-226	0.261		0.0966	0.100	0.500	0.115	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Radium-228	0.381		0.188	0.192		0.241	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Thallium-208	0.108		0.0420	0.0434		0.0457	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Thorium-228	0.243		0.0767	0.0829		0.0902	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Thorium-232	0.381		0.188	0.192		0.241	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Thorium-234	0.434	U	0.437	0.440		1.42	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Uranium-235	0.0272	U	0.0377	0.0378		0.430	pCi/g	08/05/15 17:56	08/27/15 20:51	1
Uranium-238	0.434	U	0.437	0.440		1.42	pCi/g	08/05/15 17:56	08/27/15 20:51	1

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S215

Lab Sample ID: 160-13119-15

Date Collected: 07/30/15 10:03

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.435		0.123	0.131		0.0641	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Actinium-227	0.0177	U	0.136	0.136		0.737	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Bismuth-212	0.271	U	0.321	0.322		0.520	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Bismuth-214	0.304		0.0899	0.0953		0.0898	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Cesium-137	0.000	U	0.00927	0.00927		0.0846	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-210	0.000	U	0.514	0.514		1.58	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-212	0.373		0.0906	0.103		0.0859	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-214	0.345		0.0836	0.0909		0.0716	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Potassium-40	10.4		1.21	1.61		0.531	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Protactinium-231	0.165	U	0.366	0.366		1.36	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Radium-226	0.304		0.0899	0.0953	0.500	0.0898	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Radium-228	0.435		0.123	0.131		0.0641	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thallium-208	0.105		0.0367	0.0383		0.0406	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-228	0.373		0.0906	0.103		0.0859	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-232	0.435		0.123	0.131		0.0641	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-234	0.840	U	0.746	0.751		1.20	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Uranium-235	0.00256	U	0.0287	0.0287		0.229	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Uranium-238	0.840	U	0.746	0.751		1.20	pCi/g	08/05/15 17:56	08/27/15 20:47	1

Client Sample ID: TITO04_RSY17_2-CH-S216

Lab Sample ID: 160-13119-16

Date Collected: 07/30/15 09:54

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.451		0.160	0.166		0.125	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Actinium-227	0.0817	U	0.441	0.441		0.767	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Bismuth-212	0.249	U	0.410	0.411		0.696	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Bismuth-214	0.362		0.118	0.124		0.124	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Cesium-137	0.00575	U	0.0374	0.0374		0.0681	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-210	0.0756	U	1.03	1.03		1.96	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-212	0.384		0.0991	0.111		0.102	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-214	0.397		0.116	0.123		0.142	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Potassium-40	10.8		1.38	1.77		0.537	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Protactinium-231	-0.0575	U	0.319	0.319		1.82	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Radium-226	0.362		0.118	0.124	0.500	0.124	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Radium-228	0.451		0.160	0.166		0.125	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thallium-208	0.131		0.0483	0.0502		0.0516	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-228	0.384		0.0991	0.111		0.102	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-232	0.451		0.160	0.166		0.125	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-234	0.290	U	0.903	0.904		1.63	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Uranium-235	-0.0598	U	0.161	0.161		0.429	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Uranium-238	0.290	U	0.903	0.904		1.63	pCi/g	08/05/15 17:56	08/27/15 20:47	1

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S217

Lab Sample ID: 160-13119-17

Date Collected: 07/30/15 10:07

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.547		0.163	0.172		0.0895	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Actinium-227	-0.153	U	0.422	0.422		0.723	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Bismuth-212	0.186	U	0.395	0.396		0.693	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Bismuth-214	0.372		0.112	0.118		0.103	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Cesium-137	0.00775	U	0.0382	0.0382		0.0694	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Lead-210	-0.750	U	30.0	30.0		1.91	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Lead-212	0.284		0.0774	0.0857		0.0809	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Lead-214	0.242		0.0926	0.0960		0.129	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Potassium-40	10.2		1.49	1.82		0.816	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Protactinium-231	0.290	U	0.317	0.318		1.58	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Radium-226	0.372		0.112	0.118	0.500	0.103	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Radium-228	0.547		0.163	0.172		0.0895	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thallium-208	0.0745		0.0424	0.0431		0.0600	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thorium-228	0.284		0.0774	0.0857		0.0809	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thorium-232	0.547		0.163	0.172		0.0895	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thorium-234	0.815	U	0.724	0.729		1.22	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Uranium-235	0.0266	U	0.0497	0.0498		0.292	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Uranium-238	0.815	U	0.724	0.729		1.22	pCi/g	08/05/15 17:56	08/27/15 20:46	1

Client Sample ID: TITO04_RSY17_2-CH-S218

Lab Sample ID: 160-13119-18

Date Collected: 07/30/15 10:11

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.198	U	0.130	0.132		0.268	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Actinium-227	0.0434	U	0.476	0.476		0.833	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Bismuth-212	0.000	U	0.124	0.124		0.920	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Bismuth-214	0.126	U	0.0997	0.101		0.131	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Cesium-137	0.00420	U	0.0339	0.0339		0.0640	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Lead-210	-0.0750	U	0.975	0.975		1.61	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Lead-212	0.295		0.0961	0.103		0.101	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Lead-214	0.358		0.122	0.128		0.127	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Potassium-40	9.24		1.46	1.74		0.674	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Protactinium-231	0.135	U	0.514	0.514		1.57	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Radium-226	0.126	U	0.0997	0.101	0.500	0.131	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Radium-228	0.198	U	0.130	0.132		0.268	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thallium-208	0.0792		0.0476	0.0483		0.0714	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thorium-228	0.295		0.0961	0.103		0.101	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thorium-232	0.198	U	0.130	0.132		0.268	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Thorium-234	0.132	U	0.349	0.349		1.69	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Uranium-235	0.0969	U	0.195	0.196		0.294	pCi/g	08/05/15 17:56	08/27/15 20:46	1
Uranium-238	0.132	U	0.349	0.349		1.69	pCi/g	08/05/15 17:56	08/27/15 20:46	1

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Client Sample ID: TITO04_RSY17_2-CH-S219

Lab Sample ID: 160-13119-19

Date Collected: 07/30/15 10:05

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.213		0.141	0.143		0.202	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Actinium-227	-0.197	U	0.473	0.473		0.801	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Bismuth-212	0.478	U	0.433	0.436		0.670	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Bismuth-214	0.333		0.113	0.118		0.116	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Cesium-137	-0.00994	U	0.0427	0.0427		0.0756	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-210	-0.127	U	1.10	1.10		1.87	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-212	0.340		0.0991	0.108		0.103	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Lead-214	0.370		0.104	0.110		0.115	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Potassium-40	11.5		1.37	1.81		0.718	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Protactinium-231	0.0781	U	0.108	0.108		1.68	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Radium-226	0.333		0.113	0.118	0.500	0.116	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Radium-228	0.213		0.141	0.143		0.202	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thallium-208	0.154		0.0484	0.0510		0.0439	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-228	0.340		0.0991	0.108		0.103	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-232	0.213		0.141	0.143		0.202	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Thorium-234	1.32	U	0.866	0.877		1.43	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Uranium-235	0.171	U	0.176	0.177		0.296	pCi/g	08/05/15 17:56	08/27/15 20:47	1
Uranium-238	1.32	U	0.866	0.877		1.43	pCi/g	08/05/15 17:56	08/27/15 20:47	1

Client Sample ID: TITO04_RSY17_2-CH-S220

Lab Sample ID: 160-13119-20

Date Collected: 07/30/15 10:10

Matrix: Solid

Date Received: 08/03/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.254		0.111	0.114		0.200	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Actinium-227	0.208	U	0.423	0.423		0.716	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Bismuth-212	0.0465	U	0.355	0.355		0.662	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Bismuth-214	0.399		0.0993	0.108		0.0885	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Cesium-137	-0.00113	U	0.0370	0.0370		0.0684	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Lead-210	0.483	U	1.14	1.14		1.73	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Lead-212	0.302		0.0893	0.0975		0.101	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Lead-214	0.247		0.0760	0.0802		0.110	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Potassium-40	9.58		1.27	1.60		0.534	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Protactinium-231	0.109	U	0.190	0.191		1.33	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Radium-226	0.399		0.0993	0.108	0.500	0.0885	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Radium-228	0.254		0.111	0.114		0.200	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Thallium-208	0.107		0.0471	0.0483		0.0645	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Thorium-228	0.302		0.0893	0.0975		0.101	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Thorium-232	0.254		0.111	0.114		0.200	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Thorium-234	0.371	U	0.414	0.416		1.28	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Uranium-235	0.0804	U	0.199	0.199		0.321	pCi/g	08/05/15 17:56	08/27/15 20:48	1
Uranium-238	0.371	U	0.414	0.416		1.28	pCi/g	08/05/15 17:56	08/27/15 20:48	1

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-204229/1-A

Matrix: Solid

Analysis Batch: 208139

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 204229

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.1036	U	0.133	0.133		0.284	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Actinium-227	0.1013	U	0.141	0.141		0.610	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Bismuth-212	0.06202	U	0.491	0.491		0.931	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Bismuth-214	-0.06285	U	2.51	2.51		0.212	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Cesium-137	-0.002988	U	0.0455	0.0455		0.0859	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Lead-210	0.2055	U	0.823	0.823		1.90	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Lead-212	-0.08885	U	0.255	0.255		0.126	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Lead-214	-0.03137	U	0.0606	0.0607		0.160	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Potassium-40	-0.1131	U	0.996	0.996		1.03	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Protactinium-231	0.2081	U	0.262	0.263		1.51	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Radium-226	-0.06285	U	2.51	2.51	0.500	0.212	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Radium-228	0.1036	U	0.133	0.133		0.284	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Thallium-208	0.008445	U	0.0394	0.0394		0.0893	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Thorium-228	-0.08885	U	0.255	0.255		0.126	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Thorium-232	0.1036	U	0.133	0.133		0.284	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Thorium-234	0.5913	U	0.467	0.472		1.47	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Uranium-235	0.03402	U	0.168	0.168		0.343	pCi/g	08/05/15 17:56	08/27/15 19:37	1
Uranium-238	0.5913	U	0.467	0.472		1.47	pCi/g	08/05/15 17:56	08/27/15 19:37	1

Lab Sample ID: LCS 160-204229/2-A

Matrix: Solid

Analysis Batch: 208144

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 204229

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.3	97.86		10.3		1.37	pCi/g	101	87 - 116
Cesium-137	30.2	29.74		3.19		0.292	pCi/g	98	87 - 120
Cobalt-60	19.0	18.71		1.95		0.137	pCi/g	98	87 - 115

Lab Sample ID: 160-13119-1 DU

Matrix: Solid

Analysis Batch: 208141

Client Sample ID: TITO04_RSY17_2-CH-S201

Prep Type: Total/NA

Prep Batch: 204229

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.283		0.5276		0.140		0.0580	pCi/g	0.93	1
Actinium-227	0.171	U	0.06609	U	0.230		0.565	pCi/g	0.24	1
Bismuth-212	0.262	U	0.2965	U	0.328		0.525	pCi/g	0.05	1
Bismuth-214	0.367		0.4365		0.118		0.0963	pCi/g	0.30	1
Cesium-137	-0.00916	U	0.01479	U	0.0302		0.0518	pCi/g	0.35	1
Lead-210	0.455	U	0.4848	U	0.633		1.04	pCi/g	0.02	1
Lead-212	0.452		0.3688		0.101		0.0836	pCi/g	0.40	1
Lead-214	0.464		0.4996		0.102		0.0607	pCi/g	0.18	1
Potassium-40	8.56		8.486		1.36		0.481	pCi/g	0.03	1
Protactinium-231	0.105	U	0.2083	U	0.368		1.23	pCi/g	0.19	1
Radium-226	0.367		0.4365		0.118	0.500	0.0963	pCi/g	0.30	1
Radium-228	0.283		0.5276		0.140		0.0580	pCi/g	0.93	1

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-13119-1 DU

Matrix: Solid

Analysis Batch: 208141

Client Sample ID: TITO04_RSY17_2-CH-S201

Prep Type: Total/NA

Prep Batch: 204229

Analyte	Sample		DU		Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
	Result	Qual	Result	Qual						
Thallium-208	0.182		0.1201		0.0486		0.0419	pCi/g	0.60	1
Thorium-228	0.452		0.3688		0.101		0.0836	pCi/g	0.40	1
Thorium-232	0.283		0.5276		0.140		0.0580	pCi/g	0.93	1
Thorium-234	0.343	U	0.2454	U	0.732		1.24	pCi/g	0.09	1
Uranium-235	0.130	U	0.1166	U	0.0992		0.164	pCi/g	0.06	1
Uranium-238	0.343	U	0.2454	U	0.732		1.24	pCi/g	0.09	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-13119-2

Rad

Leach Batch: 203831

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13119-1	TITO04_RSY17_2-CH-S201	Total/NA	Solid	Dry and Grind	
160-13119-1 DU	TITO04_RSY17_2-CH-S201	Total/NA	Solid	Dry and Grind	
160-13119-2	TITO04_RSY17_2-CH-S202	Total/NA	Solid	Dry and Grind	
160-13119-3	TITO04_RSY17_2-CH-S203	Total/NA	Solid	Dry and Grind	
160-13119-4	TITO04_RSY17_2-CH-S204	Total/NA	Solid	Dry and Grind	
160-13119-5	TITO04_RSY17_2-CH-S205	Total/NA	Solid	Dry and Grind	
160-13119-6	TITO04_RSY17_2-CH-S206	Total/NA	Solid	Dry and Grind	
160-13119-7	TITO04_RSY17_2-CH-S207	Total/NA	Solid	Dry and Grind	
160-13119-8	TITO04_RSY17_2-CH-S208	Total/NA	Solid	Dry and Grind	
160-13119-9	TITO04_RSY17_2-CH-S209	Total/NA	Solid	Dry and Grind	
160-13119-10	TITO04_RSY17_2-CH-S210	Total/NA	Solid	Dry and Grind	
160-13119-11	TITO04_RSY17_2-CH-S211	Total/NA	Solid	Dry and Grind	
160-13119-12	TITO04_RSY17_2-CH-S212	Total/NA	Solid	Dry and Grind	
160-13119-13	TITO04_RSY17_2-CH-S213	Total/NA	Solid	Dry and Grind	
160-13119-14	TITO04_RSY17_2-CH-S214	Total/NA	Solid	Dry and Grind	
160-13119-15	TITO04_RSY17_2-CH-S215	Total/NA	Solid	Dry and Grind	
160-13119-16	TITO04_RSY17_2-CH-S216	Total/NA	Solid	Dry and Grind	
160-13119-17	TITO04_RSY17_2-CH-S217	Total/NA	Solid	Dry and Grind	
160-13119-18	TITO04_RSY17_2-CH-S218	Total/NA	Solid	Dry and Grind	
160-13119-19	TITO04_RSY17_2-CH-S219	Total/NA	Solid	Dry and Grind	
160-13119-20	TITO04_RSY17_2-CH-S220	Total/NA	Solid	Dry and Grind	

Prep Batch: 204229

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13119-1	TITO04_RSY17_2-CH-S201	Total/NA	Solid	Fill_Geo-21	203831
160-13119-1 DU	TITO04_RSY17_2-CH-S201	Total/NA	Solid	Fill_Geo-21	203831
160-13119-2	TITO04_RSY17_2-CH-S202	Total/NA	Solid	Fill_Geo-21	203831
160-13119-3	TITO04_RSY17_2-CH-S203	Total/NA	Solid	Fill_Geo-21	203831
160-13119-4	TITO04_RSY17_2-CH-S204	Total/NA	Solid	Fill_Geo-21	203831
160-13119-5	TITO04_RSY17_2-CH-S205	Total/NA	Solid	Fill_Geo-21	203831
160-13119-6	TITO04_RSY17_2-CH-S206	Total/NA	Solid	Fill_Geo-21	203831
160-13119-7	TITO04_RSY17_2-CH-S207	Total/NA	Solid	Fill_Geo-21	203831
160-13119-8	TITO04_RSY17_2-CH-S208	Total/NA	Solid	Fill_Geo-21	203831
160-13119-9	TITO04_RSY17_2-CH-S209	Total/NA	Solid	Fill_Geo-21	203831
160-13119-10	TITO04_RSY17_2-CH-S210	Total/NA	Solid	Fill_Geo-21	203831
160-13119-11	TITO04_RSY17_2-CH-S211	Total/NA	Solid	Fill_Geo-21	203831
160-13119-12	TITO04_RSY17_2-CH-S212	Total/NA	Solid	Fill_Geo-21	203831
160-13119-13	TITO04_RSY17_2-CH-S213	Total/NA	Solid	Fill_Geo-21	203831
160-13119-14	TITO04_RSY17_2-CH-S214	Total/NA	Solid	Fill_Geo-21	203831
160-13119-15	TITO04_RSY17_2-CH-S215	Total/NA	Solid	Fill_Geo-21	203831
160-13119-16	TITO04_RSY17_2-CH-S216	Total/NA	Solid	Fill_Geo-21	203831
160-13119-17	TITO04_RSY17_2-CH-S217	Total/NA	Solid	Fill_Geo-21	203831
160-13119-18	TITO04_RSY17_2-CH-S218	Total/NA	Solid	Fill_Geo-21	203831
160-13119-19	TITO04_RSY17_2-CH-S219	Total/NA	Solid	Fill_Geo-21	203831
160-13119-20	TITO04_RSY17_2-CH-S220	Total/NA	Solid	Fill_Geo-21	203831
LCS 160-204229/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-204229/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-15048-2

Client Project/Site: Treasure Island - 500060

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
12/23/2015 5:16:38 PM

Erika Gish, Project Manager II
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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Job ID: 160-15048-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-15048-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Job ID: 160-15048-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 11/24/2015 8:30 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 19.9° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TITO04-RSY10_SU2-S001 (160-15048-1), TITO04-RSY10_SU2-S002 (160-15048-2), TITO04-RSY10_SU2-S003 (160-15048-3), TITO04-RSY10_SU2-S004 (160-15048-4), TITO04-RSY10_SU2-S005 (160-15048-5), TITO04-RSY10_SU2-S006 (160-15048-6), TITO04-RSY10_SU2-S007 (160-15048-7), TITO04-RSY10_SU2-S008 (160-15048-8), TITO04-RSY10_SU2-S009 (160-15048-9), TITO04-RSY10_SU2-S010 (160-15048-10), TITO04-RSY10_SU2-S011 (160-15048-11), TITO04-RSY10_SU2-S012 (160-15048-12), TITO04-RSY10_SU2-S013 (160-15048-13), TITO04-RSY10_SU2-S014 (160-15048-14), TITO04-RSY10_SU2-S015 (160-15048-15), TITO04-RSY10_SU2-S016 (160-15048-16), TITO04-RSY10_SU2-S017 (160-15048-17), TITO04-RSY10_SU2-S018 (160-15048-18), TITO04-RSY10_SU2-S019 (160-15048-19) and TITO04-RSY10_SU2-S020 (160-15048-20) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 11/24/2015, prepared on 11/30/2015 and analyzed on 12/21/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Ref. Document # TI_P3_FSS_SU2_RSY10 147

Page 1 of 3

Project Number: 500060

CTO-04 Phase III RSY10 FSS
Project Name / Location: SU2

Purchase Order #: 201455

Project Manager: Ulrika Messer (Name & phone)

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date: 11/23/2015

Waybill Number: 1289V4620190758648

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Project Number: 500060		CTO-04 Phase III RSY10 FSS	
Project Name / Location: SU2		Purchase Order #: 201455	
Shipment Date: 11/23/2015		Waybill Number: 1289V4020199258648	
Lab Destination: Earth Toxics Inc To Test America		Lab Contact Name / ph. #: Mike Dryden	
Project Manager: Ulrika Messer (Name & phone #)		Send Report To: Patricia Flynn	
Address: 4005 Port Chicago Hwy		Phone/Fax Number: 925-288-2037	
City: Concord, CA, 94520			

Sample ID Number	Sample Description	Collection Information			Matrix	# of containers	Preservative (water)		Gamma Scan	Analyses Requested
		Date	Time	Method			Preservative (soil)	Container Type		
TITO04-RSY10_SU2-S001	RSY10 FSS N.P. Survey Unit 2	11/20/15	1022	G	SO	1	16 oz Plastic	X		
TITO04-RSY10_SU2-S002	RSY10 FSS N.P. Survey Unit 2	11/20/15	1008	G	SO	1	16 oz Plastic	X		
TITO04-RSY10_SU2-S003	RSY10 FSS N.P. Survey Unit 2	11/20/15	1043	G	SO	1	16 oz Plastic	X		
TITO04-RSY10_SU2-S004	RSY10 FSS N.P. Survey Unit 2	11/20/15	1032	G	SO	1	16 oz Plastic	X		
TITO04-RSY10_SU2-S005	RSY10 FSS N.P. Survey Unit 2	11/20/15	1027	G	SO	1	16 oz Plastic	X		
TITO04-RSY10_SU2-S006	RSY10 FSS N.P. Survey Unit 2	11/20/15	1010	G	SO	1	16 oz Plastic	X		
TITO04-RSY10_SU2-S007	RSY10 FSS N.P. Survey Unit 2	11/20/15	1037	G	SO	1	16 oz Plastic	X		
TITO04-RSY10_SU2-S008	RSY10 FSS N.P. Survey Unit 2	11/20/15	1030	G	SO	1	16 oz Plastic	X		
TITO04-RSY10_SU2-S009	RSY10 FSS N.P. Survey Unit 2	11/20/15	1014	G	SO	1	16 oz Plastic	X		

Special Instructions: 7 days ingrown draft and follow with 21 days final		Level Of QC Required:		Project Specific:	
<input type="checkbox"/> 24-hr		<input type="checkbox"/> 3-day		<input type="checkbox"/> 7-day	
Standard TAT <input type="checkbox"/>		I		II	
Relinquished By: <i>[Signature]</i>		Date: 11/23/15		Received By: <i>[Signature]</i>	
Relinquished By:		Time: 1330		Time: 0830	
Date:		Date:		Date:	
Time:		Time:		Time:	

Method Codes		C = Composite		G = Grab	
Matrix Codes		DW = Drinking Water		SO = Soil	
		GW = Ground Water		SL = Sludge	
		WW = Waste Water		CP = Chip Samples	

ABS=Asbestos, PO=Pipe Opening	
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160-15048 Chain of Custody



Ref. Document # TI P3 FSS SU2 RSY10 147

Page 2 of 3

Project Number: **500060**
 Project Name / Location: **CTO-04 Phase III RSY10 FSS SU2**
 Purchase Order #: **201455**

Project Manager: Ulrika Messer
(Name & phone)

Send Report To: Patricia Flynn
Phone/Fax Number: 925-288-2037
Address: 4005 Port Chicago Hwy
City: Concord, CA, 94520

Shipment Date: 11/23/2015
Waybill Number: 1Z 89V462C199258648
Lab Destination: Earth Toxics Inc To Test America
Lab Contact Name / ph. #: Mike Dryden

Sampler's Name(s): A. M. Jones

Sample ID Number	Sample Description
TTT004-RSY10_SU2-S010	RSY10 FSS N.P. Survey Unit 2
TTT004-RSY10_SU2-S011	RSY10 FSS N.P. Survey Unit 2
TTT004-RSY10_SU2-S012	RSY10 FSS N.P. Survey Unit 2
TTT004-RSY10_SU2-S013	RSY10 FSS N.P. Survey Unit 2
TTT004-RSY10_SU2-S014	RSY10 FSS N.P. Survey Unit 2
TTT004-RSY10_SU2-S015	RSY10 FSS N.P. Survey Unit 2
TTT004-RSY10_SU2-S016	RSY10 FSS N.P. Survey Unit 2
TTT004-RSY10_SU2-S017	RSY10 FSS N.P. Survey Unit 2
TTT004-RSY10_SU2-S018	RSY10 FSS N.P. Survey Unit 2

Special Instructions:

7 days ingrown draft and follow with 21 days final

Standard TAT ☐ 24-hr ☐ 3-day ☐ 7-day

Relinquished By:		Date:	
		Time:	
Relinquished By:		Date:	
		Time:	

II	III	Project Specific:	11.24.15
Received By:	<i>Deo Clark</i>	Date:	<i>Nov 24</i>
Received By:		Time:	<i>0830</i>
		Date:	

C = Composite	Matrix Codes	G = Grab
DW = Drinking Water	SO = Soil	
GW = Ground Water	SL = Sludge	
WW = Waste Water	CP = Chip Samples	
A = Air		ARS=Asbestos DO=Dioxin Occasions



Ref. Document #	T1_P3_FSS_SU2_RSY10	147
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Page 3 of 3

Project Number: 500060

Project Name / Location: CTO-04 Phase III RSY10 FSS

SU2
C10:

Purchase Order #: 201455

Project Manager: Ulrika Messer (Name & phone)

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date: 11/23/2015

Waybill Number: 1Z89V4620199258648

Lab Destination: *Earth Toxics Inc To Test America*

Lab Contact Name / ph. #: Mike Dryden

Project Number: 500060 Project Name / Location: CTO-04 Phase III RSY10 FSS SU2 Purchase Order #: 201455									
Shipment Date: 11/23/2015 Waybill Number: 1284V4620199253648 Lab Destination: Earth Toxics Inc To Test America Lab Contact Name / ph. #: Mike Dryden									
Project Manager: Ulrika Messer (Name & phone #) Send Report To: Patricia Flynn Phone/Fax Number: 925-288-2037 Address: 4005 Port Chicago Hwy City: Concord, CA, 94520									
Special Instructions: 7 days ingrown draft and follow with 21 days final									
Level Of QC Required: <input type="checkbox"/> 24-hr <input type="checkbox"/> 3-day <input type="checkbox"/> 7-day									
Relinquished By: [Signature] Date: 11/23/15 Time: 12:30 Relinquished By: [Signature] Date: 11/24/15 Time: 08:30									
Project Specific: I II III									
Method Codes C = Composite Matrix Codes DW = Drinking Water GW = Ground Water WW = Waste Water A = Air G = Grab SO = Soil SL = Sludge CP = Chip Samples ABS=Asbestos, PO=Pipe Opening									

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-15048-2

Login Number: 15048

List Number: 1

Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-15048-1	TITO04-RSY10_SU2-S001	Solid	11/20/15 10:22	11/24/15 08:30
160-15048-2	TITO04-RSY10_SU2-S002	Solid	11/20/15 10:08	11/24/15 08:30
160-15048-3	TITO04-RSY10_SU2-S003	Solid	11/20/15 10:43	11/24/15 08:30
160-15048-4	TITO04-RSY10_SU2-S004	Solid	11/20/15 10:32	11/24/15 08:30
160-15048-5	TITO04-RSY10_SU2-S005	Solid	11/20/15 10:27	11/24/15 08:30
160-15048-6	TITO04-RSY10_SU2-S006	Solid	11/20/15 10:10	11/24/15 08:30
160-15048-7	TITO04-RSY10_SU2-S007	Solid	11/20/15 10:37	11/24/15 08:30
160-15048-8	TITO04-RSY10_SU2-S008	Solid	11/20/15 10:30	11/24/15 08:30
160-15048-9	TITO04-RSY10_SU2-S009	Solid	11/20/15 10:14	11/24/15 08:30
160-15048-10	TITO04-RSY10_SU2-S010	Solid	11/20/15 10:11	11/24/15 08:30
160-15048-11	TITO04-RSY10_SU2-S011	Solid	11/20/15 10:51	11/24/15 08:30
160-15048-12	TITO04-RSY10_SU2-S012	Solid	11/20/15 10:45	11/24/15 08:30
160-15048-13	TITO04-RSY10_SU2-S013	Solid	11/20/15 10:22	11/24/15 08:30
160-15048-14	TITO04-RSY10_SU2-S014	Solid	11/20/15 10:15	11/24/15 08:30
160-15048-15	TITO04-RSY10_SU2-S015	Solid	11/20/15 10:40	11/24/15 08:30
160-15048-16	TITO04-RSY10_SU2-S016	Solid	11/20/15 10:26	11/24/15 08:30
160-15048-17	TITO04-RSY10_SU2-S017	Solid	11/20/15 10:18	11/24/15 08:30
160-15048-18	TITO04-RSY10_SU2-S018	Solid	11/20/15 10:18	11/24/15 08:30
160-15048-19	TITO04-RSY10_SU2-S019	Solid	11/20/15 10:35	11/24/15 08:30
160-15048-20	TITO04-RSY10_SU2-S020	Solid	11/20/15 10:35	11/24/15 08:30

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S001

Lab Sample ID: 160-15048-1

Date Collected: 11/20/15 10:22

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.416		0.133	0.140		0.0786	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Actinium-227	-0.312	U	0.574	0.575		0.963	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Bismuth-212	0.350	U	0.402	0.403		0.648	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Bismuth-214	0.268		0.109	0.112		0.122	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Cesium-137	0.00354	U	0.0373	0.0373		0.0682	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-210	-0.0386	U	1.25	1.25		2.17	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-212	0.303		0.0990	0.107		0.106	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-214	0.355		0.0910	0.0982		0.0917	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Potassium-40	10.6		1.34	1.72		0.560	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Protactinium-231	0.135	U	0.518	0.518		1.33	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Radium-226	0.268		0.109	0.112	0.500	0.122	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Radium-228	0.416		0.133	0.140		0.0786	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thallium-208	0.123		0.0446	0.0463		0.0444	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-228	0.303		0.0990	0.107		0.106	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-232	0.416		0.133	0.140		0.0786	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-234	0.418	U	0.410	0.412		1.45	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Uranium-235	0.0525	U	0.131	0.131		0.226	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Uranium-238	0.418	U	0.410	0.412		1.45	pCi/g	11/30/15 13:55	12/21/15 15:00	1

Client Sample ID: TITO04-RSY10_SU2-S002

Lab Sample ID: 160-15048-2

Date Collected: 11/20/15 10:08

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.233		0.110	0.113		0.232	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Actinium-227	-0.122	U	0.431	0.432		0.743	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Bismuth-212	0.171	U	0.421	0.421		0.739	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Bismuth-214	0.117	U	0.110	0.110		0.168	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Cesium-137	0.00838	U	0.0331	0.0331		0.0599	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-210	0.544	U	0.964	0.966		1.72	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-212	0.306		0.0769	0.0865		0.0868	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-214	0.356		0.106	0.112		0.124	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Potassium-40	10.2		1.33	1.69		0.763	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Protactinium-231	0.219	U	0.395	0.396		1.51	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Radium-226	0.117	U	0.110	0.110	0.500	0.168	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Radium-228	0.233		0.110	0.113		0.232	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thallium-208	0.0606		0.0444	0.0448		0.0547	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-228	0.306		0.0769	0.0865		0.0868	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-232	0.233		0.110	0.113		0.232	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-234	0.102	U	0.254	0.254		1.46	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Uranium-235	0.107	U	0.181	0.182		0.296	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Uranium-238	0.102	U	0.254	0.254		1.46	pCi/g	11/30/15 13:55	12/21/15 15:03	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S003

Lab Sample ID: 160-15048-3

Date Collected: 11/20/15 10:43

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.465		0.140	0.148		0.122	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Actinium-227	0.150	U	0.211	0.212		0.522	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Bismuth-212	0.0587	U	0.413	0.413		0.795	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Bismuth-214	0.438		0.111	0.120		0.0955	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Cesium-137	-0.00279	U	0.0370	0.0370		0.0682	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-210	0.515	U	1.03	1.03		1.73	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-212	0.346		0.0935	0.104		0.101	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-214	0.478		0.0989	0.111		0.0936	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Potassium-40	10.2		1.41	1.75		0.744	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Protactinium-231	0.263	U	0.360	0.361		1.62	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Radium-226	0.438		0.111	0.120	0.500	0.0955	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Radium-228	0.465		0.140	0.148		0.122	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thallium-208	0.145		0.0532	0.0553		0.0542	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-228	0.346		0.0935	0.104		0.101	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-232	0.465		0.140	0.148		0.122	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-234	0.544	U	0.794	0.796		1.43	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Uranium-235	-0.0161	U	0.413	0.413		0.341	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Uranium-238	0.544	U	0.794	0.796		1.43	pCi/g	11/30/15 13:55	12/21/15 14:23	1

Client Sample ID: TITO04-RSY10_SU2-S004

Lab Sample ID: 160-15048-4

Date Collected: 11/20/15 10:32

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.293		0.121	0.124		0.181	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Actinium-227	-0.0973	U	0.531	0.531		0.915	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-212	0.359	U	0.437	0.439		0.710	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-214	0.173		0.106	0.107		0.146	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Cesium-137	0.00341	U	0.0432	0.0432		0.0848	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-210	0.483	U	0.963	0.965		1.63	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-212	0.372		0.0916	0.103		0.0947	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-214	0.296		0.0931	0.0981		0.123	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Potassium-40	10.1		1.47	1.80		0.539	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Protactinium-231	0.230	U	0.281	0.282		1.57	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-226	0.173		0.106	0.107	0.500	0.146	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-228	0.293		0.121	0.124		0.181	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thallium-208	0.133		0.0472	0.0492		0.0429	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-228	0.372		0.0916	0.103		0.0947	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-232	0.293		0.121	0.124		0.181	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-234	0.789	U	0.549	0.555		1.41	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-235	0.0288	U	0.0599	0.0599		0.368	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-238	0.789	U	0.549	0.555		1.41	pCi/g	11/30/15 13:55	12/21/15 14:28	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S005

Lab Sample ID: 160-15048-5

Date Collected: 11/20/15 10:27

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.189	U	0.0980	0.0999		0.239	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Actinium-227	0.0381	U	0.363	0.363		0.637	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-212	0.227	U	0.392	0.393		0.672	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-214	0.274		0.0784	0.0835		0.0664	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Cesium-137	0.00383	U	0.0298	0.0298		0.0559	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-210	0.0105	U	0.746	0.746		1.42	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-212	0.347		0.0728	0.0855		0.0710	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-214	0.303		0.0804	0.0863		0.0725	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Potassium-40	9.78		1.40	1.72		0.577	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Protactinium-231	0.265	U	0.370	0.372		1.24	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-226	0.274		0.0784	0.0835	0.500	0.0664	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-228	0.189	U	0.0980	0.0999		0.239	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thallium-208	0.144		0.0486	0.0508		0.0449	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-228	0.347		0.0728	0.0855		0.0710	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-232	0.189	U	0.0980	0.0999		0.239	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-234	0.256	U	0.337	0.338		1.08	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-235	-0.0195	U	0.0743	0.0743		0.258	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-238	0.256	U	0.337	0.338		1.08	pCi/g	11/30/15 13:55	12/21/15 14:28	1

Client Sample ID: TITO04-RSY10_SU2-S006

Lab Sample ID: 160-15048-6

Date Collected: 11/20/15 10:10

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.133	U	0.163	0.163		0.282	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Actinium-227	-0.0336	U	0.0517	0.0518		0.842	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Bismuth-212	0.394	U	0.571	0.572		0.955	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Bismuth-214	0.339		0.110	0.116		0.133	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Cesium-137	-0.0160	U	0.493	0.493		0.108	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Lead-210	0.638	U	1.18	1.18		1.76	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Lead-212	0.284		0.0779	0.0861		0.0807	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Lead-214	0.360		0.122	0.128		0.132	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Potassium-40	10.3		1.64	1.95		0.481	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Protactinium-231	0.249	U	0.675	0.676		1.47	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Radium-226	0.339		0.110	0.116	0.500	0.133	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Radium-228	0.133	U	0.163	0.163		0.282	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Thallium-208	0.134		0.0602	0.0618		0.0538	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Thorium-228	0.284		0.0779	0.0861		0.0807	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Thorium-232	0.133	U	0.163	0.163		0.282	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Thorium-234	0.371	U	0.374	0.376		1.39	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Uranium-235	0.0703	U	0.134	0.134		0.343	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Uranium-238	0.371	U	0.374	0.376		1.39	pCi/g	11/30/15 13:55	12/21/15 14:26	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S007

Lab Sample ID: 160-15048-7

Date Collected: 11/20/15 10:37

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.295		0.148	0.151		0.218	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Actinium-227	-0.00527	U	0.0114	0.0114		0.699	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-212	0.188	U	0.417	0.417		0.725	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-214	0.416		0.111	0.119		0.115	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Cesium-137	-0.0000147	U	0.0304	0.0304		0.0576	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-210	0.994	U	1.19	1.19		1.62	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-212	0.283		0.0944	0.101		0.111	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-214	0.404		0.0963	0.105		0.138	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Potassium-40	8.55		1.29	1.56		1.10	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Protactinium-231	0.220	U	0.323	0.324		1.42	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-226	0.416		0.111	0.119	0.500	0.115	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-228	0.295		0.148	0.151		0.218	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thallium-208	0.136		0.0584	0.0601		0.0611	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-228	0.283		0.0944	0.101		0.111	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-232	0.295		0.148	0.151		0.218	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-234	0.196	U	0.330	0.331		1.31	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-235	0.0141	U	0.0291	0.0292		0.295	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-238	0.196	U	0.330	0.331		1.31	pCi/g	11/30/15 13:55	12/21/15 14:28	1

Client Sample ID: TITO04-RSY10_SU2-S008

Lab Sample ID: 160-15048-8

Date Collected: 11/20/15 10:30

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.371		0.172	0.176		0.273	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Actinium-227	0.120	U	0.247	0.247		0.611	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Bismuth-212	0.178	U	0.621	0.622		1.11	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Bismuth-214	0.391		0.132	0.138		0.149	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Cesium-137	-0.00553	U	0.0770	0.0770		0.0895	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Lead-210	0.575	U	0.851	0.854		1.55	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Lead-212	0.329		0.0987	0.107		0.106	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Lead-214	0.408		0.116	0.123		0.138	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Potassium-40	11.4		1.71	2.07		0.473	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Protactinium-231	0.383	U	0.302	0.304		1.99	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Radium-226	0.391		0.132	0.138	0.500	0.149	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Radium-228	0.371		0.172	0.176		0.273	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Thallium-208	0.119		0.0605	0.0617		0.0797	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Thorium-228	0.329		0.0987	0.107		0.106	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Thorium-232	0.371		0.172	0.176		0.273	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Thorium-234	0.452	U	0.428	0.430		1.13	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Uranium-235	0.000333	U	0.00141	0.00141		0.380	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Uranium-238	0.452	U	0.428	0.430		1.13	pCi/g	11/30/15 13:55	12/21/15 15:02	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S009

Lab Sample ID: 160-15048-9

Date Collected: 11/20/15 10:14

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.190	U	0.124	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Actinium-227	0.179	U	0.205	0.206		0.554	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Bismuth-212	0.284	U	0.407	0.409		0.680	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Bismuth-214	0.319		0.0985	0.104		0.0914	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Cesium-137	0.0126	U	0.0330	0.0331		0.0585	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-210	0.381	U	0.806	0.807		1.24	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-212	0.335		0.0748	0.0865		0.0723	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-214	0.340		0.0833	0.0905		0.0975	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Potassium-40	9.56		1.34	1.66		0.548	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Protactinium-231	0.120	U	0.133	0.133		1.49	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Radium-226	0.319		0.0985	0.104	0.500	0.0914	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Radium-228	0.190	U	0.124	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thallium-208	0.0510	U	0.0412	0.0415		0.0662	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-228	0.335		0.0748	0.0865		0.0723	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-232	0.190	U	0.124	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-234	0.275	U	0.263	0.264		1.14	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Uranium-235	0.0926	U	0.151	0.152		0.254	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Uranium-238	0.275	U	0.263	0.264		1.14	pCi/g	11/30/15 13:55	12/21/15 15:03	1

Client Sample ID: TITO04-RSY10_SU2-S010

Lab Sample ID: 160-15048-10

Date Collected: 11/20/15 10:11

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.396		0.135	0.141		0.215	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Actinium-227	0.0578	U	0.141	0.141		0.901	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Bismuth-212	0.263	U	0.405	0.406		0.685	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Bismuth-214	0.418		0.104	0.113		0.0922	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Cesium-137	-0.0170	U	0.358	0.358		0.0856	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Lead-210	0.165	U	1.04	1.04		1.81	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Lead-212	0.377		0.109	0.119		0.108	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Lead-214	0.301		0.0889	0.0942		0.0974	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Potassium-40	9.76		1.45	1.76		0.541	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Protactinium-231	0.362	U	0.682	0.683		1.50	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Radium-226	0.418		0.104	0.113	0.500	0.0922	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Radium-228	0.396		0.135	0.141		0.215	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Thallium-208	0.167		0.0521	0.0549		0.0440	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Thorium-228	0.377		0.109	0.119		0.108	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Thorium-232	0.396		0.135	0.141		0.215	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Thorium-234	0.191	U	0.499	0.499		1.70	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Uranium-235	0.00874	U	0.194	0.194		0.347	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Uranium-238	0.191	U	0.499	0.499		1.70	pCi/g	11/30/15 13:55	12/21/15 15:06	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S011

Lab Sample ID: 160-15048-11

Date Collected: 11/20/15 10:51

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.329		0.124	0.128		0.171	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Actinium-227	-0.0437	U	0.369	0.369		0.645	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Bismuth-212	0.296	U	0.348	0.349		0.563	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Bismuth-214	0.319		0.0985	0.104		0.102	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Cesium-137	-0.00232	U	0.0288	0.0288		0.0532	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-210	0.225	U	0.703	0.703		1.21	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-212	0.393		0.0840	0.0981		0.0737	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-214	0.327		0.0821	0.0888		0.0744	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Potassium-40	11.2		1.27	1.71		0.591	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Protactinium-231	0.000	U	0.837	0.837		1.51	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Radium-226	0.319		0.0985	0.104	0.500	0.102	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Radium-228	0.329		0.124	0.128		0.171	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thallium-208	0.201		0.0507	0.0548		0.0339	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-228	0.393		0.0840	0.0981		0.0737	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-232	0.329		0.124	0.128		0.171	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-234	-0.439	U	0.857	0.858		1.44	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Uranium-235	0.0655	U	0.126	0.126		0.330	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Uranium-238	-0.439	U	0.857	0.858		1.44	pCi/g	11/30/15 13:55	12/21/15 15:33	1

Client Sample ID: TITO04-RSY10_SU2-S012

Lab Sample ID: 160-15048-12

Date Collected: 11/20/15 10:45

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.206	U	0.128	0.130		0.293	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Actinium-227	0.122	U	0.496	0.496		0.857	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Bismuth-212	0.315	U	0.555	0.556		0.943	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Bismuth-214	0.480		0.119	0.129		0.102	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Cesium-137	0.00190	U	0.0439	0.0439		0.0805	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-210	0.291	U	1.34	1.34		2.15	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-212	0.429		0.0974	0.112		0.104	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-214	0.467		0.117	0.126		0.137	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Potassium-40	11.9		1.51	1.94		0.613	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Protactinium-231	0.154	U	0.227	0.228		1.74	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Radium-226	0.480		0.119	0.129	0.500	0.102	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Radium-228	0.206	U	0.128	0.130		0.293	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thallium-208	0.184		0.0578	0.0608		0.0584	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-228	0.429		0.0974	0.112		0.104	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-232	0.206	U	0.128	0.130		0.293	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-234	0.152	U	1.01	1.01		1.85	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Uranium-235	0.165	U	0.197	0.198		0.324	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Uranium-238	0.152	U	1.01	1.01		1.85	pCi/g	11/30/15 13:55	12/21/15 15:00	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S013

Lab Sample ID: 160-15048-13

Date Collected: 11/20/15 10:22

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.302		0.161	0.164		0.212	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Actinium-227	0.0377	U	0.121	0.122		0.628	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Bismuth-212	0.316	U	0.436	0.437		0.724	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Bismuth-214	0.351		0.118	0.124		0.123	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Cesium-137	-0.000384	U	0.0296	0.0296		0.0568	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Lead-210	0.826	U	0.719	0.725		1.18	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Lead-212	0.269		0.0772	0.0847		0.102	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Lead-214	0.494		0.109	0.121		0.0842	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Potassium-40	9.39		1.33	1.64		0.534	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Protactinium-231	0.297	U	0.483	0.484		1.24	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Radium-226	0.351		0.118	0.124	0.500	0.123	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Radium-228	0.302		0.161	0.164		0.212	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Thallium-208	0.123		0.0590	0.0604		0.0603	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Thorium-228	0.269		0.0772	0.0847		0.102	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Thorium-232	0.302		0.161	0.164		0.212	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Thorium-234	0.810	U	0.463	0.470		1.24	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Uranium-235	0.0495	U	0.180	0.180		0.310	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Uranium-238	0.810	U	0.463	0.470		1.24	pCi/g	11/30/15 13:55	12/21/15 14:59	1

Client Sample ID: TITO04-RSY10_SU2-S014

Lab Sample ID: 160-15048-14

Date Collected: 11/20/15 10:15

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.516		0.154	0.163		0.122	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Actinium-227	0.136	U	0.427	0.427		0.737	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Bismuth-212	0.0653	U	0.502	0.502		0.945	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Bismuth-214	0.314		0.141	0.145		0.157	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Cesium-137	-0.0239	U	0.0469	0.0469		0.0802	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Lead-210	0.398	U	1.06	1.06		1.83	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Lead-212	0.343		0.0915	0.102		0.103	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Lead-214	0.472		0.110	0.120		0.0979	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Potassium-40	10.4		1.39	1.75		0.595	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Protactinium-231	-0.0702	U	0.172	0.172		1.77	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Radium-226	0.314		0.141	0.145	0.500	0.157	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Radium-228	0.516		0.154	0.163		0.122	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Thallium-208	0.135		0.0476	0.0496		0.0489	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Thorium-228	0.343		0.0915	0.102		0.103	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Thorium-232	0.516		0.154	0.163		0.122	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Thorium-234	0.121	U	0.520	0.520		1.76	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Uranium-235	0.0804	U	0.0992	0.0995		0.431	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Uranium-238	0.121	U	0.520	0.520		1.76	pCi/g	11/30/15 13:55	12/21/15 15:01	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S015

Lab Sample ID: 160-15048-15

Date Collected: 11/20/15 10:40

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.235		0.123	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Actinium-227	-0.104	U	0.417	0.417		0.720	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-212	0.394	U	0.452	0.454		0.731	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-214	0.252		0.103	0.106		0.147	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Cesium-137	-0.0156	U	0.0433	0.0433		0.0755	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-210	0.810	U	1.24	1.24		1.73	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-212	0.298		0.0803	0.0891		0.0937	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-214	0.401		0.105	0.113		0.113	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Potassium-40	8.23		1.70	1.90		1.51	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Protactinium-231	0.554	U	0.818	0.821		1.37	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-226	0.252		0.103	0.106	0.500	0.147	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-228	0.235		0.123	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thallium-208	0.130		0.0486	0.0504		0.0505	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-228	0.298		0.0803	0.0891		0.0937	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-232	0.235		0.123	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-234	0.802	U	0.475	0.482		1.31	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-235	0.00860	U	0.187	0.187		0.328	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-238	0.802	U	0.475	0.482		1.31	pCi/g	11/30/15 13:55	12/21/15 15:39	1

Client Sample ID: TITO04-RSY10_SU2-S016

Lab Sample ID: 160-15048-16

Date Collected: 11/20/15 10:26

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.604		0.199	0.208		0.120	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Actinium-227	0.0781	U	0.335	0.335		0.595	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Bismuth-212	0.276	U	0.511	0.512		0.884	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Bismuth-214	0.429		0.141	0.148		0.155	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Cesium-137	-0.0200	U	0.802	0.802		0.0782	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Lead-210	1.58	U	1.27	1.28		1.73	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Lead-212	0.389		0.0907	0.104		0.0830	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Lead-214	0.416		0.130	0.137		0.165	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Potassium-40	12.0		1.78	2.16		0.487	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Protactinium-231	0.173	U	0.254	0.254		1.74	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Radium-226	0.429		0.141	0.148	0.500	0.155	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Radium-228	0.604		0.199	0.208		0.120	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Thallium-208	0.163		0.0713	0.0733		0.0628	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Thorium-228	0.389		0.0907	0.104		0.0830	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Thorium-232	0.604		0.199	0.208		0.120	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Thorium-234	0.886	U	0.947	0.952		1.61	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Uranium-235	0.113	U	0.162	0.162		0.270	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Uranium-238	0.886	U	0.947	0.952		1.61	pCi/g	11/30/15 13:55	12/21/15 15:36	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S017

Lab Sample ID: 160-15048-17

Date Collected: 11/20/15 10:18

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.413		0.131	0.137		0.0827	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Actinium-227	0.0305	U	0.191	0.191		0.745	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-212	0.245	U	0.315	0.316		0.514	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-214	0.341		0.0920	0.0986		0.0781	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Cesium-137	0.00837	U	0.0362	0.0362		0.0652	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-210	0.248	U	0.721	0.722		1.34	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-212	0.350		0.0786	0.0907		0.0798	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-214	0.399		0.0879	0.0972		0.0931	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Potassium-40	8.22		1.34	1.58		0.997	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Protactinium-231	0.559	U	0.459	0.463		0.869	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-226	0.341		0.0920	0.0986	0.500	0.0781	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-228	0.413		0.131	0.137		0.0827	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thallium-208	0.0715		0.0460	0.0466		0.0614	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-228	0.350		0.0786	0.0907		0.0798	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-232	0.413		0.131	0.137		0.0827	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-234	0.358	U	0.283	0.285		1.07	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-235	0.0886	U	0.133	0.133		0.266	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-238	0.358	U	0.283	0.285		1.07	pCi/g	11/30/15 13:55	12/21/15 15:39	1

Client Sample ID: TITO04-RSY10_SU2-S018

Lab Sample ID: 160-15048-18

Date Collected: 11/20/15 10:18

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.283		0.140	0.143		0.217	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Actinium-227	-0.00789	U	0.0227	0.0227		0.827	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-212	-0.117	U	0.490	0.490		0.886	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-214	0.299		0.0968	0.102		0.104	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Cesium-137	-0.0214	U	0.858	0.858		0.0945	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-210	0.462	U	1.02	1.02		1.74	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-212	0.339		0.0915	0.102		0.0981	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-214	0.369		0.115	0.122		0.121	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Potassium-40	10.7		1.53	1.88		0.544	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Protactinium-231	0.323	U	0.472	0.473		1.64	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-226	0.299		0.0968	0.102	0.500	0.104	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-228	0.283		0.140	0.143		0.217	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thallium-208	0.0978		0.0585	0.0593		0.0765	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-228	0.339		0.0915	0.102		0.0981	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-232	0.283		0.140	0.143		0.217	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-234	0.359	U	0.434	0.436		1.52	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-235	0.0810	U	0.214	0.214		0.371	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-238	0.359	U	0.434	0.436		1.52	pCi/g	11/30/15 13:55	12/21/15 15:39	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S019

Lab Sample ID: 160-15048-19

Date Collected: 11/20/15 10:35

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.497		0.156	0.164		0.152	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Actinium-227	0.0744	U	0.122	0.122		0.729	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Bismuth-212	0.457	U	0.497	0.499		0.798	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Bismuth-214	0.385		0.151	0.156		0.151	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Cesium-137	0.00163	U	0.0333	0.0333		0.0625	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-210	0.765	U	1.25	1.25		1.91	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-212	0.347		0.0981	0.108		0.108	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-214	0.372		0.0953	0.103		0.110	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Potassium-40	11.6		1.44	1.87		0.582	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Protactinium-231	0.216	U	0.634	0.635		1.45	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Radium-226	0.385		0.151	0.156	0.500	0.151	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Radium-228	0.497		0.156	0.164		0.152	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thallium-208	0.101		0.0543	0.0553		0.0650	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-228	0.347		0.0981	0.108		0.108	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-232	0.497		0.156	0.164		0.152	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-234	0.524	U	0.433	0.437		1.51	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Uranium-235	0.0448	U	0.153	0.153		0.348	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Uranium-238	0.524	U	0.433	0.437		1.51	pCi/g	11/30/15 13:55	12/21/15 15:33	1

Client Sample ID: TITO04-RSY10_SU2-S020

Lab Sample ID: 160-15048-20

Date Collected: 11/20/15 10:35

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.183	U	0.104	0.106		0.227	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Actinium-227	0.0909	U	0.308	0.308		0.754	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Bismuth-212	0.215	U	0.408	0.409		0.701	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Bismuth-214	0.337		0.0975	0.104		0.100	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Cesium-137	-0.000454	U	0.0344	0.0344		0.0636	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Lead-210	1.98		1.21	1.23		1.57	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Lead-212	0.336		0.0827	0.0934		0.0897	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Lead-214	0.396		0.0886	0.0977		0.0925	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Potassium-40	8.72		1.23	1.52		0.857	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Protactinium-231	0.110	U	0.373	0.373		1.29	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Radium-226	0.337		0.0975	0.104	0.500	0.100	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Radium-228	0.183	U	0.104	0.106		0.227	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Thallium-208	0.152		0.0464	0.0491		0.0418	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Thorium-228	0.336		0.0827	0.0934		0.0897	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Thorium-232	0.183	U	0.104	0.106		0.227	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Thorium-234	0.313	U	0.344	0.345		1.70	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Uranium-235	0.0854	U	0.119	0.119		0.390	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Uranium-238	0.313	U	0.344	0.345		1.70	pCi/g	11/30/15 13:55	12/21/15 15:34	1

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QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-224921/1-A

Matrix: Solid

Analysis Batch: 228553

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 224921

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.09532	U	2.59	2.59		0.322	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Actinium-227	0.03646	U	0.206	0.206		0.502	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Bismuth-212	-0.3696	U	0.699	0.700		1.20	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Bismuth-214	-0.06582	U	2.63	2.63		0.192	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Cesium-137	0.0000	U	0.0351	0.0351		0.0646	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-210	1.470	U	1.22	1.23		2.05	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-212	-0.04688	U	0.709	0.709		0.120	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-214	-0.08155	U	3.26	3.26		0.221	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Potassium-40	-0.2464	U	2.66	2.66		1.03	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Protactinium-231	0.2444	U	0.794	0.795		1.43	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Radium-226	-0.06582	U	2.63	2.63	0.500	0.192	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Radium-228	-0.09532	U	2.59	2.59		0.322	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thallium-208	-0.01617	U	0.141	0.141		0.0869	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-228	-0.04688	U	0.709	0.709		0.120	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-232	-0.09532	U	2.59	2.59		0.322	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-234	-0.2567	U	1.10	1.10		1.67	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Uranium-235	0.04293	U	0.117	0.117		0.263	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Uranium-238	-0.2567	U	1.10	1.10		1.67	pCi/g	11/30/15 13:55	12/21/15 14:23	1

Lab Sample ID: LCS 160-224921/2-A

Matrix: Solid

Analysis Batch: 228551

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 224921

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.2	96.52		10.1		1.16	pCi/g	99	87 - 116
Cesium-137	30.0	29.39		3.13		0.263	pCi/g	98	87 - 120
Cobalt-60	18.2	17.67		1.83		0.185	pCi/g	97	87 - 115

Lab Sample ID: 160-15048-1 DU

Matrix: Solid

Analysis Batch: 228556

Client Sample ID: TITO04-RSY10_SU2-S001

Prep Type: Total/NA

Prep Batch: 224921

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.416		0.2047	U	0.127		0.255	pCi/g	0.79	1
Actinium-227	-0.312	U	0.1920	U	0.405		0.688	pCi/g	0.51	1
Bismuth-212	0.350	U	-0.04000	U	0.523		0.964	pCi/g	0.42	1
Bismuth-214	0.268		0.3022		0.101		0.102	pCi/g	0.16	1
Cesium-137	0.00354	U	0.008364	U	0.0365		0.0667	pCi/g	0.07	1
Lead-210	-0.0386	U	0.1771	U	0.850		1.60	pCi/g	0.10	1
Lead-212	0.303		0.3131		0.0973		0.0982	pCi/g	0.05	1
Lead-214	0.355		0.2753		0.0825		0.113	pCi/g	0.44	1
Potassium-40	10.6		9.924		1.77		0.602	pCi/g	0.18	1
Protactinium-231	0.135	U	0.6273	U	0.545		1.41	pCi/g	0.46	1
Radium-226	0.268		0.3022		0.101	0.500	0.102	pCi/g	0.16	1
Radium-228	0.416		0.2047	U	0.127		0.255	pCi/g	0.79	1

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QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-15048-1 DU

Matrix: Solid

Analysis Batch: 228556

Client Sample ID: TITO04-RSY10_SU2-S001

Prep Type: Total/NA

Prep Batch: 224921

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.123		0.1254		0.0438		0.0381	pCi/g	0.03	1
Thorium-228	0.303		0.3131		0.0973		0.0982	pCi/g	0.05	1
Thorium-232	0.416		0.2047	U	0.127		0.255	pCi/g	0.79	1
Thorium-234	0.418	U	0.3020	U	0.346		1.45	pCi/g	0.15	1
Uranium-235	0.0525	U	0.1232	U	0.172		0.285	pCi/g	0.23	1
Uranium-238	0.418	U	0.3020	U	0.346		1.45	pCi/g	0.15	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Rad

Leach Batch: 224064

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-15048-1	TITO04-RSY10_SU2-S001	Total/NA	Solid	Dry and Grind	
160-15048-1 DU	TITO04-RSY10_SU2-S001	Total/NA	Solid	Dry and Grind	
160-15048-2	TITO04-RSY10_SU2-S002	Total/NA	Solid	Dry and Grind	
160-15048-3	TITO04-RSY10_SU2-S003	Total/NA	Solid	Dry and Grind	
160-15048-4	TITO04-RSY10_SU2-S004	Total/NA	Solid	Dry and Grind	
160-15048-5	TITO04-RSY10_SU2-S005	Total/NA	Solid	Dry and Grind	
160-15048-6	TITO04-RSY10_SU2-S006	Total/NA	Solid	Dry and Grind	
160-15048-7	TITO04-RSY10_SU2-S007	Total/NA	Solid	Dry and Grind	
160-15048-8	TITO04-RSY10_SU2-S008	Total/NA	Solid	Dry and Grind	
160-15048-9	TITO04-RSY10_SU2-S009	Total/NA	Solid	Dry and Grind	
160-15048-10	TITO04-RSY10_SU2-S010	Total/NA	Solid	Dry and Grind	
160-15048-11	TITO04-RSY10_SU2-S011	Total/NA	Solid	Dry and Grind	
160-15048-12	TITO04-RSY10_SU2-S012	Total/NA	Solid	Dry and Grind	
160-15048-13	TITO04-RSY10_SU2-S013	Total/NA	Solid	Dry and Grind	
160-15048-14	TITO04-RSY10_SU2-S014	Total/NA	Solid	Dry and Grind	
160-15048-15	TITO04-RSY10_SU2-S015	Total/NA	Solid	Dry and Grind	
160-15048-16	TITO04-RSY10_SU2-S016	Total/NA	Solid	Dry and Grind	
160-15048-17	TITO04-RSY10_SU2-S017	Total/NA	Solid	Dry and Grind	
160-15048-18	TITO04-RSY10_SU2-S018	Total/NA	Solid	Dry and Grind	
160-15048-19	TITO04-RSY10_SU2-S019	Total/NA	Solid	Dry and Grind	
160-15048-20	TITO04-RSY10_SU2-S020	Total/NA	Solid	Dry and Grind	

Prep Batch: 224921

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-15048-1	TITO04-RSY10_SU2-S001	Total/NA	Solid	Fill_Geo-21	224064
160-15048-1 DU	TITO04-RSY10_SU2-S001	Total/NA	Solid	Fill_Geo-21	224064
160-15048-2	TITO04-RSY10_SU2-S002	Total/NA	Solid	Fill_Geo-21	224064
160-15048-3	TITO04-RSY10_SU2-S003	Total/NA	Solid	Fill_Geo-21	224064
160-15048-4	TITO04-RSY10_SU2-S004	Total/NA	Solid	Fill_Geo-21	224064
160-15048-5	TITO04-RSY10_SU2-S005	Total/NA	Solid	Fill_Geo-21	224064
160-15048-6	TITO04-RSY10_SU2-S006	Total/NA	Solid	Fill_Geo-21	224064
160-15048-7	TITO04-RSY10_SU2-S007	Total/NA	Solid	Fill_Geo-21	224064
160-15048-8	TITO04-RSY10_SU2-S008	Total/NA	Solid	Fill_Geo-21	224064
160-15048-9	TITO04-RSY10_SU2-S009	Total/NA	Solid	Fill_Geo-21	224064
160-15048-10	TITO04-RSY10_SU2-S010	Total/NA	Solid	Fill_Geo-21	224064
160-15048-11	TITO04-RSY10_SU2-S011	Total/NA	Solid	Fill_Geo-21	224064
160-15048-12	TITO04-RSY10_SU2-S012	Total/NA	Solid	Fill_Geo-21	224064
160-15048-13	TITO04-RSY10_SU2-S013	Total/NA	Solid	Fill_Geo-21	224064
160-15048-14	TITO04-RSY10_SU2-S014	Total/NA	Solid	Fill_Geo-21	224064
160-15048-15	TITO04-RSY10_SU2-S015	Total/NA	Solid	Fill_Geo-21	224064
160-15048-16	TITO04-RSY10_SU2-S016	Total/NA	Solid	Fill_Geo-21	224064
160-15048-17	TITO04-RSY10_SU2-S017	Total/NA	Solid	Fill_Geo-21	224064
160-15048-18	TITO04-RSY10_SU2-S018	Total/NA	Solid	Fill_Geo-21	224064
160-15048-19	TITO04-RSY10_SU2-S019	Total/NA	Solid	Fill_Geo-21	224064
160-15048-20	TITO04-RSY10_SU2-S020	Total/NA	Solid	Fill_Geo-21	224064
LCS 160-224921/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-224921/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica St. Louis

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-17034-2

Client Project/Site: Treasure Island - 500060
Revision: 1

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
6/29/2016 1:50:07 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Job ID: 160-17034-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-17034-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Job ID: 160-17034-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

Revision 1: The report was revised to replace the original count data with a recount for samples: TI-TO04-BS-R-SU8-S002 (160-17034-2), TI-TO04-BS-R-SU8-S003 (160-17034-3). No other data was affected.

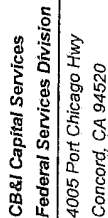
RECEIPT

The samples were received on 04/19/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-BS-R-SU8-S001 (160-17034-1), TI-TO04-BS-R-SU8-S002 (160-17034-2), TI-TO04-BS-R-SU8-S003 (160-17034-3), TI-TO04-BS-R-SU8-S004 (160-17034-4), TI-TO04-BS-R-SU8-S005 (160-17034-5), TI-TO04-BS-R-SU8-S006 (160-17034-6), TI-TO04-BS-R-SU8-S007 (160-17034-7), TI-TO04-BS-R-SU8-S008 (160-17034-8), TI-TO04-BS-R-SU8-S009 (160-17034-9), TI-TO04-BS-R-SU8-S010 (160-17034-10), TI-TO04-BS-R-SU8-S011 (160-17034-11), TI-TO04-BS-R-SU8-S012 (160-17034-12), TI-TO04-BS-R-SU8-S013 (160-17034-13), TI-TO04-BS-R-SU8-S014 (160-17034-14), TI-TO04-BS-R-SU8-S015 (160-17034-15), TI-TO04-BS-R-SU8-S016 (160-17034-16) and TI-TO04-BS-R-SU8-S019 (160-17034-17) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 04/19/2016, prepared on 04/21/2016 and analyzed on 05/13/2016 and 05/15/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Ref. Document # TI P3 FSS SU8 BS 217

Page 2 of 2

Project Number: 500060

CTO-04 Phase III Bayside

Project Name / Location: C10-U4 Phase III Bayside
FSS SU8 RSY 11 U1 P2

Purchase Order #: 201455

Shipment Date: 4/15/2016

Waybill Number: 17 2201 1112 1 2713 1180

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: *Mike Dryden*

Project Manager: *Ulrika Messer*

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Sampler's Name(s): JR

Sample ID Number	Sample Description
TI-T004-BS-R-SU8-S010	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2
TI-T004-BS-R-SU8-S011	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2
TI-T004-BS-R-SU8-S012	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2
TI-T004-BS-R-SU8-S013	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2
TI-T004-BS-R-SU8-S014	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2
TI-T004-BS-R-SU8-S015	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2
TI-T004-BS-R-SU8-S016	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2
TI-T004-BS-R-SU8-S019	BAYSIDE FSS Survey Unit 8 Bottom RSY 11 USE 1 Part 2

Collection Information				Matrix	# of containers	Preservative (water)		X
Date	Time	Method	Preservative (soil)					
			Container Type					
04/14/16	1423	G	SO	1	16 oz Plastic			X
04/14/16	1428	G	SO	1	16 oz Plastic			X
04/14/16	1433	G	SO	1	16 oz Plastic			X
04/14/16	1441	G	SO	1	16 oz Plastic			X
04/14/16	1435	G	SO	1	16 oz Plastic			X
04/14/16	1420	G	SO	1	16 oz Plastic			X
04/14/16	1437	G	SO	1	16 oz Plastic			X
04/14/16	1430	G	SO	1	16 oz Plastic			X

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hrStandard TAT ☐☐ 3-day ☐ 7-day

Relinquished By:

Page 11

—

Date: 4/18/2016

Relinquished By:

Date: 12/08

10

Date: _____

Project Specific:

1

1970-71

Date: 4/18/16

Time: 0840

Date:

$$G = G$$

C = Composite

Matrix Codes

DW = Drinking Water

GW = Ground Water

WW = Waste Water

$$A = \text{Air}$$

ABS=Asbestos BO=Bio-Oxide

UPS CampusShip: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.
2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
3. **GETTING YOUR SHIPMENT TO UPS**
Customers with a Daily Pickup
Your driver will pickup your shipment(s) as usual.

Customers without a Daily Pickup

Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, UPS Alliances (Office Depot® or Staples®) or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.

Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.

Hand the package to any UPS driver in your area.

UPS Access Point™
THE UPS STORE
101 CLAY ST
SAN FRANCISCO, CA 94111

UPS Access Point™
NORTH BEACH MARKET
536 BROADWAY
SAN FRANCISCO, CA 94133

UPS Access Point™
THE UPS STORE
182 HOWARD ST
SAN FRANCISCO, CA 94105

FOLD HERE

BRYON ROGERS 4237857272 GVT- ALAMEDA 89V462 950 AVENUE M SAN FRANCISCO CA 94130		30 LBS	1 OF 1
SHIP TO: SAMPLE CONTROL 314.298.8566 TEST AMERICA LAB EARTH CITY 13715 RIDER TRAIL NORTH EARTH CITY MO 63045-1205		DWT: 24,16,12	
		MO 630 9-63	
UPS NEXT DAY AIR		1	
TRACKING #: 1Z 89V 462 01 9713 1180			
BILLING: P/P			
Charge to Coding: 00701.500060.4701.04000109 Sender's Name: Bryon CS 18.1.11. WNTNVS0 72.0A.01/2016			

Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-17034-2

Login Number: 17034

List Source: TestAmerica St. Louis

List Number: 1

Creator: McKinney, Gerrod E

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-17034-1	TI-TO04-BS-R-SU8-S001	Solid	04/14/16 14:30	04/19/16 08:40
160-17034-2	TI-TO04-BS-R-SU8-S002	Solid	04/14/16 14:20	04/19/16 08:40
160-17034-3	TI-TO04-BS-R-SU8-S003	Solid	04/14/16 14:25	04/19/16 08:40
160-17034-4	TI-TO04-BS-R-SU8-S004	Solid	04/14/16 14:22	04/19/16 08:40
160-17034-5	TI-TO04-BS-R-SU8-S005	Solid	04/14/16 14:26	04/19/16 08:40
160-17034-6	TI-TO04-BS-R-SU8-S006	Solid	04/14/16 14:29	04/19/16 08:40
160-17034-7	TI-TO04-BS-R-SU8-S007	Solid	04/14/16 14:39	04/19/16 08:40
160-17034-8	TI-TO04-BS-R-SU8-S008	Solid	04/14/16 14:48	04/19/16 08:40
160-17034-9	TI-TO04-BS-R-SU8-S009	Solid	04/14/16 14:33	04/19/16 08:40
160-17034-10	TI-TO04-BS-R-SU8-S010	Solid	04/14/16 14:23	04/19/16 08:40
160-17034-11	TI-TO04-BS-R-SU8-S011	Solid	04/14/16 14:28	04/19/16 08:40
160-17034-12	TI-TO04-BS-R-SU8-S012	Solid	04/14/16 14:33	04/19/16 08:40
160-17034-13	TI-TO04-BS-R-SU8-S013	Solid	04/14/16 14:41	04/19/16 08:40
160-17034-14	TI-TO04-BS-R-SU8-S014	Solid	04/14/16 14:35	04/19/16 08:40
160-17034-15	TI-TO04-BS-R-SU8-S015	Solid	04/14/16 14:20	04/19/16 08:40
160-17034-16	TI-TO04-BS-R-SU8-S016	Solid	04/14/16 14:37	04/19/16 08:40
160-17034-17	TI-TO04-BS-R-SU8-S019	Solid	04/14/16 14:30	04/19/16 08:40

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S001

Lab Sample ID: 160-17034-1

Date Collected: 04/14/16 14:30

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.140	U	0.208	0.208		0.303	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Actinium-227	0.149	U	0.284	0.284		1.40	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Bismuth-212	0.245	U	0.418	0.419		0.718	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Bismuth-214	0.336		0.104	0.110		0.0939	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Cesium-137	0.0234	U	0.0550	0.0551		0.0955	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Lead-210	-1.48	U	1.27	1.29		3.22	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Lead-212	0.391		0.0947	0.107		0.108	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Lead-214	0.449		0.132	0.140		0.112	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Potassium-40	11.4		1.66	2.03		0.443	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Protactinium-231	-0.636	U	2.75	2.75		4.64	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Radium-226	0.336		0.104	0.110	0.500	0.0939	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Radium-228	0.140	U	0.208	0.208		0.303	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Thallium-208	0.134		0.0625	0.0640		0.0666	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Thorium-228	0.391		0.0947	0.107		0.108	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Thorium-232	0.140	U	0.208	0.208		0.303	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Thorium-234	0.126	U	1.48	1.48		2.51	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Uranium-235	0.143	U	0.491	0.492		0.826	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Uranium-238	0.126	U	1.48	1.48		2.51	pCi/g	04/21/16 08:59	05/13/16 09:33	1

Client Sample ID: TI-TO04-BS-R-SU8-S002

Lab Sample ID: 160-17034-2

Date Collected: 04/14/16 14:20

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.442		0.147	0.154		0.106	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Actinium-227	0.220	U	0.332	0.333		0.892	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Bismuth-212	0.195	U	0.501	0.502		0.864	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Bismuth-214	0.383		0.0925	0.101		0.0782	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Cesium-137	-0.0436	U	0.0702	0.0703		0.117	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Lead-210	-0.146	U	1.16	1.16		2.15	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Lead-212	0.308		0.0722	0.0825		0.0891	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Lead-214	0.408		0.0825	0.0928		0.0823	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Potassium-40	10.7		1.22	1.64		0.489	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Protactinium-231	0.000	U	0.262	0.262		3.43	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Radium-226	0.383		0.0925	0.101	0.500	0.0782	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Radium-228	0.442		0.147	0.154		0.106	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thallium-208	0.101		0.0569	0.0579		0.0569	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thorium-228	0.308		0.0722	0.0825		0.0891	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thorium-232	0.442		0.147	0.154		0.106	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thorium-234	0.332	U	0.702	0.703		1.72	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Uranium-235	0.0833	U	0.163	0.163		0.625	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Uranium-238	0.332	U	0.702	0.703		1.72	pCi/g	04/21/16 08:59	06/21/16 20:48	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S003

Lab Sample ID: 160-17034-3

Date Collected: 04/14/16 14:25

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.405		0.126	0.133		0.214	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Actinium-227	-0.364	U	0.875	0.876		1.47	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Bismuth-212	0.304	U	0.629	0.630		1.07	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Bismuth-214	0.391		0.117	0.124		0.108	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Cesium-137	-0.0140	U	0.0706	0.0706		0.122	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Lead-210	0.853	U	1.03	1.03		1.55	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Lead-212	0.306		0.0736	0.0836		0.0834	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Lead-214	0.323		0.0835	0.0900		0.109	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Potassium-40	10.6		1.33	1.72		0.510	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Protactinium-231	0.560	U	1.31	1.31		3.00	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Radium-226	0.391		0.117	0.124	0.500	0.108	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Radium-228	0.405		0.126	0.133		0.214	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thallium-208	0.158		0.0478	0.0505		0.0393	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thorium-228	0.306		0.0736	0.0836		0.0834	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thorium-232	0.405		0.126	0.133		0.214	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Thorium-234	1.04	U	0.988	0.994		1.33	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Uranium-235	-0.0852	U	0.280	0.280		0.863	pCi/g	04/21/16 08:59	06/21/16 20:48	1
Uranium-238	1.04	U	0.988	0.994		1.33	pCi/g	04/21/16 08:59	06/21/16 20:48	1

Client Sample ID: TI-TO04-BS-R-SU8-S004

Lab Sample ID: 160-17034-4

Date Collected: 04/14/16 14:22

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.446		0.123	0.131		0.143	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Actinium-227	-0.0237	U	0.0396	0.0397		1.07	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Bismuth-212	0.000	U	0.406	0.406		1.09	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Bismuth-214	0.333		0.0927	0.0990		0.0803	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Cesium-137	0.000394	U	0.0531	0.0531		0.0938	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Lead-210	-0.528	U	1.15	1.15		1.93	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Lead-212	0.381		0.0669	0.0831		0.0581	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Lead-214	0.366		0.0839	0.0921		0.0955	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Potassium-40	10.5		1.30	1.69		0.670	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Protactinium-231	0.290	U	1.09	1.09		3.51	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Radium-226	0.333		0.0927	0.0990	0.500	0.0803	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Radium-228	0.446		0.123	0.131		0.143	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Thallium-208	0.126		0.0504	0.0521		0.0455	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Thorium-228	0.381		0.0669	0.0831		0.0581	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Thorium-232	0.446		0.123	0.131		0.143	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Thorium-234	0.318	U	1.00	1.01		1.70	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Uranium-235	-0.0315	U	0.0572	0.0572		0.701	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Uranium-238	0.318	U	1.00	1.01		1.70	pCi/g	04/21/16 08:59	05/15/16 15:18	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S005

Lab Sample ID: 160-17034-5

Date Collected: 04/14/16 14:26

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.484		0.181	0.188		0.289	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Actinium-227	0.0700	U	0.567	0.567		0.840	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Bismuth-212	-0.371	U	1.05	1.06		1.82	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Bismuth-214	0.351		0.118	0.123		0.120	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Cesium-137	-0.00399	U	0.0576	0.0576		0.106	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-210	0.269	U	0.939	0.940		1.51	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-212	0.388		0.0993	0.111		0.114	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-214	0.278		0.111	0.114		0.135	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Potassium-40	11.9		1.85	2.21		0.745	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Protactinium-231	0.000	U	0.336	0.336		4.58	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Radium-226	0.351		0.118	0.123	0.500	0.120	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Radium-228	0.484		0.181	0.188		0.289	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thallium-208	0.108		0.0599	0.0609		0.0602	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-228	0.388		0.0993	0.111		0.114	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-232	0.484		0.181	0.188		0.289	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-234	0.416	U	0.512	0.514		1.58	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Uranium-235	0.0321	U	0.138	0.138		0.667	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Uranium-238	0.416	U	0.512	0.514		1.58	pCi/g	04/21/16 08:59	05/13/16 09:42	1

Client Sample ID: TI-TO04-BS-R-SU8-S006

Lab Sample ID: 160-17034-6

Date Collected: 04/14/16 14:29

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.497		0.113	0.124		0.145	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Actinium-227	-0.0734	U	0.124	0.124		1.43	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Bismuth-212	0.238	U	0.636	0.636		1.10	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Bismuth-214	0.348		0.115	0.120		0.113	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Cesium-137	-0.0214	U	0.0381	0.0382		0.0941	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-210	1.02	U	1.13	1.13		1.59	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-212	0.400		0.0870	0.101		0.0974	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-214	0.398		0.106	0.114		0.109	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Potassium-40	11.5		1.47	1.88		0.766	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Protactinium-231	0.000	U	0.645	0.645		4.13	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Radium-226	0.348		0.115	0.120	0.500	0.113	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Radium-228	0.497		0.113	0.124		0.145	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thallium-208	0.101		0.0471	0.0482		0.0523	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-228	0.400		0.0870	0.101		0.0974	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-232	0.497		0.113	0.124		0.145	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-234	-0.0908	U	0.995	0.995		1.72	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Uranium-235	-0.0426	U	0.0786	0.0787		0.548	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Uranium-238	-0.0908	U	0.995	0.995		1.72	pCi/g	04/21/16 08:59	05/13/16 09:42	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S007

Lab Sample ID: 160-17034-7

Date Collected: 04/14/16 14:39

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.356		0.143	0.147		0.126	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Actinium-227	-0.312	U	0.764	0.764		1.28	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Bismuth-212	0.000	U	0.422	0.422		1.11	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Bismuth-214	0.252		0.0810	0.0851		0.0782	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Cesium-137	0.00987	U	0.0350	0.0350		0.0621	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Lead-210	0.404	U	0.984	0.985		1.50	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Lead-212	0.306		0.0754	0.0852		0.0913	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Lead-214	0.377		0.0887	0.0969		0.0988	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Potassium-40	9.52		1.22	1.56		0.498	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Protactinium-231	-0.478	U	2.17	2.17		3.66	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Radium-226	0.252		0.0810	0.0851	0.500	0.0782	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Radium-228	0.356		0.143	0.147		0.126	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Thallium-208	0.185		0.0447	0.0487		0.0341	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Thorium-228	0.306		0.0754	0.0852		0.0913	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Thorium-232	0.356		0.143	0.147		0.126	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Thorium-234	0.316	U	0.314	0.315		2.13	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Uranium-235	-0.0611	U	0.163	0.163		0.757	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Uranium-238	0.316	U	0.314	0.315		2.13	pCi/g	04/21/16 08:59	05/13/16 10:33	1

Client Sample ID: TI-TO04-BS-R-SU8-S008

Lab Sample ID: 160-17034-8

Date Collected: 04/14/16 14:48

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.364		0.127	0.132		0.325	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Actinium-227	-0.282	U	0.646	0.647		0.923	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Bismuth-212	0.283	U	0.522	0.523		0.894	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Bismuth-214	0.340		0.111	0.117		0.101	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Cesium-137	-0.0523	U	0.0963	0.0965		0.162	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Lead-210	0.966	U	1.04	1.05		1.51	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Lead-212	0.334		0.0809	0.0918		0.0899	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Lead-214	0.356		0.124	0.129		0.139	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Potassium-40	11.7		1.58	1.98		0.614	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Protactinium-231	0.0646	U	0.809	0.809		3.16	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Radium-226	0.340		0.111	0.117	0.500	0.101	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Radium-228	0.364		0.127	0.132		0.325	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Thallium-208	0.146		0.0494	0.0517		0.0358	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Thorium-228	0.334		0.0809	0.0918		0.0899	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Thorium-232	0.364		0.127	0.132		0.325	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Thorium-234	1.52		0.755	0.772		1.11	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Uranium-235	-0.155	U	0.357	0.358		0.571	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Uranium-238	1.52		0.755	0.772		1.11	pCi/g	04/21/16 08:59	05/15/16 14:13	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S009

Lab Sample ID: 160-17034-9

Date Collected: 04/14/16 14:33

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.520		0.137	0.147		0.133	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Actinium-227	0.130	U	0.540	0.541		0.786	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Bismuth-212	0.272	U	0.592	0.593		1.02	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Bismuth-214	0.358		0.119	0.124		0.110	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Cesium-137	0.0205	U	0.0554	0.0555		0.0961	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Lead-210	-0.332	U	1.32	1.32		2.01	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Lead-212	0.276		0.0894	0.0963		0.121	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Lead-214	0.337		0.109	0.115		0.110	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Potassium-40	10.4		1.46	1.81		0.589	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Protactinium-231	0.476	U	1.03	1.03		2.42	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Radium-226	0.358		0.119	0.124	0.500	0.110	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Radium-228	0.520		0.137	0.147		0.133	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Thallium-208	0.125		0.0450	0.0468		0.0378	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Thorium-228	0.276		0.0894	0.0963		0.121	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Thorium-232	0.520		0.137	0.147		0.133	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Thorium-234	-0.923	U	1.05	1.06		2.01	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Uranium-235	-0.0363	U	0.0567	0.0568		0.532	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Uranium-238	-0.923	U	1.05	1.06		2.01	pCi/g	04/21/16 08:59	05/13/16 10:35	1

Client Sample ID: TI-TO04-BS-R-SU8-S010

Lab Sample ID: 160-17034-10

Date Collected: 04/14/16 14:23

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.467		0.160	0.167		0.107	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Actinium-227	-0.221	U	0.781	0.782		1.32	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Bismuth-212	0.359	U	0.708	0.709		1.21	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Bismuth-214	0.307		0.127	0.131		0.140	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Cesium-137	0.00219	U	0.0733	0.0733		0.131	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Lead-210	0.517	U	1.11	1.11		1.60	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Lead-212	0.347		0.131	0.138		0.135	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Lead-214	0.310		0.130	0.134		0.201	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Potassium-40	10.7		1.59	1.93		0.438	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Protactinium-231	0.289	U	0.900	0.901		3.91	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Radium-226	0.307		0.127	0.131	0.500	0.140	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Radium-228	0.467		0.160	0.167		0.107	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Thallium-208	0.0506	U	0.0808	0.0809		0.108	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Thorium-228	0.347		0.131	0.138		0.135	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Thorium-232	0.467		0.160	0.167		0.107	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Thorium-234	-0.894	U	0.927	0.932		2.51	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Uranium-235	-0.219	U	0.305	0.306		1.06	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Uranium-238	-0.894	U	0.927	0.932		2.51	pCi/g	04/21/16 08:59	05/13/16 10:36	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S011

Lab Sample ID: 160-17034-11

Date Collected: 04/14/16 14:28

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.535		0.189	0.196		0.135	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Actinium-227	-0.0466	U	0.0761	0.0763		1.32	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Bismuth-212	-0.192	U	0.802	0.802		1.39	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Bismuth-214	0.463		0.115	0.125		0.0951	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Cesium-137	0.0170	U	0.0371	0.0372		0.0641	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Lead-210	0.691	U	1.49	1.49		1.85	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Lead-212	0.338		0.0825	0.0934		0.0989	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Lead-214	0.458		0.123	0.131		0.114	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Potassium-40	12.5		1.47	1.95		0.717	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Protactinium-231	-0.826	U	2.60	2.60		4.36	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Radium-226	0.463		0.115	0.125	0.500	0.0951	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Radium-228	0.535		0.189	0.196		0.135	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Thallium-208	0.209		0.0574	0.0614		0.0481	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Thorium-228	0.338		0.0825	0.0934		0.0989	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Thorium-232	0.535		0.189	0.196		0.135	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Thorium-234	-0.208	U	1.35	1.35		2.30	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Uranium-235	0.000	U	0.189	0.189		0.893	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Uranium-238	-0.208	U	1.35	1.35		2.30	pCi/g	04/21/16 08:59	05/13/16 10:37	1

Client Sample ID: TI-TO04-BS-R-SU8-S012

Lab Sample ID: 160-17034-12

Date Collected: 04/14/16 14:33

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.332		0.153	0.156		0.172	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Actinium-227	0.245	U	0.511	0.512		1.18	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Bismuth-212	-0.0225	U	0.798	0.798		1.43	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Bismuth-214	0.376		0.131	0.137		0.119	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Cesium-137	-0.0207	U	0.0574	0.0575		0.108	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Lead-210	-0.382	U	1.67	1.67		2.83	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Lead-212	0.427		0.0919	0.107		0.101	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Lead-214	0.375		0.106	0.113		0.127	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Potassium-40	9.84		1.51	1.81		0.669	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Protactinium-231	0.657	U	1.84	1.84		4.19	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Radium-226	0.376		0.131	0.137	0.500	0.119	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Radium-228	0.332		0.153	0.156		0.172	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Thallium-208	0.105		0.0800	0.0807		0.0901	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Thorium-228	0.427		0.0919	0.107		0.101	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Thorium-232	0.332		0.153	0.156		0.172	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Thorium-234	-0.160	U	1.46	1.46		2.49	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Uranium-235	-0.218	U	0.401	0.402		0.813	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Uranium-238	-0.160	U	1.46	1.46		2.49	pCi/g	04/21/16 08:59	05/13/16 11:51	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S013

Lab Sample ID: 160-17034-13

Date Collected: 04/14/16 14:41

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.445		0.175	0.181		0.193	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Actinium-227	0.197	U	0.317	0.317		0.891	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Bismuth-212	0.342	U	0.598	0.599		1.01	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Bismuth-214	0.354		0.117	0.123		0.0955	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Cesium-137	-0.00580	U	0.0576	0.0576		0.0892	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Lead-210	-0.0944	U	1.25	1.25		2.14	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Lead-212	0.361		0.0688	0.0831		0.0685	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Lead-214	0.376		0.0796	0.0887		0.0737	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Potassium-40	10.8		1.42	1.80		0.562	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Protactinium-231	-0.657	U	2.17	2.17		3.65	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Radium-226	0.354		0.117	0.123	0.500	0.0955	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Radium-228	0.445		0.175	0.181		0.193	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Thallium-208	0.181		0.0513	0.0546		0.0365	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Thorium-228	0.361		0.0688	0.0831		0.0685	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Thorium-232	0.445		0.175	0.181		0.193	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Thorium-234	-0.502	U	0.918	0.919		1.71	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Uranium-235	0.122	U	0.246	0.247		0.398	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Uranium-238	-0.502	U	0.918	0.919		1.71	pCi/g	04/21/16 08:59	05/13/16 11:52	1

Client Sample ID: TI-TO04-BS-R-SU8-S014

Lab Sample ID: 160-17034-14

Date Collected: 04/14/16 14:35

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.146	U	0.218	0.219		0.349	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Actinium-227	-0.305	U	0.671	0.671		0.962	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Bismuth-212	0.472	U	0.971	0.972		1.66	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Bismuth-214	0.467		0.165	0.172		0.145	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Cesium-137	-0.00367	U	0.0792	0.0792		0.142	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Lead-210	0.658	U	1.31	1.31		1.82	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Lead-212	0.389		0.0929	0.106		0.0946	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Lead-214	0.249		0.128	0.130		0.154	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Potassium-40	12.8		1.92	2.32		0.757	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Protactinium-231	0.356	U	1.05	1.05		3.56	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Radium-226	0.467		0.165	0.172	0.500	0.145	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Radium-228	0.146	U	0.218	0.219		0.349	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Thallium-208	0.159		0.0592	0.0614		0.0503	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Thorium-228	0.389		0.0929	0.106		0.0946	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Thorium-232	0.146	U	0.218	0.219		0.349	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Thorium-234	0.585	U	0.472	0.476		1.30	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Uranium-235	0.113	U	0.320	0.320		0.529	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Uranium-238	0.585	U	0.472	0.476		1.30	pCi/g	04/21/16 08:59	05/13/16 11:54	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S015

Lab Sample ID: 160-17034-15

Date Collected: 04/14/16 14:20

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.376		0.163	0.167		0.229	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Actinium-227	0.0377	U	0.702	0.702		1.20	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Bismuth-212	0.000	U	0.515	0.515		1.24	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Bismuth-214	0.354		0.122	0.128		0.118	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Cesium-137	0.0159	U	0.0453	0.0453		0.0789	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Lead-210	1.26	U	1.18	1.19		1.57	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Lead-212	0.331		0.0863	0.0964		0.107	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Lead-214	0.394		0.108	0.115		0.127	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Potassium-40	11.4		1.46	1.87		0.766	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Protactinium-231	0.271	U	1.02	1.02		3.31	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Radium-226	0.354		0.122	0.128	0.500	0.118	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Radium-228	0.376		0.163	0.167		0.229	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Thallium-208	0.128		0.0521	0.0538		0.0540	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Thorium-228	0.331		0.0863	0.0964		0.107	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Thorium-232	0.376		0.163	0.167		0.229	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Thorium-234	0.192	U	0.278	0.279		1.33	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Uranium-235	-0.196	U	0.226	0.227		0.548	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Uranium-238	0.192	U	0.278	0.279		1.33	pCi/g	04/21/16 08:59	05/13/16 10:41	1

Client Sample ID: TI-TO04-BS-R-SU8-S016

Lab Sample ID: 160-17034-16

Date Collected: 04/14/16 14:37

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.428		0.162	0.168		0.246	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Actinium-227	0.280	U	0.587	0.588		0.986	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Bismuth-212	-0.397	U	0.721	0.722		1.21	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Bismuth-214	0.351		0.114	0.119		0.110	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Cesium-137	-0.0272	U	0.0464	0.0465		0.0783	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Lead-210	-0.237	U	1.20	1.20		2.05	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Lead-212	0.369		0.0774	0.0910		0.0872	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Lead-214	0.330		0.0912	0.0975		0.0848	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Potassium-40	11.9		1.37	1.83		0.585	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Protactinium-231	0.000	U	0.613	0.613		3.68	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Radium-226	0.351		0.114	0.119	0.500	0.110	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Radium-228	0.428		0.162	0.168		0.246	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Thallium-208	0.118		0.0437	0.0454		0.0374	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Thorium-228	0.369		0.0774	0.0910		0.0872	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Thorium-232	0.428		0.162	0.168		0.246	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Thorium-234	0.0646	U	1.17	1.17		1.99	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Uranium-235	0.0839	U	0.151	0.151		0.858	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Uranium-238	0.0646	U	1.17	1.17		1.99	pCi/g	04/21/16 08:59	05/13/16 11:59	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S019

Lab Sample ID: 160-17034-17

Date Collected: 04/14/16 14:30

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-228	0.424		0.160	0.166		0.112	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Actinium-227	0.349	U	0.738	0.739		1.24	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Bismuth-212	0.254	U	0.774	0.774		1.35	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Bismuth-214	0.331		0.108	0.113		0.0972	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Cesium-137	0.00294	U	0.0707	0.0707		0.127	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Lead-210	-0.799	U	1.79	1.79		3.13	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Lead-212	0.333		0.0882	0.0981		0.0997	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Lead-214	0.226		0.0987	0.101		0.116	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Potassium-40	11.3		1.67	2.03		0.458	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Protactinium-231	-0.915	U	2.96	2.96		4.97	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Radium-226	0.331		0.108	0.113	0.500	0.0972	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Radium-228	0.424		0.160	0.166		0.112	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Thallium-208	0.142		0.0726	0.0741		0.0786	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Thorium-228	0.333		0.0882	0.0981		0.0997	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Thorium-232	0.424		0.160	0.166		0.112	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Thorium-234	1.34	U	1.09	1.10		1.42	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Uranium-235	0.00106	U	0.0161	0.0161		1.02	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Uranium-238	1.34	U	1.09	1.10		1.42	pCi/g	04/21/16 08:59	05/15/16 14:16	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-247201/1-A

Matrix: Solid

Analysis Batch: 250931

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 247201

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.03202	U	0.0558	0.0559		0.258	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Actinium-227	-0.03707	U	0.535	0.535		0.934	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Bismuth-212	0.02583	U	0.447	0.447		0.835	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Bismuth-214	0.03295	U	0.0535	0.0536		0.229	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Cesium-137	0.02467	U	0.0501	0.0502		0.0858	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Lead-210	-0.5574	U	0.105	0.123		1.72	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Lead-212	-0.03982	U	0.0827	0.0828		0.140	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Lead-214	-0.005138	U	0.0750	0.0750		0.135	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Potassium-40	-0.2212	U	0.426	0.427		0.605	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Protactinium-231	0.4052	U	1.29	1.29		2.21	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Radium-226	0.03295	U	0.0535	0.0536	0.500	0.229	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Radium-228	0.03202	U	0.0558	0.0559		0.258	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Thallium-208	-0.03417	U	0.0381	0.0382		0.0744	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Thorium-228	-0.03982	U	0.0827	0.0828		0.140	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Thorium-232	0.03202	U	0.0558	0.0559		0.258	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Thorium-234	-0.07093	U	0.887	0.887		1.54	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Uranium-235	0.04444	U	0.264	0.264		0.455	pCi/g	04/21/16 08:59	05/13/16 09:30	1
Uranium-238	-0.07093	U	0.887	0.887		1.54	pCi/g	04/21/16 08:59	05/13/16 09:30	1

Lab Sample ID: LCS 160-247201/2-A

Matrix: Solid

Analysis Batch: 250932

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 247201

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.1	96.28		10.1		1.12	pCi/g	99	87 - 116
Cesium-137	29.7	29.43		3.15		0.264	pCi/g	99	87 - 120
Cobalt-60	17.3	16.68		1.73		0.152	pCi/g	96	87 - 115

Lab Sample ID: 160-17034-1 DU

Matrix: Solid

Analysis Batch: 250929

Client Sample ID: TI-TO04-BS-R-SU8-S001

Prep Type: Total/NA

Prep Batch: 247201

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.140	U	0.3089		0.168		0.158	pCi/g	0.45	1
Actinium-227	0.149	U	0.1626	U	0.645		1.09	pCi/g	0.01	1
Bismuth-212	0.245	U	0.3655	U	0.559		0.933	pCi/g	0.12	1
Bismuth-214	0.336		0.4141		0.125		0.0984	pCi/g	0.33	1
Cesium-137	0.0234	U	0.01844	U	0.0350		0.0598	pCi/g	0.06	1
Lead-210	-1.48	U	-0.7197	U	1.59		2.65	pCi/g	0.26	1
Lead-212	0.391		0.3595		0.0850		0.0740	pCi/g	0.16	1
Lead-214	0.449		0.3249		0.0989		0.0850	pCi/g	0.52	1
Potassium-40	11.4		10.71		1.68		0.561	pCi/g	0.19	1
Protactinium-231	-0.636	U	-0.7658	U	2.38		3.98	pCi/g	0.03	1
Radium-226	0.336		0.4141		0.125	0.500	0.0984	pCi/g	0.33	1
Radium-228	0.140	U	0.3089		0.168		0.158	pCi/g	0.45	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-17034-1 DU

Matrix: Solid

Analysis Batch: 250929

Client Sample ID: TI-TO04-BS-R-SU8-S001

Prep Type: Total/NA

Prep Batch: 247201

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.134		0.1812		0.0515		0.0324	pCi/g	0.41	1
Thorium-228	0.391		0.3595		0.0850		0.0740	pCi/g	0.16	1
Thorium-232	0.140	U	0.3089		0.168		0.158	pCi/g	0.45	1
Thorium-234	0.126	U	0.0000	U	0.781		2.11	pCi/g	0.06	1
Uranium-235	0.143	U	-0.1381	U	0.391		0.654	pCi/g	0.32	1
Uranium-238	0.126	U	0.0000	U	0.781		2.11	pCi/g	0.06	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Rad

Leach Batch: 246831

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17034-1	TI-TO04-BS-R-SU8-S001	Total/NA	Solid	Dry and Grind	
160-17034-1 DU	TI-TO04-BS-R-SU8-S001	Total/NA	Solid	Dry and Grind	
160-17034-2	TI-TO04-BS-R-SU8-S002	Total/NA	Solid	Dry and Grind	
160-17034-3	TI-TO04-BS-R-SU8-S003	Total/NA	Solid	Dry and Grind	
160-17034-4	TI-TO04-BS-R-SU8-S004	Total/NA	Solid	Dry and Grind	
160-17034-5	TI-TO04-BS-R-SU8-S005	Total/NA	Solid	Dry and Grind	
160-17034-6	TI-TO04-BS-R-SU8-S006	Total/NA	Solid	Dry and Grind	
160-17034-7	TI-TO04-BS-R-SU8-S007	Total/NA	Solid	Dry and Grind	
160-17034-8	TI-TO04-BS-R-SU8-S008	Total/NA	Solid	Dry and Grind	
160-17034-9	TI-TO04-BS-R-SU8-S009	Total/NA	Solid	Dry and Grind	
160-17034-10	TI-TO04-BS-R-SU8-S010	Total/NA	Solid	Dry and Grind	
160-17034-11	TI-TO04-BS-R-SU8-S011	Total/NA	Solid	Dry and Grind	
160-17034-12	TI-TO04-BS-R-SU8-S012	Total/NA	Solid	Dry and Grind	
160-17034-13	TI-TO04-BS-R-SU8-S013	Total/NA	Solid	Dry and Grind	
160-17034-14	TI-TO04-BS-R-SU8-S014	Total/NA	Solid	Dry and Grind	
160-17034-15	TI-TO04-BS-R-SU8-S015	Total/NA	Solid	Dry and Grind	
160-17034-16	TI-TO04-BS-R-SU8-S016	Total/NA	Solid	Dry and Grind	
160-17034-17	TI-TO04-BS-R-SU8-S019	Total/NA	Solid	Dry and Grind	

Prep Batch: 247201

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17034-1	TI-TO04-BS-R-SU8-S001	Total/NA	Solid	Fill_Geo-21	246831
160-17034-1 DU	TI-TO04-BS-R-SU8-S001	Total/NA	Solid	Fill_Geo-21	246831
160-17034-2	TI-TO04-BS-R-SU8-S002	Total/NA	Solid	Fill_Geo-21	246831
160-17034-3	TI-TO04-BS-R-SU8-S003	Total/NA	Solid	Fill_Geo-21	246831
160-17034-4	TI-TO04-BS-R-SU8-S004	Total/NA	Solid	Fill_Geo-21	246831
160-17034-5	TI-TO04-BS-R-SU8-S005	Total/NA	Solid	Fill_Geo-21	246831
160-17034-6	TI-TO04-BS-R-SU8-S006	Total/NA	Solid	Fill_Geo-21	246831
160-17034-7	TI-TO04-BS-R-SU8-S007	Total/NA	Solid	Fill_Geo-21	246831
160-17034-8	TI-TO04-BS-R-SU8-S008	Total/NA	Solid	Fill_Geo-21	246831
160-17034-9	TI-TO04-BS-R-SU8-S009	Total/NA	Solid	Fill_Geo-21	246831
160-17034-10	TI-TO04-BS-R-SU8-S010	Total/NA	Solid	Fill_Geo-21	246831
160-17034-11	TI-TO04-BS-R-SU8-S011	Total/NA	Solid	Fill_Geo-21	246831
160-17034-12	TI-TO04-BS-R-SU8-S012	Total/NA	Solid	Fill_Geo-21	246831
160-17034-13	TI-TO04-BS-R-SU8-S013	Total/NA	Solid	Fill_Geo-21	246831
160-17034-14	TI-TO04-BS-R-SU8-S014	Total/NA	Solid	Fill_Geo-21	246831
160-17034-15	TI-TO04-BS-R-SU8-S015	Total/NA	Solid	Fill_Geo-21	246831
160-17034-16	TI-TO04-BS-R-SU8-S016	Total/NA	Solid	Fill_Geo-21	246831
160-17034-17	TI-TO04-BS-R-SU8-S019	Total/NA	Solid	Fill_Geo-21	246831
LCS 160-247201/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-247201/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica St. Louis

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-14099-2

Client Project/Site: Treasure Island - 500060
Revision: 1

For:

CB&I Environmental & Infrastructure, Inc
4005 Port Chicago Hwy
Concord, California 94520

Attn: Patricia Flynn



Authorized for release by:
5/27/2016 4:07:24 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Preliminary Data

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14099-2

Job ID: 160-14099-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: CB&I Environmental & Infrastructure, Inc

Project: Treasure Island - 500060

Report Number: 160-14099-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup
Method 3620C: Florisil Cleanup
Method 3630C: Silica Gel Cleanup
Method 3640A: Gel-Permeation Cleanup
Method 3650B: Acid-Base Partition Cleanup
Method 3660B: Sulfur Cleanup
Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Case Narrative

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14099-2

Job ID: 160-14099-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RECEIPT

The samples were received on 10/05/2015; the samples arrived in good condition, properly preserved . The temperature of the coolers at receipt was 20.0 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples TI-TO04-NP-BIFSS_SU1-001 (160-14099-1), TI-TO04-NP-BIFSS_SU1-002 (160-14099-2) and TI-TO04-NP-BIFSS_SU1-003 (160-14099-3) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/05/2015, prepared on 10/08/2015 and analyzed on 10/29/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Preliminary Data



Shaw Environmental and Infrastructure Inc. (a CB&I company)
Federal Services Division

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # TL_P3_BI_NPFSSSU1 Soil_112

Page 1 of 1

Project Number: 500060

Project Name / Location: CTO-04 Phase III NorthPoint
Biased FSS SU1

Purchase Order #: 201455

Project Manager: Ulrika Messer

(Name & phone #)

Send Report To: Patricia Flynn

Phone/Fax Number: 925-288-2037

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Shipment Date: 10-2-2015

Waybill Number: 12894462018806425

Lab Destination: Earth Toxics Inc To Test America

Lab Contact Name / ph. #: Mike Dryden

Sampler's Name(s): N. Morrison

Sample ID Number	Sample Description
TI-TO04-NP-BIFSS_SU1-001	NorthPoint Biased Soil FSS SU1
TI-TO04-NP-BIFSS_SU1-002	NorthPoint Biased Soil FSS SU1
TI-TO04-NP-BIFSS_SU1-003	NorthPoint Biased Soil FSS SU1

Collection Information

Date	Time	Method
9-25-15	0804	G
9-25-15	0817	G
9-25-15	0827	G

Matrix

# of containers	Matrix
1	SO
1	SO
1	SO

Preservative (water)

Preservative (soil)

Container Type

16 oz Plastic
16 oz Plastic
16 oz Plastic

Gamma Scan

N/A

Dose Rate μ R/hr

5
5
5



160-14099 Chain of Custody

Special Instructions:

7 days ingrown draft and follow with 21 days final

Level Of QC Required:

☐ 24-hr

☐ 3-day

☐ 7-day

Project Specific:

III

I

II

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Login Sample Receipt Checklist

Client: CB&I Environmental & Infrastructure, Inc

Job Number: 160-14099-2

Login Number: 14099

List Number: 1

Creator: Daniels, Brian J

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14099-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14099-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Preliminary Data

Sample Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14099-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-14099-1	TI-TO04-NP-BIFSS_SU1-001	Solid	09/25/15 08:04	10/05/15 08:20
160-14099-2	TI-TO04-NP-BIFSS_SU1-002	Solid	09/25/15 08:17	10/05/15 08:20
160-14099-3	TI-TO04-NP-BIFSS_SU1-003	Solid	09/25/15 08:27	10/05/15 08:20

Preliminary Data

Detection Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14099-2

Client Sample ID: TI-TO04-NP-BIFSS_SU1-001

Lab Sample ID: 160-14099-1

☐ No Detections.

Client Sample ID: TI-TO04-NP-BIFSS_SU1-002

Lab Sample ID: 160-14099-2

☐ No Detections.

Client Sample ID: TI-TO04-NP-BIFSS_SU1-003

Lab Sample ID: 160-14099-3

☐ No Detections.

Preliminary Data

This Detection Summary does not include radiochemical test results.

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14099-2

Client Sample ID: TI-TO04-NP-BIFSS_SU1-001

Lab Sample ID: 160-14099-1

Date Collected: 09/25/15 08:04

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.735		0.320	0.328		0.311	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Actinium 228	0.502		0.215	0.221		0.428	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Actinium-227	0.404	U	0.854	0.855		1.43	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Actinium-227	0.00562	U	0.0392	0.0392		1.29	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Bismuth-212	-0.208	U	0.858	0.858		1.49	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Bismuth-212	0.844	U	0.852	0.857		1.35	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Bismuth-214	0.734		0.161	0.178		0.137	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Bismuth-214	1.13		0.220	0.249		0.169	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Cesium-137	-0.0417	U	0.0675	0.0676		0.113	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Cesium-137	-0.0233	U	0.0712	0.0713		0.126	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Lead-210	-0.963	U	1.23	1.24		3.45	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Lead-210	-0.0728	U	1.73	1.73		2.92	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Lead-212	0.840		0.114	0.158		0.101	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Lead-212	0.804		0.165	0.195		0.166	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Lead-214	0.820		0.136	0.160		0.125	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Lead-214	0.868		0.173	0.195		0.153	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Potassium-40	15.5		1.72	2.33		0.591	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Potassium-40	17.8		2.40	3.02		0.597	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Protactinium-231	0.000	U	0.331	0.331		5.49	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Protactinium-231	0.581	U	1.36	1.36		2.35	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Radium-226	0.734		0.161	0.178	0.500	0.137	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Radium-226	1.13		0.220	0.249	0.500	0.169	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Radium-228	0.735		0.320	0.328		0.311	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Radium-228	0.502		0.215	0.221		0.428	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thallium-208	0.277		0.0789	0.0840		0.0699	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Thallium-208	0.275		0.100	0.104		0.0931	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-228	0.840		0.114	0.158		0.101	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Thorium-228	0.804		0.165	0.195		0.166	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-232	0.735		0.320	0.328		0.311	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Thorium-232	0.502		0.215	0.221		0.428	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-234	1.36	U	0.615	0.631		1.44	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Thorium-234	1.40	U	1.10	1.11		1.86	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Uranium-235	0.000	U	0.249	0.249		0.964	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Uranium-235	0.124	U	0.365	0.365		0.583	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Uranium-238	1.36	U	0.615	0.631		1.44	pCi/g	10/08/15 09:27	05/26/16 18:56	1
Uranium-238	1.40	U	1.10	1.11		1.86	pCi/g	10/08/15 09:27	10/29/15 09:27	1

Client Sample ID: TI-TO04-NP-BIFSS_SU1-002

Lab Sample ID: 160-14099-2

Date Collected: 09/25/15 08:17

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.968		0.205	0.228		0.168	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Actinium-227	-0.000812	U	0.525	0.525		0.922	pCi/g	10/08/15 09:27	10/29/15 09:27	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14099-2

Client Sample ID: TI-TO04-NP-BIFSS_SU1-002

Lab Sample ID: 160-14099-2

Date Collected: 09/25/15 08:17

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Bismuth-212	0.124	U	0.559	0.559		1.05	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Bismuth-214	0.723		0.160	0.177		0.139	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Cesium-137	-0.0000092	U	0.0436	0.0436		0.0812	pCi/g	10/08/15 09:27	10/29/15 09:27	1
	8									
Lead-210	1.23	U	1.65	1.65		2.37	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Lead-212	0.759		0.162	0.189		0.162	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Lead-214	0.822		0.154	0.176		0.149	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Potassium-40	17.9		1.92	2.65		0.907	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Protactinium-231	1.57	U	0.887	0.903		1.78	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Radium-226	0.723		0.160	0.177	0.500	0.139	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Radium-228	0.968		0.205	0.228		0.168	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thallium-208	0.278		0.0852	0.0899		0.0808	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-228	0.759		0.162	0.189		0.162	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-232	0.968		0.205	0.228		0.168	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-234	0.506	U	0.677	0.679		2.12	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Uranium-235	0.122	U	0.198	0.198		0.485	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Uranium-238	0.506	U	0.677	0.679		2.12	pCi/g	10/08/15 09:27	10/29/15 09:27	1

Client Sample ID: TI-TO04-NP-BIFSS_SU1-003

Lab Sample ID: 160-14099-3

Date Collected: 09/25/15 08:27

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.722		0.163	0.179		0.301	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Actinium-227	0.0734	U	0.345	0.345		1.03	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Bismuth-212	0.322	U	0.610	0.611		1.05	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Bismuth-214	0.612		0.152	0.165		0.141	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Cesium-137	-0.0225	U	0.0472	0.0473		0.0819	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Lead-210	0.987	U	1.30	1.30		2.22	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Lead-212	0.599		0.129	0.150		0.133	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Lead-214	0.615		0.149	0.162		0.132	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Potassium-40	15.8		1.90	2.50		0.769	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Protactinium-231	0.133	U	0.259	0.259		2.08	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Radium-226	0.612		0.152	0.165	0.500	0.141	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Radium-228	0.722		0.163	0.179		0.301	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Thallium-208	0.224		0.0750	0.0785		0.0751	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Thorium-228	0.599		0.129	0.150		0.133	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Thorium-232	0.722		0.163	0.179		0.301	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Thorium-234	0.598	U	1.08	1.08		1.94	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Uranium-235	0.0863	U	0.231	0.232		0.426	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Uranium-238	0.598	U	1.08	1.08		1.94	pCi/g	10/08/15 09:27	10/29/15 09:29	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14099-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-215328/1-A

Matrix: Solid

Analysis Batch: 218952

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 215328

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.04665	U	0.0905	0.0906		0.160	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Actinium-227	0.007969	U	0.0950	0.0950		0.581	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Bismuth-212	0.0000	U	0.115	0.115		0.299	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Bismuth-214	-0.007408	U	0.0234	0.0235		0.140	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Cesium-137	-0.008018	U	0.0392	0.0392		0.0714	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Lead-210	-0.07329	U	0.771	0.771		1.38	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Lead-212	0.02590	U	0.0403	0.0405		0.0680	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Lead-214	-0.03097	U	1.24	1.24		0.118	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Potassium-40	-0.1681	U	0.736	0.736		0.910	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Protactinium-231	-0.05768	U	0.662	0.662		1.23	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Radium-226	-0.007408	U	0.0234	0.0235	0.500	0.140	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Radium-228	0.04665	U	0.0905	0.0906		0.160	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Thallium-208	0.003102	U	0.0276	0.0276		0.0526	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Thorium-228	0.02590	U	0.0403	0.0405		0.0680	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Thorium-232	0.04665	U	0.0905	0.0906		0.160	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Thorium-234	0.06055	U	0.456	0.456		0.829	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Uranium-235	0.001907	U	0.140	0.140		0.255	pCi/g	10/08/15 09:27	10/29/15 07:52	1
Uranium-238	0.06055	U	0.456	0.456		0.829	pCi/g	10/08/15 09:27	10/29/15 07:52	1

Lab Sample ID: LCS 160-215328/2-A

Matrix: Solid

Analysis Batch: 218950

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 215328

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.2	98.55		10.4		1.21	pCi/g	101	87 - 116
Cesium-137	30.1	30.18		3.22		0.236	pCi/g	100	87 - 120
Cobalt-60	18.6	18.20		1.88		0.122	pCi/g	98	87 - 115

Lab Sample ID: 160-14097-A-1-E DU

Matrix: Solid

Analysis Batch: 218952

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 215328

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Actinium 228	0.573		0.4521		0.112		0.0595	pCi/g	0.48	1
Actinium-227	-0.0578	U	0.04850	U	0.268		0.472	pCi/g	0.15	1
Bismuth-212	0.398	U	0.1569	U	0.358		0.621	pCi/g	0.33	1
Bismuth-214	0.287		0.3094		0.0941		0.0830	pCi/g	0.12	1
Cesium-137	0.000726	U	-0.00616	U	0.0323		0.0576	pCi/g	0.11	1
Lead-210	0.683	U	0.02435	U	0.706		1.24	pCi/g	0.34	1
Lead-212	0.367		0.3647		0.0896		0.0716	pCi/g	0.01	1
Lead-214	0.239		0.3862		0.0943		0.0916	pCi/g	0.81	1
Potassium-40	8.84		8.503		1.37		0.524	pCi/g	0.12	1
Protactinium-231	0.308	U	0.3196	U	0.369		1.42	pCi/g	0.01	1
Radium-226	0.287		0.3094		0.0941	0.500	0.0830	pCi/g	0.12	1
Radium-228	0.573		0.4521		0.112		0.0595	pCi/g	0.48	1

TestAmerica St. Louis

QC Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14099-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-14097-A-1-E DU
Matrix: Solid
Analysis Batch: 218952

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 215328

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	RER	RER Limit
Thallium-208	0.129		0.1528		0.0484		0.0340	pCi/g	0.23	1
Thorium-228	0.367		0.3647		0.0896		0.0716	pCi/g	0.01	1
Thorium-232	0.573		0.4521		0.112		0.0595	pCi/g	0.48	1
Thorium-234	0.324	U	0.8672	U	0.412		0.923	pCi/g	0.65	1
Uranium-235	0.171	U	0.02086	U	0.0510		0.279	pCi/g	0.70	1
Uranium-238	0.324	U	0.8672	U	0.412		0.923	pCi/g	0.65	1

QC Association Summary

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14099-2

Rad

Leach Batch: 214457

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14097-A-1-E DU	Duplicate	Total/NA	Solid	Dry and Grind	
160-14099-1	TI-TO04-NP-BIFSS_SU1-001	Total/NA	Solid	Dry and Grind	
160-14099-2	TI-TO04-NP-BIFSS_SU1-002	Total/NA	Solid	Dry and Grind	
160-14099-3	TI-TO04-NP-BIFSS_SU1-003	Total/NA	Solid	Dry and Grind	

Prep Batch: 215328

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-14097-A-1-E DU	Duplicate	Total/NA	Solid	Fill_Geo-21	214457
160-14099-1	TI-TO04-NP-BIFSS_SU1-001	Total/NA	Solid	Fill_Geo-21	214457
160-14099-2	TI-TO04-NP-BIFSS_SU1-002	Total/NA	Solid	Fill_Geo-21	214457
160-14099-3	TI-TO04-NP-BIFSS_SU1-003	Total/NA	Solid	Fill_Geo-21	214457
LCS 160-215328/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-215328/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

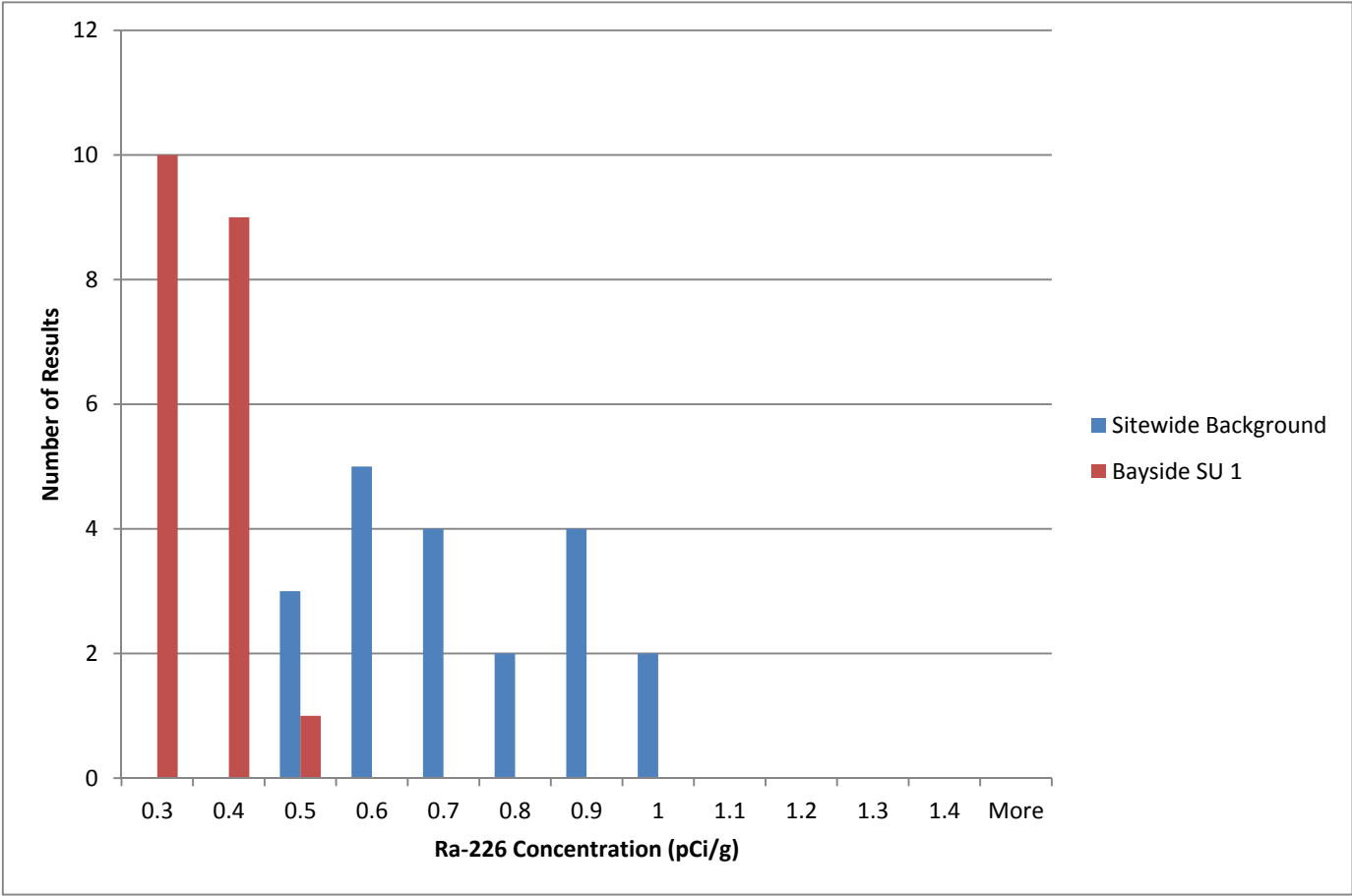
Appendix D

Statistical Testing and Histograms

Histogram, Bayside SU 1 vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

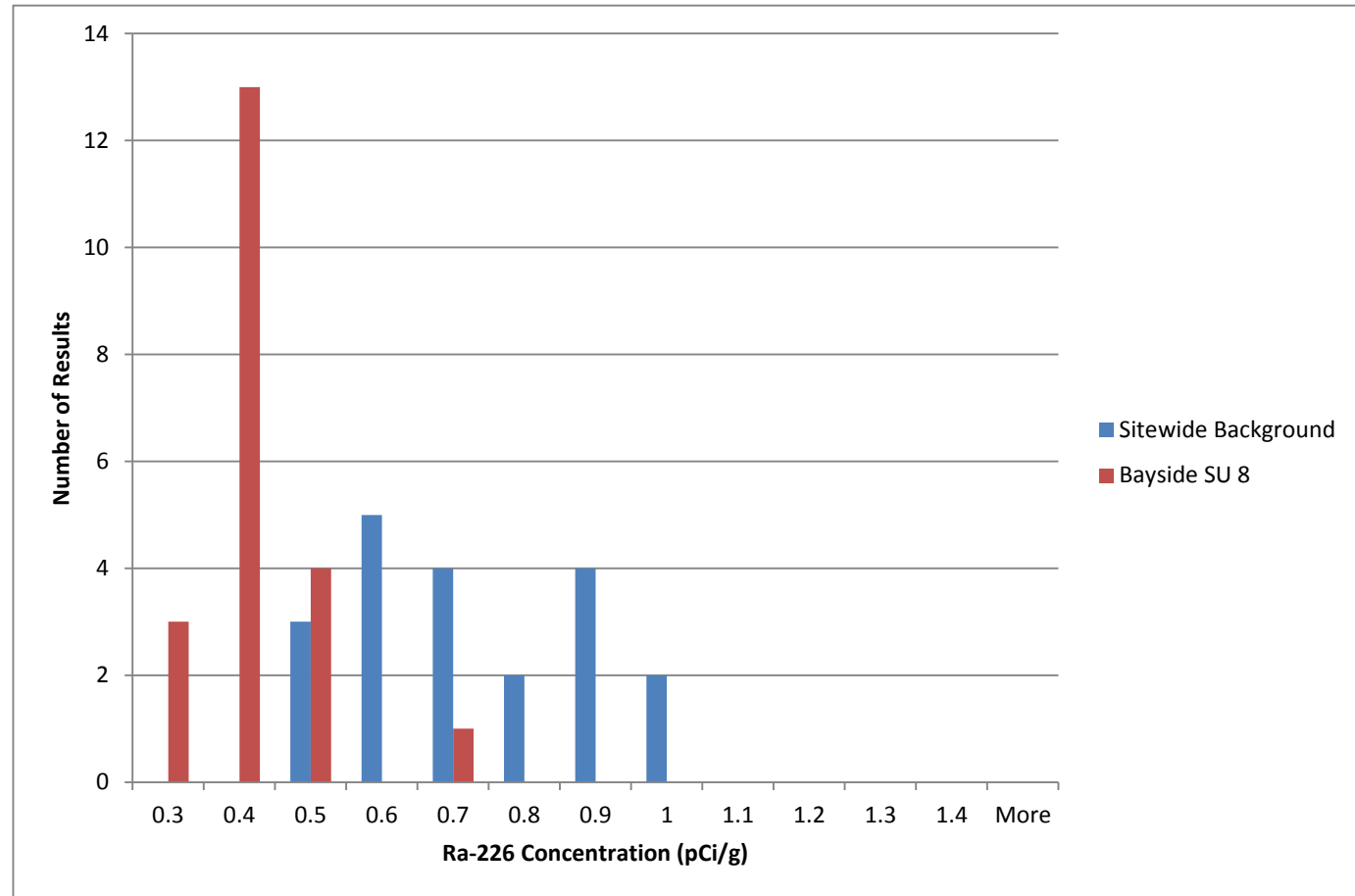
Bayside SU 1	
<i>Bin</i>	<i>Frequency</i>
0.3	10
0.4	9
0.5	1
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, Bayside SU 8 vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

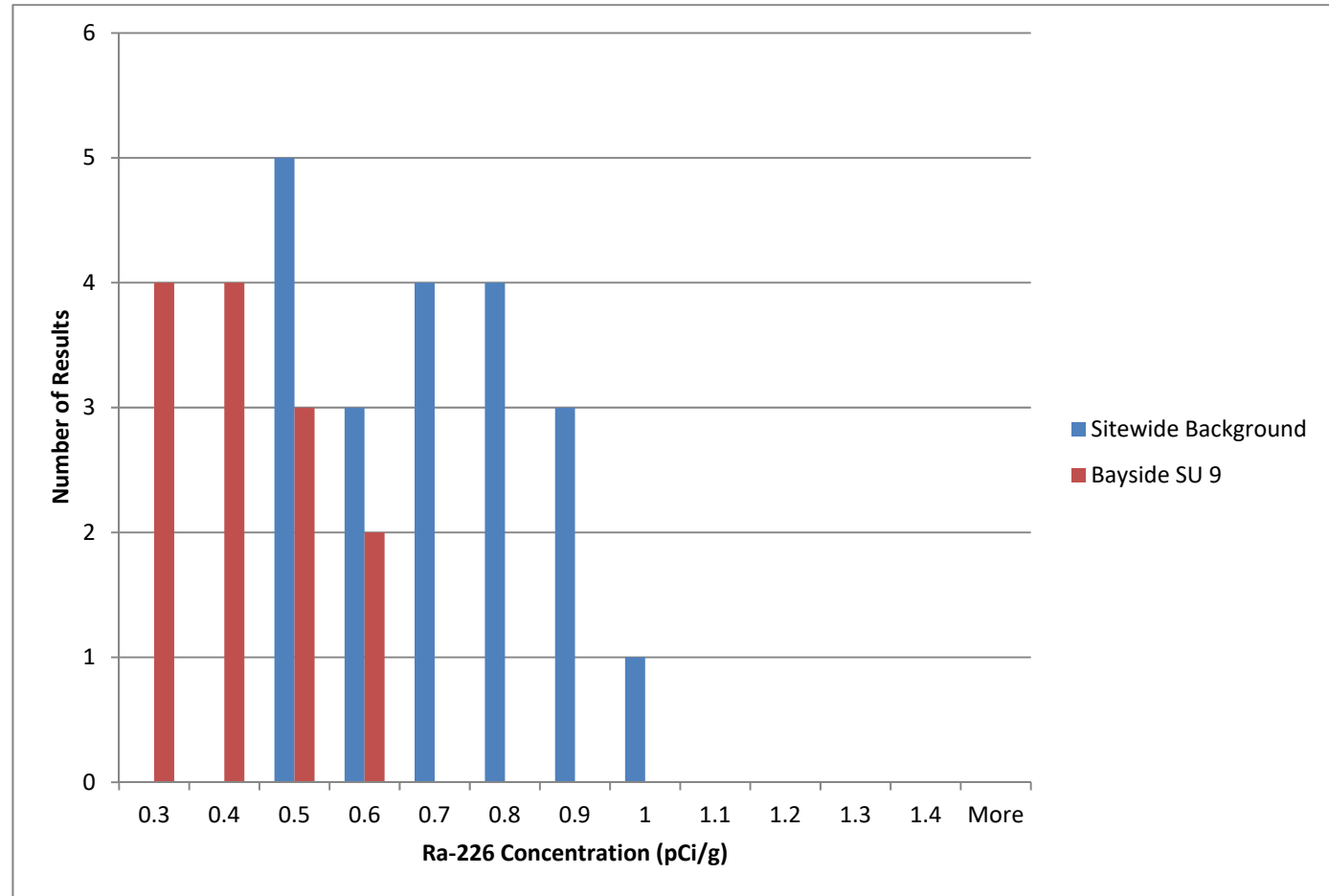
Bayside SU 8	
<i>Bin</i>	<i>Frequency</i>
0.3	3
0.4	13
0.5	4
0.6	0
0.7	1
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, Bayside SU 9 vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	3
0.7	4
0.8	4
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

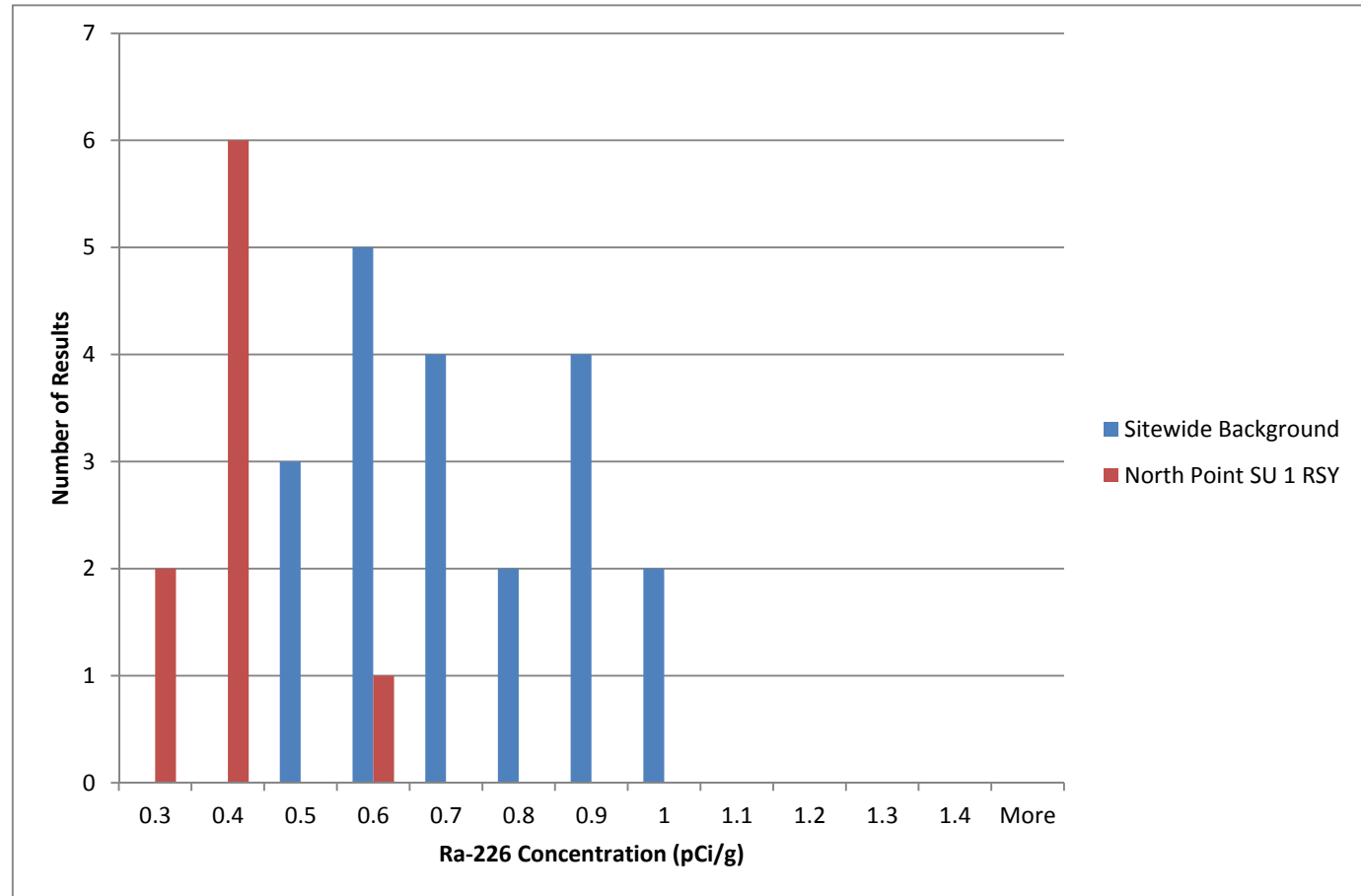
Bayside SU 9	
<i>Bin</i>	<i>Frequency</i>
0.3	4
0.4	4
0.5	3
0.6	2
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, North Point SU 1 RSY vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

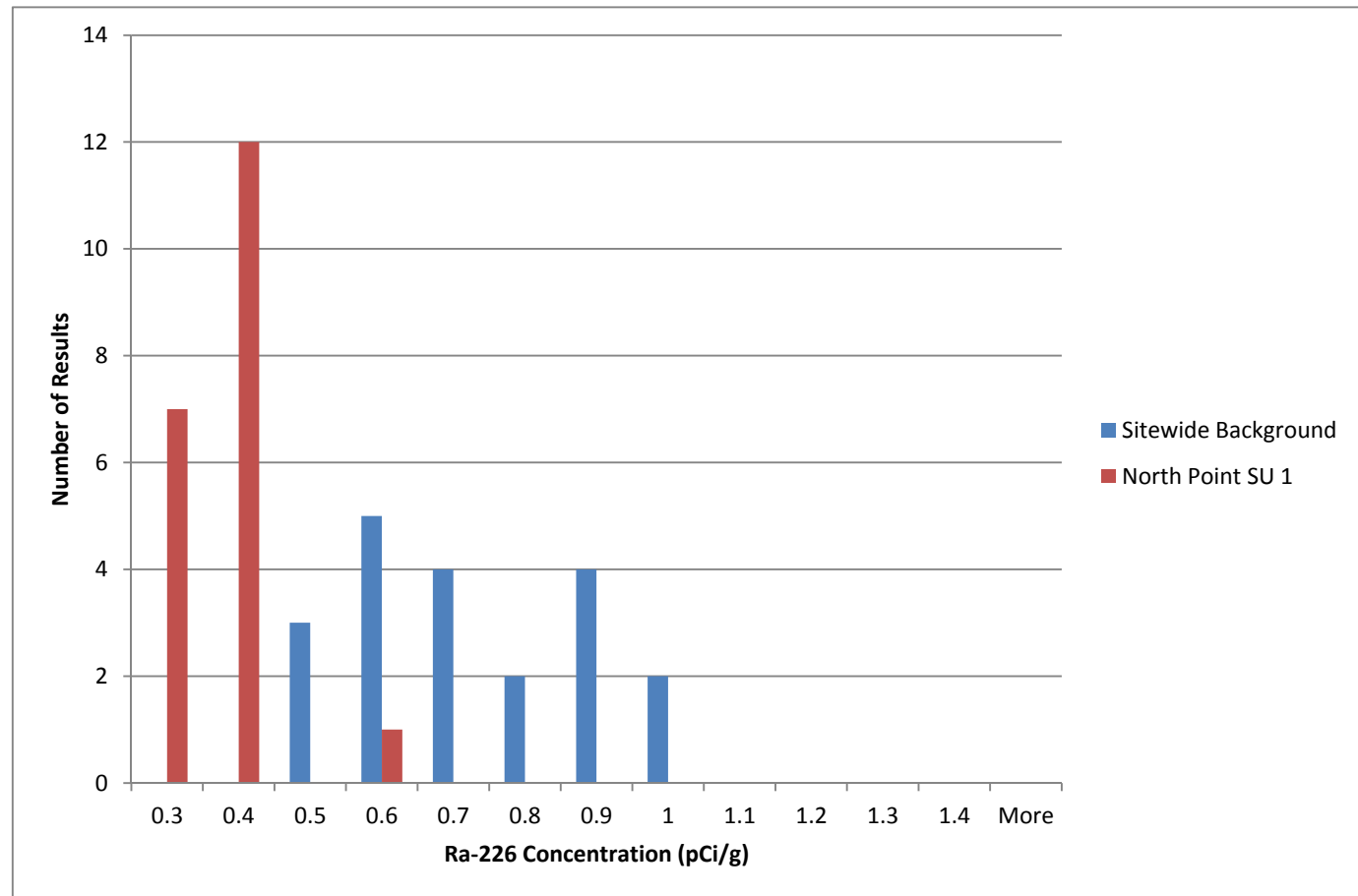
North Point SU 1 RSY	
<i>Bin</i>	<i>Frequency</i>
0.3	2
0.4	6
0.5	0
0.6	1
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, North Point SU 1 vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

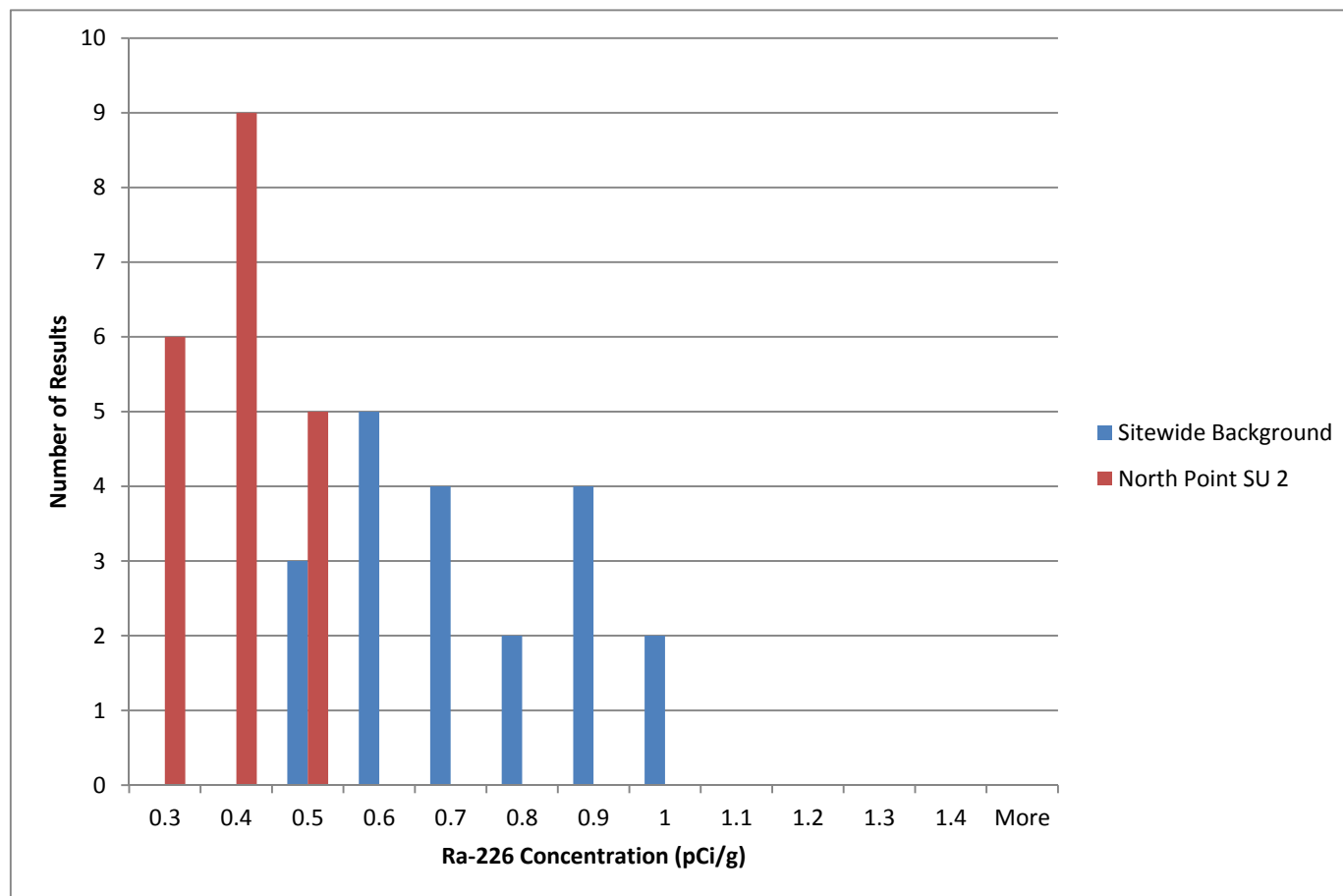
North Point SU 1	
<i>Bin</i>	<i>Frequency</i>
0.3	7
0.4	12
0.5	0
0.6	1
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, North Point SU 2 vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

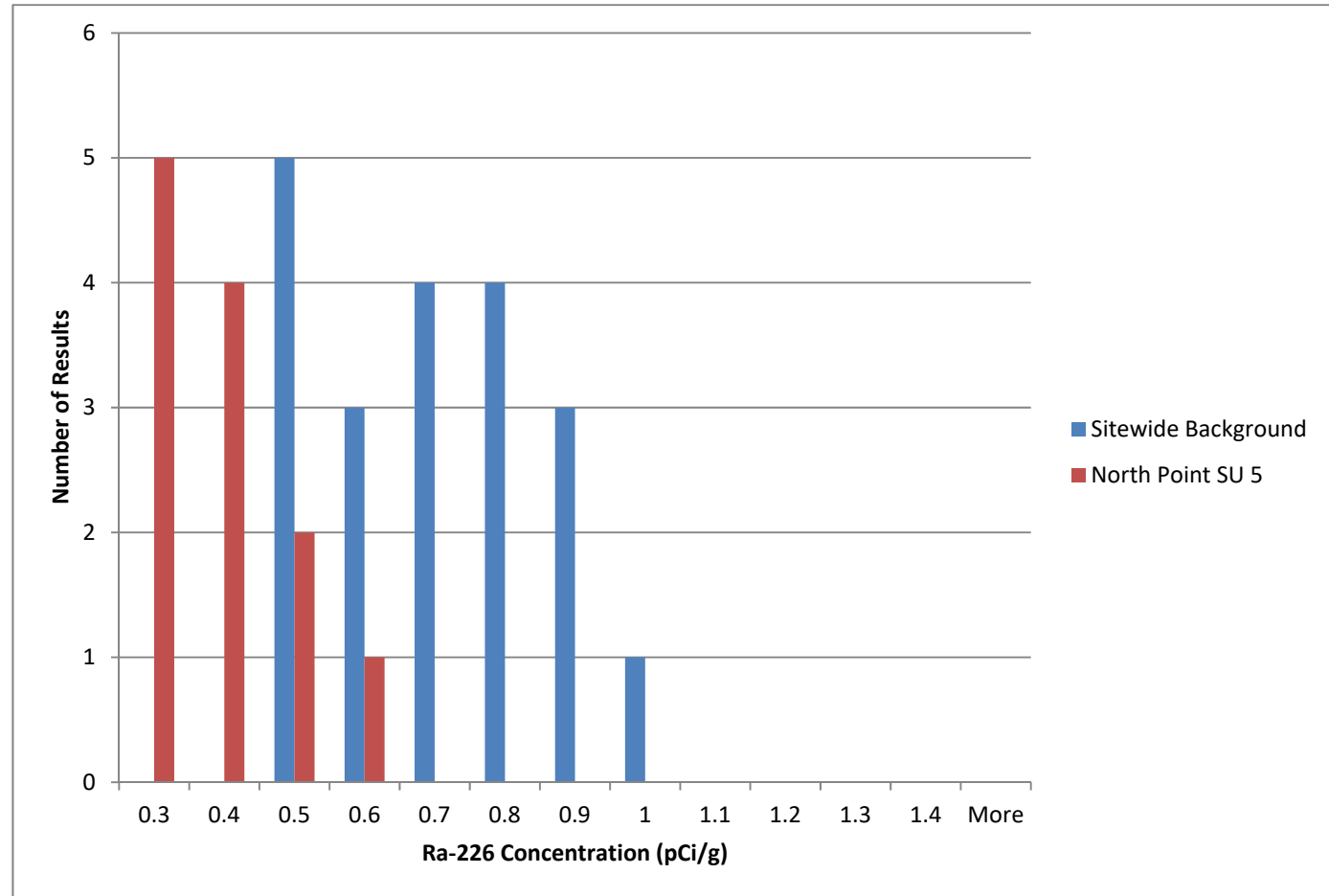
North Point SU 2	
<i>Bin</i>	<i>Frequency</i>
0.3	6
0.4	9
0.5	5
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, North Point SU 5 vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	3
0.7	4
0.8	4
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

North Point SU 5	
<i>Bin</i>	<i>Frequency</i>
0.3	5
0.4	4
0.5	2
0.6	1
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



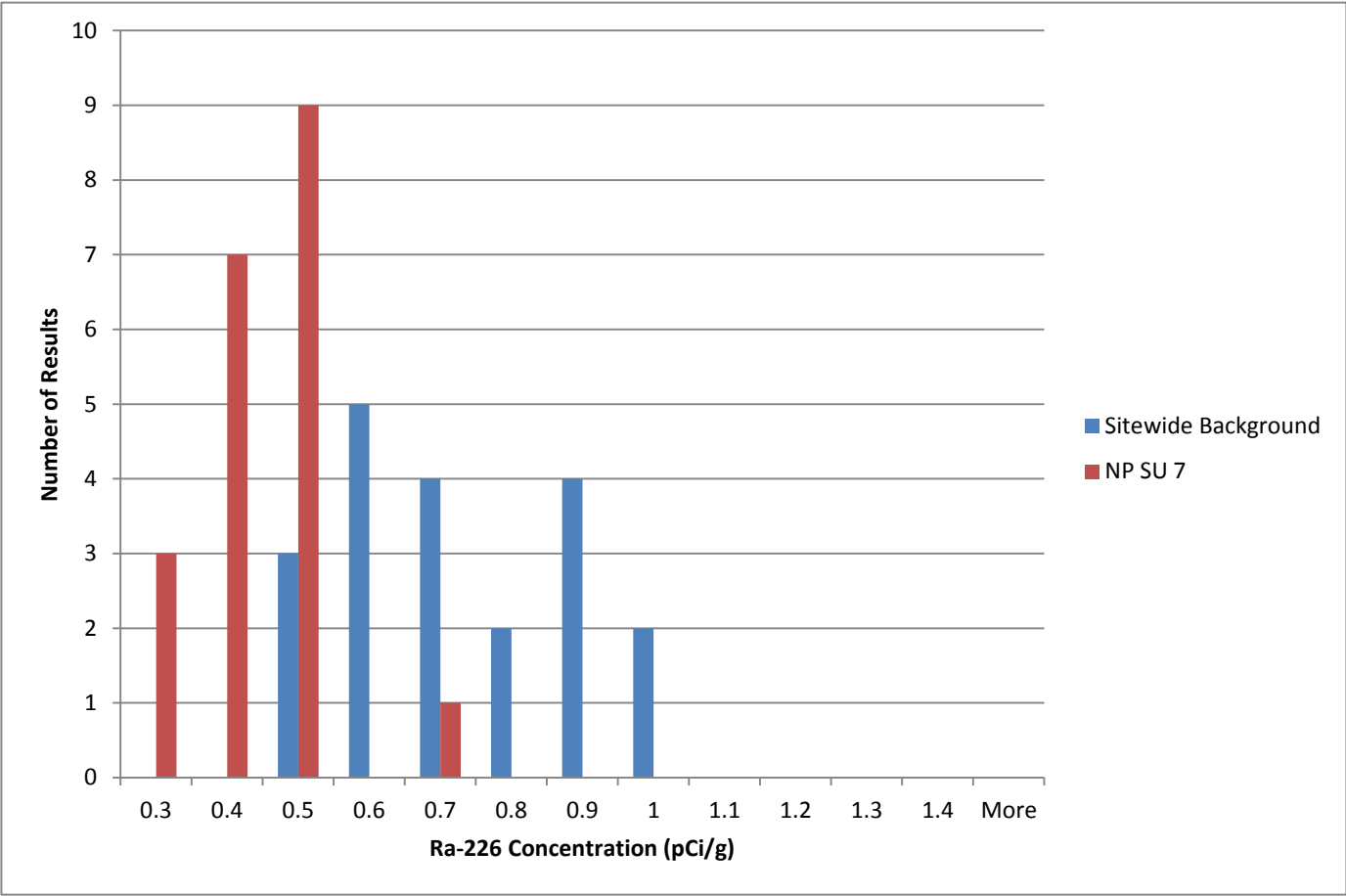
Histogram, North Point SU 7 vs. Sitewide Background

Background

<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

NP SU 7

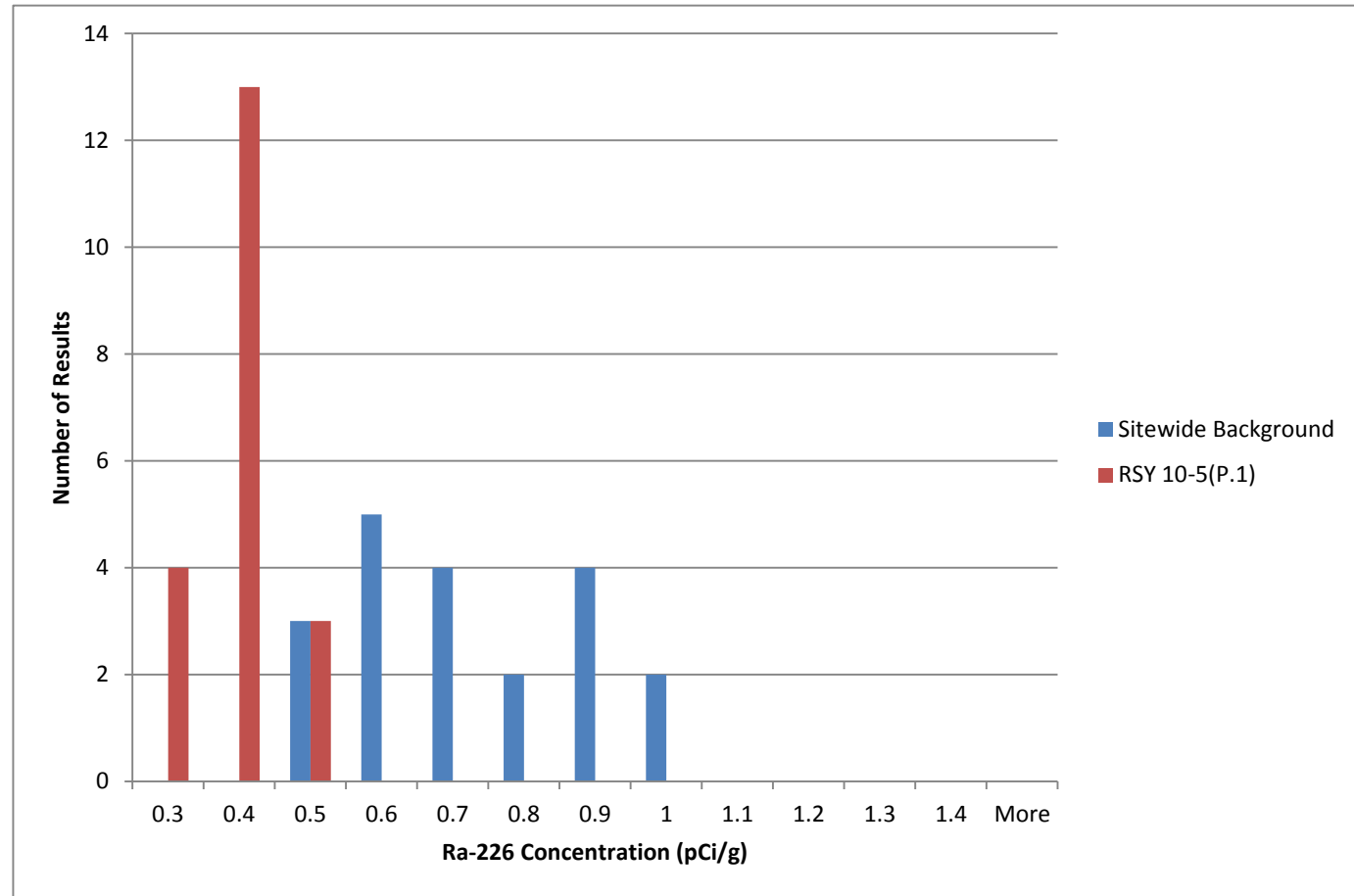
<i>Bin</i>	<i>Frequency</i>
0.3	3
0.4	7
0.5	9
0.6	0
0.7	1
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 10 Use 5 (Part 1) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

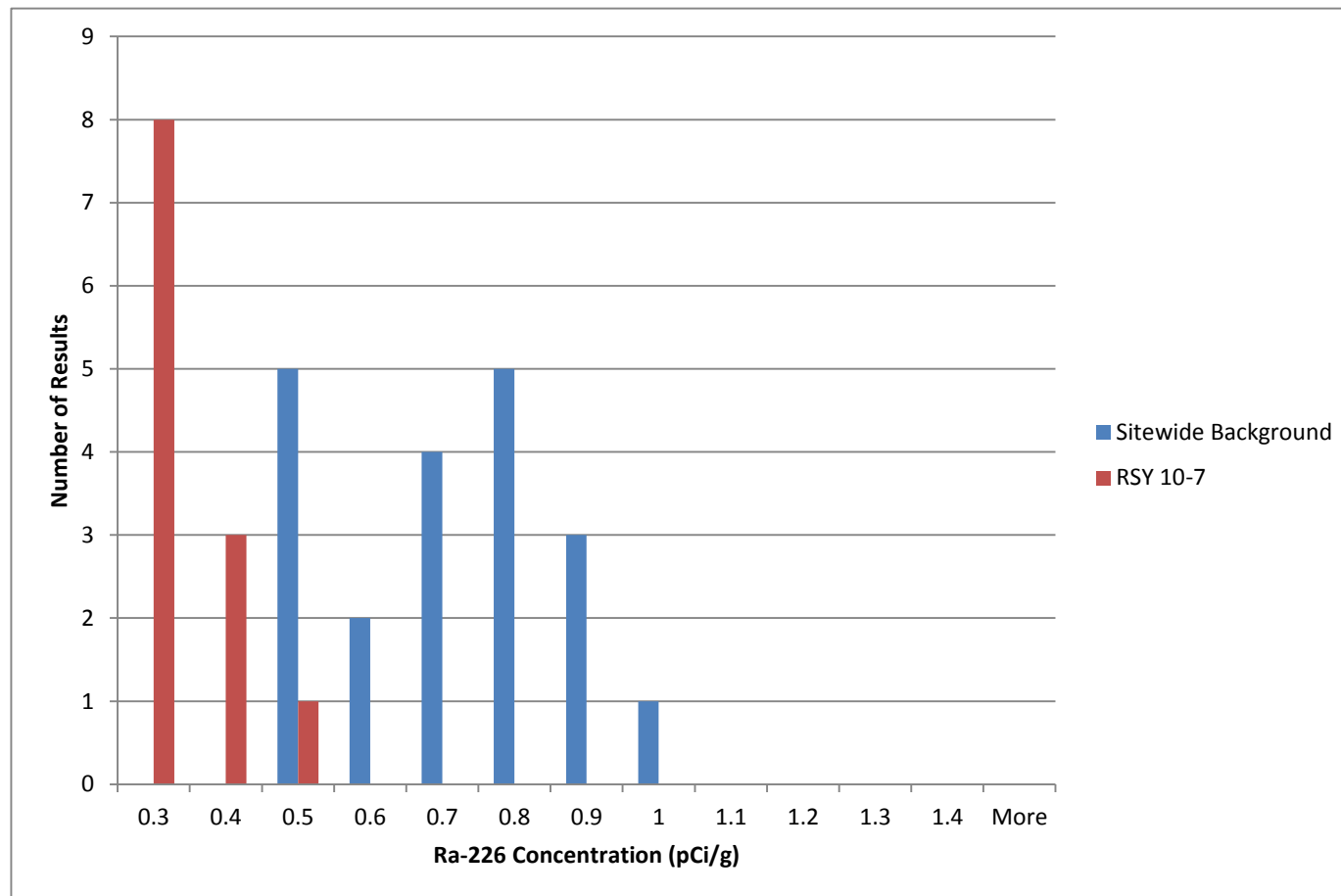
RSY 10-5(P.1)	
<i>Bin</i>	<i>Frequency</i>
0.3	4
0.4	13
0.5	3
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 10 (Use 7) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

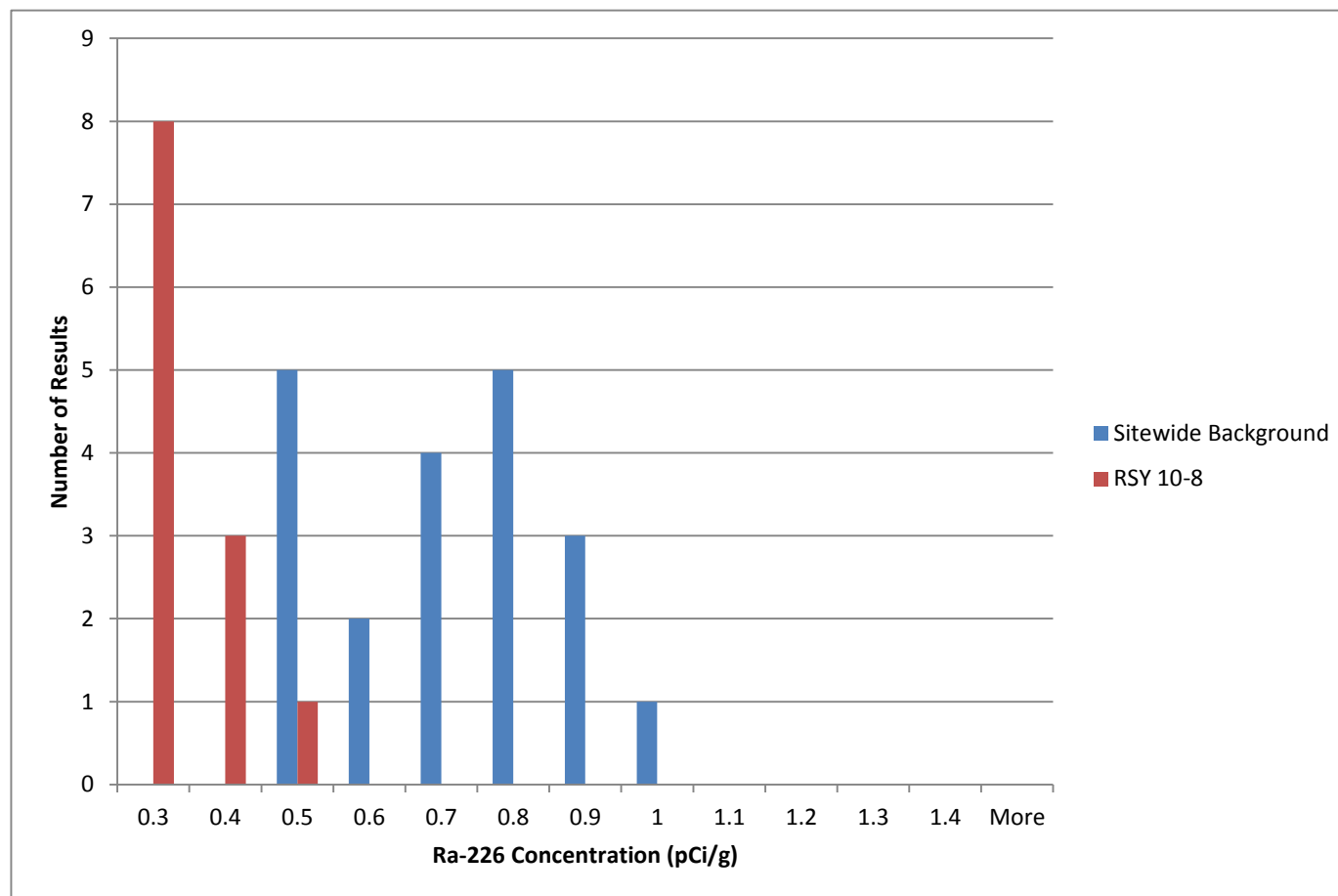
RSY 10-7	
<i>Bin</i>	<i>Frequency</i>
0.3	8
0.4	3
0.5	1
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 10 (Use 8) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

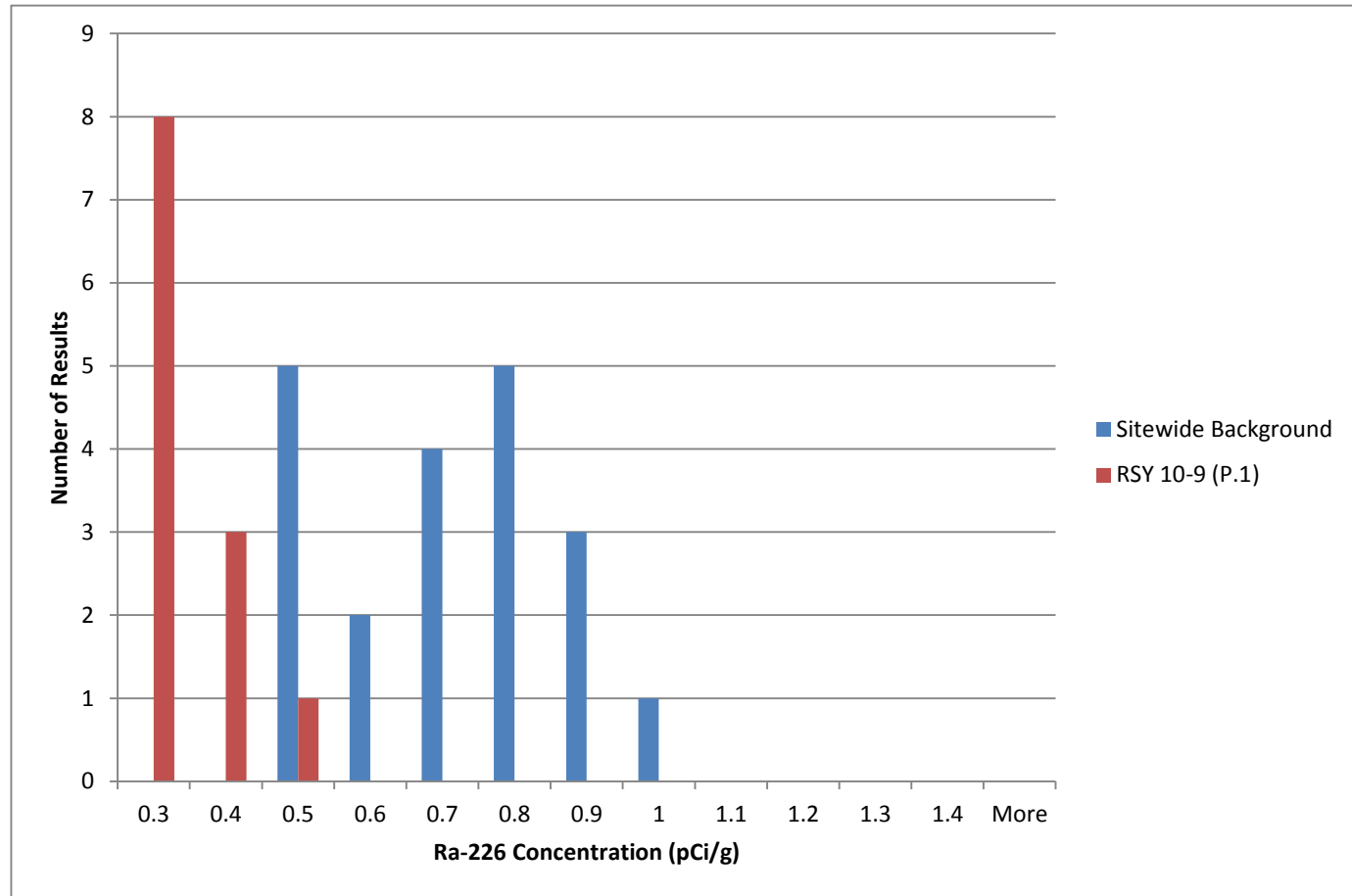
RSY 10-8	
<i>Bin</i>	<i>Frequency</i>
0.3	8
0.4	3
0.5	1
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 10 (Use 9, Part 1) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

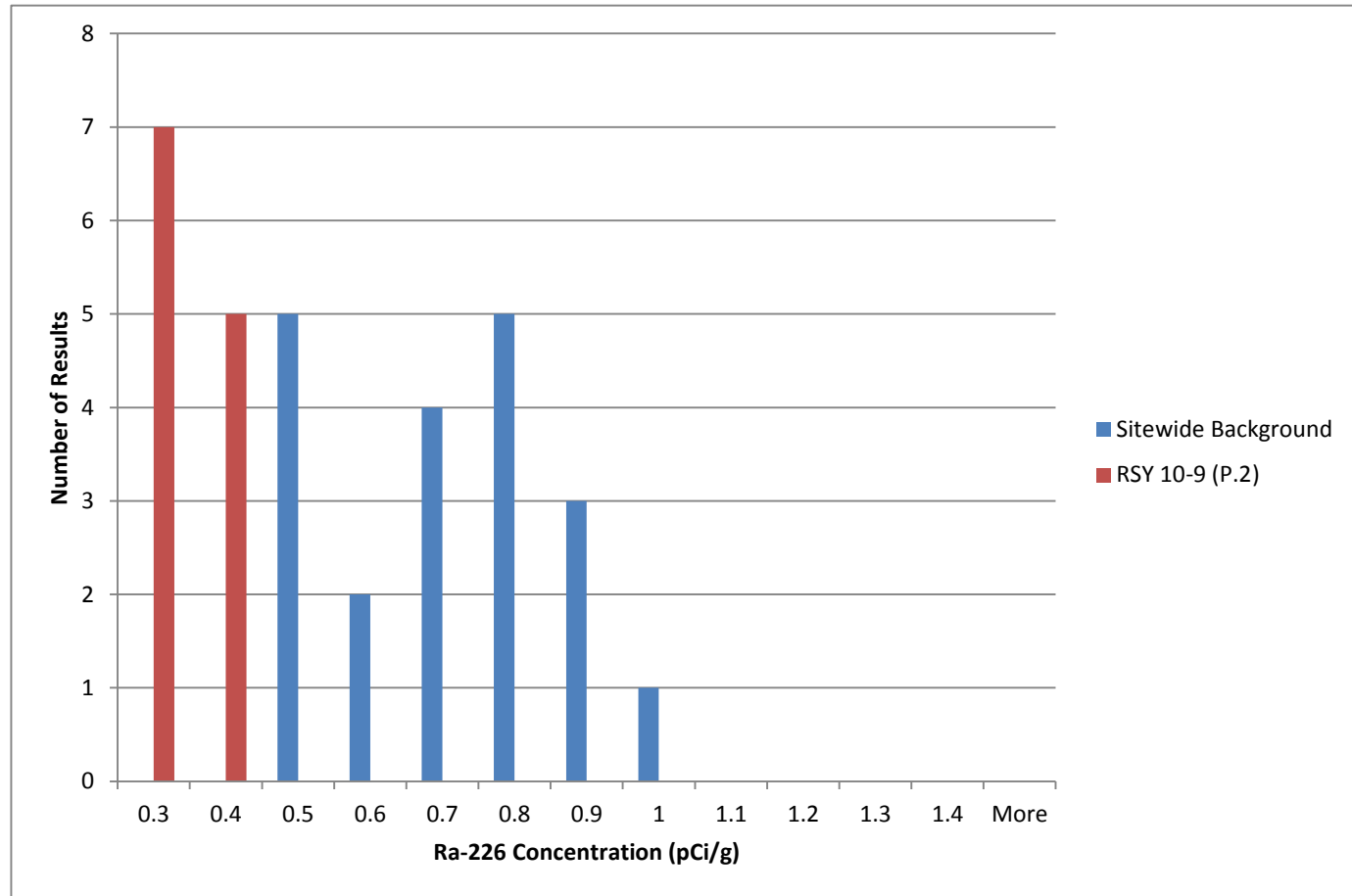
RSY 10-9 (P.1)	
<i>Bin</i>	<i>Frequency</i>
0.3	8
0.4	3
0.5	1
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 10 (Use 9, Part 2) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

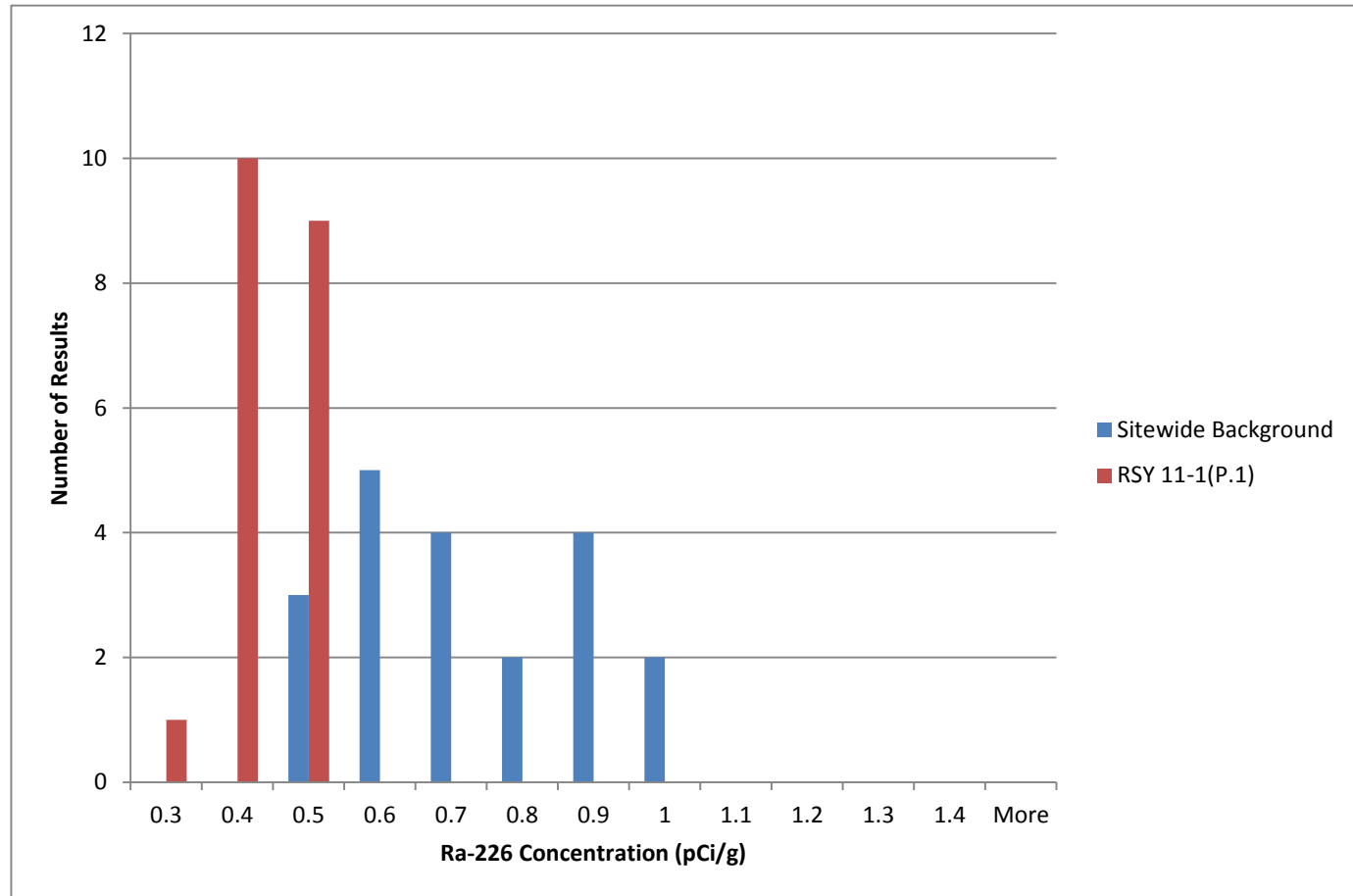
RSY 10-9 (P.2)	
<i>Bin</i>	<i>Frequency</i>
0.3	7
0.4	5
0.5	0
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 11 Use 1 (Part 1) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

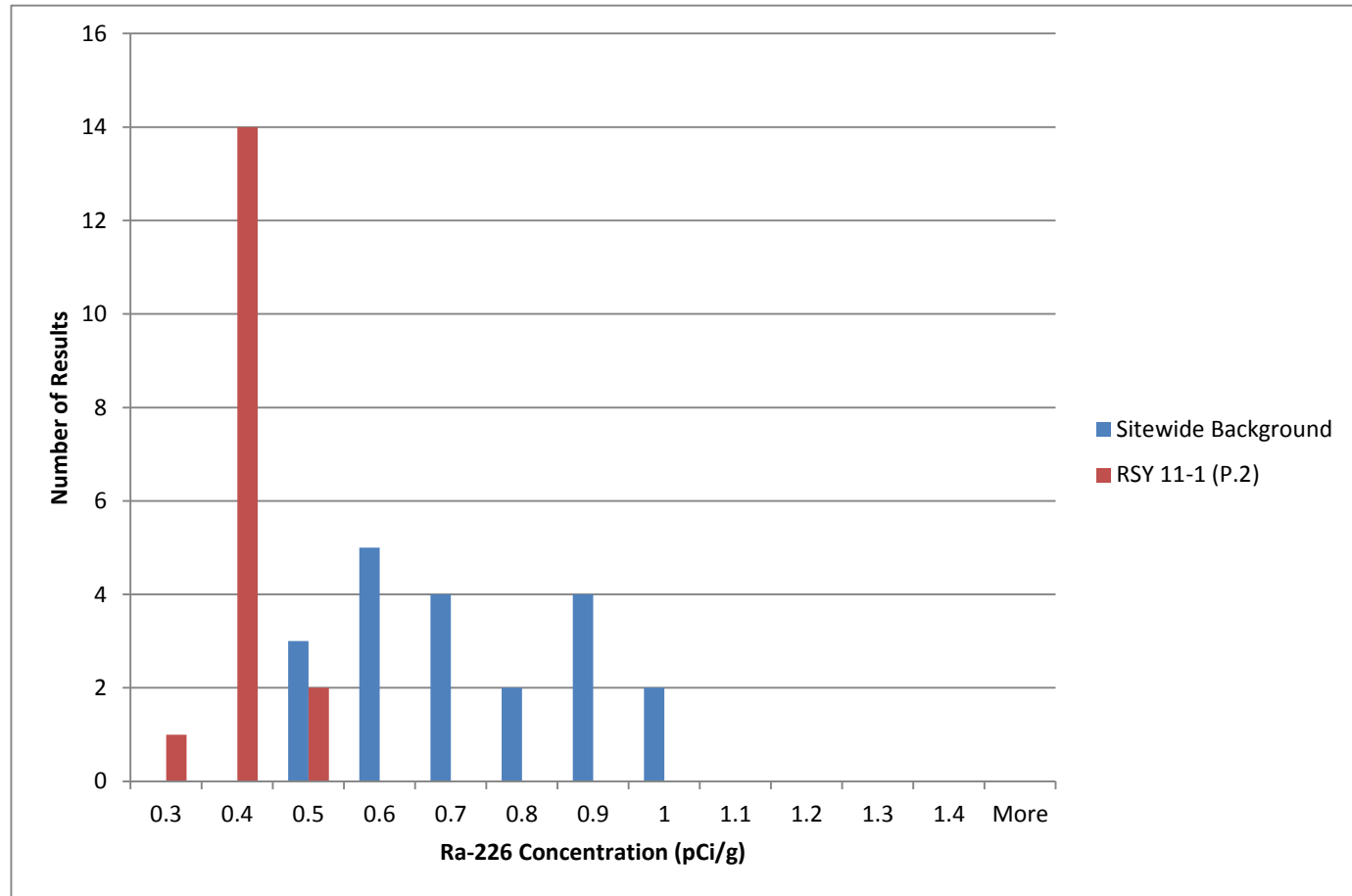
RSY 11-1(P.1)	
<i>Bin</i>	<i>Frequency</i>
0.3	1
0.4	10
0.5	9
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 11 Use 1 (Part 2) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

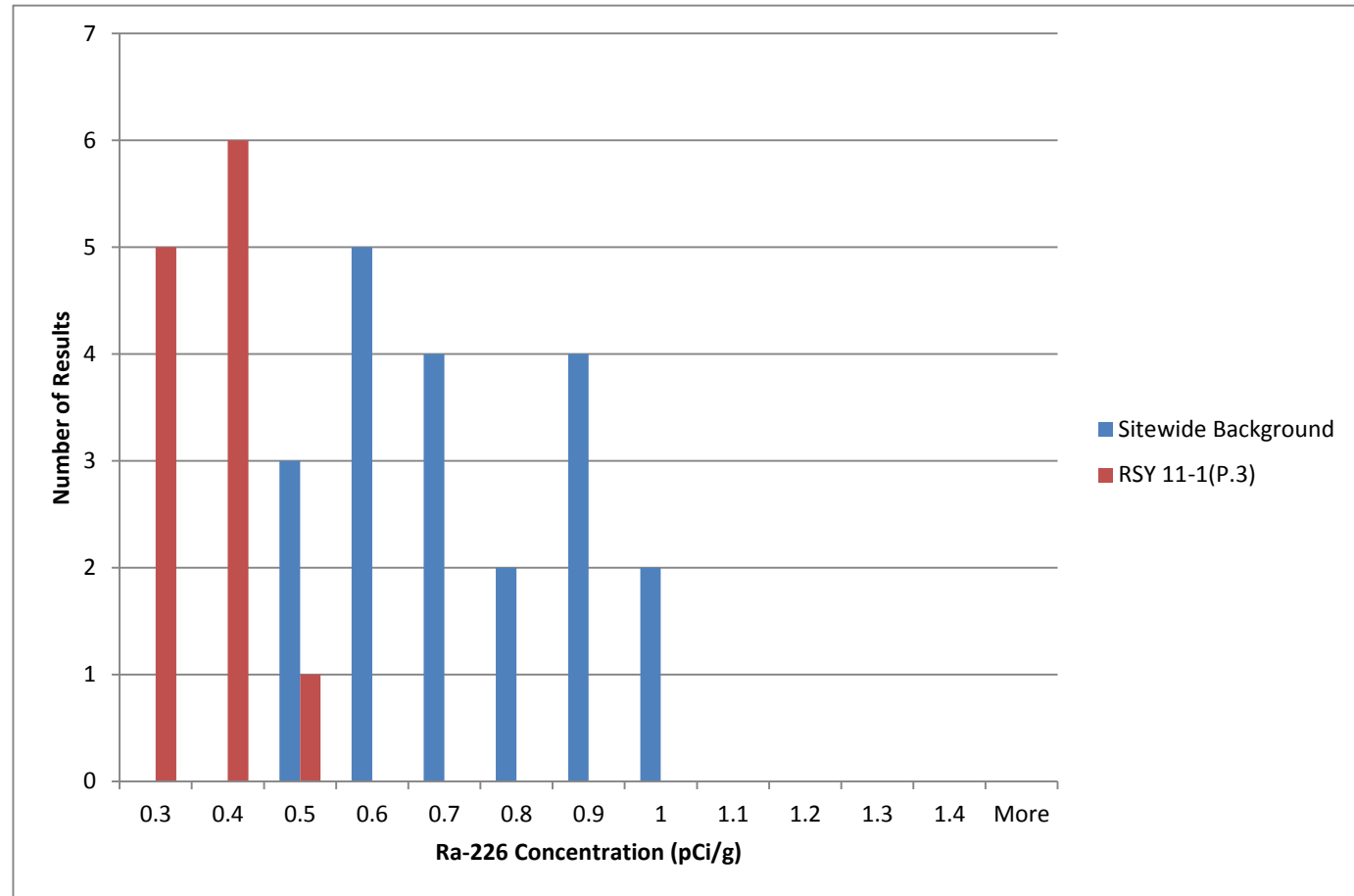
RSY 11-1 (P.2)	
<i>Bin</i>	<i>Frequency</i>
0.3	1
0.4	14
0.5	2
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 11 (Use 1, Part 3) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

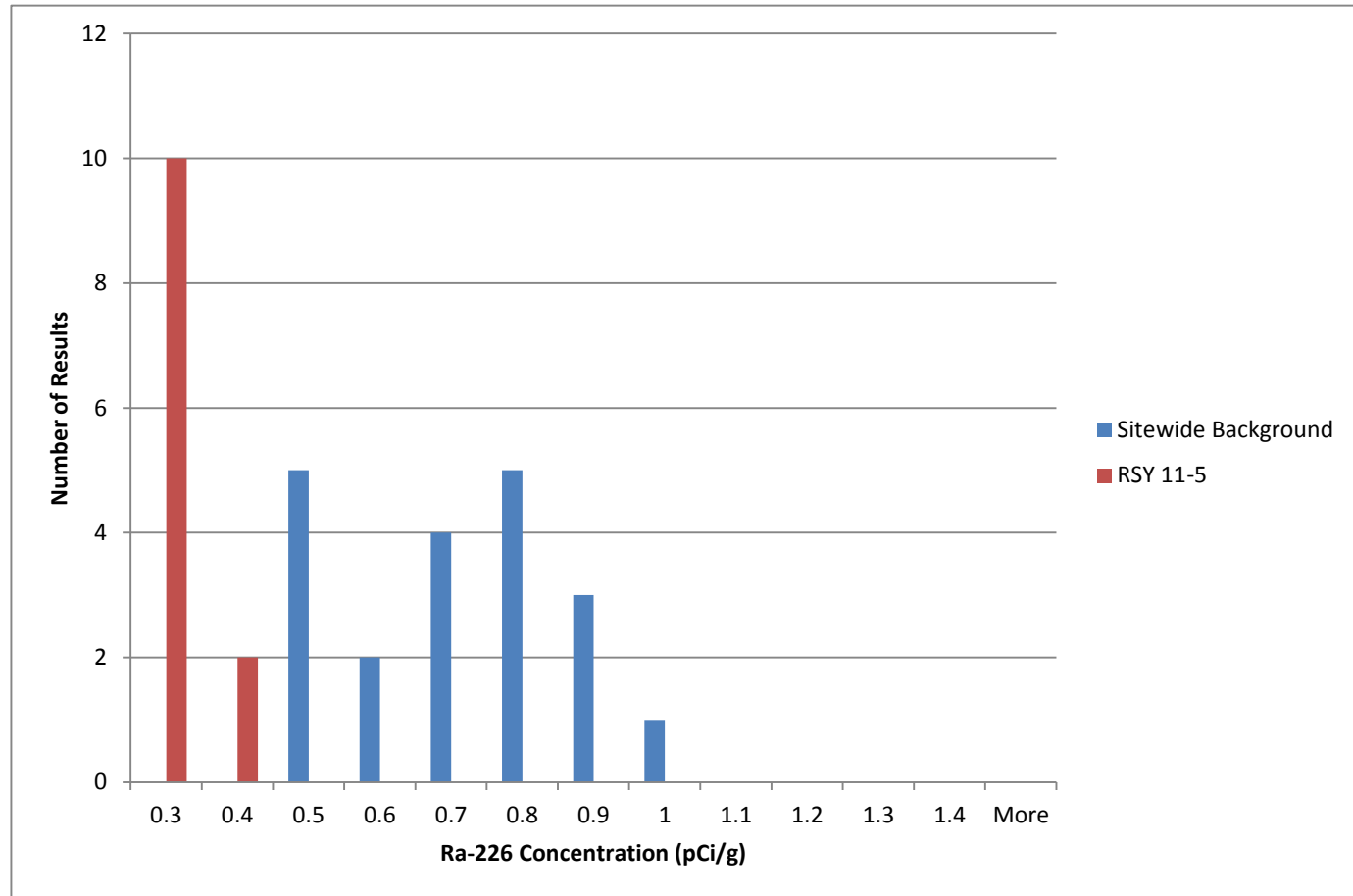
RSY 11-1(P.3)	
<i>Bin</i>	<i>Frequency</i>
0.3	5
0.4	6
0.5	1
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 11 (Use 5) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

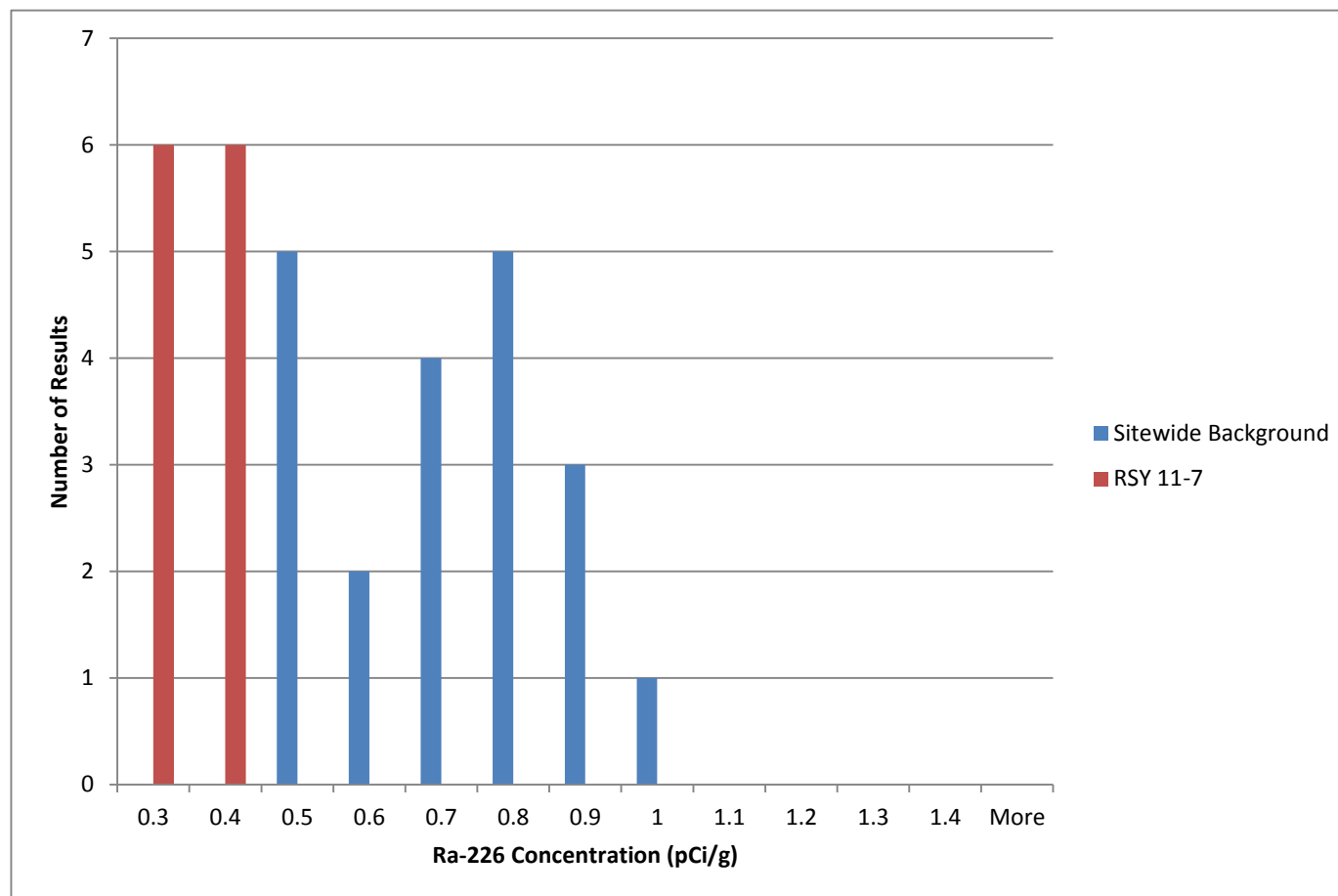
RSY 11-5	
<i>Bin</i>	<i>Frequency</i>
0.3	10
0.4	2
0.5	0
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 11 (Use 7) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

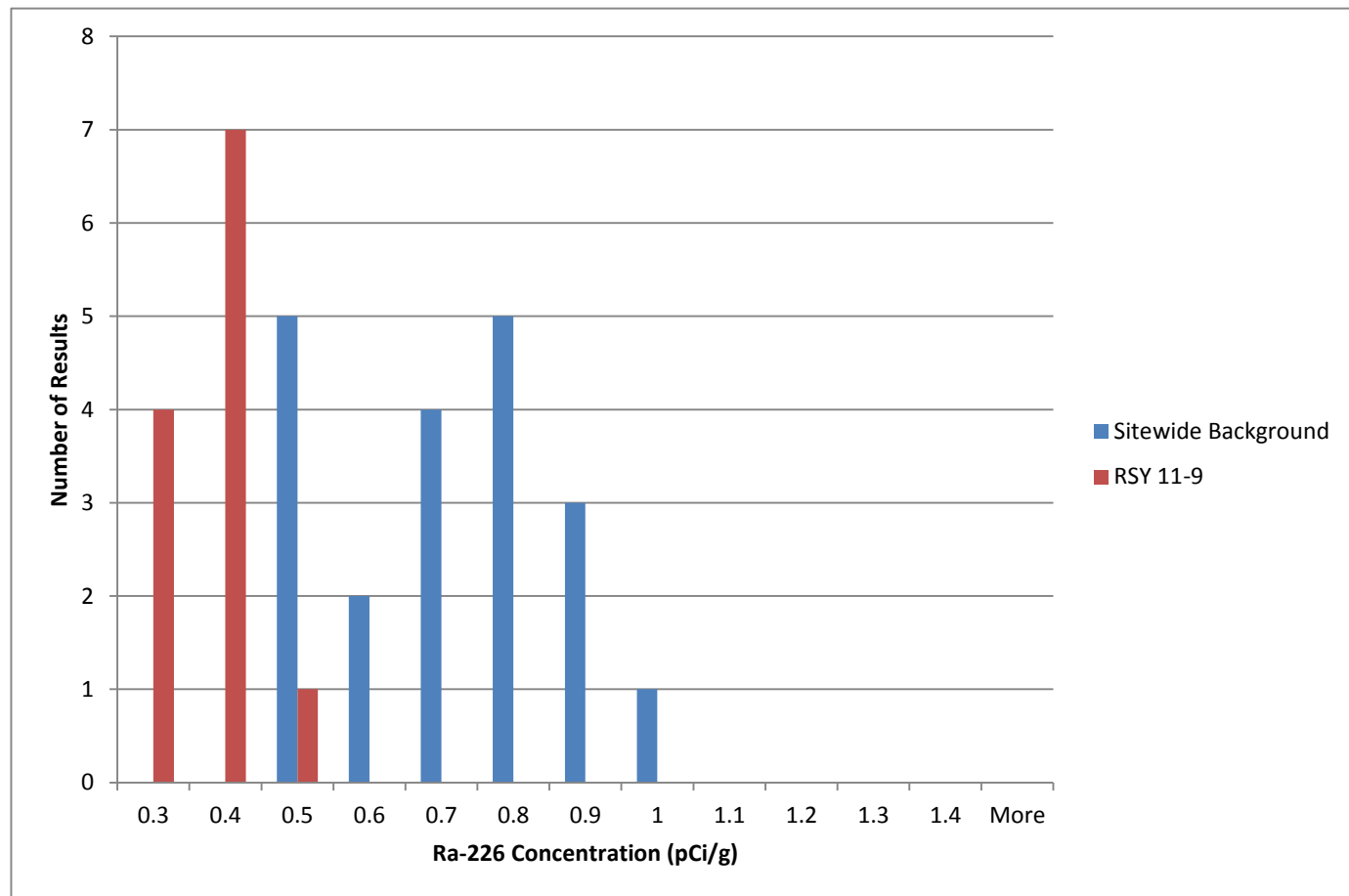
RSY 11-7	
<i>Bin</i>	<i>Frequency</i>
0.3	6
0.4	6
0.5	0
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 11 (Use 9) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

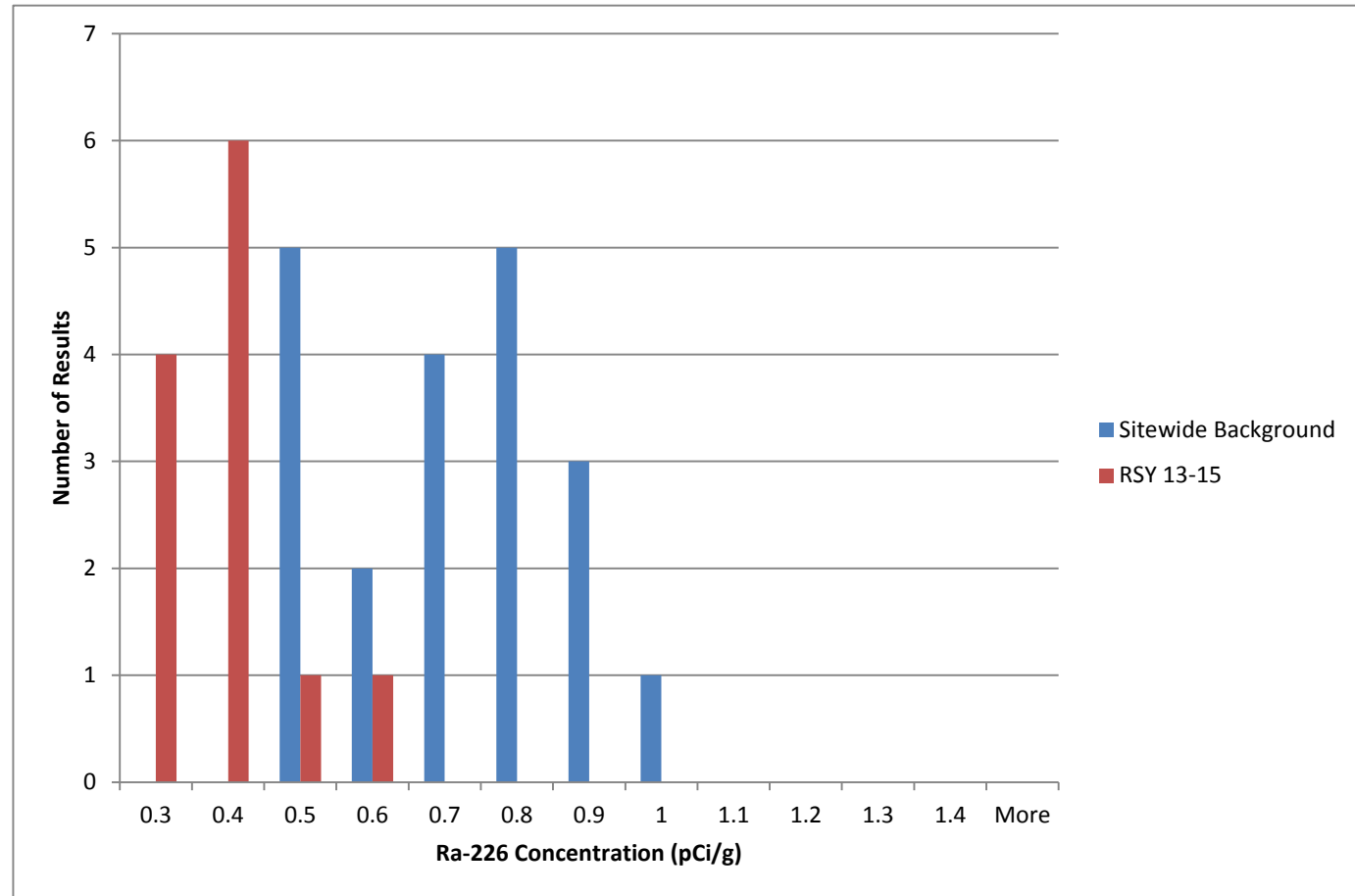
RSY 11-9	
<i>Bin</i>	<i>Frequency</i>
0.3	4
0.4	7
0.5	1
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 13 (Use 15) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

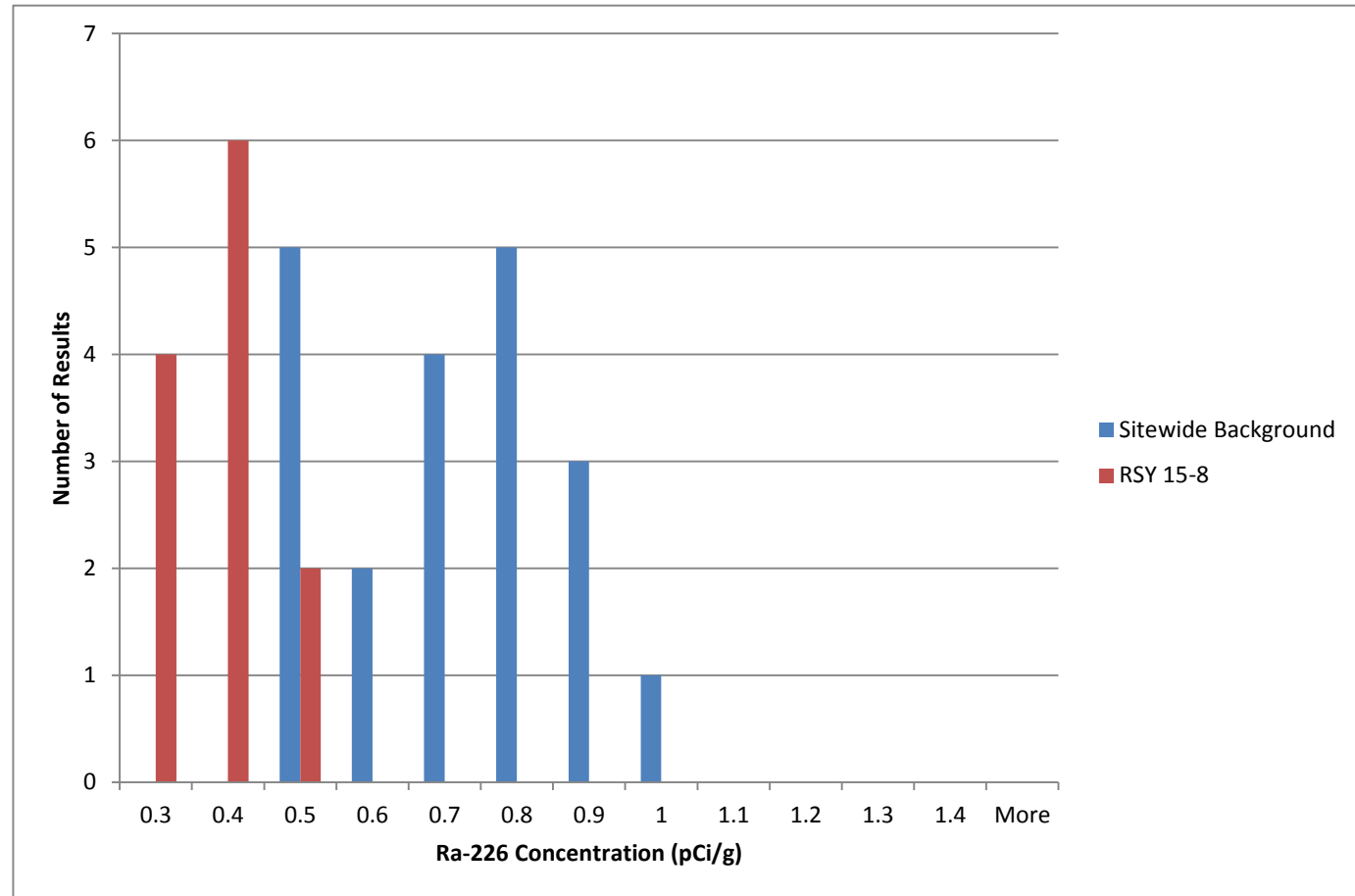
RSY 13-15	
<i>Bin</i>	<i>Frequency</i>
0.3	4
0.4	6
0.5	1
0.6	1
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 15 (Use 8) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

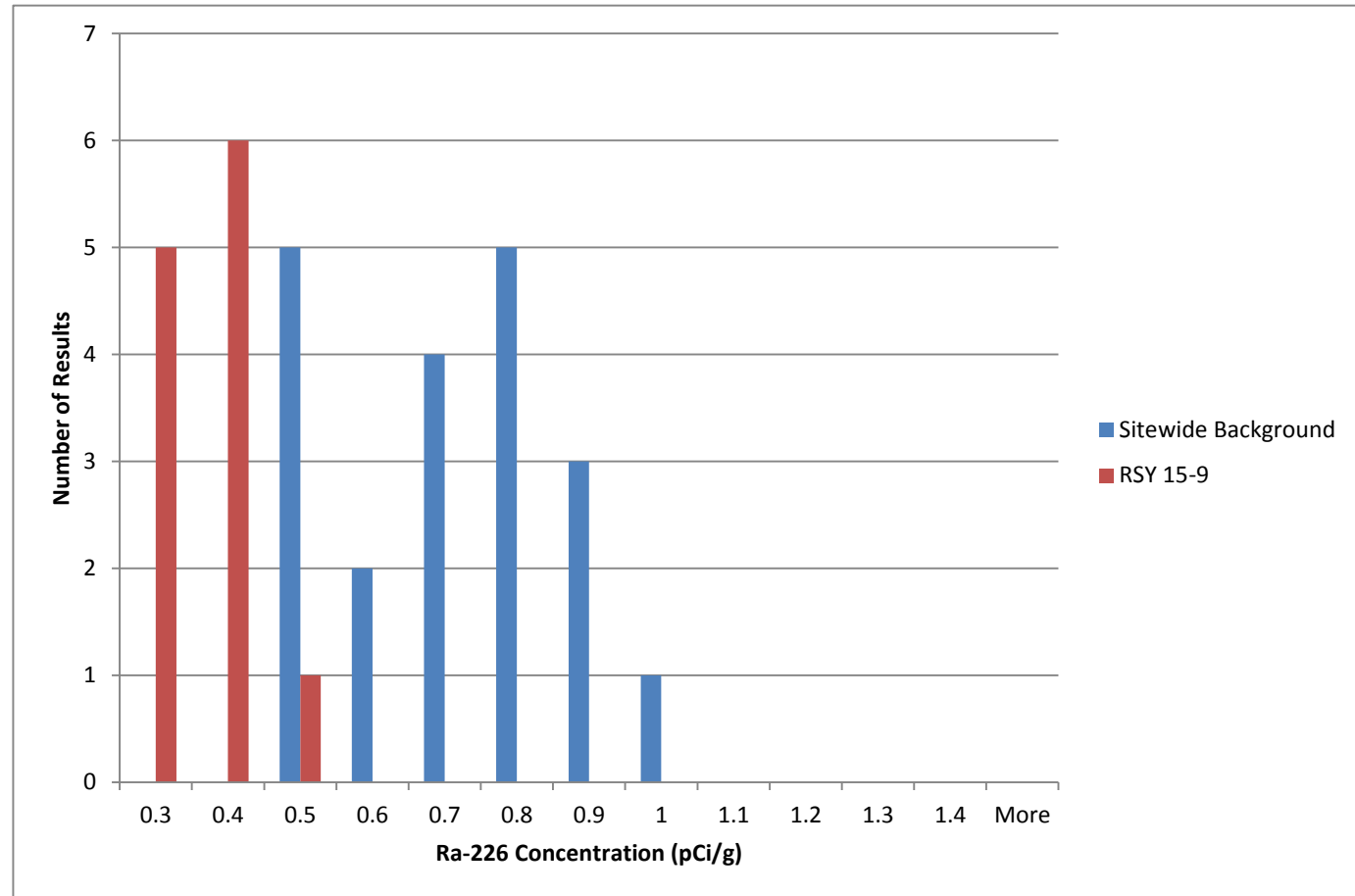
RSY 15-8	
<i>Bin</i>	<i>Frequency</i>
0.3	4
0.4	6
0.5	2
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 15 (Use 9) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

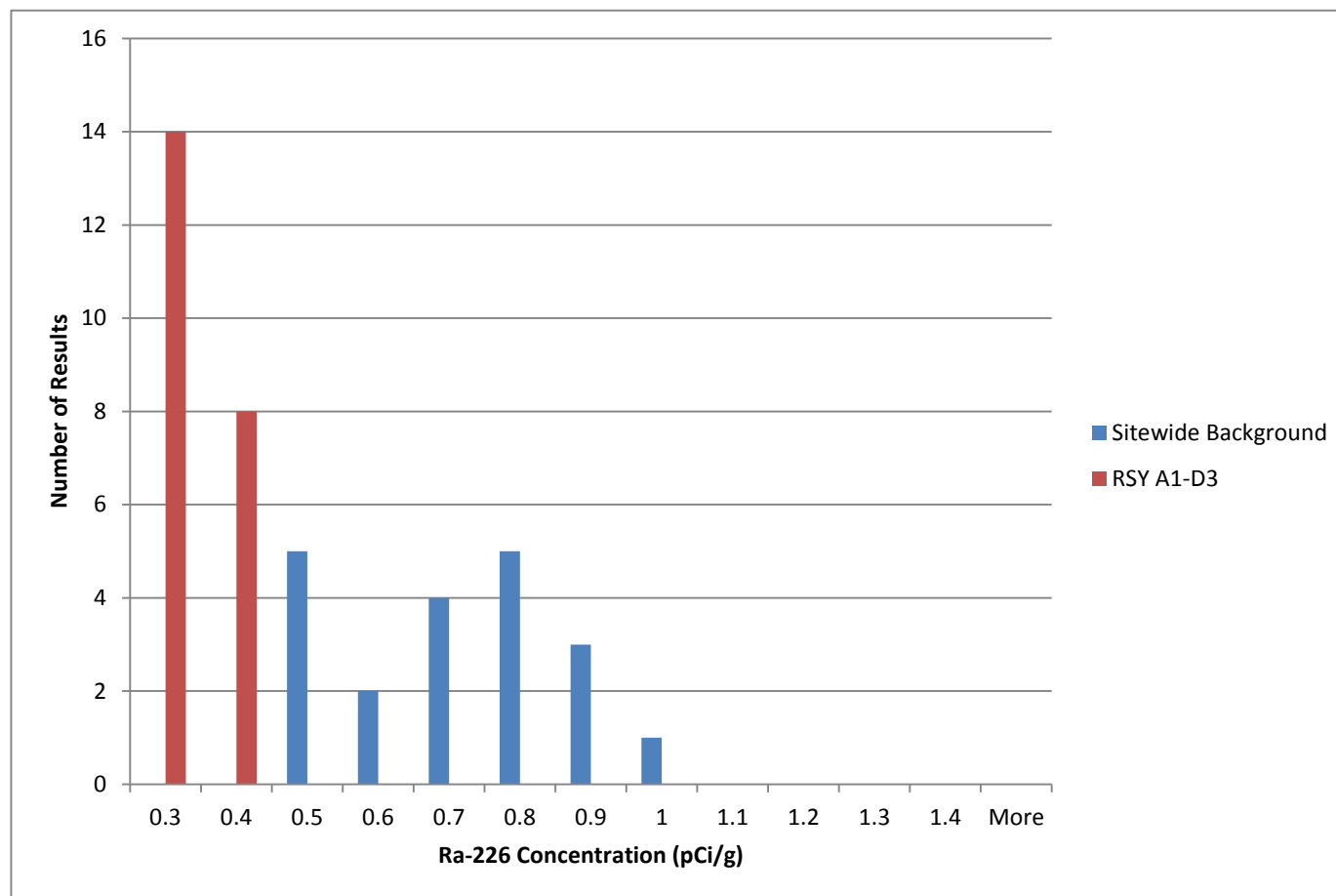
RSY 15-9	
<i>Bin</i>	<i>Frequency</i>
0.3	5
0.4	6
0.5	1
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY A1, A2, A3, B1, B2, B3, D1, D2, D3 (all Use 1) and RSY B3 (Use 2) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

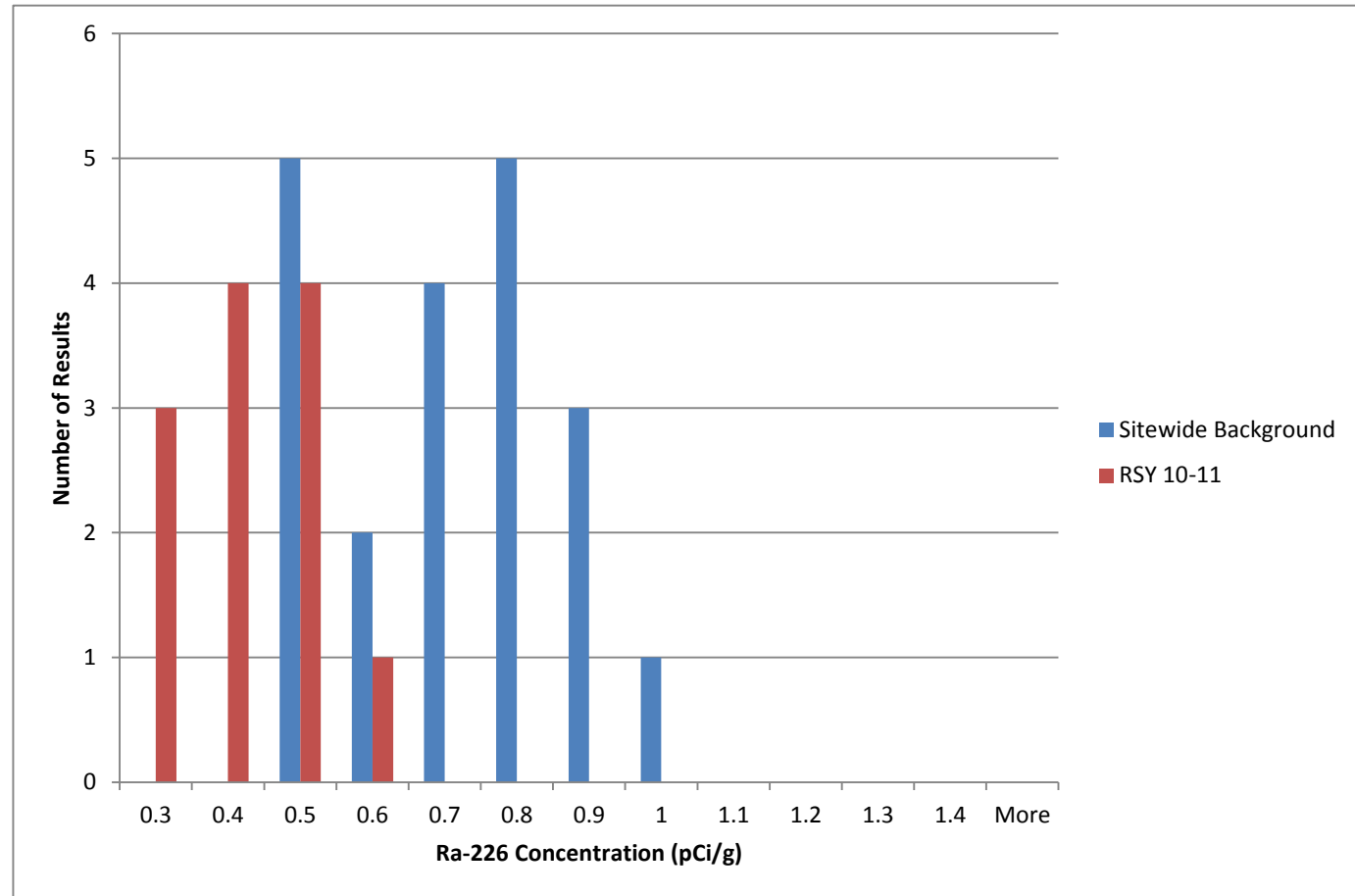
RSY A1-D3	
<i>Bin</i>	<i>Frequency</i>
0.3	14
0.4	8
0.5	0
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY 10 (Use 11) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	2
0.7	4
0.8	5
0.9	3
1	1
1.1	0
1.2	0
1.3	0
1.4	0
More	0

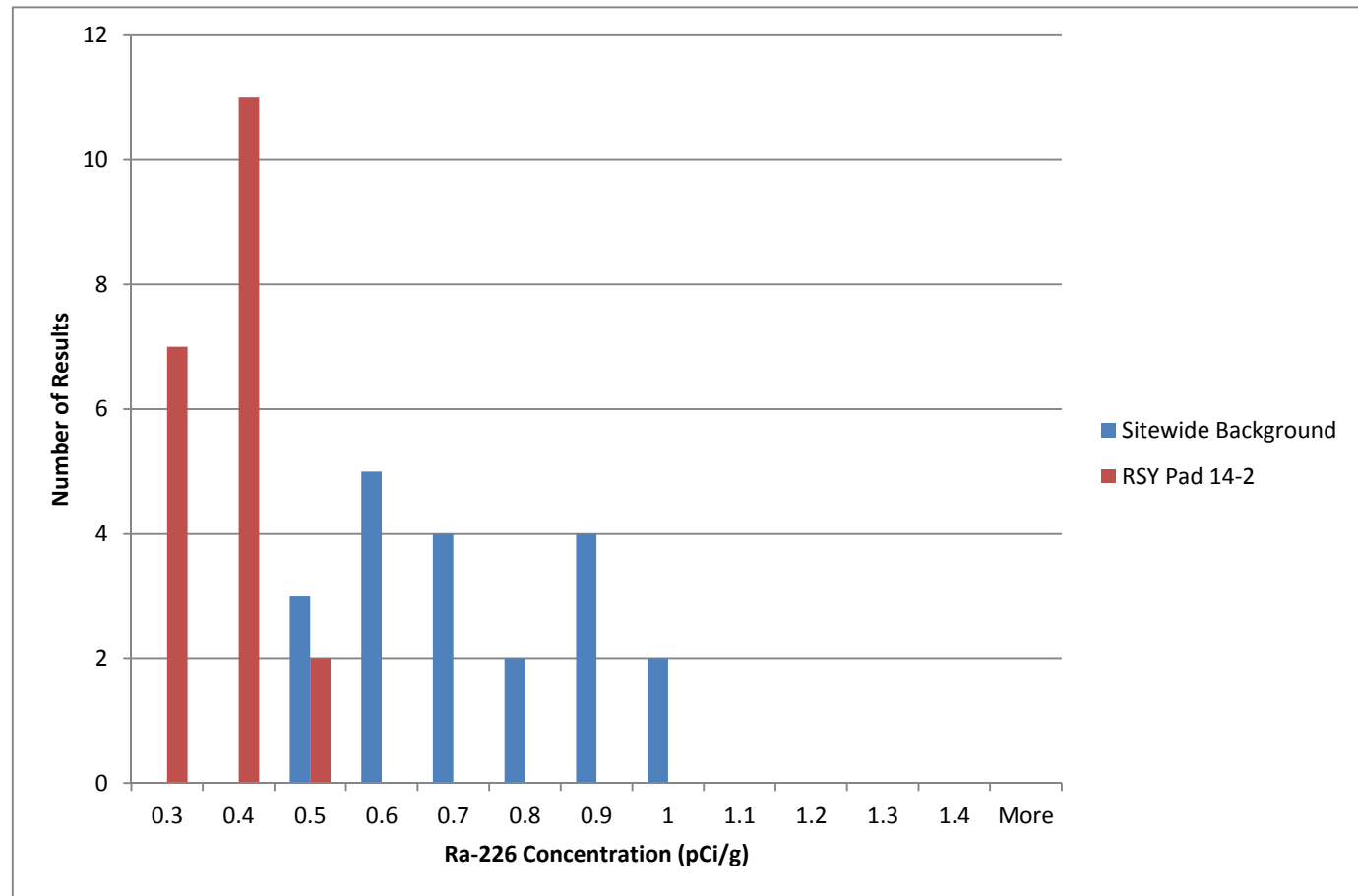
RSY 10-11	
<i>Bin</i>	<i>Frequency</i>
0.3	3
0.4	4
0.5	4
0.6	1
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY Pad 14-2 vs, Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

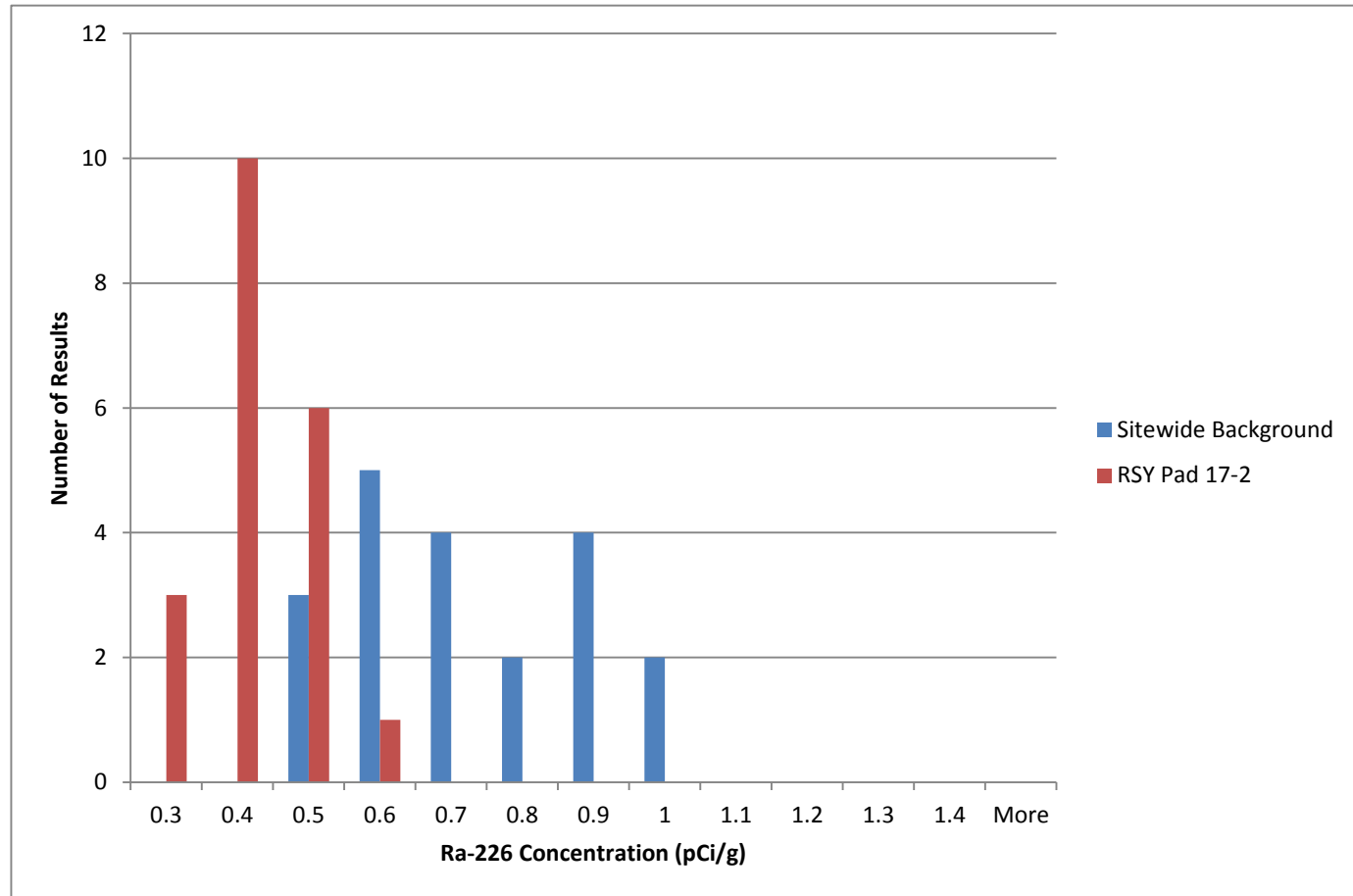
RSY Pad 14-2	
<i>Bin</i>	<i>Frequency</i>
0.3	7
0.4	11
0.5	2
0.6	0
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, vs. RSY Pad 17-2 Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	3
0.6	5
0.7	4
0.8	2
0.9	4
1	2
1.1	0
1.2	0
1.3	0
1.4	0
More	0

RSY Pad 17-2	
<i>Bin</i>	<i>Frequency</i>
0.3	3
0.4	10
0.5	6
0.6	1
0.7	0
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 13-15
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

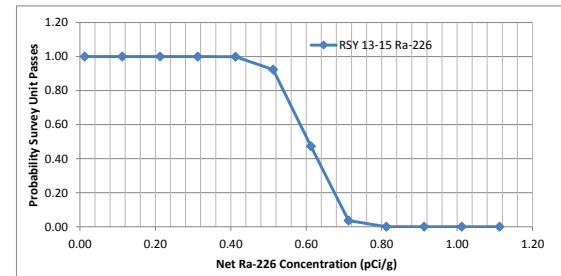
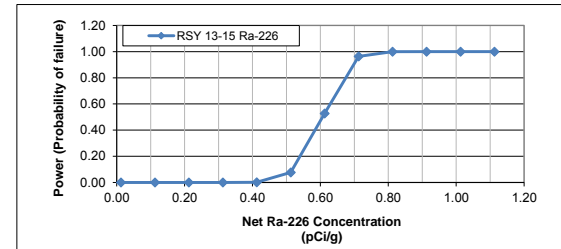
POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4	S
0.57	R	0.57	19.5	0	5.5	S
0.55	R	0.55	18	0	5.5	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.432	S	-0.050939192	10	10	21.5	R
0.409	S	-0.073939192	9	9	21.5	R
0.537	S	0.054060808	11	11	23	R
0.386	S	-0.096939192	5.5	5.5	24	R
0.399	S	-0.083939192	8	8	25	R
0.634	S	0.151060808	12	12	26	R
0.386	S	-0.096939192	5.5	5.5	27.5	R
0.320	S	-0.162939192	1	1	27.5	R
0.387	S	-0.095939192	7	7	29	R
0.334	S	-0.148939192	3	3	30	R
0.333	S	-0.149939192	2	2	31	R
0.344	S	-0.138939192	4	4	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.092
Z(1-alpha)	1.960
Z(1-beta)	1.645

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
1.5	0.81	2.0	0.92135	0.86577	221.124	138.9359	11.787107	-4.34973	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)
 Use:
 $m = 20$
 $n = 15$
 $6 r$
 $5 k$
 0.04 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

WRS Test, Quantile Test, and Power Calculation

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 15-8
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

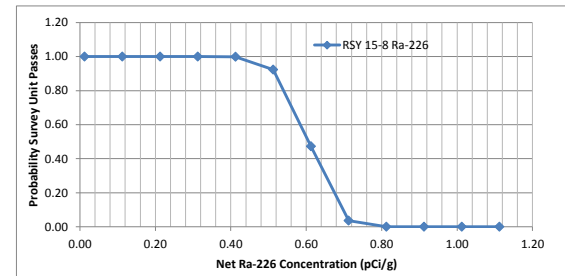
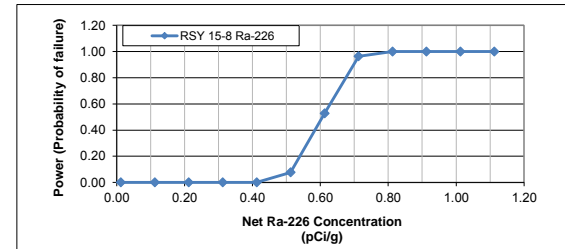
The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4	S
0.57	R	0.57	19.5	0	5	S
0.55	R	0.55	18	0	6	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.379	S	-0.103939192	6	6	21.5	R
0.305	S	-0.177939192	2	2	21.5	R
0.473	S	-0.009939192	11	11	23	R
0.296	S	-0.186939192	1	1	24	R
0.382	S	-0.100939192	7	7	25	R
0.353	S	-0.129939192	5	5	26	R
0.310	S	-0.172939192	3	3	27.5	R
0.311	S	-0.171939192	4	4	27.5	R
0.383	S	-0.099939192	8	8	29	R
0.439	S	-0.043939192	10	10	30	R
0.410	S	-0.072939192	9	9	31	R
0.489	S	0.006060808	12	12	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.066
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count	12	m
SD	0.066	
Median	0.381	
Count	20	n
SD	0.161	
Critical Value	248.4	

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
1.5	0.81	2.0	0.92135	0.86577	221.124	138.9359	11.787107	-4.34973	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)
 Use:
 $m = 20$
 $n = 15$
 $6 r$
 $5 k$
 0.04 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 15-9
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

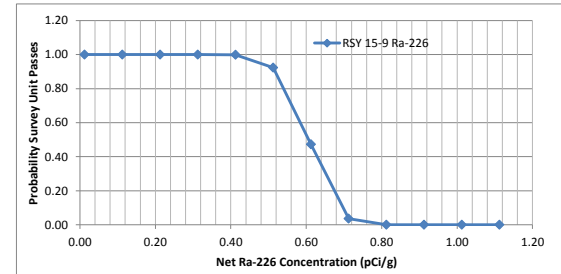
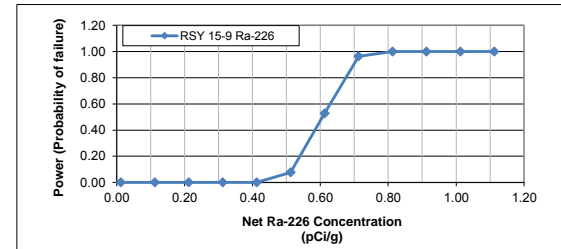
POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4	S
0.57	R	0.57	19.5	0	5	S
0.55	R	0.55	18	0	6	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.361	S	-0.121939192	8	8	21.5	R
0.397	S	-0.085939192	11	11	21.5	R
0.292	S	-0.190939192	3	3	23	R
0.360	S	-0.122939192	7	7	24	R
0.125	S	-0.357939192	1	1	25	R
0.350	S	-0.132939192	6	6	26	R
0.370	S	-0.112939192	9	9	27.5	R
0.326	S	-0.156939192	5	5	27.5	R
0.324	S	-0.158939192	4	4	29	R
0.524	S	0.041060808	12	12	30	R
0.396	S	-0.086939192	10	10	31	R
0.271	S	-0.211939192	2	2	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.093
Z(1-alpha)	1.960
Z(1-beta)	1.645

Concentration	Background (C)	SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
1.5	0.81	2.0	0.92135	0.86577	221.124	138.9359	11.787107	-4.34973	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_W = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)
 Use:
 $m = 20$
 $n = 15$
 $6 r$
 $5 k$
 0.04 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

WRS Test, Quantile Test, and Power Calculation

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY A1-D3
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

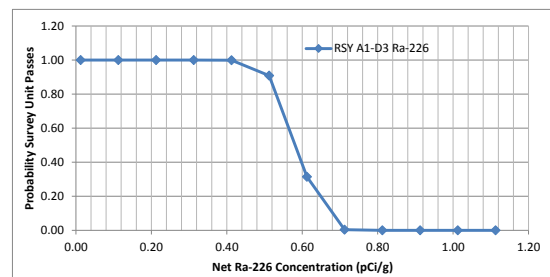
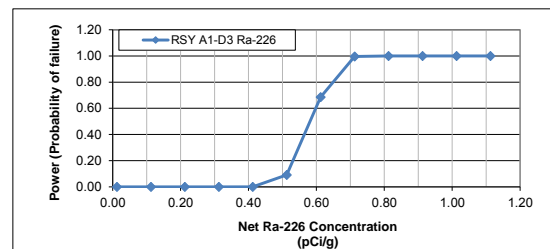
The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT RANKS
0.49	R	0.49	24	0
0.98	R	0.98	42	0
0.83	R	0.83	37.5	0
0.54	R	0.54	27	0
0.57	R	0.57	29.5	0
0.55	R	0.55	28	0
0.57	R	0.57	29.5	0
0.46	R	0.46	23	0
0.50	R	0.5	25	0
0.66	R	0.66	31.5	0
0.75	R	0.75	35	0
0.70	R	0.7	34	0
0.86	R	0.86	39	0
0.51	R	0.51	26	0
0.91	R	0.91	41	0
0.83	R	0.83	37.5	0
0.79	R	0.79	36	0
0.90	R	0.9	40	0
0.66	R	0.66	31.5	0
0.69	R	0.69	33	0
0.279	S	-0.203939192	6	10.5
0.323	S	-0.159939192	10.5	22
0.318	S	-0.164939192	9	23
0.382	S	-0.100939192	19	24
0.423	S	-0.059939192	22	25
0.323	S	-0.159939192	10.5	26
0.394	S	-0.088939192	21	27
0.359	S	-0.123939192	16	28
0.286	S	-0.196939192	7	29.5
0.335	S	-0.147939192	12	29.5
0.027	S	-0.456139192	2	31.5
0.343	S	-0.139939192	14	31.5
0.272	S	-0.210939192	5	33
0.339	S	-0.143939192	13	34
0.251	S	-0.231939192	4	35
0.009	S	-0.474009192	1	36
0.384	S	-0.098939192	20	37.5
0.350	S	-0.132939192	15	37.5
0.297	S	-0.185939192	8	39
0.141	S	-0.341939192	3	40
0.372	S	-0.110939192	17	41
0.377	S	-0.105939192	18	42
Sum =			903	253

Sorted Ranks	Location Associated with Sorted Rank
1	S
2	S
3	S
4	S
5	S
6	S
7	S
8	S
9	S
10.5	S
10.5	S
12	S
13	S
14	S
15	S
16	S
17	S
18	S
19	S
20	S
21	S
22	S
23	R
24	R
25	R
26	R
27	R
28	R
29.5	R
29.5	R
31.5	R
31.5	R
33	R
34	R
35	R
36	R
37.5	R
37.5	R
39	R
40	R
41	R
42	R

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	22
SU σ	0.109
Z(1-alpha)	1.960
Z(1-beta)	1.645

	SU Stats	
Count	22	m
SD	0.109	
Median	0.329	
	Ref Stats	
Count	20	n
SD	0.161	
Critical Value	550.8	



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 22 m
 Avg Rank R: 32.5
 Avg Rank S: 11.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 550.8$

$\alpha_W = \alpha/2 = 0.025$
 $\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α Is Approximately 0.05

22 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 25$
 $r = 5$
 $k = 5$
 0.043 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 5 adjusted measurements are from S. The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 10-11
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

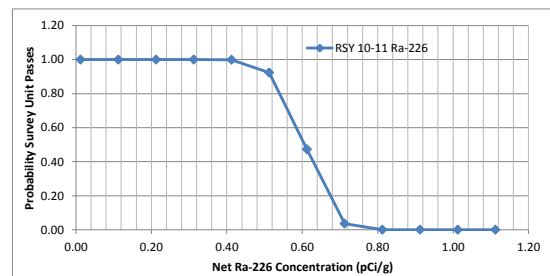
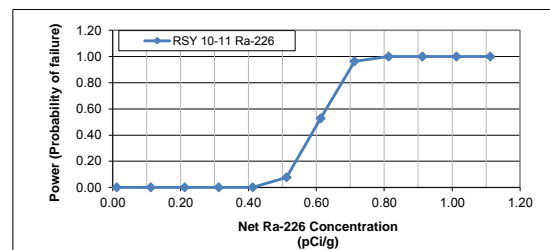
POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4	S
0.57	R	0.57	19.5	0	5	S
0.55	R	0.55	18	0	6	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.521	S	0.038060808	11	11	21.5	R
0.321	S	-0.161939192	1	1	21.5	R
0.400	S	-0.082939192	6	6	23	R
0.347	S	-0.135939192	3	3	24	R
0.442	S	-0.040939192	7	7	25	R
0.392	S	-0.090939192	5	5	26	R
0.453	S	-0.029939192	8	8	27.5	R
0.479	S	-0.003939192	10	10	27.5	R
0.335	S	-0.147939192	2	2	29	R
0.365	S	-0.117939192	4	4	30	R
0.477	S	-0.005939192	9	9	31	R
0.620	S	0.137060808	12	12	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.087
Z(1-alpha)	1.960
Z(1-beta)	1.645

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
1.5	0.81	2.0	0.92135	0.86577	221.124	138.9359	11.787107	-4.34973	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)
 Use:
 $m = 20$
 $n = 15$
 $6 r$
 $5 k$
 0.04 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: Bayside SU 1
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a median Ra-226 concentration of 0.8 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the observed Ra-226 median concentration of 0.301 pCi/g and estimated LBGR of 0.483, the SU will pass the WRS test at a 100% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.274	S	-0.21	8	8	21	R
0.202	S	-0.28	3	3	22	R
0.337	S	-0.15	16	16	23	R
0.391	S	-0.09	19	19	24	R
0.185	S	-0.30	2	2	25	R
0.384	S	-0.10	18	18	26	R
0.211	S	-0.27	4	4	27.5	R
0.259	S	-0.22	6	6	27.5	R
0.303	S	-0.18	11	11	29.5	R
0.277	S	-0.21	9	9	29.5	R
0.348	S	-0.13	17	17	31	R
0.268	S	-0.21	7	7	32	R
0.309	S	-0.17	12	12	33	R
0.155	S	-0.33	1	1	34	R
0.500	S	0.02	20	20	35.5	R
0.244	S	-0.24	5	5	35.5	R
0.328	S	-0.15	15	15	37	R
0.317	S	-0.17	13	13	38	R
0.321	S	-0.16	14	14	39	R
0.299	S	-0.18	10	10	40	R
Sum =			820	210		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 20 m
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 482.5$

$\alpha_W = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.079
Z(1-alpha)	1.960
Z(1-beta)	1.645

QUANTILE TEST

From NUREG 1505, Table A.7c: Values of r and k for the Quantile Test When α is Approximately 0.05

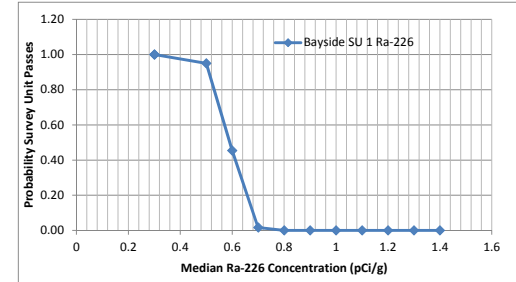
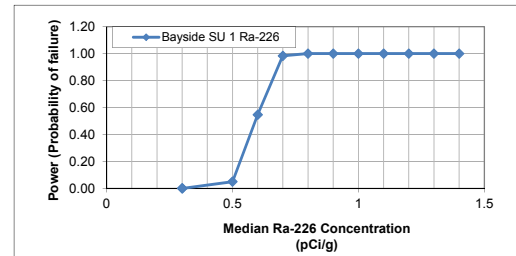
20 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 20$
 4 r
 4 k
 0.053 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S. The null hypothesis is accepted.

Measurement	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.3	-1.1	0.218338	0.098892	87.3352	847	29.10015	6.3444	0.00	1.00
0.301	-1.1	0.218338	0.098892	87.3352	846.8185	29.10015	6.3444	0.00	1.00
0.5	0.1	0.528186	0.361978	211.2744	1361.245	36.89505	1.644767	0.05	0.95
0.6	0.7	0.689691	0.544073	275.8764	1125.277	33.54514	-0.1168	0.55	0.45
0.7	1.3	0.821015	0.716331	328.406	701.2134	26.48043	-2.13168	0.98	0.02
0.8	2.0	0.92135	0.865767	368.54	285.5796	16.8991	-5.71521	1.00	0.00
0.9	2.6	0.967004	0.940817	386.8016	99.71092	9.985535	-11.501	1.00	0.00
1	3.2	0.988174	0.977961	395.2696	27.37027	5.231661	-23.5702	1.00	0.00
1.1	3.8	0.997661	0.995497	399.0644	3.510254	1.873567	-67.8418	1.00	0.00
1.2	4.5	0.999796	0.999599	399.9184	0.187351	0.43284	-295.629	1.00	0.00
1.3	5.1	0.999796	0.999599	399.9184	0.187351	0.43284	-295.629	1.00	0.00
1.4	5.7	0.999989	0.999978	399.9956	0.004398	0.066318	-1930.65	1.00	0.00



WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: Bayside SU 8
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

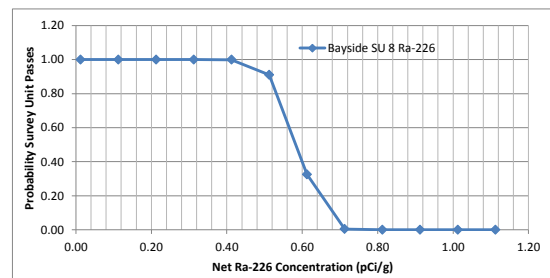
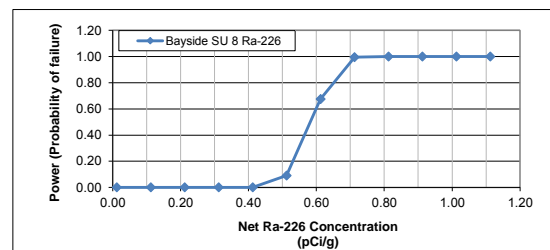
The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	23	0	1	S
0.98	R	0.98	41	0	2	S
0.83	R	0.83	36.5	0	3	S
0.54	R	0.54	26	0	4	S
0.57	R	0.57	28.5	0	5	S
0.55	R	0.55	27	0	6	S
0.57	R	0.57	28.5	0	7	S
0.46	R	0.46	22	0	8	S
0.50	R	0.5	24	0	9	S
0.66	R	0.66	30.5	0	10.5	S
0.75	R	0.75	34	0	10.5	S
0.70	R	0.7	33	0	12.5	S
0.86	R	0.86	38	0	12.5	S
0.51	R	0.51	25	0	14	S
0.91	R	0.91	40	0	15	S
0.83	R	0.83	36.5	0	16	S
0.79	R	0.79	35	0	17	S
0.90	R	0.9	39	0	18	S
0.66	R	0.66	30.5	0	19	S
0.69	R	0.69	32	0	20	S
0.336	S	-0.146939192	7	7	21	S
0.054	S	-0.429439192	1	1	22	R
0.156	S	-0.326939192	2	2	23	R
0.333	S	-0.149939192	6	6	24	R
0.351	S	-0.131939192	10.5	10.5	25	R
0.348	S	-0.134939192	9	9	26	R
0.252	S	-0.230939192	3	3	27	R
0.340	S	-0.142939192	8	8	28.5	R
0.358	S	-0.124939192	14	14	28.5	R
0.307	S	-0.175939192	4	4	30.5	R
0.463	S	-0.019939192	18	18	30.5	R
0.376	S	-0.106939192	15	15	32	R
0.354	S	-0.128939192	12.5	12.5	33	R
0.467	S	-0.015939192	20	20	34	R
0.354	S	-0.128939192	12.5	12.5	35	R
0.351	S	-0.131939192	10.5	10.5	36.5	R
0.464	S	-0.018939192	19	19	36.5	R
0.604	S	0.121060808	21	21	38	R
0.331	S	-0.151939192	5	5	39	R
0.436	S	-0.046939192	17	17	40	R
0.391	S	-0.091939192	16	16	41	R
Sum =				861	231	

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	21
SU σ	0.112
Z(1-alpha)	1.960
Z(1-beta)	1.645

SU Stats	Count
21	m
0.112	SD
0.351	Median
Ref Stats	Count
20	n
0.161	SD
Critical Value	516.1

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	7.11774	46.35497	6.8084482	40.7626	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	16.191	129.8812	11.396542	23.556	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	48.15972	471.7887	21.720697	10.8877	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	91.70196	910.672	30.177343	6.39372	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	163.2326	1379.463	37.14112	3.26902	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	233.617	1446.817	38.037046	1.3416	0.09	0.91
1.3	0.61	0.8	0.71420	0.57447	299.9623	1140.489	33.771126	-0.45349	0.67	0.33
1.4	0.71	1.4	0.83890	0.74170	352.3384	678.2695	26.043609	-2.59914	1.00	0.00
1.5	0.81	2.0	0.92135	0.86577	386.967	306.9486	17.51995	-5.84017	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	408.19	87.73207	9.3665398	-13.1898	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	415.879	23.14241	4.8106563	-27.2793	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	419.0176	3.756969	1.9382901	-69.324	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 21 m
 Avg Rank R: 31.5
 Avg Rank S: 11

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 516.1$

$\alpha_W = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

21 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 25$
 $r = 5$
 $k = 5$
 $\alpha = 0.043$

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 5 adjusted measurements are from S.

The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: Bayside SU 9
 LBGR: 0.483 pCi/g

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	15	0	1	S
0.98	R	0.98	33	0	2	S
0.83	R	0.83	28.5	0	3	S
0.54	R	0.54	18	0	4	S
0.57	R	0.57	20.5	0	5	S
0.55	R	0.55	19	0	6	S
0.57	R	0.57	20.5	0	7	S
0.46	R	0.46	14	0	8	S
0.50	R	0.5	16	0	9	S
0.66	R	0.66	22.5	0	10	S
0.75	R	0.75	26	0	11	S
0.70	R	0.7	25	0	12	S
0.86	R	0.86	30	0	13	S
0.51	R	0.51	17	0	14	R
0.91	R	0.91	32	0	15	R
0.83	R	0.83	28.5	0	16	R
0.79	R	0.79	27	0	17	R
0.90	R	0.9	31	0	18	R
0.66	R	0.66	22.5	0	19	R
0.69	R	0.69	24	0	20.5	R
0.58	S	0.097060808	12	12	20.5	R
0.42	S	-0.067939192	7	7	22.5	R
0.39	S	-0.096939192	5	5	22.5	R
0.34	S	-0.143939192	2	2	24	R
0.34	S	-0.139939192	4	4	25	R
0.53	S	0.043060808	11	11	26	R
0.51	S	0.026060808	10	10	27	R
0.32	S	-0.163939192	1	1	28.5	R
0.47	S	-0.009939192	9	9	28.5	R
0.41	S	-0.073939192	6	6	30	R
0.64	S	0.157060808	13	13	31	R
0.34	S	-0.142939192	3	3	32	R
0.44	S	-0.047939192	8	8	33	R
Sum =			561	91		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 13 m
 Avg Rank R: 23.5
 Avg Rank S: 7

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 274.2$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

$$\alpha_w = \alpha/2 = 0.025$$

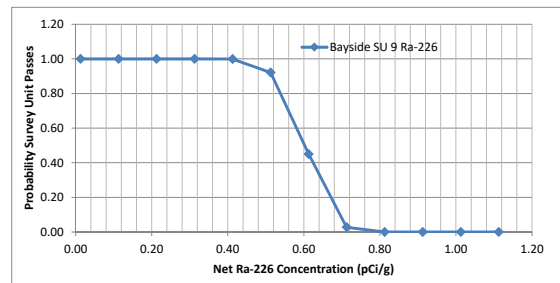
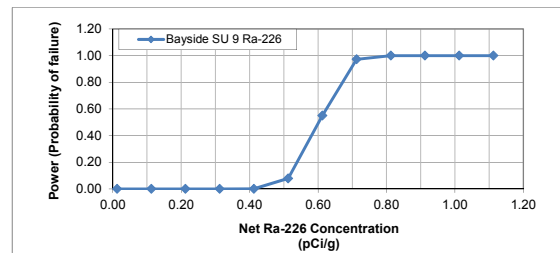
$$\beta = 0.05$$

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

Count	SU Stats	Concentration	Concentration above Background (C)	SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
13	m	0.7	0.01	-2.9	0.01695	0.00269	4.40622	23.698109	4.8680704	36.62464	0.00	1.00
SD	0.101	0.8	0.11	-2.3	0.03855	0.00847	10.023	65.886527	8.1170516	21.27306	0.00	1.00
Median	0.415	0.9	0.21	-1.7	0.11467	0.03935	29.81316	237.56425	15.41312	9.919107	0.00	1.00
		1.0	0.31	-1.1	0.21834	0.09889	56.76788	457.21067	21.382485	5.889384	0.00	1.00
		1.1	0.41	-0.4	0.38865	0.22917	101.0487	691.45532	26.295538	3.105044	0.00	1.00
Count	Ref Stats	1.2	0.51	0.2	0.55623	0.39139	144.6201	725.09044	26.927503	1.414074	0.08	0.92
SD	0.161	1.3	0.61	0.8	0.71420	0.57447	185.691	572.07939	23.918181	-0.12515	0.55	0.45
		1.4	0.71	1.4	0.83890	0.74170	218.1143	340.95947	18.465088	-1.91804	0.97	0.03
		1.5	0.81	2.0	0.92135	0.86577	239.551	154.90298	12.446002	-4.56801	1.00	0.00
	Critical Value 274.2	1.6	0.91	2.7	0.97188	0.94921	252.6891	44.627258	6.6803636	-10.4772	1.00	0.00
		1.7	1.01	3.3	0.99019	0.98164	257.4489	11.905709	3.4504651	-21.6641	1.00	0.00
		1.8	1.11	3.9	0.99766	0.99550	259.3919	1.9731219	1.4046786	-54.5992	1.00	0.00

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	13
SU σ	0.101
Z(1-alpha)	1.960
Z(1-beta)	1.645



The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

QUANTILE TEST

From NUREG 1505, Table A.7c: Values of r and k for the Quantile Test When α Is Approximately 0.05
 13 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 15$
 6 r
 5 k
 0.04 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: North Point SU 1 RSY
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a median Ra-226 concentration of 0.8 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the observed Ra-226 median concentration of 0.338 pCi/g and estimated LBGR of 0.483, the SU will pass the WRS test at a 100% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	
0.49	R	0.49	11	0	1
0.98	R	0.98	29	0	2
0.83	R	0.83	24.5	0	3
0.54	R	0.54	14	0	4
0.57	R	0.57	16.5	0	5
0.55	R	0.55	15	0	6
0.57	R	0.57	16.5	0	7
0.46	R	0.46	10	0	8
0.50	R	0.5	12	0	9
0.66	R	0.66	18.5	0	10
0.75	R	0.75	22	0	11
0.70	R	0.7	21	0	12
0.86	R	0.86	26	0	13
0.51	R	0.51	13	0	14
0.91	R	0.91	28	0	15
0.83	R	0.83	24.5	0	16.5
0.79	R	0.79	23	0	16.5
0.90	R	0.9	27	0	18.5
0.66	R	0.66	18.5	0	18.5
0.69	R	0.69	20	0	20
0.380	S	-0.10	7	7	21
0.383	S	-0.10	8	8	22
0.325	S	-0.16	4	4	23
0.351	S	-0.13	6	6	24.5
0.280	S	-0.20	1	1	24.5
0.338	S	-0.14	5	5	26
0.295	S	-0.19	2	2	27
0.319	S	-0.16	3	3	28
0.538	S	0.06	9	9	29
Sum =			435	45	

Sorted Ranks
 Location Associated with Sorted Rank

Count 9 *m*
 SD 0.076
 Median 0.338
 Ref Stats
 Count 20 *n*
 SD 0.161
 Critical Value 176.6

Number of Samples	
σ	0.161
LBGR	0.483
$\Delta\sigma$	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	9
SU σ	0.076
Z(1-alpha)	1.960
Z(1-beta)	1.645

Measurement	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.3	-1.1	0.218338	0.098892	39.30084	280	16.72279	5.488142	0.00	1.00
0.338	-0.9	0.262259	0.12892	47.20662	327.1077	18.08612	4.637328	0.00	1.00
0.5	0.1	0.528186	0.361978	95.07348	448.2251	21.17133	1.700621	0.04	0.96
0.6	0.7	0.689691	0.544073	124.1444	370.9438	19.2599	0.359997	0.36	0.64
0.7	1.3	0.821015	0.716331	147.7827	231.8606	15.22697	-1.09705	0.86	0.14
0.8	2.0	0.92135	0.865767	165.843	95.08607	9.751209	-3.56521	1.00	0.00
0.9	2.6	0.967004	0.940817	174.0607	33.54379	5.7917	-7.42145	1.00	0.00
1	3.2	0.988174	0.977961	177.8713	9.360194	3.059443	-15.2948	1.00	0.00
1.1	3.8	0.997661	0.995497	179.579	1.243947	1.115324	-43.4861	1.00	0.00
1.2	4.5	0.999796	0.999599	179.9633	0.07053	0.265575	-184.074	1.00	0.00
1.3	5.1	0.999796	0.999599	179.9633	0.07053	0.265575	-184.074	1.00	0.00
1.4	5.7	0.999989	0.999978	179.998	0.001979	0.04449	-1099.57	1.00	0.00

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 *n*
 # of S: 9 *m*
 Avg Rank R: 19.5
 Avg Rank S: 5

For *m* or *n* greater than 20, the critical value (*k*) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

z = 97.5% percentile of standard normal distribution = 1.960

k = 176.6

$\alpha_W = \alpha/2 = 0.025$
 $\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

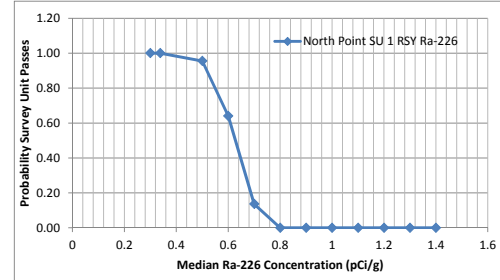
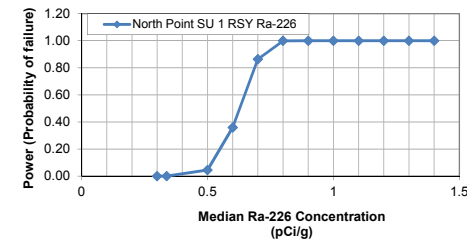
QUANTILE TEST

From NUREG 1505, Table A.7c Values of *r* and *k* for the Quantile Test When α is Approximately 0.05
 9 *n* (number of survey unit measurements)
 20 *m* (number of reference area measurements)

Use:
m = 20
n = 10
 8 *r*
 5 *k*
 0.056 alpha

If *k* or more of the *r* largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 8 adjusted measurements are from S. The null hypothesis is accepted.



WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: North Point SU 1
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a median Ra-226 concentration of 0.8 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the observed Ra-226 median concentration of 0.324 pCi/g and estimated LBGR of 0.483, the SU will pass the WRS test at a 100% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11.5	S
0.70	R	0.7	32	0	11.5	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.380	S	-0.10	18	18	21	R
0.383	S	-0.10	19	19	22	R
0.325	S	-0.16	11.5	11.5	23	R
0.351	S	-0.13	16	16	24	R
0.280	S	-0.20	2	2	25	R
0.338	S	-0.14	13	13	26	R
0.295	S	-0.19	6	6	27.5	R
0.319	S	-0.16	9	9	27.5	R
0.538	S	0.06	20	20	29.5	R
0.287	S	-0.20	4	4	29.5	R
0.313	S	-0.17	8	8	31	R
0.346	S	-0.14	15	15	32	R
0.209	S	-0.27	1	1	33	R
0.342	S	-0.14	14	14	34	R
0.325	S	-0.16	11.5	11.5	35.5	R
0.323	S	-0.16	10	10	35.5	R
0.365	S	-0.12	17	17	37	R
0.290	S	-0.19	5	5	38	R
0.298	S	-0.18	7	7	39	R
0.282	S	-0.20	3	3	40	R
Sum =			820	210		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 20 m
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 482.5$

$\alpha_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.063
Z(1-alpha)	1.960
Z(1-beta)	1.645

QUANTILE TEST

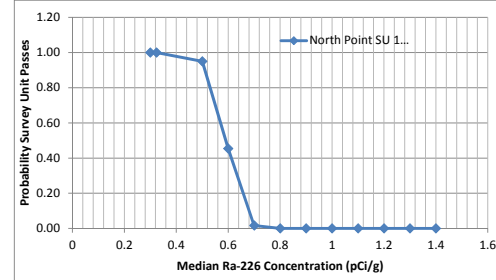
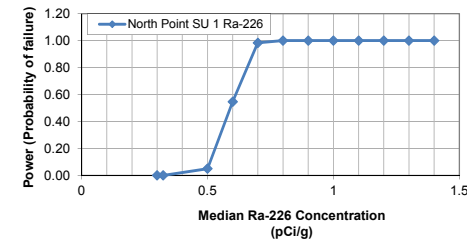
From NUREG 1505, Table A.7c: Values of r and k for the Quantile Test When α is Approximately 0.05

20 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 20$
 4 r
 4 k
 0.053 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S. The null hypothesis is accepted.



WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: North Point SU 2
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

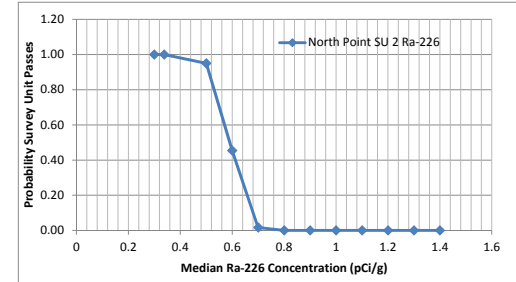
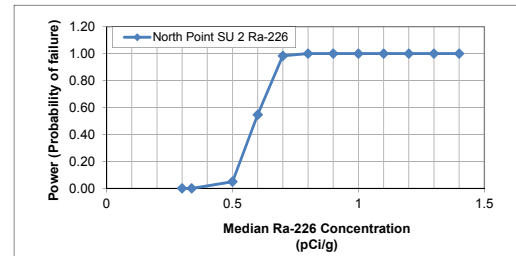
POWER CURVE CALCULATION

The power curve demonstrates that at a median Ra-226 concentration of 0.8 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the observed Ra-226 median concentration of 0.338 pCi/g and estimated LBGR of 0.483, the SU will pass the WRS test at a 100% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8.5	S
0.50	R	0.5	23	0	8.5	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.268	S	-0.21	4	4	21	R
0.117	S	-0.37	1	1	22	R
0.438	S	-0.04	19	19	23	R
0.173	S	-0.31	2	2	24	R
0.274	S	-0.21	5	5	25	R
0.339	S	-0.14	11	11	26	R
0.416	S	-0.07	16	16	27.5	R
0.391	S	-0.09	15	15	27.5	R
0.319	S	-0.16	8.5	8.5	29.5	R
0.418	S	-0.06	17	17	29.5	R
0.319	S	-0.16	8.5	8.5	31	R
0.480	S	0.00	20	20	32	R
0.351	S	-0.13	13	13	33	R
0.314	S	-0.17	7	7	34	R
0.252	S	-0.23	3	3	35.5	R
0.429	S	-0.05	18	18	35.5	R
0.341	S	-0.14	12	12	37	R
0.299	S	-0.18	6	6	38	R
0.385	S	-0.10	14	14	39	R
0.337	S	-0.15	10	10	40	R
Sum =			820	210		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.089
Z(1-alpha)	1.960
Z(1-beta)	1.645

Measurement	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.3	-1.1	0.218338	0.098892	87.3352	847	29.10015	6.3444	0.00	1.00
0.338	-0.9	0.262259	0.12892	104.9036	991.523	31.48846	5.305264	0.00	1.00
0.5	0.1	0.528186	0.361978	211.2744	1361.245	36.89505	1.644767	0.05	0.95
0.6	0.7	0.689691	0.544073	275.8764	1125.277	33.54514	-0.1168	0.55	0.45
0.7	1.3	0.821015	0.716331	328.406	701.2134	26.48043	-2.13168	0.98	0.02
0.8	2.0	0.92135	0.865767	368.54	285.5796	16.8991	-5.71521	1.00	0.00
0.9	2.6	0.967004	0.940817	386.8016	99.71092	9.985535	-11.501	1.00	0.00
1	3.2	0.988174	0.977961	395.2696	27.37027	5.231661	-23.5702	1.00	0.00
1.1	3.8	0.997661	0.995497	399.0644	3.510254	1.873567	-67.8418	1.00	0.00
1.2	4.5	0.999796	0.999599	399.9184	0.187351	0.43284	-295.629	1.00	0.00
1.3	5.1	0.999796	0.999599	399.9184	0.187351	0.43284	-295.629	1.00	0.00
1.4	5.7	0.999989	0.999978	399.9956	0.004398	0.066318	-1930.65	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 20 m
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 482.5$

$\alpha_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c: Values of r and k for the Quantile Test When α is Approximately 0.05

20 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 20$
 4 r
 4 k
 0.053 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S. The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: North Point SU 5
 LBGR: 0.483 pCi/g

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14		0	1 S
0.98	R	0.98	32		0	2 S
0.83	R	0.83	27.5		0	3 S
0.54	R	0.54	17		0	4 S
0.57	R	0.57	19.5		0	5 S
0.55	R	0.55	18		0	6 S
0.57	R	0.57	19.5		0	7 S
0.46	R	0.46	13		0	8 S
0.50	R	0.5	15		0	9 S
0.66	R	0.66	21.5		0	10 S
0.75	R	0.75	25		0	11 S
0.70	R	0.7	24		0	12 S
0.86	R	0.86	29		0	13 R
0.51	R	0.51	16		0	14 R
0.91	R	0.91	31		0	15 R
0.83	R	0.83	27.5		0	16 R
0.79	R	0.79	26		0	17 R
0.90	R	0.9	30		0	18 R
0.66	R	0.66	21.5		0	19.5 R
0.69	R	0.69	23		0	19.5 R
0.48	S	-0.006939192	11		11	21.5 R
0.46	S	-0.022939192	10		10	21.5 R
0.43	S	-0.051939192	7		7	23 R
0.35	S	-0.137939192	5		5	24 R
0.32	S	-0.159939192	4		4	25 R
0.25	S	-0.236939192	1		1	26 R
0.56	S	0.077060808	12		12	27.5 R
0.37	S	-0.116939192	6		6	27.5 R
0.44	S	-0.042939192	9		9	29 R
0.27	S	-0.209939192	2		2	30 R
0.30	S	-0.179939192	3		3	31 R
0.44	S	-0.047939192	8		8	32 R
Sum =			528		78	

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_w = \alpha/2 = 0.025$
 $\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

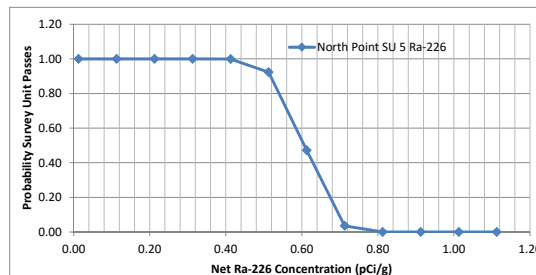
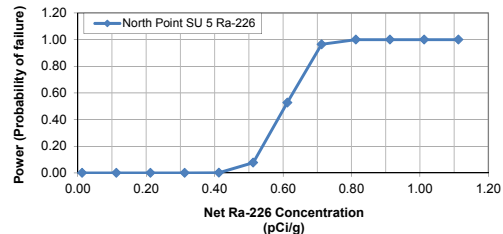
SU Stats		Concentration above Background (C) (C-LBGR)										Probability of passing	
Count	SD	Concentration	Background (C)	SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power		
12	0.094	0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.298506	4.6150304	35.92306	0.00	1.00	
SD	0.094	0.8	0.11	-2.3	0.03855	0.00847	9.252	59.143397	7.6904745	20.88315	0.00	1.00	
Median	0.399	0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.00215	14.594593	9.75248	0.00	1.00	
		1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.74769	20.242225	5.802336	0.00	1.00	
		1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.076628	0.00	1.00	
Count	Ref Stats	1.2	0.51	0.2	0.55623	0.39139	133.4954	649.63448	25.487928	1.426474	0.08	0.92	
SD	0.161	1.3	0.61	0.8	0.71420	0.57447	171.407	512.61895	22.64109	-0.06862	0.53	0.47	
		1.4	0.71	1.4	0.83890	0.74170	201.3362	305.62547	17.482147	-1.80086	0.96	0.04	
		1.5	0.81	2.0	0.92135	0.86577	221.124	138.93588	11.787107	-4.34973	1.00	0.00	
	Critical Value	1.6	0.91	2.7	0.97188	0.94921	233.2514	40.077114	6.3306488	-10.0145	1.00	0.00	
		1.7	1.01	3.3	0.99019	0.98164	237.6451	10.710591	3.272704	-20.7143	1.00	0.00	
		1.8	1.11	3.9	0.99766	0.99550	239.4386	1.7806563	1.3344124	-52.1468	1.00	0.00	

Number of Samples

σ 0.161
 LBGR 0.483
 Δ/σ 3.21
 Pr 0.983039
 N 22.28

N/2 12
 Actual N 12

SU σ 0.094
 Z(1-alpha) 1.960
 Z(1-beta) 1.645

**QUANTILE TEST**

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α Is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 15$
 6 r
 5 k
 0.04 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: NP SU 7
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

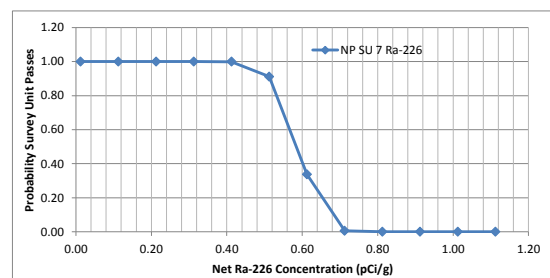
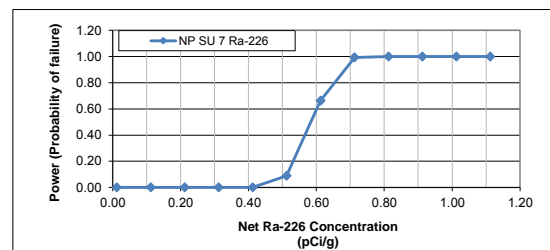
The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4.5	S
0.57	R	0.57	27.5	0	4.5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.467	S	-0.015939192	16	16	21	R
0.500	S	0.017060808	19	19	22	R
0.371	S	-0.111939192	8	8	23	R
0.407	S	-0.075939192	11	11	24	R
0.665	S	0.182060808	20	20	25	R
0.460	S	-0.022939192	15	15	26	R
0.297	S	-0.185939192	3	3	27.5	R
0.487	S	0.004060808	18	18	27.5	R
0.280	S	-0.202939192	2	2	29.5	R
0.314	S	-0.168939192	4.5	4.5	29.5	R
0.481	S	-0.001939192	17	17	31	R
0.437	S	-0.045939192	14	14	32	R
0.382	S	-0.100939192	9	9	33	R
0.060	S	-0.423439192	1	1	34	R
0.357	S	-0.125939192	7	7	35.5	R
0.320	S	-0.162939192	6	6	35.5	R
0.390	S	-0.092939192	10	10	37	R
0.314	S	-0.168939192	4.5	4.5	38	R
0.425	S	-0.057939192	13	13	39	R
0.410	S	-0.072939192	12	12	40	R
Sum =			820	210		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.119
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count	20	m
SD	0.119	
Median	0.399	
Count	20	n
SD	0.161	
Critical Value	482.5	

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	6.7788	43.18647	6.5716411	40.3521	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	15.42	120.9048	10.995672	23.3308	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	45.8664	438.8427	20.948572	10.7927	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	87.3352	846.8185	29.100146	6.3444	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	155.4596	1282.524	35.812351	3.25303	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	222.4924	1345.121	36.675894	1.34873	0.09	0.91
1.3	0.61	0.8	0.71420	0.57447	285.6784	1060.423	32.564133	-0.42133	0.66	0.34
1.4	0.71	1.4	0.83890	0.74170	335.5604	630.7938	25.115608	-2.53238	0.99	0.01
1.5	0.81	2.0	0.92135	0.86577	368.54	285.5796	16.8991	-5.71521	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	388.7524	81.69222	9.0383749	-12.922	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	396.0752	21.5749	4.6448794	-26.7213	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	399.0644	3.510254	1.8735671	-67.8418	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 20 m
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 482.5$

$a_w = a/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

20 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 20$
 $r = 4$
 $k = 4$
 0.053 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S.

The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 10-5(P.1)
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11.5	S
0.70	R	0.7	32	0	11.5	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.324	S	-0.158939192	9	9	21	R
0.337	S	-0.145939192	11.5	11.5	22	R
0.326	S	-0.156939192	10	10	23	R
0.284	S	-0.198939192	4	4	24	R
0.350	S	-0.132939192	13	13	25	R
0.337	S	-0.145939192	11.5	11.5	26	R
0.429	S	-0.053939192	18	18	27.5	R
0.307	S	-0.175939192	7	7	27.5	R
0.279	S	-0.203939192	3	3	29.5	R
0.377	S	-0.105939192	16	16	29.5	R
0.397	S	-0.085939192	17	17	31	R
0.275	S	-0.207939192	2	2	32	R
0.351	S	-0.131939192	14	14	33	R
0.305	S	-0.177939192	6	6	34	R
0.435	S	-0.047939192	20	20	35.5	R
0.309	S	-0.173939192	8	8	35.5	R
0.304	S	-0.178939192	5	5	37	R
0.226	S	-0.256939192	1	1	38	R
0.361	S	-0.121939192	15	15	39	R
0.431	S	-0.051939192	19	19	40	R
Sum =			820	210		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 *n*
 # of S: 20 *m*
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For *m* or *n* greater than 20, the critical value (*k*) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

z = 97.5% percentile of standard normal distribution = 1.960

k = 482.5

$\alpha_w = \alpha/2 = 0.025$

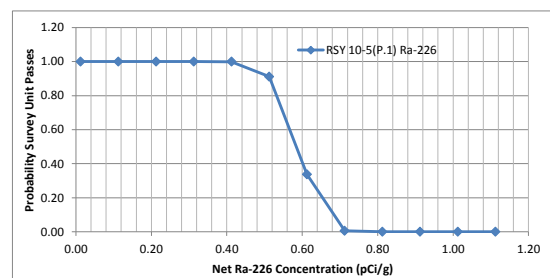
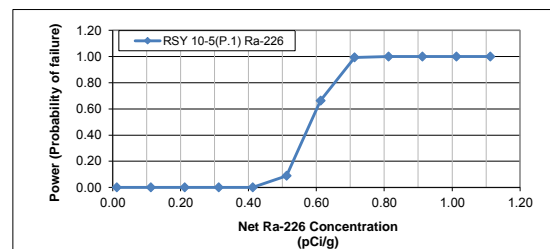
$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.056
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count 20 *m*
 SD 0.056
 Median 0.332
 Ref Stats
 Count 20 *n*
 SD 0.161
 Critical Value 482.5

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	6.7788	43.18647	6.5716411	40.3521	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	15.42	120.9048	10.995672	23.3308	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	45.8664	438.8427	20.948572	10.7927	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	87.3352	846.8185	29.100146	6.3444	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	155.4596	1282.524	35.812351	3.25303	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	222.4924	1345.121	36.675894	1.34873	0.09	0.91
1.3	0.61	0.8	0.71420	0.57447	285.6784	1060.423	32.564133	-0.42133	0.66	0.34
1.4	0.71	1.4	0.83890	0.74170	335.5604	630.7938	25.115608	-2.53238	0.99	0.01
1.5	0.81	2.0	0.92135	0.86577	368.54	285.5796	16.8991	-5.71521	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	388.7524	81.69222	9.0383749	-12.922	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	396.0752	21.5749	4.6448794	-26.7213	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	399.0644	3.510254	1.8735671	-67.8418	1.00	0.00

**QUANTILE TEST**

From NUREG 1505, Table A.7c Values of *r* and *k* for the Quantile Test When α is Approximately 0.05

20 *n* (number of survey unit measurements)
 20 *m* (number of reference area measurements)

Use:
m = 20
n = 20
 4 *r*
 4 *k*
 0.053 α

If *k* or more of the *r* largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S.

The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 10-7
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.261	S	-0.221939192	3	3	21	R
0.438	S	-0.044939192	19	19	22	R
0.311	S	-0.171939192	7	7	23	R
0.324	S	-0.158939192	8	8	24	R
0.387	S	-0.095939192	14	14	25	R
0.336	S	-0.146939192	10	10	26	R
0.231	S	-0.251939192	2	2	27.5	R
0.460	S	-0.022939192	20	20	27.5	R
0.395	S	-0.087939192	16	16	29.5	R
0.287	S	-0.195939192	5	5	29.5	R
0.098	S	-0.385439192	1	1	31	R
0.349	S	-0.133939192	11	11	32	R
0.430	S	-0.052939192	18	18	33	R
0.277	S	-0.205939192	4	4	34	R
0.301	S	-0.181939192	6	6	35.5	R
0.383	S	-0.099939192	13	13	35.5	R
0.425	S	-0.057939192	17	17	37	R
0.364	S	-0.118939192	12	12	38	R
0.331	S	-0.151939192	9	9	39	R
0.393	S	-0.089939192	15	15	40	R
Sum =			820	210		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 *n*
 # of S: 20 *m*
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For *m* or *n* greater than 20, the critical value (*k*) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

z = 97.5% percentile of standard normal distribution = 1.960

k = 482.5

$\alpha_w = \alpha/2 = 0.025$

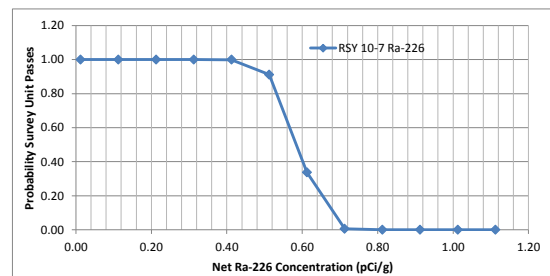
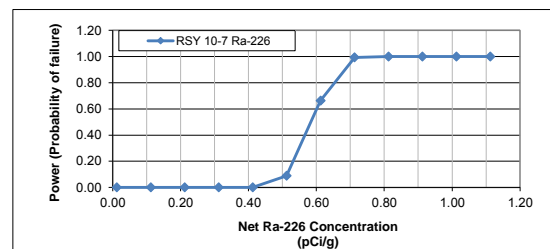
$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.085
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count 20 *m*
 SD 0.085
 Median 0.343
 Ref Stats
 Count 20 *n*
 SD 0.161
 Critical Value 482.5

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	6.7788	43.18647	6.5716411	40.3521	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	15.42	120.9048	10.995672	23.3308	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	45.8664	438.8427	20.948572	10.7927	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	87.3352	846.8185	29.100146	6.3444	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	155.4596	1282.524	35.812351	3.25303	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	222.4924	1345.121	36.675894	1.34873	0.09	0.91
1.3	0.61	0.8	0.71420	0.57447	285.6784	1060.423	32.564133	-0.42133	0.66	0.34
1.4	0.71	1.4	0.83890	0.74170	335.5604	630.7938	25.115608	-2.53238	0.99	0.01
1.5	0.81	2.0	0.92135	0.86577	368.54	285.5796	16.8991	-5.71521	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	388.7524	81.69222	9.0383749	-12.922	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	396.0752	21.5749	4.6448794	-26.7213	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	399.0644	3.510254	1.8735671	-67.8418	1.00	0.00

**QUANTILE TEST**

From NUREG 1505, Table A.7c Values of *r* and *k* for the Quantile Test When α is Approximately 0.05

20 *n* (number of survey unit measurements)
 20 *m* (number of reference area measurements)

Use:
m = 20
n = 20
 4 *r*
 4 *k*
 0.053 α

If *k* or more of the *r* largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S.

The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 10-8
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5.5	S
0.55	R	0.55	26	0	5.5	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.283	S	-0.199939192	3	3	21	R
0.319	S	-0.163939192	5.5	5.5	22	R
0.248	S	-0.234939192	1	1	23	R
0.390	S	-0.092939192	17	17	24	R
0.334	S	-0.148939192	11	11	25	R
0.327	S	-0.155939192	10	10	26	R
0.462	S	-0.020939192	20	20	27.5	R
0.323	S	-0.159939192	7	7	27.5	R
0.374	S	-0.108939192	15	15	29.5	R
0.371	S	-0.111939192	14	14	29.5	R
0.324	S	-0.158939192	8	8	31	R
0.286	S	-0.196939192	4	4	32	R
0.401	S	-0.081939192	18	18	33	R
0.414	S	-0.068939192	19	19	34	R
0.325	S	-0.157939192	9	9	35.5	R
0.366	S	-0.116939192	13	13	35.5	R
0.281	S	-0.201939192	2	2	37	R
0.319	S	-0.163939192	5.5	5.5	38	R
0.385	S	-0.097939192	16	16	39	R
0.349	S	-0.133939192	12	12	40	R
Sum =			820	210		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 *n*
 # of S: 20 *m*
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For *m* or *n* greater than 20, the critical value (*k*) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

z = 97.5% percentile of standard normal distribution = 1.960

k = 482.5

$\alpha_w = \alpha/2 = 0.025$

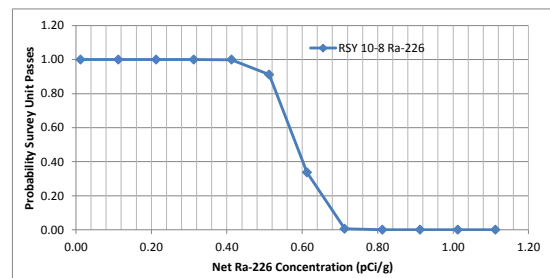
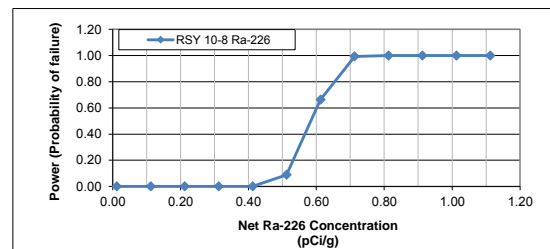
$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.052
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count 20 *m*
 SD 0.052
 Median 0.331
 Ref Stats
 Count 20 *n*
 SD 0.161
 Critical Value 482.5

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	6.7788	43.18647	6.5716411	40.3521	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	15.42	120.9048	10.995672	23.3308	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	45.8664	438.8427	20.948572	10.7927	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	87.3352	846.8185	29.100146	6.3444	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	155.4596	1282.524	35.812351	3.25303	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	222.4924	1345.121	36.675894	1.34873	0.09	0.91
1.3	0.61	0.8	0.71420	0.57447	285.6784	1060.423	32.564133	-0.42133	0.66	0.34
1.4	0.71	1.4	0.83890	0.74170	335.5604	630.7938	25.115608	-2.53238	0.99	0.01
1.5	0.81	2.0	0.92135	0.86577	368.54	285.5796	16.8991	-5.71521	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	388.7524	81.69222	9.0383749	-12.922	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	396.0752	21.5749	4.6448794	-26.7213	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	399.0644	3.510254	1.8735671	-67.8418	1.00	0.00

**QUANTILE TEST**

From NUREG 1505, Table A.7c Values of *r* and *k* for the Quantile Test When α is Approximately 0.05

20 *n* (number of survey unit measurements)
 20 *m* (number of reference area measurements)

Use:
m = 20
n = 20
 4 *r*
 4 *k*
 0.053 α

If *k* or more of the *r* largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S.

The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 10-9 (P.1)
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

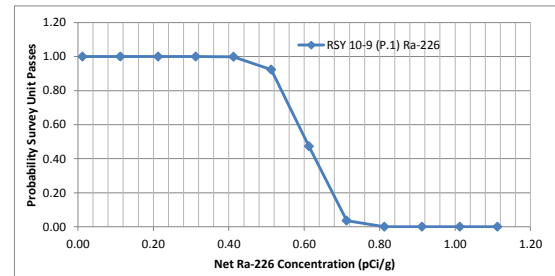
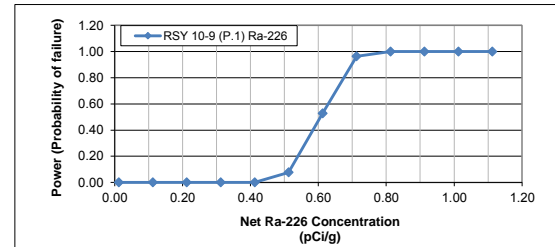
POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4	S
0.57	R	0.57	19.5	0	5	S
0.55	R	0.55	18	0	6	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.247	S	-0.235939192	4	4	21.5	R
0.356	S	-0.126939192	9	9	21.5	R
0.267	S	-0.215939192	5	5	23	R
0.362	S	-0.120939192	10	10	24	R
0.315	S	-0.167939192	7	7	25	R
0.142	S	-0.340939192	2	2	26	R
0.153	S	-0.329939192	3	3	27.5	R
0.314	S	-0.168939192	6	6	27.5	R
0.390	S	-0.092939192	11	11	29	R
0.483	S	6.0808E-05	12	12	30	R
0.327	S	-0.155939192	8	8	31	R
0.117	S	-0.365939192	1	1	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.110
Z(1-alpha)	1.960
Z(1-beta)	1.645

Concentration	Background (C)	SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
1.5	0.81	2.0	0.92135	0.86577	221.124	138.9359	11.787107	-4.34973	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_W = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)
 Use:
 $m = 20$
 $n = 15$
 6 r
 5 k
 0.04 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 10-9 (P.2)
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	17	0	1	S
0.98	R	0.98	35	0	2	S
0.83	R	0.83	30.5	0	3	S
0.54	R	0.54	20	0	4	S
0.57	R	0.57	22.5	0	5	S
0.55	R	0.55	21	0	6	S
0.57	R	0.57	22.5	0	7	S
0.46	R	0.46	16	0	8	S
0.50	R	0.5	18	0	9	S
0.66	R	0.66	24.5	0	10	S
0.75	R	0.75	28	0	11	S
0.70	R	0.7	27	0	12	S
0.86	R	0.86	32	0	13	S
0.51	R	0.51	19	0	14	S
0.91	R	0.91	34	0	15	S
0.83	R	0.83	30.5	0	16	R
0.79	R	0.79	29	0	17	R
0.90	R	0.9	33	0	18	R
0.66	R	0.66	24.5	0	19	R
0.69	R	0.69	26	0	20	R
0.290	S	-0.192939192	6	6	21	R
0.112	S	-0.370939192	4	4	22.5	R
0.416	S	-0.066939192	15	15	22.5	R
0.027	S	-0.455539192	1	1	24.5	R
0.288	S	-0.194939192	5	5	24.5	R
0.398	S	-0.084939192	12	12	26	R
0.381	S	-0.101939192	11	11	27	R
0.035	S	-0.448239192	2	2	28	R
0.408	S	-0.074939192	14	14	29	R
0.078	S	-0.404739192	3	3	30.5	R
0.402	S	-0.080939192	13	13	30.5	R
0.330	S	-0.152939192	8	8	32	R
0.293	S	-0.189939192	7	7	33	R
0.340	S	-0.142939192	9	9	34	R
0.355	S	-0.127939192	10	10	35	R
Sum =				630	120	

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 *n*
 # of S: 15 *m*
 Avg Rank R: 25.5
 Avg Rank S: 8

For *m* or *n* greater than 20, the critical value (*k*) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

z = 97.5% percentile of standard normal distribution = 1.960

k = 328.8

$\alpha_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of *r* and *k* for the Quantile Test When α is Approximately 0.05

15 *n* (number of survey unit measurements)
 20 *m* (number of reference area measurements)

Use:

m = 20

n = 15

6 *r*

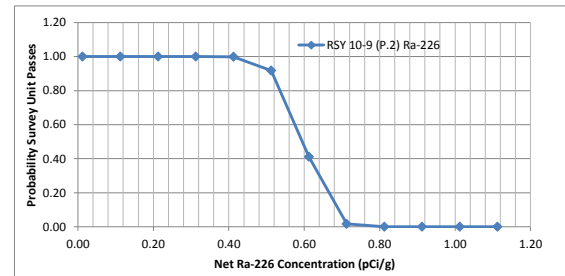
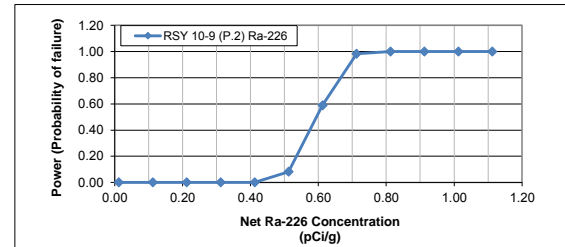
5 *k*

0.04 α

If *k* or more of the *r* largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

Concentration	Background (C)	SD	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	5.0841	28.78565	5.3652262	37.8765	0.00	1.00	
0.8	0.11	-2.3	0.03855	0.00847	11.565	80.21025	8.9560178	21.9668	0.00	1.00	
0.9	0.21	-1.7	0.11467	0.03935	34.3998	289.8324	17.024466	10.2147	0.00	1.00	
1.0	0.31	-1.1	0.21834	0.09889	65.5014	558.2831	23.628015	6.04361	0.00	1.00	
1.1	0.41	-0.4	0.38865	0.22917	116.5947	844.7074	29.063851	3.1553	0.00	1.00	
1.2	0.51	0.2	0.55623	0.39139	166.8693	885.8423	29.763102	1.39202	0.08	0.92	
1.3	0.61	0.8	0.71420	0.57447	214.2588	698.7275	26.433453	-0.22543	0.59	0.41	
1.4	0.71	1.4	0.83890	0.74170	251.6703	416.1806	20.400506	-2.12594	0.98	0.02	
1.5	0.81	2.0	0.92135	0.86577	276.405	188.8629	13.74274	-4.95571	1.00	0.00	
1.6	0.91	2.7	0.97188	0.94921	291.5643	54.28618	7.3679158	-11.3009	1.00	0.00	
1.7	1.01	3.3	0.99019	0.98164	297.0564	14.43559	3.7994199	-23.3605	1.00	0.00	
1.8	1.11	3.9	0.99766	0.99550	299.2983	2.378397	1.5422051	-59.0053	1.00	0.00	



WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 11-1(P.1)
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

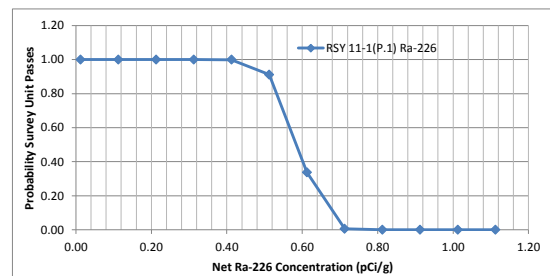
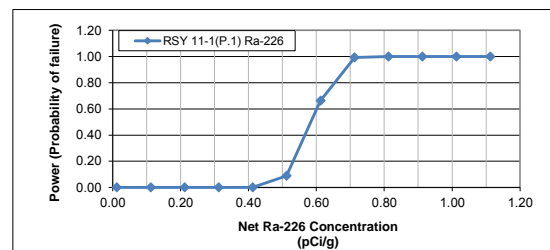
The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2.5	S
0.83	R	0.83	35.5	0	2.5	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9.5	S
0.66	R	0.66	29.5	0	9.5	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.472	S	-0.010939192	18	18	21	R
0.398	S	-0.084939192	9.5	9.5	22	R
0.490	S	0.007060808	20	20	23	R
0.411	S	-0.071939192	12	12	24	R
0.399	S	-0.083939192	11	11	25	R
0.468	S	-0.014939192	17	17	26	R
0.398	S	-0.084939192	9.5	9.5	27.5	R
0.365	S	-0.117939192	2.5	2.5	27.5	R
0.390	S	-0.092939192	7	7	29.5	R
0.451	S	-0.031939192	15	15	29.5	R
0.484	S	0.001060808	19	19	31	R
0.231	S	-0.251939192	1	1	32	R
0.387	S	-0.095939192	6	6	33	R
0.384	S	-0.098939192	5	5	34	R
0.459	S	-0.023939192	16	16	35.5	R
0.367	S	-0.115939192	4	4	35.5	R
0.422	S	-0.060939192	13	13	37	R
0.445	S	-0.037939192	14	14	38	R
0.396	S	-0.086939192	8	8	39	R
0.365	S	-0.117939192	2.5	2.5	40	R
Sum =			820	210		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.058
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count	20	m
SD	0.058	
Median	0.399	
Count	20	n
SD	0.161	
Critical Value	482.5	

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	6.7788	43.18647	6.5716411	40.3521	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	15.42	120.9048	10.995672	23.3308	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	45.8664	438.8427	20.948572	10.7927	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	87.3352	846.8185	29.100146	6.3444	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	155.4596	1282.524	35.812351	3.25303	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	222.4924	1345.121	36.675894	1.34873	0.09	0.91
1.3	0.61	0.8	0.71420	0.57447	285.6784	1060.423	32.564133	-0.42133	0.66	0.34
1.4	0.71	1.4	0.83890	0.74170	335.5604	630.7938	25.115608	-2.53238	0.99	0.01
1.5	0.81	2.0	0.92135	0.86577	368.54	285.5796	16.8991	-5.71521	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	388.7524	81.69222	9.0383749	-12.922	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	396.0752	21.5749	4.6448794	-26.7213	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	399.0644	3.510254	1.8735671	-67.8418	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 20 m
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 482.5$

$a_w = a/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

20 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 20$
 $4 r$
 $4 k$
 0.053 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S.

The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 11-1 (P.2)
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

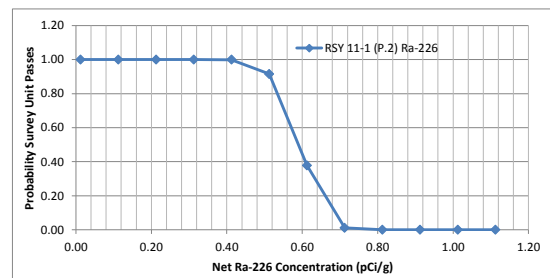
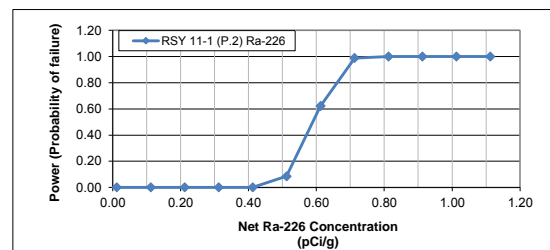
The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	19	0	1	S
0.98	R	0.98	37	0	2	S
0.83	R	0.83	32.5	0	3	S
0.54	R	0.54	22	0	4	S
0.57	R	0.57	24.5	0	5	S
0.55	R	0.55	23	0	6	S
0.57	R	0.57	24.5	0	7	S
0.46	R	0.46	18	0	8.5	S
0.50	R	0.5	20	0	8.5	S
0.66	R	0.66	26.5	0	10.5	S
0.75	R	0.75	30	0	10.5	S
0.70	R	0.7	29	0	12	S
0.86	R	0.86	34	0	13	S
0.51	R	0.51	21	0	14	S
0.91	R	0.91	36	0	15	S
0.83	R	0.83	32.5	0	16	S
0.79	R	0.79	31	0	17	S
0.90	R	0.9	35	0	18	R
0.66	R	0.66	26.5	0	19	R
0.69	R	0.69	28	0	20	R
0.336	S	-0.146939192	5	5	21	R
0.383	S	-0.099939192	14	14	22	R
0.391	S	-0.091939192	15	15	23	R
0.333	S	-0.149939192	4	4	24.5	R
0.351	S	-0.131939192	8.5	8.5	24.5	R
0.348	S	-0.134939192	7	7	26.5	R
0.252	S	-0.230939192	1	1	26.5	R
0.340	S	-0.142939192	6	6	28	R
0.358	S	-0.124939192	12	12	29	R
0.307	S	-0.175939192	2	2	30	R
0.463	S	-0.019939192	16	16	31	R
0.376	S	-0.106939192	13	13	32.5	R
0.354	S	-0.128939192	10.5	10.5	32.5	R
0.467	S	-0.015939192	17	17	34	R
0.354	S	-0.128939192	10.5	10.5	35	R
0.351	S	-0.131939192	8.5	8.5	36	R
0.331	S	-0.151939192	3	3	37	R
Sum =				703	153	

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	17
SU σ	0.051
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count	SU Stats
17	m
SD	0.051
Median	0.351
Count	Ref Stats
SD	0.161
Critical Value	387.3

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	5.76198	34.25764	5.8530028	38.963	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	13.107	95.65061	9.7801127	22.5668	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	38.98644	346.2926	18.608937	10.4695	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	74.23492	667.5508	25.837004	6.17633	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	132.1407	1010.459	31.787724	3.19847	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	189.1185	1059.714	32.553248	1.37296	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	242.8266	835.6784	28.908103	-0.31181	0.62	0.38
1.4	0.71	1.4	0.83890	0.74170	285.2263	497.4727	22.304096	-2.30512	0.99	0.01
1.5	0.81	2.0	0.92135	0.86577	313.259	225.5238	15.017451	-5.29027	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	330.4395	64.68996	8.0430069	-12.0138	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	336.6639	17.15167	4.1414574	-24.8345	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	339.2047	2.810796	1.6765428	-62.8627	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 17 m
 Avg Rank R: 27.5
 Avg Rank S: 9

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 387.3$

$a_w = a/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

17 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 20$
 4 r
 4 k
 0.053 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S. The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 11-1(P.3)
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

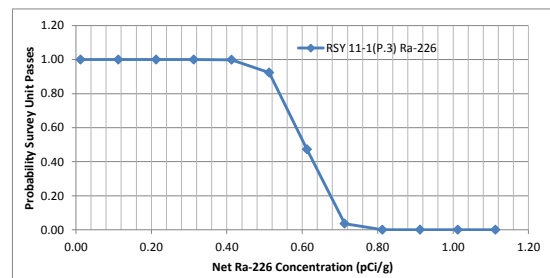
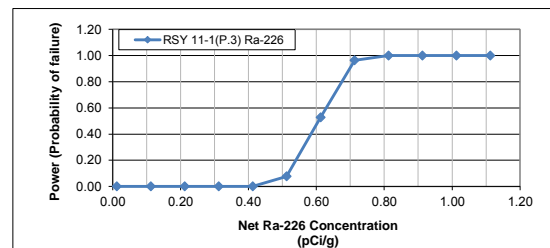
POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4.5	S
0.57	R	0.57	19.5	0	4.5	S
0.55	R	0.55	18	0	6	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.251	S	-0.231939192	2	2	21.5	R
0.334	S	-0.148939192	7	7	21.5	R
0.254	S	-0.228939192	3	3	23	R
0.238	S	-0.244939192	1	1	24	R
0.330	S	-0.152939192	6	6	25	R
0.271	S	-0.211939192	4.5	4.5	26	R
0.383	S	-0.099939192	10	10	27.5	R
0.397	S	-0.085939192	11	11	27.5	R
0.271	S	-0.211939192	4.5	4.5	29	R
0.365	S	-0.117939192	9	9	30	R
0.402	S	-0.080939192	12	12	31	R
0.349	S	-0.133939192	8	8	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.061
Z(1-alpha)	1.960
Z(1-beta)	1.645

Concentration	Background (C)	SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
1.5	0.81	2.0	0.92135	0.86577	221.124	138.9359	11.787107	-4.34973	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_W = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)
 Use:
 $m = 20$
 $n = 15$
 $6 r$
 $5 k$
 0.04 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 11-5
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

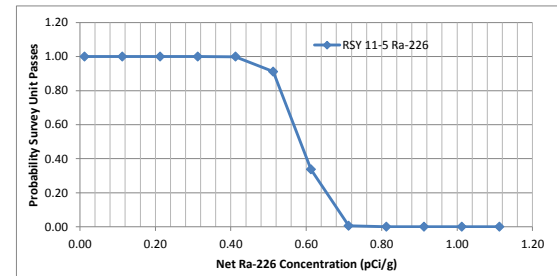
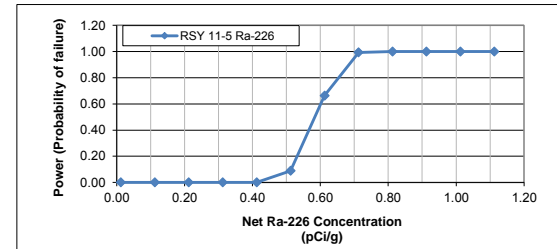
The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.072	S	-0.410639192	4	4	21	R
0.366	S	-0.116939192	17	17	22	R
0.407	S	-0.075939192	19	19	23	R
0.051	S	-0.432039192	2	2	24	R
0.259	S	-0.223939192	10	10	25	R
0.067	S	-0.416039192	3	3	26	R
0.313	S	-0.169939192	13	13	27.5	R
0.315	S	-0.167939192	14	14	27.5	R
0.324	S	-0.158939192	15	15	29.5	R
0.296	S	-0.186939192	12	12	29.5	R
0.101	S	-0.381939192	5	5	31	R
0.234	S	-0.248939192	7	7	32	R
0.024	S	-0.459239192	1	1	33	R
0.334	S	-0.148939192	16	16	34	R
0.419	S	-0.063939192	20	20	35.5	R
0.244	S	-0.238939192	9	9	35.5	R
0.225	S	-0.257939192	6	6	37	R
0.235	S	-0.247939192	8	8	38	R
0.279	S	-0.203939192	11	11	39	R
0.394	S	-0.088939192	18	18	40	R
Sum =			820	210		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.124
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count	20	m
SD	0.124	
Median	0.269	
Count	20	n
SD	0.161	
Critical Value	482.5	

Concentration	Background (C)	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	6.7788	43.18647	6.5716411	40.3521	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	15.42	120.9048	10.995672	23.3308	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	45.8664	438.8427	20.948572	10.7927	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	87.3352	846.8185	29.100146	6.3444	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	155.4596	1282.524	35.812351	3.25303	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	222.4924	1345.121	36.675894	1.34873	0.09	0.91
1.3	0.61	0.8	0.71420	0.57447	285.6784	1060.423	32.564133	-0.42133	0.66	0.34
1.4	0.71	1.4	0.83890	0.74170	335.5604	630.7938	25.115608	-2.53238	0.99	0.01
1.5	0.81	2.0	0.92135	0.86577	368.54	285.5796	16.8991	-5.71521	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	388.7524	81.69222	9.0383749	-12.922	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	396.0752	21.5749	4.6448794	-26.7213	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	399.0644	3.510254	1.8735671	-67.8418	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 20 m
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 482.5$

$a_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

20 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 20$
 $r = 4$
 $k = 4$
 0.053 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S.

The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 11-7
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

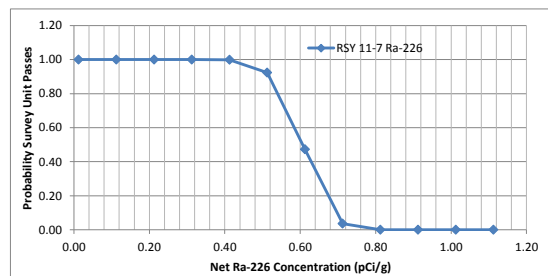
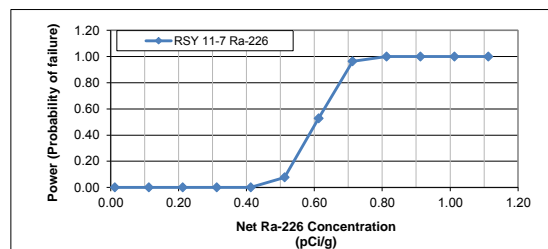
The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4	S
0.57	R	0.57	19.5	0	5	S
0.55	R	0.55	18	0	6	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.364	S	-0.118939192	8	8	21.5	R
0.306	S	-0.176939192	3	3	21.5	R
0.401	S	-0.081939192	11	11	23	R
0.393	S	-0.089939192	10	10	24	R
0.114	S	-0.368939192	1	1	25	R
0.341	S	-0.141939192	6	6	26	R
0.337	S	-0.145939192	5	5	27.5	R
0.328	S	-0.154939192	4	4	27.5	R
0.433	S	-0.049939192	12	12	29	R
0.361	S	-0.121939192	7	7	30	R
0.295	S	-0.187939192	2	2	31	R
0.388	S	-0.094939192	9	9	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.081
Z(1-alpha)	1.960
Z(1-beta)	1.645

Count	SU Stats	Concentration	Background (C)	SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
Count	12	0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
SD	0.081	0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
Median	0.351	0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
		1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
		1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
Count	Ref Stats	1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
SD	0.161	1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
		1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
		1.5	0.81	2.0	0.92135	0.86577	221.124	338.9359	11.787107	-4.34973	1.00	0.00
		1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
		1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
		1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00

Critical Value 248.4



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)
 Use:
 $m = 20$
 $n = 15$
 $6 r$
 $5 k$
 0.04 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY 11-9
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

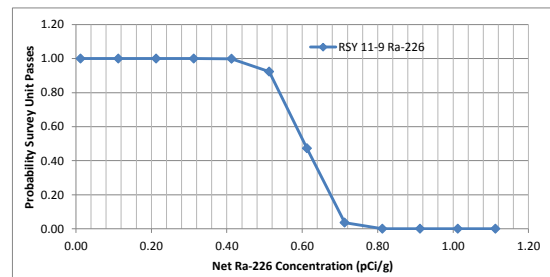
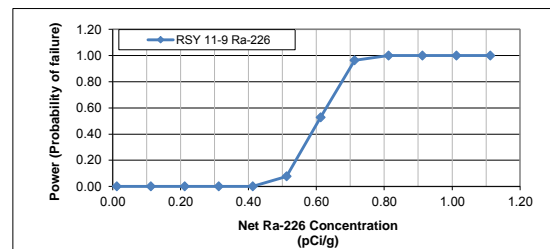
POWER CURVE CALCULATION

The power curve demonstrates that at a Ra-226 concentration above background of 0.81 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the DCGL of 1.00 pCi/g above background and estimated LBGR of 0.483, the SU will pass the WRS test at a 00% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	14	0	1	S
0.98	R	0.98	32	0	2	S
0.83	R	0.83	27.5	0	3	S
0.54	R	0.54	17	0	4	S
0.57	R	0.57	19.5	0	5	S
0.55	R	0.55	18	0	6	S
0.57	R	0.57	19.5	0	7	S
0.46	R	0.46	13	0	8	S
0.50	R	0.5	15	0	9	S
0.66	R	0.66	21.5	0	10	S
0.75	R	0.75	25	0	11	S
0.70	R	0.7	24	0	12	S
0.86	R	0.86	29	0	13	R
0.51	R	0.51	16	0	14	R
0.91	R	0.91	31	0	15	R
0.83	R	0.83	27.5	0	16	R
0.79	R	0.79	26	0	17	R
0.90	R	0.9	30	0	18	R
0.66	R	0.66	21.5	0	19.5	R
0.69	R	0.69	23	0	19.5	R
0.359	S	-0.123939192	5	5	21.5	R
0.321	S	-0.161939192	3	3	21.5	R
0.410	S	-0.072939192	10	10	23	R
0.386	S	-0.096939192	8	8	24	R
0.298	S	-0.184939192	2	2	25	R
0.372	S	-0.110939192	7	7	26	R
0.250	S	-0.232939192	1	1	27.5	R
0.454	S	-0.028939192	12	12	27.5	R
0.332	S	-0.150939192	4	4	29	R
0.404	S	-0.078939192	9	9	30	R
0.413	S	-0.069939192	11	11	31	R
0.367	S	-0.115939192	6	6	32	R
Sum =			528	78		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	12
SU σ	0.056
Z(1-alpha)	1.960
Z(1-beta)	1.645

Concentration	Background (C)	SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.7	0.01	-2.9	0.01695	0.00269	4.06728	21.29851	4.6150304	35.9231	0.00	1.00
0.8	0.11	-2.3	0.03855	0.00847	9.252	59.1434	7.6904745	20.8831	0.00	1.00
0.9	0.21	-1.7	0.11467	0.03935	27.51984	213.0022	14.594593	9.75248	0.00	1.00
1.0	0.31	-1.1	0.21834	0.09889	52.40112	409.7477	20.242225	5.80234	0.00	1.00
1.1	0.41	-0.4	0.38865	0.22917	93.27576	619.5167	24.890092	3.07663	0.00	1.00
1.2	0.51	0.2	0.55623	0.39139	133.4954	649.6345	25.487928	1.42647	0.08	0.92
1.3	0.61	0.8	0.71420	0.57447	171.407	512.6189	22.64109	-0.06862	0.53	0.47
1.4	0.71	1.4	0.83890	0.74170	201.3362	305.6255	17.482147	-1.80086	0.96	0.04
1.5	0.81	2.0	0.92135	0.86577	221.124	138.9359	11.787107	-4.34973	1.00	0.00
1.6	0.91	2.7	0.97188	0.94921	233.2514	40.07711	6.3306488	-10.0145	1.00	0.00
1.7	1.01	3.3	0.99019	0.98164	237.6451	10.71059	3.272704	-20.7143	1.00	0.00
1.8	1.11	3.9	0.99766	0.99550	239.4386	1.780656	1.3344124	-52.1468	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 12 m
 Avg Rank R: 22.5
 Avg Rank S: 6.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 248.4$

$\alpha_w = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c Values of r and k for the Quantile Test When α is Approximately 0.05

12 n (number of survey unit measurements)
 20 m (number of reference area measurements)
 Use:
 $m = 20$
 $n = 15$
 $6 r$
 $5 k$
 0.04 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 6 adjusted measurements are from S. The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY Pad 14-2
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

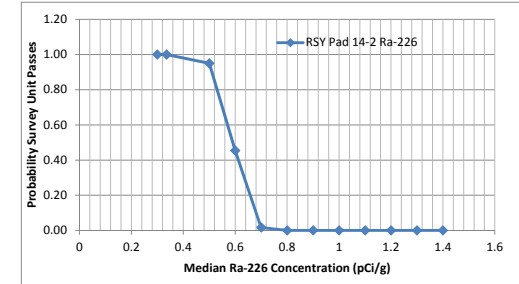
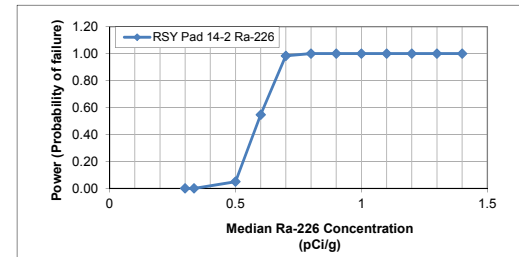
POWER CURVE CALCULATION

The power curve demonstrates that at a median Ra-226 concentration of 0.8 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the observed Ra-226 median concentration of 0.336 pCi/g and estimated LBGR of 0.483, the SU will pass the WRS test at a 100% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT RANKS	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12	S
0.86	R	0.86	37	0	13	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19.5	S
0.69	R	0.69	31	0	19.5	S
0.375	S	-0.108	17	17	21	R
0.347	S	-0.136	11	11	22	R
0.214	S	-0.269	1	1	23	R
0.237	S	-0.246	3	3	24	R
0.355	S	-0.128	13	13	25	R
0.403	S	-0.08	19.5	19.5	26	R
0.280	S	-0.203	6	6	27.5	R
0.388	S	-0.095	18	18	27.5	R
0.222	S	-0.261	2	2	29.5	R
0.243	S	-0.24	4	4	29.5	R
0.362	S	-0.121	14	14	31	R
0.275	S	-0.208	5	5	32	R
0.364	S	-0.119	15	15	33	R
0.367	S	-0.116	16	16	34	R
0.300	S	-0.183	7	7	35.5	R
0.318	S	-0.165	9	9	35.5	R
0.403	S	-0.08	19.5	19.5	37	R
0.310	S	-0.173	8	8	38	R
0.324	S	-0.159	10	10	39	R
0.351	S	-0.132	12	12	40	R
Sum =			820	210		

Number of Samples	
σ	0.161
LBGR	0.483
Δ/σ	3.21
Pr	0.983039
N	22.28
N/2	12
Actual N	20
SU σ	0.060
Z(1-alpha)	1.960
Z(1-beta)	1.645

Measurement	(C-LBGR)/SD	p1	p2	E(Wmw)	Var(Wmw)	SD(Wmw)	z	Power	Probability of passing
0.3	-1.1	0.218338	0.098892	87.3352	847	29.10015	6.3444	0.00	1.00
0.336	-0.9	0.262259	0.12892	104.9036	991.523	31.48846	5.305264	0.00	1.00
0.5	0.1	0.528186	0.361978	211.2744	1361.245	36.89505	1.644767	0.05	0.95
0.6	0.7	0.689691	0.544073	275.8764	1125.277	33.54514	-0.1168	0.55	0.45
0.7	1.3	0.821015	0.716331	328.406	701.2134	26.48043	-2.13168	0.98	0.02
0.8	2.0	0.92135	0.865767	368.54	285.5796	16.8991	-5.71521	1.00	0.00
0.9	2.6	0.967004	0.940817	386.8016	99.71092	9.985535	-11.501	1.00	0.00
1	3.2	0.988174	0.977961	395.2696	27.37027	5.231661	-23.5702	1.00	0.00
1.1	3.8	0.997661	0.995497	399.0644	3.510254	1.873567	-67.8418	1.00	0.00
1.2	4.5	0.999796	0.999599	399.9184	0.187351	0.43284	-295.629	1.00	0.00
1.3	5.1	0.999796	0.999599	399.9184	0.187351	0.43284	-295.629	1.00	0.00
1.4	5.7	0.999989	0.999978	399.9956	0.004398	0.066318	-1930.65	1.00	0.00



* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 20 m
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 482.5$

$\alpha_W = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

From NUREG 1505, Table A.7c: Values of r and k for the Quantile Test When α is Approximately 0.05

20 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 20$
 4 r
 4 k
 0.053 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S. The null hypothesis is accepted.

WILCOXON RANK SUM TEST

Nuclide: Ra-226 Location: RSY Pad 17-2
 LBGR: 0.483 pCi/g

DCGL 1
 LBGR = 3x Background Std Deviation
 LBGR = 0.483

POWER CURVE CALCULATION

The power curve demonstrates that at a median Ra-226 concentration of 0.8 pCi/g or greater, the SU will fail the WRS test with a 100% probability. At the observed Ra-226 median concentration of 0.390 pCi/g and estimated LBGR of 0.483, the SU will pass the WRS test at a 100% probability.

DATA	AREA	ADJUSTED DATA	RANKS	SURVEY UNIT	Sorted Ranks	Location Associated with Sorted Rank
0.49	R	0.49	22	0	1	S
0.98	R	0.98	40	0	2	S
0.83	R	0.83	35.5	0	3	S
0.54	R	0.54	25	0	4	S
0.57	R	0.57	27.5	0	5	S
0.55	R	0.55	26	0	6	S
0.57	R	0.57	27.5	0	7	S
0.46	R	0.46	21	0	8	S
0.50	R	0.5	23	0	9	S
0.66	R	0.66	29.5	0	10	S
0.75	R	0.75	33	0	11	S
0.70	R	0.7	32	0	12.5	S
0.86	R	0.86	37	0	12.5	S
0.51	R	0.51	24	0	14	S
0.91	R	0.91	39	0	15	S
0.83	R	0.83	35.5	0	16	S
0.79	R	0.79	34	0	17	S
0.90	R	0.9	38	0	18	S
0.66	R	0.66	29.5	0	19	S
0.69	R	0.69	31	0	20	S
0.367	S	-0.116	8	8	21	R
0.386	S	-0.097	10	10	22	R
0.512	S	0.029	20	20	23	R
0.366	S	-0.117	7	7	24	R
0.394	S	-0.089	11	11	25	R
0.443	S	-0.04	17	17	26	R
0.406	S	-0.077	14	14	27.5	R
0.2	S	-0.283	2	2	27.5	R
0.399	S	-0.084	12.5	12.5	29.5	R
0.484	S	0.011	18	18	29.5	R
0.43	S	-0.053	16	16	31	R
0.426	S	-0.057	15	15	32	R
0.172	S	-0.311	1	1	33	R
0.261	S	-0.222	3	3	34	R
0.304	S	-0.179	4	4	35.5	R
0.362	S	-0.121	6	6	35.5	R
0.372	S	-0.111	9	9	37	R
0.5	S	0.017	19	19	38	R
0.333	S	-0.15	5	5	39	R
0.399	S	-0.084	12.5	12.5	40	R
Sum =			820	210		

* This spreadsheet is designed to work with a set of twenty measurements, 10 from the survey unit (S) and 10 from the background reference area (R). If a different number of measurements have been performed, it is necessary to modify the spreadsheet to account for the change in the number of measurements.

of R: 20 n
 # of S: 20 m
 Avg Rank R: 30.5
 Avg Rank S: 10.5

For m or n greater than 20, the critical value (k) can be calculated for Scenario B from

$$\frac{m(n+m+1)}{2} + z \sqrt{\frac{nm(n+m+1)}{12}}$$

$z = 97.5\%$ percentile of standard normal distribution = 1.960

$k = 482.5$

$\alpha_W = \alpha/2 = 0.025$

$\beta = 0.05$

Since the sum of survey unit ranks is less than the critical value, the null hypothesis that the survey unit concentrations do not exceed the LBGR is accepted (i.e., survey unit passes). Scenario B

QUANTILE TEST

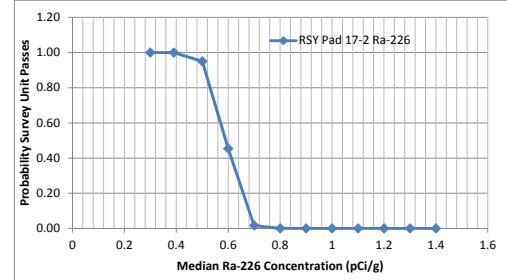
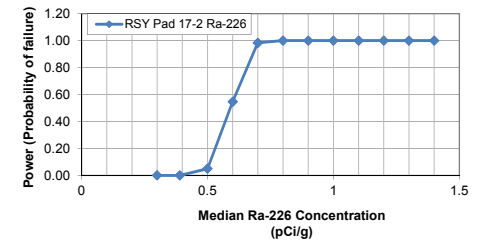
From NUREG 1505, Table A.7c: Values of r and k for the Quantile Test When α is Approximately 0.05

20 n (number of survey unit measurements)
 20 m (number of reference area measurements)

Use:
 $m = 20$
 $n = 20$
 4 r
 4 k
 0.053 α

If k or more of the r largest measurements in the combined ranked data set are from the survey unit, the null hypothesis of the Quantile test (that there is no residual radioactivity above the LBGR in any part of the survey unit) is rejected.

0 of the largest 4 adjusted measurements are from S. The null hypothesis is accepted.



Appendix E

RESRAD Dose and Risk Modeling

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\RESRAD\7.2\USERFILES\NSTI SWDA NORTH POINT SU1.RAD

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Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\RESRAD\7.2\USERFILES\NSTI SWDA NORTH POINT SU1.RAD

Dose Conversion Factor (and Related) Parameter Summary

Dose Library: DOE STD-1196-2011 (Reference Person)

Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	At-218 (Source: DCFPAK3.02)	5.567E-05	5.567E-05	DCF1(1)
A-1	Bi-210 (Source: DCFPAK3.02)	5.473E-03	5.473E-03	DCF1(2)
A-1	Bi-214 (Source: DCFPAK3.02)	9.135E+00	9.135E+00	DCF1(3)
A-1	Hg-206 (Source: DCFPAK3.02)	6.127E-01	6.127E-01	DCF1(4)
A-1	Pb-210 (Source: DCFPAK3.02)	2.092E-03	2.092E-03	DCF1(5)
A-1	Pb-214 (Source: DCFPAK3.02)	1.257E+00	1.257E+00	DCF1(6)
A-1	Po-210 (Source: DCFPAK3.02)	5.641E-05	5.641E-05	DCF1(7)
A-1	Po-214 (Source: DCFPAK3.02)	4.801E-04	4.801E-04	DCF1(8)
A-1	Po-218 (Source: DCFPAK3.02)	9.228E-09	9.228E-09	DCF1(9)
A-1	Ra-226 (Source: DCFPAK3.02)	3.176E-02	3.176E-02	DCF1(10)
A-1	Rn-218 (Source: DCFPAK3.02)	4.259E-03	4.259E-03	DCF1(11)
A-1	Rn-222 (Source: DCFPAK3.02)	2.130E-03	2.130E-03	DCF1(12)
A-1	Tl-206 (Source: DCFPAK3.02)	1.278E-02	1.278E-02	DCF1(13)
A-1	Tl-210 (Source: DCFPAK3.02)	1.677E+01	1.677E+01	DCF1(14)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	4.017E-02	2.231E-02	DCF2(1)
B-1	Ra-226+D	3.823E-02	3.811E-02	DCF2(2)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	1.026E-02	3.774E-03	DCF3(1)
D-1	Ra-226+D	1.677E-03	1.676E-03	DCF3(2)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	1.000E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	5.000E+00	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T (2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T (3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T (4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T (5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T (6)
R011	Times for calculations (yr)	2.500E+02	3.000E+02	---	T (7)
R011	Times for calculations (yr)	5.000E+02	1.000E+03	---	T (8)
R011	Times for calculations (yr)	7.500E+02	0.000E+00	---	T (9)
R011	Times for calculations (yr)	1.000E+03	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Pb-210	4.600E-02	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	4.600E-02	0.000E+00	---	S1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	5.300E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	4.000E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.500E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.000E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.663E-03	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.374E-03	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R017	Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	5.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.500E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA (1)
R017	Ring 2	not used	2.732E-01	---	FRACA (2)
R017	Ring 3	not used	0.000E+00	---	FRACA (3)
R017	Ring 4	not used	0.000E+00	---	FRACA (4)
R017	Ring 5	not used	0.000E+00	---	FRACA (5)
R017	Ring 6	not used	0.000E+00	---	FRACA (6)
R017	Ring 7	not used	0.000E+00	---	FRACA (7)
R017	Ring 8	not used	0.000E+00	---	FRACA (8)
R017	Ring 9	not used	0.000E+00	---	FRACA (9)
R017	Ring 10	not used	0.000E+00	---	FRACA (10)
R017	Ring 11	not used	0.000E+00	---	FRACA (11)
R017	Ring 12	not used	0.000E+00	---	FRACA (12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.600E+02	1.600E+02	---	DIET (1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	1.400E+01	---	DIET (2)
R018	Milk consumption (L/yr)	9.200E+01	9.200E+01	---	DIET (3)
R018	Meat and poultry consumption (kg/yr)	6.300E+01	6.300E+01	---	DIET (4)
R018	Fish consumption (kg/yr)	5.400E+00	5.400E+00	---	DIET (5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET (6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	5.100E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.500E+00	FPLANT
R018	Contamination fraction of meat	-1	-1	0.500E-01	FMEAT
R018	Contamination fraction of milk	-1	-1	0.500E-01	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV (1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV (2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV (3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE (1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE (2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE (3)

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSNI
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSNI
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	active

Summary : RESRAD Default Parameters

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Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area: 1000.00 square meters
Thickness: 2.00 meters
Cover Depth: 0.00 meters

Pb-210	4.600E-02
Ra-226	4.600E-02

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 5.000E+00 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
TDOSE(t):	9.566E-01	9.545E-01	9.501E-01	9.343E-01	8.882E-01	7.340E-01	4.822E-01	2.757E-01	4.275E-01	4.645E-01
M(t):	1.913E-01	1.909E-01	1.900E-01	1.869E-01	1.776E-01	1.468E-01	9.644E-02	5.514E-02	8.551E-02	9.291E-02

Maximum TDOSE(t): 9.566E-01 mrem/yr at t = 0.000E+00 years

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\RESRAD\7.2\USERFILES\NSTI SWDA NORTH POINT SU1.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.920E-04	0.0002	9.161E-05	0.0001	0.000E+00	0.0000	4.038E-01	0.4222	1.381E-03	0.0014	6.727E-04	0.0007	1.270E-02	0.0133
Ra-226	2.578E-01	0.2696	8.996E-05	0.0001	0.000E+00	0.0000	2.757E-01	0.2882	8.164E-04	0.0009	9.717E-04	0.0010	2.309E-03	0.0024
Total	2.580E-01	0.2698	1.816E-04	0.0002	0.000E+00	0.0000	6.795E-01	0.7103	2.197E-03	0.0023	1.644E-03	0.0017	1.501E-02	0.0157

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.189E-01	0.4379
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.377E-01	0.5621
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.566E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.858E-04	0.0002	8.865E-05	0.0001	0.000E+00	0.0000	3.908E-01	0.4094	1.336E-03	0.0014	6.509E-04	0.0007	1.229E-02	0.0129
Ra-226	2.571E-01	0.2694	9.251E-05	0.0001	0.000E+00	0.0000	2.875E-01	0.3012	8.587E-04	0.0009	9.903E-04	0.0010	2.692E-03	0.0028
Total	2.573E-01	0.2696	1.812E-04	0.0002	0.000E+00	0.0000	6.782E-01	0.7105	2.195E-03	0.0023	1.641E-03	0.0017	1.499E-02	0.0157

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.053E-01	0.4246
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.492E-01	0.5754
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.545E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\RESRAD\7.2\USERFILES\NSTI SWDA NORTH POINT SU1.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.740E-04	0.0002	8.301E-05	0.0001	0.000E+00	0.0000	3.659E-01	0.3851	1.251E-03	0.0013	6.095E-04	0.0006	1.151E-02	0.0121
Ra-226	2.557E-01	0.2691	9.734E-05	0.0001	0.000E+00	0.0000	3.094E-01	0.3257	9.344E-04	0.0010	1.024E-03	0.0011	3.418E-03	0.0036
Total	2.559E-01	0.2693	1.803E-04	0.0002	0.000E+00	0.0000	6.753E-01	0.7108	2.185E-03	0.0023	1.633E-03	0.0017	1.493E-02	0.0157

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.795E-01	0.3994
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.706E-01	0.6006
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.501E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\RESRAD\7.2\USERFILES\NSTI SWDA NORTH POINT SU1.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.382E-04	0.0001	6.594E-05	0.0001	0.000E+00	0.0000	2.906E-01	0.3111	9.937E-04	0.0011	4.842E-04	0.0005	9.144E-03	0.0098
Ra-226	2.508E-01	0.2684	1.115E-04	0.0001	0.000E+00	0.0000	3.741E-01	0.4004	1.158E-03	0.0012	1.122E-03	0.0012	5.575E-03	0.0060
Total	2.509E-01	0.2685	1.774E-04	0.0002	0.000E+00	0.0000	6.647E-01	0.7115	2.152E-03	0.0023	1.606E-03	0.0017	1.472E-02	0.0158

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.015E-01	0.3227
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.328E-01	0.6773
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.343E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	7.159E-05	0.0001	3.416E-05	0.0000	0.000E+00	0.0000	1.506E-01	0.1695	5.148E-04	0.0006	2.508E-04	0.0003	4.737E-03	0.0053
Ra-226	2.371E-01	0.2670	1.347E-04	0.0002	0.000E+00	0.0000	4.826E-01	0.5434	1.536E-03	0.0017	1.275E-03	0.0014	9.328E-03	0.0105
Total	2.372E-01	0.2671	1.688E-04	0.0002	0.000E+00	0.0000	6.332E-01	0.7129	2.050E-03	0.0023	1.526E-03	0.0017	1.406E-02	0.0158

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.562E-01	0.1758
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.320E-01	0.8242
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.882E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\RESRAD\7.2\USERFILES\NSTI SWDA NORTH POINT SU1.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	7.163E-06	0.0000	3.418E-06	0.0000	0.000E+00	0.0000	1.506E-02	0.0205	5.151E-05	0.0001	2.509E-05	0.0000	4.740E-04	0.0006
Ra-226	1.949E-01	0.2655	1.362E-04	0.0002	0.000E+00	0.0000	5.093E-01	0.6938	1.647E-03	0.0022	1.236E-03	0.0017	1.121E-02	0.0153
Total	1.949E-01	0.2655	1.396E-04	0.0002	0.000E+00	0.0000	5.244E-01	0.7144	1.699E-03	0.0023	1.261E-03	0.0017	1.169E-02	0.0159

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.563E-02	0.0213
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.184E-01	0.9787
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.340E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 2.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	5.161E-08	0.0000	2.463E-08	0.0000	0.000E+00	0.0000	1.086E-04	0.0002	3.711E-07	0.0000	1.808E-07	0.0000	3.415E-06	0.0000
Ra-226	1.279E-01	0.2653	9.171E-05	0.0002	0.000E+00	0.0000	3.444E-01	0.7143	1.116E-03	0.0023	8.280E-04	0.0017	7.678E-03	0.0159
Total	1.279E-01	0.2653	9.173E-05	0.0002	0.000E+00	0.0000	3.445E-01	0.7146	1.116E-03	0.0023	8.282E-04	0.0017	7.682E-03	0.0159

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 2.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.126E-04	0.0002
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.821E-01	0.9998
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.822E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 5.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.387E-11	0.0000	6.620E-12	0.0000	0.000E+00	0.0000	2.918E-08	0.0000	9.976E-11	0.0000	4.861E-11	0.0000	9.180E-10	0.0000
Ra-226	6.341E-02	0.2300	4.548E-05	0.0002	0.000E+00	0.0000	1.708E-01	0.6195	5.533E-04	0.0020	4.106E-04	0.0015	3.808E-03	0.0138
Total	6.341E-02	0.2300	4.548E-05	0.0002	0.000E+00	0.0000	1.708E-01	0.6195	5.533E-04	0.0020	4.106E-04	0.0015	3.808E-03	0.0138

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 5.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.027E-08	0.0000
Ra-226	3.393E-02	0.1231	5.802E-05	0.0002	0.000E+00	0.0000	2.619E-03	0.0095	3.087E-05	0.0001	3.816E-05	0.0001	2.757E-01	1.0000
Total	3.393E-02	0.1231	5.802E-05	0.0002	0.000E+00	0.0000	2.619E-03	0.0095	3.087E-05	0.0001	3.816E-05	0.0001	2.757E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 7.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.730E-15	0.0000	1.780E-15	0.0000	0.000E+00	0.0000	7.844E-12	0.0000	2.682E-14	0.0000	1.307E-14	0.0000	2.468E-13	0.0000
Ra-226	3.144E-02	0.0735	2.254E-05	0.0001	0.000E+00	0.0000	8.467E-02	0.1980	2.743E-04	0.0006	2.035E-04	0.0005	1.888E-03	0.0044
Total	3.144E-02	0.0735	2.254E-05	0.0001	0.000E+00	0.0000	8.467E-02	0.1980	2.743E-04	0.0006	2.035E-04	0.0005	1.888E-03	0.0044

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 7.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.978E-12	0.0000	6.239E-15	0.0000	0.000E+00	0.0000	2.294E-13	0.0000	2.542E-15	0.0000	2.091E-15	0.0000	1.135E-11	0.0000
Ra-226	2.859E-01	0.6687	5.175E-04	0.0012	0.000E+00	0.0000	2.208E-02	0.0516	2.571E-04	0.0006	2.909E-04	0.0007	4.275E-01	1.0000
Total	2.859E-01	0.6687	5.175E-04	0.0012	0.000E+00	0.0000	2.208E-02	0.0516	2.571E-04	0.0006	2.909E-04	0.0007	4.275E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.003E-18	0.0000	4.784E-19	0.0000	0.000E+00	0.0000	2.109E-15	0.0000	7.209E-18	0.0000	3.512E-18	0.0000	6.634E-17	0.0000
Ra-226	1.558E-02	0.0335	1.118E-05	0.0000	0.000E+00	0.0000	4.197E-02	0.0904	1.360E-04	0.0003	1.009E-04	0.0002	9.358E-04	0.0020
Total	1.558E-02	0.0335	1.118E-05	0.0000	0.000E+00	0.0000	4.197E-02	0.0904	1.360E-04	0.0003	1.009E-04	0.0002	9.358E-04	0.0020

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	6.650E-15	0.0000	1.393E-17	0.0000	0.000E+00	0.0000	5.125E-16	0.0000	5.694E-18	0.0000	4.674E-18	0.0000	9.374E-15	0.0000
Ra-226	3.754E-01	0.8081	6.809E-04	0.0015	0.000E+00	0.0000	2.899E-02	0.0624	3.375E-04	0.0007	3.804E-04	0.0008	4.645E-01	1.0000
Total	3.754E-01	0.8081	6.809E-04	0.0015	0.000E+00	0.0000	2.899E-02	0.0624	3.375E-04	0.0007	3.804E-04	0.0008	4.645E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g)									
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	9.106E+00	8.811E+00	8.250E+00	6.554E+00	3.395E+00	3.397E-01	2.448E-03	6.580E-07	2.468E-10	2.038E-13
Ra-226+D	Ra-226+D	1.000E+00	1.152E+01	1.149E+01	1.142E+01	1.120E+01	1.059E+01	8.701E+00	5.711E+00	3.037E+00	2.690E+00	2.362E+00
Ra-226+D	Pb-210+D	1.000E+00	1.684E-01	4.516E-01	9.801E-01	2.555E+00	5.323E+00	6.917E+00	4.769E+00	2.957E+00	6.604E+00	7.737E+00
Ra-226+D	ΣDSR(j)		1.169E+01	1.194E+01	1.240E+01	1.376E+01	1.591E+01	1.562E+01	1.048E+01	5.994E+00	9.294E+00	1.010E+01

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 5.000E+00 mrem/yr

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
Pb-210	5.491E-01	5.675E-01	6.060E-01	7.629E-01	1.473E+00	1.472E+01	2.043E+03	7.599E+06	2.026E+10	2.454E+13
Ra-226	4.278E-01	4.188E-01	4.031E-01	3.634E-01	3.142E-01	3.202E-01	4.771E-01	8.342E-01	5.380E-01	4.951E-01

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	4.600E-02	0.000E+00	9.106E+00	5.491E-01	9.106E+00	5.491E-01
Ra-226	4.600E-02	55.0 ± 0.1	1.657E+01	3.017E-01	1.169E+01	4.278E-01

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Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr										
			t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
Pb-210	Pb-210	1.000E+00		4.189E-01	4.053E-01	3.795E-01	3.015E-01	1.562E-01	1.563E-02	1.126E-04	3.027E-08	1.135E-11	9.374E-15
Pb-210	Ra-226	1.000E+00		7.748E-03	2.077E-02	4.508E-02	1.175E-01	2.449E-01	3.182E-01	2.194E-01	1.360E-01	3.038E-01	3.559E-01
Pb-210	ΣDOSE(j)			4.266E-01	4.261E-01	4.246E-01	4.190E-01	4.010E-01	3.338E-01	2.195E-01	1.360E-01	3.038E-01	3.559E-01
Ra-226	Ra-226	1.000E+00		5.299E-01	5.285E-01	5.255E-01	5.153E-01	4.872E-01	4.003E-01	2.627E-01	1.397E-01	1.237E-01	1.087E-01

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g										
			t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
Pb-210	Pb-210	1.000E+00		4.600E-02	4.451E-02	4.168E-02	3.311E-02	1.715E-02	1.716E-03	1.237E-05	3.324E-09	8.935E-13	2.402E-16
Pb-210	Ra-226	1.000E+00		0.000E+00	1.411E-03	4.086E-03	1.206E-02	2.609E-02	3.428E-02	2.366E-02	1.173E-02	5.817E-03	2.884E-03
Pb-210	ΣS(j):			4.600E-02	4.592E-02	4.576E-02	4.517E-02	4.324E-02	3.600E-02	2.367E-02	1.173E-02	5.817E-03	2.884E-03
Ra-226	Ra-226	1.000E+00		4.600E-02	4.587E-02	4.561E-02	4.473E-02	4.229E-02	3.474E-02	2.280E-02	1.130E-02	5.604E-03	2.778E-03

THF(i) is the thread fraction of the parent nuclide.

RESRAD.EXE execution time = 0.80 seconds

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Time= 3.000E+00	10
Time= 1.000E+01	13
Time= 3.000E+01	16
Time= 1.000E+02	19
Time= 2.500E+02	22
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Cancer Risk Slope Factors Summary Table

Risk Library: DCFPAK3.02 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Pb-210+D	4.30E-09	1.48E-09	SLPF(1,1)
Sf-1	Ra-226+D	8.37E-06	2.50E-08	SLPF(2,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Pb-210+D	3.08E-08	1.59E-08	SLPF(1,2)
Sf-2	Ra-226+D	2.82E-08	2.81E-08	SLPF(2,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	2.67E-09	8.84E-10	SLPF(1,4)
Sf-3	Ra-226+D	3.85E-10	3.85E-10	SLPF(2,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,5)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,5)
Sf-Rn	Radon Inhalation slope factors, 1/(pCi):			
Sf-Rn	Rn-222	1.80E-12	1.80E-12	SLPFRN(1,1)
Sf-Rn	Po-218	3.70E-12	3.70E-12	SLPFRN(1,2)
Sf-Rn	Pb-214	6.20E-12	6.20E-12	SLPFRN(1,3)
Sf-Rn	Bi-214	1.50E-11	1.50E-11	SLPFRN(1,4)
Sf-Rn	Radon K factors, (mrem/WLM):			
Sf-Rn	Rn-222 Indoor	3.88E+02	3.88E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	3.88E+02	3.88E+02	KFACTR(1,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

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Risk Slope and Environmental Transport Factors for the Ground Pathway

Nuclide (i)	Slope(i) *	ETFG(i,t) At Time in Years (dimensionless)									
	t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
At-218	2.740E-11	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01
Bi-210	2.770E-09	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01
Bi-214	7.340E-06	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01
Hg-206	4.830E-07	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01
Pb-210	1.480E-09	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01
Pb-214	9.940E-07	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01
Po-210	4.510E-11	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01
Po-214	3.850E-10	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01
Po-218	6.840E-15	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01
Ra-226	2.500E-08	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01
Rn-218	3.390E-09	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01
Rn-222	1.690E-09	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01
Tl-206	6.110E-09	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01
Tl-210	1.340E-05	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01

* - Units are 1/yr per (pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As pCi/yr at t= 0.000E+00 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	2.319E-03	4.002E+01	1.368E-01	6.667E-02	1.259E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.149E+01
Ra-226	2.319E-03	1.601E+02	4.666E-01	5.714E-01	1.259E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.624E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of

Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)

and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.229E-09	0.0003	2.083E-09	0.0002	4.027E-06	0.3210	1.386E-08	0.0011	6.728E-09	0.0005	1.263E-07	0.0101
Ra-226	5.957E-06	0.4749	1.883E-09	0.0002	2.372E-06	0.1891	6.916E-09	0.0006	8.467E-09	0.0007	1.866E-08	0.0015
Total	5.960E-06	0.4752	3.965E-09	0.0003	6.399E-06	0.5101	2.077E-08	0.0017	1.520E-08	0.0012	1.450E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.179E-06	0.3331
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.365E-06	0.6669
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.254E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.113E-09	0.0002	1.363E-09	0.0001	0.000E+00	0.0000	2.627E-06	0.2095	8.983E-09	0.0007	4.377E-09	0.0003	8.266E-08	0.0066
Ra-226	5.958E-06	0.4750	2.602E-09	0.0002	0.000E+00	0.0000	3.771E-06	0.3006	1.179E-08	0.0009	1.082E-08	0.0009	6.230E-08	0.0050
Total	5.960E-06	0.4752	3.965E-09	0.0003	0.000E+00	0.0000	6.399E-06	0.5101	2.077E-08	0.0017	1.520E-08	0.0012	1.450E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.727E-06	0.2174
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.817E-06	0.7826
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.254E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As pCi/yr at t= 1.000E+00 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	2.315E-03	4.009E+01	1.381E-01	6.701E-02	1.257E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.155E+01
Ra-226	2.312E-03	1.596E+02	4.655E-01	5.699E-01	1.256E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.619E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of

Radon and its Decay Products as pCi/yr at t= 1.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)

and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.222E-09	0.0003	2.078E-09	0.0002	4.020E-06	0.3212	1.384E-08	0.0011	6.718E-09	0.0005	1.260E-07	0.0101
Ra-226	5.941E-06	0.4747	1.877E-09	0.0002	2.365E-06	0.1890	6.897E-09	0.0006	8.444E-09	0.0007	1.860E-08	0.0015
Total	5.944E-06	0.4750	3.956E-09	0.0003	6.385E-06	0.5103	2.074E-08	0.0017	1.516E-08	0.0012	1.446E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.171E-06	0.3334
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.342E-06	0.6666
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.251E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+00 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.045E-09	0.0002	1.319E-09	0.0001	0.000E+00	0.0000	2.542E-06	0.2032	8.692E-09	0.0007	4.235E-09	0.0003	7.999E-08	0.0064
Ra-226	5.942E-06	0.4748	2.637E-09	0.0002	0.000E+00	0.0000	3.842E-06	0.3071	1.205E-08	0.0010	1.093E-08	0.0009	6.466E-08	0.0052
Total	5.944E-06	0.4750	3.956E-09	0.0003	0.000E+00	0.0000	6.385E-06	0.5103	2.074E-08	0.0017	1.516E-08	0.0012	1.446E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.639E-06	0.2109
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.874E-06	0.7891
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.251E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As pCi/yr at t= 3.000E+00 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	2.307E-03	3.995E+01	1.376E-01	6.677E-02	1.253E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.141E+01
Ra-226	2.299E-03	1.588E+02	4.629E-01	5.667E-01	1.249E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.610E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of

Radon and its Decay Products as pCi/yr at t= 3.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)

and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.209E-09	0.0003	2.070E-09	0.0002	4.003E-06	0.3215	1.378E-08	0.0011	6.690E-09	0.0005	1.255E-07	0.0101
Ra-226	5.907E-06	0.4745	1.867E-09	0.0001	2.352E-06	0.1889	6.858E-09	0.0006	8.396E-09	0.0007	1.850E-08	0.0015
Total	5.911E-06	0.4748	3.936E-09	0.0003	6.355E-06	0.5105	2.064E-08	0.0017	1.509E-08	0.0012	1.440E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.154E-06	0.3337
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.295E-06	0.6663
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.245E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+00 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.915E-09	0.0002	1.235E-09	0.0001	0.000E+00	0.0000	2.381E-06	0.1912	8.139E-09	0.0007	3.966E-09	0.0003	7.489E-08	0.0060
Ra-226	5.909E-06	0.4746	2.701E-09	0.0002	0.000E+00	0.0000	3.974E-06	0.3192	1.250E-08	0.0010	1.112E-08	0.0009	6.912E-08	0.0056
Total	5.911E-06	0.4748	3.936E-09	0.0003	0.000E+00	0.0000	6.355E-06	0.5105	2.064E-08	0.0017	1.509E-08	0.0012	1.440E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.471E-06	0.1985
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.978E-06	0.8015
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.245E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As pCi/yr at t= 1.000E+01 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	2.277E-03	3.943E+01	1.358E-01	6.590E-02	1.236E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.087E+01
Ra-226	2.254E-03	1.557E+02	4.539E-01	5.557E-01	1.224E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.579E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of

Radon and its Decay Products as pCi/yr at t= 1.000E+01 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)

and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.160E-09	0.0003	2.038E-09	0.0002	3.942E-06	0.3224	1.357E-08	0.0011	6.587E-09	0.0005	1.236E-07	0.0101
Ra-226	5.792E-06	0.4738	1.830E-09	0.0001	2.306E-06	0.1887	6.725E-09	0.0006	8.233E-09	0.0007	1.814E-08	0.0015
Total	5.796E-06	0.4741	3.868E-09	0.0003	6.248E-06	0.5111	2.030E-08	0.0017	1.482E-08	0.0012	1.417E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.091E-06	0.3346
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.134E-06	0.6654
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.222E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+01 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.521E-09	0.0001	9.810E-10	0.0001	0.000E+00	0.0000	1.891E-06	0.1547	6.465E-09	0.0005	3.150E-09	0.0003	5.949E-08	0.0049
Ra-226	5.794E-06	0.4740	2.888E-09	0.0002	0.000E+00	0.0000	4.357E-06	0.3564	1.383E-08	0.0011	1.167E-08	0.0010	8.225E-08	0.0067
Total	5.796E-06	0.4741	3.868E-09	0.0003	0.000E+00	0.0000	6.248E-06	0.5111	2.030E-08	0.0017	1.482E-08	0.0012	1.417E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.963E-06	0.1606
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.026E-05	0.8394
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.222E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As pCi/yr at t= 3.000E+01 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	2.179E-03	3.775E+01	1.300E-01	6.308E-02	1.184E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.912E+01
Ra-226	2.131E-03	1.472E+02	4.291E-01	5.253E-01	1.158E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.493E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of

Radon and its Decay Products as pCi/yr at t= 3.000E+01 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)

and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.012E-09	0.0003	1.943E-09	0.0002	3.757E-06	0.3242	1.294E-08	0.0011	6.279E-09	0.0005	1.178E-07	0.0102
Ra-226	5.476E-06	0.4725	1.731E-09	0.0001	2.180E-06	0.1882	6.357E-09	0.0005	7.784E-09	0.0007	1.715E-08	0.0015
Total	5.479E-06	0.4728	3.673E-09	0.0003	5.938E-06	0.5124	1.930E-08	0.0017	1.406E-08	0.0012	1.350E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.899E-06	0.3365
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.690E-06	0.6635
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.159E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+01 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	7.879E-10	0.0001	5.082E-10	0.0000	0.000E+00	0.0000	9.796E-07	0.0845	3.349E-09	0.0003	1.632E-09	0.0001	3.082E-08	0.0027
Ra-226	5.478E-06	0.4727	3.165E-09	0.0003	0.000E+00	0.0000	4.958E-06	0.4278	1.595E-08	0.0014	1.243E-08	0.0011	1.042E-07	0.0090
Total	5.479E-06	0.4728	3.673E-09	0.0003	0.000E+00	0.0000	5.938E-06	0.5124	1.930E-08	0.0017	1.406E-08	0.0012	1.350E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.017E-06	0.0877
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.057E-05	0.9123
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.159E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As pCi/yr at t= 1.000E+02 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.814E-03	3.142E+01	1.082E-01	5.251E-02	9.854E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.257E+01
Ra-226	1.751E-03	1.209E+02	3.525E-01	4.316E-01	9.511E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.227E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of

Radon and its Decay Products as pCi/yr at t= 1.000E+02 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)

and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.496E-09	0.0003	1.610E-09	0.0002	3.114E-06	0.3261	1.072E-08	0.0011	5.204E-09	0.0005	9.765E-08	0.0102
Ra-226	4.499E-06	0.4712	1.422E-09	0.0001	1.791E-06	0.1876	5.223E-09	0.0005	6.395E-09	0.0007	1.409E-08	0.0015
Total	4.502E-06	0.4714	3.032E-09	0.0003	4.905E-06	0.5137	1.595E-08	0.0017	1.160E-08	0.0012	1.117E-07	0.0117

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.232E-06	0.3384
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.318E-06	0.6616
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.549E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+02 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	7.883E-11	0.0000	5.085E-11	0.0000	0.000E+00	0.0000	9.802E-08	0.0103	3.351E-10	0.0000	1.633E-10	0.0000	3.084E-09	0.0003
Ra-226	4.502E-06	0.4714	2.981E-09	0.0003	0.000E+00	0.0000	4.807E-06	0.5034	1.561E-08	0.0016	1.144E-08	0.0012	1.087E-07	0.0114
Total	4.502E-06	0.4714	3.032E-09	0.0003	0.000E+00	0.0000	4.905E-06	0.5137	1.595E-08	0.0017	1.160E-08	0.0012	1.117E-07	0.0117

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.017E-07	0.0107
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.448E-06	0.9893
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.549E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As pCi/yr at t= 2.500E+02 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.193E-03	2.066E+01	7.114E-02	3.453E-02	6.480E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.142E+01
Ra-226	1.149E-03	7.936E+01	2.314E-01	2.833E-01	6.242E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.050E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of

Radon and its Decay Products as pCi/yr at t= 2.500E+02 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.640E-09	0.0003	1.058E-09	0.0002	2.046E-06	0.3263	7.046E-09	0.0011	3.420E-09	0.0005	6.417E-08	0.0102
Ra-226	2.953E-06	0.4710	9.332E-10	0.0001	1.176E-06	0.1875	3.428E-09	0.0005	4.198E-09	0.0007	9.249E-09	0.0015
Total	2.955E-06	0.4712	1.991E-09	0.0003	3.222E-06	0.5139	1.047E-08	0.0017	7.617E-09	0.0012	7.342E-08	0.0117

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.124E-06	0.3387
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.147E-06	0.6613
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.270E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 2.500E+02 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.680E-13	0.0000	3.664E-13	0.0000	0.000E+00	0.0000	7.063E-10	0.0001	2.415E-12	0.0000	1.177E-12	0.0000	2.222E-11	0.0000
Ra-226	2.955E-06	0.4712	1.991E-09	0.0003	0.000E+00	0.0000	3.221E-06	0.5137	1.047E-08	0.0017	7.616E-09	0.0012	7.340E-08	0.0117
Total	2.955E-06	0.4712	1.991E-09	0.0003	0.000E+00	0.0000	3.222E-06	0.5139	1.047E-08	0.0017	7.617E-09	0.0012	7.342E-08	0.0117

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+02 years

Water Dependent Pathways														
Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.330E-10	0.0001
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.270E-06	0.9999
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.270E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As pCi/yr at t= 5.000E+02 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	5.914E-04	1.024E+01	3.527E-02	1.712E-02	3.212E-01	2.399E+00	5.022E-03	1.848E-01	2.052E-03	1.686E-03	1.321E+01
Ra-226	5.698E-04	3.934E+01	1.147E-01	1.404E-01	3.095E-01	5.131E+00	3.110E-03	3.981E-01	5.469E-03	1.200E-02	4.546E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of

Radon and its Decay Products as pCi/yr at t= 5.000E+02 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 5.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.132E-10	0.0002	5.245E-10	0.0001	1.014E-06	0.2842	3.493E-09	0.0010	1.695E-09	0.0005	3.181E-08	0.0089
Ra-226	1.464E-06	0.4102	4.626E-10	0.0001	5.829E-07	0.1633	1.700E-09	0.0005	2.081E-09	0.0006	4.585E-09	0.0013
Total	1.465E-06	0.4104	9.872E-10	0.0003	1.597E-06	0.4475	5.192E-09	0.0015	3.776E-09	0.0011	3.640E-08	0.0102

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 5.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.295E-07	0.0923	8.897E-10	0.0002	3.275E-08	0.0092	3.640E-10	0.0001	2.987E-10	0.0001	1.417E-06	0.3969
Ra-226	8.733E-08	0.0245	7.077E-11	0.0000	9.059E-09	0.0025	1.246E-10	0.0000	2.732E-10	0.0001	2.153E-06	0.6031
Total	4.168E-07	0.1168	9.604E-10	0.0003	4.181E-08	0.0117	4.887E-10	0.0001	5.720E-10	0.0002	3.569E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 5.000E+02 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 5.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.527E-16	0.0000	9.849E-17	0.0000	0.000E+00	0.0000	1.899E-13	0.0000	6.491E-16	0.0000	3.163E-16	0.0000	5.973E-15	0.0000
Ra-226	1.465E-06	0.4104	9.872E-10	0.0003	0.000E+00	0.0000	1.597E-06	0.4475	5.192E-09	0.0015	3.776E-09	0.0011	3.640E-08	0.0102
Total	1.465E-06	0.4104	9.872E-10	0.0003	0.000E+00	0.0000	1.597E-06	0.4475	5.192E-09	0.0015	3.776E-09	0.0011	3.640E-08	0.0102

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 5.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.970E-13	0.0000
Ra-226	4.168E-07	0.1168	9.604E-10	0.0003	0.000E+00	0.0000	4.181E-08	0.0117	4.887E-10	0.0001	5.720E-10	0.0002	3.569E-06	1.0000
Total	4.168E-07	0.1168	9.604E-10	0.0003	0.000E+00	0.0000	4.181E-08	0.0117	4.887E-10	0.0001	5.720E-10	0.0002	3.569E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As pCi/yr at t= 7.500E+02 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	2.932E-04	5.078E+00	1.748E-02	8.486E-03	1.592E-01	2.252E+01	4.717E-02	1.736E+00	1.934E-02	1.584E-02	2.960E+01
Ra-226	2.824E-04	1.950E+01	5.687E-02	6.962E-02	1.534E-01	3.258E+01	1.977E-02	2.531E+00	3.490E-02	7.637E-02	5.503E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of

Radon and its Decay Products as pCi/yr at t= 7.500E+02 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)

and Fraction of Total Risk at t= 7.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	4.031E-10	0.0001	2.600E-10	0.0001	5.029E-07	0.1250	1.731E-09	0.0004	8.404E-10	0.0002	1.577E-08	0.0039
Ra-226	7.257E-07	0.1804	2.293E-10	0.0001	2.890E-07	0.0718	8.425E-10	0.0002	1.032E-09	0.0003	2.273E-09	0.0006
Total	7.261E-07	0.1805	4.894E-10	0.0001	7.918E-07	0.1968	2.574E-09	0.0006	1.872E-09	0.0005	1.804E-08	0.0045

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.859E-06	0.4620	5.021E-09	0.0012	1.848E-07	0.0459	2.058E-09	0.0005	1.686E-09	0.0004	2.574E-06	0.6399
Ra-226	3.875E-07	0.0963	3.141E-10	0.0001	4.022E-08	0.0100	5.547E-10	0.0001	1.214E-09	0.0003	1.449E-06	0.3601
Total	2.246E-06	0.5583	5.335E-09	0.0013	2.250E-07	0.0559	2.613E-09	0.0006	2.900E-09	0.0007	4.023E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 7.500E+02 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	4.105E-20	0.0000	2.648E-20	0.0000	0.000E+00	0.0000	5.104E-17	0.0000	1.745E-19	0.0000	8.502E-20	0.0000	1.606E-18	0.0000
Ra-226	7.261E-07	0.1805	4.894E-10	0.0001	0.000E+00	0.0000	7.918E-07	0.1968	2.574E-09	0.0006	1.872E-09	0.0005	1.804E-08	0.0045
Total	7.261E-07	0.1805	4.894E-10	0.0001	0.000E+00	0.0000	7.918E-07	0.1968	2.574E-09	0.0006	1.872E-09	0.0005	1.804E-08	0.0045

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.945E-17	0.0000	5.256E-20	0.0000	0.000E+00	0.0000	1.933E-18	0.0000	2.143E-20	0.0000	1.762E-20	0.0000	7.445E-17	0.0000
Ra-226	2.246E-06	0.5583	5.335E-09	0.0013	0.000E+00	0.0000	2.250E-07	0.0559	2.613E-09	0.0006	2.900E-09	0.0007	4.023E-06	1.0000
Total	2.246E-06	0.5583	5.335E-09	0.0013	0.000E+00	0.0000	2.250E-07	0.0559	2.613E-09	0.0006	2.900E-09	0.0007	4.023E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As pCi/yr at t= 1.000E+03 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.453E-04	2.517E+00	8.667E-03	4.207E-03	7.894E-02	2.969E+01	6.219E-02	2.289E+00	2.550E-02	2.089E-02	3.470E+01
Ra-226	1.400E-04	9.668E+00	2.819E-02	3.451E-02	7.605E-02	4.224E+01	2.562E-02	3.281E+00	4.526E-02	9.901E-02	5.550E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of

Radon and its Decay Products as pCi/yr at t= 1.000E+03 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)

and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.998E-10	0.0001	1.289E-10	0.0000	2.493E-07	0.0631	8.583E-10	0.0002	4.166E-10	0.0001	7.818E-09	0.0020
Ra-226	3.598E-07	0.0911	1.137E-10	0.0000	1.432E-07	0.0363	4.177E-10	0.0001	5.114E-10	0.0001	1.127E-09	0.0003
Total	3.600E-07	0.0911	2.426E-10	0.0001	3.925E-07	0.0994	1.276E-09	0.0003	9.279E-10	0.0002	8.944E-09	0.0023

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.393E-06	0.6056	6.464E-09	0.0016	2.379E-07	0.0602	2.650E-09	0.0007	2.171E-09	0.0005	2.901E-06	0.7342
Ra-226	4.913E-07	0.1243	3.982E-10	0.0001	5.099E-08	0.0129	7.034E-10	0.0002	1.539E-09	0.0004	1.050E-06	0.2658
Total	2.884E-06	0.7300	6.862E-09	0.0017	2.889E-07	0.0731	3.353E-09	0.0008	3.710E-09	0.0009	3.951E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+03 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.103E-23	0.0000	7.117E-24	0.0000	0.000E+00	0.0000	1.372E-20	0.0000	4.691E-23	0.0000	2.285E-23	0.0000	4.316E-22	0.0000
Ra-226	3.600E-07	0.0911	2.426E-10	0.0001	0.000E+00	0.0000	3.925E-07	0.0994	1.276E-09	0.0003	9.279E-10	0.0002	8.944E-09	0.0023
Total	3.600E-07	0.0911	2.426E-10	0.0001	0.000E+00	0.0000	3.925E-07	0.0994	1.276E-09	0.0003	9.279E-10	0.0002	8.944E-09	0.0023

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.529E-20	0.0000	9.535E-23	0.0000	0.000E+00	0.0000	3.507E-21	0.0000	3.897E-23	0.0000	3.198E-23	0.0000	5.320E-20	0.0000
Ra-226	2.884E-06	0.7300	6.862E-09	0.0017	0.000E+00	0.0000	2.889E-07	0.0731	3.353E-09	0.0008	3.710E-09	0.0009	3.951E-06	1.0000
Total	2.884E-06	0.7300	6.862E-09	0.0017	0.000E+00	0.0000	2.889E-07	0.0731	3.353E-09	0.0008	3.710E-09	0.0009	3.951E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Summary : RESRAD Default Parameters

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Dose Conversion Factor (and Related) Parameter Summary

Dose Library: DOE STD-1196-2011 (Reference Person)

Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	At-218 (Source: DCFPAK3.02)	5.567E-05	5.567E-05	DCF1(1)
A-1	Bi-210 (Source: DCFPAK3.02)	5.473E-03	5.473E-03	DCF1(2)
A-1	Bi-214 (Source: DCFPAK3.02)	9.135E+00	9.135E+00	DCF1(3)
A-1	Hg-206 (Source: DCFPAK3.02)	6.127E-01	6.127E-01	DCF1(4)
A-1	Pb-210 (Source: DCFPAK3.02)	2.092E-03	2.092E-03	DCF1(5)
A-1	Pb-214 (Source: DCFPAK3.02)	1.257E+00	1.257E+00	DCF1(6)
A-1	Po-210 (Source: DCFPAK3.02)	5.641E-05	5.641E-05	DCF1(7)
A-1	Po-214 (Source: DCFPAK3.02)	4.801E-04	4.801E-04	DCF1(8)
A-1	Po-218 (Source: DCFPAK3.02)	9.228E-09	9.228E-09	DCF1(9)
A-1	Ra-226 (Source: DCFPAK3.02)	3.176E-02	3.176E-02	DCF1(10)
A-1	Rn-218 (Source: DCFPAK3.02)	4.259E-03	4.259E-03	DCF1(11)
A-1	Rn-222 (Source: DCFPAK3.02)	2.130E-03	2.130E-03	DCF1(12)
A-1	Tl-206 (Source: DCFPAK3.02)	1.278E-02	1.278E-02	DCF1(13)
A-1	Tl-210 (Source: DCFPAK3.02)	1.677E+01	1.677E+01	DCF1(14)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	4.017E-02	2.231E-02	DCF2(1)
B-1	Ra-226+D	3.823E-02	3.811E-02	DCF2(2)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	1.026E-02	3.774E-03	DCF3(1)
D-1	Ra-226+D	1.677E-03	1.676E-03	DCF3(2)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.

*Base Case means Default.Lib w/o Associate Nuclide contributions.

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Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	1.000E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	5.000E+00	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	2.500E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	5.000E+02	1.000E+03	---	T(8)
R011	Times for calculations (yr)	7.500E+02	0.000E+00	---	T(9)
R011	Times for calculations (yr)	1.000E+03	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Pb-210	2.300E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	2.300E-01	0.000E+00	---	S1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	5.300E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	4.000E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.500E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.000E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.663E-03	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.374E-03	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R017	Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	5.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.500E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.600E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	9.200E+01	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	6.300E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	5.400E+00	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	5.100E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.500E+00	FPLANT
R018	Contamination fraction of meat	-1	-1	0.500E-01	FMEAT
R018	Contamination fraction of milk	-1	-1	0.500E-01	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSNI
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSNI
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	suppressed

Summary : RESRAD Default Parameters

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Contaminated Zone Dimensions	Initial Soil Concentrations, pCi/g
Area: 1000.00 square meters	Pb-210 2.300E-01
Thickness: 2.00 meters	Ra-226 2.300E-01
Cover Depth: 0.00 meters	

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 5.000E+00 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
TDOSE(t):	4.783E+00	4.773E+00	4.750E+00	4.672E+00	4.441E+00	3.670E+00	2.411E+00	1.379E+00	2.138E+00	2.323E+00
M(t):	9.566E-01	9.545E-01	9.501E-01	9.343E-01	8.882E-01	7.340E-01	4.822E-01	2.757E-01	4.275E-01	4.645E-01

Maximum TDOSE(t): 4.783E+00 mrem/yr at t = 0.000E+00 years

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	9.600E-04	0.0002	4.581E-04	0.0001	0.000E+00	0.0000	2.019E+00	0.4222	6.903E-03	0.0014	3.363E-03	0.0007	6.352E-02	0.0133
Ra-226	1.289E+00	0.2696	4.498E-04	0.0001	0.000E+00	0.0000	1.378E+00	0.2882	4.082E-03	0.0009	4.859E-03	0.0010	1.154E-02	0.0024
Total	1.290E+00	0.2698	9.078E-04	0.0002	0.000E+00	0.0000	3.397E+00	0.7103	1.098E-02	0.0023	8.222E-03	0.0017	7.506E-02	0.0157

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.094E+00	0.4379
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.688E+00	0.5621
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.783E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\NSTI SWDA NORTH POINT SU 5.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	9.289E-04	0.0002	4.432E-04	0.0001	0.000E+00	0.0000	1.954E+00	0.4094	6.680E-03	0.0014	3.255E-03	0.0007	6.147E-02	0.0129
Ra-226	1.286E+00	0.2694	4.626E-04	0.0001	0.000E+00	0.0000	1.437E+00	0.3012	4.293E-03	0.0009	4.952E-03	0.0010	1.346E-02	0.0028
Total	1.287E+00	0.2696	9.058E-04	0.0002	0.000E+00	0.0000	3.391E+00	0.7105	1.097E-02	0.0023	8.206E-03	0.0017	7.493E-02	0.0157

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.027E+00	0.4246
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.746E+00	0.5754
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.773E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\NSTI SWDA NORTH POINT SU 5.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	8.698E-04	0.0002	4.150E-04	0.0001	0.000E+00	0.0000	1.829E+00	0.3851	6.254E-03	0.0013	3.047E-03	0.0006	5.755E-02	0.0121
Ra-226	1.279E+00	0.2691	4.867E-04	0.0001	0.000E+00	0.0000	1.547E+00	0.3257	4.672E-03	0.0010	5.120E-03	0.0011	1.709E-02	0.0036
Total	1.279E+00	0.2693	9.017E-04	0.0002	0.000E+00	0.0000	3.376E+00	0.7108	1.093E-02	0.0023	8.167E-03	0.0017	7.464E-02	0.0157

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.898E+00	0.3994
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.853E+00	0.6006
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.750E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\NSTI SWDA NORTH POINT SU 5.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	6.909E-04	0.0001	3.297E-04	0.0001	0.000E+00	0.0000	1.453E+00	0.3111	4.968E-03	0.0011	2.421E-03	0.0005	4.572E-02	0.0098
Ra-226	1.254E+00	0.2684	5.574E-04	0.0001	0.000E+00	0.0000	1.871E+00	0.4004	5.790E-03	0.0012	5.609E-03	0.0012	2.788E-02	0.0060
Total	1.254E+00	0.2685	8.871E-04	0.0002	0.000E+00	0.0000	3.324E+00	0.7115	1.076E-02	0.0023	8.030E-03	0.0017	7.360E-02	0.0158

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.507E+00	0.3227
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.164E+00	0.6773
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.672E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\NSTI SWDA NORTH POINT SU 5.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.579E-04	0.0001	1.708E-04	0.0000	0.000E+00	0.0000	7.528E-01	0.1695	2.574E-03	0.0006	1.254E-03	0.0003	2.368E-02	0.0053
Ra-226	1.186E+00	0.2670	6.733E-04	0.0002	0.000E+00	0.0000	2.413E+00	0.5434	7.678E-03	0.0017	6.377E-03	0.0014	4.664E-02	0.0105
Total	1.186E+00	0.2671	8.440E-04	0.0002	0.000E+00	0.0000	3.166E+00	0.7129	1.025E-02	0.0023	7.631E-03	0.0017	7.032E-02	0.0158

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.809E-01	0.1758
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.660E+00	0.8242
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.441E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\NSTI SWDA NORTH POINT SU 5.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.581E-05	0.0000	1.709E-05	0.0000	0.000E+00	0.0000	7.532E-02	0.0205	2.575E-04	0.0001	1.255E-04	0.0000	2.370E-03	0.0006
Ra-226	9.744E-01	0.2655	6.811E-04	0.0002	0.000E+00	0.0000	2.546E+00	0.6938	8.236E-03	0.0022	6.179E-03	0.0017	5.606E-02	0.0153
Total	9.745E-01	0.2655	6.982E-04	0.0002	0.000E+00	0.0000	2.622E+00	0.7144	8.493E-03	0.0023	6.304E-03	0.0017	5.843E-02	0.0159

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.813E-02	0.0213
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.592E+00	0.9787
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.670E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\NSTI SWDA NORTH POINT SU 5.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 2.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.581E-07	0.0000	1.231E-07	0.0000	0.000E+00	0.0000	5.428E-04	0.0002	1.856E-06	0.0000	9.041E-07	0.0000	1.708E-05	0.0000
Ra-226	6.396E-01	0.2653	4.586E-04	0.0002	0.000E+00	0.0000	1.722E+00	0.7143	5.579E-03	0.0023	4.140E-03	0.0017	3.839E-02	0.0159
Total	6.396E-01	0.2653	4.587E-04	0.0002	0.000E+00	0.0000	1.723E+00	0.7146	5.581E-03	0.0023	4.141E-03	0.0017	3.841E-02	0.0159

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 2.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.630E-04	0.0002
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.410E+00	0.9998
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.411E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\NSTI SWDA NORTH POINT SU 5.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 5.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	6.937E-11	0.0000	3.310E-11	0.0000	0.000E+00	0.0000	1.459E-07	0.0000	4.988E-10	0.0000	2.430E-10	0.0000	4.590E-09	0.0000
Ra-226	3.171E-01	0.2300	2.274E-04	0.0002	0.000E+00	0.0000	8.540E-01	0.6195	2.767E-03	0.0020	2.053E-03	0.0015	1.904E-02	0.0138
Total	3.171E-01	0.2300	2.274E-04	0.0002	0.000E+00	0.0000	8.540E-01	0.6195	2.767E-03	0.0020	2.053E-03	0.0015	1.904E-02	0.0138

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 5.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.513E-07	0.0000
Ra-226	1.697E-01	0.1231	2.901E-04	0.0002	0.000E+00	0.0000	1.310E-02	0.0095	1.543E-04	0.0001	1.908E-04	0.0001	1.379E+00	1.0000
Total	1.697E-01	0.1231	2.901E-04	0.0002	0.000E+00	0.0000	1.310E-02	0.0095	1.543E-04	0.0001	1.908E-04	0.0001	1.379E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\NSTI SWDA NORTH POINT SU 5.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 7.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.865E-14	0.0000	8.898E-15	0.0000	0.000E+00	0.0000	3.922E-11	0.0000	1.341E-13	0.0000	6.533E-14	0.0000	1.234E-12	0.0000
Ra-226	1.572E-01	0.0735	1.127E-04	0.0001	0.000E+00	0.0000	4.234E-01	0.1980	1.372E-03	0.0006	1.018E-03	0.0005	9.439E-03	0.0044
Total	1.572E-01	0.0735	1.127E-04	0.0001	0.000E+00	0.0000	4.234E-01	0.1980	1.372E-03	0.0006	1.018E-03	0.0005	9.439E-03	0.0044

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 7.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.489E-11	0.0000	3.119E-14	0.0000	0.000E+00	0.0000	1.147E-12	0.0000	1.271E-14	0.0000	1.045E-14	0.0000	5.677E-11	0.0000
Ra-226	1.430E+00	0.6687	2.587E-03	0.0012	0.000E+00	0.0000	1.104E-01	0.0516	1.286E-03	0.0006	1.454E-03	0.0007	2.138E+00	1.0000
Total	1.430E+00	0.6687	2.587E-03	0.0012	0.000E+00	0.0000	1.104E-01	0.0516	1.286E-03	0.0006	1.454E-03	0.0007	2.138E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\NSTI SWDA NORTH POINT SU 5.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	5.013E-18	0.0000	2.392E-18	0.0000	0.000E+00	0.0000	1.054E-14	0.0000	3.605E-17	0.0000	1.756E-17	0.0000	3.317E-16	0.0000
Ra-226	7.792E-02	0.0335	5.588E-05	0.0000	0.000E+00	0.0000	2.099E-01	0.0904	6.799E-04	0.0003	5.045E-04	0.0002	4.679E-03	0.0020
Total	7.792E-02	0.0335	5.588E-05	0.0000	0.000E+00	0.0000	2.099E-01	0.0904	6.799E-04	0.0003	5.045E-04	0.0002	4.679E-03	0.0020

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.325E-14	0.0000	6.967E-17	0.0000	0.000E+00	0.0000	2.562E-15	0.0000	2.847E-17	0.0000	2.337E-17	0.0000	4.687E-14	0.0000
Ra-226	1.877E+00	0.8081	3.405E-03	0.0015	0.000E+00	0.0000	1.449E-01	0.0624	1.687E-03	0.0007	1.902E-03	0.0008	2.323E+00	1.0000
Total	1.877E+00	0.8081	3.405E-03	0.0015	0.000E+00	0.0000	1.449E-01	0.0624	1.687E-03	0.0007	1.902E-03	0.0008	2.323E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\NSTI SWDA NORTH POINT SU 5.RAD

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g)									
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	9.106E+00	8.811E+00	8.250E+00	6.554E+00	3.395E+00	3.397E-01	2.448E-03	6.580E-07	2.468E-10	2.038E-13
Ra-226+D	Ra-226+D	1.000E+00	1.152E+01	1.149E+01	1.142E+01	1.120E+01	1.059E+01	8.701E+00	5.711E+00	3.037E+00	2.690E+00	2.362E+00
Ra-226+D	Pb-210+D	1.000E+00	1.684E-01	4.516E-01	9.801E-01	2.555E+00	5.323E+00	6.917E+00	4.769E+00	2.957E+00	6.604E+00	7.737E+00
Ra-226+D	ΣDSR(j)		1.169E+01	1.194E+01	1.240E+01	1.376E+01	1.591E+01	1.562E+01	1.048E+01	5.994E+00	9.294E+00	1.010E+01

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 5.000E+00 mrem/yr

Nuclide (i)	t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
Pb-210	5.491E-01	5.675E-01	6.060E-01	7.629E-01	1.473E+00	1.472E+01	2.043E+03	7.599E+06	2.026E+10	2.454E+13	
Ra-226	4.278E-01	4.188E-01	4.031E-01	3.634E-01	3.142E-01	3.202E-01	4.771E-01	8.342E-01	5.380E-01	4.951E-01	

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	2.300E-01	0.000E+00	9.106E+00	5.491E-01	9.106E+00	5.491E-01
Ra-226	2.300E-01	55.0 ± 0.1	1.657E+01	3.017E-01	1.169E+01	4.278E-01

Summary : RESRAD Default Parameters

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Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr										
			t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03	
Pb-210	Pb-210	1.000E+00	2.094E+00	2.027E+00	1.898E+00	1.507E+00	7.809E-01	7.813E-02	5.630E-04	1.513E-07	5.677E-11	4.687E-14	
Pb-210	Ra-226	1.000E+00	3.874E-02	1.039E-01	2.254E-01	5.877E-01	1.224E+00	1.591E+00	1.097E+00	6.801E-01	1.519E+00	1.779E+00	
Pb-210	ΣDOSE(j)		2.133E+00	2.130E+00	2.123E+00	2.095E+00	2.005E+00	1.669E+00	1.097E+00	6.801E-01	1.519E+00	1.779E+00	
Ra-226	Ra-226	1.000E+00	2.650E+00	2.642E+00	2.628E+00	2.576E+00	2.436E+00	2.001E+00	1.314E+00	6.985E-01	6.187E-01	5.433E-01	

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g										
			t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
Pb-210	Pb-210	1.000E+00		2.300E-01	2.226E-01	2.084E-01	1.655E-01	8.576E-02	8.580E-03	6.183E-05	1.662E-08	4.468E-12	1.201E-15
Pb-210	Ra-226	1.000E+00		0.000E+00	7.054E-03	2.043E-02	6.030E-02	1.304E-01	1.714E-01	1.183E-01	5.867E-02	2.908E-02	1.442E-02
Pb-210	ΣS(j):			2.300E-01	2.296E-01	2.288E-01	2.258E-01	2.162E-01	1.800E-01	1.184E-01	5.867E-02	2.908E-02	1.442E-02
Ra-226	Ra-226	1.000E+00		2.300E-01	2.294E-01	2.281E-01	2.236E-01	2.114E-01	1.737E-01	1.140E-01	5.652E-02	2.802E-02	1.389E-02

THF(i) is the thread fraction of the parent nuclide.

RESRAD.EXE execution time = 0.36 seconds

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Cancer Risk Slope Factors Summary Table

Risk Library: DCFPAK3.02 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Pb-210+D	4.30E-09	1.48E-09	SLPF(1,1)
Sf-1	Ra-226+D	8.37E-06	2.50E-08	SLPF(2,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Pb-210+D	3.08E-08	1.59E-08	SLPF(1,2)
Sf-2	Ra-226+D	2.82E-08	2.81E-08	SLPF(2,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	2.67E-09	8.84E-10	SLPF(1,4)
Sf-3	Ra-226+D	3.85E-10	3.85E-10	SLPF(2,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,5)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,5)
Sf-Rn	Radon Inhalation slope factors, 1/(pCi):			
Sf-Rn	Rn-222	1.80E-12	1.80E-12	SLPFRN(1,1)
Sf-Rn	Po-218	3.70E-12	3.70E-12	SLPFRN(1,2)
Sf-Rn	Pb-214	6.20E-12	6.20E-12	SLPFRN(1,3)
Sf-Rn	Bi-214	1.50E-11	1.50E-11	SLPFRN(1,4)
Sf-Rn	Radon K factors, (mrem/WLM):			
Sf-Rn	Rn-222 Indoor	3.88E+02	3.88E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	3.88E+02	3.88E+02	KFACTR(1,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

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Risk Slope and Environmental Transport Factors for the Ground Pathway

Nuclide (i)	Slope(i)*										
	ETFG(i,t) At Time in Years (dimensionless)										
	t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
At-218	2.740E-11	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01
Bi-210	2.770E-09	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01
Bi-214	7.340E-06	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01
Hg-206	4.830E-07	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01
Pb-210	1.480E-09	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01
Pb-214	9.940E-07	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01
Po-210	4.510E-11	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01
Po-214	3.850E-10	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01
Po-218	6.840E-15	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01
Ra-226	2.500E-08	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01
Rn-218	3.390E-09	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01
Rn-222	1.690E-09	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01
Tl-206	6.110E-09	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01
Tl-210	1.340E-05	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01

* - Units are 1/yr per (pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.159E-02	2.001E+02	6.841E-01	3.333E-01	6.296E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.074E+02
Ra-226	1.159E-02	8.004E+02	2.333E+00	2.857E+00	6.296E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.119E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.614E-08	0.0003	1.041E-08	0.0002	2.013E-05	0.3210	6.929E-08	0.0011	3.364E-08	0.0005	6.315E-07	0.0101
Ra-226	2.979E-05	0.4749	9.413E-09	0.0002	1.186E-05	0.1891	3.458E-08	0.0006	4.234E-08	0.0007	9.328E-08	0.0015
Total	2.980E-05	0.4752	1.983E-08	0.0003	3.199E-05	0.5101	1.039E-07	0.0017	7.598E-08	0.0012	7.248E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.089E-05	0.3331
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.183E-05	0.6669
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.272E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.057E-08	0.0002	6.815E-09	0.0001	0.000E+00	0.0000	1.314E-05	0.2095	4.491E-08	0.0007	2.188E-08	0.0003	4.133E-07	0.0066
Ra-226	2.979E-05	0.4750	1.301E-08	0.0002	0.000E+00	0.0000	1.886E-05	0.3006	5.896E-08	0.0009	5.409E-08	0.0009	3.115E-07	0.0050
Total	2.980E-05	0.4752	1.983E-08	0.0003	0.000E+00	0.0000	3.199E-05	0.5101	1.039E-07	0.0017	7.598E-08	0.0012	7.248E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.363E-05	0.2174
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.909E-05	0.7826
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.272E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.157E-02	2.005E+02	6.904E-01	3.350E-01	6.286E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.078E+02
Ra-226	1.156E-02	7.982E+02	2.327E+00	2.850E+00	6.279E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.097E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.611E-08	0.0003	1.039E-08	0.0002	2.010E-05	0.3212	6.921E-08	0.0011	3.359E-08	0.0005	6.302E-07	0.0101
Ra-226	2.970E-05	0.4747	9.386E-09	0.0002	1.183E-05	0.1890	3.448E-08	0.0006	4.222E-08	0.0007	9.302E-08	0.0015
Total	2.972E-05	0.4750	1.978E-08	0.0003	3.192E-05	0.5103	1.037E-07	0.0017	7.581E-08	0.0012	7.232E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.086E-05	0.3334
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.171E-05	0.6666
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.257E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+00 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.022E-08	0.0002	6.594E-09	0.0001	0.000E+00	0.0000	1.271E-05	0.2032	4.346E-08	0.0007	2.118E-08	0.0003	3.999E-07	0.0064
Ra-226	2.971E-05	0.4748	1.318E-08	0.0002	0.000E+00	0.0000	1.921E-05	0.3071	6.024E-08	0.0010	5.463E-08	0.0009	3.233E-07	0.0052
Total	2.972E-05	0.4750	1.978E-08	0.0003	0.000E+00	0.0000	3.192E-05	0.5103	1.037E-07	0.0017	7.581E-08	0.0012	7.232E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.319E-05	0.2109
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.937E-05	0.7891
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.257E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.153E-02	1.998E+02	6.880E-01	3.339E-01	6.264E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.070E+02
Ra-226	1.150E-02	7.938E+02	2.314E+00	2.834E+00	6.243E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.052E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.604E-08	0.0003	1.035E-08	0.0002	2.001E-05	0.3215	6.892E-08	0.0011	3.345E-08	0.0005	6.276E-07	0.0101
Ra-226	2.954E-05	0.4745	9.334E-09	0.0001	1.176E-05	0.1889	3.429E-08	0.0006	4.198E-08	0.0007	9.250E-08	0.0015
Total	2.955E-05	0.4748	1.968E-08	0.0003	3.177E-05	0.5105	1.032E-07	0.0017	7.543E-08	0.0012	7.201E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.077E-05	0.3337
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.148E-05	0.6663
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.224E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+00 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	9.573E-09	0.0002	6.175E-09	0.0001	0.000E+00	0.0000	1.190E-05	0.1912	4.069E-08	0.0007	1.983E-08	0.0003	3.745E-07	0.0060
Ra-226	2.954E-05	0.4746	1.351E-08	0.0002	0.000E+00	0.0000	1.987E-05	0.3192	6.252E-08	0.0010	5.560E-08	0.0009	3.456E-07	0.0056
Total	2.955E-05	0.4748	1.968E-08	0.0003	0.000E+00	0.0000	3.177E-05	0.5105	1.032E-07	0.0017	7.543E-08	0.0012	7.201E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.235E-05	0.1985
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.989E-05	0.8015
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.224E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+01 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.138E-02	1.972E+02	6.790E-01	3.295E-01	6.182E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.044E+02
Ra-226	1.127E-02	7.783E+02	2.269E+00	2.778E+00	6.122E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.895E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+01 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.580E-08	0.0003	1.019E-08	0.0002	1.971E-05	0.3224	6.787E-08	0.0011	3.294E-08	0.0005	6.180E-07	0.0101
Ra-226	2.896E-05	0.4738	9.152E-09	0.0001	1.153E-05	0.1887	3.362E-08	0.0006	4.117E-08	0.0007	9.070E-08	0.0015
Total	2.898E-05	0.4741	1.934E-08	0.0003	3.124E-05	0.5111	1.015E-07	0.0017	7.410E-08	0.0012	7.087E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.045E-05	0.3346
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.067E-05	0.6654
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.112E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+01 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	7.604E-09	0.0001	4.905E-09	0.0001	0.000E+00	0.0000	9.455E-06	0.1547	3.233E-08	0.0005	1.575E-08	0.0003	2.975E-07	0.0049
Ra-226	2.897E-05	0.4740	1.444E-08	0.0002	0.000E+00	0.0000	2.178E-05	0.3564	6.916E-08	0.0011	5.835E-08	0.0010	4.112E-07	0.0067
Total	2.898E-05	0.4741	1.934E-08	0.0003	0.000E+00	0.0000	3.124E-05	0.5111	1.015E-07	0.0017	7.410E-08	0.0012	7.087E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.813E-06	0.1606
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.131E-05	0.8394
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.112E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+01 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.090E-02	1.887E+02	6.499E-01	3.154E-01	5.919E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.956E+02
Ra-226	1.066E-02	7.358E+02	2.145E+00	2.627E+00	5.788E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.464E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+01 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.506E-08	0.0003	9.714E-09	0.0002	1.879E-05	0.3242	6.469E-08	0.0011	3.140E-08	0.0005	5.891E-07	0.0102
Ra-226	2.738E-05	0.4725	8.653E-09	0.0001	1.090E-05	0.1882	3.179E-08	0.0005	3.892E-08	0.0007	8.575E-08	0.0015
Total	2.740E-05	0.4728	1.837E-08	0.0003	2.969E-05	0.5124	9.648E-08	0.0017	7.031E-08	0.0012	6.749E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.950E-05	0.3365
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.845E-05	0.6635
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.794E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+01 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.939E-09	0.0001	2.541E-09	0.0000	0.000E+00	0.0000	4.898E-06	0.0845	1.675E-08	0.0003	8.159E-09	0.0001	1.541E-07	0.0027
Ra-226	2.739E-05	0.4727	1.583E-08	0.0003	0.000E+00	0.0000	2.479E-05	0.4278	7.973E-08	0.0014	6.215E-08	0.0011	5.208E-07	0.0090
Total	2.740E-05	0.4728	1.837E-08	0.0003	0.000E+00	0.0000	2.969E-05	0.5124	9.648E-08	0.0017	7.031E-08	0.0012	6.749E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.084E-06	0.0877
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.286E-05	0.9123
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.794E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+02 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	9.072E-03	1.571E+02	5.410E-01	2.626E-01	4.927E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.628E+02
Ra-226	8.755E-03	6.046E+02	1.763E+00	2.158E+00	4.755E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.133E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+02 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.248E-08	0.0003	8.051E-09	0.0002	1.557E-05	0.3261	5.361E-08	0.0011	2.602E-08	0.0005	4.883E-07	0.0102
Ra-226	2.250E-05	0.4712	7.109E-09	0.0001	8.957E-06	0.1876	2.612E-08	0.0005	3.198E-08	0.0007	7.045E-08	0.0015
Total	2.251E-05	0.4714	1.516E-08	0.0003	2.453E-05	0.5137	7.973E-08	0.0017	5.799E-08	0.0012	5.587E-07	0.0117

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.616E-05	0.3384
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.159E-05	0.6616
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.775E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+02 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.942E-10	0.0000	2.542E-10	0.0000	0.000E+00	0.0000	4.901E-07	0.0103	1.676E-09	0.0000	8.164E-10	0.0000	1.542E-08	0.0003
Ra-226	2.251E-05	0.4714	1.491E-08	0.0003	0.000E+00	0.0000	2.404E-05	0.5034	7.805E-08	0.0016	5.718E-08	0.0012	5.433E-07	0.0114
Total	2.251E-05	0.4714	1.516E-08	0.0003	0.000E+00	0.0000	2.453E-05	0.5137	7.973E-08	0.0017	5.799E-08	0.0012	5.587E-07	0.0117

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.087E-07	0.0107
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.724E-05	0.9893
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.775E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 2.500E+02 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	5.965E-03	1.033E+02	3.557E-01	1.726E-01	3.240E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.071E+02
Ra-226	5.747E-03	3.968E+02	1.157E+00	1.417E+00	3.121E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.025E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 2.500E+02 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.202E-09	0.0003	5.290E-09	0.0002	1.023E-05	0.3263	3.523E-08	0.0011	1.710E-08	0.0005	3.209E-07	0.0102
Ra-226	1.477E-05	0.4710	4.666E-09	0.0001	5.879E-06	0.1875	1.714E-08	0.0005	2.099E-08	0.0007	4.624E-08	0.0015
Total	1.477E-05	0.4712	9.957E-09	0.0003	1.611E-05	0.5139	5.237E-08	0.0017	3.809E-08	0.0012	3.671E-07	0.0117

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.062E-05	0.3387
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.073E-05	0.6613
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.135E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 2.500E+02 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.840E-12	0.0000	1.832E-12	0.0000	0.000E+00	0.0000	3.531E-09	0.0001	1.207E-11	0.0000	5.883E-12	0.0000	1.111E-10	0.0000
Ra-226	1.477E-05	0.4712	9.955E-09	0.0003	0.000E+00	0.0000	1.611E-05	0.5137	5.236E-08	0.0017	3.808E-08	0.0012	3.670E-07	0.0117
Total	1.477E-05	0.4712	9.957E-09	0.0003	0.000E+00	0.0000	1.611E-05	0.5139	5.237E-08	0.0017	3.809E-08	0.0012	3.671E-07	0.0117

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.665E-09	0.0001
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.135E-05	0.9999
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.135E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 5.000E+02 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	2.957E-03	5.121E+01	1.763E-01	8.559E-02	1.606E+00	1.200E+01	2.511E-02	9.241E-01	1.026E-02	8.429E-03	6.605E+01
Ra-226	2.849E-03	1.967E+02	5.736E-01	7.022E-01	1.547E+00	2.565E+01	1.555E-02	1.991E+00	2.734E-02	6.002E-02	2.273E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 5.000E+02 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 5.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	4.066E-09	0.0002	2.623E-09	0.0001	5.072E-06	0.2842	1.746E-08	0.0010	8.476E-09	0.0005	1.591E-07	0.0089
Ra-226	7.320E-06	0.4102	2.313E-09	0.0001	2.915E-06	0.1633	8.498E-09	0.0005	1.040E-08	0.0006	2.292E-08	0.0013
Total	7.324E-06	0.4104	4.936E-09	0.0003	7.986E-06	0.4475	2.596E-08	0.0015	1.888E-08	0.0011	1.820E-07	0.0102

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 5.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.647E-06	0.0923	4.448E-09	0.0002	1.637E-07	0.0092	1.820E-09	0.0001	1.494E-09	0.0001	7.083E-06	0.3969
Ra-226	4.367E-07	0.0245	3.538E-10	0.0000	4.530E-08	0.0025	6.231E-10	0.0000	1.366E-09	0.0001	1.076E-05	0.6031
Total	2.084E-06	0.1168	4.802E-09	0.0003	2.090E-07	0.0117	2.443E-09	0.0001	2.860E-09	0.0002	1.785E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 5.000E+02 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 5.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	7.635E-16	0.0000	4.924E-16	0.0000	0.000E+00	0.0000	9.493E-13	0.0000	3.246E-15	0.0000	1.581E-15	0.0000	2.987E-14	0.0000
Ra-226	7.324E-06	0.4104	4.936E-09	0.0003	0.000E+00	0.0000	7.986E-06	0.4475	2.596E-08	0.0015	1.888E-08	0.0011	1.820E-07	0.0102
Total	7.324E-06	0.4104	4.936E-09	0.0003	0.000E+00	0.0000	7.986E-06	0.4475	2.596E-08	0.0015	1.888E-08	0.0011	1.820E-07	0.0102

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 5.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.852E-13	0.0000
Ra-226	2.084E-06	0.1168	4.802E-09	0.0003	0.000E+00	0.0000	2.090E-07	0.0117	2.443E-09	0.0001	2.860E-09	0.0002	1.785E-05	1.0000
Total	2.084E-06	0.1168	4.802E-09	0.0003	0.000E+00	0.0000	2.090E-07	0.0117	2.443E-09	0.0001	2.860E-09	0.0002	1.785E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 7.500E+02 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.466E-03	2.539E+01	8.742E-02	4.243E-02	7.962E-01	1.126E+02	2.359E-01	8.681E+00	9.668E-02	7.922E-02	1.480E+02
Ra-226	1.412E-03	9.752E+01	2.843E-01	3.481E-01	7.670E-01	1.629E+02	9.883E-02	1.265E+01	1.745E-01	3.818E-01	2.751E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 7.500E+02 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.016E-09	0.0001	1.300E-09	0.0001	2.514E-06	0.1250	8.657E-09	0.0004	4.202E-09	0.0002	7.885E-08	0.0039
Ra-226	3.629E-06	0.1804	1.147E-09	0.0001	1.445E-06	0.0718	4.213E-09	0.0002	5.158E-09	0.0003	1.136E-08	0.0006
Total	3.631E-06	0.1805	2.447E-09	0.0001	3.959E-06	0.1968	1.287E-08	0.0006	9.359E-09	0.0005	9.021E-08	0.0045

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	9.294E-06	0.4620	2.510E-08	0.0012	9.240E-07	0.0459	1.029E-08	0.0005	8.432E-09	0.0004	1.287E-05	0.6399
Ra-226	1.938E-06	0.0963	1.571E-09	0.0001	2.011E-07	0.0100	2.774E-09	0.0001	6.069E-09	0.0003	7.244E-06	0.3601
Total	1.123E-05	0.5583	2.668E-08	0.0013	1.125E-06	0.0559	1.306E-08	0.0006	1.450E-08	0.0007	2.012E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 7.500E+02 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.052E-19	0.0000	1.324E-19	0.0000	0.000E+00	0.0000	2.552E-16	0.0000	8.724E-19	0.0000	4.251E-19	0.0000	8.028E-18	0.0000
Ra-226	3.631E-06	0.1805	2.447E-09	0.0001	0.000E+00	0.0000	3.959E-06	0.1968	1.287E-08	0.0006	9.359E-09	0.0005	9.021E-08	0.0045
Total	3.631E-06	0.1805	2.447E-09	0.0001	0.000E+00	0.0000	3.959E-06	0.1968	1.287E-08	0.0006	9.359E-09	0.0005	9.021E-08	0.0045

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	9.727E-17	0.0000	2.628E-19	0.0000	0.000E+00	0.0000	9.663E-18	0.0000	1.072E-19	0.0000	8.809E-20	0.0000	3.722E-16	0.0000
Ra-226	1.123E-05	0.5583	2.668E-08	0.0013	0.000E+00	0.0000	1.125E-06	0.0559	1.306E-08	0.0006	1.450E-08	0.0007	2.012E-05	1.0000
Total	1.123E-05	0.5583	2.668E-08	0.0013	0.000E+00	0.0000	1.125E-06	0.0559	1.306E-08	0.0006	1.450E-08	0.0007	2.012E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Intrisk : RESRAD Default Parameters

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As pCi/yr at t= 1.000E+03 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	7.267E-04	1.259E+01	4.334E-02	2.103E-02	3.947E-01	1.484E+02	3.110E-01	1.145E+01	1.275E-01	1.044E-01	1.735E+02
Ra-226	7.001E-04	4.834E+01	1.410E-01	1.726E-01	3.802E-01	2.112E+02	1.281E-01	1.641E+01	2.263E-01	4.951E-01	2.775E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of

Radon and its Decay Products as pCi/yr at t= 1.000E+03 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)

and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	9.992E-10	0.0001	6.445E-10	0.0000	1.246E-06	0.0631	4.292E-09	0.0002	2.083E-09	0.0001	3.909E-08	0.0020
Ra-226	1.799E-06	0.0911	5.684E-10	0.0000	7.162E-07	0.0363	2.088E-09	0.0001	2.557E-09	0.0001	5.634E-09	0.0003
Total	1.800E-06	0.0911	1.213E-09	0.0001	1.963E-06	0.0994	6.380E-09	0.0003	4.640E-09	0.0002	4.472E-08	0.0023

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.196E-05	0.6056	3.232E-08	0.0016	1.190E-06	0.0602	1.325E-08	0.0007	1.086E-08	0.0005	1.450E-05	0.7342
Ra-226	2.456E-06	0.1243	1.991E-09	0.0001	2.550E-07	0.0129	3.517E-09	0.0002	7.694E-09	0.0004	5.250E-06	0.2658
Total	1.442E-05	0.7300	3.431E-08	0.0017	1.445E-06	0.0731	1.677E-08	0.0008	1.855E-08	0.0009	1.975E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+03 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.517E-23	0.0000	3.558E-23	0.0000	0.000E+00	0.0000	6.860E-20	0.0000	2.345E-22	0.0000	1.143E-22	0.0000	2.158E-21	0.0000
Ra-226	1.800E-06	0.0911	1.213E-09	0.0001	0.000E+00	0.0000	1.963E-06	0.0994	6.380E-09	0.0003	4.640E-09	0.0002	4.472E-08	0.0023
Total	1.800E-06	0.0911	1.213E-09	0.0001	0.000E+00	0.0000	1.963E-06	0.0994	6.380E-09	0.0003	4.640E-09	0.0002	4.472E-08	0.0023

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.764E-19	0.0000	4.768E-22	0.0000	0.000E+00	0.0000	1.753E-20	0.0000	1.948E-22	0.0000	1.599E-22	0.0000	2.660E-19	0.0000
Ra-226	1.442E-05	0.7300	3.431E-08	0.0017	0.000E+00	0.0000	1.445E-06	0.0731	1.677E-08	0.0008	1.855E-08	0.0009	1.975E-05	1.0000
Total	1.442E-05	0.7300	3.431E-08	0.0017	0.000E+00	0.0000	1.445E-06	0.0731	1.677E-08	0.0008	1.855E-08	0.0009	1.975E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Summary : RESRAD Default Parameters

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Dose Conversion Factor (and Related) Parameter Summary

Dose Library: DOE STD-1196-2011 (Reference Person)

Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	At-218 (Source: DCFPAK3.02)	5.567E-05	5.567E-05	DCF1(1)
A-1	Bi-210 (Source: DCFPAK3.02)	5.473E-03	5.473E-03	DCF1(2)
A-1	Bi-214 (Source: DCFPAK3.02)	9.135E+00	9.135E+00	DCF1(3)
A-1	Hg-206 (Source: DCFPAK3.02)	6.127E-01	6.127E-01	DCF1(4)
A-1	Pb-210 (Source: DCFPAK3.02)	2.092E-03	2.092E-03	DCF1(5)
A-1	Pb-214 (Source: DCFPAK3.02)	1.257E+00	1.257E+00	DCF1(6)
A-1	Po-210 (Source: DCFPAK3.02)	5.641E-05	5.641E-05	DCF1(7)
A-1	Po-214 (Source: DCFPAK3.02)	4.801E-04	4.801E-04	DCF1(8)
A-1	Po-218 (Source: DCFPAK3.02)	9.228E-09	9.228E-09	DCF1(9)
A-1	Ra-226 (Source: DCFPAK3.02)	3.176E-02	3.176E-02	DCF1(10)
A-1	Rn-218 (Source: DCFPAK3.02)	4.259E-03	4.259E-03	DCF1(11)
A-1	Rn-222 (Source: DCFPAK3.02)	2.130E-03	2.130E-03	DCF1(12)
A-1	Tl-206 (Source: DCFPAK3.02)	1.278E-02	1.278E-02	DCF1(13)
A-1	Tl-210 (Source: DCFPAK3.02)	1.677E+01	1.677E+01	DCF1(14)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	4.017E-02	2.231E-02	DCF2(1)
B-1	Ra-226+D	3.823E-02	3.811E-02	DCF2(2)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	1.026E-02	3.774E-03	DCF3(1)
D-1	Ra-226+D	1.677E-03	1.676E-03	DCF3(2)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRAC
R011	Length parallel to aquifer flow (m)	1.000E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	5.000E+00	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	2.500E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	5.000E+02	1.000E+03	---	T(8)
R011	Times for calculations (yr)	7.500E+02	0.000E+00	---	T(9)
R011	Times for calculations (yr)	1.000E+03	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Pb-210	2.430E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	2.430E-01	0.000E+00	---	S1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	5.300E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	4.000E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.500E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.000E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.663E-03	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.374E-03	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R017	Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	5.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.500E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.600E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	9.200E+01	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	6.300E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	5.400E+00	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	5.100E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.500E+00	FPLANT
R018	Contamination fraction of meat	-1	-1	0.500E-01	FMEAT
R018	Contamination fraction of milk	-1	-1	0.500E-01	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSNI
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSNI
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	suppressed

Summary : RESRAD Default Parameters

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Contaminated Zone Dimensions	Initial Soil Concentrations, pCi/g
Area: 1000.00 square meters	Pb-210 2.430E-01
Thickness: 2.00 meters	Ra-226 2.430E-01
Cover Depth: 0.00 meters	

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 5.000E+00 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
TDOSE(t):	5.053E+00	5.043E+00	5.019E+00	4.936E+00	4.692E+00	3.878E+00	2.547E+00	1.456E+00	2.259E+00	2.454E+00
M(t):	1.011E+00	1.009E+00	1.004E+00	9.871E-01	9.384E-01	7.755E-01	5.094E-01	2.913E-01	4.517E-01	4.908E-01

Maximum TDOSE(t): 5.053E+00 mrem/yr at t = 0.000E+00 years

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\NSTI SWDA BAYSIDE SU 9.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.014E-03	0.0002	4.840E-04	0.0001	0.000E+00	0.0000	2.133E+00	0.4222	7.293E-03	0.0014	3.553E-03	0.0007	6.711E-02	0.0133
Ra-226	1.362E+00	0.2696	4.752E-04	0.0001	0.000E+00	0.0000	1.456E+00	0.2882	4.313E-03	0.0009	5.133E-03	0.0010	1.220E-02	0.0024
Total	1.363E+00	0.2698	9.592E-04	0.0002	0.000E+00	0.0000	3.589E+00	0.7103	1.161E-02	0.0023	8.687E-03	0.0017	7.931E-02	0.0157

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.213E+00	0.4379
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.840E+00	0.5621
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.053E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\NSTI SWDA BAYSIDE SU 9.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	9.814E-04	0.0002	4.683E-04	0.0001	0.000E+00	0.0000	2.064E+00	0.4094	7.057E-03	0.0014	3.439E-03	0.0007	6.494E-02	0.0129
Ra-226	1.358E+00	0.2694	4.887E-04	0.0001	0.000E+00	0.0000	1.519E+00	0.3012	4.536E-03	0.0009	5.231E-03	0.0010	1.422E-02	0.0028
Total	1.359E+00	0.2696	9.570E-04	0.0002	0.000E+00	0.0000	3.583E+00	0.7105	1.159E-02	0.0023	8.670E-03	0.0017	7.916E-02	0.0157

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.141E+00	0.4246
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.901E+00	0.5754
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.043E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	9.190E-04	0.0002	4.385E-04	0.0001	0.000E+00	0.0000	1.933E+00	0.3851	6.608E-03	0.0013	3.220E-03	0.0006	6.081E-02	0.0121
Ra-226	1.351E+00	0.2691	5.142E-04	0.0001	0.000E+00	0.0000	1.635E+00	0.3257	4.936E-03	0.0010	5.409E-03	0.0011	1.805E-02	0.0036
Total	1.352E+00	0.2693	9.527E-04	0.0002	0.000E+00	0.0000	3.567E+00	0.7108	1.154E-02	0.0023	8.629E-03	0.0017	7.886E-02	0.0157

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.005E+00	0.3994
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.014E+00	0.6006
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.019E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	7.300E-04	0.0001	3.483E-04	0.0001	0.000E+00	0.0000	1.535E+00	0.3111	5.249E-03	0.0011	2.558E-03	0.0005	4.830E-02	0.0098
Ra-226	1.325E+00	0.2684	5.889E-04	0.0001	0.000E+00	0.0000	1.976E+00	0.4004	6.117E-03	0.0012	5.926E-03	0.0012	2.945E-02	0.0060
Total	1.325E+00	0.2685	9.373E-04	0.0002	0.000E+00	0.0000	3.512E+00	0.7115	1.137E-02	0.0023	8.484E-03	0.0017	7.776E-02	0.0158

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.593E+00	0.3227
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.343E+00	0.6773
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.936E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.782E-04	0.0001	1.804E-04	0.0000	0.000E+00	0.0000	7.954E-01	0.1695	2.719E-03	0.0006	1.325E-03	0.0003	2.502E-02	0.0053
Ra-226	1.253E+00	0.2670	7.113E-04	0.0002	0.000E+00	0.0000	2.549E+00	0.5434	8.112E-03	0.0017	6.737E-03	0.0014	4.927E-02	0.0105
Total	1.253E+00	0.2671	8.918E-04	0.0002	0.000E+00	0.0000	3.345E+00	0.7129	1.083E-02	0.0023	8.062E-03	0.0017	7.430E-02	0.0158

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.250E-01	0.1758
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.867E+00	0.8242
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.692E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.784E-05	0.0000	1.805E-05	0.0000	0.000E+00	0.0000	7.958E-02	0.0205	2.721E-04	0.0001	1.326E-04	0.0000	2.504E-03	0.0006
Ra-226	1.030E+00	0.2655	7.196E-04	0.0002	0.000E+00	0.0000	2.690E+00	0.6938	8.701E-03	0.0022	6.528E-03	0.0017	5.923E-02	0.0153
Total	1.030E+00	0.2655	7.376E-04	0.0002	0.000E+00	0.0000	2.770E+00	0.7144	8.973E-03	0.0023	6.660E-03	0.0017	6.173E-02	0.0159

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.255E-02	0.0213
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.795E+00	0.9787
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.878E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 2.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.726E-07	0.0000	1.301E-07	0.0000	0.000E+00	0.0000	5.734E-04	0.0002	1.961E-06	0.0000	9.552E-07	0.0000	1.804E-05	0.0000
Ra-226	6.758E-01	0.2653	4.845E-04	0.0002	0.000E+00	0.0000	1.820E+00	0.7143	5.895E-03	0.0023	4.374E-03	0.0017	4.056E-02	0.0159
Total	6.758E-01	0.2653	4.846E-04	0.0002	0.000E+00	0.0000	1.820E+00	0.7146	5.897E-03	0.0023	4.375E-03	0.0017	4.058E-02	0.0159

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 2.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.948E-04	0.0002
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.547E+00	0.9998
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.547E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 5.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	7.329E-11	0.0000	3.497E-11	0.0000	0.000E+00	0.0000	1.541E-07	0.0000	5.270E-10	0.0000	2.568E-10	0.0000	4.850E-09	0.0000
Ra-226	3.350E-01	0.2300	2.402E-04	0.0002	0.000E+00	0.0000	9.023E-01	0.6195	2.923E-03	0.0020	2.169E-03	0.0015	2.012E-02	0.0138
Total	3.350E-01	0.2300	2.402E-04	0.0002	0.000E+00	0.0000	9.023E-01	0.6195	2.923E-03	0.0020	2.169E-03	0.0015	2.012E-02	0.0138

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 5.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.599E-07	0.0000
Ra-226	1.793E-01	0.1231	3.065E-04	0.0002	0.000E+00	0.0000	1.384E-02	0.0095	1.631E-04	0.0001	2.016E-04	0.0001	1.456E+00	1.0000
Total	1.793E-01	0.1231	3.065E-04	0.0002	0.000E+00	0.0000	1.384E-02	0.0095	1.631E-04	0.0001	2.016E-04	0.0001	1.456E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 7.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.970E-14	0.0000	9.401E-15	0.0000	0.000E+00	0.0000	4.144E-11	0.0000	1.417E-13	0.0000	6.903E-14	0.0000	1.304E-12	0.0000
Ra-226	1.661E-01	0.0735	1.191E-04	0.0001	0.000E+00	0.0000	4.473E-01	0.1980	1.449E-03	0.0006	1.075E-03	0.0005	9.972E-03	0.0044
Total	1.661E-01	0.0735	1.191E-04	0.0001	0.000E+00	0.0000	4.473E-01	0.1980	1.449E-03	0.0006	1.075E-03	0.0005	9.972E-03	0.0044

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 7.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.573E-11	0.0000	3.296E-14	0.0000	0.000E+00	0.0000	1.212E-12	0.0000	1.343E-14	0.0000	1.105E-14	0.0000	5.998E-11	0.0000
Ra-226	1.510E+00	0.6687	2.734E-03	0.0012	0.000E+00	0.0000	1.166E-01	0.0516	1.358E-03	0.0006	1.537E-03	0.0007	2.259E+00	1.0000
Total	1.510E+00	0.6687	2.734E-03	0.0012	0.000E+00	0.0000	1.166E-01	0.0516	1.358E-03	0.0006	1.537E-03	0.0007	2.259E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	5.296E-18	0.0000	2.527E-18	0.0000	0.000E+00	0.0000	1.114E-14	0.0000	3.808E-17	0.0000	1.856E-17	0.0000	3.504E-16	0.0000
Ra-226	8.232E-02	0.0335	5.904E-05	0.0000	0.000E+00	0.0000	2.217E-01	0.0904	7.183E-04	0.0003	5.330E-04	0.0002	4.944E-03	0.0020
Total	8.232E-02	0.0335	5.904E-05	0.0000	0.000E+00	0.0000	2.217E-01	0.0904	7.183E-04	0.0003	5.330E-04	0.0002	4.944E-03	0.0020

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.513E-14	0.0000	7.361E-17	0.0000	0.000E+00	0.0000	2.707E-15	0.0000	3.008E-17	0.0000	2.469E-17	0.0000	4.952E-14	0.0000
Ra-226	1.983E+00	0.8081	3.597E-03	0.0015	0.000E+00	0.0000	1.531E-01	0.0624	1.783E-03	0.0007	2.010E-03	0.0008	2.454E+00	1.0000
Total	1.983E+00	0.8081	3.597E-03	0.0015	0.000E+00	0.0000	1.531E-01	0.0624	1.783E-03	0.0007	2.010E-03	0.0008	2.454E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g)									
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	9.106E+00	8.811E+00	8.250E+00	6.554E+00	3.395E+00	3.397E-01	2.448E-03	6.580E-07	2.468E-10	2.038E-13
Ra-226+D	Ra-226+D	1.000E+00	1.152E+01	1.149E+01	1.142E+01	1.120E+01	1.059E+01	8.701E+00	5.711E+00	3.037E+00	2.690E+00	2.362E+00
Ra-226+D	Pb-210+D	1.000E+00	1.684E-01	4.516E-01	9.801E-01	2.555E+00	5.323E+00	6.917E+00	4.769E+00	2.957E+00	6.604E+00	7.737E+00
Ra-226+D	ΣDSR(j)		1.169E+01	1.194E+01	1.240E+01	1.376E+01	1.591E+01	1.562E+01	1.048E+01	5.994E+00	9.294E+00	1.010E+01

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 5.000E+00 mrem/yr

Nuclide (i)	t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
Pb-210	5.491E-01	5.675E-01	6.060E-01	7.629E-01	1.473E+00	1.472E+01	2.043E+03	7.599E+06	2.026E+10	2.454E+13	
Ra-226	4.278E-01	4.188E-01	4.031E-01	3.634E-01	3.142E-01	3.202E-01	4.771E-01	8.342E-01	5.380E-01	4.951E-01	

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	2.430E-01	0.000E+00	9.106E+00	5.491E-01	9.106E+00	5.491E-01
Ra-226	2.430E-01	55.0 ± 0.1	1.657E+01	3.017E-01	1.169E+01	4.278E-01

Summary : RESRAD Default Parameters

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Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr									
			t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
Pb-210	Pb-210	1.000E+00	2.213E+00	2.141E+00	2.005E+00	1.593E+00	8.250E-01	8.255E-02	5.948E-04	1.599E-07	5.998E-11	4.952E-14
Pb-210	Ra-226	1.000E+00	4.093E-02	1.097E-01	2.382E-01	6.210E-01	1.294E+00	1.681E+00	1.159E+00	7.185E-01	1.605E+00	1.880E+00
Pb-210	ΣDOSE(j)		2.254E+00	2.251E+00	2.243E+00	2.214E+00	2.119E+00	1.763E+00	1.159E+00	7.185E-01	1.605E+00	1.880E+00
Ra-226	Ra-226	1.000E+00	2.800E+00	2.792E+00	2.776E+00	2.722E+00	2.573E+00	2.114E+00	1.388E+00	7.379E-01	6.537E-01	5.740E-01

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g									
			t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	2.500E+02	5.000E+02	7.500E+02	1.000E+03
Pb-210	Pb-210	1.000E+00	2.430E-01	2.351E-01	2.202E-01	1.749E-01	9.060E-02	9.065E-03	6.532E-05	1.756E-08	4.720E-12	1.269E-15
Pb-210	Ra-226	1.000E+00	0.000E+00	7.453E-03	2.158E-02	6.371E-02	1.378E-01	1.811E-01	1.250E-01	6.199E-02	3.073E-02	1.523E-02
Pb-210	ΣS(j):		2.430E-01	2.426E-01	2.418E-01	2.386E-01	2.284E-01	1.902E-01	1.250E-01	6.199E-02	3.073E-02	1.523E-02
Ra-226	Ra-226	1.000E+00	2.430E-01	2.423E-01	2.410E-01	2.363E-01	2.234E-01	1.835E-01	1.205E-01	5.972E-02	2.960E-02	1.468E-02

THF(i) is the thread fraction of the parent nuclide.

RESRAD.EXE execution time = 0.43 seconds

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Time= 1.000E+01	13
Time= 3.000E+01	16
Time= 1.000E+02	19
Time= 2.500E+02	22
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Cancer Risk Slope Factors Summary Table

Risk Library: DCFPAK3.02 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Pb-210+D	4.30E-09	1.48E-09	SLPF(1,1)
Sf-1	Ra-226+D	8.37E-06	2.50E-08	SLPF(2,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Pb-210+D	3.08E-08	1.59E-08	SLPF(1,2)
Sf-2	Ra-226+D	2.82E-08	2.81E-08	SLPF(2,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	2.67E-09	8.84E-10	SLPF(1,4)
Sf-3	Ra-226+D	3.85E-10	3.85E-10	SLPF(2,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,5)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,5)
Sf-Rn	Radon Inhalation slope factors, 1/(pCi):			
Sf-Rn	Rn-222	1.80E-12	1.80E-12	SLPFRN(1,1)
Sf-Rn	Po-218	3.70E-12	3.70E-12	SLPFRN(1,2)
Sf-Rn	Pb-214	6.20E-12	6.20E-12	SLPFRN(1,3)
Sf-Rn	Bi-214	1.50E-11	1.50E-11	SLPFRN(1,4)
Sf-Rn	Radon K factors, (mrem/WLM):			
Sf-Rn	Rn-222 Indoor	3.88E+02	3.88E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	3.88E+02	3.88E+02	KFACTR(1,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

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Risk Slope and Environmental Transport Factors for the Ground Pathway

Nuclide (i)	Slope(i)* t= 0.000E+00 1.000E+00 3.000E+00 1.000E+01 3.000E+01 1.000E+02 2.500E+02 5.000E+02 7.500E+02 1.000E+03										
	ETFG(i,t) At Time in Years (dimensionless)										
At-218	2.740E-11	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01
Bi-210	2.770E-09	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01	5.406E-01
Bi-214	7.340E-06	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01	5.370E-01
Hg-206	4.830E-07	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01
Pb-210	1.480E-09	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01	5.994E-01
Pb-214	9.940E-07	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01	5.466E-01
Po-210	4.510E-11	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01
Po-214	3.850E-10	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01
Po-218	6.840E-15	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01	5.514E-01
Ra-226	2.500E-08	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01	5.490E-01
Rn-218	3.390E-09	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01	5.322E-01
Rn-222	1.690E-09	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01
Tl-206	6.110E-09	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01	5.328E-01
Tl-210	1.340E-05	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01	5.358E-01

* - Units are 1/yr per (pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.225E-02	2.114E+02	7.227E-01	3.522E-01	6.652E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.192E+02
Ra-226	1.225E-02	8.457E+02	2.465E+00	3.018E+00	6.652E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.578E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.706E-08	0.0003	1.100E-08	0.0002	2.127E-05	0.3210	7.321E-08	0.0011	3.554E-08	0.0005	6.672E-07	0.0101
Ra-226	3.147E-05	0.4749	9.945E-09	0.0002	1.253E-05	0.1891	3.653E-08	0.0006	4.473E-08	0.0007	9.856E-08	0.0015
Total	3.149E-05	0.4752	2.095E-08	0.0003	3.380E-05	0.5101	1.097E-07	0.0017	8.027E-08	0.0012	7.658E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.208E-05	0.3331
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.419E-05	0.6669
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.627E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.116E-08	0.0002	7.200E-09	0.0001	0.000E+00	0.0000	1.388E-05	0.2095	4.745E-08	0.0007	2.312E-08	0.0003	4.367E-07	0.0066
Ra-226	3.148E-05	0.4750	1.375E-08	0.0002	0.000E+00	0.0000	1.992E-05	0.3006	6.229E-08	0.0009	5.715E-08	0.0009	3.291E-07	0.0050
Total	3.149E-05	0.4752	2.095E-08	0.0003	0.000E+00	0.0000	3.380E-05	0.5101	1.097E-07	0.0017	8.027E-08	0.0012	7.658E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.441E-05	0.2174
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.186E-05	0.7826
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.627E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.223E-02	2.118E+02	7.294E-01	3.540E-01	6.641E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.195E+02
Ra-226	1.221E-02	8.434E+02	2.459E+00	3.011E+00	6.633E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.555E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.702E-08	0.0003	1.098E-08	0.0002	2.123E-05	0.3212	7.313E-08	0.0011	3.549E-08	0.0005	6.658E-07	0.0101
Ra-226	3.138E-05	0.4747	9.917E-09	0.0002	1.250E-05	0.1890	3.643E-08	0.0006	4.460E-08	0.0007	9.828E-08	0.0015
Total	3.140E-05	0.4750	2.090E-08	0.0003	3.373E-05	0.5103	1.096E-07	0.0017	8.009E-08	0.0012	7.641E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.204E-05	0.3334
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.407E-05	0.6666
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.610E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+00 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.080E-08	0.0002	6.967E-09	0.0001	0.000E+00	0.0000	1.343E-05	0.2032	4.592E-08	0.0007	2.237E-08	0.0003	4.225E-07	0.0064
Ra-226	3.139E-05	0.4748	1.393E-08	0.0002	0.000E+00	0.0000	2.030E-05	0.3071	6.364E-08	0.0010	5.772E-08	0.0009	3.416E-07	0.0052
Total	3.140E-05	0.4750	2.090E-08	0.0003	0.000E+00	0.0000	3.373E-05	0.5103	1.096E-07	0.0017	8.009E-08	0.0012	7.641E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.394E-05	0.2109
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.216E-05	0.7891
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.610E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.218E-02	2.111E+02	7.269E-01	3.527E-01	6.618E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.188E+02
Ra-226	1.215E-02	8.386E+02	2.445E+00	2.994E+00	6.596E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.507E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.695E-08	0.0003	1.093E-08	0.0002	2.114E-05	0.3215	7.282E-08	0.0011	3.534E-08	0.0005	6.630E-07	0.0101
Ra-226	3.121E-05	0.4745	9.861E-09	0.0001	1.243E-05	0.1889	3.623E-08	0.0006	4.435E-08	0.0007	9.773E-08	0.0015
Total	3.122E-05	0.4748	2.079E-08	0.0003	3.357E-05	0.5105	1.090E-07	0.0017	7.969E-08	0.0012	7.608E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.194E-05	0.3337
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.382E-05	0.6663
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.576E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+00 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.011E-08	0.0002	6.524E-09	0.0001	0.000E+00	0.0000	1.258E-05	0.1912	4.299E-08	0.0007	2.095E-08	0.0003	3.956E-07	0.0060
Ra-226	3.121E-05	0.4746	1.427E-08	0.0002	0.000E+00	0.0000	2.099E-05	0.3192	6.605E-08	0.0010	5.874E-08	0.0009	3.651E-07	0.0056
Total	3.122E-05	0.4748	2.079E-08	0.0003	0.000E+00	0.0000	3.357E-05	0.5105	1.090E-07	0.0017	7.969E-08	0.0012	7.608E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.305E-05	0.1985
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.271E-05	0.8015
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.576E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+01 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.203E-02	2.083E+02	7.174E-01	3.481E-01	6.532E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.159E+02
Ra-226	1.191E-02	8.223E+02	2.398E+00	2.935E+00	6.468E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.341E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+01 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.669E-08	0.0003	1.077E-08	0.0002	2.082E-05	0.3224	7.170E-08	0.0011	3.480E-08	0.0005	6.529E-07	0.0101
Ra-226	3.060E-05	0.4738	9.669E-09	0.0001	1.218E-05	0.1887	3.552E-08	0.0006	4.349E-08	0.0007	9.583E-08	0.0015
Total	3.062E-05	0.4741	2.044E-08	0.0003	3.301E-05	0.5111	1.072E-07	0.0017	7.829E-08	0.0012	7.488E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.161E-05	0.3346
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.297E-05	0.6654
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.458E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+01 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.034E-09	0.0001	5.182E-09	0.0001	0.000E+00	0.0000	9.990E-06	0.1547	3.415E-08	0.0005	1.664E-08	0.0003	3.143E-07	0.0049
Ra-226	3.061E-05	0.4740	1.525E-08	0.0002	0.000E+00	0.0000	2.302E-05	0.3564	7.307E-08	0.0011	6.165E-08	0.0010	4.345E-07	0.0067
Total	3.062E-05	0.4741	2.044E-08	0.0003	0.000E+00	0.0000	3.301E-05	0.5111	1.072E-07	0.0017	7.829E-08	0.0012	7.488E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.037E-05	0.1606
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.421E-05	0.8394
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.458E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+01 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.151E-02	1.994E+02	6.867E-01	3.333E-01	6.253E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.067E+02
Ra-226	1.126E-02	7.774E+02	2.267E+00	2.775E+00	6.115E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.886E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+01 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.591E-08	0.0003	1.026E-08	0.0002	1.985E-05	0.3242	6.835E-08	0.0011	3.317E-08	0.0005	6.224E-07	0.0102
Ra-226	2.893E-05	0.4725	9.142E-09	0.0001	1.152E-05	0.1882	3.358E-08	0.0005	4.112E-08	0.0007	9.060E-08	0.0015
Total	2.894E-05	0.4728	1.940E-08	0.0003	3.137E-05	0.5124	1.019E-07	0.0017	7.429E-08	0.0012	7.130E-07	0.0116

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.060E-05	0.3365
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.062E-05	0.6635
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.122E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+01 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	4.162E-09	0.0001	2.685E-09	0.0000	0.000E+00	0.0000	5.175E-06	0.0845	1.769E-08	0.0003	8.620E-09	0.0001	1.628E-07	0.0027
Ra-226	2.894E-05	0.4727	1.672E-08	0.0003	0.000E+00	0.0000	2.619E-05	0.4278	8.424E-08	0.0014	6.567E-08	0.0011	5.502E-07	0.0090
Total	2.894E-05	0.4728	1.940E-08	0.0003	0.000E+00	0.0000	3.137E-05	0.5124	1.019E-07	0.0017	7.429E-08	0.0012	7.130E-07	0.0116

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.371E-06	0.0877
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.585E-05	0.9123
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.122E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+02 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	9.585E-03	1.660E+02	5.716E-01	2.774E-01	5.206E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.721E+02
Ra-226	9.250E-03	6.387E+02	1.862E+00	2.280E+00	5.024E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.479E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+02 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.319E-08	0.0003	8.506E-09	0.0002	1.645E-05	0.3261	5.664E-08	0.0011	2.749E-08	0.0005	5.158E-07	0.0102
Ra-226	2.377E-05	0.4712	7.511E-09	0.0001	9.464E-06	0.1876	2.759E-08	0.0005	3.378E-08	0.0007	7.444E-08	0.0015
Total	2.378E-05	0.4714	1.602E-08	0.0003	2.591E-05	0.5137	8.423E-08	0.0017	6.127E-08	0.0012	5.903E-07	0.0117

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.707E-05	0.3384
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.337E-05	0.6616
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.045E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+02 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	4.164E-10	0.0000	2.686E-10	0.0000	0.000E+00	0.0000	5.178E-07	0.0103	1.770E-09	0.0000	8.625E-10	0.0000	1.629E-08	0.0003
Ra-226	2.378E-05	0.4714	1.575E-08	0.0003	0.000E+00	0.0000	2.539E-05	0.5034	8.246E-08	0.0016	6.041E-08	0.0012	5.740E-07	0.0114
Total	2.378E-05	0.4714	1.602E-08	0.0003	0.000E+00	0.0000	2.591E-05	0.5137	8.423E-08	0.0017	6.127E-08	0.0012	5.903E-07	0.0117

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.374E-07	0.0107
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.991E-05	0.9893
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.045E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 2.500E+02 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	6.302E-03	1.091E+02	3.758E-01	1.824E-01	3.423E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.131E+02
Ra-226	6.072E-03	4.193E+02	1.222E+00	1.497E+00	3.298E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.253E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 2.500E+02 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.666E-09	0.0003	5.589E-09	0.0002	1.081E-05	0.3263	3.722E-08	0.0011	1.806E-08	0.0005	3.390E-07	0.0102
Ra-226	1.560E-05	0.4710	4.930E-09	0.0001	6.212E-06	0.1875	1.811E-08	0.0005	2.217E-08	0.0007	4.886E-08	0.0015
Total	1.561E-05	0.4712	1.052E-08	0.0003	1.702E-05	0.5139	5.533E-08	0.0017	4.024E-08	0.0012	3.878E-07	0.0117

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.122E-05	0.3387
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.191E-05	0.6613
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.312E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 2.500E+02 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.001E-12	0.0000	1.935E-12	0.0000	0.000E+00	0.0000	3.731E-09	0.0001	1.276E-11	0.0000	6.215E-12	0.0000	1.174E-10	0.0000
Ra-226	1.561E-05	0.4712	1.052E-08	0.0003	0.000E+00	0.0000	1.702E-05	0.5137	5.532E-08	0.0017	4.023E-08	0.0012	3.877E-07	0.0117
Total	1.561E-05	0.4712	1.052E-08	0.0003	0.000E+00	0.0000	1.702E-05	0.5139	5.533E-08	0.0017	4.024E-08	0.0012	3.878E-07	0.0117

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.872E-09	0.0001
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.312E-05	0.9999
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.312E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 5.000E+02 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	3.124E-03	5.411E+01	1.863E-01	9.043E-02	1.697E+00	1.267E+01	2.653E-02	9.764E-01	1.084E-02	8.905E-03	6.978E+01
Ra-226	3.010E-03	2.078E+02	6.060E-01	7.419E-01	1.635E+00	2.710E+01	1.643E-02	2.103E+00	2.889E-02	6.341E-02	2.401E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 5.000E+02 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 5.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	4.296E-09	0.0002	2.771E-09	0.0001	5.359E-06	0.2842	1.845E-08	0.0010	8.955E-09	0.0005	1.680E-07	0.0089
Ra-226	7.734E-06	0.4102	2.444E-09	0.0001	3.079E-06	0.1633	8.978E-09	0.0005	1.099E-08	0.0006	2.422E-08	0.0013
Total	7.738E-06	0.4104	5.215E-09	0.0003	8.438E-06	0.4475	2.743E-08	0.0015	1.995E-08	0.0011	1.923E-07	0.0102

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 5.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.741E-06	0.0923	4.700E-09	0.0002	1.730E-07	0.0092	1.923E-09	0.0001	1.578E-09	0.0001	7.483E-06	0.3969
Ra-226	4.613E-07	0.0245	3.738E-10	0.0000	4.786E-08	0.0025	6.584E-10	0.0000	1.443E-09	0.0001	1.137E-05	0.6031
Total	2.202E-06	0.1168	5.074E-09	0.0003	2.208E-07	0.0117	2.581E-09	0.0001	3.021E-09	0.0002	1.885E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 5.000E+02 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 5.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.066E-16	0.0000	5.203E-16	0.0000	0.000E+00	0.0000	1.003E-12	0.0000	3.429E-15	0.0000	1.671E-15	0.0000	3.155E-14	0.0000
Ra-226	7.738E-06	0.4104	5.215E-09	0.0003	0.000E+00	0.0000	8.438E-06	0.4475	2.743E-08	0.0015	1.995E-08	0.0011	1.923E-07	0.0102
Total	7.738E-06	0.4104	5.215E-09	0.0003	0.000E+00	0.0000	8.438E-06	0.4475	2.743E-08	0.0015	1.995E-08	0.0011	1.923E-07	0.0102

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 5.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.041E-12	0.0000
Ra-226	2.202E-06	0.1168	5.074E-09	0.0003	0.000E+00	0.0000	2.208E-07	0.0117	2.581E-09	0.0001	3.021E-09	0.0002	1.885E-05	1.0000
Total	2.202E-06	0.1168	5.074E-09	0.0003	0.000E+00	0.0000	2.208E-07	0.0117	2.581E-09	0.0001	3.021E-09	0.0002	1.885E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 7.500E+02 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.549E-03	2.682E+01	9.236E-02	4.483E-02	8.412E-01	1.190E+02	2.492E-01	9.172E+00	1.021E-01	8.370E-02	1.564E+02
Ra-226	1.492E-03	1.030E+02	3.004E-01	3.678E-01	8.104E-01	1.721E+02	1.044E-01	1.337E+01	1.844E-01	4.034E-01	2.907E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 7.500E+02 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.130E-09	0.0001	1.374E-09	0.0001	2.656E-06	0.1250	9.147E-09	0.0004	4.439E-09	0.0002	8.331E-08	0.0039
Ra-226	3.834E-06	0.1804	1.211E-09	0.0001	1.526E-06	0.0718	4.451E-09	0.0002	5.449E-09	0.0003	1.201E-08	0.0006
Total	3.836E-06	0.1805	2.585E-09	0.0001	4.183E-06	0.1968	1.360E-08	0.0006	9.888E-09	0.0005	9.531E-08	0.0045

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	9.819E-06	0.4620	2.652E-08	0.0012	9.763E-07	0.0459	1.087E-08	0.0005	8.909E-09	0.0004	1.360E-05	0.6399
Ra-226	2.047E-06	0.0963	1.659E-09	0.0001	2.125E-07	0.0100	2.930E-09	0.0001	6.412E-09	0.0003	7.654E-06	0.3601
Total	1.187E-05	0.5583	2.818E-08	0.0013	1.189E-06	0.0559	1.380E-08	0.0006	1.532E-08	0.0007	2.125E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 7.500E+02 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.500E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.168E-19	0.0000	1.399E-19	0.0000	0.000E+00	0.0000	2.696E-16	0.0000	9.218E-19	0.0000	4.491E-19	0.0000	8.482E-18	0.0000
Ra-226	3.836E-06	0.1805	2.585E-09	0.0001	0.000E+00	0.0000	4.183E-06	0.1968	1.360E-08	0.0006	9.888E-09	0.0005	9.531E-08	0.0045
Total	3.836E-06	0.1805	2.585E-09	0.0001	0.000E+00	0.0000	4.183E-06	0.1968	1.360E-08	0.0006	9.888E-09	0.0005	9.531E-08	0.0045

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.500E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.028E-16	0.0000	2.776E-19	0.0000	0.000E+00	0.0000	1.021E-17	0.0000	1.132E-19	0.0000	9.307E-20	0.0000	3.933E-16	0.0000
Ra-226	1.187E-05	0.5583	2.818E-08	0.0013	0.000E+00	0.0000	1.189E-06	0.0559	1.380E-08	0.0006	1.532E-08	0.0007	2.125E-05	1.0000
Total	1.187E-05	0.5583	2.818E-08	0.0013	0.000E+00	0.0000	1.189E-06	0.0559	1.380E-08	0.0006	1.532E-08	0.0007	2.125E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+03 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	7.678E-04	1.330E+01	4.579E-02	2.222E-02	4.170E-01	1.568E+02	3.285E-01	1.209E+01	1.347E-01	1.104E-01	1.833E+02
Ra-226	7.397E-04	5.107E+01	1.489E-01	1.823E-01	4.017E-01	2.232E+02	1.354E-01	1.733E+01	2.391E-01	5.230E-01	2.932E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+03 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.056E-09	0.0001	6.809E-10	0.0000	1.317E-06	0.0631	4.534E-09	0.0002	2.201E-09	0.0001	4.130E-08	0.0020
Ra-226	1.900E-06	0.0911	6.006E-10	0.0000	7.567E-07	0.0363	2.206E-09	0.0001	2.701E-09	0.0001	5.952E-09	0.0003
Total	1.902E-06	0.0911	1.282E-09	0.0001	2.074E-06	0.0994	6.741E-09	0.0003	4.902E-09	0.0002	4.725E-08	0.0023

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.264E-05	0.6056	3.414E-08	0.0016	1.257E-06	0.0602	1.400E-08	0.0007	1.147E-08	0.0005	1.532E-05	0.7342
Ra-226	2.595E-06	0.1243	2.104E-09	0.0001	2.694E-07	0.0129	3.716E-09	0.0002	8.129E-09	0.0004	5.547E-06	0.2658
Total	1.523E-05	0.7300	3.625E-08	0.0017	1.526E-06	0.0731	1.771E-08	0.0008	1.960E-08	0.0009	2.087E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+03 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.829E-23	0.0000	3.760E-23	0.0000	0.000E+00	0.0000	7.247E-20	0.0000	2.478E-22	0.0000	1.207E-22	0.0000	2.280E-21	0.0000
Ra-226	1.902E-06	0.0911	1.282E-09	0.0001	0.000E+00	0.0000	2.074E-06	0.0994	6.741E-09	0.0003	4.902E-09	0.0002	4.725E-08	0.0023
Total	1.902E-06	0.0911	1.282E-09	0.0001	0.000E+00	0.0000	2.074E-06	0.0994	6.741E-09	0.0003	4.902E-09	0.0002	4.725E-08	0.0023

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Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.864E-19	0.0000	5.037E-22	0.0000	0.000E+00	0.0000	1.853E-20	0.0000	2.058E-22	0.0000	1.690E-22	0.0000	2.810E-19	0.0000
Ra-226	1.523E-05	0.7300	3.625E-08	0.0017	0.000E+00	0.0000	1.526E-06	0.0731	1.771E-08	0.0008	1.960E-08	0.0009	2.087E-05	1.0000
Total	1.523E-05	0.7300	3.625E-08	0.0017	0.000E+00	0.0000	1.526E-06	0.0731	1.771E-08	0.0008	1.960E-08	0.0009	2.087E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Appendix F

Data Validation Reports

COVER LETTER

February 16, 2017

Lynn Caragan
C, B, & I Federal services
420 Exchange, #150
Irvine, CA. 92602

Dear Mrs. Caragan:

Enclosed is Revision 0 of the data validation report for the Treasure Island Naval Shipyard, Site 12, project number 500060. This DVR encompasses the laboratory data produced by TestAmerica Laboratories, Inc. for the sample delivery groups (SDG) listed in Table 1-1 of the DVR.

The specific sample identifications are listed in the sample identification table(s). The data packages were reviewed per the data validation procedures referenced in the introduction of the report.

Sincerely,

A handwritten signature in cursive script, appearing to read "Larry W. Duty", is positioned above a solid horizontal line.

Larry Duty
Data Validation Project Manager

Data Validation Report 02162017
for Treasure Island Site 12, Navy
BRAC PMO West

Contract Number N62473-12-D-2005
TO004

San Francisco, California

TestAmerica Laboratories

Subcontract Number 203598

Prepared for CB&I Federal Services
420 Exchange, Suite 150
Irvine, CA 92602
CB&I Project Number 50060

Prepared by:
E-Lab Consultants
30710 S Holly Oaks Circle
Magnolia, Texas 77355

February 2017

Data Validation Report 02162017 for Treasure Island Site 12, Navy BRAC PMO West

Contract Number N62473-12-D-2005
TO004

San Francisco, California

TestAmerica Laboratories

Subcontract Number 203598

Prepared for CB&I Federal Services
420 Exchange, Suite 150
Irvine, CA 92602
CB&I Project Number 50060

Approved by:



Larry Duty
E-Lab Consultants

Date: 02/16/2017

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Acronyms and Abbreviations

Following is a list of acronyms and abbreviations that may be used in data validation reports and/or data quality assessment reports.

%D	percent difference	DFTPP	decafluorotriphenylphosphine
%R	percent recovery	DOD	Department Of Defense
µg/L	microgram per liter	DQAR	data quality assessment report
mg/L	milligram per liter		
pg/L	picogram per liter	DUP	laboratory duplicate
µg/kg	microgram per kilogram	DVP	data validation procedure
mg/kg	milligram per kilogram	EDB	ethylene dibromide
ng/kg	nanogram per kilogram	EDL	estimated detection limit
pg/g	picogram per gram	EICP	extracted ion current profile
AA	atomic absorption	EPA	Environmental Protection Agency, United States
ARRF	average relative response factor	EB	equipment blank
BFB	bromofluorobenzene	FB	field blank
BNA	base/neutral/acid compounds	GC	gas chromatography
CCB	continuing calibration blank	GC/ECD	gas chromatography/electron capture detector
CCC	calibration check compound	GC/ELCD	gas chromatography/electrolytic conductivity detector (Hall detector)
CCV	continuing calibration verification	GC/FPD	gas chromatography/flame photometric detector
CF	calibration factor	GC/MS	gas chromatography/mass spectrometry
CLP	Contract Laboratory Program	GC/PID	gas chromatography/photoionization detector
COC	chain of custody record	GFAA	graphite furnace atomic

			absorption
COD	chemical oxygen demand	GPC	gel permeation chromatography
CTO	contract task order	Hg	mercury
CVAA	cold vapor atomic absorption	HPLC	high-performance liquid chromatography
DBCP	dibromochloropropane	HRGC/HR MS	high resolution gas chromatography/high resolution mass spectrometry
DCB	decachlorobiphenyl	RF r2	response factor coefficient of determination
4,4'-DDD	4,4'-dichlorodiphenyldichloroethane	RICRF	reconstructed ion chromatogram response factor
4,4'-DDE	4,4'-dichlorodiphenyldichloroethylene	RLRIC	reporting limit reconstructed ion chromatogram
4,4'-DDT	4,4'-dichlorodiphenyltrichloroethane	RPDRL	relative percent difference reporting limit
ICV	initial calibration verification	RRFRPD	relative response factor relative percent difference
IDL	instrument detection limit	RRTRRF	relative retention time relative response factor
IR	infrared spectroscopy	RSDRRT	relative standard deviation relative retention time
IRP	installation restoration program	RTRSD	retention time relative standard deviation
IS	internal standards	RT	retention time
LCS	laboratory control sample	HT	holding time
MBAS	methyl blue active substance	ICB	initial calibration blank
MDL	method detection limit	ICP	inductively coupled plasma
MS	matrix spike	ICS	interference check sample
MSA	method of standard addition	SDG	sample delivery group

MSD	matrix spike duplicate	SICP	selected ion current profiles
m/z	mass to charge ratio	s/n	signal to noise ratio
NFESC	Naval Facilities Engineering Services Center	SOP	standard operating procedure
OP	organophosphorus	SOW	statement of work
PAH	polynuclear aromatic hydrocarbon	SPCC	system performance check compound
PARCC	precision, accuracy, representativeness, comparability, completeness	SRM	standard reference material
PCB	polychlorinated biphenyl	SVOC	semivolatile organic compound
PCDD	polychlorinated dibenzodioxin	TB	trip blank
PCDF	polychlorinated dibenzofuran	TCDD	tetrachlorodibenzodioxin
PE	performance evaluation	TCX	tetrachloro-m-xylene
PEM	performance evaluation mixture	TDS	total dissolved solids
PFK	perfluorokerosene	TIC	tentatively identified compound
PQO	project quality objective	TOC	total organic carbon
QAPFK	quality assurance perfluorokerosene	TOX	total organic halides
QACQA	quality assurance coordinator quality assurance	TPHE	total petroleum hydrocarbons as extractables
QAPPQA C	quality assurance project plan quality assurance coordinator	UV/VIS	ultraviolet/visible
QCQAPP	quality control quality assurance project plan	VOA	volatile organic analysis
QSM QC	quality system manual quality control	VOC	volatile organic compound
rQSM	correlation coefficient quality system manual	VTSR	validated time of sample receipt

r ² r	coefficient of determination correlation coefficient	WDM	window defining mixture
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1.0 INTRODUCTION

This Data Validation Report (DVR) contains the results of the data validation conducted for samples collected and analyzed as part of the Treasure Island Naval Shipyard Site 12 investigation. The project was conducted per contract number N62473-12-D-2005 under task order 004 for the Base Realignment and Closure Program Management Office, West Naval Facilities Engineering Command, 1455 Frazee Road, #600, San Diego CA. 92108. This DVR was subcontracted to E-Lab Consultants from Chicago, Bridge, and Iron (CB&I) to serve third party data assessment purposes and evaluates the laboratory data contained in Sample Delivery Groups (SDGs) list in **Table 1-1** produced by TestAmerica Laboratories, Inc.

These samples were analyzed in accordance with the approved *United States Department of Defense (DOD) Quality Systems Manual (QSM) for Environmental Laboratories Version 5.0, July 2013* and the analytical methods specified for the analytes requested on the Chain of Custody (COC) documentation. **Table 1-1** provides a list of the samples collected, a laboratory sample number cross-reference, sample matrix, date collected, sample purpose, and analytical methods performed for each sample pertaining to this DVR. This DVR is conducted per the analysis requested on the COC in accordance with the; *Sampling and Analysis Plan (SAP) October 2013, Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Organic (NFGO) Data Review (August 2014), NFG for Inorganic (NFGIO) Data Review (August 2014)*, and the method specified for the analysis.

The data were evaluated against the quantitative acceptance limits given in the DOD QSM for the data quality parameters of sensitivity, accuracy, precision, and completeness. **Appendix A** contains the Laboratory Data Report Form 1s that has been annotated with qualifiers assigned during the validation process in accordance with the project procedures manual.

In accordance with SAP, a review of the data was conducted independent of the laboratory. This review consisted of an evaluation of laboratory performance criteria from the case narrative, and an evaluation of the sample-specific criteria included in the laboratory data packages analyzed in accordance with the DOD QSM.

The validation consists of an evaluation of the chain of custody and associated laboratory sample receipt forms, proper sample preservations, holding times, initial calibration and continuing calibration procedures and results, laboratory control sample (LCS) (and duplicate [LCSD] if reported) accuracy and precision and matrix spike (MS) and matrix spike duplicate (MSD) sample analyses, method blanks, field blanks, and field duplicate precision.

Additional review included;

- Organic Analysis; internal standards, surrogate recoveries, instrument tuning, initial calibration, second source calibration verification, continuing calibration verification, internal standards, degradation summary, retention times, second column or second detector confirmations
- Inorganic Analysis; laboratory duplicate precision, instrument tuning, initial calibration, low-level calibration check standards, initial and continuing calibration verification, initial and continuing calibration blanks, interference check sample, internal standards, serial dilution results, post digestion spike recoveries, and interelement correction factors

The results of the independent data review are presented in **Section 2.0**.

Table 1-1
Sample Field and Laboratory ID Numbers

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TI-TO04-NP-R-SU1-S002	160-14097-1	Solid	9/25/15	Normal	EPAGA_01_R	Level 4
TI-TO04-NP-R-SU1-S003	160-14097-2	Solid	9/25/15	Normal	EPAGA_01_R	Level 4
TI-TO04-NP-R-SU1-S005	160-14097-3	Solid	9/25/15	Normal	EPAGA_01_R	Level 4
TI-TO04-NP-R-SU1-S007	160-14097-4	Solid	9/25/15	Normal	EPAGA_01_R	Level 4
TI-TO04-NP-R-SU1-S010	160-14097-5	Solid	9/25/15	Normal	EPAGA_01_R	Level 4
TI-TO04-NP-R-SU1-S012	160-14097-6	Solid	9/25/15	Normal	EPAGA_01_R	Level 4
TI-TO04-NP-R-SU1-S013	160-14097-7	Solid	9/25/15	Normal	EPAGA_01_R	Level 4
TI-TO04-NP-R-SU1-S015	160-14097-8	Solid	9/25/15	Normal	EPAGA_01_R	Level 4
TI-TO04-NP-R-SU1-S016	160-14097-9	Solid	9/25/15	Normal	EPAGA_01_R	Level 4
TI-TO04-NP-R-SU1-S017	160-14097-10	Solid	9/25/15	Normal	EPAGA_01_R	Level 4
TI-TO04-NP-R-SU1-S019	160-14907-11	Solid	9/25/15	Normal	EPAGA_01_R	Level 4
TI-TO04-NP-R-BISU5-S001	160-14098-1	Solid	9/30/15	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-BIFSS_SU1-001	160-14099-1	Solid	9/25/15	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-BIFSS_SU1-002	160-14099-1	Solid	9/25/15	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-BIFSS_SU1-003	160-14099-1	Solid	9/25/15	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-SU5-S010	160-14100-1	Solid	9/28/15	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-SU5-S011	160-14100-2	Solid	9/28/15	Normal	EPAGA_01_R	Level 3



Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TI-TO04-NP-R-SU5-S012	160-14100-3	Solid	9/28/15	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSBISU5-002	160-14140-1	Solid	10/05/15	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSBISU5-003	160-14140-2	Solid	10/05/15	Normal	EPAGA_01_R	Level 3
TI-TO04_SU1_FSS_NP-S001	160-14255-1	Solid	10/09/15	Normal	EPAGA_01_R	Level 3
TI-TO04_SU1_FSS_NP-S004	160-14255-2	Solid	10/09/15	Normal	EPAGA_01_R	Level 3
TI-TO04_SU1_FSS_NP-S006	160-14255-3	Solid	10/09/15	Normal	EPAGA_01_R	Level 3
TI-TO04_SU1_FSS_NP-S008	160-14255-4	Solid	10/09/15	Normal	EPAGA_01_R	Level 3
TI-TO04_SU1_FSS_NP-S009	160-14255-5	Solid	10/09/15	Normal	EPAGA_01_R	Level 3
TI-TO04_SU1_FSS_NP-S011	160-14255-6	Solid	10/09/15	Normal	EPAGA_01_R	Level 3
TI-TO04_SU1_FSS_NP-S014	160-14255-7	Solid	10/09/15	Normal	EPAGA_01_R	Level 3
TI-TO04_SU1_FSS_NP-S018	160-14255-8	Solid	10/09/15	Normal	EPAGA_01_R	Level 3
TI-TO04_SU1_FSS_NP-S020	160-14255-9	Solid	10/09/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S001	160-15048-1	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S002	160-15048-2	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S003	160-15048-3	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S004	160-15048-4	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S005	160-15048-5	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S006	160-15048-6	Solid	11/20/15	Normal	EPAGA_01_R	Level 3



Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04-RSY10_SU2-S007	160-15048-7	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S008	160-15048-8	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S009	160-15048-9	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S010	160-15048-10	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S011	160-15048-11	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S012	160-15048-12	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S013	160-15048-13	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S014	160-15048-14	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S015	160-15048-15	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S016	160-15048-16	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S017	160-15048-17	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S018	160-15048-18	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S019	160-15048-19	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TITO04-RSY10_SU2-S020	160-15048-20	Solid	11/20/15	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S401	160-16804-1	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S402	160-16804-2	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S403	160-16804-3	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S404	160-16804-4	Solid	4/4/16	Normal	EPAGA_01_R	Level 3



Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TI-TO04-NP-R-FSSSU4-S405	160-16804-5	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S406	160-16804-6	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S407	160-16804-7	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S408	160-16804-8	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S409	160-16804-9	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S410	160-16804-10	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S411	160-16804-11	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S412	160-16804-12	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S413	160-16804-13	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S414	160-16804-14	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S415	160-16804-15	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S416	160-16804-16	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S417	160-16804-17	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S418	160-16804-18	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S419	160-16804-19	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSSSU4-S420	160-16804-20	Solid	4/4/16	Normal	EPAGA_01_R	Level 3
TITO04_NP-R-FSSSU4-S421	160-17136-1	Solid	4/25/16	Normal	EPAGA_01_R	Level 3
TITO04_NP-R-FSSSU4-S422	160-17136-2	Solid	4/25/16	Normal	EPAGA_01_R	Level 3



Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04_NP-R-FSSSU4-S423	160-17136-3	Solid	4/25/16	Normal	EPAGA_01_R	Level 3
TITO04_NP-R-FSSSU4-S424	160-17136-4	Solid	4/25/16	Normal	EPAGA_01_R	Level 3
TITO04_NP-R-FSSSU4-S425	160-17136-5	Solid	4/25/16	Normal	EPAGA_01_R	Level 3
TITO04_NP-R-FSSSU4-S426	160-17136-6	Solid	4/25/16	Normal	EPAGA_01_R	Level 3
TITO04_NP-R-FSSSU4-S427	160-17136-7	Solid	4/25/16	Normal	EPAGA_01_R	Level 3
TITO04_NP-R-FSSSU4-S428	160-17136-8	Solid	4/25/16	Normal	EPAGA_01_R	Level 3
TITO04_NP-R-FSSSU4-S429	160-17136-9	Solid	4/25/16	Normal	EPAGA_01_R	Level 3
TITO04_NP-R-FSSSU4-S430	160-17136-10	Solid	4/25/16	Normal	EPAGA_01_R	Level 3
TITO04_NP-R-FSSSU4-S431	160-17136-11	Solid	4/25/16	Normal	EPAGA_01_R	Level 3
TITO04_NP-R-FSSSU4-S432	160-17136-12	Solid	4/25/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-BISU7-S001	160-17238-1	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS SU7-LLRO505CH-S001	160-17242-1	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS SU7-LLRO505CH-S002	160-17242-2	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS SU7-LLRO505CH-S003	160-17242-3	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS SU7-LLRO505CH-S004	160-17242-4	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS SU7-LLRO505CH-S005	160-17242-5	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S001	160-17243-1	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S002	160-17243-2	Solid	5/3/16	Normal	EPAGA_01_R	Level 3

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TI-TO04-NP-R-FSS-SU7-S003	160-17243-3	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S004	160-17243-4	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S005	160-17243-5	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S006	160-17243-6	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S007	160-17243-7	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S008	160-17243-8	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S009	160-17243-9	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S010	160-17243-10	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S011	160-17243-11	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S012	160-17243-12	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S013	160-17243-13	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S014	160-17243-14	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S015	160-17243-15	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S016	160-17243-16	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S017	160-17243-17	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S018	160-17243-18	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S019	160-17243-19	Solid	5/3/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SU7-S020	160-17243-20	Solid	5/3/16	Normal	EPAGA_01_R	Level 3

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TI-TO04-NP-R-FSS-SWSU5-S5-14	160-17267-1	Solid	5/3/16	Normal	EPAGA_01_R	Level 4
TI-TO04-NP-R-FSS-SWSU5-S5-15	160-17267-2	Solid	5/3/16	Normal	EPAGA_01_R	Level 4
TI-TO04-NP-R-FSS-SWSU5-S5-01	160-17479-1	Solid	5/19/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SWSU5-S5-02	160-17479-2	Solid	5/19/16	Normal	EPAGA_01_R	Level 3
TI-TO04-NP-R-FSS-SWSU5-S5-23	160-17479-3	Solid	5/19/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S001	160-19855-1	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S002	160-19855-2	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S003	160-19855-3	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S004	160-19855-4	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S005	160-19855-5	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S006	160-19855-6	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S007	160-19855-7	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S008	160-19855-8	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S009	160-19855-9	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S010	160-19855-10	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S011	160-19855-11	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S012	160-19855-12	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S013	160-19855-13	Solid	11/1/16	Normal	EPAGA_01_R	Level 3

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04-NP-FSS-SU3-BSRSY10-U7-S014	160-19855-14	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S015	160-19855-15	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S016	160-19855-16	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S017	160-19855-17	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S018	160-19855-18	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S019	160-19855-19	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS-SU3-BSRSY10-U7-S020	160-19855-20	Solid	11/1/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-SU5-SWFSS-5-13-S001	160-19909-1	Solid	10/24/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-SU5-SWSU2-BI#8-S001	160-19910-1	Solid	11/7/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-SU5-SWSU2-BI#18-S002	160-19910-2	Solid	11/7/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-SU5-SWSU2-BI#30-S003	160-19910-3	Solid	11/7/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-SU5SW-FSS-5-09-S001	160-19955-1	Solid	11/9/16	Normal	EPAGA_01_R	Level 3

Following the specifications in the SAP related to the data validation process, the data were annotated with data validation qualifiers and codes on the analytical data sheets that are required qualifier flags as described in the SAP. **Table 1-2** provides definitions of the data qualifiers references, and **Table 1-3** lists and defines the data review qualifier codes.

Table 1-2
Data Qualifier References

Qualifier	Organics	Inorganics
U	The analyte was analyzed for, but was not detected above the method detection limit.	The analyte was analyzed for, but was not detected above the method detection limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."	Not applicable.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.	Not applicable.
UJ	The analyte was not detected above the method detection limit. However, the associated value is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.	The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and to meet quality control criteria. The presence or absence of the analyte cannot be verified.	The data are unusable. The sample results are rejected due to serious deficiencies in meeting the Quality Control (QC) criteria. The analyte may or may not be present in the sample.

Table 1-3
Data Review Qualifier Codes

Reason Code	Description
A	Serial dilution outside criteria (Level IV).
B1	Method blank contaminants above reporting limit.
B2	Calibration blank contaminants above reporting limit.
B2 (Bias flag –)	Calibration blank indicates negative interference, false negatives may be present
B3	Trip blank contamination
B4	Equipment rinsate contamination.
B5	Ambient blank contamination
C	ICV or CCV % D outside control limits.
C1	Initial calibration RSD outside control limit.
C2	Initial calibration RRF outside control limit.
C3	Continuing calibration RRF outside control limit.
D1	Sample Duplicate RPD outside control limit.
D2	Matrix Duplicate RPD outside control limit
E	The sample results exceed the linear calibration range of the instrument.
F	Hydrocarbon pattern does not match hydrocarbon pattern in the standard.
H	Holding time exceeded.
I	Internal standard recovery outside control limit.
L	LCS outside control limits.
M	MS outside control limits.
M1	MS, MSD or RPD outside of control limits
O	Interference check sample outside acceptance criteria
P	Analyte qualified based on the professional judgement of the reviewer.
S	Surrogate recovery outside control limit.
T	Temperature outside acceptance criteria.
Tr	Value reported detected between the DL and LOQ
W	Pesticide breakdown outside criteria (Level IV).



X	Raised reporting limit due to matrix interference or high analyte concentration.
Y	Analyte was not confirmed by a second column.
Y1	Primary and Confirmation Sample Duplicate RPD outside control limit.

2.0 DATA VALIDATION RESULTS

Laboratory Data Package Review

The samples reported, QC designations, and validation level is listed in **Table 1-1**. The data packages were reviewed in accordance with the project procedures manual.

Sample Documentation, Preservation, Handling, and Transport

All samples arrived at the laboratory on time, intact and within preservation requirements.

A cross reference of the COC and analytical reports has concluded all extractions and analysis were performed within the required holding times. The validation met all QC requirements listed in the method and data validation requirements of the SAP. None of the data is qualified based on sample documentation, preservation, handling, or transport

2.1 Radium-226 by GAMMA SPEC (21 DAY INGROWTH)

2.1.1 Instrument Performance Checks

Data verification included the recalculation of raw data, verifying the mass spectral abundance and assignment are correct and within the method requirements. All samples were analyzed with an acceptable BFB performance check and within the 12-hour window requirement.

2.1.2 Instrument Initial Calibrations

Relative Retention Factors (RRF) was verified against the quantitation reports, mass spectra, and chromatograms. Average RRF and percent relative Standard Deviations (%RSD) were verified for one compound associated with each internal standard. All initial calibration average relative response factors were within the project DoD QSM requirements.

2.1.3 Initial Calibration Verifications

The initial calibration curve was verified with a second source standard mix that contained all target compounds.

2.1.4 Continuing Calibrations

Continuing calibration average relative response factors were within the DoD QSM requirements (<20%). Continuing calibrations were performed on a 12-hour basis.

2.1.5 Blanks

Each analytical batch was represented with a method blank. The laboratory reports none of the target compounds were detected in any of the method blanks

2.1.6 Laboratory Control Sample Recovery (Blank Spikes)

The LCS values were validated by recalculating two compounds per LCS. None of the data are qualified based on LCS recoveries.

2.1.7 Matrix Spike/Matrix Spike Duplicate Recoveries

MS/MSD samples were not submitted for this analysis.

2.1.8 Laboratory Duplicate Recoveries

All laboratory generated duplicate recoveries are within QC limits.

2.1.9 Field QC Samples

2.1.9.1 Trip, Equipment and Field Blanks

Field blank samples were not submitted for this analysis.

2.1.10 Target Compound Identification

None of the identified target compounds were qualified based compound identification.

2.1.11 Compound Quantitation and Reporting Limits

Reporting limits were verified to be equal to the Level of Detection (LOD). The LODs have been verified to meet or exceed the project required performance standards. Sample dilutions, cleanup concentrations, and moisture correction have been applied to all reportable results. The results are reported on a dry weight basis where applicable.

2.1.12 Tentatively Identified Compounds

No Tentatively Identified Compounds are reported.

Appendix A

Annotated Laboratory Analytical Data Reporting Forms 1s

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Client Sample ID: TI-TO04-NP-R-SU1-S002

Lab Sample ID: 160-14097-1

Date Collected: 09/25/15 13:22

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.573		0.127	0.140		0.112	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Actinium-227	-0.0578	U	0.429	0.429		0.742	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Bismuth-212	0.398	U	0.379	0.382		0.636	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Bismuth-214	0.287		0.0905	0.0953		0.100	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Cesium-137	0.000726	U	0.0297	0.0297		0.0555	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Lead-210	0.683	U	1.25	1.25		1.73	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Lead-212	0.367		0.0913	0.103		0.0980	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Lead-214	0.239		0.0846	0.0882		0.116	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Potassium-40	8.84		1.16	1.47		0.668	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Protactinium-231	0.308	U	0.628	0.629		1.08	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Radium-226	0.287		0.0905	0.0953	0.500	0.100	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Radium-228	0.573		0.127	0.140		0.112	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Thallium-208	0.129		0.0536	0.0553		0.0540	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Thorium-228	0.367		0.0913	0.103		0.0980	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Thorium-232	0.573		0.127	0.140		0.112	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Thorium-234	0.324	U	0.423	0.425		1.39	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Uranium-235	0.171	U	0.163	0.164		0.357	pCi/g	10/08/15 09:27	10/29/15 07:56	1
Uranium-238	0.324	U	0.423	0.425		1.39	pCi/g	10/08/15 09:27	10/29/15 07:56	1

Client Sample ID: TI-TO04-NP-R-SU1-S003

Lab Sample ID: 160-14097-2

Date Collected: 09/25/15 13:18

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.263		0.0838	0.0880		0.212	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Actinium-227	0.198	U	0.415	0.416		0.706	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Bismuth-212	0.243	U	0.492	0.493		0.848	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Bismuth-214	0.313		0.0976	0.103		0.108	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Cesium-137	-0.00454	U	0.0443	0.0443		0.0800	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Lead-210	0.210	U	1.00	1.01		1.92	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Lead-212	0.374		0.0843	0.0972		0.0851	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Lead-214	0.411		0.113	0.121		0.112	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Potassium-40	11.2		1.40	1.81		0.592	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Protactinium-231	0.224	U	0.261	0.262		1.64	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Radium-226	0.313		0.0976	0.103	0.500	0.108	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Radium-228	0.263		0.0838	0.0880		0.212	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Thallium-208	0.158		0.0518	0.0543		0.0515	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Thorium-228	0.374		0.0843	0.0972		0.0851	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Thorium-232	0.263		0.0838	0.0880		0.212	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Thorium-234	0.752	U	0.871	0.875		1.39	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Uranium-235	-0.0243	U	0.675	0.675		0.294	pCi/g	10/08/15 09:27	10/29/15 07:58	1
Uranium-238	0.752	U	0.871	0.875		1.39	pCi/g	10/08/15 09:27	10/29/15 07:58	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Client Sample ID: TI-TO04-NP-R-SU1-S005

Lab Sample ID: 160-14097-3

Date Collected: 09/25/15 13:13

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.271		0.0916	0.0957		0.240	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Actinium-227	0.132	U	0.307	0.307		0.525	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Bismuth-212	0.288	U	0.453	0.454		0.764	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Bismuth-214	0.346		0.0868	0.0940		0.0495	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Cesium-137	-0.0133	U	0.0370	0.0370		0.0651	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Lead-210	1.44		0.941	0.956		1.24	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Lead-212	0.438		0.0884	0.105		0.0859	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Lead-214	0.371		0.0921	0.0999		0.0720	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Potassium-40	6.46		1.17	1.35		0.911	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Protactinium-231	0.198	U	0.415	0.416		1.00	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Radium-226	0.346		0.0868	0.0940	0.500	0.0495	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Radium-228	0.271		0.0916	0.0957		0.240	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Thallium-208	0.177		0.0453	0.0489		0.0266	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Thorium-228	0.438		0.0884	0.105		0.0859	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Thorium-232	0.271		0.0916	0.0957		0.240	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Thorium-234	0.554	U	0.654	0.656		1.13	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Uranium-235	0.00821	U	0.176	0.176		0.306	pCi/g	10/08/15 09:27	10/29/15 08:00	1
Uranium-238	0.554	U	0.654	0.656		1.13	pCi/g	10/08/15 09:27	10/29/15 08:00	1

Client Sample ID: TI-TO04-NP-R-SU1-S007

Lab Sample ID: 160-14097-4

Date Collected: 09/25/15 13:29

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.223	U	0.135	0.137		0.292	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Actinium-227	0.137	U	0.275	0.276		0.711	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Bismuth-212	0.127	U	0.588	0.589		1.07	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Bismuth-214	0.209		0.111	0.113		0.161	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Cesium-137	-0.0200	U	0.350	0.350		0.104	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Lead-210	-0.255	U	1.82	1.82		1.84	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Lead-212	0.284		0.0850	0.0926		0.0926	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Lead-214	0.276		0.0921	0.0965		0.130	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Potassium-40	10.1		1.64	1.94		0.804	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Protactinium-231	-0.274	U	0.997	0.998		1.76	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Radium-226	0.209		0.111	0.113	0.500	0.161	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Radium-228	0.223	U	0.135	0.137		0.292	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Thallium-208	0.131		0.0627	0.0641		0.0579	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Thorium-228	0.284		0.0850	0.0926		0.0926	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Thorium-232	0.223	U	0.135	0.137		0.292	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Thorium-234	0.253	U	0.472	0.473		1.46	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Uranium-235	0.188	U	0.205	0.206		0.294	pCi/g	10/08/15 09:27	10/29/15 07:59	1
Uranium-238	0.253	U	0.472	0.473		1.46	pCi/g	10/08/15 09:27	10/29/15 07:59	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Client Sample ID: TI-TO04-NP-R-SU1-S010

Lab Sample ID: 160-14097-5

Date Collected: 09/25/15 13:31

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.176	U	0.113	0.114		0.226	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Actinium-227	0.00646	U	0.399	0.399		0.707	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Bismuth-212	0.231	U	0.338	0.339		0.566	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Bismuth-214	0.342		0.0896	0.0964		0.0889	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Cesium-137	-0.0105	U	0.0446	0.0446		0.0791	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Lead-210	-0.344	U	1.44	1.44		1.87	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Lead-212	0.404		0.0871	0.102		0.0890	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Lead-214	0.346		0.0924	0.0991		0.121	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Potassium-40	8.92		1.29	1.58		0.805	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Protactinium-231	-0.0244	U	0.737	0.737		1.34	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Radium-226	0.342		0.0896	0.0964	0.500	0.0889	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Radium-228	0.176	U	0.113	0.114		0.226	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Thallium-208	0.130		0.0499	0.0517		0.0511	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Thorium-228	0.404		0.0871	0.102		0.0890	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Thorium-232	0.176	U	0.113	0.114		0.226	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Thorium-234	0.150	U	0.838	0.838		1.56	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Uranium-235	0.0918	U	0.186	0.187		0.332	pCi/g	10/08/15 09:27	10/29/15 08:44	1
Uranium-238	0.150	U	0.838	0.838		1.56	pCi/g	10/08/15 09:27	10/29/15 08:44	1

Client Sample ID: TI-TO04-NP-R-SU1-S012

Lab Sample ID: 160-14097-6

Date Collected: 09/25/15 13:15

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.486		0.103	0.114		0.0767	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Actinium-227	0.0164	U	0.140	0.140		0.644	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Bismuth-212	-0.00343	U	0.482	0.482		0.889	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Bismuth-214	0.325		0.105	0.110		0.106	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Cesium-137	-0.00766	U	0.0408	0.0408		0.0730	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Lead-210	1.21	U	1.22	1.23		1.75	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Lead-212	0.223		0.106	0.110		0.118	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Lead-214	0.337		0.111	0.117		0.103	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Potassium-40	10.5		1.33	1.71		0.736	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Protactinium-231	0.212	U	0.276	0.277		1.67	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Radium-226	0.325		0.105	0.110	0.500	0.106	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Radium-228	0.486		0.103	0.114		0.0767	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Thallium-208	0.152		0.0515	0.0539		0.0527	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Thorium-228	0.223		0.106	0.110		0.118	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Thorium-232	0.486		0.103	0.114		0.0767	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Thorium-234	0.916	U	1.07	1.07		1.46	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Uranium-235	0.0544	U	0.191	0.191		0.351	pCi/g	10/08/15 09:27	10/29/15 08:46	1
Uranium-238	0.916	U	1.07	1.07		1.46	pCi/g	10/08/15 09:27	10/29/15 08:46	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Client Sample ID: TI-TO04-NP-R-SU1-S013

Lab Sample ID: 160-14097-7

Date Collected: 09/25/15 13:10

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.575		0.145	0.156		0.0744	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Actinium-227	-0.0252	U	0.152	0.152		0.623	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Bismuth-212	0.0819	U	0.357	0.357		0.651	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Bismuth-214	0.323		0.0979	0.104		0.0949	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Cesium-137	0.00849	U	0.0312	0.0312		0.0563	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Lead-210	1.65	U	1.25	1.27		1.74	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Lead-212	0.334		0.0823	0.0929		0.0836	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Lead-214	0.346		0.0939	0.101		0.0971	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Potassium-40	7.95		1.14	1.40		0.540	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Protactinium-231	0.137	U	0.206	0.206		1.30	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Radium-226	0.323		0.0979	0.104	0.500	0.0949	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Radium-228	0.575		0.145	0.156		0.0744	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Thallium-208	0.111		0.0458	0.0472		0.0487	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Thorium-228	0.334		0.0823	0.0929		0.0836	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Thorium-232	0.575		0.145	0.156		0.0744	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Thorium-234	0.458	U	0.372	0.375		1.25	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Uranium-235	0.0920	U	0.176	0.176		0.298	pCi/g	10/08/15 09:27	10/29/15 08:47	1
Uranium-238	0.458	U	0.372	0.375		1.25	pCi/g	10/08/15 09:27	10/29/15 08:47	1

Client Sample ID: TI-TO04-NP-R-SU1-S015

Lab Sample ID: 160-14097-8

Date Collected: 09/25/15 13:55

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.155	U	0.113	0.115		0.233	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Actinium-227	0.0376	U	0.279	0.279		0.495	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Bismuth-212	0.160	U	0.448	0.449		0.791	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Bismuth-214	0.365		0.0843	0.0925		0.0359	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Cesium-137	-0.00977	U	0.0364	0.0364		0.0651	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Lead-210	0.0175	U	0.735	0.735		1.38	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Lead-212	0.306		0.0685	0.0792		0.0626	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Lead-214	0.290		0.0725	0.0785		0.0603	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Potassium-40	10.9		1.43	1.81		0.515	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Protactinium-231	0.243	U	0.297	0.299		1.21	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Radium-226	0.365		0.0843	0.0925	0.500	0.0359	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Radium-228	0.155	U	0.113	0.115		0.233	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Thallium-208	0.128		0.0361	0.0385		0.0188	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Thorium-228	0.306		0.0685	0.0792		0.0626	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Thorium-232	0.155	U	0.113	0.115		0.233	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Thorium-234	0.204	U	0.185	0.186		1.14	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Uranium-235	0.00247	U	0.0434	0.0434		0.198	pCi/g	10/08/15 09:27	10/29/15 08:48	1
Uranium-238	0.204	U	0.185	0.186		1.14	pCi/g	10/08/15 09:27	10/29/15 08:48	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Client Sample ID: TI-TO04-NP-R-SU1-S016

Lab Sample ID: 160-14097-9

Date Collected: 09/25/15 13:07

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.183	U	0.124	0.125		0.278	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Actinium-227	0.0891	U	0.240	0.240		0.635	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Bismuth-212	0.0579	U	0.550	0.550		1.03	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Bismuth-214	0.290		0.129	0.133		0.159	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Cesium-137	-0.0309	U	0.652	0.652		0.100	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Lead-210	1.15	U	1.12	1.13		1.64	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Lead-212	0.354		0.0863	0.0977		0.0848	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Lead-214	0.325		0.0956	0.101		0.0922	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Potassium-40	11.4		1.75	2.10		0.816	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Protactinium-231	0.347	U	0.694	0.695		1.52	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Radium-226	0.290		0.129	0.133	0.500	0.159	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Radium-228	0.183	U	0.124	0.125		0.278	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Thallium-208	0.137		0.0604	0.0621		0.0554	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Thorium-228	0.354		0.0863	0.0977		0.0848	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Thorium-232	0.183	U	0.124	0.125		0.278	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Thorium-234	0.607	U	0.495	0.499		1.31	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Uranium-235	0.143	U	0.174	0.174		0.256	pCi/g	10/08/15 09:27	10/29/15 08:49	1
Uranium-238	0.607	U	0.495	0.499		1.31	pCi/g	10/08/15 09:27	10/29/15 08:49	1

Client Sample ID: TI-TO04-NP-R-SU1-S017

Lab Sample ID: 160-14097-10

Date Collected: 09/25/15 13:05

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.306		0.135	0.139		0.224	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Actinium-227	0.0291	U	0.442	0.442		0.779	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Bismuth-212	-0.131	U	0.532	0.532		0.958	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Bismuth-214	0.298		0.108	0.112		0.118	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Cesium-137	0.0215	U	0.0404	0.0405		0.0697	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Lead-210	0.266	U	0.958	0.959		1.80	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Lead-212	0.257		0.101	0.107		0.112	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Lead-214	0.244		0.101	0.104		0.139	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Potassium-40	9.62		1.56	1.85		1.01	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Protactinium-231	0.0210	U	0.324	0.324		1.13	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Radium-226	0.298		0.108	0.112	0.500	0.118	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Radium-228	0.306		0.135	0.139		0.224	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Thallium-208	0.0497	U	0.0433	0.0436		0.0635	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Thorium-228	0.257		0.101	0.107		0.112	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Thorium-232	0.306		0.135	0.139		0.224	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Thorium-234	0.130	U	0.507	0.507		1.59	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Uranium-235	0.177	U	0.154	0.155		0.262	pCi/g	10/08/15 09:27	10/29/15 08:45	1
Uranium-238	0.130	U	0.507	0.507		1.59	pCi/g	10/08/15 09:27	10/29/15 08:45	1

TestAmerica St. Louis

Reviewed by E-Lab Consultants 02/17/2017

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14097-2

Client Sample ID: TI-TO04-NP-R-SU1-S019

Lab Sample ID: 160-14097-11

Date Collected: 09/25/15 13:00

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.233		0.116	0.118		0.175	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Actinium-227	0.211	U	0.432	0.433		0.730	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Bismuth-212	0.205	U	0.319	0.319		0.538	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Bismuth-214	0.282		0.0849	0.0898		0.0822	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Cesium-137	0.00616	U	0.0331	0.0331		0.0597	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Lead-210	0.464	U	0.791	0.793		1.33	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Lead-212	0.335		0.0809	0.0918		0.0710	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Lead-214	0.301		0.0763	0.0825		0.0978	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Potassium-40	10.4		1.31	1.69		0.847	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Protactinium-231	0.0526	U	0.110	0.111		1.56	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Radium-226	0.282		0.0849	0.0898	0.500	0.0822	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Radium-228	0.233		0.116	0.118		0.175	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Thallium-208	0.142		0.0488	0.0510		0.0391	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Thorium-228	0.335		0.0809	0.0918		0.0710	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Thorium-232	0.233		0.116	0.118		0.175	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Thorium-234	0.255	U	0.784	0.784		1.33	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Uranium-235	0.0109	U	0.158	0.158		0.327	pCi/g	10/08/15 09:27	10/29/15 09:26	1
Uranium-238	0.255	U	0.784	0.784		1.33	pCi/g	10/08/15 09:27	10/29/15 09:26	1

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14098-2

Client Sample ID: TI-TO04-NP-R-BISU5-S001

Lab Sample ID: 160-14098-1

Date Collected: 09/30/15 08:40

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.382		0.169	0.173		0.310	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Actinium-227	0.0109	U	0.0116	0.0116		1.28	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Bismuth-212	0.101	U	0.582	0.582		1.06	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Bismuth-214	0.730		0.176	0.192		0.159	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Cesium-137	0.000	U	0.0198	0.0198		0.0595	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Lead-210	0.334	U	1.51	1.51		2.53	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Lead-212	0.583		0.126	0.147		0.132	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Lead-214	0.665		0.137	0.153		0.143	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Potassium-40	10.0		1.59	1.89		0.958	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Protactinium-231	-0.386	U	1.18	1.18		2.06	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Radium-226	0.730		0.176	0.192	0.500	0.159	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Radium-228	0.382		0.169	0.173		0.310	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thallium-208	0.330		0.0720	0.0797		0.0492	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-228	0.583		0.126	0.147		0.132	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-232	0.382		0.169	0.173		0.310	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-234	0.0160	U	0.0926	0.0926		2.28	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Uranium-235	0.0421	U	0.247	0.247		0.444	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Uranium-238	0.0160	U	0.0926	0.0926		2.28	pCi/g	10/08/15 09:27	10/29/15 09:27	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14099-2

Client Sample ID: TI-TO04-NP-BIFSS_SU1-001

Lab Sample ID: 160-14099-1

Date Collected: 09/25/15 08:04

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.502		0.215	0.221		0.428	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Actinium-227	0.00562	U	0.0392	0.0392		1.29	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Bismuth-212	0.844	U	0.852	0.857		1.35	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Bismuth-214	1.13		0.220	0.249		0.169	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Cesium-137	-0.0233	U	0.0712	0.0713		0.126	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Lead-210	-0.0728	U	1.73	1.73		2.92	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Lead-212	0.804		0.165	0.195		0.166	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Lead-214	0.868		0.173	0.195		0.153	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Potassium-40	17.8		2.40	3.02		0.597	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Protactinium-231	0.581	U	1.36	1.36		2.35	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Radium-226	1.13		0.220	0.249	0.500	0.169	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Radium-228	0.502		0.215	0.221		0.428	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thallium-208	0.275		0.100	0.104		0.0931	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-228	0.804		0.165	0.195		0.166	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-232	0.502		0.215	0.221		0.428	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-234	1.40	U	1.10	1.11		1.86	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Uranium-235	0.124	U	0.365	0.365		0.583	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Uranium-238	1.40	U	1.10	1.11		1.86	pCi/g	10/08/15 09:27	10/29/15 09:27	1

Client Sample ID: TI-TO04-NP-BIFSS_SU1-002

Lab Sample ID: 160-14099-2

Date Collected: 09/25/15 08:17

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.968		0.205	0.228		0.168	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Actinium-227	-0.000812	U	0.525	0.525		0.922	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Bismuth-212	0.124	U	0.559	0.559		1.05	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Bismuth-214	0.723		0.160	0.177		0.139	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Cesium-137	-0.0000092	U	0.0436	0.0436		0.0812	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Lead-210	1.23	U	1.65	1.65		2.37	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Lead-212	0.759		0.162	0.189		0.162	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Lead-214	0.822		0.154	0.176		0.149	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Potassium-40	17.9		1.92	2.65		0.907	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Protactinium-231	1.57	U	0.887	0.903		1.78	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Radium-226	0.723		0.160	0.177	0.500	0.139	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Radium-228	0.968		0.205	0.228		0.168	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thallium-208	0.278		0.0852	0.0899		0.0808	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-228	0.759		0.162	0.189		0.162	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-232	0.968		0.205	0.228		0.168	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Thorium-234	0.506	U	0.677	0.679		2.12	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Uranium-235	0.122	U	0.198	0.198		0.485	pCi/g	10/08/15 09:27	10/29/15 09:27	1
Uranium-238	0.506	U	0.677	0.679		2.12	pCi/g	10/08/15 09:27	10/29/15 09:27	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14099-2

Client Sample ID: TI-TO04-NP-BIFSS_SU1-003

Lab Sample ID: 160-14099-3

Date Collected: 09/25/15 08:27

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-228	0.722		0.163	0.179		0.301	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Actinium-227	0.0734	U	0.345	0.345		1.03	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Bismuth-212	0.322	U	0.610	0.611		1.05	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Bismuth-214	0.612		0.152	0.165		0.141	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Cesium-137	-0.0225	U	0.0472	0.0473		0.0819	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Lead-210	0.987	U	1.30	1.30		2.22	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Lead-212	0.599		0.129	0.150		0.133	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Lead-214	0.615		0.149	0.162		0.132	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Potassium-40	15.8		1.90	2.50		0.769	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Protactinium-231	0.133	U	0.259	0.259		2.08	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Radium-226	0.612		0.152	0.165	0.500	0.141	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Radium-228	0.722		0.163	0.179		0.301	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Thallium-208	0.224		0.0750	0.0785		0.0751	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Thorium-228	0.599		0.129	0.150		0.133	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Thorium-232	0.722		0.163	0.179		0.301	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Thorium-234	0.598	U	1.08	1.08		1.94	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Uranium-235	0.0863	U	0.231	0.232		0.426	pCi/g	10/08/15 09:27	10/29/15 09:29	1
Uranium-238	0.598	U	1.08	1.08		1.94	pCi/g	10/08/15 09:27	10/29/15 09:29	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14100-2

Client Sample ID: TI-TO04-NP-R-SU5-S010

Date Collected: 09/28/15 13:20

Date Received: 10/05/15 08:20

Lab Sample ID: 160-14100-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.221		0.146	0.148		0.219	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Actinium-227	0.0319	U	0.181	0.181		0.553	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Bismuth-212	0.224	U	0.389	0.390		0.667	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Bismuth-214	0.246		0.0927	0.0962		0.0775	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Cesium-137	0.000696	U	0.0230	0.0230		0.0454	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Lead-210	0.218	U	0.791	0.791		1.45	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Lead-212	0.299		0.0808	0.0895		0.0801	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Lead-214	0.285		0.0709	0.0769		0.0686	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Potassium-40	10.3		1.41	1.76		0.524	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Protactinium-231	0.0390	U	0.671	0.671		1.22	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Radium-226	0.246		0.0927	0.0962	0.500	0.0775	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Radium-228	0.221		0.146	0.148		0.219	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Thallium-208	0.117		0.0420	0.0437		0.0313	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Thorium-228	0.299		0.0808	0.0895		0.0801	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Thorium-232	0.221		0.146	0.148		0.219	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Thorium-234	0.539	U	0.616	0.619		1.07	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Uranium-235	0.0689	U	0.0983	0.0985		0.164	pCi/g	10/08/15 09:27	10/29/15 09:32	1
Uranium-238	0.539	U	0.616	0.619		1.07	pCi/g	10/08/15 09:27	10/29/15 09:32	1

Client Sample ID: TI-TO04-NP-R-SU5-S011

Date Collected: 09/28/15 13:41

Date Received: 10/05/15 08:20

Lab Sample ID: 160-14100-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.911		0.292	0.306		0.172	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Actinium-227	0.214	U	0.604	0.605		1.04	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Bismuth-212	0.350	U	0.865	0.866		1.52	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Bismuth-214	0.560		0.158	0.169		0.140	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Cesium-137	0.0182	U	0.0633	0.0633		0.127	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Lead-210	0.926	U	1.49	1.49		2.35	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Lead-212	0.533		0.131	0.148		0.130	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Lead-214	0.721		0.174	0.190		0.151	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Potassium-40	10.4		2.16	2.41		1.81	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Protactinium-231	0.275	U	0.312	0.314		2.63	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Radium-226	0.560		0.158	0.169	0.500	0.140	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Radium-228	0.911		0.292	0.306		0.172	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Thallium-208	0.116		0.0723	0.0732		0.100	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Thorium-228	0.533		0.131	0.148		0.130	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Thorium-232	0.911		0.292	0.306		0.172	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Thorium-234	1.40	U	1.27	1.28		1.88	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Uranium-235	0.252	U	0.227	0.228		0.376	pCi/g	10/08/15 09:27	10/29/15 09:31	1
Uranium-238	1.40	U	1.27	1.28		1.88	pCi/g	10/08/15 09:27	10/29/15 09:31	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14100-2

Client Sample ID: TI-TO04-NP-R-SU5-S012

Lab Sample ID: 160-14100-3

Date Collected: 09/28/15 13:56

Matrix: Solid

Date Received: 10/05/15 08:20

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.568		0.161	0.171		0.116	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Actinium-227	0.0793	U	0.367	0.367		0.639	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Bismuth-212	0.178	U	0.454	0.455		0.792	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Bismuth-214	0.366		0.112	0.119		0.104	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Cesium-137	-0.00372	U	0.0324	0.0324		0.0594	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Lead-210	0.692	U	0.824	0.828		1.35	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Lead-212	0.407		0.0812	0.0968		0.0737	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Lead-214	0.361		0.0953	0.102		0.103	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Potassium-40	10.2		1.27	1.64		0.623	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Protactinium-231	0.220	U	0.587	0.588		1.26	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Radium-226	0.366		0.112	0.119	0.500	0.104	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Radium-228	0.568		0.161	0.171		0.116	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Thallium-208	0.212		0.0446	0.0497		0.0173	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Thorium-228	0.407		0.0812	0.0968		0.0737	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Thorium-232	0.568		0.161	0.171		0.116	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Thorium-234	1.10	U	0.744	0.753		1.16	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Uranium-235	0.0447	U	0.117	0.117		0.384	pCi/g	10/08/15 09:27	10/29/15 10:05	1
Uranium-238	1.10	U	0.744	0.753		1.16	pCi/g	10/08/15 09:27	10/29/15 10:05	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14140-2

Client Sample ID: TI-TO04-NP-R-FSSBISU5-002

Lab Sample ID: 160-14140-1

Date Collected: 10/05/15 14:30

Matrix: Solid

Date Received: 10/07/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.462		0.139	0.147		0.242	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Actinium-227	0.258	U	0.550	0.550		0.931	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Bismuth-212	0.256	U	0.468	0.469		0.805	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Bismuth-214	0.365		0.119	0.125		0.127	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Cesium-137	0.0334	U	0.0467	0.0468		0.0776	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Lead-210	1.40	U	1.44	1.45		2.19	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Lead-212	0.432		0.118	0.130		0.122	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Lead-214	0.480		0.133	0.142		0.131	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Potassium-40	11.6		1.55	1.96		0.693	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Protactinium-231	0.138	U	0.210	0.210		1.97	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Radium-226	0.365		0.119	0.125	0.500	0.127	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Radium-228	0.462		0.139	0.147		0.242	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Thallium-208	0.167		0.0605	0.0629		0.0617	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Thorium-228	0.432		0.118	0.130		0.122	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Thorium-232	0.462		0.139	0.147		0.242	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Thorium-234	1.07	U	0.917	0.923		1.59	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Uranium-235	0.120	U	0.181	0.182		0.341	pCi/g	10/09/15 08:41	10/30/15 13:23	1
Uranium-238	1.07	U	0.917	0.923		1.59	pCi/g	10/09/15 08:41	10/30/15 13:23	1

Client Sample ID: TI-TO04-NP-R-FSSBISU5-003

Lab Sample ID: 160-14140-2

Date Collected: 10/05/15 14:20

Matrix: Solid

Date Received: 10/07/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.521		0.173	0.181		0.294	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Actinium-227	-0.194	U	0.498	0.498		0.851	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Bismuth-212	0.442	U	0.547	0.549		0.893	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Bismuth-214	0.517		0.143	0.153		0.101	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Cesium-137	-0.0231	U	0.0567	0.0568		0.0987	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Lead-210	0.659	U	1.01	1.01		1.81	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Lead-212	0.562		0.109	0.131		0.0974	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Lead-214	0.583		0.128	0.142		0.129	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Potassium-40	11.3		1.77	2.11		1.04	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Protactinium-231	0.334	U	0.245	0.248		1.72	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Radium-226	0.517		0.143	0.153	0.500	0.101	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Radium-228	0.521		0.173	0.181		0.294	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Thallium-208	0.239		0.0697	0.0740		0.0511	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Thorium-228	0.562		0.109	0.131		0.0974	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Thorium-232	0.521		0.173	0.181		0.294	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Thorium-234	0.923	U	0.996	1.00		1.70	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Uranium-235	0.138	U	0.187	0.188		0.302	pCi/g	10/09/15 08:41	10/30/15 13:27	1
Uranium-238	0.923	U	0.996	1.00		1.70	pCi/g	10/09/15 08:41	10/30/15 13:27	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S001

Lab Sample ID: 160-14255-1

Date Collected: 10/09/15 13:07

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.192	U	0.144	0.146		0.211	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Actinium-227	0.0993	U	0.524	0.524		0.905	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Bismuth-212	0.371	U	0.451	0.452		0.734	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Bismuth-214	0.380		0.132	0.138		0.145	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Cesium-137	0.00281	U	0.0412	0.0412		0.0757	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Lead-210	1.22	U	1.19	1.20		1.91	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Lead-212	0.324		0.0907	0.0999		0.0994	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Lead-214	0.335		0.101	0.107		0.133	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Potassium-40	10.5		1.40	1.77		0.587	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Protactinium-231	-0.0316	U	0.0770	0.0771		1.84	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Radium-226	0.380		0.132	0.138	0.500	0.145	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Radium-228	0.192	U	0.144	0.146		0.211	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Thallium-208	0.107		0.0422	0.0436		0.0457	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Thorium-228	0.324		0.0907	0.0999		0.0994	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Thorium-232	0.192	U	0.144	0.146		0.211	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Thorium-234	0.150	U	0.485	0.485		1.72	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Uranium-235	0.0518	U	0.177	0.177		0.336	pCi/g	10/15/15 14:22	11/10/15 19:43	1
Uranium-238	0.150	U	0.485	0.485		1.72	pCi/g	10/15/15 14:22	11/10/15 19:43	1

Client Sample ID: TI-TO04_SU1_FSS_NP-S004

Lab Sample ID: 160-14255-2

Date Collected: 10/09/15 13:06

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.300		0.162	0.165		0.232	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Actinium-227	-0.127	U	0.433	0.433		0.750	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Bismuth-212	0.332	U	0.556	0.557		0.945	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Bismuth-214	0.383		0.117	0.123		0.0979	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Cesium-137	-0.0220	U	1.05	1.05		0.0949	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-210	0.746	U	0.944	0.948		1.55	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-212	0.307		0.105	0.113		0.110	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-214	0.392		0.124	0.131		0.115	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Potassium-40	11.9		1.69	2.08		0.675	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Protactinium-231	-0.269	U	1.00	1.00		1.76	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Radium-226	0.383		0.117	0.123	0.500	0.0979	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Radium-228	0.300		0.162	0.165		0.232	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thallium-208	0.162		0.0471	0.0500		0.0252	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-228	0.307		0.105	0.113		0.110	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-232	0.300		0.162	0.165		0.232	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-234	0.637	U	1.12	1.12		1.56	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Uranium-235	0.0560	U	0.183	0.183		0.369	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Uranium-238	0.637	U	1.12	1.12		1.56	pCi/g	10/15/15 14:22	11/06/15 18:00	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S006

Lab Sample ID: 160-14255-3

Date Collected: 10/09/15 13:03

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.406		0.105	0.113		0.0673	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Actinium-227	0.000	U	0.314	0.314		0.626	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Bismuth-212	0.0864	U	0.373	0.373		0.671	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Bismuth-214	0.325		0.0877	0.0940		0.0833	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Cesium-137	-0.00268	U	0.0284	0.0284		0.0526	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-210	0.362	U	0.773	0.774		1.31	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-212	0.353		0.0892	0.100		0.0829	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Lead-214	0.245		0.0796	0.0836		0.103	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Potassium-40	9.43		1.19	1.53		0.592	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Protactinium-231	0.0130	U	0.0242	0.0243		1.44	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Radium-226	0.325		0.0877	0.0940	0.500	0.0833	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Radium-228	0.406		0.105	0.113		0.0673	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thallium-208	0.125		0.0403	0.0423		0.0316	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-228	0.353		0.0892	0.100		0.0829	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-232	0.406		0.105	0.113		0.0673	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Thorium-234	0.369	U	0.371	0.373		1.18	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Uranium-235	0.00197	U	0.00589	0.00589		0.298	pCi/g	10/15/15 14:22	11/06/15 18:00	1
Uranium-238	0.369	U	0.371	0.373		1.18	pCi/g	10/15/15 14:22	11/06/15 18:00	1

Client Sample ID: TI-TO04_SU1_FSS_NP-S008

Lab Sample ID: 160-14255-4

Date Collected: 10/09/15 13:09

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.235	U	0.154	0.156		0.259	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Actinium-227	0.819	U	1.04	1.04		1.71	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Bismuth-212	0.295	U	0.490	0.491		0.831	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Bismuth-214	0.351		0.0959	0.103		0.0983	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Cesium-137	0.00465	U	0.0403	0.0403		0.0740	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-210	1.03	U	1.35	1.35		2.10	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-212	0.351		0.103	0.112		0.116	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-214	0.355		0.0993	0.106		0.102	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Potassium-40	10.1		1.40	1.74		0.648	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Protactinium-231	-0.0522	U	0.789	0.789		1.44	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Radium-226	0.351		0.0959	0.103	0.500	0.0983	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Radium-228	0.235	U	0.154	0.156		0.259	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thallium-208	0.0929		0.0536	0.0545		0.0802	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-228	0.351		0.103	0.112		0.116	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-232	0.235	U	0.154	0.156		0.259	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-234	1.15	U	1.10	1.11		1.57	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Uranium-235	0.0783	U	0.217	0.217		0.354	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Uranium-238	1.15	U	1.10	1.11		1.57	pCi/g	10/15/15 14:22	11/06/15 18:01	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S009

Lab Sample ID: 160-14255-5

Date Collected: 10/09/15 13:15

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.165	U	0.107	0.108		0.237	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Actinium-227	0.0583	U	0.152	0.152		0.721	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Bismuth-212	0.0903	U	0.441	0.441		0.792	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Bismuth-214	0.280		0.0923	0.0968		0.105	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Cesium-137	-0.00828	U	0.0371	0.0371		0.0663	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-210	0.819	U	0.961	0.966		1.55	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-212	0.295		0.0809	0.0894		0.0850	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Lead-214	0.302		0.0843	0.0899		0.106	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Potassium-40	10.7		1.36	1.75		0.680	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Protactinium-231	-0.239	U	0.758	0.759		1.32	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Radium-226	0.280		0.0923	0.0968	0.500	0.105	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Radium-228	0.165	U	0.107	0.108		0.237	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thallium-208	0.119		0.0397	0.0415		0.0374	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-228	0.295		0.0809	0.0894		0.0850	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-232	0.165	U	0.107	0.108		0.237	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Thorium-234	0.603	U	0.879	0.881		1.52	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Uranium-235	-0.114	U	0.459	0.460		0.358	pCi/g	10/15/15 14:22	11/06/15 18:01	1
Uranium-238	0.603	U	0.879	0.881		1.52	pCi/g	10/15/15 14:22	11/06/15 18:01	1

Client Sample ID: TI-TO04_SU1_FSS_NP-S011

Lab Sample ID: 160-14255-6

Date Collected: 10/09/15 13:12

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.513		0.133	0.143		0.127	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Actinium-227	-0.000693	U	0.396	0.396		0.704	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Bismuth-212	-0.123	U	0.516	0.517		0.928	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Bismuth-214	0.338		0.106	0.112		0.105	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Cesium-137	-0.00658	U	0.0375	0.0375		0.0689	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Lead-210	-0.424	U	2.18	2.18		1.71	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Lead-212	0.0574	U	0.0938	0.0941		0.159	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Lead-214	0.296		0.0923	0.0973		0.122	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Potassium-40	11.9		1.55	1.97		0.373	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Protactinium-231	0.556	U	0.531	0.534		1.44	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Radium-226	0.338		0.106	0.112	0.500	0.105	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Radium-228	0.513		0.133	0.143		0.127	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Thallium-208	0.0654	U	0.0518	0.0522		0.0752	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Thorium-228	0.0574	U	0.0938	0.0941		0.159	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Thorium-232	0.513		0.133	0.143		0.127	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Thorium-234	0.288	U	0.448	0.449		1.43	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Uranium-235	0.0177	U	0.0484	0.0484		0.308	pCi/g	10/15/15 14:22	11/06/15 18:02	1
Uranium-238	0.288	U	0.448	0.449		1.43	pCi/g	10/15/15 14:22	11/06/15 18:02	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S014

Lab Sample ID: 160-14255-7

Date Collected: 10/09/15 13:15

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.199	U	0.131	0.133		0.253	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Actinium-227	0.226	U	0.423	0.423		0.712	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Bismuth-212	0.0320	U	0.492	0.492		0.930	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Bismuth-214	0.295		0.144	0.147		0.153	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Cesium-137	-0.0146	U	0.0459	0.0460		0.0802	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Lead-210	0.0641	U	1.05	1.05		1.99	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Lead-212	0.328		0.107	0.115		0.120	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Lead-214	0.460		0.105	0.115		0.0918	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Potassium-40	11.5		1.39	1.82		0.735	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Protactinium-231	0.165	U	0.640	0.641		1.55	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Radium-226	0.295		0.144	0.147	0.500	0.153	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Radium-228	0.199	U	0.131	0.133		0.253	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Thallium-208	0.169		0.0565	0.0592		0.0557	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Thorium-228	0.328		0.107	0.115		0.120	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Thorium-232	0.199	U	0.131	0.133		0.253	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Thorium-234	0.943	U	0.777	0.783		1.33	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Uranium-235	0.0496	U	0.205	0.206		0.365	pCi/g	10/15/15 14:22	11/06/15 18:03	1
Uranium-238	0.943	U	0.777	0.783		1.33	pCi/g	10/15/15 14:22	11/06/15 18:03	1

Client Sample ID: TI-TO04_SU1_FSS_NP-S018

Lab Sample ID: 160-14255-8

Date Collected: 10/09/15 13:26

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.442		0.135	0.142		0.0831	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Actinium-227	0.0953	U	0.477	0.477		0.827	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Bismuth-212	0.170	U	0.449	0.449		0.792	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Bismuth-214	0.319		0.101	0.107		0.0944	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Cesium-137	0.0147	U	0.0287	0.0288		0.0501	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Lead-210	0.456	U	1.24	1.24		1.95	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Lead-212	0.348		0.0921	0.103		0.0961	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Lead-214	0.373		0.100	0.107		0.0989	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Potassium-40	10.6		1.38	1.76		0.604	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Protactinium-231	0.267	U	0.444	0.444		1.43	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Radium-226	0.319		0.101	0.107	0.500	0.0944	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Radium-228	0.442		0.135	0.142		0.0831	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Thallium-208	0.125		0.0396	0.0417		0.0386	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Thorium-228	0.348		0.0921	0.103		0.0961	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Thorium-232	0.442		0.135	0.142		0.0831	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Thorium-234	0.256	U	0.361	0.362		1.70	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Uranium-235	0.0406	U	0.188	0.188		0.332	pCi/g	10/15/15 14:22	11/06/15 18:04	1
Uranium-238	0.256	U	0.361	0.362		1.70	pCi/g	10/15/15 14:22	11/06/15 18:04	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14255-2

Client Sample ID: TI-TO04_SU1_FSS_NP-S020

Lab Sample ID: 160-14255-9

Date Collected: 10/09/15 13:22

Matrix: Solid

Date Received: 10/14/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.193	U	0.130	0.131		0.324	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Actinium-227	0.137	U	0.389	0.389		0.675	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Bismuth-212	0.000	U	0.418	0.418		1.27	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Bismuth-214	0.538		0.130	0.142		0.0982	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Cesium-137	-0.0197	U	0.272	0.272		0.0974	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Lead-210	0.243	U	1.12	1.12		2.05	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Lead-212	0.285		0.109	0.115		0.118	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Lead-214	0.451		0.104	0.114		0.111	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Potassium-40	10.2		1.77	2.05		1.33	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Protactinium-231	0.136	U	0.552	0.552		1.69	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Radium-226	0.538		0.130	0.142	0.500	0.0982	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Radium-228	0.193	U	0.130	0.131		0.324	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Thallium-208	0.138		0.0570	0.0588		0.0427	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Thorium-228	0.285		0.109	0.115		0.118	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Thorium-232	0.193	U	0.130	0.131		0.324	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Thorium-234	-0.0274	U	0.0458	0.0459		1.67	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Uranium-235	0.000411	U	0.00189	0.00189		0.365	pCi/g	10/15/15 14:22	11/06/15 18:34	1
Uranium-238	-0.0274	U	0.0458	0.0459		1.67	pCi/g	10/15/15 14:22	11/06/15 18:34	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S001

Lab Sample ID: 160-15048-1

Date Collected: 11/20/15 10:22

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.416		0.133	0.140		0.0786	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Actinium-227	-0.312	U	0.574	0.575		0.963	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Bismuth-212	0.350	U	0.402	0.403		0.648	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Bismuth-214	0.268		0.109	0.112		0.122	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Cesium-137	0.00354	U	0.0373	0.0373		0.0682	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-210	-0.0386	U	1.25	1.25		2.17	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-212	0.303		0.0990	0.107		0.106	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-214	0.355		0.0910	0.0982		0.0917	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Potassium-40	10.6		1.34	1.72		0.560	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Protactinium-231	0.135	U	0.518	0.518		1.33	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Radium-226	0.268		0.109	0.112	0.500	0.122	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Radium-228	0.416		0.133	0.140		0.0786	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thallium-208	0.123		0.0446	0.0463		0.0444	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-228	0.303		0.0990	0.107		0.106	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-232	0.416		0.133	0.140		0.0786	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-234	0.418	U	0.410	0.412		1.45	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Uranium-235	0.0525	U	0.131	0.131		0.226	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Uranium-238	0.418	U	0.410	0.412		1.45	pCi/g	11/30/15 13:55	12/21/15 15:00	1

Client Sample ID: TITO04-RSY10_SU2-S002

Lab Sample ID: 160-15048-2

Date Collected: 11/20/15 10:08

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.233		0.110	0.113		0.232	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Actinium-227	-0.122	U	0.431	0.432		0.743	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Bismuth-212	0.171	U	0.421	0.421		0.739	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Bismuth-214	0.117	U	0.110	0.110		0.168	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Cesium-137	0.00838	U	0.0331	0.0331		0.0599	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-210	0.544	U	0.964	0.966		1.72	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-212	0.306		0.0769	0.0865		0.0868	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-214	0.356		0.106	0.112		0.124	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Potassium-40	10.2		1.33	1.69		0.763	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Protactinium-231	0.219	U	0.395	0.396		1.51	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Radium-226	0.117	U	0.110	0.110	0.500	0.168	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Radium-228	0.233		0.110	0.113		0.232	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thallium-208	0.0606		0.0444	0.0448		0.0547	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-228	0.306		0.0769	0.0865		0.0868	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-232	0.233		0.110	0.113		0.232	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-234	0.102	U	0.254	0.254		1.46	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Uranium-235	0.107	U	0.181	0.182		0.296	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Uranium-238	0.102	U	0.254	0.254		1.46	pCi/g	11/30/15 13:55	12/21/15 15:03	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S003

Lab Sample ID: 160-15048-3

Date Collected: 11/20/15 10:43

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.465		0.140	0.148		0.122	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Actinium-227	0.150	U	0.211	0.212		0.522	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Bismuth-212	0.0587	U	0.413	0.413		0.795	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Bismuth-214	0.438		0.111	0.120		0.0955	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Cesium-137	-0.00279	U	0.0370	0.0370		0.0682	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-210	0.515	U	1.03	1.03		1.73	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-212	0.346		0.0935	0.104		0.101	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Lead-214	0.478		0.0989	0.111		0.0936	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Potassium-40	10.2		1.41	1.75		0.744	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Protactinium-231	0.263	U	0.360	0.361		1.62	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Radium-226	0.438		0.111	0.120	0.500	0.0955	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Radium-228	0.465		0.140	0.148		0.122	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thallium-208	0.145		0.0532	0.0553		0.0542	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-228	0.346		0.0935	0.104		0.101	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-232	0.465		0.140	0.148		0.122	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Thorium-234	0.544	U	0.794	0.796		1.43	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Uranium-235	-0.0161	U	0.413	0.413		0.341	pCi/g	11/30/15 13:55	12/21/15 14:23	1
Uranium-238	0.544	U	0.794	0.796		1.43	pCi/g	11/30/15 13:55	12/21/15 14:23	1

Client Sample ID: TITO04-RSY10_SU2-S004

Lab Sample ID: 160-15048-4

Date Collected: 11/20/15 10:32

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.293		0.121	0.124		0.181	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Actinium-227	-0.0973	U	0.531	0.531		0.915	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-212	0.359	U	0.437	0.439		0.710	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-214	0.173		0.106	0.107		0.146	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Cesium-137	0.00341	U	0.0432	0.0432		0.0848	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-210	0.483	U	0.963	0.965		1.63	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-212	0.372		0.0916	0.103		0.0947	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-214	0.296		0.0931	0.0981		0.123	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Potassium-40	10.1		1.47	1.80		0.539	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Protactinium-231	0.230	U	0.281	0.282		1.57	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-226	0.173		0.106	0.107	0.500	0.146	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-228	0.293		0.121	0.124		0.181	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thallium-208	0.133		0.0472	0.0492		0.0429	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-228	0.372		0.0916	0.103		0.0947	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-232	0.293		0.121	0.124		0.181	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-234	0.789	U	0.549	0.555		1.41	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-235	0.0288	U	0.0599	0.0599		0.368	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-238	0.789	U	0.549	0.555		1.41	pCi/g	11/30/15 13:55	12/21/15 14:28	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S005

Lab Sample ID: 160-15048-5

Date Collected: 11/20/15 10:27

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.189	U	0.0980	0.0999		0.239	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Actinium-227	0.0381	U	0.363	0.363		0.637	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-212	0.227	U	0.392	0.393		0.672	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-214	0.274		0.0784	0.0835		0.0664	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Cesium-137	0.00383	U	0.0298	0.0298		0.0559	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-210	0.0105	U	0.746	0.746		1.42	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-212	0.347		0.0728	0.0855		0.0710	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-214	0.303		0.0804	0.0863		0.0725	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Potassium-40	9.78		1.40	1.72		0.577	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Protactinium-231	0.265	U	0.370	0.372		1.24	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-226	0.274		0.0784	0.0835	0.500	0.0664	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-228	0.189	U	0.0980	0.0999		0.239	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thallium-208	0.144		0.0486	0.0508		0.0449	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-228	0.347		0.0728	0.0855		0.0710	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-232	0.189	U	0.0980	0.0999		0.239	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-234	0.256	U	0.337	0.338		1.08	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-235	-0.0195	U	0.0743	0.0743		0.258	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-238	0.256	U	0.337	0.338		1.08	pCi/g	11/30/15 13:55	12/21/15 14:28	1

Client Sample ID: TITO04-RSY10_SU2-S006

Lab Sample ID: 160-15048-6

Date Collected: 11/20/15 10:10

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.133	U	0.163	0.163		0.282	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Actinium-227	-0.0336	U	0.0517	0.0518		0.842	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Bismuth-212	0.394	U	0.571	0.572		0.955	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Bismuth-214	0.339		0.110	0.116		0.133	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Cesium-137	-0.0160	U	0.493	0.493		0.108	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Lead-210	0.638	U	1.18	1.18		1.76	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Lead-212	0.284		0.0779	0.0861		0.0807	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Lead-214	0.360		0.122	0.128		0.132	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Potassium-40	10.3		1.64	1.95		0.481	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Protactinium-231	0.249	U	0.675	0.676		1.47	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Radium-226	0.339		0.110	0.116	0.500	0.133	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Radium-228	0.133	U	0.163	0.163		0.282	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Thallium-208	0.134		0.0602	0.0618		0.0538	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Thorium-228	0.284		0.0779	0.0861		0.0807	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Thorium-232	0.133	U	0.163	0.163		0.282	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Thorium-234	0.371	U	0.374	0.376		1.39	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Uranium-235	0.0703	U	0.134	0.134		0.343	pCi/g	11/30/15 13:55	12/21/15 14:26	1
Uranium-238	0.371	U	0.374	0.376		1.39	pCi/g	11/30/15 13:55	12/21/15 14:26	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S007

Lab Sample ID: 160-15048-7

Date Collected: 11/20/15 10:37

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.295		0.148	0.151		0.218	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Actinium-227	-0.00527	U	0.0114	0.0114		0.699	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-212	0.188	U	0.417	0.417		0.725	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Bismuth-214	0.416		0.111	0.119		0.115	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Cesium-137	-0.0000147	U	0.0304	0.0304		0.0576	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-210	0.994	U	1.19	1.19		1.62	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-212	0.283		0.0944	0.101		0.111	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Lead-214	0.404		0.0963	0.105		0.138	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Potassium-40	8.55		1.29	1.56		1.10	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Protactinium-231	0.220	U	0.323	0.324		1.42	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-226	0.416		0.111	0.119	0.500	0.115	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Radium-228	0.295		0.148	0.151		0.218	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thallium-208	0.136		0.0584	0.0601		0.0611	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-228	0.283		0.0944	0.101		0.111	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-232	0.295		0.148	0.151		0.218	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Thorium-234	0.196	U	0.330	0.331		1.31	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-235	0.0141	U	0.0291	0.0292		0.295	pCi/g	11/30/15 13:55	12/21/15 14:28	1
Uranium-238	0.196	U	0.330	0.331		1.31	pCi/g	11/30/15 13:55	12/21/15 14:28	1

Client Sample ID: TITO04-RSY10_SU2-S008

Lab Sample ID: 160-15048-8

Date Collected: 11/20/15 10:30

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.371		0.172	0.176		0.273	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Actinium-227	0.120	U	0.247	0.247		0.611	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Bismuth-212	0.178	U	0.621	0.622		1.11	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Bismuth-214	0.391		0.132	0.138		0.149	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Cesium-137	-0.00553	U	0.0770	0.0770		0.0895	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Lead-210	0.575	U	0.851	0.854		1.55	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Lead-212	0.329		0.0987	0.107		0.106	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Lead-214	0.408		0.116	0.123		0.138	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Potassium-40	11.4		1.71	2.07		0.473	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Protactinium-231	0.383	U	0.302	0.304		1.99	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Radium-226	0.391		0.132	0.138	0.500	0.149	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Radium-228	0.371		0.172	0.176		0.273	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Thallium-208	0.119		0.0605	0.0617		0.0797	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Thorium-228	0.329		0.0987	0.107		0.106	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Thorium-232	0.371		0.172	0.176		0.273	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Thorium-234	0.452	U	0.428	0.430		1.13	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Uranium-235	0.000333	U	0.00141	0.00141		0.380	pCi/g	11/30/15 13:55	12/21/15 15:02	1
Uranium-238	0.452	U	0.428	0.430		1.13	pCi/g	11/30/15 13:55	12/21/15 15:02	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S009

Lab Sample ID: 160-15048-9

Date Collected: 11/20/15 10:14

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.190	U	0.124	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Actinium-227	0.179	U	0.205	0.206		0.554	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Bismuth-212	0.284	U	0.407	0.409		0.680	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Bismuth-214	0.319		0.0985	0.104		0.0914	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Cesium-137	0.0126	U	0.0330	0.0331		0.0585	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-210	0.381	U	0.806	0.807		1.24	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-212	0.335		0.0748	0.0865		0.0723	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Lead-214	0.340		0.0833	0.0905		0.0975	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Potassium-40	9.56		1.34	1.66		0.548	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Protactinium-231	0.120	U	0.133	0.133		1.49	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Radium-226	0.319		0.0985	0.104	0.500	0.0914	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Radium-228	0.190	U	0.124	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thallium-208	0.0510	U	0.0412	0.0415		0.0662	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-228	0.335		0.0748	0.0865		0.0723	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-232	0.190	U	0.124	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Thorium-234	0.275	U	0.263	0.264		1.14	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Uranium-235	0.0926	U	0.151	0.152		0.254	pCi/g	11/30/15 13:55	12/21/15 15:03	1
Uranium-238	0.275	U	0.263	0.264		1.14	pCi/g	11/30/15 13:55	12/21/15 15:03	1

Client Sample ID: TITO04-RSY10_SU2-S010

Lab Sample ID: 160-15048-10

Date Collected: 11/20/15 10:11

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.396		0.135	0.141		0.215	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Actinium-227	0.0578	U	0.141	0.141		0.901	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Bismuth-212	0.263	U	0.405	0.406		0.685	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Bismuth-214	0.418		0.104	0.113		0.0922	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Cesium-137	-0.0170	U	0.358	0.358		0.0856	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Lead-210	0.165	U	1.04	1.04		1.81	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Lead-212	0.377		0.109	0.119		0.108	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Lead-214	0.301		0.0889	0.0942		0.0974	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Potassium-40	9.76		1.45	1.76		0.541	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Protactinium-231	0.362	U	0.682	0.683		1.50	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Radium-226	0.418		0.104	0.113	0.500	0.0922	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Radium-228	0.396		0.135	0.141		0.215	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Thallium-208	0.167		0.0521	0.0549		0.0440	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Thorium-228	0.377		0.109	0.119		0.108	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Thorium-232	0.396		0.135	0.141		0.215	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Thorium-234	0.191	U	0.499	0.499		1.70	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Uranium-235	0.00874	U	0.194	0.194		0.347	pCi/g	11/30/15 13:55	12/21/15 15:06	1
Uranium-238	0.191	U	0.499	0.499		1.70	pCi/g	11/30/15 13:55	12/21/15 15:06	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S011

Lab Sample ID: 160-15048-11

Date Collected: 11/20/15 10:51

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.329		0.124	0.128		0.171	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Actinium-227	-0.0437	U	0.369	0.369		0.645	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Bismuth-212	0.296	U	0.348	0.349		0.563	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Bismuth-214	0.319		0.0985	0.104		0.102	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Cesium-137	-0.00232	U	0.0288	0.0288		0.0532	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-210	0.225	U	0.703	0.703		1.21	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-212	0.393		0.0840	0.0981		0.0737	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-214	0.327		0.0821	0.0888		0.0744	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Potassium-40	11.2		1.27	1.71		0.591	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Protactinium-231	0.000	U	0.837	0.837		1.51	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Radium-226	0.319		0.0985	0.104	0.500	0.102	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Radium-228	0.329		0.124	0.128		0.171	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thallium-208	0.201		0.0507	0.0548		0.0339	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-228	0.393		0.0840	0.0981		0.0737	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-232	0.329		0.124	0.128		0.171	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-234	-0.439	U	0.857	0.858		1.44	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Uranium-235	0.0655	U	0.126	0.126		0.330	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Uranium-238	-0.439	U	0.857	0.858		1.44	pCi/g	11/30/15 13:55	12/21/15 15:33	1

Client Sample ID: TITO04-RSY10_SU2-S012

Lab Sample ID: 160-15048-12

Date Collected: 11/20/15 10:45

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.206	U	0.128	0.130		0.293	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Actinium-227	0.122	U	0.496	0.496		0.857	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Bismuth-212	0.315	U	0.555	0.556		0.943	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Bismuth-214	0.480		0.119	0.129		0.102	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Cesium-137	0.00190	U	0.0439	0.0439		0.0805	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-210	0.291	U	1.34	1.34		2.15	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-212	0.429		0.0974	0.112		0.104	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Lead-214	0.467		0.117	0.126		0.137	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Potassium-40	11.9		1.51	1.94		0.613	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Protactinium-231	0.154	U	0.227	0.228		1.74	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Radium-226	0.480		0.119	0.129	0.500	0.102	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Radium-228	0.206	U	0.128	0.130		0.293	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thallium-208	0.184		0.0578	0.0608		0.0584	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-228	0.429		0.0974	0.112		0.104	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-232	0.206	U	0.128	0.130		0.293	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Thorium-234	0.152	U	1.01	1.01		1.85	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Uranium-235	0.165	U	0.197	0.198		0.324	pCi/g	11/30/15 13:55	12/21/15 15:00	1
Uranium-238	0.152	U	1.01	1.01		1.85	pCi/g	11/30/15 13:55	12/21/15 15:00	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S013

Lab Sample ID: 160-15048-13

Date Collected: 11/20/15 10:22

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.302		0.161	0.164		0.212	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Actinium-227	0.0377	U	0.121	0.122		0.628	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Bismuth-212	0.316	U	0.436	0.437		0.724	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Bismuth-214	0.351		0.118	0.124		0.123	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Cesium-137	-0.000384	U	0.0296	0.0296		0.0568	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Lead-210	0.826	U	0.719	0.725		1.18	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Lead-212	0.269		0.0772	0.0847		0.102	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Lead-214	0.494		0.109	0.121		0.0842	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Potassium-40	9.39		1.33	1.64		0.534	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Protactinium-231	0.297	U	0.483	0.484		1.24	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Radium-226	0.351		0.118	0.124	0.500	0.123	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Radium-228	0.302		0.161	0.164		0.212	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Thallium-208	0.123		0.0590	0.0604		0.0603	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Thorium-228	0.269		0.0772	0.0847		0.102	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Thorium-232	0.302		0.161	0.164		0.212	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Thorium-234	0.810	U	0.463	0.470		1.24	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Uranium-235	0.0495	U	0.180	0.180		0.310	pCi/g	11/30/15 13:55	12/21/15 14:59	1
Uranium-238	0.810	U	0.463	0.470		1.24	pCi/g	11/30/15 13:55	12/21/15 14:59	1

Client Sample ID: TITO04-RSY10_SU2-S014

Lab Sample ID: 160-15048-14

Date Collected: 11/20/15 10:15

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.516		0.154	0.163		0.122	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Actinium-227	0.136	U	0.427	0.427		0.737	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Bismuth-212	0.0653	U	0.502	0.502		0.945	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Bismuth-214	0.314		0.141	0.145		0.157	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Cesium-137	-0.0239	U	0.0469	0.0469		0.0802	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Lead-210	0.398	U	1.06	1.06		1.83	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Lead-212	0.343		0.0915	0.102		0.103	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Lead-214	0.472		0.110	0.120		0.0979	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Potassium-40	10.4		1.39	1.75		0.595	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Protactinium-231	-0.0702	U	0.172	0.172		1.77	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Radium-226	0.314		0.141	0.145	0.500	0.157	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Radium-228	0.516		0.154	0.163		0.122	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Thallium-208	0.135		0.0476	0.0496		0.0489	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Thorium-228	0.343		0.0915	0.102		0.103	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Thorium-232	0.516		0.154	0.163		0.122	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Thorium-234	0.121	U	0.520	0.520		1.76	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Uranium-235	0.0804	U	0.0992	0.0995		0.431	pCi/g	11/30/15 13:55	12/21/15 15:01	1
Uranium-238	0.121	U	0.520	0.520		1.76	pCi/g	11/30/15 13:55	12/21/15 15:01	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S015

Lab Sample ID: 160-15048-15

Date Collected: 11/20/15 10:40

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.235		0.123	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Actinium-227	-0.104	U	0.417	0.417		0.720	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-212	0.394	U	0.452	0.454		0.731	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-214	0.252		0.103	0.106		0.147	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Cesium-137	-0.0156	U	0.0433	0.0433		0.0755	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-210	0.810	U	1.24	1.24		1.73	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-212	0.298		0.0803	0.0891		0.0937	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-214	0.401		0.105	0.113		0.113	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Potassium-40	8.23		1.70	1.90		1.51	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Protactinium-231	0.554	U	0.818	0.821		1.37	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-226	0.252		0.103	0.106	0.500	0.147	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-228	0.235		0.123	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thallium-208	0.130		0.0486	0.0504		0.0505	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-228	0.298		0.0803	0.0891		0.0937	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-232	0.235		0.123	0.125		0.224	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-234	0.802	U	0.475	0.482		1.31	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-235	0.00860	U	0.187	0.187		0.328	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-238	0.802	U	0.475	0.482		1.31	pCi/g	11/30/15 13:55	12/21/15 15:39	1

Client Sample ID: TITO04-RSY10_SU2-S016

Lab Sample ID: 160-15048-16

Date Collected: 11/20/15 10:26

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.604		0.199	0.208		0.120	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Actinium-227	0.0781	U	0.335	0.335		0.595	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Bismuth-212	0.276	U	0.511	0.512		0.884	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Bismuth-214	0.429		0.141	0.148		0.155	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Cesium-137	-0.0200	U	0.802	0.802		0.0782	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Lead-210	1.58	U	1.27	1.28		1.73	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Lead-212	0.389		0.0907	0.104		0.0830	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Lead-214	0.416		0.130	0.137		0.165	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Potassium-40	12.0		1.78	2.16		0.487	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Protactinium-231	0.173	U	0.254	0.254		1.74	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Radium-226	0.429		0.141	0.148	0.500	0.155	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Radium-228	0.604		0.199	0.208		0.120	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Thallium-208	0.163		0.0713	0.0733		0.0628	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Thorium-228	0.389		0.0907	0.104		0.0830	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Thorium-232	0.604		0.199	0.208		0.120	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Thorium-234	0.886	U	0.947	0.952		1.61	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Uranium-235	0.113	U	0.162	0.162		0.270	pCi/g	11/30/15 13:55	12/21/15 15:36	1
Uranium-238	0.886	U	0.947	0.952		1.61	pCi/g	11/30/15 13:55	12/21/15 15:36	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S017

Lab Sample ID: 160-15048-17

Date Collected: 11/20/15 10:18

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.413		0.131	0.137		0.0827	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Actinium-227	0.0305	U	0.191	0.191		0.745	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-212	0.245	U	0.315	0.316		0.514	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-214	0.341		0.0920	0.0986		0.0781	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Cesium-137	0.00837	U	0.0362	0.0362		0.0652	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-210	0.248	U	0.721	0.722		1.34	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-212	0.350		0.0786	0.0907		0.0798	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-214	0.399		0.0879	0.0972		0.0931	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Potassium-40	8.22		1.34	1.58		0.997	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Protactinium-231	0.559	U	0.459	0.463		0.869	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-226	0.341		0.0920	0.0986	0.500	0.0781	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-228	0.413		0.131	0.137		0.0827	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thallium-208	0.0715		0.0460	0.0466		0.0614	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-228	0.350		0.0786	0.0907		0.0798	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-232	0.413		0.131	0.137		0.0827	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-234	0.358	U	0.283	0.285		1.07	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-235	0.0886	U	0.133	0.133		0.266	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-238	0.358	U	0.283	0.285		1.07	pCi/g	11/30/15 13:55	12/21/15 15:39	1

Client Sample ID: TITO04-RSY10_SU2-S018

Lab Sample ID: 160-15048-18

Date Collected: 11/20/15 10:18

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.283		0.140	0.143		0.217	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Actinium-227	-0.00789	U	0.0227	0.0227		0.827	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-212	-0.117	U	0.490	0.490		0.886	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Bismuth-214	0.299		0.0968	0.102		0.104	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Cesium-137	-0.0214	U	0.858	0.858		0.0945	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-210	0.462	U	1.02	1.02		1.74	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-212	0.339		0.0915	0.102		0.0981	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Lead-214	0.369		0.115	0.122		0.121	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Potassium-40	10.7		1.53	1.88		0.544	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Protactinium-231	0.323	U	0.472	0.473		1.64	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-226	0.299		0.0968	0.102	0.500	0.104	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Radium-228	0.283		0.140	0.143		0.217	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thallium-208	0.0978		0.0585	0.0593		0.0765	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-228	0.339		0.0915	0.102		0.0981	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-232	0.283		0.140	0.143		0.217	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Thorium-234	0.359	U	0.434	0.436		1.52	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-235	0.0810	U	0.214	0.214		0.371	pCi/g	11/30/15 13:55	12/21/15 15:39	1
Uranium-238	0.359	U	0.434	0.436		1.52	pCi/g	11/30/15 13:55	12/21/15 15:39	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-15048-2

Client Sample ID: TITO04-RSY10_SU2-S019

Lab Sample ID: 160-15048-19

Date Collected: 11/20/15 10:35

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.497		0.156	0.164		0.152	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Actinium-227	0.0744	U	0.122	0.122		0.729	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Bismuth-212	0.457	U	0.497	0.499		0.798	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Bismuth-214	0.385		0.151	0.156		0.151	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Cesium-137	0.00163	U	0.0333	0.0333		0.0625	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-210	0.765	U	1.25	1.25		1.91	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-212	0.347		0.0981	0.108		0.108	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Lead-214	0.372		0.0953	0.103		0.110	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Potassium-40	11.6		1.44	1.87		0.582	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Protactinium-231	0.216	U	0.634	0.635		1.45	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Radium-226	0.385		0.151	0.156	0.500	0.151	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Radium-228	0.497		0.156	0.164		0.152	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thallium-208	0.101		0.0543	0.0553		0.0650	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-228	0.347		0.0981	0.108		0.108	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-232	0.497		0.156	0.164		0.152	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Thorium-234	0.524	U	0.433	0.437		1.51	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Uranium-235	0.0448	U	0.153	0.153		0.348	pCi/g	11/30/15 13:55	12/21/15 15:33	1
Uranium-238	0.524	U	0.433	0.437		1.51	pCi/g	11/30/15 13:55	12/21/15 15:33	1

Client Sample ID: TITO04-RSY10_SU2-S020

Lab Sample ID: 160-15048-20

Date Collected: 11/20/15 10:35

Matrix: Solid

Date Received: 11/24/15 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.183	U	0.104	0.106		0.227	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Actinium-227	0.0909	U	0.308	0.308		0.754	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Bismuth-212	0.215	U	0.408	0.409		0.701	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Bismuth-214	0.337		0.0975	0.104		0.100	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Cesium-137	-0.000454	U	0.0344	0.0344		0.0636	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Lead-210	1.98		1.21	1.23		1.57	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Lead-212	0.336		0.0827	0.0934		0.0897	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Lead-214	0.396		0.0886	0.0977		0.0925	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Potassium-40	8.72		1.23	1.52		0.857	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Protactinium-231	0.110	U	0.373	0.373		1.29	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Radium-226	0.337		0.0975	0.104	0.500	0.100	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Radium-228	0.183	U	0.104	0.106		0.227	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Thallium-208	0.152		0.0464	0.0491		0.0418	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Thorium-228	0.336		0.0827	0.0934		0.0897	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Thorium-232	0.183	U	0.104	0.106		0.227	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Thorium-234	0.313	U	0.344	0.345		1.70	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Uranium-235	0.0854	U	0.119	0.119		0.390	pCi/g	11/30/15 13:55	12/21/15 15:34	1
Uranium-238	0.313	U	0.344	0.345		1.70	pCi/g	11/30/15 13:55	12/21/15 15:34	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S401

Lab Sample ID: 160-16804-1

Date Collected: 04/04/16 12:15

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.182	U	0.126	0.127		0.330	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Actinium-227	0.287	U	0.393	0.394		0.652	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Bismuth-212	0.000	U	0.585	0.585		1.16	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Bismuth-214	0.324		0.129	0.134		0.140	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Cesium-137	-0.00693	U	0.0994	0.0994		0.106	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Lead-210	0.792	U	0.996	1.00		1.78	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Lead-212	0.369		0.114	0.123		0.119	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Lead-214	0.274		0.102	0.105		0.128	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Potassium-40	8.58		1.71	1.92		1.35	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Protactinium-231	0.0694	U	0.707	0.707		2.05	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Radium-226	0.324		0.129	0.134	0.500	0.140	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Radium-228	0.182	U	0.126	0.127		0.330	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Thallium-208	0.129		0.0470	0.0489		0.0314	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Thorium-228	0.369		0.114	0.123		0.119	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Thorium-232	0.182	U	0.126	0.127		0.330	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Thorium-234	0.0609	U	0.447	0.447		1.47	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Uranium-235	0.150	U	0.228	0.228		0.349	pCi/g	04/07/16 12:21	04/28/16 16:01	1
Uranium-238	0.0609	U	0.447	0.447		1.47	pCi/g	04/07/16 12:21	04/28/16 16:01	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S402

Lab Sample ID: 160-16804-2

Date Collected: 04/04/16 12:18

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.198	U	0.143	0.144		0.252	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Actinium-227	0.0979	U	0.179	0.180		0.611	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Bismuth-212	0.386	U	0.419	0.421		0.668	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Bismuth-214	0.337		0.0850	0.0920		0.0380	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Cesium-137	-0.0103	U	0.0425	0.0425		0.0757	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Lead-210	0.582	U	0.910	0.913		1.59	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Lead-212	0.297		0.0886	0.0966		0.0917	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Lead-214	0.355		0.0778	0.0861		0.0839	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Potassium-40	9.67		1.39	1.70		0.491	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Protactinium-231	0.332	U	0.260	0.263		1.40	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Radium-226	0.337		0.0850	0.0920	0.500	0.0380	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Radium-228	0.198	U	0.143	0.144		0.252	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Thallium-208	0.125		0.0477	0.0494		0.0407	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Thorium-228	0.297		0.0886	0.0966		0.0917	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Thorium-232	0.198	U	0.143	0.144		0.252	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Thorium-234	0.590	U	0.651	0.654		1.13	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Uranium-235	0.00250	U	0.151	0.151		0.271	pCi/g	04/07/16 12:21	04/28/16 15:59	1
Uranium-238	0.590	U	0.651	0.654		1.13	pCi/g	04/07/16 12:21	04/28/16 15:59	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S403

Lab Sample ID: 160-16804-3

Date Collected: 04/04/16 12:22

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.287		0.126	0.129		0.241	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Actinium-227	0.0381	U	0.469	0.469		0.824	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Bismuth-212	0.222	U	0.499	0.500		0.875	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Bismuth-214	0.326		0.128	0.133		0.148	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Cesium-137	-0.00587	U	0.0721	0.0721		0.0821	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Lead-210	0.000	U	0.714	0.714		1.76	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Lead-212	0.408		0.103	0.116		0.0976	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Lead-214	0.334		0.0956	0.102		0.0712	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Potassium-40	11.9		1.65	2.05		0.566	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Protactinium-231	-0.166	U	0.865	0.865		1.54	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Radium-226	0.326		0.128	0.133	0.500	0.148	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Radium-228	0.287		0.126	0.129		0.241	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Thallium-208	0.128		0.0495	0.0512		0.0475	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Thorium-228	0.408		0.103	0.116		0.0976	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Thorium-232	0.287		0.126	0.129		0.241	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Thorium-234	0.219	U	0.471	0.472		1.73	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Uranium-235	0.186	U	0.184	0.185		0.258	pCi/g	04/07/16 12:21	04/28/16 15:57	1
Uranium-238	0.219	U	0.471	0.472		1.73	pCi/g	04/07/16 12:21	04/28/16 15:57	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S404

Lab Sample ID: 160-16804-4

Date Collected: 04/04/16 12:25

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.165	U	0.0998	0.101		0.195	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Actinium-227	0.000	U	0.289	0.289		0.716	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Bismuth-212	0.350	U	0.361	0.362		0.572	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Bismuth-214	0.284		0.0882	0.0930		0.0632	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Cesium-137	0.00492	U	0.0219	0.0219		0.0408	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Lead-210	0.783	U	0.618	0.625		0.958	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Lead-212	0.317		0.0687	0.0800		0.0661	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Lead-214	0.465		0.110	0.120		0.0809	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Potassium-40	10.6		1.23	1.64		0.417	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Protactinium-231	0.195	U	0.518	0.519		1.45	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Radium-226	0.284		0.0882	0.0930	0.500	0.0632	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Radium-228	0.165	U	0.0998	0.101		0.195	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Thallium-208	0.110		0.0377	0.0394		0.0314	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Thorium-228	0.317		0.0687	0.0800		0.0661	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Thorium-232	0.165	U	0.0998	0.101		0.195	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Thorium-234	0.448	U	0.650	0.651		1.08	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Uranium-235	0.0848	U	0.137	0.138		0.193	pCi/g	04/07/16 12:21	04/28/16 16:06	1
Uranium-238	0.448	U	0.650	0.651		1.08	pCi/g	04/07/16 12:21	04/28/16 16:06	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S405

Lab Sample ID: 160-16804-5

Date Collected: 04/04/16 12:29

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.346		0.123	0.128		0.205	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Actinium-227	-0.172	U	0.427	0.427		0.728	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Bismuth-212	0.000	U	0.434	0.434		1.07	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Bismuth-214	0.350		0.104	0.110		0.0851	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Cesium-137	-0.00952	U	0.0396	0.0396		0.0712	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Lead-210	-0.0320	U	0.961	0.961		1.67	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Lead-212	0.298		0.0952	0.103		0.109	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Lead-214	0.349		0.0928	0.0997		0.0858	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Potassium-40	10.9		1.46	1.84		0.559	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Protactinium-231	0.0249	U	0.692	0.692		1.27	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Radium-226	0.350		0.104	0.110	0.500	0.0851	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Radium-228	0.346		0.123	0.128		0.205	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Thallium-208	0.155		0.0493	0.0519		0.0465	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Thorium-228	0.298		0.0952	0.103		0.109	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Thorium-232	0.346		0.123	0.128		0.205	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Thorium-234	0.131	U	0.291	0.292		1.39	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Uranium-235	0.127	U	0.169	0.170		0.304	pCi/g	04/07/16 12:21	04/28/16 15:55	1
Uranium-238	0.131	U	0.291	0.292		1.39	pCi/g	04/07/16 12:21	04/28/16 15:55	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S406

Lab Sample ID: 160-16804-6

Date Collected: 04/04/16 12:32

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.303		0.111	0.115		0.105	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Actinium-227	0.0171	U	0.104	0.104		0.749	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Bismuth-212	0.550	U	0.466	0.470		0.714	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Bismuth-214	0.337		0.109	0.115		0.114	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Cesium-137	0.000	U	0.00792	0.00792		0.0845	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Lead-210	0.718	U	0.950	0.954		1.60	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Lead-212	0.287		0.0903	0.0976		0.0996	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Lead-214	0.353		0.0947	0.102		0.120	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Potassium-40	11.3		1.37	1.80		0.507	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Protactinium-231	0.438	U	0.299	0.303		1.47	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Radium-226	0.337		0.109	0.115	0.500	0.114	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Radium-228	0.303		0.111	0.115		0.105	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Thallium-208	0.0932		0.0487	0.0497		0.0721	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Thorium-228	0.287		0.0903	0.0976		0.0996	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Thorium-232	0.303		0.111	0.115		0.105	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Thorium-234	0.946	U	0.417	0.429		1.35	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Uranium-235	0.125	U	0.161	0.162		0.289	pCi/g	04/07/16 12:21	04/28/16 15:56	1
Uranium-238	0.946	U	0.417	0.429		1.35	pCi/g	04/07/16 12:21	04/28/16 15:56	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S407

Lab Sample ID: 160-16804-7

Date Collected: 04/04/16 12:34

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.265		0.135	0.138		0.206	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Actinium-227	-0.223	U	0.464	0.465		0.784	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Bismuth-212	0.194	U	0.416	0.417		0.725	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Bismuth-214	0.429		0.118	0.126		0.113	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Cesium-137	-0.00645	U	0.0385	0.0385		0.0696	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Lead-210	1.15	U	0.937	0.947		1.54	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Lead-212	0.406		0.0850	0.0999		0.0877	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Lead-214	0.458		0.102	0.113		0.133	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Potassium-40	13.7		1.58	2.11		0.981	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Protactinium-231	0.561	U	0.928	0.930		1.56	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Radium-226	0.429		0.118	0.126	0.500	0.113	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Radium-228	0.265		0.135	0.138		0.206	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Thallium-208	0.0603	U	0.0473	0.0477		0.0755	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Thorium-228	0.406		0.0850	0.0999		0.0877	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Thorium-232	0.265		0.135	0.138		0.206	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Thorium-234	0.0967	U	0.381	0.381		1.62	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Uranium-235	0.245	U	0.182	0.184		0.307	pCi/g	04/07/16 12:21	04/28/16 16:05	1
Uranium-238	0.0967	U	0.381	0.381		1.62	pCi/g	04/07/16 12:21	04/28/16 16:05	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S408

Lab Sample ID: 160-16804-8

Date Collected: 04/04/16 12:37

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.374		0.137	0.143		0.149	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Actinium-227	0.156	U	0.350	0.350		0.599	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Bismuth-212	0.244	U	0.424	0.425		0.724	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Bismuth-214	0.307		0.0922	0.0976		0.103	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Cesium-137	0.000336	U	0.0370	0.0370		0.0688	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Lead-210	0.593	U	1.02	1.02		1.56	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Lead-212	0.287		0.0891	0.0965		0.0993	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Lead-214	0.415		0.115	0.123		0.116	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Potassium-40	10.4		1.36	1.73		0.743	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Protactinium-231	0.247	U	0.438	0.439		1.41	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Radium-226	0.307		0.0922	0.0976	0.500	0.103	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Radium-228	0.374		0.137	0.143		0.149	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Thallium-208	0.137		0.0506	0.0526		0.0512	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Thorium-228	0.287		0.0891	0.0965		0.0993	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Thorium-232	0.374		0.137	0.143		0.149	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Thorium-234	0.432	U	0.362	0.364		1.25	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Uranium-235	0.115	U	0.168	0.168		0.295	pCi/g	04/07/16 12:21	04/28/16 16:34	1
Uranium-238	0.432	U	0.362	0.364		1.25	pCi/g	04/07/16 12:21	04/28/16 16:34	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S409

Lab Sample ID: 160-16804-9

Date Collected: 04/04/16 12:40

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.485		0.156	0.164		0.186	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Actinium-227	0.158	U	0.267	0.268		0.695	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Bismuth-212	-0.0225	U	0.387	0.387		0.724	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Bismuth-214	0.279		0.119	0.122		0.145	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Cesium-137	-0.000412	U	0.0356	0.0356		0.0663	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-210	-0.281	U	1.81	1.81		1.71	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-212	0.334		0.0981	0.107		0.105	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-214	0.362		0.0897	0.0972		0.0966	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Potassium-40	7.37		1.17	1.39		0.865	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Protactinium-231	0.255	U	0.513	0.514		1.47	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Radium-226	0.279		0.119	0.122	0.500	0.145	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Radium-228	0.485		0.156	0.164		0.186	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thallium-208	0.199		0.0552	0.0590		0.0473	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-228	0.334		0.0981	0.107		0.105	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-232	0.485		0.156	0.164		0.186	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-234	0.144	U	0.196	0.197		1.37	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Uranium-235	0.133	U	0.176	0.177		0.276	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Uranium-238	0.144	U	0.196	0.197		1.37	pCi/g	04/07/16 12:21	04/28/16 18:36	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S410

Lab Sample ID: 160-16804-10

Date Collected: 04/04/16 12:44

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.159	U	0.117	0.118		0.236	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Actinium-227	0.0285	U	0.0639	0.0640		0.691	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Bismuth-212	0.382	U	0.383	0.385		0.604	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Bismuth-214	0.377		0.117	0.123		0.106	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Cesium-137	0.00813	U	0.0314	0.0314		0.0564	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-210	0.605	U	0.846	0.849		1.40	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-212	0.341		0.0840	0.0948		0.0790	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Lead-214	0.381		0.0925	0.101		0.0722	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Potassium-40	11.3		1.38	1.80		0.758	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Protactinium-231	0.164	U	0.589	0.589		1.05	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Radium-226	0.377		0.117	0.123	0.500	0.106	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Radium-228	0.159	U	0.117	0.118		0.236	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thallium-208	0.0725		0.0495	0.0501		0.0664	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-228	0.341		0.0840	0.0948		0.0790	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-232	0.159	U	0.117	0.118		0.236	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Thorium-234	0.348	U	0.408	0.409		1.35	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Uranium-235	0.146	U	0.158	0.159		0.257	pCi/g	04/07/16 12:21	04/28/16 18:36	1
Uranium-238	0.348	U	0.408	0.409		1.35	pCi/g	04/07/16 12:21	04/28/16 18:36	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S411

Lab Sample ID: 160-16804-11

Date Collected: 04/04/16 12:47

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.317		0.137	0.141		0.111	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Actinium-227	0.145	U	0.294	0.295		0.675	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Bismuth-212	0.0457	U	0.391	0.391		0.722	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Bismuth-214	0.397		0.100	0.108		0.0885	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Cesium-137	-0.0122	U	0.0369	0.0370		0.0652	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Lead-210	0.277	U	0.795	0.796		1.37	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Lead-212	0.306		0.0893	0.0976		0.0931	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Lead-214	0.447		0.0871	0.0987		0.0791	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Potassium-40	10.9		1.35	1.75		0.686	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Protactinium-231	0.384	U	0.410	0.413		1.40	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Radium-226	0.397		0.100	0.108	0.500	0.0885	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Radium-228	0.317		0.137	0.141		0.111	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Thallium-208	0.0505	U	0.0386	0.0389		0.0640	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Thorium-228	0.306		0.0893	0.0976		0.0931	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Thorium-232	0.317		0.137	0.141		0.111	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Thorium-234	0.365	U	0.709	0.710		1.20	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Uranium-235	-0.0205	U	0.165	0.165		0.290	pCi/g	04/07/16 12:21	04/28/16 16:32	1
Uranium-238	0.365	U	0.709	0.710		1.20	pCi/g	04/07/16 12:21	04/28/16 16:32	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S412

Lab Sample ID: 160-16804-12

Date Collected: 04/04/16 13:00

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.252		0.125	0.127		0.220	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Actinium-227	-0.243	U	0.500	0.501		0.845	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Bismuth-212	0.140	U	0.405	0.405		0.721	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Bismuth-214	0.275		0.0934	0.0977		0.0911	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Cesium-137	0.0141	U	0.0357	0.0357		0.0628	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Lead-210	0.900	U	1.35	1.35		1.86	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Lead-212	0.330		0.102	0.111		0.109	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Lead-214	0.454		0.0971	0.108		0.122	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Potassium-40	10.5		1.41	1.77		0.695	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Protactinium-231	1.13		0.525	0.539		0.918	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Radium-226	0.275		0.0934	0.0977	0.500	0.0911	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Radium-228	0.252		0.125	0.127		0.220	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Thallium-208	0.0391	U	0.0379	0.0381		0.0650	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Thorium-228	0.330		0.102	0.111		0.109	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Thorium-232	0.252		0.125	0.127		0.220	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Thorium-234	0.217	U	0.145	0.146		1.61	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Uranium-235	0.0570	U	0.108	0.108		0.307	pCi/g	04/07/16 12:21	04/28/16 16:36	1
Uranium-238	0.217	U	0.145	0.146		1.61	pCi/g	04/07/16 12:21	04/28/16 16:36	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S413

Lab Sample ID: 160-16804-13

Date Collected: 04/04/16 13:05

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.251		0.112	0.114		0.143	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Actinium-227	0.0317	U	0.135	0.135		0.623	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-212	0.769		0.296	0.306		0.210	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-214	0.351		0.0855	0.0930		0.0536	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Cesium-137	-0.00514	U	0.0320	0.0320		0.0578	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-210	0.198	U	0.787	0.787		1.36	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-212	0.254		0.0841	0.0903		0.0861	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-214	0.361		0.0787	0.0872		0.0533	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Potassium-40	9.76		1.22	1.58		0.563	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Protactinium-231	0.310	U	0.604	0.605		1.27	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-226	0.351		0.0855	0.0930	0.500	0.0536	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-228	0.251		0.112	0.114		0.143	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thallium-208	0.115		0.0450	0.0466		0.0365	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-228	0.254		0.0841	0.0903		0.0861	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-232	0.251		0.112	0.114		0.143	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-234	0.420	U	0.341	0.344		1.10	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-235	0.127	U	0.150	0.150		0.263	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-238	0.420	U	0.341	0.344		1.10	pCi/g	04/07/16 12:21	04/28/16 16:41	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S414

Lab Sample ID: 160-16804-14

Date Collected: 04/04/16 13:07

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.136	U	0.0963	0.0973		0.325	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Actinium-227	0.0287	U	0.132	0.132		0.876	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-212	0.250	U	0.499	0.500		0.863	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-214	0.305		0.115	0.120		0.123	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Cesium-137	-0.000589	U	0.0432	0.0432		0.0803	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-210	0.600	U	1.26	1.26		1.80	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-212	0.241		0.102	0.106		0.114	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-214	0.383		0.108	0.115		0.102	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Potassium-40	10.5		1.55	1.89		0.920	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Protactinium-231	0.0325	U	0.108	0.108		1.48	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-226	0.305		0.115	0.120	0.500	0.123	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-228	0.136	U	0.0963	0.0973		0.325	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thallium-208	0.126		0.0433	0.0452		0.0426	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-228	0.241		0.102	0.106		0.114	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-232	0.136	U	0.0963	0.0973		0.325	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-234	0.597	U	0.460	0.464		1.41	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-235	0.0855	U	0.171	0.171		0.283	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-238	0.597	U	0.460	0.464		1.41	pCi/g	04/07/16 12:21	04/28/16 16:41	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S415

Lab Sample ID: 160-16804-15

Date Collected: 04/04/16 13:09

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.471		0.169	0.176		0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Actinium-227	0.110	U	0.183	0.183		0.823	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-212	0.372	U	0.549	0.550		0.917	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Bismuth-214	0.435		0.130	0.138		0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Cesium-137	0.00918	U	0.0405	0.0405		0.0726	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-210	-0.480	U	1.96	1.96		2.03	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-212	0.256		0.0752	0.0822		0.0923	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Lead-214	0.360		0.109	0.115		0.126	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Potassium-40	10.1		1.40	1.74		0.881	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Protactinium-231	0.350	U	0.320	0.322		1.69	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-226	0.435		0.130	0.138	0.500	0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Radium-228	0.471		0.169	0.176		0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thallium-208	0.0550	U	0.0604	0.0607		0.0840	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-228	0.256		0.0752	0.0822		0.0923	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-232	0.471		0.169	0.176		0.127	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Thorium-234	0.973	U	1.22	1.23		1.60	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-235	0.160	U	0.180	0.180		0.329	pCi/g	04/07/16 12:21	04/28/16 16:41	1
Uranium-238	0.973	U	1.22	1.23		1.60	pCi/g	04/07/16 12:21	04/28/16 16:41	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S416

Lab Sample ID: 160-16804-16

Date Collected: 04/04/16 13:14

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.345		0.109	0.114		0.0634	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Actinium-227	0.191	U	0.287	0.288		0.480	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Bismuth-212	0.152	U	0.306	0.306		0.532	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Bismuth-214	0.309		0.0829	0.0890		0.0709	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Cesium-137	0.00287	U	0.0307	0.0307		0.0561	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Lead-210	-0.253	U	0.763	0.763		1.31	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Lead-212	0.243		0.0780	0.0841		0.0808	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Lead-214	0.354		0.0692	0.0784		0.0757	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Potassium-40	11.7		1.28	1.75		0.575	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Protactinium-231	0.331	U	0.444	0.445		1.04	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Radium-226	0.309		0.0829	0.0890	0.500	0.0709	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Radium-228	0.345		0.109	0.114		0.0634	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Thallium-208	0.112		0.0353	0.0372		0.0309	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Thorium-228	0.243		0.0780	0.0841		0.0808	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Thorium-232	0.345		0.109	0.114		0.0634	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Thorium-234	0.198	U	0.718	0.719		1.23	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Uranium-235	-0.0709	U	0.194	0.194		0.329	pCi/g	04/07/16 12:21	04/28/16 18:04	1
Uranium-238	0.198	U	0.718	0.719		1.23	pCi/g	04/07/16 12:21	04/28/16 18:04	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S417

Lab Sample ID: 160-16804-17

Date Collected: 04/04/16 13:18

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.293		0.135	0.138		0.116	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Actinium-227	-0.000588	U	0.00218	0.00218		0.750	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Bismuth-212	0.116	U	0.389	0.389		0.699	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Bismuth-214	0.304		0.0928	0.0980		0.0962	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Cesium-137	-0.0151	U	0.0392	0.0392		0.0685	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Lead-210	0.763	U	0.999	1.00		1.66	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Lead-212	0.345		0.0852	0.0962		0.0859	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Lead-214	0.290		0.0832	0.0885		0.0952	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Potassium-40	10.7		1.34	1.73		0.511	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Protactinium-231	0.0735	U	0.151	0.152		1.45	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Radium-226	0.304		0.0928	0.0980	0.500	0.0962	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Radium-228	0.293		0.135	0.138		0.116	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Thallium-208	0.0731		0.0442	0.0448		0.0615	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Thorium-228	0.345		0.0852	0.0962		0.0859	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Thorium-232	0.293		0.135	0.138		0.116	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Thorium-234	0.334	U	0.371	0.373		1.46	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Uranium-235	0.0646	U	0.117	0.117		0.312	pCi/g	04/07/16 12:21	04/28/16 18:05	1
Uranium-238	0.334	U	0.371	0.373		1.46	pCi/g	04/07/16 12:21	04/28/16 18:05	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S418

Lab Sample ID: 160-16804-18

Date Collected: 04/04/16 13:22

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.327		0.109	0.114		0.0670	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Actinium-227	-0.0158	U	0.0509	0.0509		0.719	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Bismuth-212	0.227	U	0.381	0.382		0.647	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Bismuth-214	0.226		0.0778	0.0812		0.0878	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Cesium-137	0.00951	U	0.0289	0.0289		0.0515	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-210	0.585	U	0.836	0.839		1.39	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-212	0.261		0.0703	0.0780		0.0781	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-214	0.400		0.0872	0.0966		0.0604	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Potassium-40	9.53		1.20	1.55		0.624	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Protactinium-231	0.0858	U	0.128	0.129		1.21	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Radium-226	0.226		0.0778	0.0812	0.500	0.0878	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Radium-228	0.327		0.109	0.114		0.0670	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thallium-208	0.136		0.0406	0.0430		0.0263	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-228	0.261		0.0703	0.0780		0.0781	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-232	0.327		0.109	0.114		0.0670	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-234	0.0304	U	0.743	0.743		1.29	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Uranium-235	0.0817	U	0.150	0.150		0.253	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Uranium-238	0.0304	U	0.743	0.743		1.29	pCi/g	04/07/16 12:21	04/28/16 18:06	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16804-2

Client Sample ID: TI-TO04-NP-R-FSSSU4-S419

Lab Sample ID: 160-16804-19

Date Collected: 04/04/16 13:25

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.241		0.130	0.132		0.230	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Actinium-227	-0.000577	U	0.00327	0.00327		0.671	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Bismuth-212	0.0678	U	0.467	0.467		0.861	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Bismuth-214	0.361		0.0982	0.105		0.0749	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Cesium-137	-0.00136	U	0.0340	0.0340		0.0647	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-210	-0.101	U	0.982	0.982		1.52	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-212	0.200		0.0908	0.0944		0.103	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Lead-214	0.325		0.0957	0.102		0.0966	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Potassium-40	11.3		1.54	1.92		0.602	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Protactinium-231	0.281	U	0.326	0.328		1.58	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Radium-226	0.361		0.0982	0.105	0.500	0.0749	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Radium-228	0.241		0.130	0.132		0.230	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thallium-208	0.135		0.0432	0.0454		0.0418	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-228	0.200		0.0908	0.0944		0.103	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-232	0.241		0.130	0.132		0.230	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Thorium-234	0.217	U	0.251	0.252		1.39	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Uranium-235	-0.00617	U	0.160	0.160		0.285	pCi/g	04/07/16 12:21	04/28/16 18:06	1
Uranium-238	0.217	U	0.251	0.252		1.39	pCi/g	04/07/16 12:21	04/28/16 18:06	1

Client Sample ID: TI-TO04-NP-R-FSSSU4-S420

Lab Sample ID: 160-16804-20

Date Collected: 04/04/16 13:28

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.184	U	0.124	0.126		0.265	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Actinium-227	0.220	U	0.280	0.281		0.757	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Bismuth-212	0.000	U	0.417	0.417		1.02	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Bismuth-214	0.431		0.121	0.129		0.116	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Cesium-137	0.0166	U	0.0417	0.0417		0.0727	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Lead-210	0.528	U	1.02	1.03		1.91	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Lead-212	0.373		0.111	0.121		0.121	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Lead-214	0.408		0.0951	0.104		0.109	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Potassium-40	11.6		1.43	1.86		0.767	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Protactinium-231	0.340	U	0.429	0.431		1.66	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Radium-226	0.431		0.121	0.129	0.500	0.116	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Radium-228	0.184	U	0.124	0.126		0.265	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Thallium-208	0.0771	U	0.0601	0.0606		0.0822	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Thorium-228	0.373		0.111	0.121		0.121	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Thorium-232	0.184	U	0.124	0.126		0.265	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Thorium-234	0.695	U	0.522	0.527		1.29	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Uranium-235	0.113	U	0.205	0.206		0.380	pCi/g	04/07/16 12:21	04/28/16 18:07	1
Uranium-238	0.695	U	0.522	0.527		1.29	pCi/g	04/07/16 12:21	04/28/16 18:07	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S421

Lab Sample ID: 160-17136-1

Date Collected: 04/25/16 14:36

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.356		0.131	0.136		0.128	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Actinium-227	-0.0295	U	0.0550	0.0551		0.983	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Bismuth-212	0.000	U	0.518	0.518		1.38	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Bismuth-214	0.251		0.110	0.113		0.122	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Cesium-137	0.0533	U	0.0529	0.0532		0.0804	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Lead-210	1.03	U	1.32	1.32		1.90	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Lead-212	0.319		0.0826	0.0923		0.0815	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Lead-214	0.292		0.117	0.121		0.135	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Potassium-40	9.26		1.65	1.90		0.758	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Protactinium-231	0.416	U	1.39	1.39		3.17	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Radium-226	0.251		0.110	0.113	0.500	0.122	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Radium-228	0.356		0.131	0.136		0.128	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Thallium-208	0.117		0.0537	0.0550		0.0511	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Thorium-228	0.319		0.0826	0.0923		0.0815	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Thorium-232	0.356		0.131	0.136		0.128	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Thorium-234	-0.616	U	1.16	1.16		1.92	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Uranium-235	0.0940	U	0.295	0.295		0.541	pCi/g	04/28/16 09:26	05/19/16 09:21	1
Uranium-238	-0.616	U	1.16	1.16		1.92	pCi/g	04/28/16 09:26	05/19/16 09:21	1

Client Sample ID: TITO04_NP-R-FSSSU4-S422

Lab Sample ID: 160-17136-2

Date Collected: 04/25/16 14:39

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.451		0.174	0.180		0.181	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Actinium-227	-0.305	U	0.741	0.742		1.25	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Bismuth-212	0.182	U	0.432	0.433		0.757	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Bismuth-214	0.334		0.136	0.140		0.131	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Cesium-137	-0.0331	U	0.0549	0.0550		0.0895	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Lead-210	-0.978	U	1.54	1.55		2.44	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Lead-212	0.302		0.0850	0.0936		0.109	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Lead-214	0.274		0.0915	0.0958		0.110	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Potassium-40	10.7		1.41	1.78		0.753	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Protactinium-231	-0.713	U	2.32	2.32		3.91	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Radium-226	0.334		0.136	0.140	0.500	0.131	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Radium-228	0.451		0.174	0.180		0.181	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Thallium-208	0.119		0.0509	0.0524		0.0561	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Thorium-228	0.302		0.0850	0.0936		0.109	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Thorium-232	0.451		0.174	0.180		0.181	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Thorium-234	0.397	U	0.892	0.893		1.28	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Uranium-235	-0.0343	U	0.122	0.122		0.573	pCi/g	04/28/16 09:26	05/19/16 09:18	1
Uranium-238	0.397	U	0.892	0.893		1.28	pCi/g	04/28/16 09:26	05/19/16 09:18	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S423

Lab Sample ID: 160-17136-3

Date Collected: 04/25/16 14:42

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.421		0.126	0.133		0.0690	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Actinium-227	0.265	U	0.582	0.583		0.978	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Bismuth-212	0.292	U	0.520	0.521		0.881	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Bismuth-214	0.254		0.0843	0.0884		0.0939	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Cesium-137	0.0137	U	0.0300	0.0301		0.0523	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Lead-210	-0.690	U	1.52	1.52		2.55	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Lead-212	0.241		0.0652	0.0722		0.0785	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Lead-214	0.372		0.0803	0.0891		0.0977	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Potassium-40	11.2		1.32	1.75		0.579	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Protactinium-231	0.346	U	1.27	1.28		3.70	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Radium-226	0.254		0.0843	0.0884	0.500	0.0939	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Radium-228	0.421		0.126	0.133		0.0690	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Thallium-208	0.131		0.0363	0.0388		0.0185	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Thorium-228	0.241		0.0652	0.0722		0.0785	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Thorium-232	0.421		0.126	0.133		0.0690	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Thorium-234	0.000	U	0.680	0.680		2.14	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Uranium-235	0.000	U	0.155	0.155		0.682	pCi/g	04/28/16 09:26	05/19/16 10:13	1
Uranium-238	0.000	U	0.680	0.680		2.14	pCi/g	04/28/16 09:26	05/19/16 10:13	1

Client Sample ID: TITO04_NP-R-FSSSU4-S424

Lab Sample ID: 160-17136-4

Date Collected: 04/25/16 14:45

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.374		0.145	0.150		0.114	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Actinium-227	-0.283	U	0.766	0.767		1.29	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Bismuth-212	-0.210	U	0.625	0.625		1.08	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Bismuth-214	0.238		0.0867	0.0901		0.0903	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Cesium-137	0.0181	U	0.0397	0.0398		0.0685	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Lead-210	1.24	U	1.04	1.05		1.42	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Lead-212	0.286		0.0732	0.0820		0.0876	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Lead-214	0.367		0.0997	0.107		0.124	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Potassium-40	9.92		1.27	1.63		0.517	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Protactinium-231	-0.712	U	2.34	2.34		3.94	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Radium-226	0.238		0.0867	0.0901	0.500	0.0903	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Radium-228	0.374		0.145	0.150		0.114	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Thallium-208	0.132		0.0408	0.0430		0.0354	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Thorium-228	0.286		0.0732	0.0820		0.0876	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Thorium-232	0.374		0.145	0.150		0.114	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Thorium-234	1.07	U	1.09	1.09		1.35	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Uranium-235	0.143	U	0.271	0.271		0.460	pCi/g	04/28/16 09:26	05/19/16 10:14	1
Uranium-238	1.07	U	1.09	1.09		1.35	pCi/g	04/28/16 09:26	05/19/16 10:14	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S425

Lab Sample ID: 160-17136-5

Date Collected: 04/25/16 14:48

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.327		0.154	0.157		0.147	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Actinium-227	0.170	U	0.442	0.442		0.748	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Bismuth-212	-0.177	U	0.554	0.554		0.955	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Bismuth-214	0.330		0.0840	0.0907		0.0679	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Cesium-137	0.0165	U	0.0269	0.0270		0.0456	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Lead-210	-0.0351	U	0.651	0.651		1.78	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Lead-212	0.295		0.0537	0.0659		0.0420	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Lead-214	0.327		0.0734	0.0809		0.0561	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Potassium-40	9.59		1.12	1.49		0.404	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Protactinium-231	0.265	U	0.941	0.942		3.02	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Radium-226	0.330		0.0840	0.0907	0.500	0.0679	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Radium-228	0.327		0.154	0.157		0.147	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Thallium-208	0.108		0.0320	0.0339		0.0257	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Thorium-228	0.295		0.0537	0.0659		0.0420	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Thorium-232	0.327		0.154	0.157		0.147	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Thorium-234	0.289	U	0.614	0.615		1.50	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Uranium-235	0.0671	U	0.160	0.160		0.633	pCi/g	04/28/16 09:26	05/19/16 10:45	1
Uranium-238	0.289	U	0.614	0.615		1.50	pCi/g	04/28/16 09:26	05/19/16 10:45	1

Client Sample ID: TITO04_NP-R-FSSSU4-S426

Lab Sample ID: 160-17136-6

Date Collected: 04/25/16 14:51

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.393		0.143	0.148		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Actinium-227	0.186	U	0.432	0.433		0.626	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Bismuth-212	-0.330	U	0.748	0.749		1.28	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Bismuth-214	0.271		0.0947	0.0989		0.0918	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Cesium-137	-0.0424	U	0.0733	0.0734		0.123	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Lead-210	0.295	U	1.05	1.05		1.57	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Lead-212	0.303		0.0741	0.0838		0.0824	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Lead-214	0.432		0.104	0.113		0.0888	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Potassium-40	11.9		1.55	1.97		0.583	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Protactinium-231	0.000	U	0.679	0.679		2.95	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Radium-226	0.271		0.0947	0.0989	0.500	0.0918	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Radium-228	0.393		0.143	0.148		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Thallium-208	0.102		0.0460	0.0472		0.0422	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Thorium-228	0.303		0.0741	0.0838		0.0824	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Thorium-232	0.393		0.143	0.148		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Thorium-234	-0.0797	U	0.964	0.964		1.66	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Uranium-235	-0.0214	U	0.287	0.287		0.552	pCi/g	04/28/16 09:26	05/19/16 10:16	1
Uranium-238	-0.0797	U	0.964	0.964		1.66	pCi/g	04/28/16 09:26	05/19/16 10:16	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S427

Lab Sample ID: 160-17136-7

Date Collected: 04/25/16 14:53

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.101	U	0.208	0.208		0.382	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Actinium-227	0.332	U	0.341	0.343		1.18	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Bismuth-212	0.0155	U	0.657	0.657		1.20	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Bismuth-214	0.383		0.142	0.147		0.134	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Cesium-137	-0.00923	U	0.0751	0.0751		0.133	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Lead-210	-0.221	U	1.50	1.50		2.60	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Lead-212	0.250		0.0811	0.0873		0.100	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Lead-214	0.392		0.108	0.115		0.139	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Potassium-40	11.0		1.63	1.99		0.445	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Protactinium-231	-0.922	U	2.97	2.97		4.99	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Radium-226	0.383		0.142	0.147	0.500	0.134	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Radium-228	0.101	U	0.208	0.208		0.382	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Thallium-208	0.105		0.0897	0.0904		0.0915	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Thorium-228	0.250		0.0811	0.0873		0.100	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Thorium-232	0.101	U	0.208	0.208		0.382	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Thorium-234	-0.539	U	1.20	1.20		2.90	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Uranium-235	0.0958	U	0.186	0.186		0.835	pCi/g	04/28/16 09:26	05/19/16 10:17	1
Uranium-238	-0.539	U	1.20	1.20		2.90	pCi/g	04/28/16 09:26	05/19/16 10:17	1

Client Sample ID: TITO04_NP-R-FSSSU4-S428

Lab Sample ID: 160-17136-8

Date Collected: 04/25/16 14:59

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.234		0.0997	0.103		0.0782	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Actinium-227	-0.0595	U	0.0975	0.0978		1.39	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Bismuth-212	0.000	U	0.525	0.525		1.25	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Bismuth-214	0.397		0.106	0.113		0.0928	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Cesium-137	-0.00249	U	0.0661	0.0661		0.117	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Lead-210	1.68	U	1.37	1.38		1.78	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Lead-212	0.265		0.0750	0.0825		0.0917	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Lead-214	0.332		0.0905	0.0968		0.0852	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Potassium-40	10.1		1.35	1.70		0.728	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Protactinium-231	0.638	U	1.42	1.42		3.25	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Radium-226	0.397		0.106	0.113	0.500	0.0928	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Radium-228	0.234		0.0997	0.103		0.0782	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Thallium-208	0.105		0.0687	0.0695		0.0724	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Thorium-228	0.265		0.0750	0.0825		0.0917	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Thorium-232	0.234		0.0997	0.103		0.0782	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Thorium-234	0.736	U	0.759	0.763		1.22	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Uranium-235	0.121	U	0.260	0.260		0.777	pCi/g	04/28/16 09:26	05/19/16 10:19	1
Uranium-238	0.736	U	0.759	0.763		1.22	pCi/g	04/28/16 09:26	05/19/16 10:19	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S429

Lab Sample ID: 160-17136-9

Date Collected: 04/25/16 14:55

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.260		0.204	0.206		0.245	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Actinium-227	0.206	U	0.518	0.519		0.877	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Bismuth-212	-0.356	U	0.676	0.677		1.46	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Bismuth-214	0.271		0.0927	0.0969		0.0812	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Cesium-137	-0.0384	U	0.0759	0.0760		0.101	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Lead-210	-0.145	U	1.17	1.17		2.02	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Lead-212	0.265		0.0619	0.0707		0.0639	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Lead-214	0.257		0.0661	0.0712		0.0913	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Potassium-40	11.0		1.49	1.87		0.605	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Protactinium-231	0.000	U	0.218	0.218		2.81	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Radium-226	0.271		0.0927	0.0969	0.500	0.0812	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Radium-228	0.260		0.204	0.206		0.245	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Thallium-208	0.0827		0.0419	0.0427		0.0825	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Thorium-228	0.265		0.0619	0.0707		0.0639	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Thorium-232	0.260		0.204	0.206		0.245	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Thorium-234	0.340	U	0.314	0.316		0.915	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Uranium-235	0.0967	U	0.205	0.205		0.348	pCi/g	04/28/16 09:26	05/19/16 19:26	1
Uranium-238	0.340	U	0.314	0.316		0.915	pCi/g	04/28/16 09:26	05/19/16 19:26	1

Client Sample ID: TITO04_NP-R-FSSSU4-S430

Lab Sample ID: 160-17136-10

Date Collected: 04/25/16 14:57

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.481		0.188	0.195		0.319	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Actinium-227	-0.263	U	0.823	0.824		1.39	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Bismuth-212	0.297	U	0.604	0.604		1.04	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Bismuth-214	0.365		0.124	0.130		0.120	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Cesium-137	0.0161	U	0.0795	0.0795		0.138	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Lead-210	-0.803	U	1.60	1.60		2.67	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Lead-212	0.321		0.0766	0.0871		0.0778	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Lead-214	0.397		0.104	0.112		0.0801	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Potassium-40	10.4		1.57	1.90		0.692	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Protactinium-231	0.000	U	0.280	0.280		4.57	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Radium-226	0.365		0.124	0.130	0.500	0.120	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Radium-228	0.481		0.188	0.195		0.319	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Thallium-208	0.123		0.0448	0.0466		0.0399	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Thorium-228	0.321		0.0766	0.0871		0.0778	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Thorium-232	0.481		0.188	0.195		0.319	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Thorium-234	1.14	U	1.13	1.14		1.45	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Uranium-235	0.157	U	0.343	0.343		0.877	pCi/g	04/28/16 09:26	05/19/16 19:25	1
Uranium-238	1.14	U	1.13	1.14		1.45	pCi/g	04/28/16 09:26	05/19/16 19:25	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17136-2

Client Sample ID: TITO04_NP-R-FSSSU4-S431

Lab Sample ID: 160-17136-11

Date Collected: 04/25/16 14:50

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.395		0.190	0.195		0.370	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Actinium-227	-0.0166	U	0.0540	0.0541		0.937	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Bismuth-212	-0.0258	U	0.782	0.782		1.42	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Bismuth-214	0.402		0.144	0.150		0.135	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Cesium-137	0.0253	U	0.0451	0.0452		0.0751	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Lead-210	0.796	U	0.894	0.899		1.35	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Lead-212	0.371		0.0880	0.100		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Lead-214	0.346		0.106	0.112		0.142	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Potassium-40	10.0		1.65	1.95		0.708	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Protactinium-231	0.000	U	0.713	0.713		3.40	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Radium-226	0.402		0.144	0.150	0.500	0.135	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Radium-228	0.395		0.190	0.195		0.370	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Thallium-208	0.0997		0.102	0.103		0.0932	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Thorium-228	0.371		0.0880	0.100		0.0901	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Thorium-232	0.395		0.190	0.195		0.370	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Thorium-234	-0.886	U	0.777	0.783		1.84	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Uranium-235	0.0362	U	0.179	0.179		0.520	pCi/g	04/28/16 09:26	05/19/16 10:29	1
Uranium-238	-0.886	U	0.777	0.783		1.84	pCi/g	04/28/16 09:26	05/19/16 10:29	1

Client Sample ID: TITO04_NP-R-FSSSU4-S432

Lab Sample ID: 160-17136-12

Date Collected: 04/25/16 15:01

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.389		0.117	0.123		0.186	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Actinium-227	0.0939	U	0.439	0.439		1.09	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Bismuth-212	0.310	U	0.576	0.577		0.979	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Bismuth-214	0.349		0.0928	0.0997		0.0770	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Cesium-137	-0.0130	U	0.0551	0.0551		0.119	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Lead-210	-0.508	U	1.33	1.33		2.33	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Lead-212	0.250		0.0748	0.0815		0.0942	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Lead-214	0.365		0.0945	0.102		0.122	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Potassium-40	11.3		1.43	1.84		0.740	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Protactinium-231	0.262	U	1.01	1.01		3.28	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Radium-226	0.349		0.0928	0.0997	0.500	0.0770	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Radium-228	0.389		0.117	0.123		0.186	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Thallium-208	0.118		0.0500	0.0515		0.0499	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Thorium-228	0.250		0.0748	0.0815		0.0942	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Thorium-232	0.389		0.117	0.123		0.186	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Thorium-234	-0.0808	U	1.06	1.06		1.82	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Uranium-235	0.111	U	0.264	0.264		0.452	pCi/g	04/28/16 09:26	05/19/16 10:27	1
Uranium-238	-0.0808	U	1.06	1.06		1.82	pCi/g	04/28/16 09:26	05/19/16 10:27	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17238-2

Client Sample ID: TI-TO04-NP-R-FSS-BISU7-S001

Lab Sample ID: 160-17238-1

Date Collected: 05/03/16 09:45

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.591		0.136	0.149		0.0732	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Actinium-227	0.0989	U	0.643	0.643		1.10	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Bismuth-212	0.240	U	0.508	0.509		0.870	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Bismuth-214	0.565		0.112	0.126		0.0807	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Cesium-137	0.0303	U	0.0490	0.0491		0.0822	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Lead-210	0.446	U	1.45	1.45		2.44	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Lead-212	0.632		0.0903	0.122		0.0840	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Lead-214	0.575		0.127	0.140		0.112	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Potassium-40	11.7		1.40	1.85		0.645	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Protactinium-231	0.396	U	1.33	1.33		4.23	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Radium-226	0.565		0.112	0.126	0.500	0.0807	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Radium-228	0.591		0.136	0.149		0.0732	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Thallium-208	0.187		0.0632	0.0661		0.0570	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Thorium-228	0.632		0.0903	0.122		0.0840	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Thorium-232	0.591		0.136	0.149		0.0732	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Thorium-234	0.549	U	1.26	1.27		2.12	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Uranium-235	0.000	U	0.0827	0.0827		0.889	pCi/g	05/06/16 10:08	05/30/16 16:20	1
Uranium-238	0.549	U	1.26	1.27		2.12	pCi/g	05/06/16 10:08	05/30/16 16:20	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17242-2

Client Sample ID: TITO04-NP-FSS SU7-LLRO505CH-S001

Lab Sample ID: 160-17242-1

Date Collected: 05/03/16 09:20

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.320		0.141	0.145		0.227	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Actinium-227	-0.309	U	0.650	0.651		1.09	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Bismuth-212	0.000	U	0.374	0.374		0.796	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Bismuth-214	0.355		0.118	0.124		0.104	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Cesium-137	-0.0366	U	0.0561	0.0562		0.0936	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Lead-210	0.362	U	1.29	1.29		2.19	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Lead-212	0.265		0.0647	0.0732		0.0712	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Lead-214	0.366		0.0943	0.102		0.109	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Potassium-40	10.1		1.28	1.64		0.596	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Protactinium-231	-0.769	U	2.43	2.43		4.07	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Radium-226	0.355		0.118	0.124	0.500	0.104	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Radium-228	0.320		0.141	0.145		0.227	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Thallium-208	0.0897		0.0528	0.0536		0.0555	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Thorium-228	0.265		0.0647	0.0732		0.0712	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Thorium-232	0.320		0.141	0.145		0.227	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Thorium-234	0.0954	U	1.12	1.12		1.90	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Uranium-235	0.000	U	0.0812	0.0812		0.614	pCi/g	05/06/16 09:55	05/30/16 21:57	1
Uranium-238	0.0954	U	1.12	1.12		1.90	pCi/g	05/06/16 09:55	05/30/16 21:57	1

Client Sample ID: TITO04-NP-FSS SU7-LLRO505CH-S002

Lab Sample ID: 160-17242-2

Date Collected: 05/03/16 09:22

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.369		0.129	0.135		0.126	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Actinium-227	0.312	U	0.701	0.702		1.18	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Bismuth-212	0.322	U	0.764	0.765		1.30	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Bismuth-214	0.289		0.101	0.105		0.102	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Cesium-137	-0.000137	U	0.0471	0.0471		0.0856	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Lead-210	-1.45	U	1.18	1.19		2.99	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Lead-212	0.443		0.110	0.124		0.145	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Lead-214	0.212		0.100	0.103		0.155	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Potassium-40	10.9		1.76	2.09		1.28	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Protactinium-231	-0.734	U	2.26	2.26		3.80	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Radium-226	0.289		0.101	0.105	0.500	0.102	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Radium-228	0.369		0.129	0.135		0.126	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Thallium-208	0.0771		0.0429	0.0436		0.0485	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Thorium-228	0.443		0.110	0.124		0.145	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Thorium-232	0.369		0.129	0.135		0.126	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Thorium-234	0.343	U	0.992	0.993		1.44	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Uranium-235	-0.0775	U	0.242	0.242		0.782	pCi/g	05/06/16 09:55	05/30/16 21:58	1
Uranium-238	0.343	U	0.992	0.993		1.44	pCi/g	05/06/16 09:55	05/30/16 21:58	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17242-2

Client Sample ID: TITO04-NP-FSS SU7-LLRO505CH-S003

Lab Sample ID: 160-17242-3

Date Collected: 05/03/16 09:25

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.376		0.117	0.123		0.0676	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Actinium-227	0.000	U	0.355	0.355		0.916	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Bismuth-212	0.254	U	0.480	0.481		0.816	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Bismuth-214	0.134	U	0.0751	0.0764		0.315	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Cesium-137	0.000774	U	0.0491	0.0491		0.0870	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Lead-210	-0.0697	U	1.10	1.10		1.92	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Lead-212	0.316		0.0637	0.0757		0.0656	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Lead-214	0.346		0.0875	0.0946		0.0772	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Potassium-40	10.9		1.24	1.67		0.433	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Protactinium-231	-0.670	U	2.05	2.06		3.45	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Radium-226	0.134	U	0.0751	0.0764	0.500	0.315	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Radium-228	0.376		0.117	0.123		0.0676	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Thallium-208	0.0284	U	0.0721	0.0721		0.0821	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Thorium-228	0.316		0.0637	0.0757		0.0656	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Thorium-232	0.376		0.117	0.123		0.0676	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Thorium-234	0.514	U	1.08	1.08		1.80	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Uranium-235	0.000	U	0.157	0.157		0.606	pCi/g	05/06/16 09:55	05/30/16 21:59	1
Uranium-238	0.514	U	1.08	1.08		1.80	pCi/g	05/06/16 09:55	05/30/16 21:59	1

Client Sample ID: TITO04-NP-FSS SU7-LLRO505CH-S004

Lab Sample ID: 160-17242-4

Date Collected: 05/03/16 09:30

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.238	U	0.0983	0.101		0.282	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Actinium-227	0.167	U	0.592	0.593		0.856	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Bismuth-212	0.383	U	0.796	0.797		1.35	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Bismuth-214	0.392		0.102	0.110		0.0786	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Cesium-137	0.0261	U	0.0541	0.0542		0.0926	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Lead-210	-0.331	U	1.24	1.24		1.89	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Lead-212	0.231		0.0918	0.0966		0.109	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Lead-214	0.195		0.0844	0.0868		0.0972	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Potassium-40	9.17		1.37	1.66		0.587	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Protactinium-231	0.138	U	0.853	0.853		2.79	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Radium-226	0.392		0.102	0.110	0.500	0.0786	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Radium-228	0.238	U	0.0983	0.101		0.282	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thallium-208	0.197		0.0482	0.0524		0.0217	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thorium-228	0.231		0.0918	0.0966		0.109	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thorium-232	0.238	U	0.0983	0.101		0.282	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thorium-234	1.72		0.976	0.993		1.19	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Uranium-235	0.105	U	0.164	0.164		0.424	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Uranium-238	1.72		0.976	0.993		1.19	pCi/g	05/06/16 09:55	05/30/16 22:00	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17242-2

Client Sample ID: TITO04-NP-FSS SU7-LLRO505CH-S005

Lab Sample ID: 160-17242-5

Date Collected: 05/03/16 09:28

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.304	U	0.121	0.125		0.355	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Actinium-227	0.298	U	0.760	0.761		1.28	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Bismuth-212	0.438	U	0.813	0.815		1.38	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Bismuth-214	0.367		0.115	0.121		0.0967	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Cesium-137	0.0241	U	0.0529	0.0530		0.0918	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Lead-210	0.901	U	1.21	1.21		1.67	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Lead-212	0.338		0.0913	0.101		0.107	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Lead-214	0.334		0.105	0.110		0.142	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Potassium-40	11.2		2.05	2.35		1.36	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Protactinium-231	0.373	U	1.25	1.25		4.07	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Radium-226	0.367		0.115	0.121	0.500	0.0967	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Radium-228	0.304	U	0.121	0.125		0.355	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thallium-208	0.127		0.0580	0.0594		0.0560	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thorium-228	0.338		0.0913	0.101		0.107	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thorium-232	0.304	U	0.121	0.125		0.355	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Thorium-234	0.547	U	0.808	0.810		1.33	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Uranium-235	0.0564	U	0.179	0.179		0.791	pCi/g	05/06/16 09:55	05/30/16 22:00	1
Uranium-238	0.547	U	0.808	0.810		1.33	pCi/g	05/06/16 09:55	05/30/16 22:00	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S001

Lab Sample ID: 160-17243-1

Date Collected: 05/03/16 12:50

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.478		0.228	0.234		0.313	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Actinium-227	0.133	U	0.362	0.363		1.34	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Bismuth-212	0.481	U	0.809	0.811		1.36	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Bismuth-214	0.467		0.129	0.138		0.113	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Cesium-137	-0.0183	U	0.0397	0.0397		0.0936	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Lead-210	0.422	U	1.04	1.04		1.65	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Lead-212	0.463		0.0975	0.114		0.114	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Lead-214	0.420		0.116	0.124		0.121	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Potassium-40	11.3		1.45	1.85		0.760	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Protactinium-231	0.704	U	1.72	1.72		3.86	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Radium-226	0.467		0.129	0.138	0.500	0.113	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Radium-228	0.478		0.228	0.234		0.313	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Thallium-208	0.194		0.0663	0.0693		0.0600	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Thorium-228	0.463		0.0975	0.114		0.114	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Thorium-232	0.478		0.228	0.234		0.313	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Thorium-234	0.455	U	0.387	0.390		2.84	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Uranium-235	0.202	U	0.166	0.167		0.261	pCi/g	05/06/16 10:27	05/30/16 22:02	1
Uranium-238	0.455	U	0.387	0.390		2.84	pCi/g	05/06/16 10:27	05/30/16 22:02	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S002

Lab Sample ID: 160-17243-2

Date Collected: 05/03/16 12:52

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.445		0.277	0.280		0.296	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Actinium-227	0.279	U	0.682	0.683		1.15	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Bismuth-212	-0.234	U	0.826	0.827		1.43	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Bismuth-214	0.500		0.152	0.160		0.138	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Cesium-137	-0.0374	U	0.0883	0.0884		0.138	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Lead-210	-1.01	U	1.07	1.08		3.01	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Lead-212	0.327		0.105	0.113		0.147	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Lead-214	0.458		0.130	0.139		0.149	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Potassium-40	9.48		1.37	1.68		0.793	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Protactinium-231	0.0000000	U	2.53	2.53		4.31	pCi/g	05/06/16 10:27	05/30/16 22:04	1
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Radium-226	0.500		0.152	0.160	0.500	0.138	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Radium-228	0.445		0.277	0.280		0.296	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Thallium-208	0.165		0.0586	0.0611		0.0570	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Thorium-228	0.327		0.105	0.113		0.147	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Thorium-232	0.445		0.277	0.280		0.296	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Thorium-234	-0.0108	U	1.29	1.29		2.19	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Uranium-235	-0.0608	U	0.394	0.394		0.595	pCi/g	05/06/16 10:27	05/30/16 22:04	1
Uranium-238	-0.0108	U	1.29	1.29		2.19	pCi/g	05/06/16 10:27	05/30/16 22:04	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S003

Lab Sample ID: 160-17243-3

Date Collected: 05/03/16 12:54

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.299	U	0.173	0.175		0.373	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Actinium-227	0.188	U	0.418	0.418		0.759	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Bismuth-212	-0.320	U	0.935	0.936		1.62	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Bismuth-214	0.371		0.158	0.162		0.156	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Cesium-137	0.00454	U	0.0646	0.0646		0.115	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Lead-210	-0.127	U	1.31	1.31		1.99	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Lead-212	0.411		0.0973	0.111		0.107	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Lead-214	0.374		0.109	0.115		0.115	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Potassium-40	8.91		1.57	1.81		0.713	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Protactinium-231	0.335	U	0.990	0.991		3.40	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Radium-226	0.371		0.158	0.162	0.500	0.156	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Radium-228	0.299	U	0.173	0.175		0.373	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Thallium-208	0.0432	U	0.0904	0.0905		0.115	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Thorium-228	0.411		0.0973	0.111		0.107	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Thorium-232	0.299	U	0.173	0.175		0.373	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Thorium-234	-0.266	U	1.02	1.02		1.80	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Uranium-235	-0.0136	U	0.335	0.335		0.580	pCi/g	05/06/16 10:27	05/30/16 22:03	1
Uranium-238	-0.266	U	1.02	1.02		1.80	pCi/g	05/06/16 10:27	05/30/16 22:03	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S004

Lab Sample ID: 160-17243-4

Date Collected: 05/03/16 12:57

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.183	U	0.258	0.259		0.366	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Actinium-227	0.331	U	0.482	0.483		1.41	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Bismuth-212	-0.583	U	1.21	1.21		2.04	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Bismuth-214	0.407		0.132	0.139		0.124	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Cesium-137	-0.0309	U	0.0938	0.0938		0.161	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Lead-210	-0.131	U	1.81	1.81		3.10	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Lead-212	0.406		0.0946	0.108		0.100	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Lead-214	0.545		0.112	0.126		0.137	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Potassium-40	11.1		1.68	2.03		0.471	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Protactinium-231	0.686	U	1.57	1.58		3.65	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Radium-226	0.407		0.132	0.139	0.500	0.124	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Radium-228	0.183	U	0.258	0.259		0.366	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Thallium-208	0.196		0.0587	0.0621		0.0449	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Thorium-228	0.406		0.0946	0.108		0.100	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Thorium-232	0.183	U	0.258	0.259		0.366	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Thorium-234	-0.190	U	1.83	1.83		3.12	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Uranium-235	-0.213	U	0.540	0.540		0.951	pCi/g	05/06/16 10:27	05/30/16 22:35	1
Uranium-238	-0.190	U	1.83	1.83		3.12	pCi/g	05/06/16 10:27	05/30/16 22:35	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S005

Lab Sample ID: 160-17243-5

Date Collected: 05/03/16 13:00

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.446		0.143	0.151		0.184	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Actinium-227	-0.357	U	0.869	0.870		1.46	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Bismuth-212	1.16		0.470	0.485		0.377	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Bismuth-214	0.665		0.133	0.150		0.0992	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Cesium-137	0.0197	U	0.0517	0.0518		0.0891	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Lead-210	1.34	U	1.38	1.39		1.77	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Lead-212	0.430		0.0882	0.104		0.0981	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Lead-214	0.498		0.112	0.123		0.125	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Potassium-40	12.0		1.45	1.90		0.724	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Protactinium-231	0.762	U	1.60	1.60		3.53	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Radium-226	0.665		0.133	0.150	0.500	0.0992	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Radium-228	0.446		0.143	0.151		0.184	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Thallium-208	0.225		0.0585	0.0630		0.0480	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Thorium-228	0.430		0.0882	0.104		0.0981	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Thorium-232	0.446		0.143	0.151		0.184	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Thorium-234	0.148	U	0.218	0.219		2.60	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Uranium-235	-0.203	U	0.598	0.598		0.997	pCi/g	05/06/16 10:27	05/30/16 22:36	1
Uranium-238	0.148	U	0.218	0.219		2.60	pCi/g	05/06/16 10:27	05/30/16 22:36	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S006

Lab Sample ID: 160-17243-6

Date Collected: 05/03/16 13:02

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.499		0.194	0.201		0.185	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Actinium-227	0.312	U	0.787	0.788		1.32	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Bismuth-212	0.457	U	0.899	0.900		1.52	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Bismuth-214	0.460		0.132	0.140		0.118	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Cesium-137	-0.00127	U	0.0514	0.0514		0.0928	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Lead-210	-1.59	U	0.949	0.967		3.34	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Lead-212	0.252		0.127	0.132		0.144	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Lead-214	0.278		0.112	0.115		0.162	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Potassium-40	10.5		1.41	1.77		0.772	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Protactinium-231	0.405	U	1.16	1.16		2.68	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Radium-226	0.460		0.132	0.140	0.500	0.118	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Radium-228	0.499		0.194	0.201		0.185	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Thallium-208	0.175		0.0724	0.0747		0.0735	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Thorium-228	0.252		0.127	0.132		0.144	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Thorium-232	0.499		0.194	0.201		0.185	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Thorium-234	0.319	U	0.853	0.853		1.32	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Uranium-235	0.0740	U	0.309	0.309		0.522	pCi/g	05/06/16 10:27	05/30/16 22:40	1
Uranium-238	0.319	U	0.853	0.853		1.32	pCi/g	05/06/16 10:27	05/30/16 22:40	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S007

Lab Sample ID: 160-17243-7

Date Collected: 05/03/16 13:03

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.358		0.211	0.214		0.205	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Actinium-227	-0.241	U	0.631	0.631		0.909	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Bismuth-212	-0.251	U	1.26	1.26		2.18	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Bismuth-214	0.297		0.110	0.114		0.113	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Cesium-137	0.00446	U	0.0560	0.0560		0.101	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Lead-210	-0.677	U	1.04	1.04		2.14	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Lead-212	0.287		0.0821	0.0901		0.0938	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Lead-214	0.364		0.107	0.114		0.135	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Potassium-40	9.99		1.64	1.93		0.701	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Protactinium-231	0.000	U	0.657	0.657		3.34	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Radium-226	0.297		0.110	0.114	0.500	0.113	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Radium-228	0.358		0.211	0.214		0.205	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Thallium-208	0.110		0.0481	0.0494		0.0451	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Thorium-228	0.287		0.0821	0.0901		0.0938	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Thorium-232	0.358		0.211	0.214		0.205	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Thorium-234	-0.00522	U	1.06	1.06		1.84	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Uranium-235	0.125	U	0.264	0.264		0.548	pCi/g	05/06/16 10:27	05/30/16 22:37	1
Uranium-238	-0.00522	U	1.06	1.06		1.84	pCi/g	05/06/16 10:27	05/30/16 22:37	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S008

Lab Sample ID: 160-17243-8

Date Collected: 05/03/16 13:05

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.537		0.160	0.169		0.0903	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Actinium-227	0.256	U	0.635	0.636		1.07	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Bismuth-212	0.265	U	0.711	0.712		1.23	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Bismuth-214	0.487		0.122	0.132		0.0842	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Cesium-137	-0.00659	U	0.0594	0.0594		0.106	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Lead-210	-0.0964	U	1.26	1.26		2.18	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Lead-212	0.444		0.0878	0.105		0.0987	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Lead-214	0.529		0.109	0.122		0.110	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Potassium-40	10.4		1.49	1.83		0.639	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Protactinium-231	-0.477	U	1.99	1.99		3.37	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Radium-226	0.487		0.122	0.132	0.500	0.0842	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Radium-228	0.537		0.160	0.169		0.0903	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Thallium-208	0.183		0.0526	0.0559		0.0384	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Thorium-228	0.444		0.0878	0.105		0.0987	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Thorium-232	0.537		0.160	0.169		0.0903	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Thorium-234	0.00651	U	0.0226	0.0226		1.74	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Uranium-235	0.105	U	0.368	0.368		0.618	pCi/g	05/06/16 10:27	05/30/16 22:38	1
Uranium-238	0.00651	U	0.0226	0.0226		1.74	pCi/g	05/06/16 10:27	05/30/16 22:38	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S009

Lab Sample ID: 160-17243-9

Date Collected: 05/03/16 13:04

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.356		0.169	0.173		0.228	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Actinium-227	-0.427	U	0.892	0.893		1.49	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Bismuth-212	-0.0296	U	1.01	1.01		1.11	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Bismuth-214	0.280		0.120	0.124		0.159	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Cesium-137	-0.0236	U	0.0819	0.0819		0.147	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Lead-210	0.760	U	1.66	1.66		2.78	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Lead-212	0.267		0.0921	0.0984		0.127	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Lead-214	0.437		0.114	0.123		0.145	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Potassium-40	9.22		1.46	1.74		0.668	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Protactinium-231	-0.293	U	2.67	2.67		4.53	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Radium-226	0.280		0.120	0.124	0.500	0.159	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Radium-228	0.356		0.169	0.173		0.228	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Thallium-208	0.139		0.0532	0.0551		0.0507	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Thorium-228	0.267		0.0921	0.0984		0.127	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Thorium-232	0.356		0.169	0.173		0.228	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Thorium-234	-0.150	U	1.36	1.36		2.34	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Uranium-235	-0.241	U	0.307	0.308		0.849	pCi/g	05/06/16 10:27	05/30/16 22:39	1
Uranium-238	-0.150	U	1.36	1.36		2.34	pCi/g	05/06/16 10:27	05/30/16 22:39	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S010

Lab Sample ID: 160-17243-10

Date Collected: 05/03/16 13:06

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.282		0.126	0.129		0.107	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Actinium-227	0.0478	U	0.0975	0.0976		1.04	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Bismuth-212	-0.0563	U	0.656	0.656		1.16	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Bismuth-214	0.314		0.0985	0.104		0.0932	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Cesium-137	-0.0251	U	0.0669	0.0669		0.114	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Lead-210	0.554	U	1.03	1.03		1.73	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Lead-212	0.306		0.0726	0.0827		0.0850	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Lead-214	0.366		0.103	0.110		0.0981	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Potassium-40	10.8		1.31	1.72		0.587	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Protactinium-231	0.559	U	1.38	1.39		3.15	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Radium-226	0.314		0.0985	0.104	0.500	0.0932	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Radium-228	0.282		0.126	0.129		0.107	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thallium-208	0.125		0.0457	0.0475		0.0394	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thorium-228	0.306		0.0726	0.0827		0.0850	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thorium-232	0.282		0.126	0.129		0.107	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thorium-234	0.628	U	0.690	0.693		0.933	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Uranium-235	0.0838	U	0.152	0.152		0.726	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Uranium-238	0.628	U	0.690	0.693		0.933	pCi/g	05/06/16 10:27	05/31/16 08:36	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S011

Lab Sample ID: 160-17243-11

Date Collected: 05/03/16 13:09

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.361		0.141	0.146		0.102	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Actinium-227	0.402	U	0.426	0.428		1.14	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Bismuth-212	-0.0599	U	0.884	0.884		1.42	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Bismuth-214	0.481		0.126	0.136		0.0926	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Cesium-137	0.0117	U	0.0718	0.0718		0.126	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Lead-210	-0.393	U	1.75	1.75		2.96	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Lead-212	0.480		0.0871	0.107		0.0729	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Lead-214	0.457		0.122	0.131		0.116	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Potassium-40	11.1		1.62	1.97		0.687	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Protactinium-231	0.360	U	1.34	1.34		4.34	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Radium-226	0.481		0.126	0.136	0.500	0.0926	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Radium-228	0.361		0.141	0.146		0.102	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thallium-208	0.193		0.0680	0.0709		0.0619	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thorium-228	0.480		0.0871	0.107		0.0729	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thorium-232	0.361		0.141	0.146		0.102	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thorium-234	-0.145	U	1.44	1.44		2.46	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Uranium-235	-0.0566	U	0.294	0.294		0.736	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Uranium-238	-0.145	U	1.44	1.44		2.46	pCi/g	05/06/16 10:27	05/31/16 08:39	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S012

Lab Sample ID: 160-17243-12

Date Collected: 05/03/16 13:11

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.426		0.129	0.136		0.152	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Actinium-227	0.211	U	0.576	0.576		0.972	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Bismuth-212	0.246	U	0.546	0.547		0.939	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Bismuth-214	0.437		0.105	0.114		0.0598	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Cesium-137	-0.0305	U	0.0658	0.0659		0.0922	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Lead-210	-0.0778	U	1.33	1.33		2.29	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Lead-212	0.345		0.0709	0.0838		0.0758	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Lead-214	0.382		0.0852	0.0941		0.0833	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Potassium-40	8.01		1.25	1.50		0.580	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Protactinium-231	-0.545	U	1.73	1.73		2.92	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Radium-226	0.437		0.105	0.114	0.500	0.0598	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Radium-228	0.426		0.129	0.136		0.152	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Thallium-208	0.155		0.0604	0.0625		0.0552	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Thorium-228	0.345		0.0709	0.0838		0.0758	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Thorium-232	0.426		0.129	0.136		0.152	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Thorium-234	-0.0418	U	0.985	0.985		1.39	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Uranium-235	-0.121	U	0.239	0.239		0.616	pCi/g	05/06/16 10:27	05/31/16 08:37	1
Uranium-238	-0.0418	U	0.985	0.985		1.39	pCi/g	05/06/16 10:27	05/31/16 08:37	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S013

Lab Sample ID: 160-17243-13

Date Collected: 05/03/16 13:14

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.405		0.265	0.269		0.391	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Actinium-227	-0.345	U	0.756	0.757		1.08	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Bismuth-212	-0.335	U	0.951	0.952		1.65	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Bismuth-214	0.382		0.150	0.156		0.141	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Cesium-137	-0.0541	U	0.0879	0.0881		0.156	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Lead-210	-0.573	U	1.51	1.51		2.32	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Lead-212	0.388		0.0959	0.108		0.105	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Lead-214	0.436		0.144	0.151		0.143	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Potassium-40	9.47		1.82	2.06		1.10	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Protactinium-231	0.000	U	0.644	0.644		4.34	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Radium-226	0.382		0.150	0.156	0.500	0.141	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Radium-228	0.405		0.265	0.269		0.391	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thallium-208	0.0382	U	0.0885	0.0886		0.113	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thorium-228	0.388		0.0959	0.108		0.105	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thorium-232	0.405		0.265	0.269		0.391	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Thorium-234	0.362	U	0.588	0.589		1.45	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Uranium-235	0.0169	U	0.131	0.131		0.614	pCi/g	05/06/16 10:27	05/31/16 08:36	1
Uranium-238	0.362	U	0.588	0.589		1.45	pCi/g	05/06/16 10:27	05/31/16 08:36	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S014

Lab Sample ID: 160-17243-14

Date Collected: 05/03/16 13:16

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.359		0.148	0.153		0.147	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Actinium-227	0.256	U	0.664	0.665		1.12	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Bismuth-212	0.000	U	0.291	0.291		1.27	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Bismuth-214	0.0595	U	0.177	0.177		0.270	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Cesium-137	-0.0471	U	0.0576	0.0578		0.124	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Lead-210	-0.337	U	1.35	1.35		2.34	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Lead-212	0.307		0.0794	0.0888		0.0931	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Lead-214	0.417		0.109	0.118		0.0989	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Potassium-40	11.7		1.49	1.91		0.780	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Protactinium-231	-0.786	U	2.69	2.69		4.52	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Radium-226	0.0595	U	0.177	0.177	0.500	0.270	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Radium-228	0.359		0.148	0.153		0.147	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thallium-208	0.0902		0.0731	0.0737		0.0860	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thorium-228	0.307		0.0794	0.0888		0.0931	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thorium-232	0.359		0.148	0.153		0.147	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Thorium-234	0.581	U	0.777	0.779		1.27	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Uranium-235	0.196		0.149	0.150		0.192	pCi/g	05/06/16 10:27	05/31/16 08:39	1
Uranium-238	0.581	U	0.777	0.779		1.27	pCi/g	05/06/16 10:27	05/31/16 08:39	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S015

Lab Sample ID: 160-17243-15

Date Collected: 05/03/16 13:18

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.477		0.103	0.114		0.0706	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Actinium-227	0.122	U	0.601	0.601		1.02	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Bismuth-212	0.172	U	0.285	0.286		0.488	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Bismuth-214	0.357		0.104	0.111		0.0948	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Cesium-137	0.0170	U	0.0504	0.0504		0.0871	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Lead-210	0.318	U	1.18	1.18		2.00	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Lead-212	0.303		0.0732	0.0831		0.0867	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Lead-214	0.399		0.0931	0.102		0.104	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Potassium-40	11.1		1.33	1.75		0.592	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Protactinium-231	0.597	U	1.60	1.61		3.63	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Radium-226	0.357		0.104	0.111	0.500	0.0948	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Radium-228	0.477		0.103	0.114		0.0706	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thallium-208	0.152		0.0500	0.0524		0.0409	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thorium-228	0.303		0.0732	0.0831		0.0867	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thorium-232	0.477		0.103	0.114		0.0706	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thorium-234	0.350	U	0.752	0.753		1.95	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Uranium-235	0.168	U	0.354	0.354		0.767	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Uranium-238	0.350	U	0.752	0.753		1.95	pCi/g	05/06/16 10:27	05/31/16 09:15	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S016

Lab Sample ID: 160-17243-16

Date Collected: 05/03/16 13:19

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.219	U	0.113	0.116		0.351	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Actinium-227	0.206	U	0.507	0.508		1.28	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Bismuth-212	-0.247	U	0.696	0.696		1.20	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Bismuth-214	0.320		0.114	0.119		0.118	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Cesium-137	0.0244	U	0.0467	0.0467		0.0795	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Lead-210	-0.731	U	1.64	1.64		2.85	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Lead-212	0.306		0.0793	0.0886		0.0950	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Lead-214	0.372		0.111	0.117		0.102	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Potassium-40	11.5		1.43	1.85		0.565	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Protactinium-231	0.0000000	U	2.08	2.08		3.56	pCi/g	05/06/16 10:27	05/31/16 09:15	1
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Radium-226	0.320		0.114	0.119	0.500	0.118	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Radium-228	0.219	U	0.113	0.116		0.351	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thallium-208	0.106		0.0392	0.0407		0.0387	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thorium-228	0.306		0.0793	0.0886		0.0950	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thorium-232	0.219	U	0.113	0.116		0.351	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Thorium-234	-0.157	U	1.44	1.44		2.46	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Uranium-235	0.000	U	0.134	0.134		0.831	pCi/g	05/06/16 10:27	05/31/16 09:15	1
Uranium-238	-0.157	U	1.44	1.44		2.46	pCi/g	05/06/16 10:27	05/31/16 09:15	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S017

Lab Sample ID: 160-17243-17

Date Collected: 05/03/16 13:21

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.197	U	0.208	0.209		0.270	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Actinium-227	-0.0363	U	0.593	0.593		0.778	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Bismuth-212	-0.194	U	0.662	0.662		1.14	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Bismuth-214	0.390		0.104	0.112		0.0883	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Cesium-137	0.000	U	0.0331	0.0331		0.0744	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Lead-210	0.0163	U	1.08	1.08		1.87	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Lead-212	0.414		0.0715	0.0894		0.0687	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Lead-214	0.420		0.0831	0.0938		0.0901	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Potassium-40	10.0		1.20	1.58		0.443	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Protactinium-231	-0.706	U	2.21	2.21		3.70	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Radium-226	0.390		0.104	0.112	0.500	0.0883	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Radium-228	0.197	U	0.208	0.209		0.270	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Thallium-208	0.149		0.0445	0.0472		0.0394	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Thorium-228	0.414		0.0715	0.0894		0.0687	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Thorium-232	0.197	U	0.208	0.209		0.270	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Thorium-234	-0.0730	U	1.16	1.16		1.97	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Uranium-235	0.0735	U	0.204	0.204		0.713	pCi/g	05/06/16 10:27	05/31/16 09:16	1
Uranium-238	-0.0730	U	1.16	1.16		1.97	pCi/g	05/06/16 10:27	05/31/16 09:16	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S018

Lab Sample ID: 160-17243-18

Date Collected: 05/03/16 13:23

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.300		0.115	0.119		0.209	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Actinium-227	0.210	U	0.486	0.487		0.700	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Bismuth-212	-0.0523	U	0.690	0.690		1.23	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Bismuth-214	0.314		0.137	0.141		0.131	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Cesium-137	-0.0247	U	0.0736	0.0736		0.126	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Lead-210	-0.366	U	1.07	1.07		1.68	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Lead-212	0.284		0.0776	0.0859		0.0934	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Lead-214	0.323		0.0873	0.0936		0.108	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Potassium-40	10.3		1.45	1.80		0.586	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Protactinium-231	-0.278	U	2.09	2.09		3.57	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Radium-226	0.314		0.137	0.141	0.500	0.131	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Radium-228	0.300		0.115	0.119		0.209	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Thallium-208	0.0956		0.0666	0.0673		0.0627	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Thorium-228	0.284		0.0776	0.0859		0.0934	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Thorium-232	0.300		0.115	0.119		0.209	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Thorium-234	0.0603	U	0.600	0.600		1.04	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Uranium-235	0.00740	U	0.0625	0.0625		0.510	pCi/g	05/06/16 10:27	05/31/16 09:17	1
Uranium-238	0.0603	U	0.600	0.600		1.04	pCi/g	05/06/16 10:27	05/31/16 09:17	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17243-2

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S019

Lab Sample ID: 160-17243-19

Date Collected: 05/03/16 13:24

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0868	U	0.306	0.306		0.405	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Actinium-227	0.323	U	0.817	0.817		1.37	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Bismuth-212	0.417	U	0.837	0.838		1.43	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Bismuth-214	0.425		0.143	0.150		0.117	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Cesium-137	0.0257	U	0.0635	0.0636		0.110	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Lead-210	1.11	U	1.53	1.54		1.99	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Lead-212	0.357		0.0915	0.102		0.107	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Lead-214	0.390		0.110	0.118		0.128	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Potassium-40	10.4		1.56	1.89		0.434	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Protactinium-231	-0.899	U	2.68	2.69		4.52	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Radium-226	0.425		0.143	0.150	0.500	0.117	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Radium-228	0.0868	U	0.306	0.306		0.405	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Thallium-208	0.163		0.0620	0.0642		0.0561	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Thorium-228	0.357		0.0915	0.102		0.107	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Thorium-232	0.0868	U	0.306	0.306		0.405	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Thorium-234	-0.299	U	1.50	1.50		2.57	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Uranium-235	0.180	U	0.192	0.193		0.310	pCi/g	05/06/16 10:27	05/31/16 09:18	1
Uranium-238	-0.299	U	1.50	1.50		2.57	pCi/g	05/06/16 10:27	05/31/16 09:18	1

Client Sample ID: TI-TO04-NP-R-FSS-SU7-S020

Lab Sample ID: 160-17243-20

Date Collected: 05/03/16 13:26

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.216	U	0.111	0.113		0.239	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Actinium-227	-0.0597	U	0.0978	0.0980		1.36	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Bismuth-212	0.225	U	0.623	0.623		1.08	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Bismuth-214	0.410		0.114	0.122		0.103	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Cesium-137	0.00258	U	0.0666	0.0666		0.117	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Lead-210	1.89		1.25	1.27		1.59	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Lead-212	0.452		0.0859	0.104		0.0909	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Lead-214	0.488		0.124	0.134		0.114	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Potassium-40	11.9		1.41	1.86		0.696	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Protactinium-231	0.000	U	0.671	0.671		3.81	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Radium-226	0.410		0.114	0.122	0.500	0.103	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Radium-228	0.216	U	0.111	0.113		0.239	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Thallium-208	0.102		0.0742	0.0750		0.0860	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Thorium-228	0.452		0.0859	0.104		0.0909	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Thorium-232	0.216	U	0.111	0.113		0.239	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Thorium-234	0.889	U	0.872	0.877		1.25	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Uranium-235	0.000	U	0.134	0.134		0.924	pCi/g	05/06/16 10:27	05/31/16 09:19	1
Uranium-238	0.889	U	0.872	0.877		1.25	pCi/g	05/06/16 10:27	05/31/16 09:19	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17267-2

Client Sample ID: TI-TO04-NP-R-FSS-SWSU5-S5-14

Date Collected: 05/03/16 15:20

Date Received: 05/06/16 08:30

Lab Sample ID: 160-17267-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.279	U	0.256	0.258		0.308	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Actinium-227	0.142	U	0.457	0.457		0.871	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Bismuth-212	0.000	U	0.231	0.231		1.36	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Bismuth-214	0.476		0.173	0.180		0.172	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Cesium-137	-0.0000549	U	0.0694	0.0694		0.125	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Lead-210	-0.313	U	1.11	1.11		1.78	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Lead-212	0.235		0.0785	0.0842		0.0897	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Lead-214	0.275		0.111	0.114		0.122	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Potassium-40	7.36		1.52	1.69		0.795	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Protactinium-231	0.0000000	U	2.08	2.08		3.62	pCi/g	05/11/16 09:07	06/01/16 11:12	1
	35									
Radium-226	0.476		0.173	0.180	0.500	0.172	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Radium-228	0.279	U	0.256	0.258		0.308	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thallium-208	0.0930	U	0.104	0.104		0.105	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thorium-228	0.235		0.0785	0.0842		0.0897	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thorium-232	0.279	U	0.256	0.258		0.308	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thorium-234	-0.180	U	1.09	1.09		1.91	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Uranium-235	0.139	U	0.320	0.320		0.507	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Uranium-238	-0.180	U	1.09	1.09		1.91	pCi/g	05/11/16 09:07	06/01/16 11:12	1

Client Sample ID: TI-TO04-NP-R-FSS-SWSU5-S5-15

Date Collected: 05/03/16 15:27

Date Received: 05/06/16 08:30

Lab Sample ID: 160-17267-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.426		0.155	0.161		0.144	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Actinium-227	-0.0637	U	0.105	0.106		1.37	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Bismuth-212	0.318	U	0.574	0.575		0.975	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Bismuth-214	0.460		0.120	0.129		0.104	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Cesium-137	0.0230	U	0.0433	0.0434		0.0737	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Lead-210	0.654	U	1.16	1.16		1.67	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Lead-212	0.420		0.0873	0.103		0.0952	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Lead-214	0.406		0.0870	0.0967		0.105	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Potassium-40	10.1		1.37	1.72		0.760	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Protactinium-231	0.000	U	0.419	0.419		3.67	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Radium-226	0.460		0.120	0.129	0.500	0.104	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Radium-228	0.426		0.155	0.161		0.144	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thallium-208	0.113		0.0507	0.0521		0.0519	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thorium-228	0.420		0.0873	0.103		0.0952	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thorium-232	0.426		0.155	0.161		0.144	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Thorium-234	-0.0229	U	1.30	1.30		1.81	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Uranium-235	0.0441	U	0.114	0.114		0.593	pCi/g	05/11/16 09:07	06/01/16 11:12	1
Uranium-238	-0.0229	U	1.30	1.30		1.81	pCi/g	05/11/16 09:07	06/01/16 11:12	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17479-2

Client Sample ID: TI-TO04-NP-R-FSS-SWSU5-S5-01

Lab Sample ID: 160-17479-1

Date Collected: 05/19/16 13:36

Matrix: Solid

Date Received: 05/21/16 09:05

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.518		0.166	0.174		0.131	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Actinium-227	0.00800	U	0.0144	0.0145		0.984	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Bismuth-212	0.479	U	0.938	0.939		1.60	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Bismuth-214	0.440		0.135	0.143		0.0936	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Cesium-137	-0.00549	U	0.0572	0.0572		0.107	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Lead-210	1.36	U	1.31	1.32		1.71	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Lead-212	0.398		0.101	0.113		0.114	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Lead-214	0.524		0.119	0.131		0.0948	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Potassium-40	9.18		1.68	1.93		0.945	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Protactinium-231	0.320	U	1.13	1.13		3.74	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Radium-226	0.440		0.135	0.143	0.500	0.0936	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Radium-228	0.518		0.166	0.174		0.131	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Thallium-208	0.132		0.0567	0.0583		0.0510	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Thorium-228	0.398		0.101	0.113		0.114	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Thorium-232	0.518		0.166	0.174		0.131	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Thorium-234	-0.396	U	1.03	1.03		1.83	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Uranium-235	0.0824	U	0.165	0.166		0.687	pCi/g	05/24/16 09:32	06/14/16 10:23	1
Uranium-238	-0.396	U	1.03	1.03		1.83	pCi/g	05/24/16 09:32	06/14/16 10:23	1

Client Sample ID: TI-TO04-NP-R-FSS-SWSU5-S5-02

Lab Sample ID: 160-17479-2

Date Collected: 05/19/16 13:28

Matrix: Solid

Date Received: 05/21/16 09:05

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.687		0.168	0.182		0.0747	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Actinium-227	-0.138	U	0.585	0.585		1.14	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Bismuth-212	0.000	U	0.347	0.347		1.05	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Bismuth-214	0.136	U	0.0802	0.0814		0.273	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Cesium-137	0.0252	U	0.0458	0.0459		0.0778	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Lead-210	0.395	U	1.23	1.23		2.08	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Lead-212	0.385		0.0776	0.0922		0.0810	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Lead-214	0.344		0.112	0.118		0.112	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Potassium-40	9.59		1.28	1.61		0.588	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Protactinium-231	0.543	U	1.97	1.97		4.09	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Radium-226	0.136	U	0.0802	0.0814	0.500	0.273	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Radium-228	0.687		0.168	0.182		0.0747	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thallium-208	0.151		0.0499	0.0523		0.0425	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thorium-228	0.385		0.0776	0.0922		0.0810	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thorium-232	0.687		0.168	0.182		0.0747	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thorium-234	0.472	U	1.02	1.02		1.72	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Uranium-235	-0.169	U	0.457	0.457		0.763	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Uranium-238	0.472	U	1.02	1.02		1.72	pCi/g	05/24/16 09:32	06/14/16 10:39	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17479-2

Client Sample ID: TI-TO04-NP-R-FSS-SWSU5-S5-23

Lab Sample ID: 160-17479-3

Date Collected: 05/19/16 13:17

Matrix: Solid

Date Received: 05/21/16 09:05

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.375		0.149	0.154		0.118	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Actinium-227	0.215	U	0.334	0.335		0.922	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Bismuth-212	0.00360	U	0.633	0.633		1.13	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Bismuth-214	0.303		0.0977	0.103		0.0994	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Cesium-137	0.000912	U	0.0583	0.0583		0.104	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Lead-210	-1.04	U	1.52	1.53		2.69	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Lead-212	0.424		0.0843	0.101		0.0894	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Lead-214	0.434		0.0967	0.107		0.113	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Potassium-40	10.2		1.32	1.69		0.520	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Protactinium-231	0.000	U	0.270	0.270		3.09	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Radium-226	0.303		0.0977	0.103	0.500	0.0994	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Radium-228	0.375		0.149	0.154		0.118	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thallium-208	0.133		0.0509	0.0527		0.0503	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thorium-228	0.424		0.0843	0.101		0.0894	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thorium-232	0.375		0.149	0.154		0.118	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Thorium-234	-0.122	U	1.40	1.40		2.39	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Uranium-235	-0.0293	U	0.0538	0.0539		0.763	pCi/g	05/24/16 09:32	06/14/16 10:39	1
Uranium-238	-0.122	U	1.40	1.40		2.39	pCi/g	05/24/16 09:32	06/14/16 10:39	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S001

Lab Sample ID: 160-19855-1

Date Collected: 11/01/16 12:22

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.437		0.133	0.141		0.0750	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Actinium-227	0.253	U	0.665	0.665		1.12	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Bismuth-212	-0.0826	U	0.895	0.895		1.55	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Bismuth-214	0.261		0.0990	0.103		0.117	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Cesium-137	0.0279	U	0.0469	0.0470		0.0789	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Lead-210	1.37	U	1.29	1.30		1.71	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Lead-212	0.289		0.0743	0.0832		0.0887	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Lead-214	0.419		0.0923	0.102		0.0841	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Potassium-40	10.0		1.31	1.66		0.672	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Protactinium-231	0.269	U	1.08	1.08		3.49	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Radium-226	0.261		0.0990	0.103	0.500	0.117	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Radium-228	0.437		0.133	0.141		0.0750	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Thallium-208	0.108		0.0456	0.0469		0.0489	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Thorium-228	0.289		0.0743	0.0832		0.0887	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Thorium-232	0.437		0.133	0.141		0.0750	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Thorium-234	0.767	U	0.447	0.454		1.31	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Uranium-235	0.0805	U	0.216	0.216		0.822	pCi/g	11/07/16 15:28	11/28/16 11:28	1
Uranium-238	0.767	U	0.447	0.454		1.31	pCi/g	11/07/16 15:28	11/28/16 11:28	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S002

Lab Sample ID: 160-19855-2

Date Collected: 11/01/16 12:24

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.370		0.179	0.183		0.229	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Actinium-227	-0.0371	U	0.239	0.239		0.931	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Bismuth-212	-0.327	U	0.724	0.725		1.24	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Bismuth-214	0.438		0.131	0.139		0.113	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Cesium-137	-0.0178	U	0.0625	0.0625		0.108	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-210	0.748	U	1.46	1.46		1.99	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-212	0.285		0.0774	0.0857		0.0924	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-214	0.499		0.105	0.117		0.127	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Potassium-40	11.3		1.46	1.86		0.669	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Protactinium-231	0.000	U	1.37	1.37		2.34	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Radium-226	0.438		0.131	0.139	0.500	0.113	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Radium-228	0.370		0.179	0.183		0.229	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thallium-208	0.0886		0.0606	0.0613		0.0718	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-228	0.285		0.0774	0.0857		0.0924	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-232	0.370		0.179	0.183		0.229	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-234	-0.636	U	1.13	1.13		1.99	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Uranium-235	-0.139	U	0.283	0.283		0.614	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Uranium-238	-0.636	U	1.13	1.13		1.99	pCi/g	11/07/16 15:28	11/28/16 11:31	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S003

Lab Sample ID: 160-19855-3

Date Collected: 11/01/16 12:26

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.182		0.151	0.152		0.171	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Actinium-227	0.230	U	0.496	0.497		1.19	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Bismuth-212	0.184	U	0.934	0.934		1.63	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Bismuth-214	0.311		0.119	0.123		0.0968	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Cesium-137	-0.0359	U	0.112	0.112		0.104	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-210	-0.785	U	1.71	1.71		2.86	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-212	0.365		0.0801	0.0931		0.0808	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Lead-214	0.347		0.116	0.122		0.108	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Potassium-40	11.4		1.60	1.98		0.566	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Protactinium-231	0.0000000	U	2.38	2.38		4.07	pCi/g	11/07/16 15:28	11/28/16 11:31	1
	26									
Radium-226	0.311		0.119	0.123	0.500	0.0968	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Radium-228	0.182		0.151	0.152		0.171	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thallium-208	0.0800	U	0.0700	0.0705		0.0820	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-228	0.365		0.0801	0.0931		0.0808	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-232	0.182		0.151	0.152		0.171	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Thorium-234	-1.44	U	0.918	0.930		2.91	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Uranium-235	0.0827	U	0.219	0.219		0.916	pCi/g	11/07/16 15:28	11/28/16 11:31	1
Uranium-238	-1.44	U	0.918	0.930		2.91	pCi/g	11/07/16 15:28	11/28/16 11:31	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S004

Lab Sample ID: 160-19855-4

Date Collected: 11/01/16 12:26

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.108	U	0.195	0.195		0.267	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Actinium-227	0.0816	U	0.518	0.518		0.715	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Bismuth-212	-0.585	U	0.940	0.942		1.57	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Bismuth-214	0.324		0.0832	0.0897		0.0583	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Cesium-137	-0.00758	U	0.0605	0.0605		0.106	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Lead-210	0.0210	U	1.12	1.12		1.93	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Lead-212	0.307		0.0674	0.0782		0.0730	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Lead-214	0.356		0.0773	0.0857		0.0898	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Potassium-40	9.22		1.34	1.64		0.535	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Protactinium-231	0.327	U	1.07	1.07		2.59	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Radium-226	0.324		0.0832	0.0897	0.500	0.0583	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Radium-228	0.108	U	0.195	0.195		0.267	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Thallium-208	0.103		0.0513	0.0524		0.0539	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Thorium-228	0.307		0.0674	0.0782		0.0730	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Thorium-232	0.108	U	0.195	0.195		0.267	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Thorium-234	0.510	U	0.874	0.876		1.21	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Uranium-235	-0.127	U	0.184	0.184		0.619	pCi/g	11/07/16 15:28	11/28/16 11:32	1
Uranium-238	0.510	U	0.874	0.876		1.21	pCi/g	11/07/16 15:28	11/28/16 11:32	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S005

Lab Sample ID: 160-19855-5

Date Collected: 11/01/16 12:36

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.490		0.231	0.237		0.206	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Actinium-227	0.170	U	0.391	0.391		0.915	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Bismuth-212	-0.317	U	0.850	0.851		1.48	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Bismuth-214	0.387		0.183	0.187		0.187	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Cesium-137	-0.0229	U	0.0375	0.0376		0.159	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Lead-210	-0.0513	U	1.43	1.43		2.15	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Lead-212	0.189		0.0773	0.0811		0.104	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Lead-214	0.328		0.104	0.110		0.137	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Potassium-40	8.48		1.52	1.75		0.710	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Protactinium-231	0.408	U	1.20	1.21		3.40	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Radium-226	0.387		0.183	0.187	0.500	0.187	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Radium-228	0.490		0.231	0.237		0.206	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Thallium-208	0.0397	U	0.101	0.101		0.110	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Thorium-228	0.189		0.0773	0.0811		0.104	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Thorium-232	0.490		0.231	0.237		0.206	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Thorium-234	-0.305	U	1.03	1.03		1.81	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Uranium-235	-0.191	U	0.395	0.396		0.608	pCi/g	11/07/16 15:28	11/28/16 11:34	1
Uranium-238	-0.305	U	1.03	1.03		1.81	pCi/g	11/07/16 15:28	11/28/16 11:34	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S006

Lab Sample ID: 160-19855-6

Date Collected: 11/01/16 12:31

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.310		0.107	0.112		0.0715	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Actinium-227	0.222	U	0.314	0.315		0.854	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Bismuth-212	0.219	U	0.407	0.408		0.695	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Bismuth-214	0.336		0.118	0.123		0.107	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Cesium-137	0.0137	U	0.0357	0.0358		0.0620	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-210	0.260	U	1.01	1.01		1.72	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-212	0.310		0.0578	0.0704		0.0490	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-214	0.332		0.0738	0.0814		0.0945	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Potassium-40	10.3		1.27	1.66		0.602	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Protactinium-231	0.266	U	0.929	0.929		3.00	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Radium-226	0.336		0.118	0.123	0.500	0.107	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Radium-228	0.310		0.107	0.112		0.0715	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thallium-208	0.117		0.0386	0.0405		0.0317	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-228	0.310		0.0578	0.0704		0.0490	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-232	0.310		0.107	0.112		0.0715	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-234	-0.501	U	1.05	1.05		1.75	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Uranium-235	0.0832	U	0.217	0.217		0.605	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Uranium-238	-0.501	U	1.05	1.05		1.75	pCi/g	11/07/16 15:28	11/28/16 12:08	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S007

Lab Sample ID: 160-19855-7

Date Collected: 11/01/16 12:34

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.241		0.172	0.173		0.189	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Actinium-227	0.137	U	0.278	0.279		1.23	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Bismuth-212	0.246	U	0.616	0.616		1.06	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Bismuth-214	0.231		0.0908	0.0939		0.106	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Cesium-137	0.0194	U	0.0504	0.0505		0.0870	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Lead-210	1.20	U	1.13	1.14		1.59	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Lead-212	0.285		0.0824	0.0903		0.106	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Lead-214	0.292		0.106	0.110		0.117	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Potassium-40	9.97		1.35	1.69		0.714	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Protactinium-231	0.373	U	1.13	1.13		3.66	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Radium-226	0.231		0.0908	0.0939	0.500	0.106	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Radium-228	0.241		0.172	0.173		0.189	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Thallium-208	0.0987		0.0565	0.0574		0.0583	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Thorium-228	0.285		0.0824	0.0903		0.106	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Thorium-232	0.241		0.172	0.173		0.189	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Thorium-234	1.54		1.08	1.09		1.36	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Uranium-235	0.0242	U	0.448	0.449		0.758	pCi/g	11/07/16 15:28	11/28/16 12:03	1
Uranium-238	1.54		1.08	1.09		1.36	pCi/g	11/07/16 15:28	11/28/16 12:03	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S008

Lab Sample ID: 160-19855-8

Date Collected: 11/01/16 12:36

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.377		0.120	0.126		0.0836	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Actinium-227	-0.288	U	0.789	0.789		1.33	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Bismuth-212	-0.318	U	0.735	0.736		1.26	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Bismuth-214	0.460		0.116	0.125		0.102	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Cesium-137	0.0208	U	0.0527	0.0527		0.0909	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-210	2.11		1.06	1.09		1.26	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-212	0.288		0.0797	0.0880		0.0977	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Lead-214	0.429		0.123	0.131		0.120	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Potassium-40	12.2		1.51	1.96		0.667	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Protactinium-231	0.000	U	0.354	0.354		2.98	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Radium-226	0.460		0.116	0.125	0.500	0.102	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Radium-228	0.377		0.120	0.126		0.0836	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thallium-208	0.106		0.0437	0.0451		0.0431	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-228	0.288		0.0797	0.0880		0.0977	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-232	0.377		0.120	0.126		0.0836	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Thorium-234	0.359	U	0.539	0.540		1.54	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Uranium-235	0.0544	U	0.293	0.293		0.498	pCi/g	11/07/16 15:28	11/28/16 12:08	1
Uranium-238	0.359	U	0.539	0.540		1.54	pCi/g	11/07/16 15:28	11/28/16 12:08	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S009

Lab Sample ID: 160-19855-9

Date Collected: 11/01/16 12:38

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.141	U	0.206	0.206		0.359	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Actinium-227	0.115	U	0.563	0.563		1.34	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Bismuth-212	-0.409	U	0.861	0.862		1.47	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Bismuth-214	0.395		0.124	0.131		0.106	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Cesium-137	-0.00888	U	0.0498	0.0498		0.0933	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Lead-210	-0.878	U	1.91	1.91		3.20	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Lead-212	0.338		0.120	0.128		0.173	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Lead-214	0.444		0.110	0.119		0.111	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Potassium-40	11.7		1.67	2.06		0.602	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Protactinium-231	0.742	U	1.71	1.71		3.92	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Radium-226	0.395		0.124	0.131	0.500	0.106	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Radium-228	0.141	U	0.206	0.206		0.359	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Thallium-208	0.0613	U	0.0741	0.0744		0.0938	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Thorium-228	0.338		0.120	0.128		0.173	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Thorium-232	0.141	U	0.206	0.206		0.359	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Thorium-234	0.392	U	0.280	0.283		2.30	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Uranium-235	-0.0145	U	0.0781	0.0781		0.826	pCi/g	11/07/16 15:28	11/28/16 12:11	1
Uranium-238	0.392	U	0.280	0.283		2.30	pCi/g	11/07/16 15:28	11/28/16 12:11	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S010

Lab Sample ID: 160-19855-10

Date Collected: 11/01/16 12:38

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0211	U	0.0495	0.0496		0.337	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Actinium-227	-0.278	U	0.666	0.666		0.897	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Bismuth-212	0.255	U	0.606	0.607		1.04	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Bismuth-214	0.287		0.0941	0.0987		0.0767	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Cesium-137	-0.0379	U	0.0635	0.0636		0.107	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Lead-210	0.0000946	U	1.12	1.12		1.94	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Lead-212	0.268		0.0605	0.0697		0.0620	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Lead-214	0.431		0.0790	0.0908		0.0722	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Potassium-40	9.91		1.38	1.71		0.529	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Protactinium-231	0.000	U	0.170	0.170		2.87	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Radium-226	0.287		0.0941	0.0987	0.500	0.0767	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Radium-228	0.0211	U	0.0495	0.0496		0.337	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Thallium-208	0.112		0.0416	0.0432		0.0344	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Thorium-228	0.268		0.0605	0.0697		0.0620	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Thorium-232	0.0211	U	0.0495	0.0496		0.337	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Thorium-234	-0.0634	U	0.740	0.740		1.29	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Uranium-235	0.0787	U	0.279	0.279		0.470	pCi/g	11/07/16 15:28	11/28/16 12:12	1
Uranium-238	-0.0634	U	0.740	0.740		1.29	pCi/g	11/07/16 15:28	11/28/16 12:12	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S011

Lab Sample ID: 160-19855-11

Date Collected: 11/01/16 12:40

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0523	U	0.283	0.283		0.351	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Actinium-227	0.235	U	0.373	0.374		0.758	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Bismuth-212	-0.369	U	0.887	0.887		1.53	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Bismuth-214	0.0975	U	0.0779	0.0785		0.302	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Cesium-137	-0.0865	U	0.108	0.108		0.207	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Lead-210	-0.326	U	1.44	1.44		2.21	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Lead-212	0.236		0.0775	0.0833		0.0906	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Lead-214	0.288		0.115	0.119		0.131	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Potassium-40	10.1		1.73	2.02		0.766	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Protactinium-231	0.487	U	1.45	1.45		3.45	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Radium-226	0.0975	U	0.0779	0.0785	0.500	0.302	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Radium-228	0.0523	U	0.283	0.283		0.351	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Thallium-208	0.110		0.0479	0.0492		0.0454	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Thorium-228	0.236		0.0775	0.0833		0.0906	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Thorium-232	0.0523	U	0.283	0.283		0.351	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Thorium-234	0.779	U	0.508	0.515		1.39	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Uranium-235	0.0163	U	0.0771	0.0771		0.613	pCi/g	11/07/16 15:28	11/28/16 12:20	1
Uranium-238	0.779	U	0.508	0.515		1.39	pCi/g	11/07/16 15:28	11/28/16 12:20	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S012

Lab Sample ID: 160-19855-12

Date Collected: 11/01/16 12:42

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.142	U	0.176	0.177		0.236	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Actinium-227	-0.231	U	0.586	0.587		0.989	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Bismuth-212	-0.230	U	0.647	0.647		1.11	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Bismuth-214	0.349		0.108	0.114		0.101	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Cesium-137	-0.0226	U	0.0459	0.0459		0.0781	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Lead-210	-0.296	U	1.10	1.10		1.87	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Lead-212	0.258		0.0706	0.0781		0.0893	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Lead-214	0.305		0.0904	0.0958		0.0838	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Potassium-40	10.8		1.28	1.69		0.561	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Protactinium-231	0.338	U	1.11	1.11		3.51	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Radium-226	0.349		0.108	0.114	0.500	0.101	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Radium-228	0.142	U	0.176	0.177		0.236	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Thallium-208	0.152		0.0496	0.0521		0.0382	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Thorium-228	0.258		0.0706	0.0781		0.0893	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Thorium-232	0.142	U	0.176	0.177		0.236	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Thorium-234	0.340	U	0.684	0.685		1.71	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Uranium-235	-0.157	U	0.278	0.279		0.724	pCi/g	11/07/16 15:28	11/28/16 12:38	1
Uranium-238	0.340	U	0.684	0.685		1.71	pCi/g	11/07/16 15:28	11/28/16 12:38	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S013

Lab Sample ID: 160-19855-13

Date Collected: 11/01/16 12:44

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.262		0.193	0.194		0.218	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Actinium-227	-0.300	U	0.883	0.884		1.49	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Bismuth-212	-0.511	U	0.859	0.860		1.44	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Bismuth-214	0.430		0.126	0.134		0.113	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Cesium-137	0.0250	U	0.0565	0.0565		0.0969	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Lead-210	1.32	U	1.32	1.33		1.86	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Lead-212	0.270		0.0981	0.104		0.110	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Lead-214	0.332		0.133	0.137		0.189	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Potassium-40	9.74		1.42	1.73		0.656	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Protactinium-231	0.000	U	0.318	0.318		3.89	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Radium-226	0.430		0.126	0.134	0.500	0.113	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Radium-228	0.262		0.193	0.194		0.218	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Thallium-208	0.0681	U	0.0869	0.0872		0.100	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Thorium-228	0.270		0.0981	0.104		0.110	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Thorium-232	0.262		0.193	0.194		0.218	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Thorium-234	0.736	U	0.858	0.861		1.38	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Uranium-235	0.0911	U	0.289	0.289		0.491	pCi/g	11/07/16 15:28	11/28/16 12:39	1
Uranium-238	0.736	U	0.858	0.861		1.38	pCi/g	11/07/16 15:28	11/28/16 12:39	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S014

Lab Sample ID: 160-19855-14

Date Collected: 11/01/16 12:47

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.107	U	0.150	0.150		0.309	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Actinium-227	0.273	U	0.737	0.737		1.24	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Bismuth-212	-0.482	U	0.568	0.570		1.43	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Bismuth-214	0.277		0.0927	0.0971		0.0948	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Cesium-137	0.0169	U	0.0416	0.0416		0.0722	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-210	0.915	U	1.37	1.37		1.80	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-212	0.267		0.0716	0.0795		0.0860	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-214	0.415		0.104	0.112		0.0861	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Potassium-40	10.6		1.32	1.71		0.489	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Protactinium-231	0.293	U	0.945	0.946		3.14	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Radium-226	0.277		0.0927	0.0971	0.500	0.0948	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Radium-228	0.107	U	0.150	0.150		0.309	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thallium-208	0.127		0.0431	0.0450		0.0413	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-228	0.267		0.0716	0.0795		0.0860	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-232	0.107	U	0.150	0.150		0.309	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-234	0.864	U	0.927	0.931		1.25	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Uranium-235	-0.0102	U	0.0566	0.0566		0.707	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Uranium-238	0.864	U	0.927	0.931		1.25	pCi/g	11/07/16 15:28	11/28/16 12:40	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S015

Lab Sample ID: 160-19855-15

Date Collected: 11/01/16 12:47

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.208		0.149	0.150		0.176	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Actinium-227	0.146	U	0.384	0.384		0.856	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Bismuth-212	-0.0131	U	0.437	0.437		0.789	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Bismuth-214	0.301		0.0878	0.0932		0.0844	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Cesium-137	-0.0206	U	0.0373	0.0374		0.0716	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Lead-210	0.504	U	0.920	0.921		1.54	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Lead-212	0.304		0.0616	0.0731		0.0649	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Lead-214	0.304		0.0824	0.0883		0.0784	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Potassium-40	9.85		1.14	1.52		0.409	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Protactinium-231	0.000	U	0.356	0.356		3.04	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Radium-226	0.301		0.0878	0.0932	0.500	0.0844	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Radium-228	0.208		0.149	0.150		0.176	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Thallium-208	0.0981		0.0424	0.0436		0.0407	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Thorium-228	0.304		0.0616	0.0731		0.0649	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Thorium-232	0.208		0.149	0.150		0.176	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Thorium-234	0.436	U	1.01	1.01		1.69	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Uranium-235	0.152	U	0.204	0.205		0.692	pCi/g	11/07/16 15:28	11/28/16 12:42	1
Uranium-238	0.436	U	1.01	1.01		1.69	pCi/g	11/07/16 15:28	11/28/16 12:42	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S016

Lab Sample ID: 160-19855-16

Date Collected: 11/01/16 12:56

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.151	U	0.184	0.185		0.202	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Actinium-227	-0.275	U	0.744	0.745		1.25	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Bismuth-212	-0.422	U	0.798	0.799		1.34	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Bismuth-214	0.383		0.0966	0.105		0.0888	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Cesium-137	-0.00429	U	0.0462	0.0462		0.101	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-210	1.73		1.35	1.37		1.61	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-212	0.280		0.0754	0.0837		0.0949	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Lead-214	0.336		0.0881	0.0948		0.104	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Potassium-40	10.1		1.28	1.64		0.642	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Protactinium-231	-0.565	U	2.35	2.35		3.95	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Radium-226	0.383		0.0966	0.105	0.500	0.0888	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Radium-228	0.151	U	0.184	0.185		0.202	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thallium-208	0.106		0.0509	0.0521		0.0501	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-228	0.280		0.0754	0.0837		0.0949	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-232	0.151	U	0.184	0.185		0.202	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Thorium-234	0.652	U	0.726	0.729		1.18	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Uranium-235	0.272		0.184	0.186		0.239	pCi/g	11/07/16 15:28	11/28/16 12:40	1
Uranium-238	0.652	U	0.726	0.729		1.18	pCi/g	11/07/16 15:28	11/28/16 12:40	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S017

Lab Sample ID: 160-19855-17

Date Collected: 11/01/16 12:53

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.364		0.190	0.194		0.245	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Actinium-227	0.217	U	0.441	0.442		0.636	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Bismuth-212	0.776		0.394	0.402		0.359	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Bismuth-214	0.425		0.117	0.126		0.0969	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Cesium-137	-0.0297	U	0.0598	0.0599		0.102	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Lead-210	-0.993	U	1.27	1.27		2.04	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Lead-212	0.229		0.0710	0.0770		0.0896	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Lead-214	0.291		0.0861	0.0912		0.0997	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Potassium-40	10.7		1.38	1.76		0.631	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Protactinium-231	0.000	U	0.432	0.432		3.26	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Radium-226	0.425		0.117	0.126	0.500	0.0969	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Radium-228	0.364		0.190	0.194		0.245	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Thallium-208	0.127		0.0615	0.0629		0.0588	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Thorium-228	0.229		0.0710	0.0770		0.0896	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Thorium-232	0.364		0.190	0.194		0.245	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Thorium-234	0.385	U	0.359	0.362		1.33	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Uranium-235	-0.0533	U	0.111	0.111		0.499	pCi/g	11/07/16 15:28	11/28/16 12:44	1
Uranium-238	0.385	U	0.359	0.362		1.33	pCi/g	11/07/16 15:28	11/28/16 12:44	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S018

Lab Sample ID: 160-19855-18

Date Collected: 11/01/16 12:55

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.108	U	0.233	0.233		0.318	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Actinium-227	-0.398	U	0.841	0.843		1.41	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Bismuth-212	-0.0148	U	0.703	0.703		1.28	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Bismuth-214	0.364		0.116	0.122		0.0990	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Cesium-137	-0.0531	U	0.0736	0.0738		0.119	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Lead-210	-0.817	U	1.78	1.78		2.98	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Lead-212	0.335		0.0842	0.0947		0.0958	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Lead-214	0.355		0.105	0.112		0.0956	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Potassium-40	11.1		1.72	2.06		0.904	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Protactinium-231	0.513	U	1.47	1.47		3.38	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Radium-226	0.364		0.116	0.122	0.500	0.0990	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Radium-228	0.108	U	0.233	0.233		0.318	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Thallium-208	0.0799	U	0.0751	0.0755		0.0853	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Thorium-228	0.335		0.0842	0.0947		0.0958	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Thorium-232	0.108	U	0.233	0.233		0.318	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Thorium-234	0.801	U	0.537	0.543		1.47	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Uranium-235	0.0621	U	0.168	0.168		0.713	pCi/g	11/07/16 15:28	11/28/16 12:45	1
Uranium-238	0.801	U	0.537	0.543		1.47	pCi/g	11/07/16 15:28	11/28/16 12:45	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19855-2

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S019

Lab Sample ID: 160-19855-19

Date Collected: 11/01/16 12:57

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.372		0.123	0.129		0.152	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Actinium-227	-0.215	U	0.574	0.575		0.969	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Bismuth-212	0.227	U	0.583	0.583		1.01	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Bismuth-214	0.331		0.0991	0.105		0.0798	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Cesium-137	-0.0185	U	0.0533	0.0533		0.0922	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Lead-210	0.150	U	0.716	0.716		1.15	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Lead-212	0.309		0.0647	0.0760		0.0653	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Lead-214	0.337		0.0985	0.105		0.0896	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Potassium-40	10.8		1.44	1.82		0.532	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Protactinium-231	0.264	U	0.896	0.897		2.92	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Radium-226	0.331		0.0991	0.105	0.500	0.0798	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Radium-228	0.372		0.123	0.129		0.152	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Thallium-208	0.0754		0.0336	0.0345		0.0328	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Thorium-228	0.309		0.0647	0.0760		0.0653	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Thorium-232	0.372		0.123	0.129		0.152	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Thorium-234	-0.0449	U	0.933	0.933		1.32	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Uranium-235	0.0618	U	0.220	0.220		0.385	pCi/g	11/07/16 15:28	11/28/16 12:46	1
Uranium-238	-0.0449	U	0.933	0.933		1.32	pCi/g	11/07/16 15:28	11/28/16 12:46	1

Client Sample ID: TITO04-NP-FSS-SU3-BSRSY10-U7-S020

Lab Sample ID: 160-19855-20

Date Collected: 11/01/16 12:59

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.339		0.270	0.273		0.292	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Actinium-227	0.471	U	0.520	0.523		0.722	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Bismuth-212	-0.0730	U	0.967	0.967		1.73	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Bismuth-214	0.393		0.131	0.138		0.136	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Cesium-137	-0.0219	U	0.0656	0.0657		0.110	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Lead-210	0.842	U	0.941	0.946		1.39	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Lead-212	0.241		0.0829	0.0886		0.104	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Lead-214	0.376		0.112	0.119		0.191	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Potassium-40	12.4		1.89	2.28		0.757	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Protactinium-231	0.465	U	1.16	1.16		2.77	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Radium-226	0.393		0.131	0.138	0.500	0.136	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Radium-228	0.339		0.270	0.273		0.292	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Thallium-208	0.0749	U	0.0780	0.0784		0.0940	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Thorium-228	0.241		0.0829	0.0886		0.104	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Thorium-232	0.339		0.270	0.273		0.292	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Thorium-234	0.604	U	0.928	0.930		1.31	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Uranium-235	0.0519	U	0.278	0.278		0.479	pCi/g	11/07/16 15:28	11/28/16 12:52	1
Uranium-238	0.604	U	0.928	0.930		1.31	pCi/g	11/07/16 15:28	11/28/16 12:52	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-3

Client Sample ID: TITO04-NP-SU5-SWFSS-5-13-S001

Lab Sample ID: 160-19909-1

Date Collected: 10/24/16 09:45

Matrix: Solid

Date Received: 11/09/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.506		0.139	0.148		0.0704	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Actinium-227	0.0570	U	0.664	0.664		1.14	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Bismuth-212	0.421	U	0.703	0.705		1.18	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Bismuth-214	0.431		0.121	0.129		0.114	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Cesium-137	0.0307	U	0.0510	0.0511		0.0857	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Lead-210	0.597	U	1.32	1.32		2.22	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Lead-212	0.467		0.0775	0.0983		0.0696	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Lead-214	0.551		0.100	0.115		0.0946	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Potassium-40	11.6		1.36	1.81		0.560	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Protactinium-231	0.000	U	0.365	0.365		3.98	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Radium-226	0.431		0.121	0.129	0.500	0.114	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Radium-228	0.506		0.139	0.148		0.0704	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Thallium-208	0.177		0.0462	0.0497		0.0314	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Thorium-228	0.467		0.0775	0.0983		0.0696	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Thorium-232	0.506		0.139	0.148		0.0704	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Thorium-234	0.379	U	1.28	1.28		2.16	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Uranium-235	0.139	U	0.254	0.254		0.848	pCi/g	01/12/17 11:51	01/12/17 12:30	1
Uranium-238	0.379	U	1.28	1.28		2.16	pCi/g	01/12/17 11:51	01/12/17 12:30	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19910-2

Client Sample ID: TITO04-NP-SU5-SWSU2-BI#8-S001

Lab Sample ID: 160-19910-1

Date Collected: 11/07/16 15:37

Matrix: Solid

Date Received: 11/09/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.514		0.198	0.204		0.331	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Actinium-227	0.269	U	0.479	0.480		1.27	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Bismuth-212	0.307	U	0.988	0.989		1.71	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Bismuth-214	0.598		0.131	0.145		0.0787	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Cesium-137	-0.0174	U	0.0620	0.0620		0.115	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Lead-210	0.717	U	1.57	1.57		2.64	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Lead-212	0.480		0.0990	0.117		0.106	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Lead-214	0.454		0.114	0.124		0.104	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Potassium-40	10.2		1.58	1.89		0.612	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Protactinium-231	0.598	U	2.23	2.23		4.62	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Radium-226	0.598		0.131	0.145	0.500	0.0787	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Radium-228	0.514		0.198	0.204		0.331	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Thallium-208	0.195		0.0664	0.0695		0.0537	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Thorium-228	0.480		0.0990	0.117		0.106	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Thorium-232	0.514		0.198	0.204		0.331	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Thorium-234	0.161	U	0.246	0.246		2.64	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Uranium-235	-0.0229	U	0.110	0.110		0.897	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Uranium-238	0.161	U	0.246	0.246		2.64	pCi/g	11/11/16 13:26	12/02/16 08:03	1

Client Sample ID: TITO04-NP-SU5-SWSU2-BI#18-S002

Lab Sample ID: 160-19910-2

Date Collected: 11/07/16 15:21

Matrix: Solid

Date Received: 11/09/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.442		0.143	0.150		0.0825	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Actinium-227	0.135	U	0.273	0.273		1.03	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Bismuth-212	0.185	U	0.395	0.396		0.690	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Bismuth-214	0.370		0.119	0.125		0.100	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Cesium-137	0.00668	U	0.0460	0.0460		0.0821	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Lead-210	1.08	U	0.978	0.986		1.29	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Lead-212	0.426		0.0800	0.0971		0.0866	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Lead-214	0.476		0.0985	0.110		0.0777	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Potassium-40	10.5		1.43	1.79		0.535	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Protactinium-231	-0.457	U	1.82	1.82		3.08	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Radium-226	0.370		0.119	0.125	0.500	0.100	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Radium-228	0.442		0.143	0.150		0.0825	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Thallium-208	0.147		0.0463	0.0487		0.0365	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Thorium-228	0.426		0.0800	0.0971		0.0866	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Thorium-232	0.442		0.143	0.150		0.0825	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Thorium-234	0.378	U	0.360	0.363		1.15	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Uranium-235	-0.127	U	0.198	0.199		0.638	pCi/g	11/11/16 13:26	12/02/16 08:04	1
Uranium-238	0.378	U	0.360	0.363		1.15	pCi/g	11/11/16 13:26	12/02/16 08:04	1

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Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19910-2

Client Sample ID: TITO04-NP-SU5-SWSU2-BI#30-S003

Lab Sample ID: 160-19910-3

Date Collected: 11/07/16 15:12

Matrix: Solid

Date Received: 11/09/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.409	U	0.171	0.176		0.535	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Actinium-227	-0.483	U	1.06	1.06		1.50	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Bismuth-212	0.000	U	0.687	0.687		2.60	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Bismuth-214	0.918		0.213	0.233		0.167	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Cesium-137	-0.0677	U	0.123	0.123		0.179	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Lead-210	-0.273	U	2.03	2.03		3.05	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Lead-212	0.704		0.137	0.164		0.136	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Lead-214	0.831		0.167	0.188		0.207	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Potassium-40	11.6		2.04	2.36		0.931	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Protactinium-231	0.000	U	0.589	0.589		4.55	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Radium-226	0.918		0.213	0.233	0.500	0.167	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Radium-228	0.409	U	0.171	0.176		0.535	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Thallium-208	0.193		0.0768	0.0794		0.0724	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Thorium-228	0.704		0.137	0.164		0.136	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Thorium-232	0.409	U	0.171	0.176		0.535	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Thorium-234	0.187	U	0.382	0.383		2.56	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Uranium-235	-0.0443	U	0.0770	0.0772		0.787	pCi/g	11/11/16 13:26	12/02/16 08:07	1
Uranium-238	0.187	U	0.382	0.383		2.56	pCi/g	11/11/16 13:26	12/02/16 08:07	1

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Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19955-2

Client Sample ID: TITO04-NP-SU5SW-FSS-5-09-S001

Lab Sample ID: 160-19955-1

Date Collected: 11/09/16 14:10

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.467		0.176	0.183		0.151	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Actinium-227	0.00651	U	0.714	0.714		1.23	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Bismuth-212	-0.0754	U	0.606	0.606		1.22	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Bismuth-214	0.435		0.116	0.124		0.109	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Cesium-137	0.0232	U	0.0488	0.0488		0.0834	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Lead-210	0.937	U	1.16	1.17		1.66	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Lead-212	0.342		0.0808	0.0922		0.0927	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Lead-214	0.347		0.0982	0.105		0.125	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Potassium-40	11.6		1.43	1.86		0.508	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Protactinium-231	0.325	U	0.997	0.997		3.25	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Radium-226	0.435		0.116	0.124	0.500	0.109	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Radium-228	0.467		0.176	0.183		0.151	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Thallium-208	0.0691	U	0.0684	0.0688		0.0813	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Thorium-228	0.342		0.0808	0.0922		0.0927	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Thorium-232	0.467		0.176	0.183		0.151	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Thorium-234	1.29	U	1.08	1.08		1.34	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Uranium-235	0.0548	U	0.121	0.121		0.714	pCi/g	11/14/16 10:31	12/05/16 13:41	1
Uranium-238	1.29	U	1.08	1.08		1.34	pCi/g	11/14/16 10:31	12/05/16 13:41	1

TestAmerica St. Louis

COVER LETTER

February 21, 2017

Lynn Caragan
C, B, & I Federal services
420 Exchange, #150
Irvine, CA. 92602

Dear Mrs. Caragan:

Enclosed is Revision 0 of the data validation report for the Treasure Island Naval Shipyard, Site 12, project number 500060. This DVR encompasses the laboratory data produced by TestAmerica Laboratories, Inc. for the sample delivery groups (SDG) listed in Table 1-1 of the DVR.

The specific sample identifications are listed in the sample identification table(s). The data packages were reviewed per the data validation procedures referenced in the introduction of the report.

Sincerely,

A handwritten signature in cursive script, appearing to read "Larry W. Duty", is written above a solid horizontal line.

Larry Duty
Data Validation Project Manager

Data Validation Report 02212017
for Treasure Island Site 12, Navy
BRAC PMO West

Contract Number N62473-12-D-2005
TO004

San Francisco, California

TestAmerica Laboratories

Subcontract Number 203598

Prepared for CB&I Federal Services
420 Exchange, Suite 150
Irvine, CA 92602
CB&I Project Number 50060

Prepared by:
E-Lab Consultants
30710 S Holly Oaks Circle
Magnolia, Texas 77355

February 2017

Data Validation Report 02212017 for Treasure Island Site 12, Navy BRAC PMO West

Contract Number N62473-12-D-2005
TO004

San Francisco, California

TestAmerica Laboratories

Subcontract Number 203598

Prepared for CB&I Federal Services
420 Exchange, Suite 150
Irvine, CA 92602
CB&I Project Number 50060

Approved by:



Larry Duty
E-Lab Consultants

Date: 02/28/2017

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Acronyms and Abbreviations

Following is a list of acronyms and abbreviations that may be used in data validation reports and/or data quality assessment reports.

%D	percent difference	DFTPP	decafluorotriphenylphosphine
%R	percent recovery	DOD	Department Of Defense
µg/L	microgram per liter	DQAR	data quality assessment report
mg/L	milligram per liter		
pg/L	picogram per liter	DUP	laboratory duplicate
µg/kg	microgram per kilogram	DVP	data validation procedure
mg/kg	milligram per kilogram	EDB	ethylene dibromide
ng/kg	nanogram per kilogram	EDL	estimated detection limit
pg/g	picogram per gram	EICP	extracted ion current profile
AA	atomic absorption	EPA	Environmental Protection Agency, United States
ARRF	average relative response factor	EB	equipment blank
BFB	bromofluorobenzene	FB	field blank
BNA	base/neutral/acid compounds	GC	gas chromatography
CCB	continuing calibration blank	GC/ECD	gas chromatography/electron capture detector
CCC	calibration check compound	GC/ELCD	gas chromatography/electrolytic conductivity detector (Hall detector)
CCV	continuing calibration verification	GC/FPD	gas chromatography/flame photometric detector
CF	calibration factor	GC/MS	gas chromatography/mass spectrometry
CLP	Contract Laboratory Program	GC/PID	gas chromatography/photoionization detector
COC	chain of custody record	GFAA	graphite furnace atomic

			absorption
COD	chemical oxygen demand	GPC	gel permeation chromatography
CTO	contract task order	Hg	mercury
CVAA	cold vapor atomic absorption	HPLC	high-performance liquid chromatography
DBCP	dibromochloropropane	HRGC/HR MS	high resolution gas chromatography/high resolution mass spectrometry
DCB	decachlorobiphenyl	RF r2	response factor coefficient of determination
4,4'-DDD	4,4'-dichlorodiphenyldichloroethane	RICRF	reconstructed ion chromatogram response factor
4,4'-DDE	4,4'-dichlorodiphenyldichloroethylene	RLRIC	reporting limit reconstructed ion chromatogram
4,4'-DDT	4,4'-dichlorodiphenyltrichloroethane	RPDRL	relative percent difference reporting limit
ICV	initial calibration verification	RRFRPD	relative response factor relative percent difference
IDL	instrument detection limit	RRTRRF	relative retention time relative response factor
IR	infrared spectroscopy	RSDRRT	relative standard deviation relative retention time
IRP	installation restoration program	RTRSD	retention time relative standard deviation
IS	internal standards	RT	retention time
LCS	laboratory control sample	HT	holding time
MBAS	methyl blue active substance	ICB	initial calibration blank
MDL	method detection limit	ICP	inductively coupled plasma
MS	matrix spike	ICS	interference check sample
MSA	method of standard addition	SDG	sample delivery group

MSD	matrix spike duplicate	SICP	selected ion current profiles
m/z	mass to charge ratio	s/n	signal to noise ratio
NFESC	Naval Facilities Engineering Services Center	SOP	standard operating procedure
OP	organophosphorus	SOW	statement of work
PAH	polynuclear aromatic hydrocarbon	SPCC	system performance check compound
PARCC	precision, accuracy, representativeness, comparability, completeness	SRM	standard reference material
PCB	polychlorinated biphenyl	SVOC	semivolatile organic compound
PCDD	polychlorinated dibenzodioxin	TB	trip blank
PCDF	polychlorinated dibenzofuran	TCDD	tetrachlorodibenzodioxin
PE	performance evaluation	TCX	tetrachloro-m-xylene
PEM	performance evaluation mixture	TDS	total dissolved solids
PFK	perfluorokerosene	TIC	tentatively identified compound
PQO	project quality objective	TOC	total organic carbon
QAPFK	quality assurance perfluorokerosene	TOX	total organic halides
QACQA	quality assurance coordinator quality assurance	TPHE	total petroleum hydrocarbons as extractables
QAPPQA C	quality assurance project plan quality assurance coordinator	UV/VIS	ultraviolet/visible
QCQAPP	quality control quality assurance project plan	VOA	volatile organic analysis
QSM QC	quality system manual quality control	VOC	volatile organic compound
rQSM	correlation coefficient quality system manual	VTSR	validated time of sample receipt

r ² r	coefficient of determination correlation coefficient	WDM	window defining mixture
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1.0 INTRODUCTION

This Data Validation Report (DVR) contains the results of the data validation conducted for samples collected and analyzed as part of the Treasure Island Naval Shipyard Site 12 investigation. The project was conducted per contract number N62473-12-D-2005 under task order 004 for the Base Realignment and Closure Program Management Office, West Naval Facilities Engineering Command, 1455 Frazee Road, #600, San Diego CA. 92108. This DVR was subcontracted to E-Lab Consultants from Chicago, Bridge, and Iron (CB&I) to serve third party data assessment purposes and evaluates the laboratory data contained in Sample Delivery Groups (SDGs) list in **Table 1-1** produced by TestAmerica Laboratories, Inc.

These samples were analyzed in accordance with the approved *United States Department of Defense (DOD) Quality Systems Manual (QSM) for Environmental Laboratories Version 5.0, July 2013* and the analytical methods specified for the analytes requested on the Chain of Custody (COC) documentation. **Table 1-1** provides a list of the samples collected, a laboratory sample number cross-reference, sample matrix, date collected, sample purpose, and analytical methods performed for each sample pertaining to this DVR. This DVR is conducted per the analysis requested on the COC in accordance with the; *Sampling and Analysis Plan (SAP) October 2013, Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Organic (NFGO) Data Review (August 2014), NFG for Inorganic (NFGIO) Data Review (August 2014)*, and the method specified for the analysis.

The data were evaluated against the quantitative acceptance limits given in the DOD QSM for the data quality parameters of sensitivity, accuracy, precision, and completeness. **Appendix A** contains the Laboratory Data Report Form 1s that has been annotated with qualifiers assigned during the validation process in accordance with the project procedures manual.

In accordance with SAP, a review of the data was conducted independent of the laboratory. This review consisted of an evaluation of laboratory performance criteria from the case narrative, and an evaluation of the sample-specific criteria included in the laboratory data packages analyzed in accordance with the DOD QSM.

The validation consists of an evaluation of the chain of custody and associated laboratory sample receipt forms, proper sample preservations, holding times, initial calibration and continuing calibration procedures and results, laboratory control sample (LCS) (and duplicate [LCSD] if reported) accuracy and precision and matrix spike (MS) and matrix spike duplicate (MSD) sample analyses, method blanks, field blanks, and field duplicate precision.

Additional review included;

- Organic Analysis; internal standards, surrogate recoveries, instrument tuning, initial calibration, second source calibration verification, continuing calibration verification, internal standards, degradation summary, retention times, second column or second detector confirmations
- Inorganic Analysis; laboratory duplicate precision, instrument tuning, initial calibration, low-level calibration check standards, initial and continuing calibration verification, initial and continuing calibration blanks, interference check sample, internal standards, serial dilution results, post digestion spike recoveries, and interelement correction factors

The results of the independent data review are presented in **Section 2.0**.

Table 1-1
Sample Field and Laboratory ID Numbers

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TI_TO04-BS-R-SU8-S017	160-14443-1	Solid	10/14/15	Normal	EPAGA_01_R	Level 3
TI_TO04-BS-R-SU8-S018	160-14443-2	Solid	10/14/15	Normal	EPAGA_01_R	Level 3
TI_TO04-BS-R-SU8-S020	160-14443-3	Solid	10/14/15	Normal	EPAGA_01_R	Level 3
TI_TO04-BS-R-SU8-S021	160-14443-4	Solid	10/14/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU9-S008	160-14445-1	Solid	10/16/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU9-S009	160-14445-2	Solid	10/16/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU9-S010	160-14445-3	Solid	10/16/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU9-S011	160-14445-4	Solid	10/16/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU9-S019	160-14445-5	Solid	10/16/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU9-S020	160-14445-6	Solid	10/16/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S001	160-14498-1	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S002	160-14498-2	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S003	160-14498-3	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S004	160-14498-4	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S005	160-14498-5	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S006	160-14498-6	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S007	160-14498-7	Solid	10/21/15	Normal	EPAGA_01_R	Level 3



Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TI-TO04-BS-FSS-SU1-S008	160-14498-8	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S009	160-14498-9	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S010	160-14498-10	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S011	160-14498-11	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S012	160-14498-12	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S013	160-14498-13	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S014	160-14498-14	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S015	160-14498-15	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S016	160-14498-16	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S017	160-14498-17	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S018	160-14498-18	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S019	160-14498-19	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-FSS-SU1-S020	160-14498-20	Solid	10/21/15	Normal	EPAGA_01_R	Level 3
TI-TO04-FSS-BISU8-S001	160-14512-1	Solid	10/26/15	Normal	EPAGA_01_R	Level 3
TI-TO04-FSS-BISU8-S002	160-14512-2	Solid	10/26/15	Normal	EPAGA_01_R	Level 3
TI-TO04-FSS-BISU8-S003	160-14512-3	Solid	10/26/15	Normal	EPAGA_01_R	Level 3
TI-TO04-FSS-BISU8-S004	160-14512-4	Solid	10/26/15	Normal	EPAGA_01_R	Level 3
TI-TO04-FSS-BISU9-S001	160-14514-1	Solid	10/22/15	Normal	EPAGA_01_R	Level 3



Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TI-TO04-FSS-BISU9-S002	160-14514-2	Solid	10/22/15	Normal	EPAGA_01_R	Level 3
TI-TO04-FSS-BISU9-S003	160-14514-3	Solid	10/22/15	Normal	EPAGA_01_R	Level 3
TI-TO04-FSS-BISU9-S004	160-14514-4	Solid	10/22/15	Normal	EPAGA_01_R	Level 3
TI-TO04-FSS-BISU9-S005	160-14514-5	Solid	10/22/15	Normal	EPAGA_01_R	Level 3
TI-TO04-FSS-BISU9-S006	160-14514-6	Solid	10/22/15	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S601	160-16805-1	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S602	160-16805-2	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S603	160-16805-3	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S604	160-16805-4	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S605	160-16805-5	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S606	160-16805-6	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S607	160-16805-7	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S608	160-16805-8	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S609	160-16805-9	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S610	160-16805-10	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S611	160-16805-11	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S612	160-16805-12	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S613	160-16805-13	Solid	04/04/16	Normal	EPAGA_01_R	Level 3

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TI-TITO04-BS-R-FSSSU6-S614	160-16805-14	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S615	160-16805-15	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S616	160-16805-16	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S617	160-16805-17	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S618	160-16805-18	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S619	160-16805-19	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TITO04-BS-R-FSSSU6-S620	160-16805-20	Solid	04/04/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S001	160-17034-1	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S002	160-17034-2	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S003	160-17034-3	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S004	160-17034-4	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S005	160-17034-5	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S006	160-17034-6	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S007	160-17034-7	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S008	160-17034-8	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S009	160-17034-9	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S010	160-17034-10	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S011	160-17034-11	Solid	04/14/16	Normal	EPAGA_01_R	Level 3

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TI-TO04-BS-R-SU8-S012	160-17034-12	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S013	160-17034-13	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S014	160-17034-14	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S015	160-17034-15	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S016	160-17034-16	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S017	160-17034-17	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S018	160-17034-18	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-SU8-S019	160-17034-19	Solid	04/14/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-FSS-BISU9-S001	160-17241-1	Solid	05/03/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-FSS-BISU9-S002	160-17241-2	Solid	05/03/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-FSS-BISU9-S003	160-17241-3	Solid	05/03/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-FSS-BISU9-S004	160-17241-4	Solid	05/03/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-FSS-BISU9-S005	160-17241-5	Solid	05/03/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-FSS-BISU9-S006	160-17241-6	Solid	05/03/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-FSS-BISU9-S007	160-17241-7	Solid	05/03/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-FSS-BISU9-S008	160-17241-8	Solid	05/03/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-FSS-BISU9-S009	160-17241-9	Solid	05/03/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-FSS-BISU9-S010	160-17241-10	Solid	05/03/16	Normal	EPAGA_01_R	Level 3

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TI-TO04-BS-R-FSS-SWSU9-S9-16	160-17266-1	Solid	05/03/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-FSS-SWSU9-S9-17	160-17266-2	Solid	05/03/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-FSS-SWSU9-S9-19	160-17266-3	Solid	05/03/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-BISU9-S001	160-17372-1	Solid	05/10/16	Normal	EPAGA_01_R	Level 3
TI-TO04-BS-R-BISU9-S002	160-17372-2	Solid	05/10/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S501	160-19730-1	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S502	160-19730-2	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S503	160-19730-3	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S504	160-19730-4	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S505	160-19730-5	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S506	160-19730-6	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S507	160-19730-7	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S508	160-19730-8	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S509	160-19730-9	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S510	160-19730-10	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S511	160-19730-11	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S512	160-19730-12	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S513	160-19730-13	Solid	10/26/16	Normal	EPAGA_01_R	Level 3



Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04-BS-FSS-SU2RSY11-5-S514	160-19730-14	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S515	160-19730-15	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S516	160-19730-16	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S517	160-19730-17	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S518	160-19730-18	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S519	160-19730-19	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU2RSY11-5-S520	160-19730-20	Solid	10/26/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3-RSY11-U7-S701	160-19923-1	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3-RSY11-U7-S702	160-19923-2	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3-RSY11-U7-S703	160-19923-3	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3-RSY11-U7-S704	160-19923-4	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3-RSY11-U7-S705	160-19923-5	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3-RSY11-U7-S706	160-19923-6	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3-RSY11-U7-S707	160-19923-7	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3-RSY11-U7-S708	160-19923-8	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3-RSY11-U7-S709	160-19923-9	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3-RSY11-U7-S710	160-19923-10	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3-RSY11-U7-S711	160-19923-11	Solid	11/08/16	Normal	EPAGA_01_R	Level 3



Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04-BS-FSSSU3-RSY11-U7-S712	160-19923-12	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU4-RSY10-U8-S801	160-19954-1	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S802	160-19954-2	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S803	160-19954-3	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S804	160-19954-4	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S805	160-19954-5	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S806	160-19954-6	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S807	160-19954-7	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S808	160-19954-8	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S809	160-19954-9	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S810	160-19954-10	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S811	160-19954-11	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S812	160-19954-12	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S813	160-19954-13	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S814	160-19954-14	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S815	160-19954-15	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S816	160-19954-16	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S817	160-19954-17	Solid	11/09/16	Normal	EPAGA_01_R	Level 4



Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04-BS-FSSSU4-RSY10-U8-S818	160-19954-18	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S819	160-19954-19	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4-RSY10-U8-S820	160-19954-20	Solid	11/09/16	Normal	EPAGA_01_R	Level 4
TITO04-BS-FSSSU4P1-RSY10-U9-S901	160-20016-1	Solid	11/14/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU4P1-RSY10-U9-S902	160-20016-2	Solid	11/14/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU4P1-RSY10-U9-S903	160-20016-3	Solid	11/14/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU4P1-RSY10-U9-S904	160-20016-4	Solid	11/14/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU4P1-RSY10-U9-S905	160-20016-5	Solid	11/14/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU4P1-RSY10-U9-S906	160-20016-6	Solid	11/14/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU4P1-RSY10-U9-S907	160-20016-7	Solid	11/14/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU4P1-RSY10-U9-S908	160-20016-8	Solid	11/14/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU4P1-RSY10-U9-S909	160-20016-9	Solid	11/14/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU4P1-RSY10-U9-S910	160-20016-10	Solid	11/14/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU4P1-RSY10-U9-S911	160-20016-11	Solid	11/14/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU4P1-RSY10-U9-S912	160-20016-12	Solid	11/14/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3P2-RSY10-U9-S901	160-20048-1	Solid	11/15/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3P2-RSY10-U9-S902	160-20048-2	Solid	11/15/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3P2-RSY10-U9-S903	160-20048-3	Solid	11/15/16	Normal	EPAGA_01_R	Level 3

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04-BS-FSSSU3P2-RSY10-U9-S904	160-20048-4	Solid	11/15/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3P2-RSY10-U9-S905	160-20048-5	Solid	11/15/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3P2-RSY10-U9-S906	160-20048-6	Solid	11/15/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3P2-RSY10-U9-S907	160-20048-7	Solid	11/15/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3P2-RSY10-U9-S908	160-20048-8	Solid	11/15/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3P2-RSY10-U9-S909	160-20048-9	Solid	11/15/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3P2-RSY10-U9-S910	160-20048-10	Solid	11/15/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3P2-RSY10-U9-S911	160-20048-11	Solid	11/15/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3P2-RSY10-U9-S912	160-20048-12	Solid	11/15/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3P2-RSY10-U9-S913	160-20048-13	Solid	11/15/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3P2-RSY10-U9-S914	160-20048-14	Solid	11/15/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU3P2-RSY10-U9-S915	160-20048-15	Solid	11/15/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU5-RSY11-U9-S901	160-20102-1	Solid	11/17/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU5-RSY11-U9-S902	160-20102-2	Solid	11/17/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU5-RSY11-U9-S903	160-20102-3	Solid	11/17/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU5-RSY11-U9-S904	160-20102-4	Solid	11/17/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU5-RSY11-U9-S905	160-20102-5	Solid	11/17/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU5-RSY11-U9-S906	160-20102-6	Solid	11/17/16	Normal	EPAGA_01_R	Level 3

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04-BS-FSSSU5-RSY11-U9-S907	160-20102-7	Solid	11/17/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU5-RSY11-U9-S908	160-20102-8	Solid	11/17/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU5-RSY11-U9-S909	160-20102-9	Solid	11/17/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU5-RSY11-U9-S910	160-20102-10	Solid	11/17/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU5-RSY11-U9-S911	160-20102-11	Solid	11/17/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU5-RSY11-U9-S912	160-20102-12	Solid	11/17/16	Normal	EPAGA_01_R	Level 3

Following the specifications in the SAP related to the data validation process, the data were annotated with data validation qualifiers and codes on the analytical data sheets that are required qualifier flags as described in the SAP. **Table 1-2** provides definitions of the data qualifiers references, and **Table 1-3** lists and defines the data review qualifier codes.

Table 1-2
Data Qualifier References

Qualifier	Organics	Inorganics
U	The analyte was analyzed for, but was not detected above the method detection limit.	The analyte was analyzed for, but was not detected above the method detection limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."	Not applicable.

NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.	Not applicable.
UJ	The analyte was not detected above the method detection limit. However, the associated value is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.	The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and to meet quality control criteria. The presence or absence of the analyte cannot be verified.	The data are unusable. The sample results are rejected due to serious deficiencies in meeting the Quality Control (QC) criteria. The analyte may or may not be present in the sample.

**Table 1-3
Data Review Qualifier Codes**

Reason Code	Description
A	Serial dilution outside criteria (Level IV).
B1	Method blank contaminants above reporting limit.
B2	Calibration blank contaminants above reporting limit.
B2 (Bias flag –)	Calibration blank indicates negative interference, false negatives may be present
B3	Trip blank contamination
B4	Equipment rinsate contamination.
B5	Ambient blank contamination
C	ICV or CCV % D outside control limits.
C1	Initial calibration RSD outside control limit.
C2	Initial calibration RRF outside control limit.
C3	Continuing calibration RRF outside control limit.

D1	Sample Duplicate RPD outside control limit.
D2	Matrix Duplicate RPD outside control limit
E	The sample results exceed the linear calibration range of the instrument.
F	Hydrocarbon pattern does not match hydrocarbon pattern in the standard.
H	Holding time exceeded.
I	Internal standard recovery outside control limit.
L	LCS outside control limits.
M	MS outside control limits.
M1	MS, MSD or RPD outside of control limits
O	Interference check sample outside acceptance criteria
P	Analyte qualified based on the professional judgement of the reviewer.
S	Surrogate recovery outside control limit.
T	Temperature outside acceptance criteria.
Tr	Value reported detected between the DL and LOQ
W	Pesticide breakdown outside criteria (Level IV).
X	Raised reporting limit due to matrix interference or high analyte concentration.
Y	Analyte was not confirmed by a second column.
Y1	Primary and Confirmation Sample Duplicate RPD outside control limit.

2.0 DATA VALIDATION RESULTS

Laboratory Data Package Review

The samples reported, QC designations, and validation level is listed in **Table 1-1**. The data packages were reviewed in accordance with the project procedures manual.

Sample Documentation, Preservation, Handling, and Transport

All samples arrived at the laboratory on time, intact and within preservation requirements.

A cross reference of the COC and analytical reports has concluded all extractions and analysis were performed within the required holding times. The validation met all QC requirements listed in the method and data validation requirements of the SAP. None of the data is qualified based on sample documentation, preservation, handling, or transport

2.1 Radium-226 by GAMMA SPEC (21 DAY INGROWTH)

2.1.1 Instrument Performance Checks

Data verification included the recalculation of raw data, verifying the mass spectral abundance and assignment are correct and within the method requirements. All samples were analyzed with an acceptable BFB performance check and within the 12-hour window requirement.

2.1.2 Instrument Initial Calibrations

Relative Retention Factors (RRF) was verified against the quantitation reports, mass spectra, and chromatograms. Average RRF and percent relative Standard Deviations (%RSD) were verified for one compound associated with each internal standard. All initial calibration average relative response factors were within the project DoD QSM requirements.

2.1.3 Initial Calibration Verifications

The initial calibration curve was verified with a second source standard mix that contained all target compounds.

2.1.4 Continuing Calibrations

Continuing calibration average relative response factors were within the DoD QSM requirements (<20%). Continuing calibrations were performed on a 12-hour basis.

2.1.5 Blanks

Each analytical batch was represented with a method blank. The laboratory reports none of the target compounds were detected in any of the method blanks

2.1.6 Laboratory Control Sample Recovery (Blank Spikes)

The LCS values were validated by recalculating two compounds per LCS. None of the data are qualified based on LCS recoveries.

2.1.7 Matrix Spike/Matrix Spike Duplicate Recoveries

MS/MSD samples were not submitted for this analysis.

2.1.8 Laboratory Duplicate Recoveries

All laboratory generated duplicate recoveries are within QC limits.

2.1.9 Field QC Samples

2.1.9.1 Trip, Equipment and Field Blanks

Field blank samples were not submitted for this analysis.

2.1.10 Target Compound Identification

None of the identified target compounds were qualified based compound identification.

2.1.11 Compound Quantitation and Reporting Limits

Reporting limits were verified to be equal to the Level of Detection (LOD). The LODs have been verified to meet or exceed the project required performance standards. Sample dilutions, cleanup concentrations, and moisture correction have been applied to all reportable results. The results are reported on a dry weight basis where applicable.

2.1.12 Tentatively Identified Compounds

No Tentatively Identified Compounds are reported.

Appendix A

Annotated Laboratory Analytical Data Reporting Forms 1s

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14443-2

Client Sample ID: TI_TO04-BS-R-SU8-S017

Date Collected: 10/14/15 13:37

Date Received: 10/23/15 08:45

Lab Sample ID: 160-14443-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.330		0.166	0.169		0.205	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Actinium-227	0.0263	U	0.428	0.428		0.760	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Bismuth-212	0.671	U	0.613	0.617		0.961	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Bismuth-214	0.464		0.161	0.169		0.161	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Cesium-137	-0.00823	U	0.0472	0.0472		0.0851	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Lead-210	1.29	U	1.43	1.44		2.15	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Lead-212	0.574		0.106	0.129		0.103	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Lead-214	0.456		0.114	0.123		0.124	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Potassium-40	10.6		1.47	1.83		0.633	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Protactinium-231	0.362	U	0.597	0.599		1.67	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Radium-226	0.464		0.161	0.169	0.500	0.161	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Radium-228	0.330		0.166	0.169		0.205	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Thallium-208	0.208		0.0572	0.0611		0.0498	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Thorium-228	0.574		0.106	0.129		0.103	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Thorium-232	0.330		0.166	0.169		0.205	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Thorium-234	1.01	U	0.917	0.923		1.44	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Uranium-235	0.0600	U	0.218	0.218		0.386	pCi/g	10/26/15 15:31	11/16/15 20:47	1
Uranium-238	1.01	U	0.917	0.923		1.44	pCi/g	10/26/15 15:31	11/16/15 20:47	1

Client Sample ID: TI_TO04-BS-R-SU8-S018

Date Collected: 10/14/15 13:40

Date Received: 10/23/15 08:45

Lab Sample ID: 160-14443-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.716		0.181	0.195		0.216	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Actinium-227	0.0428	U	0.175	0.175		0.843	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Bismuth-212	0.000	U	0.641	0.641		0.957	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Bismuth-214	0.604		0.146	0.159		0.122	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Cesium-137	-0.00831	U	0.0464	0.0464		0.0847	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Lead-210	0.446	U	1.19	1.19		2.17	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Lead-212	0.828		0.132	0.170		0.120	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Lead-214	0.702		0.141	0.159		0.126	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Potassium-40	8.53		1.44	1.69		0.761	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Protactinium-231	0.254	U	0.531	0.532		2.36	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Radium-226	0.604		0.146	0.159	0.500	0.122	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Radium-228	0.716		0.181	0.195		0.216	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Thallium-208	0.282		0.0716	0.0774		0.0571	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Thorium-228	0.828		0.132	0.170		0.120	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Thorium-232	0.716		0.181	0.195		0.216	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Thorium-234	0.859	U	0.970	0.974		1.66	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Uranium-235	0.156	U	0.224	0.224		0.482	pCi/g	10/26/15 15:31	11/16/15 20:49	1
Uranium-238	0.859	U	0.970	0.974		1.66	pCi/g	10/26/15 15:31	11/16/15 20:49	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14443-2

Client Sample ID: TI_TO04-BS-R-SU8-S020

Lab Sample ID: 160-14443-3

Date Collected: 10/14/15 13:50

Matrix: Solid

Date Received: 10/23/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.515		0.147	0.156		0.0774	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Actinium-227	0.178	U	0.400	0.400		0.680	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Bismuth-212	0.0872	U	0.452	0.452		0.842	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Bismuth-214	0.436		0.124	0.132		0.117	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Cesium-137	-0.0106	U	0.0407	0.0407		0.0721	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Lead-210	0.186	U	0.911	0.911		1.70	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Lead-212	0.253		0.0800	0.0865		0.0925	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Lead-214	0.361		0.0885	0.0961		0.123	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Potassium-40	10.8		1.35	1.74		0.659	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Protactinium-231	0.335	U	0.213	0.216		1.70	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Radium-226	0.436		0.124	0.132	0.500	0.117	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Radium-228	0.515		0.147	0.156		0.0774	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Thallium-208	0.0463	U	0.0459	0.0462		0.0622	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Thorium-228	0.253		0.0800	0.0865		0.0925	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Thorium-232	0.515		0.147	0.156		0.0774	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Thorium-234	0.301	U	0.434	0.435		1.52	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Uranium-235	0.179	U	0.165	0.166		0.305	pCi/g	10/26/15 15:31	11/16/15 21:33	1
Uranium-238	0.301	U	0.434	0.435		1.52	pCi/g	10/26/15 15:31	11/16/15 21:33	1

Client Sample ID: TI_TO04-BS-R-SU8-S021

Lab Sample ID: 160-14443-4

Date Collected: 10/15/15 14:30

Matrix: Solid

Date Received: 10/23/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.191	U	0.107	0.109		0.267	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Actinium-227	-0.0195	U	0.386	0.386		0.693	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Bismuth-212	0.000	U	0.546	0.546		1.05	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Bismuth-214	0.391		0.137	0.143		0.157	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Cesium-137	-0.0414	U	0.250	0.250		0.121	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Lead-210	0.638	U	1.08	1.08		1.91	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Lead-212	0.499		0.113	0.130		0.106	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Lead-214	0.279		0.107	0.111		0.177	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Potassium-40	12.0		1.79	2.17		0.678	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Protactinium-231	-0.349	U	1.17	1.17		2.04	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Radium-226	0.391		0.137	0.143	0.500	0.157	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Radium-228	0.191	U	0.107	0.109		0.267	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Thallium-208	0.249		0.0707	0.0753		0.0461	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Thorium-228	0.499		0.113	0.130		0.106	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Thorium-232	0.191	U	0.107	0.109		0.267	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Thorium-234	0.525	U	0.366	0.370		1.73	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Uranium-235	0.130	U	0.192	0.192		0.319	pCi/g	10/26/15 15:31	11/16/15 21:34	1
Uranium-238	0.525	U	0.366	0.370		1.73	pCi/g	10/26/15 15:31	11/16/15 21:34	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14445-2

Client Sample ID: TI-TO04-BS-R-SU9-S008

Date Collected: 10/16/15 10:29

Date Received: 10/23/15 08:45

Lab Sample ID: 160-14445-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.257		0.128	0.131		0.206	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Actinium-227	0.130	U	0.152	0.153		1.46	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Bismuth-212	0.226	U	0.498	0.499		0.867	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Bismuth-214	0.339		0.107	0.113		0.119	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Cesium-137	0.000	U	0.00931	0.00931		0.109	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Lead-210	1.49	U	1.82	1.83		2.42	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Lead-212	0.291		0.0828	0.0909		0.0949	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Lead-214	0.223		0.0755	0.0790		0.122	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Potassium-40	11.6		1.51	1.92		0.613	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Protactinium-231	0.210	U	0.708	0.708		1.26	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Radium-226	0.339		0.107	0.113	0.500	0.119	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Radium-228	0.257		0.128	0.131		0.206	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Thallium-208	0.0708		0.0463	0.0469		0.0692	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Thorium-228	0.291		0.0828	0.0909		0.0949	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Thorium-232	0.257		0.128	0.131		0.206	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Thorium-234	0.585	U	0.489	0.493		1.50	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Uranium-235	-0.0276	U	0.0649	0.0650		0.326	pCi/g	10/26/15 15:31	11/16/15 21:37	1
Uranium-238	0.585	U	0.489	0.493		1.50	pCi/g	10/26/15 15:31	11/16/15 21:37	1

Client Sample ID: TI-TO04-BS-R-SU9-S009

Date Collected: 10/16/15 10:07

Date Received: 10/23/15 08:45

Lab Sample ID: 160-14445-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.160	U	0.152	0.153		0.251	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Actinium-227	-0.112	U	0.390	0.390		0.676	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Bismuth-212	0.191	U	0.431	0.431		0.758	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Bismuth-214	0.343		0.106	0.111		0.104	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Cesium-137	0.000281	U	0.0318	0.0318		0.0614	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Lead-210	-0.129	U	1.07	1.07		1.63	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Lead-212	0.270		0.0766	0.0842		0.0830	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Lead-214	0.226		0.0875	0.0906		0.121	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Potassium-40	10.8		1.51	1.87		0.657	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Protactinium-231	0.0627	U	0.408	0.408		1.37	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Radium-226	0.343		0.106	0.111	0.500	0.104	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Radium-228	0.160	U	0.152	0.153		0.251	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thallium-208	0.0712		0.0593	0.0597		0.0671	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thorium-228	0.270		0.0766	0.0842		0.0830	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thorium-232	0.160	U	0.152	0.153		0.251	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thorium-234	0.452	U	0.654	0.656		1.17	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Uranium-235	0.117	U	0.148	0.148		0.260	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Uranium-238	0.452	U	0.654	0.656		1.17	pCi/g	10/26/15 15:31	11/16/15 21:38	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14445-2

Client Sample ID: TI-TO04-BS-R-SU9-S010

Lab Sample ID: 160-14445-3

Date Collected: 10/16/15 09:10

Matrix: Solid

Date Received: 10/23/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.882		0.209	0.227		0.136	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Actinium-227	0.0391	U	0.134	0.134		1.01	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Bismuth-212	0.429	U	0.510	0.512		0.831	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Bismuth-214	0.526		0.155	0.164		0.157	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Cesium-137	0.00753	U	0.0357	0.0357		0.0646	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Lead-210	0.844	U	1.36	1.36		2.00	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Lead-212	0.712		0.149	0.175		0.146	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Lead-214	0.603		0.147	0.160		0.154	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Potassium-40	17.4		1.72	2.47		0.783	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Protactinium-231	0.615	U	0.832	0.834		1.68	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Radium-226	0.526		0.155	0.164	0.500	0.157	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Radium-228	0.882		0.209	0.227		0.136	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thallium-208	0.219		0.0592	0.0634		0.0559	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thorium-228	0.712		0.149	0.175		0.146	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thorium-232	0.882		0.209	0.227		0.136	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Thorium-234	0.302	U	0.612	0.613		2.00	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Uranium-235	0.134	U	0.238	0.238		0.398	pCi/g	10/26/15 15:31	11/16/15 21:38	1
Uranium-238	0.302	U	0.612	0.613		2.00	pCi/g	10/26/15 15:31	11/16/15 21:38	1

Client Sample ID: TI-TO04-BS-R-SU9-S011

Lab Sample ID: 160-14445-4

Date Collected: 10/16/15 09:35

Matrix: Solid

Date Received: 10/23/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.531		0.180	0.188		0.285	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Actinium-227	0.154	U	0.408	0.409		1.22	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Bismuth-212	0.696	U	0.673	0.677		1.06	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Bismuth-214	0.509		0.134	0.144		0.121	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Cesium-137	-0.0195	U	0.0603	0.0603		0.106	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Lead-210	-0.202	U	1.91	1.91		2.94	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Lead-212	0.760		0.139	0.171		0.127	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Lead-214	0.503		0.125	0.136		0.169	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Potassium-40	19.1		2.26	2.99		1.05	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Protactinium-231	0.626	U	0.505	0.510		2.06	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Radium-226	0.509		0.134	0.144	0.500	0.121	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Radium-228	0.531		0.180	0.188		0.285	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Thallium-208	0.241		0.0863	0.0899		0.0803	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Thorium-228	0.760		0.139	0.171		0.127	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Thorium-232	0.531		0.180	0.188		0.285	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Thorium-234	0.0567	U	0.297	0.297		2.63	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Uranium-235	0.120	U	0.270	0.270		0.468	pCi/g	10/26/15 15:31	11/16/15 21:39	1
Uranium-238	0.0567	U	0.297	0.297		2.63	pCi/g	10/26/15 15:31	11/16/15 21:39	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14445-2

Client Sample ID: TI-TO04-BS-R-SU9-S019

Lab Sample ID: 160-14445-5

Date Collected: 10/16/15 09:29

Matrix: Solid

Date Received: 10/23/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.598		0.200	0.209		0.157	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Actinium-227	-0.245	U	0.443	0.444		0.743	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Bismuth-212	0.380	U	0.452	0.454		0.738	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Bismuth-214	0.319		0.108	0.113		0.114	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Cesium-137	0.000	U	0.0156	0.0156		0.0706	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Lead-210	0.946	U	0.852	0.859		1.36	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Lead-212	0.424		0.0929	0.108		0.0917	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Lead-214	0.337		0.0943	0.101		0.104	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Potassium-40	9.14		1.21	1.53		0.773	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Protactinium-231	0.161	U	0.625	0.625		1.27	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Radium-226	0.319		0.108	0.113	0.500	0.114	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Radium-228	0.598		0.200	0.209		0.157	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Thallium-208	0.131		0.0414	0.0436		0.0417	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Thorium-228	0.424		0.0929	0.108		0.0917	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Thorium-232	0.598		0.200	0.209		0.157	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Thorium-234	0.681	U	0.394	0.401		1.23	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Uranium-235	0.0784	U	0.166	0.166		0.334	pCi/g	10/26/15 15:31	11/16/15 22:11	1
Uranium-238	0.681	U	0.394	0.401		1.23	pCi/g	10/26/15 15:31	11/16/15 22:11	1

Client Sample ID: TI-TO04-BS-R-SU9-S020

Lab Sample ID: 160-14445-6

Date Collected: 10/16/15 09:36

Matrix: Solid

Date Received: 10/23/15 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.476		0.145	0.153		0.125	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Actinium-227	0.400	U	0.351	0.354		1.57	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Bismuth-212	0.362	U	0.476	0.477		0.786	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Bismuth-214	0.473		0.114	0.125		0.110	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Cesium-137	0.0208	U	0.0323	0.0324		0.0545	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Lead-210	0.390	U	1.30	1.30		2.12	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Lead-212	0.395		0.106	0.117		0.114	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Lead-214	0.404		0.0975	0.106		0.106	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Potassium-40	9.90		1.33	1.67		0.555	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Protactinium-231	-0.0167	U	0.836	0.836		1.51	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Radium-226	0.473		0.114	0.125	0.500	0.110	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Radium-228	0.476		0.145	0.153		0.125	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Thallium-208	0.166		0.0592	0.0617		0.0538	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Thorium-228	0.395		0.106	0.117		0.114	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Thorium-232	0.476		0.145	0.153		0.125	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Thorium-234	0.777	U	0.865	0.869		1.52	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Uranium-235	-0.0108	U	0.0253	0.0253		0.379	pCi/g	10/26/15 15:31	11/16/15 22:12	1
Uranium-238	0.777	U	0.865	0.869		1.52	pCi/g	10/26/15 15:31	11/16/15 22:12	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S001

Lab Sample ID: 160-14498-1

Date Collected: 10/21/15 11:02

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.433		0.158	0.164		0.152	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Actinium-227	0.340		0.232	0.235		0.325	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Bismuth-212	0.0529	U	0.440	0.440		0.822	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Bismuth-214	0.274		0.113	0.117		0.129	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Cesium-137	0.00536	U	0.0371	0.0371		0.0688	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Lead-210	0.367	U	0.860	0.861		1.53	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Lead-212	0.274		0.0943	0.101		0.105	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Lead-214	0.235		0.0871	0.0904		0.117	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Potassium-40	11.0		1.53	1.90		0.669	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Protactinium-231	0.218	U	0.616	0.617		1.10	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Radium-226	0.274		0.113	0.117	0.500	0.129	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Radium-228	0.433		0.158	0.164		0.152	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Thallium-208	0.102		0.0427	0.0440		0.0472	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Thorium-228	0.274		0.0943	0.101		0.105	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Thorium-232	0.433		0.158	0.164		0.152	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Thorium-234	0.000882	U	0.804	0.804		1.47	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Uranium-235	0.152	U	0.183	0.183		0.299	pCi/g	10/29/15 09:48	11/19/15 15:47	1
Uranium-238	0.000882	U	0.804	0.804		1.47	pCi/g	10/29/15 09:48	11/19/15 15:47	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S002

Lab Sample ID: 160-14498-2

Date Collected: 10/21/15 11:03

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.410		0.152	0.158		0.116	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Actinium-227	-0.00538	U	0.351	0.351		0.629	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Bismuth-212	0.291	U	0.416	0.417		0.695	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Bismuth-214	0.202		0.0846	0.0872		0.0972	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Cesium-137	-0.00856	U	0.0388	0.0388		0.0696	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-210	0.337	U	1.04	1.04		1.71	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-212	0.276		0.0764	0.0843		0.0814	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Lead-214	0.412		0.125	0.132		0.121	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Potassium-40	9.49		1.28	1.61		0.547	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Protactinium-231	0.423	U	0.461	0.464		0.971	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Radium-226	0.202		0.0846	0.0872	0.500	0.0972	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Radium-228	0.410		0.152	0.158		0.116	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thallium-208	0.142		0.0461	0.0484		0.0429	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-228	0.276		0.0764	0.0843		0.0814	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-232	0.410		0.152	0.158		0.116	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Thorium-234	0.127	U	0.243	0.243		1.33	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Uranium-235	0.0401	U	0.185	0.185		0.348	pCi/g	10/29/15 09:48	11/19/15 15:48	1
Uranium-238	0.127	U	0.243	0.243		1.33	pCi/g	10/29/15 09:48	11/19/15 15:48	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S003

Lab Sample ID: 160-14498-3

Date Collected: 10/21/15 11:07

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.295		0.126	0.130		0.234	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Actinium-227	0.0147	U	0.398	0.398		0.708	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Bismuth-212	0.303	U	0.487	0.488		0.823	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Bismuth-214	0.337		0.129	0.134		0.145	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Cesium-137	-0.0000995	U	0.0329	0.0329		0.0625	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-210	0.399	U	1.23	1.23		1.91	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-212	0.282		0.0808	0.0887		0.0945	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-214	0.253		0.0963	0.0999		0.139	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Potassium-40	10.4		1.39	1.75		0.579	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Protactinium-231	0.456	U	0.482	0.484		1.63	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Radium-226	0.337		0.129	0.134	0.500	0.145	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Radium-228	0.295		0.126	0.130		0.234	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thallium-208	0.0646		0.0465	0.0470		0.0598	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-228	0.282		0.0808	0.0887		0.0945	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-232	0.295		0.126	0.130		0.234	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-234	0.339	U	0.424	0.426		1.38	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Uranium-235	0.0811	U	0.182	0.182		0.308	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Uranium-238	0.339	U	0.424	0.426		1.38	pCi/g	10/29/15 09:48	11/19/15 16:20	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S004

Lab Sample ID: 160-14498-4

Date Collected: 10/21/15 11:08

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.190	U	0.131	0.132		0.303	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Actinium-227	-0.00905	U	0.336	0.336		0.605	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Bismuth-212	0.261	U	0.482	0.482		0.828	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Bismuth-214	0.391		0.101	0.109		0.0888	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Cesium-137	-0.00588	U	0.0370	0.0370		0.0683	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-210	1.23	U	0.990	1.00		1.55	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-212	0.0155	U	0.0979	0.0979		0.170	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Lead-214	0.332		0.0938	0.100		0.124	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Potassium-40	9.88		1.45	1.77		0.671	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Protactinium-231	-0.183	U	0.788	0.788		1.40	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Radium-226	0.391		0.101	0.109	0.500	0.0888	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Radium-228	0.190	U	0.131	0.132		0.303	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thallium-208	0.153		0.0585	0.0606		0.0584	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-228	0.0155	U	0.0979	0.0979		0.170	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-232	0.190	U	0.131	0.132		0.303	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Thorium-234	0.349	U	0.462	0.464		1.41	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Uranium-235	0.132	U	0.142	0.142		0.291	pCi/g	10/29/15 09:48	11/19/15 16:20	1
Uranium-238	0.349	U	0.462	0.464		1.41	pCi/g	10/29/15 09:48	11/19/15 16:20	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S005

Lab Sample ID: 160-14498-5

Date Collected: 10/21/15 11:14

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.290		0.117	0.121		0.196	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Actinium-227	0.270	U	0.242	0.243		0.614	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Bismuth-212	0.318	U	0.462	0.464		0.773	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Bismuth-214	0.185		0.0738	0.0763		0.0861	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Cesium-137	0.0120	U	0.0280	0.0280		0.0497	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Lead-210	0.00551	U	0.931	0.931		1.71	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Lead-212	0.311		0.0760	0.0860		0.0774	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Lead-214	0.356		0.0876	0.0951		0.102	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Potassium-40	9.95		1.31	1.66		0.551	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Protactinium-231	0.0742	U	0.308	0.308		1.26	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Radium-226	0.185		0.0738	0.0763	0.500	0.0861	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Radium-228	0.290		0.117	0.121		0.196	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Thallium-208	0.0850		0.0418	0.0427		0.0585	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Thorium-228	0.311		0.0760	0.0860		0.0774	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Thorium-232	0.290		0.117	0.121		0.196	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Thorium-234	0.182	U	0.431	0.432		1.43	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Uranium-235	0.0856	U	0.150	0.150		0.288	pCi/g	10/29/15 09:48	11/19/15 16:21	1
Uranium-238	0.182	U	0.431	0.432		1.43	pCi/g	10/29/15 09:48	11/19/15 16:21	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S006

Lab Sample ID: 160-14498-6

Date Collected: 10/21/15 11:17

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.418		0.146	0.152		0.189	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Actinium-227	0.158	U	0.173	0.174		0.662	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Bismuth-212	0.0275	U	0.421	0.421		0.807	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Bismuth-214	0.384		0.114	0.121		0.114	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Cesium-137	-0.00651	U	0.0314	0.0314		0.0573	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-210	0.554	U	1.09	1.09		1.62	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-212	0.263		0.0892	0.0955		0.102	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-214	0.310		0.0946	0.0999		0.125	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Potassium-40	12.1		1.48	1.93		0.790	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Protactinium-231	0.0107	U	0.735	0.735		1.34	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Radium-226	0.384		0.114	0.121	0.500	0.114	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Radium-228	0.418		0.146	0.152		0.189	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thallium-208	0.118		0.0480	0.0495		0.0545	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-228	0.263		0.0892	0.0955		0.102	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-232	0.418		0.146	0.152		0.189	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-234	0.163	U	0.787	0.788		1.41	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Uranium-235	0.0960	U	0.150	0.150		0.295	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Uranium-238	0.163	U	0.787	0.788		1.41	pCi/g	10/29/15 09:48	11/19/15 17:23	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S007

Lab Sample ID: 160-14498-7

Date Collected: 10/21/15 11:19

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.321		0.160	0.163		0.242	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Actinium-227	-0.207	U	0.464	0.464		0.791	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Bismuth-212	0.189	U	0.459	0.460		0.824	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Bismuth-214	0.211		0.0986	0.101		0.134	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Cesium-137	-0.0253	U	9.13	9.13		0.0942	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Lead-210	0.375	U	0.947	0.948		1.73	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Lead-212	0.230		0.0897	0.0945		0.105	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Lead-214	0.293		0.106	0.110		0.131	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Potassium-40	12.1		1.80	2.19		0.680	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Protactinium-231	0.0405	U	0.604	0.604		1.16	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Radium-226	0.211		0.0986	0.101	0.500	0.134	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Radium-228	0.321		0.160	0.163		0.242	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Thallium-208	0.0618	U	0.0589	0.0592		0.0882	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Thorium-228	0.230		0.0897	0.0945		0.105	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Thorium-232	0.321		0.160	0.163		0.242	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Thorium-234	0.887	U	0.975	0.979		1.34	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Uranium-235	0.113	U	0.159	0.159		0.243	pCi/g	10/29/15 09:48	11/19/15 17:22	1
Uranium-238	0.887	U	0.975	0.979		1.34	pCi/g	10/29/15 09:48	11/19/15 17:22	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S008

Lab Sample ID: 160-14498-8

Date Collected: 10/21/15 12:21

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.408		0.190	0.194		0.162	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Actinium-227	0.197	U	0.287	0.287		0.882	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Bismuth-212	0.325	U	0.537	0.538		0.911	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Bismuth-214	0.259		0.0931	0.0969		0.102	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Cesium-137	0.0111	U	0.0435	0.0435		0.0850	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-210	0.552	U	1.03	1.03		1.74	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-212	0.264		0.0813	0.0882		0.0913	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Lead-214	0.219		0.0853	0.0883		0.132	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Potassium-40	10.9		1.59	1.94		0.663	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Protactinium-231	0.156	U	0.785	0.786		1.41	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Radium-226	0.259		0.0931	0.0969	0.500	0.102	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Radium-228	0.408		0.190	0.194		0.162	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thallium-208	0.114		0.0445	0.0460		0.0474	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-228	0.264		0.0813	0.0882		0.0913	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-232	0.408		0.190	0.194		0.162	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Thorium-234	0.170	U	0.458	0.458		1.42	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Uranium-235	0.0231	U	0.0410	0.0411		0.372	pCi/g	10/29/15 09:48	11/19/15 17:23	1
Uranium-238	0.170	U	0.458	0.458		1.42	pCi/g	10/29/15 09:48	11/19/15 17:23	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S009

Lab Sample ID: 160-14498-9

Date Collected: 10/21/15 12:27

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.225		0.104	0.107		0.212	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Actinium-227	0.114	U	0.209	0.209		0.651	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-212	0.201	U	0.366	0.367		0.627	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-214	0.303		0.115	0.119		0.109	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Cesium-137	0.00517	U	0.0260	0.0260		0.0477	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-210	-0.0568	U	0.748	0.748		1.31	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-212	0.272		0.0755	0.0833		0.0796	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-214	0.242		0.0728	0.0771		0.0918	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Potassium-40	10.3		1.21	1.60		0.546	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Protactinium-231	0.0708	U	0.166	0.167		1.37	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-226	0.303		0.115	0.119	0.500	0.109	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-228	0.225		0.104	0.107		0.212	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thallium-208	0.131		0.0444	0.0464		0.0426	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-228	0.272		0.0755	0.0833		0.0796	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-232	0.225		0.104	0.107		0.212	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-234	0.403	U	0.716	0.718		1.20	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-235	0.163	U	0.147	0.148		0.258	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-238	0.403	U	0.716	0.718		1.20	pCi/g	10/29/15 09:48	11/19/15 17:20	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S010

Lab Sample ID: 160-14498-10

Date Collected: 10/21/15 12:26

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.224	U	0.130	0.132		0.250	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Actinium-227	0.0708	U	0.230	0.230		0.644	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-212	0.000	U	0.451	0.451		0.907	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-214	0.277		0.109	0.113		0.130	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Cesium-137	-0.0241	U	0.0458	0.0459		0.0783	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-210	0.910	U	1.28	1.28		1.97	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-212	0.266		0.0923	0.0986		0.109	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-214	0.283		0.0921	0.0967		0.138	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Potassium-40	9.18		1.29	1.60		0.567	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Protactinium-231	0.143	U	0.185	0.185		1.69	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-226	0.277		0.109	0.113	0.500	0.130	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-228	0.224	U	0.130	0.132		0.250	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thallium-208	0.102		0.0485	0.0497		0.0559	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-228	0.266		0.0923	0.0986		0.109	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-232	0.224	U	0.130	0.132		0.250	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-234	1.01	U	0.985	0.990		1.40	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-235	0.0863	U	0.146	0.147		0.257	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-238	1.01	U	0.985	0.990		1.40	pCi/g	10/29/15 09:48	11/19/15 17:20	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S011

Lab Sample ID: 160-14498-11

Date Collected: 10/21/15 12:33

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.160	U	0.114	0.115		0.232	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Actinium-227	0.136	U	0.234	0.235		0.694	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Bismuth-212	0.0781	U	0.413	0.413		0.751	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Bismuth-214	0.348		0.0968	0.103		0.0975	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Cesium-137	0.00621	U	0.0359	0.0359		0.0651	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-210	1.05	U	1.36	1.37		1.84	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-212	0.268		0.0843	0.0911		0.0973	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-214	0.345		0.0906	0.0974		0.0884	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Potassium-40	10.7		1.41	1.79		0.755	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Protactinium-231	0.237	U	0.639	0.640		1.55	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Radium-226	0.348		0.0968	0.103	0.500	0.0975	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Radium-228	0.160	U	0.114	0.115		0.232	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thallium-208	0.0541	U	0.0424	0.0428		0.0672	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-228	0.268		0.0843	0.0911		0.0973	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-232	0.160	U	0.114	0.115		0.232	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-234	0.109	U	0.243	0.244		1.53	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Uranium-235	0.0843	U	0.177	0.177		0.262	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Uranium-238	0.109	U	0.243	0.244		1.53	pCi/g	10/29/15 09:48	11/19/15 17:21	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S012

Lab Sample ID: 160-14498-12

Date Collected: 10/21/15 12:32

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0860	U	0.0974	0.0978		0.262	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Actinium-227	0.0539	U	0.125	0.125		0.701	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-212	0.178	U	0.489	0.489		0.866	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Bismuth-214	0.268		0.108	0.111		0.119	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Cesium-137	-0.00209	U	0.0341	0.0341		0.0647	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-210	0.527	U	1.01	1.01		1.62	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-212	0.307		0.0832	0.0922		0.0913	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Lead-214	0.241		0.120	0.123		0.140	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Potassium-40	12.4		1.61	2.05		0.663	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Protactinium-231	0.0820	U	0.695	0.695		1.27	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-226	0.268		0.108	0.111	0.500	0.119	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Radium-228	0.0860	U	0.0974	0.0978		0.262	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thallium-208	0.0447	U	0.0509	0.0511		0.0704	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-228	0.307		0.0832	0.0922		0.0913	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-232	0.0860	U	0.0974	0.0978		0.262	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Thorium-234	0.233	U	0.435	0.436		1.40	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-235	0.171	U	0.164	0.165		0.263	pCi/g	10/29/15 09:48	11/19/15 17:20	1
Uranium-238	0.233	U	0.435	0.436		1.40	pCi/g	10/29/15 09:48	11/19/15 17:20	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S013

Lab Sample ID: 160-14498-13

Date Collected: 10/21/15 12:39

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.240		0.0993	0.102		0.225	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Actinium-227	0.000	U	0.418	0.418		0.778	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Bismuth-212	0.141	U	0.542	0.543		0.962	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Bismuth-214	0.309		0.0959	0.101		0.0990	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Cesium-137	-0.00890	U	0.0434	0.0434		0.0777	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-210	1.08	U	1.27	1.28		1.87	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-212	0.316		0.0921	0.101		0.0998	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Lead-214	0.280		0.0833	0.0882		0.135	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Potassium-40	10.8		1.41	1.79		0.584	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Protactinium-231	0.0299	U	0.0474	0.0475		1.64	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Radium-226	0.309		0.0959	0.101	0.500	0.0990	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Radium-228	0.240		0.0993	0.102		0.225	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thallium-208	0.123		0.0435	0.0453		0.0435	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-228	0.316		0.0921	0.101		0.0998	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-232	0.240		0.0993	0.102		0.225	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Thorium-234	0.433	U	0.509	0.511		1.51	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Uranium-235	0.0128	U	0.171	0.172		0.311	pCi/g	10/29/15 09:48	11/19/15 17:21	1
Uranium-238	0.433	U	0.509	0.511		1.51	pCi/g	10/29/15 09:48	11/19/15 17:21	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S014

Lab Sample ID: 160-14498-14

Date Collected: 10/21/15 12:45

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.241		0.155	0.157		0.222	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Actinium-227	0.0782	U	0.413	0.413		0.718	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Bismuth-212	0.151	U	0.428	0.429		0.789	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Bismuth-214	0.155		0.0882	0.0896		0.139	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Cesium-137	0.00219	U	0.0382	0.0382		0.0701	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-210	0.653	U	0.951	0.954		1.48	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-212	0.261		0.0811	0.0879		0.0917	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-214	0.246		0.0909	0.0945		0.107	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Potassium-40	10.7		1.36	1.74		0.670	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Protactinium-231	0.0996	U	0.442	0.442		1.39	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Radium-226	0.155		0.0882	0.0896	0.500	0.139	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Radium-228	0.241		0.155	0.157		0.222	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thallium-208	0.115		0.0514	0.0527		0.0532	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-228	0.261		0.0811	0.0879		0.0917	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-232	0.241		0.155	0.157		0.222	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-234	0.456	U	0.361	0.364		1.11	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Uranium-235	0.102	U	0.143	0.144		0.256	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Uranium-238	0.456	U	0.361	0.364		1.11	pCi/g	10/29/15 09:48	11/19/15 17:55	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S015

Lab Sample ID: 160-14498-15

Date Collected: 10/21/15 12:44

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.180	U	0.166	0.167		0.295	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Actinium-227	-0.126	U	0.426	0.427		0.743	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Bismuth-212	0.0561	U	0.569	0.569		1.07	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Bismuth-214	0.119	U	0.127	0.127		0.173	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Cesium-137	0.00293	U	0.0491	0.0491		0.0997	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Lead-210	-0.0400	U	0.883	0.883		1.55	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Lead-212	0.370		0.0973	0.108		0.0912	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Lead-214	0.252		0.0958	0.0993		0.154	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Potassium-40	9.92		1.67	1.96		0.715	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Protactinium-231	-0.00944	U	0.0195	0.0196		1.83	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Radium-226	0.119	U	0.127	0.127	0.500	0.173	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Radium-228	0.180	U	0.166	0.167		0.295	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Thallium-208	0.0516	U	0.0488	0.0491		0.0757	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Thorium-228	0.370		0.0973	0.108		0.0912	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Thorium-232	0.180	U	0.166	0.167		0.295	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Thorium-234	0.280	U	0.387	0.388		1.20	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Uranium-235	0.148	U	0.163	0.163		0.265	pCi/g	10/29/15 09:48	11/19/15 17:54	1
Uranium-238	0.280	U	0.387	0.388		1.20	pCi/g	10/29/15 09:48	11/19/15 17:54	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S016

Lab Sample ID: 160-14498-16

Date Collected: 10/21/15 12:38

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.336		0.124	0.129		0.215	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Actinium-227	0.143	U	0.154	0.155		0.570	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Bismuth-212	-0.00294	U	0.337	0.337		0.651	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Bismuth-214	0.244		0.0895	0.0930		0.0857	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Cesium-137	0.0194	U	0.0278	0.0278		0.0464	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-210	0.317	U	0.747	0.748		1.37	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-212	0.319		0.0706	0.0818		0.0713	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Lead-214	0.292		0.0843	0.0896		0.0753	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Potassium-40	10.9		1.48	1.86		0.768	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Protactinium-231	0.350	U	0.434	0.435		1.72	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Radium-226	0.244		0.0895	0.0930	0.500	0.0857	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Radium-228	0.336		0.124	0.129		0.215	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thallium-208	0.101		0.0437	0.0449		0.0492	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-228	0.319		0.0706	0.0818		0.0713	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-232	0.336		0.124	0.129		0.215	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Thorium-234	0.243	U	0.324	0.325		1.07	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Uranium-235	0.0407	U	0.0538	0.0539		0.249	pCi/g	10/29/15 09:48	11/19/15 17:55	1
Uranium-238	0.243	U	0.324	0.325		1.07	pCi/g	10/29/15 09:48	11/19/15 17:55	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S017

Lab Sample ID: 160-14498-17

Date Collected: 10/21/15 12:52

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.252		0.125	0.128		0.245	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Actinium-227	0.209	U	0.290	0.291		0.814	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Bismuth-212	0.000	U	0.557	0.557		0.967	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Bismuth-214	0.328		0.0944	0.100		0.0914	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Cesium-137	0.00566	U	0.0429	0.0429		0.0860	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Lead-210	0.363	U	0.972	0.973		1.67	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Lead-212	0.397		0.120	0.131		0.122	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Lead-214	0.222		0.0929	0.0957		0.127	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Potassium-40	10.2		1.55	1.87		0.677	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Protactinium-231	0.239	U	0.534	0.534		2.32	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Radium-226	0.328		0.0944	0.100	0.500	0.0914	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Radium-228	0.252		0.125	0.128		0.245	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Thallium-208	0.142		0.0530	0.0550		0.0524	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Thorium-228	0.397		0.120	0.131		0.122	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Thorium-232	0.252		0.125	0.128		0.245	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Thorium-234	1.12	U	0.882	0.890		1.32	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Uranium-235	0.0797	U	0.193	0.193		0.312	pCi/g	10/29/15 09:48	11/19/15 17:56	1
Uranium-238	1.12	U	0.882	0.890		1.32	pCi/g	10/29/15 09:48	11/19/15 17:56	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S018

Lab Sample ID: 160-14498-18

Date Collected: 10/21/15 12:53

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.310		0.120	0.124		0.0932	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Actinium-227	0.0573	U	0.382	0.382		0.665	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Bismuth-212	0.329	U	0.430	0.431		0.710	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Bismuth-214	0.317		0.101	0.106		0.103	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Cesium-137	0.00617	U	0.0297	0.0297		0.0538	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Lead-210	0.252	U	0.771	0.772		1.33	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Lead-212	0.365		0.0810	0.0938		0.0774	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Lead-214	0.262		0.0840	0.0883		0.0951	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Potassium-40	10.4		1.25	1.64		0.574	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Protactinium-231	0.142	U	0.206	0.206		1.23	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Radium-226	0.317		0.101	0.106	0.500	0.103	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Radium-228	0.310		0.120	0.124		0.0932	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Thallium-208	0.168		0.0457	0.0489		0.0387	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Thorium-228	0.365		0.0810	0.0938		0.0774	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Thorium-232	0.310		0.120	0.124		0.0932	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Thorium-234	0.424	U	0.366	0.369		1.17	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Uranium-235	0.0551	U	0.164	0.164		0.267	pCi/g	10/29/15 09:48	11/19/15 17:51	1
Uranium-238	0.424	U	0.366	0.369		1.17	pCi/g	10/29/15 09:48	11/19/15 17:51	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14498-2

Client Sample ID: TI-TO04-BS-FSS-SU1-S019

Lab Sample ID: 160-14498-19

Date Collected: 10/21/15 12:59

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.247		0.160	0.162		0.226	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Actinium-227	0.0211	U	0.245	0.245		0.811	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Bismuth-212	-0.0101	U	0.376	0.376		0.722	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Bismuth-214	0.321		0.0937	0.0994		0.106	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Cesium-137	0.00876	U	0.0339	0.0339		0.0618	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Lead-210	1.22	U	1.10	1.11		1.78	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Lead-212	0.282		0.0873	0.0946		0.105	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Lead-214	0.321		0.0926	0.0984		0.149	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Potassium-40	10.4		1.42	1.77		0.603	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Protactinium-231	-0.0234	U	0.690	0.690		1.28	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Radium-226	0.321		0.0937	0.0994	0.500	0.106	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Radium-228	0.247		0.160	0.162		0.226	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Thallium-208	0.0891		0.0498	0.0506		0.0688	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Thorium-228	0.282		0.0873	0.0946		0.105	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Thorium-232	0.247		0.160	0.162		0.226	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Thorium-234	0.164	U	0.361	0.361		1.83	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Uranium-235	0.147	U	0.198	0.199		0.351	pCi/g	10/29/15 09:48	11/19/15 17:52	1
Uranium-238	0.164	U	0.361	0.361		1.83	pCi/g	10/29/15 09:48	11/19/15 17:52	1

Client Sample ID: TI-TO04-BS-FSS-SU1-S020

Lab Sample ID: 160-14498-20

Date Collected: 10/21/15 13:00

Matrix: Solid

Date Received: 10/27/15 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.445		0.134	0.142		0.0740	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Actinium-227	0.00860	U	0.403	0.403		0.712	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Bismuth-212	-0.00300	U	0.412	0.412		0.766	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Bismuth-214	0.299		0.0999	0.105		0.105	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Cesium-137	0.00760	U	0.0259	0.0259		0.0473	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Lead-210	0.137	U	0.851	0.852		1.64	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Lead-212	0.343		0.0862	0.0970		0.0894	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Lead-214	0.270		0.108	0.112		0.111	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Potassium-40	9.89		1.26	1.62		0.580	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Protactinium-231	0.189	U	0.392	0.392		1.20	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Radium-226	0.299		0.0999	0.105	0.500	0.105	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Radium-228	0.445		0.134	0.142		0.0740	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Thallium-208	0.0586	U	0.0394	0.0398		0.0617	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Thorium-228	0.343		0.0862	0.0970		0.0894	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Thorium-232	0.445		0.134	0.142		0.0740	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Thorium-234	0.169	U	0.450	0.450		1.42	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Uranium-235	0.0524	U	0.0960	0.0962		0.340	pCi/g	10/29/15 09:48	11/19/15 17:53	1
Uranium-238	0.169	U	0.450	0.450		1.42	pCi/g	10/29/15 09:48	11/19/15 17:53	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14512-2

Client Sample ID: TI-TO04-FSS-BISU8-S001

Date Collected: 10/26/15 13:22

Date Received: 10/28/15 08:40

Lab Sample ID: 160-14512-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.679		0.153	0.168		0.134	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Actinium-227	0.0754	U	0.126	0.126		0.904	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Bismuth-212	0.198	U	0.586	0.586		1.02	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Bismuth-214	0.613		0.133	0.147		0.111	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Cesium-137	0.00206	U	0.0399	0.0399		0.0736	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Lead-210	0.731	U	1.25	1.26		1.99	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Lead-212	0.487		0.101	0.119		0.104	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Lead-214	0.612		0.132	0.146		0.137	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Potassium-40	13.9		1.60	2.14		0.666	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Protactinium-231	0.170	U	0.186	0.187		2.09	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Radium-226	0.613		0.133	0.147	0.500	0.111	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Radium-228	0.679		0.153	0.168		0.134	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Thallium-208	0.189		0.0558	0.0592		0.0527	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Thorium-228	0.487		0.101	0.119		0.104	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Thorium-232	0.679		0.153	0.168		0.134	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Thorium-234	0.412	U	0.522	0.524		1.91	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Uranium-235	0.151	U	0.163	0.164		0.439	pCi/g	10/30/15 13:09	11/20/15 12:02	1
Uranium-238	0.412	U	0.522	0.524		1.91	pCi/g	10/30/15 13:09	11/20/15 12:02	1

Client Sample ID: TI-TO04-FSS-BISU8-S002

Date Collected: 10/26/15 13:25

Date Received: 10/28/15 08:40

Lab Sample ID: 160-14512-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.669		0.217	0.228		0.189	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Actinium-227	-0.171	U	0.639	0.639		1.10	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Bismuth-212	0.637	U	0.620	0.623		0.967	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Bismuth-214	0.656		0.168	0.181		0.163	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Cesium-137	0.0109	U	0.0524	0.0524		0.0949	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Lead-210	1.23	U	1.51	1.51		2.24	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Lead-212	0.752		0.142	0.172		0.141	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Lead-214	0.761		0.138	0.159		0.144	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Potassium-40	15.5		2.03	2.58		0.835	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Protactinium-231	0.538	U	0.528	0.531		2.10	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Radium-226	0.656		0.168	0.181	0.500	0.163	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Radium-228	0.669		0.217	0.228		0.189	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Thallium-208	0.295		0.0896	0.0947		0.0816	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Thorium-228	0.752		0.142	0.172		0.141	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Thorium-232	0.669		0.217	0.228		0.189	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Thorium-234	0.993	U	1.18	1.19		2.01	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Uranium-235	0.230	U	0.227	0.228		0.407	pCi/g	10/30/15 13:09	11/20/15 12:03	1
Uranium-238	0.993	U	1.18	1.19		2.01	pCi/g	10/30/15 13:09	11/20/15 12:03	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14512-2

Client Sample ID: TI-TO04-FSS-BISU8-S003

Lab Sample ID: 160-14512-3

Date Collected: 10/26/15 13:27

Matrix: Solid

Date Received: 10/28/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.674		0.135	0.152		0.124	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Actinium-227	0.0105	U	0.390	0.390		0.689	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Bismuth-212	0.277	U	0.489	0.490		0.833	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Bismuth-214	0.366		0.124	0.130		0.131	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Cesium-137	-0.000243	U	0.0401	0.0401		0.0737	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Lead-210	-0.155	U	1.29	1.29		2.05	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Lead-212	0.412		0.107	0.120		0.113	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Lead-214	0.455		0.103	0.113		0.118	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Potassium-40	9.89		1.33	1.67		0.854	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Protactinium-231	-0.00605	U	0.824	0.824		1.49	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Radium-226	0.366		0.124	0.130	0.500	0.131	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Radium-228	0.674		0.135	0.152		0.124	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Thallium-208	0.121		0.0525	0.0539		0.0742	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Thorium-228	0.412		0.107	0.120		0.113	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Thorium-232	0.674		0.135	0.152		0.124	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Thorium-234	0.421	U	1.01	1.01		1.77	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Uranium-235	0.200	U	0.203	0.204		0.330	pCi/g	10/30/15 13:09	11/20/15 12:11	1
Uranium-238	0.421	U	1.01	1.01		1.77	pCi/g	10/30/15 13:09	11/20/15 12:11	1

Client Sample ID: TI-TO04-FSS-BISU8-S004

Lab Sample ID: 160-14512-4

Date Collected: 10/26/15 13:24

Matrix: Solid

Date Received: 10/28/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.573		0.136	0.148		0.215	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Actinium-227	-0.0308	U	0.599	0.599		1.04	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Bismuth-212	0.571	U	0.489	0.493		0.742	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Bismuth-214	0.556		0.137	0.149		0.133	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Cesium-137	-0.0192	U	0.0472	0.0472		0.0821	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Lead-210	-0.0392	U	1.28	1.28		2.31	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Lead-212	0.568		0.106	0.129		0.102	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Lead-214	0.547		0.106	0.120		0.119	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Potassium-40	7.09		1.18	1.39		0.621	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Protactinium-231	0.604	U	0.535	0.539		1.97	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Radium-226	0.556		0.137	0.149	0.500	0.133	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Radium-228	0.573		0.136	0.148		0.215	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Thallium-208	0.261		0.0624	0.0680		0.0483	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Thorium-228	0.568		0.106	0.129		0.102	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Thorium-232	0.573		0.136	0.148		0.215	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Thorium-234	0.460	U	0.537	0.539		1.92	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Uranium-235	0.0421	U	0.122	0.122		0.278	pCi/g	10/30/15 13:09	11/20/15 12:04	1
Uranium-238	0.460	U	0.537	0.539		1.92	pCi/g	10/30/15 13:09	11/20/15 12:04	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14514-2

Client Sample ID: TI-TO04-FSS-BISU9-S001

Lab Sample ID: 160-14514-1

Date Collected: 10/21/15 13:56

Matrix: Solid

Date Received: 10/28/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.438		0.136	0.143		0.196	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Actinium-227	-0.305	U	0.558	0.559		0.936	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Bismuth-212	0.687	U	0.537	0.542		0.817	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Bismuth-214	0.523		0.135	0.145		0.126	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Cesium-137	-0.0105	U	0.0377	0.0378		0.0673	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Lead-210	0.325	U	1.24	1.24		1.92	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Lead-212	0.491		0.126	0.141		0.131	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Lead-214	0.607		0.143	0.156		0.139	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Potassium-40	13.4		1.53	2.05		0.627	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Protactinium-231	0.312	U	0.468	0.470		1.60	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Radium-226	0.523		0.135	0.145	0.500	0.126	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Radium-228	0.438		0.136	0.143		0.196	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Thallium-208	0.188		0.0548	0.0581		0.0514	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Thorium-228	0.491		0.126	0.141		0.131	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Thorium-232	0.438		0.136	0.143		0.196	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Thorium-234	0.659	U	0.534	0.538		1.76	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Uranium-235	0.125	U	0.200	0.200		0.392	pCi/g	10/30/15 13:09	11/20/15 12:49	1
Uranium-238	0.659	U	0.534	0.538		1.76	pCi/g	10/30/15 13:09	11/20/15 12:49	1

Client Sample ID: TI-TO04-FSS-BISU9-S002

Lab Sample ID: 160-14514-2

Date Collected: 10/21/15 14:14

Matrix: Solid

Date Received: 10/28/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.806		0.197	0.213		0.200	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Actinium-227	0.161	U	0.580	0.580		1.00	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Bismuth-212	0.579	U	0.596	0.599		0.937	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Bismuth-214	0.669		0.184	0.197		0.177	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Cesium-137	0.0212	U	0.0515	0.0515		0.0907	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Lead-210	1.90	U	1.63	1.64		2.32	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Lead-212	0.788		0.146	0.178		0.140	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Lead-214	0.348		0.124	0.130		0.337	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Potassium-40	13.0		1.91	2.33		0.882	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Protactinium-231	0.221	U	0.905	0.905		1.87	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Radium-226	0.669		0.184	0.197	0.500	0.177	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Radium-228	0.806		0.197	0.213		0.200	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Thallium-208	0.255		0.0790	0.0833		0.0739	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Thorium-228	0.788		0.146	0.178		0.140	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Thorium-232	0.806		0.197	0.213		0.200	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Thorium-234	0.192	U	0.155	0.156		2.26	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Uranium-235	0.129	U	0.233	0.233		0.375	pCi/g	10/30/15 13:09	11/20/15 12:50	1
Uranium-238	0.192	U	0.155	0.156		2.26	pCi/g	10/30/15 13:09	11/20/15 12:50	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14514-2

Client Sample ID: TI-TO04-FSS-BISU9-S003

Lab Sample ID: 160-14514-3

Date Collected: 10/21/15 14:26

Matrix: Solid

Date Received: 10/28/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.18		0.273	0.299		0.116	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Actinium-227	-0.181	U	0.686	0.686		1.18	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Bismuth-212	0.556	U	0.698	0.700		1.15	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Bismuth-214	0.529		0.162	0.171		0.220	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Cesium-137	0.00375	U	0.0541	0.0541		0.0997	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Lead-210	0.197	U	1.53	1.53		2.92	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Lead-212	0.792		0.193	0.218		0.203	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Lead-214	0.810		0.197	0.214		0.205	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Potassium-40	16.4		2.08	2.68		1.32	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Protactinium-231	0.610	U	0.664	0.667		3.11	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Radium-226	0.529		0.162	0.171	0.500	0.220	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Radium-228	1.18		0.273	0.299		0.116	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Thallium-208	0.370		0.0874	0.0955		0.0701	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Thorium-228	0.792		0.193	0.218		0.203	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Thorium-232	1.18		0.273	0.299		0.116	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Thorium-234	1.77	U	1.32	1.33		2.20	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Uranium-235	0.0707	U	0.343	0.343		0.588	pCi/g	10/30/15 13:09	11/20/15 12:51	1
Uranium-238	1.77	U	1.32	1.33		2.20	pCi/g	10/30/15 13:09	11/20/15 12:51	1

Client Sample ID: TI-TO04-FSS-BISU9-S004

Lab Sample ID: 160-14514-4

Date Collected: 10/22/15 09:59

Matrix: Solid

Date Received: 10/28/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.950		0.235	0.254		0.142	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Actinium-227	0.369	U	0.529	0.531		0.879	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Bismuth-212	0.413	U	0.495	0.497		0.807	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Bismuth-214	0.556		0.132	0.144		0.116	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Cesium-137	-0.000939	U	0.0386	0.0386		0.0716	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Lead-210	0.179	U	1.20	1.20		2.22	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Lead-212	0.670		0.109	0.140		0.0990	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Lead-214	0.602		0.117	0.133		0.119	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Potassium-40	12.1		1.47	1.92		0.570	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Protactinium-231	0.279	U	0.313	0.314		1.79	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Radium-226	0.556		0.132	0.144	0.500	0.116	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Radium-228	0.950		0.235	0.254		0.142	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Thallium-208	0.226		0.0709	0.0747		0.0671	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Thorium-228	0.670		0.109	0.140		0.0990	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Thorium-232	0.950		0.235	0.254		0.142	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Thorium-234	0.635	U	0.916	0.918		1.61	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Uranium-235	0.0695	U	0.171	0.172		0.407	pCi/g	10/30/15 13:09	11/20/15 12:52	1
Uranium-238	0.635	U	0.916	0.918		1.61	pCi/g	10/30/15 13:09	11/20/15 12:52	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-14514-2

Client Sample ID: TI-TO04-FSS-BISU9-S005

Lab Sample ID: 160-14514-5

Date Collected: 10/22/15 10:14

Matrix: Solid

Date Received: 10/28/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.484		0.133	0.142		0.106	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Actinium-227	0.102	U	0.157	0.158		0.781	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Bismuth-212	0.256	U	0.525	0.525		0.908	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Bismuth-214	0.238		0.117	0.120		0.154	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Cesium-137	0.00996	U	0.0309	0.0309		0.0652	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Lead-210	0.235	U	0.806	0.806		1.40	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Lead-212	0.412		0.118	0.130		0.117	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Lead-214	0.383		0.105	0.112		0.111	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Potassium-40	9.77		1.47	1.78		0.637	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Protactinium-231	0.229	U	0.315	0.316		1.77	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Radium-226	0.238		0.117	0.120	0.500	0.154	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Radium-228	0.484		0.133	0.142		0.106	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Thallium-208	0.116		0.0519	0.0533		0.0735	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Thorium-228	0.412		0.118	0.130		0.117	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Thorium-232	0.484		0.133	0.142		0.106	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Thorium-234	0.431	U	0.488	0.490		1.60	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Uranium-235	0.115	U	0.193	0.193		0.341	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Uranium-238	0.431	U	0.488	0.490		1.60	pCi/g	10/30/15 13:09	11/20/15 12:53	1

Client Sample ID: TI-TO04-FSS-BISU9-S006

Lab Sample ID: 160-14514-6

Date Collected: 10/22/15 10:24

Matrix: Solid

Date Received: 10/28/15 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.293		0.115	0.119		0.217	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Actinium-227	0.0679	U	0.114	0.115		0.598	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Bismuth-212	0.0180	U	0.436	0.436		0.806	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Bismuth-214	0.235		0.0836	0.0871		0.0889	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Cesium-137	-0.00335	U	0.0313	0.0313		0.0580	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Lead-210	-0.0159	U	0.723	0.723		1.31	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Lead-212	0.357		0.0732	0.0866		0.0729	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Lead-214	0.350		0.0744	0.0828		0.0767	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Potassium-40	10.9		1.42	1.80		0.553	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Protactinium-231	0.174	U	0.221	0.222		1.33	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Radium-226	0.235		0.0836	0.0871	0.500	0.0889	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Radium-228	0.293		0.115	0.119		0.217	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Thallium-208	0.122		0.0363	0.0385		0.0306	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Thorium-228	0.357		0.0732	0.0866		0.0729	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Thorium-232	0.293		0.115	0.119		0.217	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Thorium-234	0.258	U	0.331	0.332		1.03	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Uranium-235	0.0877	U	0.142	0.143		0.225	pCi/g	10/30/15 13:09	11/20/15 12:53	1
Uranium-238	0.258	U	0.331	0.332		1.03	pCi/g	10/30/15 13:09	11/20/15 12:53	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S601

Lab Sample ID: 160-16805-1

Date Collected: 04/04/16 14:30

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.602		0.170	0.181		0.0887	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Actinium-227	-0.160	U	0.432	0.432		0.738	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Bismuth-212	0.0867	U	0.459	0.459		0.836	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Bismuth-214	0.472		0.130	0.139		0.108	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Cesium-137	-0.0000343	U	0.0301	0.0301		0.0582	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Lead-210	-0.577	U	6.21	6.21		1.66	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Lead-212	0.384		0.0955	0.108		0.102	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Lead-214	0.473		0.112	0.122		0.0928	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Potassium-40	10.4		1.50	1.84		0.760	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Protactinium-231	0.192	U	0.344	0.345		1.52	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Radium-226	0.472		0.130	0.139	0.500	0.108	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Radium-228	0.602		0.170	0.181		0.0887	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Thallium-208	0.153		0.0545	0.0568		0.0551	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Thorium-228	0.384		0.0955	0.108		0.102	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Thorium-232	0.602		0.170	0.181		0.0887	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Thorium-234	-0.0127	U	0.0208	0.0208		1.48	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Uranium-235	0.0854	U	0.181	0.181		0.212	pCi/g	04/07/16 12:29	04/28/16 18:39	1
Uranium-238	-0.0127	U	0.0208	0.0208		1.48	pCi/g	04/07/16 12:29	04/28/16 18:39	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S602

Lab Sample ID: 160-16805-2

Date Collected: 04/04/16 14:32

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.501		0.146	0.154		0.0759	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Actinium-227	0.275	U	0.282	0.283		0.661	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Bismuth-212	-0.00673	U	0.469	0.469		0.862	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Bismuth-214	0.398		0.111	0.118		0.107	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Cesium-137	-0.00311	U	0.0408	0.0408		0.0740	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Lead-210	0.962	U	0.978	0.985		1.57	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Lead-212	0.372		0.0900	0.102		0.0981	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Lead-214	0.363		0.116	0.122		0.121	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Potassium-40	12.1		1.42	1.88		0.717	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Protactinium-231	0.222	U	0.475	0.475		2.03	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Radium-226	0.398		0.111	0.118	0.500	0.107	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Radium-228	0.501		0.146	0.154		0.0759	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Thallium-208	0.122		0.0508	0.0523		0.0583	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Thorium-228	0.372		0.0900	0.102		0.0981	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Thorium-232	0.501		0.146	0.154		0.0759	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Thorium-234	0.422	U	0.471	0.473		1.57	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Uranium-235	0.124	U	0.217	0.217		0.350	pCi/g	04/07/16 12:29	04/28/16 18:43	1
Uranium-238	0.422	U	0.471	0.473		1.57	pCi/g	04/07/16 12:29	04/28/16 18:43	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S603

Lab Sample ID: 160-16805-3

Date Collected: 04/04/16 14:36

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.209	U	0.124	0.125		0.283	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Actinium-227	0.000	U	0.383	0.383		0.793	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Bismuth-212	0.257	U	0.437	0.438		0.743	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Bismuth-214	0.490		0.124	0.134		0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Cesium-137	0.00985	U	0.0329	0.0330		0.0590	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Lead-210	-0.224	U	1.74	1.74		1.84	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Lead-212	0.328		0.107	0.115		0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Lead-214	0.441		0.113	0.122		0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Potassium-40	11.9		1.42	1.87		0.715	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Protactinium-231	0.0105	U	0.631	0.631		1.16	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Radium-226	0.490		0.124	0.134	0.500	0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Radium-228	0.209	U	0.124	0.125		0.283	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Thallium-208	0.128		0.0412	0.0433		0.0418	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Thorium-228	0.328		0.107	0.115		0.116	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Thorium-232	0.209	U	0.124	0.125		0.283	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Thorium-234	0.271	U	0.374	0.375		1.59	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Uranium-235	0.126	U	0.173	0.173		0.297	pCi/g	04/07/16 12:29	04/28/16 19:10	1
Uranium-238	0.271	U	0.374	0.375		1.59	pCi/g	04/07/16 12:29	04/28/16 19:10	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S604

Lab Sample ID: 160-16805-4

Date Collected: 04/04/16 14:39

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.441		0.121	0.129		0.0629	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Actinium-227	0.000	U	0.128	0.128		0.646	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Bismuth-212	0.272	U	0.403	0.404		0.674	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Bismuth-214	0.411		0.102	0.111		0.0805	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Cesium-137	-0.0137	U	0.0359	0.0359		0.0623	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Lead-210	0.0406	U	0.724	0.724		1.27	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Lead-212	0.331		0.0744	0.0859		0.0673	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Lead-214	0.385		0.0952	0.103		0.0786	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Potassium-40	11.3		1.25	1.70		0.571	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Protactinium-231	0.0595	U	0.715	0.715		1.27	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Radium-226	0.411		0.102	0.111	0.500	0.0805	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Radium-228	0.441		0.121	0.129		0.0629	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Thallium-208	0.155		0.0433	0.0462		0.0340	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Thorium-228	0.331		0.0744	0.0859		0.0673	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Thorium-232	0.441		0.121	0.129		0.0629	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Thorium-234	0.518	U	0.351	0.355		1.20	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Uranium-235	0.0598	U	0.0994	0.0995		0.318	pCi/g	04/07/16 12:29	04/28/16 19:11	1
Uranium-238	0.518	U	0.351	0.355		1.20	pCi/g	04/07/16 12:29	04/28/16 19:11	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S605

Lab Sample ID: 160-16805-5

Date Collected: 04/04/16 14:42

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.423		0.150	0.156		0.124	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Actinium-227	-0.135	U	0.347	0.348		0.593	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Bismuth-212	0.00536	U	0.344	0.344		0.639	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Bismuth-214	0.399		0.101	0.109		0.0747	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Cesium-137	0.000	U	0.00896	0.00896		0.0494	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Lead-210	0.742	U	0.670	0.676		1.07	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Lead-212	0.291		0.0676	0.0774		0.0697	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Lead-214	0.339		0.0873	0.0942		0.0683	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Potassium-40	12.2		1.28	1.79		0.394	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Protactinium-231	0.146	U	0.431	0.432		1.00	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Radium-226	0.399		0.101	0.109	0.500	0.0747	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Radium-228	0.423		0.150	0.156		0.124	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Thallium-208	0.158		0.0390	0.0423		0.0231	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Thorium-228	0.291		0.0676	0.0774		0.0697	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Thorium-232	0.423		0.150	0.156		0.124	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Thorium-234	0.693	U	0.337	0.345		1.33	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Uranium-235	-0.00506	U	0.0113	0.0113		0.325	pCi/g	04/07/16 12:29	04/28/16 19:12	1
Uranium-238	0.693	U	0.337	0.345		1.33	pCi/g	04/07/16 12:29	04/28/16 19:12	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S606

Lab Sample ID: 160-16805-6

Date Collected: 04/04/16 14:45

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0997	U	0.0926	0.0931		0.351	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Actinium-227	0.167	U	0.466	0.466		0.795	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Bismuth-212	0.265	U	0.521	0.522		0.897	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Bismuth-214	0.468		0.124	0.133		0.105	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Cesium-137	0.000	U	0.00911	0.00911		0.117	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Lead-210	-0.809	U	43.2	43.2		2.14	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Lead-212	0.359		0.109	0.119		0.123	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Lead-214	0.389		0.0879	0.0967		0.125	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Potassium-40	13.6		1.64	2.15		0.572	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Protactinium-231	-0.0281	U	0.0677	0.0678		1.21	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Radium-226	0.468		0.124	0.133	0.500	0.105	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Radium-228	0.0997	U	0.0926	0.0931		0.351	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Thallium-208	0.145		0.0480	0.0503		0.0476	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Thorium-228	0.359		0.109	0.119		0.123	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Thorium-232	0.0997	U	0.0926	0.0931		0.351	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Thorium-234	0.367	U	0.477	0.478		1.51	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Uranium-235	0.0583	U	0.170	0.170		0.266	pCi/g	04/07/16 12:29	04/28/16 19:13	1
Uranium-238	0.367	U	0.477	0.478		1.51	pCi/g	04/07/16 12:29	04/28/16 19:13	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S607

Lab Sample ID: 160-16805-7

Date Collected: 04/04/16 14:49

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.231	U	0.146	0.148		0.267	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Actinium-227	0.314	U	0.419	0.420		0.693	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Bismuth-212	0.330	U	0.457	0.458		0.759	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Bismuth-214	0.398		0.113	0.120		0.115	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Cesium-137	-0.00242	U	0.0390	0.0390		0.0713	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Lead-210	0.805	U	1.32	1.32		1.82	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Lead-212	0.378		0.100	0.112		0.109	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Lead-214	0.373		0.0955	0.103		0.0984	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Potassium-40	13.2		1.48	2.01		0.723	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Protactinium-231	0.133	U	0.218	0.219		1.85	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Radium-226	0.398		0.113	0.120	0.500	0.115	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Radium-228	0.231	U	0.146	0.148		0.267	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Thallium-208	0.159		0.0434	0.0464		0.0481	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Thorium-228	0.378		0.100	0.112		0.109	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Thorium-232	0.231	U	0.146	0.148		0.267	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Thorium-234	0.255	U	0.486	0.486		1.66	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Uranium-235	0.161	U	0.197	0.197		0.307	pCi/g	04/07/16 12:29	04/28/16 19:17	1
Uranium-238	0.255	U	0.486	0.486		1.66	pCi/g	04/07/16 12:29	04/28/16 19:17	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S608

Lab Sample ID: 160-16805-8

Date Collected: 04/04/16 14:55

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.225	U	0.125	0.127		0.264	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Actinium-227	-0.0656	U	0.447	0.448		0.777	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Bismuth-212	0.390	U	0.454	0.456		0.738	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Bismuth-214	0.365		0.115	0.121		0.114	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Cesium-137	-0.00401	U	0.0334	0.0334		0.0615	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Lead-210	0.255	U	1.00	1.00		1.82	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Lead-212	0.378		0.0986	0.110		0.107	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Lead-214	0.387		0.122	0.129		0.120	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Potassium-40	13.0		1.48	1.99		0.715	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Protactinium-231	0.479	U	0.387	0.391		1.62	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Radium-226	0.365		0.115	0.121	0.500	0.114	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Radium-228	0.225	U	0.125	0.127		0.264	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Thallium-208	0.181		0.0529	0.0562		0.0463	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Thorium-228	0.378		0.0986	0.110		0.107	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Thorium-232	0.225	U	0.125	0.127		0.264	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Thorium-234	0.430	U	0.459	0.462		1.43	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Uranium-235	0.106	U	0.189	0.190		0.304	pCi/g	04/07/16 12:29	04/28/16 19:47	1
Uranium-238	0.430	U	0.459	0.462		1.43	pCi/g	04/07/16 12:29	04/28/16 19:47	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S609

Lab Sample ID: 160-16805-9

Date Collected: 04/04/16 15:01

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.311		0.0959	0.101		0.227	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Actinium-227	0.0339	U	0.337	0.337		0.594	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Bismuth-212	0.184	U	0.369	0.369		0.637	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Bismuth-214	0.390		0.0950	0.103		0.0762	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Cesium-137	-0.0120	U	0.0399	0.0399		0.0698	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Lead-210	0.684	U	0.852	0.856		1.40	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Lead-212	0.396		0.105	0.117		0.0989	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Lead-214	0.446		0.101	0.111		0.0744	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Potassium-40	12.6		1.36	1.88		0.610	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Protactinium-231	0.366	U	0.471	0.473		1.10	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Radium-226	0.390		0.0950	0.103	0.500	0.0762	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Radium-228	0.311		0.0959	0.101		0.227	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Thallium-208	0.125		0.0381	0.0403		0.0331	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Thorium-228	0.396		0.105	0.117		0.0989	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Thorium-232	0.311		0.0959	0.101		0.227	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Thorium-234	0.649	U	0.437	0.443		1.34	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Uranium-235	0.0928	U	0.176	0.176		0.292	pCi/g	04/07/16 12:29	04/28/16 19:48	1
Uranium-238	0.649	U	0.437	0.443		1.34	pCi/g	04/07/16 12:29	04/28/16 19:48	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S610

Lab Sample ID: 160-16805-10

Date Collected: 04/04/16 15:05

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.502		0.153	0.162		0.176	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Actinium-227	-0.0378	U	0.0924	0.0925		0.807	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Bismuth-212	0.214	U	0.405	0.406		0.697	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Bismuth-214	0.451		0.101	0.111		0.0871	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Cesium-137	-0.0114	U	0.0379	0.0380		0.0672	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-210	0.122	U	0.965	0.965		1.67	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-212	0.372		0.0906	0.103		0.0960	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-214	0.443		0.107	0.117		0.102	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Potassium-40	13.4		1.48	2.02		0.500	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Protactinium-231	0.150	U	0.281	0.281		1.33	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Radium-226	0.451		0.101	0.111	0.500	0.0871	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Radium-228	0.502		0.153	0.162		0.176	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thallium-208	0.134		0.0493	0.0512		0.0536	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-228	0.372		0.0906	0.103		0.0960	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-232	0.502		0.153	0.162		0.176	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-234	0.362	U	0.312	0.315		1.74	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Uranium-235	0.0737	U	0.213	0.213		0.365	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Uranium-238	0.362	U	0.312	0.315		1.74	pCi/g	04/07/16 12:29	04/28/16 19:49	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S611

Lab Sample ID: 160-16805-11

Date Collected: 04/04/16 15:09

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.658		0.154	0.168		0.0664	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Actinium-227	0.125	U	0.424	0.424		0.726	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Bismuth-212	0.242	U	0.419	0.419		0.711	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Bismuth-214	0.484		0.0899	0.103		0.0308	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Cesium-137	-0.00244	U	0.0311	0.0311		0.0571	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-210	0.561	U	0.820	0.823		1.36	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-212	0.412		0.0739	0.0911		0.0652	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Lead-214	0.444		0.0821	0.0942		0.0692	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Potassium-40	12.3		1.33	1.83		0.422	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Protactinium-231	0.256	U	0.239	0.241		1.61	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Radium-226	0.484		0.0899	0.103	0.500	0.0308	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Radium-228	0.658		0.154	0.168		0.0664	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thallium-208	0.109		0.0443	0.0457		0.0574	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-228	0.412		0.0739	0.0911		0.0652	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-232	0.658		0.154	0.168		0.0664	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Thorium-234	0.0607	U	0.242	0.242		1.44	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Uranium-235	-0.00714	U	0.0141	0.0141		0.341	pCi/g	04/07/16 12:29	04/28/16 19:49	1
Uranium-238	0.0607	U	0.242	0.242		1.44	pCi/g	04/07/16 12:29	04/28/16 19:49	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S612

Lab Sample ID: 160-16805-12

Date Collected: 04/04/16 15:11

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.710		0.145	0.162		0.0950	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Actinium-227	-0.0108	U	0.0292	0.0292		0.804	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Bismuth-212	0.410	U	0.514	0.515		0.841	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Bismuth-214	0.231		0.107	0.109		0.128	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Cesium-137	0.000	U	0.00958	0.00958		0.0810	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-210	0.821	U	0.978	0.983		1.57	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-212	0.493		0.116	0.132		0.119	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-214	0.435		0.112	0.121		0.0979	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Potassium-40	12.5		1.62	2.06		0.601	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Protactinium-231	0.184	U	0.308	0.309		1.40	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Radium-226	0.231		0.107	0.109	0.500	0.128	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Radium-228	0.710		0.145	0.162		0.0950	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thallium-208	0.139		0.0627	0.0643		0.0695	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-228	0.493		0.116	0.132		0.119	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-232	0.710		0.145	0.162		0.0950	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-234	0.299	U	0.476	0.477		1.50	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Uranium-235	0.0510	U	0.157	0.157		0.368	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Uranium-238	0.299	U	0.476	0.477		1.50	pCi/g	04/07/16 12:29	04/28/16 19:50	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S613

Lab Sample ID: 160-16805-13

Date Collected: 04/04/16 15:15

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.439		0.149	0.156		0.108	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Actinium-227	0.0708	U	0.411	0.411		0.712	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Bismuth-212	0.334	U	0.432	0.434		0.713	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Bismuth-214	0.387		0.0942	0.102		0.0871	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Cesium-137	0.000	U	0.0253	0.0253		0.0877	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-210	0.961	U	1.43	1.43		1.84	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-212	0.372		0.107	0.117		0.115	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Lead-214	0.427		0.0986	0.108		0.117	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Potassium-40	12.3		1.38	1.86		0.670	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Protactinium-231	0.0696	U	0.122	0.122		1.29	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Radium-226	0.387		0.0942	0.102	0.500	0.0871	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Radium-228	0.439		0.149	0.156		0.108	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thallium-208	0.144		0.0575	0.0594		0.0641	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-228	0.372		0.107	0.117		0.115	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-232	0.439		0.149	0.156		0.108	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Thorium-234	0.474	U	0.425	0.428		1.43	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Uranium-235	0.0615	U	0.162	0.162		0.320	pCi/g	04/07/16 12:29	04/28/16 19:50	1
Uranium-238	0.474	U	0.425	0.428		1.43	pCi/g	04/07/16 12:29	04/28/16 19:50	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S614

Lab Sample ID: 160-16805-14

Date Collected: 04/04/16 15:18

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.413		0.205	0.209		0.298	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Actinium-227	0.00154	U	0.413	0.413		0.732	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Bismuth-212	0.135	U	0.473	0.473		0.841	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Bismuth-214	0.384		0.121	0.127		0.128	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Cesium-137	0.0155	U	0.0404	0.0404		0.0707	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Lead-210	1.30	U	1.37	1.38		1.84	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Lead-212	0.433		0.109	0.122		0.114	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Lead-214	0.389		0.0951	0.103		0.0997	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Potassium-40	11.4		1.43	1.84		0.758	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Protactinium-231	0.0282	U	0.0609	0.0610		1.56	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Radium-226	0.384		0.121	0.127	0.500	0.128	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Radium-228	0.413		0.205	0.209		0.298	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Thallium-208	0.154		0.0678	0.0696		0.0653	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Thorium-228	0.433		0.109	0.122		0.114	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Thorium-232	0.413		0.205	0.209		0.298	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Thorium-234	0.574	U	0.374	0.379		1.64	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Uranium-235	0.0990	U	0.202	0.202		0.308	pCi/g	04/07/16 12:29	04/28/16 20:20	1
Uranium-238	0.574	U	0.374	0.379		1.64	pCi/g	04/07/16 12:29	04/28/16 20:20	1

TestAmerica St. Louis

reviewed by E-Lab Consultants 2/21/2017
5/2/2016

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S615

Lab Sample ID: 160-16805-15

Date Collected: 04/04/16 15:21

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.287		0.137	0.140		0.207	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Actinium-227	0.0448	U	0.125	0.125		0.548	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Bismuth-212	0.304	U	0.388	0.389		0.636	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Bismuth-214	0.459		0.107	0.117		0.0702	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Cesium-137	-0.0193	U	0.0419	0.0420		0.0723	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Lead-210	-0.195	U	2.18	2.18		1.66	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Lead-212	0.395		0.0876	0.101		0.0897	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Lead-214	0.442		0.0786	0.0910		0.0789	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Potassium-40	10.9		1.41	1.79		0.453	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Protactinium-231	0.659	U	0.385	0.392		1.49	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Radium-226	0.459		0.107	0.117	0.500	0.0702	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Radium-228	0.287		0.137	0.140		0.207	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Thallium-208	0.201		0.0513	0.0554		0.0315	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Thorium-228	0.395		0.0876	0.101		0.0897	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Thorium-232	0.287		0.137	0.140		0.207	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Thorium-234	0.288	U	0.291	0.292		1.34	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Uranium-235	0.0557	U	0.130	0.131		0.228	pCi/g	04/07/16 12:29	04/28/16 20:33	1
Uranium-238	0.288	U	0.291	0.292		1.34	pCi/g	04/07/16 12:29	04/28/16 20:33	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S616

Lab Sample ID: 160-16805-16

Date Collected: 04/04/16 15:25

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.554		0.132	0.144		0.105	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Actinium-227	0.194	U	0.351	0.352		0.592	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Bismuth-212	0.295	U	0.366	0.368		0.600	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Bismuth-214	0.367		0.100	0.107		0.0939	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Cesium-137	0.00361	U	0.0300	0.0300		0.0548	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Lead-210	0.439	U	0.708	0.710		1.19	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Lead-212	0.324		0.0914	0.101		0.0905	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Lead-214	0.489		0.100	0.112		0.0837	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Potassium-40	10.8		1.24	1.66		0.584	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Protactinium-231	0.132	U	0.180	0.181		1.41	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Radium-226	0.367		0.100	0.107	0.500	0.0939	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Radium-228	0.554		0.132	0.144		0.105	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Thallium-208	0.118		0.0328	0.0351		0.0248	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Thorium-228	0.324		0.0914	0.101		0.0905	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Thorium-232	0.554		0.132	0.144		0.105	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Thorium-234	0.408	U	0.694	0.695		1.16	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Uranium-235	0.0197	U	0.0918	0.0918		0.355	pCi/g	04/07/16 12:29	04/28/16 20:23	1
Uranium-238	0.408	U	0.694	0.695		1.16	pCi/g	04/07/16 12:29	04/28/16 20:23	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S617

Lab Sample ID: 160-16805-17

Date Collected: 04/04/16 15:28

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.603		0.163	0.174		0.0747	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Actinium-227	0.106	U	0.513	0.513		0.883	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Bismuth-212	0.155	U	0.518	0.518		0.909	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Bismuth-214	0.422		0.137	0.144		0.136	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Cesium-137	-0.00694	U	0.0365	0.0365		0.0658	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Lead-210	0.450	U	0.920	0.921		1.74	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Lead-212	0.359		0.110	0.119		0.121	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Lead-214	0.455		0.0991	0.110		0.124	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Potassium-40	12.9		1.44	1.96		0.491	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Protactinium-231	0.0882	U	0.390	0.390		1.42	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Radium-226	0.422		0.137	0.144	0.500	0.136	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Radium-228	0.603		0.163	0.174		0.0747	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Thallium-208	0.136		0.0516	0.0535		0.0527	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Thorium-228	0.359		0.110	0.119		0.121	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Thorium-232	0.603		0.163	0.174		0.0747	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Thorium-234	0.293	U	0.485	0.486		1.79	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Uranium-235	0.0442	U	0.178	0.178		0.380	pCi/g	04/07/16 12:29	04/28/16 20:24	1
Uranium-238	0.293	U	0.485	0.486		1.79	pCi/g	04/07/16 12:29	04/28/16 20:24	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S618

Lab Sample ID: 160-16805-18

Date Collected: 04/04/16 15:32

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.458		0.148	0.155		0.155	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Actinium-227	0.0390	U	0.149	0.149		0.591	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Bismuth-212	0.182	U	0.390	0.391		0.674	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Bismuth-214	0.445		0.0899	0.101		0.0462	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Cesium-137	0.00896	U	0.0275	0.0276		0.0490	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-210	-0.206	U	0.897	0.897		1.54	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-212	0.395		0.0834	0.0978		0.0794	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-214	0.410		0.0871	0.0969		0.0649	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Potassium-40	12.6		1.30	1.83		0.394	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Protactinium-231	0.177	U	0.413	0.414		1.27	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Radium-226	0.445		0.0899	0.101	0.500	0.0462	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Radium-228	0.458		0.148	0.155		0.155	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thallium-208	0.0928		0.0391	0.0403		0.0511	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-228	0.395		0.0834	0.0978		0.0794	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-232	0.458		0.148	0.155		0.155	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-234	0.940	U	0.673	0.680		1.06	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Uranium-235	0.0493	U	0.114	0.115		0.329	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Uranium-238	0.940	U	0.673	0.680		1.06	pCi/g	04/07/16 12:29	04/28/16 20:25	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16805-2

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S619

Lab Sample ID: 160-16805-19

Date Collected: 04/04/16 15:36

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.226		0.139	0.141		0.221	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Actinium-227	0.120	U	0.248	0.249		0.655	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Bismuth-212	0.388	U	0.493	0.494		0.809	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Bismuth-214	0.396		0.134	0.141		0.134	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Cesium-137	0.00212	U	0.0402	0.0402		0.0744	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-210	0.924	U	0.994	0.999		1.48	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-212	0.260		0.0836	0.0902		0.116	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Lead-214	0.356		0.115	0.121		0.135	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Potassium-40	11.7		1.53	1.94		0.576	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Protactinium-231	0.364	U	0.489	0.491		1.58	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Radium-226	0.396		0.134	0.141	0.500	0.134	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Radium-228	0.226		0.139	0.141		0.221	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thallium-208	0.106		0.0422	0.0436		0.0471	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-228	0.260		0.0836	0.0902		0.116	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-232	0.226		0.139	0.141		0.221	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Thorium-234	0.199	U	0.452	0.453		1.52	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Uranium-235	0.0801	U	0.139	0.140		0.276	pCi/g	04/07/16 12:29	04/28/16 20:25	1
Uranium-238	0.199	U	0.452	0.453		1.52	pCi/g	04/07/16 12:29	04/28/16 20:25	1

Client Sample ID: TI-TITO04-BS-R-FSSSU6-S620

Lab Sample ID: 160-16805-20

Date Collected: 04/04/16 15:40

Matrix: Solid

Date Received: 04/06/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.608		0.161	0.173		0.122	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Actinium-227	0.221	U	0.286	0.287		0.620	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Bismuth-212	0.641	U	0.523	0.527		0.807	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Bismuth-214	0.365		0.108	0.114		0.106	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Cesium-137	0.00378	U	0.0394	0.0394		0.0711	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Lead-210	0.944	U	1.05	1.05		1.63	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Lead-212	0.467		0.0925	0.110		0.0975	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Lead-214	0.456		0.0995	0.110		0.0981	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Potassium-40	13.4		1.45	1.99		0.683	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Protactinium-231	0.672	U	0.669	0.673		1.69	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Radium-226	0.365		0.108	0.114	0.500	0.106	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Radium-228	0.608		0.161	0.173		0.122	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Thallium-208	0.103		0.0522	0.0533		0.0752	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Thorium-228	0.467		0.0925	0.110		0.0975	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Thorium-232	0.608		0.161	0.173		0.122	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Thorium-234	0.437	U	0.382	0.385		1.72	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Uranium-235	0.122	U	0.142	0.142		0.310	pCi/g	04/07/16 12:29	04/28/16 20:26	1
Uranium-238	0.437	U	0.382	0.385		1.72	pCi/g	04/07/16 12:29	04/28/16 20:26	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S001

Date Collected: 04/14/16 14:30

Date Received: 04/19/16 08:40

Lab Sample ID: 160-17034-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.140	U	0.208	0.208		0.303	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Actinium-227	0.149	U	0.284	0.284		1.40	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Bismuth-212	0.245	U	0.418	0.419		0.718	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Bismuth-214	0.336		0.104	0.110		0.0939	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Cesium-137	0.0234	U	0.0550	0.0551		0.0955	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Lead-210	-1.48	U	1.27	1.29		3.22	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Lead-212	0.391		0.0947	0.107		0.108	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Lead-214	0.449		0.132	0.140		0.112	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Potassium-40	11.4		1.66	2.03		0.443	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Protactinium-231	-0.636	U	2.75	2.75		4.64	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Radium-226	0.336		0.104	0.110	0.500	0.0939	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Radium-228	0.140	U	0.208	0.208		0.303	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Thallium-208	0.134		0.0625	0.0640		0.0666	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Thorium-228	0.391		0.0947	0.107		0.108	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Thorium-232	0.140	U	0.208	0.208		0.303	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Thorium-234	0.126	U	1.48	1.48		2.51	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Uranium-235	0.143	U	0.491	0.492		0.826	pCi/g	04/21/16 08:59	05/13/16 09:33	1
Uranium-238	0.126	U	1.48	1.48		2.51	pCi/g	04/21/16 08:59	05/13/16 09:33	1

Client Sample ID: TI-TO04-BS-R-SU8-S002

Date Collected: 04/14/16 14:20

Date Received: 04/19/16 08:40

Lab Sample ID: 160-17034-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.532		0.174	0.183		0.129	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Actinium-227	0.0166	U	0.268	0.268		1.13	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Bismuth-212	-0.0107	U	0.597	0.597		1.07	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Bismuth-214	0.0535	U	0.137	0.137		0.216	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Cesium-137	-0.0215	U	0.0726	0.0727		0.100	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Lead-210	0.300	U	1.04	1.04		1.54	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Lead-212	0.383		0.0807	0.0947		0.0903	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Lead-214	0.446		0.123	0.131		0.131	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Potassium-40	10.2		1.30	1.67		0.676	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Protactinium-231	0.560	U	2.06	2.06		3.47	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Radium-226	0.0535	U	0.137	0.137	0.500	0.216	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Radium-228	0.532		0.174	0.183		0.129	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Thallium-208	0.165		0.0447	0.0478		0.0367	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Thorium-228	0.383		0.0807	0.0947		0.0903	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Thorium-232	0.532		0.174	0.183		0.129	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Thorium-234	0.526	U	0.491	0.495		1.35	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Uranium-235	0.0157	U	0.0260	0.0260		0.973	pCi/g	04/21/16 08:59	05/13/16 09:37	1
Uranium-238	0.526	U	0.491	0.495		1.35	pCi/g	04/21/16 08:59	05/13/16 09:37	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S003

Lab Sample ID: 160-17034-3

Date Collected: 04/14/16 14:25

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.364		0.190	0.194		0.176	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Actinium-227	0.271	U	0.454	0.455		1.20	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Bismuth-212	-0.636	U	1.20	1.20		1.76	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Bismuth-214	0.156	U	0.0949	0.0962		0.279	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Cesium-137	-0.0794	U	0.0980	0.0983		0.164	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Lead-210	-0.851	U	1.85	1.85		3.10	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Lead-212	0.344		0.128	0.136		0.190	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Lead-214	0.383		0.118	0.125		0.107	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Potassium-40	11.5		1.64	2.02		0.684	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Protactinium-231	-0.820	U	2.66	2.66		4.48	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Radium-226	0.156	U	0.0949	0.0962	0.500	0.279	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Radium-228	0.364		0.190	0.194		0.176	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Thallium-208	0.150		0.0484	0.0508		0.0395	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Thorium-228	0.344		0.128	0.136		0.190	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Thorium-232	0.364		0.190	0.194		0.176	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Thorium-234	-0.985	U	1.44	1.44		2.37	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Uranium-235	0.0357	U	0.0775	0.0776		0.996	pCi/g	04/21/16 08:59	05/13/16 09:38	1
Uranium-238	-0.985	U	1.44	1.44		2.37	pCi/g	04/21/16 08:59	05/13/16 09:38	1

Client Sample ID: TI-TO04-BS-R-SU8-S004

Lab Sample ID: 160-17034-4

Date Collected: 04/14/16 14:22

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.446		0.123	0.131		0.143	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Actinium-227	-0.0237	U	0.0396	0.0397		1.07	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Bismuth-212	0.000	U	0.406	0.406		1.09	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Bismuth-214	0.333		0.0927	0.0990		0.0803	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Cesium-137	0.000394	U	0.0531	0.0531		0.0938	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Lead-210	-0.528	U	1.15	1.15		1.93	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Lead-212	0.381		0.0669	0.0831		0.0581	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Lead-214	0.366		0.0839	0.0921		0.0955	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Potassium-40	10.5		1.30	1.69		0.670	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Protactinium-231	0.290	U	1.09	1.09		3.51	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Radium-226	0.333		0.0927	0.0990	0.500	0.0803	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Radium-228	0.446		0.123	0.131		0.143	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Thallium-208	0.126		0.0504	0.0521		0.0455	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Thorium-228	0.381		0.0669	0.0831		0.0581	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Thorium-232	0.446		0.123	0.131		0.143	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Thorium-234	0.318	U	1.00	1.01		1.70	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Uranium-235	-0.0315	U	0.0572	0.0572		0.701	pCi/g	04/21/16 08:59	05/15/16 15:18	1
Uranium-238	0.318	U	1.00	1.01		1.70	pCi/g	04/21/16 08:59	05/15/16 15:18	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S005

Lab Sample ID: 160-17034-5

Date Collected: 04/14/16 14:26

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.484		0.181	0.188		0.289	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Actinium-227	0.0700	U	0.567	0.567		0.840	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Bismuth-212	-0.371	U	1.05	1.06		1.82	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Bismuth-214	0.351		0.118	0.123		0.120	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Cesium-137	-0.00399	U	0.0576	0.0576		0.106	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-210	0.269	U	0.939	0.940		1.51	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-212	0.388		0.0993	0.111		0.114	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-214	0.278		0.111	0.114		0.135	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Potassium-40	11.9		1.85	2.21		0.745	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Protactinium-231	0.000	U	0.336	0.336		4.58	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Radium-226	0.351		0.118	0.123	0.500	0.120	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Radium-228	0.484		0.181	0.188		0.289	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thallium-208	0.108		0.0599	0.0609		0.0602	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-228	0.388		0.0993	0.111		0.114	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-232	0.484		0.181	0.188		0.289	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-234	0.416	U	0.512	0.514		1.58	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Uranium-235	0.0321	U	0.138	0.138		0.667	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Uranium-238	0.416	U	0.512	0.514		1.58	pCi/g	04/21/16 08:59	05/13/16 09:42	1

Client Sample ID: TI-TO04-BS-R-SU8-S006

Lab Sample ID: 160-17034-6

Date Collected: 04/14/16 14:29

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.497		0.113	0.124		0.145	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Actinium-227	-0.0734	U	0.124	0.124		1.43	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Bismuth-212	0.238	U	0.636	0.636		1.10	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Bismuth-214	0.348		0.115	0.120		0.113	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Cesium-137	-0.0214	U	0.0381	0.0382		0.0941	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-210	1.02	U	1.13	1.13		1.59	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-212	0.400		0.0870	0.101		0.0974	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Lead-214	0.398		0.106	0.114		0.109	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Potassium-40	11.5		1.47	1.88		0.766	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Protactinium-231	0.000	U	0.645	0.645		4.13	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Radium-226	0.348		0.115	0.120	0.500	0.113	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Radium-228	0.497		0.113	0.124		0.145	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thallium-208	0.101		0.0471	0.0482		0.0523	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-228	0.400		0.0870	0.101		0.0974	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-232	0.497		0.113	0.124		0.145	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Thorium-234	-0.0908	U	0.995	0.995		1.72	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Uranium-235	-0.0426	U	0.0786	0.0787		0.548	pCi/g	04/21/16 08:59	05/13/16 09:42	1
Uranium-238	-0.0908	U	0.995	0.995		1.72	pCi/g	04/21/16 08:59	05/13/16 09:42	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S007

Lab Sample ID: 160-17034-7

Date Collected: 04/14/16 14:39

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.356		0.143	0.147		0.126	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Actinium-227	-0.312	U	0.764	0.764		1.28	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Bismuth-212	0.000	U	0.422	0.422		1.11	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Bismuth-214	0.252		0.0810	0.0851		0.0782	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Cesium-137	0.00987	U	0.0350	0.0350		0.0621	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Lead-210	0.404	U	0.984	0.985		1.50	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Lead-212	0.306		0.0754	0.0852		0.0913	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Lead-214	0.377		0.0887	0.0969		0.0988	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Potassium-40	9.52		1.22	1.56		0.498	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Protactinium-231	-0.478	U	2.17	2.17		3.66	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Radium-226	0.252		0.0810	0.0851	0.500	0.0782	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Radium-228	0.356		0.143	0.147		0.126	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Thallium-208	0.185		0.0447	0.0487		0.0341	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Thorium-228	0.306		0.0754	0.0852		0.0913	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Thorium-232	0.356		0.143	0.147		0.126	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Thorium-234	0.316	U	0.314	0.315		2.13	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Uranium-235	-0.0611	U	0.163	0.163		0.757	pCi/g	04/21/16 08:59	05/13/16 10:33	1
Uranium-238	0.316	U	0.314	0.315		2.13	pCi/g	04/21/16 08:59	05/13/16 10:33	1

Client Sample ID: TI-TO04-BS-R-SU8-S008

Lab Sample ID: 160-17034-8

Date Collected: 04/14/16 14:48

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.364		0.127	0.132		0.325	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Actinium-227	-0.282	U	0.646	0.647		0.923	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Bismuth-212	0.283	U	0.522	0.523		0.894	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Bismuth-214	0.340		0.111	0.117		0.101	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Cesium-137	-0.0523	U	0.0963	0.0965		0.162	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Lead-210	0.966	U	1.04	1.05		1.51	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Lead-212	0.334		0.0809	0.0918		0.0899	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Lead-214	0.356		0.124	0.129		0.139	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Potassium-40	11.7		1.58	1.98		0.614	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Protactinium-231	0.0646	U	0.809	0.809		3.16	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Radium-226	0.340		0.111	0.117	0.500	0.101	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Radium-228	0.364		0.127	0.132		0.325	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Thallium-208	0.146		0.0494	0.0517		0.0358	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Thorium-228	0.334		0.0809	0.0918		0.0899	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Thorium-232	0.364		0.127	0.132		0.325	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Thorium-234	1.52		0.755	0.772		1.11	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Uranium-235	-0.155	U	0.357	0.358		0.571	pCi/g	04/21/16 08:59	05/15/16 14:13	1
Uranium-238	1.52		0.755	0.772		1.11	pCi/g	04/21/16 08:59	05/15/16 14:13	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S009

Lab Sample ID: 160-17034-9

Date Collected: 04/14/16 14:33

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.520		0.137	0.147		0.133	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Actinium-227	0.130	U	0.540	0.541		0.786	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Bismuth-212	0.272	U	0.592	0.593		1.02	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Bismuth-214	0.358		0.119	0.124		0.110	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Cesium-137	0.0205	U	0.0554	0.0555		0.0961	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Lead-210	-0.332	U	1.32	1.32		2.01	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Lead-212	0.276		0.0894	0.0963		0.121	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Lead-214	0.337		0.109	0.115		0.110	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Potassium-40	10.4		1.46	1.81		0.589	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Protactinium-231	0.476	U	1.03	1.03		2.42	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Radium-226	0.358		0.119	0.124	0.500	0.110	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Radium-228	0.520		0.137	0.147		0.133	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Thallium-208	0.125		0.0450	0.0468		0.0378	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Thorium-228	0.276		0.0894	0.0963		0.121	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Thorium-232	0.520		0.137	0.147		0.133	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Thorium-234	-0.923	U	1.05	1.06		2.01	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Uranium-235	-0.0363	U	0.0567	0.0568		0.532	pCi/g	04/21/16 08:59	05/13/16 10:35	1
Uranium-238	-0.923	U	1.05	1.06		2.01	pCi/g	04/21/16 08:59	05/13/16 10:35	1

Client Sample ID: TI-TO04-BS-R-SU8-S010

Lab Sample ID: 160-17034-10

Date Collected: 04/14/16 14:23

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.467		0.160	0.167		0.107	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Actinium-227	-0.221	U	0.781	0.782		1.32	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Bismuth-212	0.359	U	0.708	0.709		1.21	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Bismuth-214	0.307		0.127	0.131		0.140	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Cesium-137	0.00219	U	0.0733	0.0733		0.131	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Lead-210	0.517	U	1.11	1.11		1.60	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Lead-212	0.347		0.131	0.138		0.135	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Lead-214	0.310		0.130	0.134		0.201	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Potassium-40	10.7		1.59	1.93		0.438	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Protactinium-231	0.289	U	0.900	0.901		3.91	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Radium-226	0.307		0.127	0.131	0.500	0.140	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Radium-228	0.467		0.160	0.167		0.107	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Thallium-208	0.0506	U	0.0808	0.0809		0.108	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Thorium-228	0.347		0.131	0.138		0.135	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Thorium-232	0.467		0.160	0.167		0.107	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Thorium-234	-0.894	U	0.927	0.932		2.51	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Uranium-235	-0.219	U	0.305	0.306		1.06	pCi/g	04/21/16 08:59	05/13/16 10:36	1
Uranium-238	-0.894	U	0.927	0.932		2.51	pCi/g	04/21/16 08:59	05/13/16 10:36	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S011

Lab Sample ID: 160-17034-11

Date Collected: 04/14/16 14:28

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.535		0.189	0.196		0.135	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Actinium-227	-0.0466	U	0.0761	0.0763		1.32	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Bismuth-212	-0.192	U	0.802	0.802		1.39	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Bismuth-214	0.463		0.115	0.125		0.0951	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Cesium-137	0.0170	U	0.0371	0.0372		0.0641	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Lead-210	0.691	U	1.49	1.49		1.85	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Lead-212	0.338		0.0825	0.0934		0.0989	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Lead-214	0.458		0.123	0.131		0.114	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Potassium-40	12.5		1.47	1.95		0.717	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Protactinium-231	-0.826	U	2.60	2.60		4.36	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Radium-226	0.463		0.115	0.125	0.500	0.0951	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Radium-228	0.535		0.189	0.196		0.135	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Thallium-208	0.209		0.0574	0.0614		0.0481	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Thorium-228	0.338		0.0825	0.0934		0.0989	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Thorium-232	0.535		0.189	0.196		0.135	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Thorium-234	-0.208	U	1.35	1.35		2.30	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Uranium-235	0.000	U	0.189	0.189		0.893	pCi/g	04/21/16 08:59	05/13/16 10:37	1
Uranium-238	-0.208	U	1.35	1.35		2.30	pCi/g	04/21/16 08:59	05/13/16 10:37	1

Client Sample ID: TI-TO04-BS-R-SU8-S012

Lab Sample ID: 160-17034-12

Date Collected: 04/14/16 14:33

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.332		0.153	0.156		0.172	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Actinium-227	0.245	U	0.511	0.512		1.18	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Bismuth-212	-0.0225	U	0.798	0.798		1.43	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Bismuth-214	0.376		0.131	0.137		0.119	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Cesium-137	-0.0207	U	0.0574	0.0575		0.108	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Lead-210	-0.382	U	1.67	1.67		2.83	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Lead-212	0.427		0.0919	0.107		0.101	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Lead-214	0.375		0.106	0.113		0.127	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Potassium-40	9.84		1.51	1.81		0.669	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Protactinium-231	0.657	U	1.84	1.84		4.19	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Radium-226	0.376		0.131	0.137	0.500	0.119	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Radium-228	0.332		0.153	0.156		0.172	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Thallium-208	0.105		0.0800	0.0807		0.0901	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Thorium-228	0.427		0.0919	0.107		0.101	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Thorium-232	0.332		0.153	0.156		0.172	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Thorium-234	-0.160	U	1.46	1.46		2.49	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Uranium-235	-0.218	U	0.401	0.402		0.813	pCi/g	04/21/16 08:59	05/13/16 11:51	1
Uranium-238	-0.160	U	1.46	1.46		2.49	pCi/g	04/21/16 08:59	05/13/16 11:51	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S013

Lab Sample ID: 160-17034-13

Date Collected: 04/14/16 14:41

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.445		0.175	0.181		0.193	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Actinium-227	0.197	U	0.317	0.317		0.891	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Bismuth-212	0.342	U	0.598	0.599		1.01	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Bismuth-214	0.354		0.117	0.123		0.0955	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Cesium-137	-0.00580	U	0.0576	0.0576		0.0892	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Lead-210	-0.0944	U	1.25	1.25		2.14	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Lead-212	0.361		0.0688	0.0831		0.0685	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Lead-214	0.376		0.0796	0.0887		0.0737	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Potassium-40	10.8		1.42	1.80		0.562	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Protactinium-231	-0.657	U	2.17	2.17		3.65	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Radium-226	0.354		0.117	0.123	0.500	0.0955	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Radium-228	0.445		0.175	0.181		0.193	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Thallium-208	0.181		0.0513	0.0546		0.0365	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Thorium-228	0.361		0.0688	0.0831		0.0685	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Thorium-232	0.445		0.175	0.181		0.193	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Thorium-234	-0.502	U	0.918	0.919		1.71	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Uranium-235	0.122	U	0.246	0.247		0.398	pCi/g	04/21/16 08:59	05/13/16 11:52	1
Uranium-238	-0.502	U	0.918	0.919		1.71	pCi/g	04/21/16 08:59	05/13/16 11:52	1

Client Sample ID: TI-TO04-BS-R-SU8-S014

Lab Sample ID: 160-17034-14

Date Collected: 04/14/16 14:35

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.146	U	0.218	0.219		0.349	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Actinium-227	-0.305	U	0.671	0.671		0.962	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Bismuth-212	0.472	U	0.971	0.972		1.66	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Bismuth-214	0.467		0.165	0.172		0.145	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Cesium-137	-0.00367	U	0.0792	0.0792		0.142	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Lead-210	0.658	U	1.31	1.31		1.82	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Lead-212	0.389		0.0929	0.106		0.0946	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Lead-214	0.249		0.128	0.130		0.154	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Potassium-40	12.8		1.92	2.32		0.757	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Protactinium-231	0.356	U	1.05	1.05		3.56	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Radium-226	0.467		0.165	0.172	0.500	0.145	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Radium-228	0.146	U	0.218	0.219		0.349	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Thallium-208	0.159		0.0592	0.0614		0.0503	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Thorium-228	0.389		0.0929	0.106		0.0946	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Thorium-232	0.146	U	0.218	0.219		0.349	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Thorium-234	0.585	U	0.472	0.476		1.30	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Uranium-235	0.113	U	0.320	0.320		0.529	pCi/g	04/21/16 08:59	05/13/16 11:54	1
Uranium-238	0.585	U	0.472	0.476		1.30	pCi/g	04/21/16 08:59	05/13/16 11:54	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S015

Lab Sample ID: 160-17034-15

Date Collected: 04/14/16 14:20

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.376		0.163	0.167		0.229	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Actinium-227	0.0377	U	0.702	0.702		1.20	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Bismuth-212	0.000	U	0.515	0.515		1.24	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Bismuth-214	0.354		0.122	0.128		0.118	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Cesium-137	0.0159	U	0.0453	0.0453		0.0789	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Lead-210	1.26	U	1.18	1.19		1.57	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Lead-212	0.331		0.0863	0.0964		0.107	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Lead-214	0.394		0.108	0.115		0.127	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Potassium-40	11.4		1.46	1.87		0.766	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Protactinium-231	0.271	U	1.02	1.02		3.31	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Radium-226	0.354		0.122	0.128	0.500	0.118	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Radium-228	0.376		0.163	0.167		0.229	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Thallium-208	0.128		0.0521	0.0538		0.0540	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Thorium-228	0.331		0.0863	0.0964		0.107	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Thorium-232	0.376		0.163	0.167		0.229	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Thorium-234	0.192	U	0.278	0.279		1.33	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Uranium-235	-0.196	U	0.226	0.227		0.548	pCi/g	04/21/16 08:59	05/13/16 10:41	1
Uranium-238	0.192	U	0.278	0.279		1.33	pCi/g	04/21/16 08:59	05/13/16 10:41	1

Client Sample ID: TI-TO04-BS-R-SU8-S016

Lab Sample ID: 160-17034-16

Date Collected: 04/14/16 14:37

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.428		0.162	0.168		0.246	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Actinium-227	0.280	U	0.587	0.588		0.986	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Bismuth-212	-0.397	U	0.721	0.722		1.21	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Bismuth-214	0.351		0.114	0.119		0.110	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Cesium-137	-0.0272	U	0.0464	0.0465		0.0783	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Lead-210	-0.237	U	1.20	1.20		2.05	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Lead-212	0.369		0.0774	0.0910		0.0872	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Lead-214	0.330		0.0912	0.0975		0.0848	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Potassium-40	11.9		1.37	1.83		0.585	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Protactinium-231	0.000	U	0.613	0.613		3.68	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Radium-226	0.351		0.114	0.119	0.500	0.110	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Radium-228	0.428		0.162	0.168		0.246	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Thallium-208	0.118		0.0437	0.0454		0.0374	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Thorium-228	0.369		0.0774	0.0910		0.0872	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Thorium-232	0.428		0.162	0.168		0.246	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Thorium-234	0.0646	U	1.17	1.17		1.99	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Uranium-235	0.0839	U	0.151	0.151		0.858	pCi/g	04/21/16 08:59	05/13/16 11:59	1
Uranium-238	0.0646	U	1.17	1.17		1.99	pCi/g	04/21/16 08:59	05/13/16 11:59	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17034-2

Client Sample ID: TI-TO04-BS-R-SU8-S019

Lab Sample ID: 160-17034-17

Date Collected: 04/14/16 14:30

Matrix: Solid

Date Received: 04/19/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.424		0.160	0.166		0.112	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Actinium-227	0.349	U	0.738	0.739		1.24	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Bismuth-212	0.254	U	0.774	0.774		1.35	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Bismuth-214	0.331		0.108	0.113		0.0972	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Cesium-137	0.00294	U	0.0707	0.0707		0.127	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Lead-210	-0.799	U	1.79	1.79		3.13	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Lead-212	0.333		0.0882	0.0981		0.0997	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Lead-214	0.226		0.0987	0.101		0.116	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Potassium-40	11.3		1.67	2.03		0.458	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Protactinium-231	-0.915	U	2.96	2.96		4.97	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Radium-226	0.331		0.108	0.113	0.500	0.0972	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Radium-228	0.424		0.160	0.166		0.112	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Thallium-208	0.142		0.0726	0.0741		0.0786	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Thorium-228	0.333		0.0882	0.0981		0.0997	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Thorium-232	0.424		0.160	0.166		0.112	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Thorium-234	1.34	U	1.09	1.10		1.42	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Uranium-235	0.00106	U	0.0161	0.0161		1.02	pCi/g	04/21/16 08:59	05/15/16 14:16	1
Uranium-238	1.34	U	1.09	1.10		1.42	pCi/g	04/21/16 08:59	05/15/16 14:16	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17241-2

Client Sample ID: TI-TO04-BS-R-FSS-BISU9-S001

Lab Sample ID: 160-17241-1

Date Collected: 05/03/16 12:49

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.03		0.244	0.265		0.181	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Actinium-227	0.447	U	1.13	1.13		1.89	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Bismuth-212	0.304	U	0.856	0.857		1.48	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Bismuth-214	0.672		0.163	0.178		0.132	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Cesium-137	-0.0246	U	0.0701	0.0702		0.129	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Lead-210	-0.680	U	2.26	2.26		3.81	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Lead-212	0.525		0.119	0.137		0.150	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Lead-214	0.622		0.188	0.199		0.167	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Potassium-40	17.1		2.03	2.68		0.714	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Protactinium-231	-1.02	U	3.40	3.40		5.71	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Radium-226	0.672		0.163	0.178	0.500	0.132	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Radium-228	1.03		0.244	0.265		0.181	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Thallium-208	0.260		0.0941	0.0979		0.0849	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Thorium-228	0.525		0.119	0.137		0.150	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Thorium-232	1.03		0.244	0.265		0.181	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Thorium-234	0.0246	U	2.06	2.06		3.47	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Uranium-235	-0.298	U	0.828	0.829		1.08	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Uranium-238	0.0246	U	2.06	2.06		3.47	pCi/g	05/06/16 09:55	05/30/16 20:58	1

Client Sample ID: TI-TO04-BS-R-FSS-BISU9-S002

Lab Sample ID: 160-17241-2

Date Collected: 05/03/16 12:46

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.726		0.188	0.202		0.133	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Actinium-227	0.303	U	0.630	0.631		1.06	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Bismuth-212	-0.391	U	0.761	0.762		1.28	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Bismuth-214	0.564		0.116	0.130		0.0867	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Cesium-137	0.0150	U	0.0502	0.0502		0.0866	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Lead-210	-0.261	U	1.53	1.53		2.60	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Lead-212	0.652		0.0913	0.124		0.0889	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Lead-214	0.666		0.128	0.145		0.111	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Potassium-40	17.2		1.63	2.40		0.692	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Protactinium-231	0.675	U	1.77	1.77		3.97	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Radium-226	0.564		0.116	0.130	0.500	0.0867	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Radium-228	0.726		0.188	0.202		0.133	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Thallium-208	0.262		0.0587	0.0646		0.0426	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Thorium-228	0.652		0.0913	0.124		0.0889	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Thorium-232	0.726		0.188	0.202		0.133	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Thorium-234	0.254	U	0.687	0.687		2.23	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Uranium-235	0.0000150	U	0.430	0.430		0.726	pCi/g	05/06/16 09:55	05/30/16 21:24	1
Uranium-238	0.254	U	0.687	0.687		2.23	pCi/g	05/06/16 09:55	05/30/16 21:24	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17241-2

Client Sample ID: TI-TO04-BS-R-FSS-BISU9-S003

Lab Sample ID: 160-17241-3

Date Collected: 05/03/16 13:52

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.454		0.206	0.211		0.208	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Actinium-227	0.255	U	0.423	0.424		1.22	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Bismuth-212	0.352	U	0.868	0.869		1.47	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Bismuth-214	0.526		0.114	0.126		0.0917	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Cesium-137	-0.0140	U	0.0664	0.0664		0.0941	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Lead-210	0.367	U	1.03	1.04		1.74	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Lead-212	0.457		0.0928	0.110		0.109	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Lead-214	0.668		0.113	0.133		0.113	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Potassium-40	15.4		1.58	2.23		0.520	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Protactinium-231	0.576	U	2.27	2.27		3.83	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Radium-226	0.526		0.114	0.126	0.500	0.0917	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Radium-228	0.454		0.206	0.211		0.208	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Thallium-208	0.141		0.0626	0.0642		0.0675	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Thorium-228	0.457		0.0928	0.110		0.109	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Thorium-232	0.454		0.206	0.211		0.208	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Thorium-234	0.924	U	0.654	0.661		1.71	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Uranium-235	0.147	U	0.555	0.555		0.928	pCi/g	05/06/16 09:55	05/30/16 21:25	1
Uranium-238	0.924	U	0.654	0.661		1.71	pCi/g	05/06/16 09:55	05/30/16 21:25	1

Client Sample ID: TI-TO04-BS-R-FSS-BISU9-S004

Lab Sample ID: 160-17241-4

Date Collected: 05/03/16 13:25

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.708		0.164	0.179		0.152	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Actinium-227	-0.0251	U	0.797	0.797		1.36	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Bismuth-212	0.434	U	0.761	0.762		1.28	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Bismuth-214	0.583		0.131	0.144		0.109	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Cesium-137	0.0346	U	0.0598	0.0599		0.101	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Lead-210	1.64		1.27	1.29		1.53	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Lead-212	0.710		0.0990	0.135		0.0843	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Lead-214	0.546		0.121	0.133		0.117	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Potassium-40	14.6		1.65	2.22		0.722	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Protactinium-231	-1.06	U	3.27	3.28		5.47	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Radium-226	0.583		0.131	0.144	0.500	0.109	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Radium-228	0.708		0.164	0.179		0.152	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Thallium-208	0.267		0.0631	0.0689		0.0453	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Thorium-228	0.710		0.0990	0.135		0.0843	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Thorium-232	0.708		0.164	0.179		0.152	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Thorium-234	0.491	U	1.41	1.41		2.37	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Uranium-235	0.000	U	0.132	0.132		0.845	pCi/g	05/06/16 09:55	05/30/16 21:26	1
Uranium-238	0.491	U	1.41	1.41		2.37	pCi/g	05/06/16 09:55	05/30/16 21:26	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17241-2

Client Sample ID: TI-TO04-BS-R-FSS-BISU9-S005

Lab Sample ID: 160-17241-5

Date Collected: 05/03/16 13:30

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.906		0.266	0.281		0.188	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Actinium-227	0.0801	U	0.743	0.743		1.08	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Bismuth-212	-0.0283	U	0.908	0.908		1.61	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Bismuth-214	0.863		0.164	0.187		0.117	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Cesium-137	0.0231	U	0.0430	0.0431		0.0739	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Lead-210	1.08	U	1.53	1.54		2.06	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Lead-212	0.519		0.115	0.133		0.144	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Lead-214	0.534		0.153	0.163		0.201	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Potassium-40	16.1		1.88	2.49		0.634	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Protactinium-231	0.000	U	0.738	0.738		3.85	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Radium-226	0.863		0.164	0.187	0.500	0.117	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Radium-228	0.906		0.266	0.281		0.188	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Thallium-208	0.248		0.0701	0.0747		0.0555	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Thorium-228	0.519		0.115	0.133		0.144	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Thorium-232	0.906		0.266	0.281		0.188	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Thorium-234	1.85	U	1.51	1.53		2.44	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Uranium-235	-0.0232	U	0.604	0.604		0.731	pCi/g	05/06/16 09:55	05/30/16 21:27	1
Uranium-238	1.85	U	1.51	1.53		2.44	pCi/g	05/06/16 09:55	05/30/16 21:27	1

Client Sample ID: TI-TO04-BS-R-FSS-BISU9-S006

Lab Sample ID: 160-17241-6

Date Collected: 05/03/16 13:39

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.05		0.218	0.243		0.0832	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Actinium-227	-0.397	U	0.945	0.946		1.58	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Bismuth-212	-0.278	U	0.870	0.871		1.49	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Bismuth-214	0.667		0.145	0.161		0.120	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Cesium-137	-0.0173	U	0.0390	0.0391		0.119	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Lead-210	1.09	U	1.58	1.59		2.10	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Lead-212	0.650		0.115	0.143		0.132	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Lead-214	0.811		0.177	0.196		0.161	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Potassium-40	14.3		1.64	2.20		0.775	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Protactinium-231	0.816	U	1.81	1.82		4.12	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Radium-226	0.667		0.145	0.161	0.500	0.120	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Radium-228	1.05		0.218	0.243		0.0832	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Thallium-208	0.310		0.0756	0.0821		0.0607	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Thorium-228	0.650		0.115	0.143		0.132	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Thorium-232	1.05		0.218	0.243		0.0832	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Thorium-234	-0.476	U	1.86	1.86		3.15	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Uranium-235	-0.0125	U	0.0219	0.0220		0.975	pCi/g	05/06/16 09:55	05/30/16 21:28	1
Uranium-238	-0.476	U	1.86	1.86		3.15	pCi/g	05/06/16 09:55	05/30/16 21:28	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17241-2

Client Sample ID: TI-TO04-BS-R-FSS-BISU9-S007

Lab Sample ID: 160-17241-7

Date Collected: 05/03/16 13:22

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.338		0.138	0.142		0.148	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Actinium-227	0.0185	U	0.359	0.359		1.26	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Bismuth-212	0.304	U	0.618	0.619		1.06	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Bismuth-214	0.261		0.107	0.111		0.140	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Cesium-137	-0.00164	U	0.0714	0.0714		0.126	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Lead-210	0.688	U	1.37	1.37		1.81	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Lead-212	0.213		0.108	0.112		0.121	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Lead-214	0.113	U	0.101	0.102		0.190	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Potassium-40	10.1		1.46	1.79		0.909	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Protactinium-231	0.500	U	1.66	1.66		3.58	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Radium-226	0.261		0.107	0.111	0.500	0.140	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Radium-228	0.338		0.138	0.142		0.148	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Thallium-208	0.0676	U	0.0969	0.0972		0.0908	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Thorium-228	0.213		0.108	0.112		0.121	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Thorium-232	0.338		0.138	0.142		0.148	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Thorium-234	-0.123	U	1.04	1.04		1.80	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Uranium-235	0.0304	U	0.0900	0.0901		0.610	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Uranium-238	-0.123	U	1.04	1.04		1.80	pCi/g	05/06/16 09:55	05/30/16 21:31	1

Client Sample ID: TI-TO04-BS-R-FSS-BISU9-S008

Lab Sample ID: 160-17241-8

Date Collected: 05/03/16 13:50

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.239	U	0.232	0.233		0.294	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Actinium-227	0.260	U	0.575	0.575		0.830	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Bismuth-212	-0.395	U	0.970	0.971		1.67	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Bismuth-214	0.323		0.159	0.162		0.165	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Cesium-137	-0.0821	U	0.0621	0.0627		0.168	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Lead-210	-0.201	U	1.25	1.25		1.94	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Lead-212	0.304		0.0930	0.101		0.114	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Lead-214	0.303		0.105	0.110		0.138	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Potassium-40	10.8		1.77	2.09		0.757	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Protactinium-231	0.000	U	0.393	0.393		4.33	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Radium-226	0.323		0.159	0.162	0.500	0.165	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Radium-228	0.239	U	0.232	0.233		0.294	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Thallium-208	0.152		0.0569	0.0590		0.0487	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Thorium-228	0.304		0.0930	0.101		0.114	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Thorium-232	0.239	U	0.232	0.233		0.294	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Thorium-234	0.304	U	0.266	0.268		1.76	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Uranium-235	0.0416	U	0.186	0.187		0.571	pCi/g	05/06/16 09:55	05/30/16 21:29	1
Uranium-238	0.304	U	0.266	0.268		1.76	pCi/g	05/06/16 09:55	05/30/16 21:29	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17241-2

Client Sample ID: TI-TO04-BS-R-FSS-BISU9-S009

Lab Sample ID: 160-17241-9

Date Collected: 05/03/16 13:14

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.732		0.163	0.179		0.178	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Actinium-227	0.288	U	0.711	0.711		1.20	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Bismuth-212	0.456	U	0.915	0.916		1.55	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Bismuth-214	0.537		0.158	0.168		0.115	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Cesium-137	-0.0416	U	0.0276	0.0279		0.119	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Lead-210	-1.30	U	1.76	1.77		2.60	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Lead-212	0.497		0.0988	0.118		0.117	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Lead-214	0.561		0.107	0.122		0.113	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Potassium-40	8.66		1.63	1.86		1.13	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Protactinium-231	0.593	U	1.44	1.45		3.31	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Radium-226	0.537		0.158	0.168	0.500	0.115	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Radium-228	0.732		0.163	0.179		0.178	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Thallium-208	0.0335	U	0.0731	0.0732		0.128	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Thorium-228	0.497		0.0988	0.118		0.117	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Thorium-232	0.732		0.163	0.179		0.178	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Thorium-234	0.833	U	0.891	0.895		1.45	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Uranium-235	0.0685	U	0.221	0.222		0.429	pCi/g	05/06/16 09:55	05/30/16 21:30	1
Uranium-238	0.833	U	0.891	0.895		1.45	pCi/g	05/06/16 09:55	05/30/16 21:30	1

Client Sample ID: TI-TO04-BS-R-FSS-BISU9-S010

Lab Sample ID: 160-17241-10

Date Collected: 05/03/16 13:06

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.402		0.155	0.160		0.294	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Actinium-227	0.294	U	0.808	0.809		1.36	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Bismuth-212	0.387	U	0.771	0.772		1.32	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Bismuth-214	0.354		0.128	0.134		0.103	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Cesium-137	-0.00150	U	0.0575	0.0575		0.105	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Lead-210	-0.854	U	1.86	1.86		3.12	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Lead-212	0.311		0.0924	0.101		0.118	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Lead-214	0.334		0.0882	0.0947		0.120	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Potassium-40	9.92		1.58	1.87		0.723	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Protactinium-231	0.537	U	1.61	1.62		3.71	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Radium-226	0.354		0.128	0.134	0.500	0.103	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Radium-228	0.402		0.155	0.160		0.294	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Thallium-208	0.0953	U	0.0658	0.0665		0.104	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Thorium-228	0.311		0.0924	0.101		0.118	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Thorium-232	0.402		0.155	0.160		0.294	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Thorium-234	-0.226	U	1.40	1.40		2.42	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Uranium-235	0.0622	U	0.182	0.182		0.770	pCi/g	05/06/16 09:55	05/30/16 21:31	1
Uranium-238	-0.226	U	1.40	1.40		2.42	pCi/g	05/06/16 09:55	05/30/16 21:31	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17266-2

Client Sample ID: TI-TO04-BS-R-FSS-SWSU9-S9-16

Lab Sample ID: 160-17266-1

Date Collected: 05/03/16 16:10

Matrix: Solid

Date Received: 05/06/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.540		0.155	0.164		0.134	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Actinium-227	-0.170	U	0.752	0.752		1.27	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Bismuth-212	1.43		0.514	0.535		0.384	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Bismuth-214	0.580		0.132	0.145		0.129	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Cesium-137	0.0172	U	0.0685	0.0685		0.118	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Lead-210	0.705	U	1.56	1.56		2.61	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Lead-212	0.520		0.0905	0.113		0.0930	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Lead-214	0.679		0.113	0.133		0.112	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Potassium-40	12.7		1.47	1.97		0.632	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Protactinium-231	-0.839	U	2.74	2.74		4.59	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Radium-226	0.580		0.132	0.145	0.500	0.129	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Radium-228	0.540		0.155	0.164		0.134	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Thallium-208	0.186		0.0529	0.0563		0.0411	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Thorium-228	0.520		0.0905	0.113		0.0930	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Thorium-232	0.540		0.155	0.164		0.134	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Thorium-234	-0.634	U	1.45	1.45		2.43	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Uranium-235	-0.171	U	0.486	0.487		0.813	pCi/g	05/11/16 09:07	06/01/16 10:54	1
Uranium-238	-0.634	U	1.45	1.45		2.43	pCi/g	05/11/16 09:07	06/01/16 10:54	1

Client Sample ID: TI-TO04-BS-R-FSS-SWSU9-S9-17

Lab Sample ID: 160-17266-2

Date Collected: 05/03/16 16:20

Matrix: Solid

Date Received: 05/06/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.564		0.146	0.156		0.0708	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Actinium-227	0.0589	U	0.630	0.630		1.08	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Bismuth-212	-0.0850	U	0.639	0.639		1.12	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Bismuth-214	0.415		0.0991	0.108		0.0795	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Cesium-137	0.0293	U	0.0529	0.0530		0.0891	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Lead-210	-0.668	U	1.15	1.15		2.40	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Lead-212	0.504		0.0764	0.100		0.0645	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Lead-214	0.413		0.0822	0.0927		0.0924	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Potassium-40	9.99		1.21	1.58		0.454	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Protactinium-231	-0.0927	U	2.17	2.17		3.68	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Radium-226	0.415		0.0991	0.108	0.500	0.0795	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Radium-228	0.564		0.146	0.156		0.0708	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Thallium-208	0.174		0.0470	0.0503		0.0414	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Thorium-228	0.504		0.0764	0.100		0.0645	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Thorium-232	0.564		0.146	0.156		0.0708	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Thorium-234	0.881		0.559	0.566		0.848	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Uranium-235	0.0587	U	0.198	0.199		0.668	pCi/g	05/11/16 09:07	06/01/16 10:55	1
Uranium-238	0.881		0.559	0.566		0.848	pCi/g	05/11/16 09:07	06/01/16 10:55	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17266-2

Client Sample ID: TI-TO04-BS-R-FSS-SWSU9-S9-19

Lab Sample ID: 160-17266-3

Date Collected: 05/03/16 16:30

Matrix: Solid

Date Received: 05/06/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.166	U	0.235	0.236		0.340	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Actinium-227	-0.472	U	0.978	0.979		1.64	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Bismuth-212	-0.427	U	0.831	0.832		1.62	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Bismuth-214	0.386		0.125	0.131		0.104	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Cesium-137	0.00728	U	0.0674	0.0674		0.119	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Lead-210	0.656	U	1.79	1.79		3.01	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Lead-212	0.383		0.0866	0.0997		0.0880	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Lead-214	0.429		0.101	0.110		0.100	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Potassium-40	11.4		1.70	2.06		0.738	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Protactinium-231	0.000	U	0.750	0.750		4.55	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Radium-226	0.386		0.125	0.131	0.500	0.104	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Radium-228	0.166	U	0.235	0.236		0.340	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Thallium-208	0.0845	U	0.0773	0.0777		0.0927	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Thorium-228	0.383		0.0866	0.0997		0.0880	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Thorium-232	0.166	U	0.235	0.236		0.340	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Thorium-234	-0.208	U	1.58	1.58		2.71	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Uranium-235	0.0264	U	0.448	0.448		0.762	pCi/g	05/11/16 09:07	06/01/16 11:11	1
Uranium-238	-0.208	U	1.58	1.58		2.71	pCi/g	05/11/16 09:07	06/01/16 11:11	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17372-2

Client Sample ID: TI-TO04-BS-R-BISU9-S001

Lab Sample ID: 160-17372-1

Date Collected: 05/10/16 10:53

Matrix: Solid

Date Received: 05/13/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.308	U	0.314	0.316		0.334	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Actinium-227	0.0791	U	0.666	0.666		0.984	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Bismuth-212	0.0799	U	0.933	0.934		1.68	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Bismuth-214	0.494		0.146	0.154		0.108	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Cesium-137	-0.00545	U	0.0879	0.0879		0.158	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Lead-210	1.41	U	1.48	1.49		2.10	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Lead-212	0.611		0.123	0.146		0.126	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Lead-214	0.782		0.149	0.170		0.133	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Potassium-40	7.61		1.60	1.78		1.01	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Protactinium-231	1.07	U	0.790	0.798		1.55	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Radium-226	0.494		0.146	0.154	0.500	0.108	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Radium-228	0.308	U	0.314	0.316		0.334	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Thallium-208	0.185		0.129	0.131		0.139	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Thorium-228	0.611		0.123	0.146		0.126	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Thorium-232	0.308	U	0.314	0.316		0.334	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Thorium-234	1.16	U	1.45	1.46		1.90	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Uranium-235	0.0364	U	0.132	0.132		0.791	pCi/g	05/16/16 14:26	06/06/16 16:55	1
Uranium-238	1.16	U	1.45	1.46		1.90	pCi/g	05/16/16 14:26	06/06/16 16:55	1

Client Sample ID: TI-TO04-BS-R-BISU9-S002

Lab Sample ID: 160-17372-2

Date Collected: 05/10/16 11:00

Matrix: Solid

Date Received: 05/13/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.723		0.173	0.188		0.0747	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Actinium-227	0.361	U	0.759	0.760		1.27	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Bismuth-212	0.320	U	0.534	0.535		0.901	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Bismuth-214	0.565		0.124	0.137		0.0874	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Cesium-137	0.000	U	0.0132	0.0132		0.0909	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Lead-210	-1.14	U	1.43	1.43		2.68	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Lead-212	0.764		0.104	0.143		0.0967	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Lead-214	0.676		0.141	0.157		0.121	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Potassium-40	8.77		1.21	1.51		0.522	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Protactinium-231	-0.839	U	2.70	2.70		4.52	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Radium-226	0.565		0.124	0.137	0.500	0.0874	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Radium-228	0.723		0.173	0.188		0.0747	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Thallium-208	0.258		0.0591	0.0649		0.0395	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Thorium-228	0.764		0.104	0.143		0.0967	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Thorium-232	0.723		0.173	0.188		0.0747	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Thorium-234	1.13	U	0.823	0.831		1.30	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Uranium-235	-0.0415	U	0.0741	0.0742		0.903	pCi/g	05/16/16 14:26	06/06/16 19:50	1
Uranium-238	1.13	U	0.823	0.831		1.30	pCi/g	05/16/16 14:26	06/06/16 19:50	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S501

Lab Sample ID: 160-19730-1

Date Collected: 10/26/16 13:11

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.164	U	0.211	0.212		0.286	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Actinium-227	0.0778	U	0.607	0.607		1.04	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Bismuth-212	0.000	U	0.302	0.302		1.16	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Bismuth-214	0.0723	U	0.168	0.168		0.294	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Cesium-137	-0.00195	U	0.0637	0.0637		0.113	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Lead-210	0.352	U	1.12	1.12		1.90	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Lead-212	0.285		0.0657	0.0754		0.0688	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Lead-214	0.376		0.0840	0.0926		0.0459	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Potassium-40	10.0		1.44	1.77		0.575	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Protactinium-231	0.000	U	0.319	0.319		2.87	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Radium-226	0.0723	U	0.168	0.168	0.500	0.294	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Radium-228	0.164	U	0.211	0.212		0.286	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Thallium-208	0.131		0.0523	0.0540		0.0480	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Thorium-228	0.285		0.0657	0.0754		0.0688	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Thorium-232	0.164	U	0.211	0.212		0.286	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Thorium-234	-0.0619	U	0.800	0.800		1.39	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Uranium-235	0.0193	U	0.0261	0.0262		0.631	pCi/g	10/31/16 12:10	11/21/16 16:07	1
Uranium-238	-0.0619	U	0.800	0.800		1.39	pCi/g	10/31/16 12:10	11/21/16 16:07	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S502

Lab Sample ID: 160-19730-2

Date Collected: 10/26/16 13:13

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.510		0.175	0.182		0.105	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Actinium-227	0.296	U	0.432	0.433		1.17	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Bismuth-212	0.474	U	0.895	0.896		1.52	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Bismuth-214	0.366		0.119	0.125		0.0969	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Cesium-137	0.00489	U	0.0615	0.0615		0.110	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Lead-210	0.315	U	1.70	1.70		2.89	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Lead-212	0.272		0.120	0.125		0.180	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Lead-214	0.401		0.0923	0.101		0.0723	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Potassium-40	10.1		1.56	1.87		0.604	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Protactinium-231	0.000	U	0.810	0.810		4.27	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Radium-226	0.366		0.119	0.125	0.500	0.0969	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Radium-228	0.510		0.175	0.182		0.105	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Thallium-208	0.0942		0.0406	0.0417		0.0368	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Thorium-228	0.272		0.120	0.125		0.180	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Thorium-232	0.510		0.175	0.182		0.105	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Thorium-234	-0.811	U	0.984	0.988		2.51	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Uranium-235	0.00594	U	0.0263	0.0263		0.932	pCi/g	10/31/16 12:10	11/21/16 16:09	1
Uranium-238	-0.811	U	0.984	0.988		2.51	pCi/g	10/31/16 12:10	11/21/16 16:09	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S503

Lab Sample ID: 160-19730-3

Date Collected: 10/26/16 13:15

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.417		0.188	0.193		0.200	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Actinium-227	0.0374	U	0.0325	0.0327		0.936	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Bismuth-212	-0.370	U	0.818	0.819		1.39	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Bismuth-214	0.407		0.118	0.126		0.107	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Cesium-137	0.00936	U	0.0477	0.0478		0.0852	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Lead-210	0.247	U	1.39	1.39		2.13	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Lead-212	0.236		0.0767	0.0826		0.0983	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Lead-214	0.343		0.109	0.114		0.129	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Potassium-40	10.5		1.43	1.79		0.695	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Protactinium-231	-0.795	U	2.44	2.44		4.10	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Radium-226	0.407		0.118	0.126	0.500	0.107	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Radium-228	0.417		0.188	0.193		0.200	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Thallium-208	0.112		0.0517	0.0530		0.0534	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Thorium-228	0.236		0.0767	0.0826		0.0983	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Thorium-232	0.417		0.188	0.193		0.200	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Thorium-234	1.05	U	1.06	1.07		1.51	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Uranium-235	0.0566	U	0.286	0.286		0.487	pCi/g	10/31/16 12:10	11/21/16 16:34	1
Uranium-238	1.05	U	1.06	1.07		1.51	pCi/g	10/31/16 12:10	11/21/16 16:34	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S504

Lab Sample ID: 160-19730-4

Date Collected: 10/26/16 13:17

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.305		0.124	0.128		0.169	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Actinium-227	-0.303	U	0.799	0.800		1.35	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Bismuth-212	-0.432	U	0.801	0.803		1.26	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Bismuth-214	0.0509	U	0.137	0.137		0.241	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Cesium-137	0.0147	U	0.0314	0.0314		0.0549	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Lead-210	1.28	U	1.33	1.34		2.15	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Lead-212	0.224		0.0727	0.0782		0.0938	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Lead-214	0.306		0.0984	0.103		0.101	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Potassium-40	10.1		1.57	1.88		1.03	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Protactinium-231	-0.800	U	2.63	2.63		4.42	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Radium-226	0.0509	U	0.137	0.137	0.500	0.241	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Radium-228	0.305		0.124	0.128		0.169	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Thallium-208	0.109		0.0477	0.0490		0.0511	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Thorium-228	0.224		0.0727	0.0782		0.0938	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Thorium-232	0.305		0.124	0.128		0.169	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Thorium-234	1.25		0.744	0.755		1.13	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Uranium-235	-0.0445	U	0.0897	0.0898		0.805	pCi/g	10/31/16 12:10	11/21/16 16:26	1
Uranium-238	1.25		0.744	0.755		1.13	pCi/g	10/31/16 12:10	11/21/16 16:26	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S505

Lab Sample ID: 160-19730-5

Date Collected: 10/26/16 13:19

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.431		0.185	0.190		0.167	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Actinium-227	-0.340	U	0.723	0.724		1.21	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Bismuth-212	0.000	U	0.322	0.322		0.444	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Bismuth-214	0.259		0.100	0.104		0.104	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Cesium-137	-0.0306	U	0.0521	0.0522		0.0877	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Lead-210	-0.661	U	1.46	1.46		2.45	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Lead-212	0.306		0.0689	0.0794		0.0744	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Lead-214	0.373		0.0826	0.0913		0.0856	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Potassium-40	11.6		1.36	1.80		0.592	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Protactinium-231	-0.718	U	2.37	2.37		3.97	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Radium-226	0.259		0.100	0.104	0.500	0.104	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Radium-228	0.431		0.185	0.190		0.167	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Thallium-208	0.104		0.0625	0.0634		0.0536	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Thorium-228	0.306		0.0689	0.0794		0.0744	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Thorium-232	0.431		0.185	0.190		0.167	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Thorium-234	0.533	U	1.17	1.17		1.95	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Uranium-235	-0.00807	U	0.318	0.318		0.742	pCi/g	10/31/16 12:10	11/21/16 16:37	1
Uranium-238	0.533	U	1.17	1.17		1.95	pCi/g	10/31/16 12:10	11/21/16 16:37	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S506

Lab Sample ID: 160-19730-6

Date Collected: 10/26/16 13:21

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.156	U	0.282	0.283		0.318	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Actinium-227	-0.300	U	0.883	0.884		1.49	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Bismuth-212	0.264	U	0.630	0.631		1.09	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Bismuth-214	0.0669	U	0.0681	0.0685		0.250	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Cesium-137	0.0318	U	0.0629	0.0630		0.107	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-210	1.59	U	1.58	1.59		2.02	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-212	0.283		0.0814	0.0892		0.0986	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-214	0.400		0.0981	0.107		0.100	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Potassium-40	10.5		1.45	1.81		0.642	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Protactinium-231	0.588	U	2.07	2.08		3.52	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Radium-226	0.0669	U	0.0681	0.0685	0.500	0.250	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Radium-228	0.156	U	0.282	0.283		0.318	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thallium-208	0.0777		0.0494	0.0501		0.0589	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-228	0.283		0.0814	0.0892		0.0986	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-232	0.156	U	0.282	0.283		0.318	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-234	1.09	U	1.21	1.21		1.60	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Uranium-235	0.0977	U	0.215	0.215		0.460	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Uranium-238	1.09	U	1.21	1.21		1.60	pCi/g	10/31/16 12:10	11/21/16 16:38	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S507

Lab Sample ID: 160-19730-7

Date Collected: 10/26/16 13:23

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.385		0.105	0.112		0.118	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Actinium-227	-0.336	U	1.09	1.09		1.82	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Bismuth-212	0.175	U	0.474	0.475		0.822	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Bismuth-214	0.313		0.0885	0.0943		0.0793	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Cesium-137	-0.0000891	U	0.0403	0.0403		0.0725	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Lead-210	-0.733	U	2.41	2.41		4.02	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Lead-212	0.230		0.0562	0.0636		0.0622	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Lead-214	0.303		0.0802	0.0862		0.0928	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Potassium-40	10.4		1.20	1.60		0.431	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Protactinium-231	-0.646	U	2.03	2.03		3.41	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Radium-226	0.313		0.0885	0.0943	0.500	0.0793	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Radium-228	0.385		0.105	0.112		0.118	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Thallium-208	0.107		0.0327	0.0345		0.0232	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Thorium-228	0.230		0.0562	0.0636		0.0622	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Thorium-232	0.385		0.105	0.112		0.118	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Thorium-234	0.426	U	0.915	0.916		1.54	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Uranium-235	0.138	U	0.149	0.150		0.615	pCi/g	10/31/16 12:10	11/21/16 16:40	1
Uranium-238	0.426	U	0.915	0.916		1.54	pCi/g	10/31/16 12:10	11/21/16 16:40	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S508

Lab Sample ID: 160-19730-8

Date Collected: 10/26/16 13:25

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.271	U	0.117	0.120		0.313	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Actinium-227	0.0431	U	0.101	0.101		0.856	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Bismuth-212	0.000	U	0.464	0.464		1.33	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Bismuth-214	0.315		0.117	0.122		0.115	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Cesium-137	0.0292	U	0.0559	0.0560		0.0954	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-210	0.282	U	0.939	0.940		1.46	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-212	0.366		0.0880	0.0999		0.0994	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Lead-214	0.311		0.0955	0.101		0.133	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Potassium-40	10.2		1.54	1.86		0.749	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Protactinium-231	0.000	U	0.430	0.430		3.11	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Radium-226	0.315		0.117	0.122	0.500	0.115	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Radium-228	0.271	U	0.117	0.120		0.313	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thallium-208	0.167		0.0605	0.0630		0.0569	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-228	0.366		0.0880	0.0999		0.0994	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-232	0.271	U	0.117	0.120		0.313	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Thorium-234	0.704	U	0.790	0.794		1.27	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Uranium-235	0.273	U	0.235	0.237		0.505	pCi/g	10/31/16 12:10	11/21/16 16:38	1
Uranium-238	0.704	U	0.790	0.794		1.27	pCi/g	10/31/16 12:10	11/21/16 16:38	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S509

Lab Sample ID: 160-19730-9

Date Collected: 10/26/16 13:27

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.335		0.214	0.217		0.209	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Actinium-227	-0.413	U	0.914	0.915		1.53	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Bismuth-212	0.379	U	0.647	0.648		1.10	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Bismuth-214	0.324		0.131	0.135		0.127	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Cesium-137	0.0338	U	0.0719	0.0719		0.123	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Lead-210	0.636	U	1.12	1.12		1.63	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Lead-212	0.316		0.0841	0.0935		0.0894	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Lead-214	0.409		0.102	0.111		0.113	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Potassium-40	10.3		1.69	2.00		0.803	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Protactinium-231	0.000	U	0.321	0.321		4.20	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Radium-226	0.324		0.131	0.135	0.500	0.127	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Radium-228	0.335		0.214	0.217		0.209	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Thallium-208	0.135		0.0656	0.0671		0.0598	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Thorium-228	0.316		0.0841	0.0935		0.0894	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Thorium-232	0.335		0.214	0.217		0.209	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Thorium-234	0.0227	U	1.56	1.56		2.65	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Uranium-235	0.290	U	0.245	0.246		0.768	pCi/g	10/31/16 12:10	11/21/16 16:39	1
Uranium-238	0.0227	U	1.56	1.56		2.65	pCi/g	10/31/16 12:10	11/21/16 16:39	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S510

Lab Sample ID: 160-19730-10

Date Collected: 10/26/16 13:29

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.572		0.163	0.173		0.170	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Actinium-227	0.327	U	0.719	0.720		1.21	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Bismuth-212	-0.361	U	0.866	0.867		1.48	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Bismuth-214	0.296		0.113	0.118		0.137	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Cesium-137	0.0230	U	0.0471	0.0472		0.0807	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Lead-210	-0.816	U	1.82	1.82		3.14	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Lead-212	0.346		0.0850	0.0961		0.0971	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Lead-214	0.293		0.110	0.114		0.127	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Potassium-40	11.1		1.60	1.96		0.979	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Protactinium-231	0.636	U	1.54	1.54		3.54	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Radium-226	0.296		0.113	0.118	0.500	0.137	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Radium-228	0.572		0.163	0.173		0.170	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Thallium-208	0.0859	U	0.0732	0.0737		0.0872	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Thorium-228	0.346		0.0850	0.0961		0.0971	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Thorium-232	0.572		0.163	0.173		0.170	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Thorium-234	1.79		0.786	0.808		1.12	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Uranium-235	0.0290	U	0.0381	0.0382		0.473	pCi/g	10/31/16 12:10	11/21/16 16:41	1
Uranium-238	1.79		0.786	0.808		1.12	pCi/g	10/31/16 12:10	11/21/16 16:41	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S511

Lab Sample ID: 160-19730-11

Date Collected: 10/26/16 13:31

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.365		0.159	0.163		0.135	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Actinium-227	0.126	U	0.615	0.615		0.905	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Bismuth-212	0.370	U	0.976	0.976		1.69	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Bismuth-214	0.101	U	0.0953	0.0959		0.378	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Cesium-137	0.00334	U	0.0518	0.0518		0.0794	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Lead-210	-1.09	U	1.42	1.42		2.45	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Lead-212	0.301		0.0847	0.0932		0.0895	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Lead-214	0.407		0.127	0.134		0.148	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Potassium-40	10.2		1.79	2.07		0.808	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Protactinium-231	-0.0000000	U	1.95	1.95		3.41	pCi/g	10/31/16 12:10	11/21/16 16:46	1
	18									
Radium-226	0.101	U	0.0953	0.0959	0.500	0.378	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Radium-228	0.365		0.159	0.163		0.135	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Thallium-208	0.100		0.0768	0.0775		0.0794	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Thorium-228	0.301		0.0847	0.0932		0.0895	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Thorium-232	0.365		0.159	0.163		0.135	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Thorium-234	0.171	U	0.190	0.191		1.89	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Uranium-235	-0.0287	U	0.0582	0.0583		0.472	pCi/g	10/31/16 12:10	11/21/16 16:46	1
Uranium-238	0.171	U	0.190	0.191		1.89	pCi/g	10/31/16 12:10	11/21/16 16:46	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S512

Lab Sample ID: 160-19730-12

Date Collected: 10/26/16 13:33

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.331		0.146	0.150		0.230	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Actinium-227	0.209	U	0.533	0.533		0.904	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Bismuth-212	-0.284	U	0.855	0.856		1.47	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Bismuth-214	0.234		0.0801	0.0837		0.0673	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Cesium-137	-0.0502	U	0.0859	0.0860		0.144	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Lead-210	-1.06	U	1.40	1.41		2.50	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Lead-212	0.305		0.0721	0.0822		0.0784	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Lead-214	0.331		0.0931	0.0993		0.0738	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Potassium-40	11.8		1.62	2.02		0.618	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Protactinium-231	-0.203	U	2.23	2.23		3.79	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Radium-226	0.234		0.0801	0.0837	0.500	0.0673	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Radium-228	0.331		0.146	0.150		0.230	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Thallium-208	0.143		0.0433	0.0457		0.0285	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Thorium-228	0.305		0.0721	0.0822		0.0784	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Thorium-232	0.331		0.146	0.150		0.230	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Thorium-234	-0.702	U	0.960	0.963		1.61	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Uranium-235	-0.0398	U	0.0820	0.0821		0.656	pCi/g	10/31/16 12:10	11/21/16 16:47	1
Uranium-238	-0.702	U	0.960	0.963		1.61	pCi/g	10/31/16 12:10	11/21/16 16:47	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S513

Lab Sample ID: 160-19730-13

Date Collected: 10/26/16 13:35

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.329		0.263	0.265		0.284	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Actinium-227	-0.0789	U	0.387	0.387		1.59	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Bismuth-212	0.0932	U	0.819	0.819		1.47	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Bismuth-214	0.0237	U	0.184	0.184		0.299	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Cesium-137	0.00839	U	0.0866	0.0866		0.152	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Lead-210	-1.01	U	2.21	2.21		3.70	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Lead-212	0.256		0.0785	0.0852		0.0874	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Lead-214	0.355		0.106	0.112		0.111	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Potassium-40	12.3		1.86	2.25		0.707	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Protactinium-231	-0.952	U	3.01	3.01		5.08	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Radium-226	0.0237	U	0.184	0.184	0.500	0.299	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Radium-228	0.329		0.263	0.265		0.284	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Thallium-208	0.133		0.0605	0.0621		0.0562	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Thorium-228	0.256		0.0785	0.0852		0.0874	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Thorium-232	0.329		0.263	0.265		0.284	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Thorium-234	-1.70	U	1.22	1.24		3.21	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Uranium-235	0.162	U	0.176	0.177		0.875	pCi/g	10/31/16 12:10	11/21/16 16:48	1
Uranium-238	-1.70	U	1.22	1.24		3.21	pCi/g	10/31/16 12:10	11/21/16 16:48	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S514

Lab Sample ID: 160-19730-14

Date Collected: 10/26/16 13:37

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.280	U	0.151	0.154		0.299	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Actinium-227	0.265	U	0.672	0.673		1.14	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Bismuth-212	-0.0187	U	0.622	0.622		1.12	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Bismuth-214	0.334		0.107	0.112		0.125	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Cesium-137	-0.0205	U	0.0740	0.0740		0.127	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-210	-0.230	U	1.55	1.55		2.67	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-212	0.329		0.0820	0.0925		0.0954	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-214	0.407		0.104	0.113		0.126	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Potassium-40	12.1		1.53	1.96		0.755	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Protactinium-231	-0.917	U	3.11	3.11		5.21	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Radium-226	0.334		0.107	0.112	0.500	0.125	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Radium-228	0.280	U	0.151	0.154		0.299	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thallium-208	0.0923		0.0458	0.0468		0.0522	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-228	0.329		0.0820	0.0925		0.0954	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-232	0.280	U	0.151	0.154		0.299	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-234	0.559	U	1.23	1.23		1.69	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Uranium-235	0.164	U	0.293	0.294		0.499	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Uranium-238	0.559	U	1.23	1.23		1.69	pCi/g	10/31/16 12:10	11/21/16 17:45	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S515

Lab Sample ID: 160-19730-15

Date Collected: 10/26/16 13:39

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.322		0.148	0.152		0.134	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Actinium-227	0.0397	U	0.0934	0.0935		0.868	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Bismuth-212	-0.753	U	1.24	1.24		2.07	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Bismuth-214	0.419		0.172	0.177		0.166	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Cesium-137	-0.0215	U	0.104	0.104		0.136	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-210	1.45	U	1.27	1.28		1.66	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-212	0.269		0.0899	0.0964		0.112	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Lead-214	0.308		0.120	0.124		0.139	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Potassium-40	11.2		1.85	2.18		0.797	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Protactinium-231	0.323	U	1.10	1.10		3.64	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Radium-226	0.419		0.172	0.177	0.500	0.166	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Radium-228	0.322		0.148	0.152		0.134	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thallium-208	0.0912		0.0906	0.0911		0.0894	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-228	0.269		0.0899	0.0964		0.112	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-232	0.322		0.148	0.152		0.134	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Thorium-234	0.713	U	0.984	0.987		1.38	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Uranium-235	0.0221	U	0.0882	0.0882		0.567	pCi/g	10/31/16 12:10	11/21/16 17:45	1
Uranium-238	0.713	U	0.984	0.987		1.38	pCi/g	10/31/16 12:10	11/21/16 17:45	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S516

Lab Sample ID: 160-19730-16

Date Collected: 10/26/16 13:41

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.139	U	0.235	0.235		0.253	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Actinium-227	0.0287	U	0.594	0.594		1.02	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Bismuth-212	0.203	U	0.642	0.642		1.12	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Bismuth-214	0.244		0.0995	0.103		0.0904	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Cesium-137	-0.0412	U	0.0674	0.0675		0.113	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Lead-210	-0.741	U	1.35	1.35		2.11	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Lead-212	0.267		0.0723	0.0801		0.0893	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Lead-214	0.261		0.0910	0.0950		0.0810	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Potassium-40	10.9		1.51	1.87		0.575	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Protactinium-231	0.000	U	0.626	0.626		2.93	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Radium-226	0.244		0.0995	0.103	0.500	0.0904	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Radium-228	0.139	U	0.235	0.235		0.253	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Thallium-208	0.113		0.0375	0.0393		0.0266	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Thorium-228	0.267		0.0723	0.0801		0.0893	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Thorium-232	0.139	U	0.235	0.235		0.253	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Thorium-234	0.774	U	0.409	0.417		0.963	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Uranium-235	-0.0111	U	0.255	0.255		0.366	pCi/g	10/31/16 12:10	11/21/16 17:46	1
Uranium-238	0.774	U	0.409	0.417		0.963	pCi/g	10/31/16 12:10	11/21/16 17:46	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S517

Lab Sample ID: 160-19730-17

Date Collected: 10/26/16 13:41

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.339		0.138	0.143		0.276	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Actinium-227	-0.0604	U	0.105	0.105		1.45	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Bismuth-212	0.362	U	0.833	0.834		1.44	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Bismuth-214	0.225	U	0.173	0.174		0.335	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Cesium-137	-0.0549	U	0.118	0.118		0.138	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Lead-210	0.443	U	1.52	1.52		2.60	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Lead-212	0.398		0.0943	0.107		0.0996	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Lead-214	0.258		0.112	0.115		0.223	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Potassium-40	12.1		1.82	2.20		0.687	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Protactinium-231	0.395	U	1.47	1.47		4.82	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Radium-226	0.225	U	0.173	0.174	0.500	0.335	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Radium-228	0.339		0.138	0.143		0.276	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Thallium-208	0.131		0.0588	0.0604		0.0581	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Thorium-228	0.398		0.0943	0.107		0.0996	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Thorium-232	0.339		0.138	0.143		0.276	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Thorium-234	0.983	U	0.598	0.606		1.63	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Uranium-235	-0.268	U	0.354	0.355		1.00	pCi/g	10/31/16 12:10	11/21/16 17:47	1
Uranium-238	0.983	U	0.598	0.606		1.63	pCi/g	10/31/16 12:10	11/21/16 17:47	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S518

Lab Sample ID: 160-19730-18

Date Collected: 10/26/16 13:42

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.515		0.161	0.170		0.204	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Actinium-227	0.174	U	0.627	0.627		1.06	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Bismuth-212	0.177	U	0.442	0.443		0.771	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Bismuth-214	0.235		0.0951	0.0982		0.103	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Cesium-137	0.00175	U	0.0417	0.0417		0.0754	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Lead-210	-0.700	U	1.30	1.30		2.17	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Lead-212	0.357		0.0738	0.0870		0.0768	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Lead-214	0.343		0.0789	0.0865		0.100	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Potassium-40	11.2		1.36	1.78		0.607	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Protactinium-231	0.540	U	1.49	1.49		3.39	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Radium-226	0.235		0.0951	0.0982	0.500	0.103	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Radium-228	0.515		0.161	0.170		0.204	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Thallium-208	0.131		0.0453	0.0473		0.0368	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Thorium-228	0.357		0.0738	0.0870		0.0768	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Thorium-232	0.515		0.161	0.170		0.204	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Thorium-234	0.310	U	1.00	1.00		1.69	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Uranium-235	-0.00827	U	0.274	0.274		0.645	pCi/g	10/31/16 12:10	11/21/16 17:44	1
Uranium-238	0.310	U	1.00	1.00		1.69	pCi/g	10/31/16 12:10	11/21/16 17:44	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19730-2

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S519

Lab Sample ID: 160-19730-19

Date Collected: 10/26/16 13:43

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.454		0.176	0.182		0.179	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Actinium-227	-0.0836	U	0.168	0.168		1.55	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Bismuth-212	0.266	U	1.07	1.07		1.84	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Bismuth-214	0.279		0.125	0.128		0.128	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Cesium-137	-0.000716	U	0.0659	0.0659		0.144	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-210	1.22	U	1.64	1.65		2.69	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-212	0.347		0.0914	0.102		0.106	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-214	0.381		0.120	0.126		0.153	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Potassium-40	9.76		1.49	1.79		0.718	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Protactinium-231	0.707	U	1.72	1.72		3.95	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Radium-226	0.279		0.125	0.128	0.500	0.128	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Radium-228	0.454		0.176	0.182		0.179	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thallium-208	0.142		0.0557	0.0576		0.0578	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-228	0.347		0.0914	0.102		0.106	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-232	0.454		0.176	0.182		0.179	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-234	0.513	U	0.502	0.505		1.41	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Uranium-235	0.251		0.145	0.148		0.180	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Uranium-238	0.513	U	0.502	0.505		1.41	pCi/g	10/31/16 12:10	11/21/16 17:43	1

Client Sample ID: TITO04-BS-FSS-SU2RSY11-5-S520

Lab Sample ID: 160-19730-20

Date Collected: 10/26/16 13:43

Matrix: Solid

Date Received: 10/28/16 08:50

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0683	U	0.116	0.116		0.396	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Actinium-227	-0.345	U	0.853	0.853		1.43	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Bismuth-212	0.402	U	0.845	0.846		1.43	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Bismuth-214	0.394		0.112	0.119		0.105	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Cesium-137	0.0336	U	0.0624	0.0625		0.105	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-210	1.07	U	1.01	1.02		1.61	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-212	0.275		0.0806	0.0881		0.103	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Lead-214	0.255		0.104	0.107		0.113	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Potassium-40	12.0		1.47	1.92		0.532	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Protactinium-231	0.0975	U	1.05	1.05		3.39	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Radium-226	0.394		0.112	0.119	0.500	0.105	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Radium-228	0.0683	U	0.116	0.116		0.396	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thallium-208	0.106		0.0379	0.0395		0.0339	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-228	0.275		0.0806	0.0881		0.103	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-232	0.0683	U	0.116	0.116		0.396	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Thorium-234	1.27	U	1.15	1.16		1.46	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Uranium-235	0.178	U	0.346	0.347		0.706	pCi/g	10/31/16 12:10	11/21/16 17:43	1
Uranium-238	1.27	U	1.15	1.16		1.46	pCi/g	10/31/16 12:10	11/21/16 17:43	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S701

Lab Sample ID: 160-19923-1

Date Collected: 11/08/16 09:55

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.416		0.136	0.143		0.0982	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Actinium-227	0.522	U	0.511	0.514		0.702	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Bismuth-212	0.0142	U	0.701	0.701		1.27	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Bismuth-214	0.364		0.103	0.110		0.0925	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Cesium-137	-0.00117	U	0.0541	0.0541		0.0983	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Lead-210	1.10	U	1.13	1.13		1.54	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Lead-212	0.206		0.107	0.111		0.164	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Lead-214	0.353		0.111	0.117		0.138	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Potassium-40	11.1		1.58	1.94		0.727	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Protactinium-231	0.000	U	0.611	0.611		3.06	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Radium-226	0.364		0.103	0.110	0.500	0.0925	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Radium-228	0.416		0.136	0.143		0.0982	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Thallium-208	0.117		0.0479	0.0494		0.0430	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Thorium-228	0.206		0.107	0.111		0.164	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Thorium-232	0.416		0.136	0.143		0.0982	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Thorium-234	0.0138	U	0.947	0.947		1.63	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Uranium-235	-0.0107	U	0.404	0.404		0.552	pCi/g	11/11/16 13:08	12/02/16 08:36	1
Uranium-238	0.0138	U	0.947	0.947		1.63	pCi/g	11/11/16 13:08	12/02/16 08:36	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S702

Lab Sample ID: 160-19923-2

Date Collected: 11/08/16 09:58

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.444		0.149	0.156		0.112	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Actinium-227	0.185	U	0.363	0.363		1.33	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Bismuth-212	0.0320	U	0.838	0.838		1.50	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Bismuth-214	0.306		0.130	0.134		0.137	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Cesium-137	-0.0282	U	0.0747	0.0748		0.129	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Lead-210	-0.401	U	1.50	1.50		2.62	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Lead-212	0.333		0.0879	0.0979		0.0993	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Lead-214	0.467		0.110	0.121		0.119	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Potassium-40	9.51		1.58	1.86		0.763	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Protactinium-231	0.0000000	U	2.13	2.13		3.68	pCi/g	11/11/16 13:08	12/02/16 08:37	1
	30									
Radium-226	0.306		0.130	0.134	0.500	0.137	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Radium-228	0.444		0.149	0.156		0.112	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Thallium-208	0.129		0.0933	0.0943		0.0872	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Thorium-228	0.333		0.0879	0.0979		0.0993	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Thorium-232	0.444		0.149	0.156		0.112	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Thorium-234	0.0329	U	1.43	1.43		2.43	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Uranium-235	0.0323	U	0.0388	0.0389		1.04	pCi/g	11/11/16 13:08	12/02/16 08:37	1
Uranium-238	0.0329	U	1.43	1.43		2.43	pCi/g	11/11/16 13:08	12/02/16 08:37	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S703

Lab Sample ID: 160-19923-3

Date Collected: 11/08/16 09:53

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.312		0.153	0.156		0.211	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Actinium-227	0.143	U	0.331	0.331		0.766	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Bismuth-212	0.255	U	0.459	0.460		0.784	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Bismuth-214	0.401		0.113	0.120		0.105	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Cesium-137	-0.0218	U	0.0469	0.0469		0.0964	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Lead-210	-0.785	U	1.34	1.35		2.36	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Lead-212	0.315		0.0749	0.0853		0.0860	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Lead-214	0.309		0.0957	0.101		0.107	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Potassium-40	11.3		1.38	1.80		0.672	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Protactinium-231	0.000	U	0.905	0.905		3.50	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Radium-226	0.401		0.113	0.120	0.500	0.105	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Radium-228	0.312		0.153	0.156		0.211	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Thallium-208	0.133		0.0453	0.0473		0.0440	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Thorium-228	0.315		0.0749	0.0853		0.0860	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Thorium-232	0.312		0.153	0.156		0.211	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Thorium-234	-0.178	U	1.36	1.36		2.31	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Uranium-235	-0.0401	U	0.0732	0.0733		0.408	pCi/g	11/11/16 13:08	12/02/16 08:38	1
Uranium-238	-0.178	U	1.36	1.36		2.31	pCi/g	11/11/16 13:08	12/02/16 08:38	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S704

Lab Sample ID: 160-19923-4

Date Collected: 11/08/16 09:56

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.285		0.195	0.197		0.204	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Actinium-227	0.214	U	0.351	0.352		0.852	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Bismuth-212	0.312	U	0.740	0.740		1.27	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Bismuth-214	0.393		0.124	0.130		0.109	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Cesium-137	0.0149	U	0.0338	0.0338		0.0595	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Lead-210	1.67	U	1.37	1.39		1.89	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Lead-212	0.281		0.0768	0.0850		0.0890	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Lead-214	0.263		0.106	0.110		0.127	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Potassium-40	10.2		1.43	1.77		0.708	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Protactinium-231	0.503	U	1.12	1.12		2.63	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Radium-226	0.393		0.124	0.130	0.500	0.109	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Radium-228	0.285		0.195	0.197		0.204	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Thallium-208	0.134		0.0470	0.0490		0.0440	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Thorium-228	0.281		0.0768	0.0850		0.0890	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Thorium-232	0.285		0.195	0.197		0.204	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Thorium-234	1.84		0.983	1.00		1.23	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Uranium-235	-0.0585	U	0.293	0.293		0.588	pCi/g	11/11/16 13:08	12/02/16 08:41	1
Uranium-238	1.84		0.983	1.00		1.23	pCi/g	11/11/16 13:08	12/02/16 08:41	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S705

Lab Sample ID: 160-19923-5

Date Collected: 11/08/16 09:49

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.397		0.194	0.198		0.248	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Actinium-227	-0.404	U	0.845	0.847		1.42	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Bismuth-212	0.310	U	0.896	0.897		1.55	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Bismuth-214	0.114	U	0.244	0.244		0.298	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Cesium-137	-0.0138	U	0.0564	0.0564		0.105	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Lead-210	0.599	U	1.62	1.62		2.74	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Lead-212	0.321		0.113	0.120		0.160	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Lead-214	0.316		0.0951	0.101		0.0858	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Potassium-40	10.6		1.62	1.95		0.619	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Protactinium-231	-0.870	U	2.84	2.84		4.77	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Radium-226	0.114	U	0.244	0.244	0.500	0.298	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Radium-228	0.397		0.194	0.198		0.248	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Thallium-208	0.135		0.0468	0.0488		0.0378	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Thorium-228	0.321		0.113	0.120		0.160	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Thorium-232	0.397		0.194	0.198		0.248	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Thorium-234	-0.374	U	1.45	1.45		2.51	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Uranium-235	0.104	U	0.379	0.379		0.817	pCi/g	11/11/16 13:08	12/02/16 08:44	1
Uranium-238	-0.374	U	1.45	1.45		2.51	pCi/g	11/11/16 13:08	12/02/16 08:44	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S706

Lab Sample ID: 160-19923-6

Date Collected: 11/08/16 09:51

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.255		0.200	0.202		0.211	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Actinium-227	-0.267	U	0.663	0.663		1.11	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Bismuth-212	-0.0248	U	0.605	0.605		1.09	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Bismuth-214	0.341		0.101	0.107		0.0904	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Cesium-137	-0.00101	U	0.0516	0.0516		0.0931	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Lead-210	0.690	U	0.774	0.778		1.17	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Lead-212	0.239		0.0673	0.0741		0.0828	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Lead-214	0.361		0.0802	0.0885		0.0677	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Potassium-40	10.7		1.48	1.84		0.567	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Protactinium-231	0.265	U	0.880	0.880		2.88	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Radium-226	0.341		0.101	0.107	0.500	0.0904	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Radium-228	0.255		0.200	0.202		0.211	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Thallium-208	0.0335	U	0.0734	0.0734		0.0893	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Thorium-228	0.239		0.0673	0.0741		0.0828	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Thorium-232	0.255		0.200	0.202		0.211	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Thorium-234	-0.277	U	0.950	0.950		1.65	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Uranium-235	0.117	U	0.205	0.206		0.465	pCi/g	11/11/16 13:08	12/02/16 08:46	1
Uranium-238	-0.277	U	0.950	0.950		1.65	pCi/g	11/11/16 13:08	12/02/16 08:46	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S707

Lab Sample ID: 160-19923-7

Date Collected: 11/08/16 09:58

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.564		0.199	0.207		0.130	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Actinium-227	0.169	U	0.576	0.577		0.843	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Bismuth-212	0.196	U	1.28	1.28		2.23	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Bismuth-214	0.337		0.150	0.154		0.171	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Cesium-137	-0.0342	U	0.119	0.119		0.173	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Lead-210	0.692	U	1.34	1.34		1.97	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Lead-212	0.336		0.0858	0.0962		0.0866	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Lead-214	0.322		0.108	0.113		0.155	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Potassium-40	11.0		1.81	2.13		0.774	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Protactinium-231	0.362	U	1.07	1.07		3.66	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Radium-226	0.337		0.150	0.154	0.500	0.171	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Radium-228	0.564		0.199	0.207		0.130	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Thallium-208	0.149		0.0545	0.0566		0.0459	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Thorium-228	0.336		0.0858	0.0962		0.0866	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Thorium-232	0.564		0.199	0.207		0.130	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Thorium-234	0.393	U	1.05	1.05		1.50	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Uranium-235	0.0763	U	0.326	0.326		0.555	pCi/g	11/11/16 13:08	12/02/16 08:47	1
Uranium-238	0.393	U	1.05	1.05		1.50	pCi/g	11/11/16 13:08	12/02/16 08:47	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S708

Lab Sample ID: 160-19923-8

Date Collected: 11/08/16 09:41

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.264	U	0.117	0.120		0.269	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Actinium-227	0.153	U	0.355	0.356		0.963	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Bismuth-212	-0.0235	U	0.521	0.521		0.931	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Bismuth-214	0.328		0.0821	0.0889		0.0732	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Cesium-137	0.0164	U	0.0381	0.0381		0.0655	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Lead-210	-0.652	U	1.26	1.26		2.10	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Lead-212	0.282		0.0589	0.0693		0.0578	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Lead-214	0.364		0.0945	0.102		0.0867	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Potassium-40	10.9		1.24	1.67		0.439	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Protactinium-231	-0.187	U	1.98	1.98		3.35	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Radium-226	0.328		0.0821	0.0889	0.500	0.0732	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Radium-228	0.264	U	0.117	0.120		0.269	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Thallium-208	0.118		0.0356	0.0377		0.0250	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Thorium-228	0.282		0.0589	0.0693		0.0578	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Thorium-232	0.264	U	0.117	0.120		0.269	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Thorium-234	-0.377	U	1.14	1.14		1.91	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Uranium-235	0.0846	U	0.169	0.169		0.608	pCi/g	11/11/16 13:08	12/02/16 09:10	1
Uranium-238	-0.377	U	1.14	1.14		1.91	pCi/g	11/11/16 13:08	12/02/16 09:10	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S709

Lab Sample ID: 160-19923-9

Date Collected: 11/08/16 09:46

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.232	U	0.179	0.181		0.280	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Actinium-227	0.120	U	0.309	0.309		0.754	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Bismuth-212	0.237	U	0.902	0.902		1.57	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Bismuth-214	0.433		0.120	0.128		0.121	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Cesium-137	-0.0341	U	0.0647	0.0648		0.110	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Lead-210	-0.0962	U	1.38	1.38		2.08	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Lead-212	0.0194	U	0.115	0.115		0.196	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Lead-214	0.388		0.117	0.124		0.134	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Potassium-40	10.9		1.60	1.95		0.759	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Protactinium-231	0.000	U	0.594	0.594		3.00	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Radium-226	0.433		0.120	0.128	0.500	0.121	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Radium-228	0.232	U	0.179	0.181		0.280	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Thallium-208	0.0822		0.0423	0.0432		0.0426	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Thorium-228	0.0194	U	0.115	0.115		0.196	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Thorium-232	0.232	U	0.179	0.181		0.280	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Thorium-234	0.0145	U	1.17	1.17		2.01	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Uranium-235	0.0252	U	0.168	0.168		0.538	pCi/g	11/11/16 13:08	12/02/16 09:11	1
Uranium-238	0.0145	U	1.17	1.17		2.01	pCi/g	11/11/16 13:08	12/02/16 09:11	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S710

Lab Sample ID: 160-19923-10

Date Collected: 11/08/16 09:39

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.421		0.165	0.171		0.323	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Actinium-227	-0.410	U	0.875	0.876		1.47	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Bismuth-212	0.369	U	0.770	0.771		1.32	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Bismuth-214	0.361		0.146	0.151		0.146	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Cesium-137	-0.0600	U	0.103	0.103		0.173	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Lead-210	-1.36	U	1.86	1.86		2.73	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Lead-212	0.0261	U	0.129	0.129		0.219	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Lead-214	0.399		0.111	0.118		0.103	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Potassium-40	11.1		1.73	2.07		0.784	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Protactinium-231	0.584	U	1.99	1.99		3.39	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Radium-226	0.361		0.146	0.151	0.500	0.146	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Radium-228	0.421		0.165	0.171		0.323	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Thallium-208	0.180		0.0652	0.0678		0.0462	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Thorium-228	0.0261	U	0.129	0.129		0.219	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Thorium-232	0.421		0.165	0.171		0.323	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Thorium-234	-0.586	U	1.46	1.46		2.77	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Uranium-235	-0.208	U	0.416	0.417		1.05	pCi/g	11/11/16 13:08	12/02/16 09:13	1
Uranium-238	-0.586	U	1.46	1.46		2.77	pCi/g	11/11/16 13:08	12/02/16 09:13	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19923-2

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S711

Lab Sample ID: 160-19923-11

Date Collected: 11/08/16 09:44

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.407		0.132	0.139		0.0790	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Actinium-227	0.224	U	0.474	0.474		1.24	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Bismuth-212	0.0348	U	0.834	0.834		1.46	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Bismuth-214	0.295		0.107	0.111		0.133	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Cesium-137	0.0142	U	0.0322	0.0322		0.0561	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Lead-210	1.33	U	1.35	1.36		1.75	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Lead-212	0.305		0.0821	0.0911		0.103	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Lead-214	0.407		0.120	0.127		0.127	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Potassium-40	9.89		1.34	1.68		0.708	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Protactinium-231	-0.848	U	2.64	2.64		4.43	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Radium-226	0.295		0.107	0.111	0.500	0.133	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Radium-228	0.407		0.132	0.139		0.0790	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Thallium-208	0.164		0.0519	0.0546		0.0476	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Thorium-228	0.305		0.0821	0.0911		0.103	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Thorium-232	0.407		0.132	0.139		0.0790	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Thorium-234	1.07	U	1.18	1.18		1.48	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Uranium-235	0.0864	U	0.174	0.174		0.780	pCi/g	11/11/16 13:08	12/02/16 09:16	1
Uranium-238	1.07	U	1.18	1.18		1.48	pCi/g	11/11/16 13:08	12/02/16 09:16	1

Client Sample ID: TITO04-BS-FSSSU3-RSY11-U7-S712

Lab Sample ID: 160-19923-12

Date Collected: 11/08/16 09:48

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.522		0.156	0.165		0.0858	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Actinium-227	0.495	U	0.538	0.541		0.709	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Bismuth-212	0.239	U	0.723	0.723		1.25	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Bismuth-214	0.388		0.113	0.120		0.104	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Cesium-137	0.0245	U	0.0676	0.0677		0.116	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Lead-210	-0.400	U	1.40	1.40		2.19	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Lead-212	0.248		0.0749	0.0815		0.0921	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Lead-214	0.353		0.0945	0.101		0.115	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Potassium-40	11.5		1.49	1.90		0.685	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Protactinium-231	0.000	U	0.257	0.257		2.78	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Radium-226	0.388		0.113	0.120	0.500	0.104	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Radium-228	0.522		0.156	0.165		0.0858	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Thallium-208	0.0707		0.0388	0.0395		0.0463	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Thorium-228	0.248		0.0749	0.0815		0.0921	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Thorium-232	0.522		0.156	0.165		0.0858	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Thorium-234	-0.652	U	0.979	0.981		1.75	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Uranium-235	-0.203	U	0.302	0.302		0.499	pCi/g	11/11/16 13:08	12/02/16 09:17	1
Uranium-238	-0.652	U	0.979	0.981		1.75	pCi/g	11/11/16 13:08	12/02/16 09:17	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S801

Lab Sample ID: 160-19954-1

Date Collected: 11/09/16 09:33

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.308		0.189	0.191		0.193	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Actinium-227	0.00953	U	0.533	0.533		0.917	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Bismuth-212	0.169	U	0.453	0.453		0.784	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Bismuth-214	0.283		0.0867	0.0916		0.0826	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Cesium-137	-0.0352	U	0.0543	0.0545		0.0907	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Lead-210	-0.533	U	0.990	0.992		1.66	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Lead-212	0.297		0.0608	0.0720		0.0639	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Lead-214	0.259		0.0750	0.0796		0.0780	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Potassium-40	9.78		1.14	1.52		0.470	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Protactinium-231	-0.196	U	1.78	1.78		3.01	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Radium-226	0.283		0.0867	0.0916	0.500	0.0826	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Radium-228	0.308		0.189	0.191		0.193	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Thallium-208	0.0660		0.0504	0.0509		0.0540	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Thorium-228	0.297		0.0608	0.0720		0.0639	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Thorium-232	0.308		0.189	0.191		0.193	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Thorium-234	0.433	U	0.919	0.920		1.54	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Uranium-235	0.176	U	0.314	0.314		0.703	pCi/g	11/14/16 10:15	12/05/16 13:44	1
Uranium-238	0.433	U	0.919	0.920		1.54	pCi/g	11/14/16 10:15	12/05/16 13:44	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S802

Lab Sample ID: 160-19954-2

Date Collected: 11/09/16 09:31

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.499		0.179	0.186		0.197	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Actinium-227	-0.290	U	0.662	0.663		0.943	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Bismuth-212	-0.0248	U	0.722	0.722		1.29	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Bismuth-214	0.319		0.0986	0.104		0.0949	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Cesium-137	-0.0143	U	0.0418	0.0418		0.0736	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Lead-210	-0.371	U	1.23	1.23		1.87	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Lead-212	0.199		0.0822	0.0862		0.118	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Lead-214	0.407		0.0958	0.105		0.0795	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Potassium-40	9.86		1.39	1.72		0.634	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Protactinium-231	0.485	U	1.07	1.07		2.51	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Radium-226	0.319		0.0986	0.104	0.500	0.0949	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Radium-228	0.499		0.179	0.186		0.197	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Thallium-208	0.0770	U	0.0671	0.0675		0.0905	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Thorium-228	0.199		0.0822	0.0862		0.118	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Thorium-232	0.499		0.179	0.186		0.197	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Thorium-234	0.760	U	0.668	0.673		0.960	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Uranium-235	-0.143	U	0.207	0.207		0.573	pCi/g	11/14/16 10:15	12/05/16 13:41	1
Uranium-238	0.760	U	0.668	0.673		0.960	pCi/g	11/14/16 10:15	12/05/16 13:41	1

TestAmerica St. Louis

reviewed by E-Lab Consultants 2/21/2017

12/06/2016

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S803

Lab Sample ID: 160-19954-3

Date Collected: 11/09/16 09:36

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.413		0.111	0.119		0.0951	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Actinium-227	0.284	U	0.632	0.633		1.06	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Bismuth-212	0.217	U	0.455	0.456		0.794	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Bismuth-214	0.248		0.0981	0.101		0.101	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Cesium-137	-0.0106	U	0.0600	0.0600		0.106	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Lead-210	-0.248	U	1.39	1.39		2.40	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Lead-212	0.224		0.0713	0.0770		0.0887	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Lead-214	0.288		0.106	0.110		0.154	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Potassium-40	11.5		1.59	1.97		0.610	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Protactinium-231	0.000	U	0.259	0.259		3.20	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Radium-226	0.248		0.0981	0.101	0.500	0.101	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Radium-228	0.413		0.111	0.119		0.0951	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Thallium-208	0.104		0.0432	0.0445		0.0429	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Thorium-228	0.224		0.0713	0.0770		0.0887	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Thorium-232	0.413		0.111	0.119		0.0951	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Thorium-234	1.65		0.711	0.731		0.850	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Uranium-235	-0.00951	U	0.611	0.611		0.864	pCi/g	11/14/16 10:15	12/05/16 13:42	1
Uranium-238	1.65		0.711	0.731		0.850	pCi/g	11/14/16 10:15	12/05/16 13:42	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S804

Lab Sample ID: 160-19954-4

Date Collected: 11/09/16 09:40

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.408		0.120	0.127		0.138	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Actinium-227	-0.369	U	0.900	0.901		1.51	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Bismuth-212	0.0171	U	0.733	0.733		1.30	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Bismuth-214	0.390		0.120	0.126		0.111	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Cesium-137	-0.0263	U	0.0564	0.0565		0.0961	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Lead-210	1.13	U	1.27	1.28		1.74	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Lead-212	0.264		0.0769	0.0841		0.0975	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Lead-214	0.381		0.106	0.113		0.102	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Potassium-40	9.84		1.33	1.67		0.760	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Protactinium-231	0.000	U	0.668	0.668		3.68	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Radium-226	0.390		0.120	0.126	0.500	0.111	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Radium-228	0.408		0.120	0.127		0.138	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Thallium-208	0.122		0.0527	0.0542		0.0551	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Thorium-228	0.264		0.0769	0.0841		0.0975	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Thorium-232	0.408		0.120	0.127		0.138	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Thorium-234	0.175	U	0.235	0.236		2.57	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Uranium-235	-0.0136	U	0.0257	0.0257		0.871	pCi/g	11/14/16 10:15	12/05/16 13:43	1
Uranium-238	0.175	U	0.235	0.236		2.57	pCi/g	11/14/16 10:15	12/05/16 13:43	1

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reviewed by E-Lab Consultants 2/21/2017

12/06/2016

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S805

Lab Sample ID: 160-19954-5

Date Collected: 11/09/16 09:44

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.356		0.160	0.164		0.235	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Actinium-227	0.269	U	0.600	0.600		0.859	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Bismuth-212	0.000	U	0.283	0.283		1.20	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Bismuth-214	0.334		0.109	0.114		0.108	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Cesium-137	-0.0185	U	0.0431	0.0431		0.0919	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Lead-210	0.798	U	1.39	1.39		1.96	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Lead-212	0.331		0.0824	0.0929		0.0958	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Lead-214	0.395		0.109	0.117		0.117	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Potassium-40	12.3		1.53	1.98		0.675	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Protactinium-231	0.000	U	0.743	0.743		3.60	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Radium-226	0.334		0.109	0.114	0.500	0.108	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Radium-228	0.356		0.160	0.164		0.235	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Thallium-208	0.0784		0.0632	0.0637		0.0782	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Thorium-228	0.331		0.0824	0.0929		0.0958	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Thorium-232	0.356		0.160	0.164		0.235	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Thorium-234	-0.438	U	1.15	1.15		2.01	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Uranium-235	0.0358	U	0.102	0.102		0.602	pCi/g	11/14/16 10:15	12/05/16 13:45	1
Uranium-238	-0.438	U	1.15	1.15		2.01	pCi/g	11/14/16 10:15	12/05/16 13:45	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S806

Lab Sample ID: 160-19954-6

Date Collected: 11/09/16 09:48

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.421		0.158	0.164		0.311	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Actinium-227	0.221	U	0.512	0.513		0.739	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Bismuth-212	0.425	U	0.862	0.863		1.47	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Bismuth-214	0.327		0.112	0.117		0.0993	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Cesium-137	-0.00601	U	0.0752	0.0753		0.133	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Lead-210	2.13		1.17	1.20		1.49	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Lead-212	0.177	U	0.123	0.125		0.194	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Lead-214	0.403		0.112	0.120		0.110	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Potassium-40	10.5		1.56	1.89		0.743	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Protactinium-231	0.485	U	1.32	1.32		2.94	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Radium-226	0.327		0.112	0.117	0.500	0.0993	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Radium-228	0.421		0.158	0.164		0.311	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Thallium-208	0.164		0.0475	0.0505		0.0241	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Thorium-228	0.177	U	0.123	0.125		0.194	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Thorium-232	0.421		0.158	0.164		0.311	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Thorium-234	-0.0660	U	1.24	1.24		2.12	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Uranium-235	0.0940	U	0.327	0.327		0.554	pCi/g	11/14/16 10:15	12/05/16 14:40	1
Uranium-238	-0.0660	U	1.24	1.24		2.12	pCi/g	11/14/16 10:15	12/05/16 14:40	1

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12/06/2016

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S807

Lab Sample ID: 160-19954-7

Date Collected: 11/09/16 09:58

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.511		0.168	0.176		0.102	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Actinium-227	0.0743	U	0.208	0.209		1.24	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Bismuth-212	0.000	U	0.429	0.429		1.20	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Bismuth-214	0.462		0.130	0.139		0.110	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Cesium-137	0.0318	U	0.0572	0.0573		0.0972	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Lead-210	0.307	U	1.46	1.46		2.46	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Lead-212	0.236		0.0797	0.0854		0.104	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Lead-214	0.377		0.106	0.113		0.0945	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Potassium-40	10.5		1.57	1.90		0.653	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Protactinium-231	-0.867	U	2.79	2.79		4.69	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Radium-226	0.462		0.130	0.139	0.500	0.110	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Radium-228	0.511		0.168	0.176		0.102	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Thallium-208	0.145		0.0601	0.0619		0.0618	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Thorium-228	0.236		0.0797	0.0854		0.104	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Thorium-232	0.511		0.168	0.176		0.102	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Thorium-234	-0.861	U	0.797	0.802		2.74	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Uranium-235	0.163	U	0.280	0.281		0.460	pCi/g	11/14/16 10:15	12/05/16 14:41	1
Uranium-238	-0.861	U	0.797	0.802		2.74	pCi/g	11/14/16 10:15	12/05/16 14:41	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S808

Lab Sample ID: 160-19954-8

Date Collected: 11/09/16 10:01

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.459		0.137	0.145		0.0752	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Actinium-227	-0.321	U	0.760	0.761		1.27	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Bismuth-212	0.256	U	0.421	0.422		0.714	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Bismuth-214	0.323		0.133	0.137		0.135	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Cesium-137	0.0217	U	0.0459	0.0459		0.0786	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Lead-210	1.01	U	1.32	1.32		1.79	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Lead-212	0.286		0.0754	0.0840		0.0917	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Lead-214	0.322		0.101	0.106		0.108	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Potassium-40	10.5		1.35	1.72		0.738	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Protactinium-231	0.646	U	1.43	1.43		3.28	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Radium-226	0.323		0.133	0.137	0.500	0.135	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Radium-228	0.459		0.137	0.145		0.0752	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Thallium-208	0.115		0.0528	0.0541		0.0582	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Thorium-228	0.286		0.0754	0.0840		0.0917	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Thorium-232	0.459		0.137	0.145		0.0752	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Thorium-234	-0.197	U	1.21	1.21		2.07	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Uranium-235	-0.181	U	0.500	0.500		0.835	pCi/g	11/14/16 10:15	12/05/16 14:43	1
Uranium-238	-0.197	U	1.21	1.21		2.07	pCi/g	11/14/16 10:15	12/05/16 14:43	1

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12/06/2016

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S809

Lab Sample ID: 160-19954-9

Date Collected: 11/09/16 10:04

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.206	U	0.213	0.214		0.233	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Actinium-227	0.0807	U	0.605	0.605		0.885	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Bismuth-212	0.479	U	1.04	1.04		1.75	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Bismuth-214	0.374		0.125	0.131		0.109	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Cesium-137	0.0284	U	0.0511	0.0512		0.0866	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-210	-0.924	U	1.54	1.55		2.41	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-212	0.250		0.0780	0.0844		0.0998	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-214	0.331		0.0884	0.0948		0.0971	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Potassium-40	11.8		1.50	1.92		0.670	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Protactinium-231	0.000	U	0.330	0.330		3.21	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Radium-226	0.374		0.125	0.131	0.500	0.109	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Radium-228	0.206	U	0.213	0.214		0.233	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thallium-208	0.0876		0.0436	0.0445		0.0478	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-228	0.250		0.0780	0.0844		0.0998	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-232	0.206	U	0.213	0.214		0.233	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-234	-0.550	U	1.09	1.09		1.92	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Uranium-235	-0.216	U	0.327	0.328		0.661	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Uranium-238	-0.550	U	1.09	1.09		1.92	pCi/g	11/14/16 10:15	12/05/16 14:45	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S810

Lab Sample ID: 160-19954-10

Date Collected: 11/09/16 10:09

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.370		0.165	0.170		0.128	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Actinium-227	-0.387	U	0.678	0.679		1.18	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Bismuth-212	0.395	U	1.10	1.10		1.89	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Bismuth-214	0.371		0.123	0.129		0.121	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Cesium-137	0.00267	U	0.0761	0.0761		0.136	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-210	-0.140	U	1.43	1.43		2.17	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-212	0.310		0.0830	0.0922		0.0867	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Lead-214	0.410		0.127	0.134		0.133	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Potassium-40	11.3		1.83	2.16		0.847	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Protactinium-231	0.000	U	0.278	0.278		4.06	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Radium-226	0.371		0.123	0.129	0.500	0.121	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Radium-228	0.370		0.165	0.170		0.128	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thallium-208	0.161		0.0575	0.0599		0.0464	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-228	0.310		0.0830	0.0922		0.0867	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-232	0.370		0.165	0.170		0.128	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Thorium-234	0.0144	U	1.03	1.03		1.79	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Uranium-235	0.139	U	0.292	0.292		0.523	pCi/g	11/14/16 10:15	12/05/16 14:45	1
Uranium-238	0.0144	U	1.03	1.03		1.79	pCi/g	11/14/16 10:15	12/05/16 14:45	1

TestAmerica St. Louis

reviewed by E-Lab Consultants 2/21/2017

12/06/2016

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S811

Lab Sample ID: 160-19954-11

Date Collected: 11/09/16 10:01

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.141	U	0.252	0.253		0.270	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Actinium-227	0.225	U	0.559	0.560		0.944	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Bismuth-212	0.0804	U	0.486	0.486		0.879	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Bismuth-214	0.324		0.0924	0.0984		0.0784	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Cesium-137	0.0294	U	0.0554	0.0555		0.0939	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Lead-210	-0.0597	U	1.11	1.11		1.92	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Lead-212	0.300		0.0686	0.0788		0.0764	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Lead-214	0.340		0.0754	0.0833		0.0916	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Potassium-40	12.0		1.53	1.96		0.541	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Protactinium-231	0.363	U	0.908	0.909		2.13	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Radium-226	0.324		0.0924	0.0984	0.500	0.0784	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Radium-228	0.141	U	0.252	0.253		0.270	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Thallium-208	0.127		0.0476	0.0494		0.0407	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Thorium-228	0.300		0.0686	0.0788		0.0764	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Thorium-232	0.141	U	0.252	0.253		0.270	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Thorium-234	1.40		0.860	0.873		1.06	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Uranium-235	0.147	U	0.110	0.111		0.158	pCi/g	11/14/16 10:15	12/05/16 14:48	1
Uranium-238	1.40		0.860	0.873		1.06	pCi/g	11/14/16 10:15	12/05/16 14:48	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S812

Lab Sample ID: 160-19954-12

Date Collected: 11/09/16 10:03

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.271		0.217	0.219		0.234	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Actinium-227	0.288	U	0.628	0.629		1.06	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Bismuth-212	0.336	U	0.802	0.803		1.38	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Bismuth-214	0.286		0.106	0.110		0.108	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Cesium-137	-0.0231	U	0.0663	0.0663		0.123	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Lead-210	0.666	U	1.46	1.46		2.45	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Lead-212	0.374		0.0818	0.0951		0.0822	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Lead-214	0.334		0.0854	0.0922		0.117	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Potassium-40	12.1		1.67	2.08		0.607	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Protactinium-231	-0.785	U	2.68	2.69		4.52	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Radium-226	0.286		0.106	0.110	0.500	0.108	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Radium-228	0.271		0.217	0.219		0.234	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Thallium-208	0.0883	U	0.0820	0.0825		0.0982	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Thorium-228	0.374		0.0818	0.0951		0.0822	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Thorium-232	0.271		0.217	0.219		0.234	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Thorium-234	0.979	U	1.23	1.24		1.56	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Uranium-235	-0.141	U	0.175	0.176		0.761	pCi/g	11/14/16 10:15	12/05/16 14:50	1
Uranium-238	0.979	U	1.23	1.24		1.56	pCi/g	11/14/16 10:15	12/05/16 14:50	1

TestAmerica St. Louis

reviewed by E-Lab Consultants 2/21/2017

12/06/2016

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S813

Lab Sample ID: 160-19954-13

Date Collected: 11/09/16 10:03

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.107	U	0.207	0.207		0.382	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Actinium-227	-0.188	U	0.475	0.476		0.813	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Bismuth-212	-0.349	U	0.982	0.983		1.70	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Bismuth-214	0.401		0.136	0.143		0.138	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Cesium-137	-0.0482	U	0.0480	0.0482		0.141	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Lead-210	1.39		1.00	1.02		1.36	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Lead-212	0.312		0.0837	0.0930		0.0917	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Lead-214	0.364		0.126	0.131		0.128	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Potassium-40	11.2		1.77	2.11		0.804	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Protactinium-231	0.574	U	1.26	1.27		2.99	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Radium-226	0.401		0.136	0.143	0.500	0.138	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Radium-228	0.107	U	0.207	0.207		0.382	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Thallium-208	0.0875	U	0.0841	0.0846		0.0904	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Thorium-228	0.312		0.0837	0.0930		0.0917	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Thorium-232	0.107	U	0.207	0.207		0.382	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Thorium-234	1.58		1.04	1.06		1.29	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Uranium-235	0.00810	U	0.0139	0.0139		0.538	pCi/g	11/14/16 10:15	12/05/16 15:19	1
Uranium-238	1.58		1.04	1.06		1.29	pCi/g	11/14/16 10:15	12/05/16 15:19	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S814

Lab Sample ID: 160-19954-14

Date Collected: 11/09/16 10:09

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.300		0.135	0.139		0.244	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Actinium-227	0.215	U	0.524	0.524		0.885	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Bismuth-212	0.265	U	0.640	0.640		1.10	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Bismuth-214	0.414		0.119	0.126		0.110	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Cesium-137	-0.0196	U	0.0530	0.0531		0.0918	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Lead-210	-0.809	U	0.928	0.932		2.49	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Lead-212	0.273		0.0736	0.0816		0.0920	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Lead-214	0.365		0.0874	0.0953		0.0779	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Potassium-40	9.75		1.41	1.73		0.556	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Protactinium-231	0.457	U	1.10	1.10		2.55	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Radium-226	0.414		0.119	0.126	0.500	0.110	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Radium-228	0.300		0.135	0.139		0.244	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Thallium-208	0.137		0.0520	0.0539		0.0482	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Thorium-228	0.273		0.0736	0.0816		0.0920	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Thorium-232	0.300		0.135	0.139		0.244	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Thorium-234	-0.0344	U	0.899	0.899		1.55	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Uranium-235	0.0868	U	0.275	0.275		0.463	pCi/g	11/14/16 10:15	12/05/16 15:21	1
Uranium-238	-0.0344	U	0.899	0.899		1.55	pCi/g	11/14/16 10:15	12/05/16 15:21	1

TestAmerica St. Louis

reviewed by E-Lab Consultants 2/21/2017

12/06/2016

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S815

Lab Sample ID: 160-19954-15

Date Collected: 11/09/16 10:11

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.103	U	0.229	0.229		0.349	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Actinium-227	0.354	U	0.746	0.747		1.25	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Bismuth-212	-0.726	U	1.16	1.16		1.93	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Bismuth-214	0.325		0.106	0.111		0.0934	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Cesium-137	-0.0166	U	0.0842	0.0842		0.151	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Lead-210	-0.581	U	1.47	1.47		2.48	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Lead-212	0.406		0.116	0.127		0.158	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Lead-214	0.284		0.101	0.105		0.103	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Potassium-40	10.6		1.57	1.91		0.609	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Protactinium-231	-0.888	U	2.81	2.81		4.72	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Radium-226	0.325		0.106	0.111	0.500	0.0934	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Radium-228	0.103	U	0.229	0.229		0.349	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Thallium-208	0.0407	U	0.0763	0.0764		0.0984	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Thorium-228	0.406		0.116	0.127		0.158	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Thorium-232	0.103	U	0.229	0.229		0.349	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Thorium-234	0.180	U	0.240	0.240		2.31	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Uranium-235	-0.0294	U	0.139	0.139		0.792	pCi/g	11/14/16 10:15	12/05/16 15:23	1
Uranium-238	0.180	U	0.240	0.240		2.31	pCi/g	11/14/16 10:15	12/05/16 15:23	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S816

Lab Sample ID: 160-19954-16

Date Collected: 11/09/16 10:12

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.226		0.105	0.108		0.106	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Actinium-227	0.116	U	0.0911	0.0920		1.11	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Bismuth-212	0.000	U	0.441	0.441		1.11	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Bismuth-214	0.366		0.0940	0.101		0.0834	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Cesium-137	-0.0331	U	0.0544	0.0545		0.0911	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Lead-210	-0.670	U	1.30	1.30		2.17	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Lead-212	0.318		0.0664	0.0781		0.0694	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Lead-214	0.289		0.0859	0.0910		0.101	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Potassium-40	9.94		1.22	1.59		0.576	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Protactinium-231	0.493	U	1.30	1.30		2.96	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Radium-226	0.366		0.0940	0.101	0.500	0.0834	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Radium-228	0.226		0.105	0.108		0.106	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Thallium-208	0.127		0.0346	0.0371		0.0203	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Thorium-228	0.318		0.0664	0.0781		0.0694	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Thorium-232	0.226		0.105	0.108		0.106	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Thorium-234	0.443	U	0.954	0.956		1.60	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Uranium-235	-0.164	U	0.455	0.455		0.759	pCi/g	11/14/16 10:15	12/05/16 15:12	1
Uranium-238	0.443	U	0.954	0.956		1.60	pCi/g	11/14/16 10:15	12/05/16 15:12	1

TestAmerica St. Louis

reviewed by E-Lab Consultants 2/21/2017

12/06/2016

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S817

Lab Sample ID: 160-19954-17

Date Collected: 11/09/16 10:06

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.444		0.126	0.134		0.0639	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Actinium-227	0.000972	U	0.00226	0.00226		0.967	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Bismuth-212	0.220	U	0.489	0.490		0.840	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Bismuth-214	0.281		0.0882	0.0929		0.0895	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Cesium-137	0.0219	U	0.0396	0.0397		0.0672	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-210	0.539	U	1.17	1.17		1.96	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-212	0.338		0.0691	0.0818		0.0758	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-214	0.382		0.0796	0.0889		0.0977	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Potassium-40	11.6		1.28	1.75		0.505	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Protactinium-231	0.481	U	1.38	1.38		3.12	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Radium-226	0.281		0.0882	0.0929	0.500	0.0895	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Radium-228	0.444		0.126	0.134		0.0639	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thallium-208	0.122		0.0407	0.0426		0.0325	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-228	0.338		0.0691	0.0818		0.0758	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-232	0.444		0.126	0.134		0.0639	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-234	-0.567	U	1.30	1.30		2.17	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Uranium-235	0.0751	U	0.187	0.188		0.613	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Uranium-238	-0.567	U	1.30	1.30		2.17	pCi/g	11/14/16 10:15	12/05/16 15:15	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S818

Lab Sample ID: 160-19954-18

Date Collected: 11/09/16 10:08

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.289		0.205	0.207		0.216	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Actinium-227	-0.250	U	0.609	0.610		0.873	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Bismuth-212	-0.0136	U	0.616	0.616		1.12	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Bismuth-214	0.319		0.126	0.130		0.134	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Cesium-137	-0.0313	U	0.0579	0.0580		0.0983	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-210	0.365	U	1.20	1.20		1.78	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-212	0.172		0.0785	0.0816		0.113	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Lead-214	0.280		0.0910	0.0955		0.122	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Potassium-40	9.68		1.45	1.76		0.695	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Protactinium-231	-0.104	U	2.00	2.00		3.42	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Radium-226	0.319		0.126	0.130	0.500	0.134	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Radium-228	0.289		0.205	0.207		0.216	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thallium-208	0.107		0.0486	0.0499		0.0454	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-228	0.172		0.0785	0.0816		0.113	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-232	0.289		0.205	0.207		0.216	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Thorium-234	0.413	U	1.13	1.13		1.63	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Uranium-235	0.0893	U	0.299	0.299		0.507	pCi/g	11/14/16 10:15	12/05/16 15:15	1
Uranium-238	0.413	U	1.13	1.13		1.63	pCi/g	11/14/16 10:15	12/05/16 15:15	1

TestAmerica St. Louis

reviewed by E-Lab Consultants 2/21/2017

12/06/2016

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19954-2

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S819

Lab Sample ID: 160-19954-19

Date Collected: 11/09/16 10:10

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.153	U	0.0769	0.0785		0.386	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Actinium-227	0.292	U	0.429	0.430		1.20	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Bismuth-212	0.000	U	0.231	0.231		1.41	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Bismuth-214	0.385		0.127	0.133		0.117	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Cesium-137	0.0180	U	0.0784	0.0785		0.137	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Lead-210	-0.269	U	1.43	1.43		2.48	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Lead-212	0.307		0.0905	0.0988		0.113	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Lead-214	0.375		0.114	0.120		0.142	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Potassium-40	12.2		1.76	2.16		0.702	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Protactinium-231	0.000	U	0.827	0.827		4.45	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Radium-226	0.385		0.127	0.133	0.500	0.117	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Radium-228	0.153	U	0.0769	0.0785		0.386	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Thallium-208	0.145		0.0491	0.0514		0.0400	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Thorium-228	0.307		0.0905	0.0988		0.113	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Thorium-232	0.153	U	0.0769	0.0785		0.386	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Thorium-234	0.634	U	0.479	0.484		1.41	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Uranium-235	-0.124	U	0.495	0.495		0.674	pCi/g	11/14/16 10:15	12/05/16 15:16	1
Uranium-238	0.634	U	0.479	0.484		1.41	pCi/g	11/14/16 10:15	12/05/16 15:16	1

Client Sample ID: TITO04-BS-FSSSU4-RSY10-U8-S820

Lab Sample ID: 160-19954-20

Date Collected: 11/09/16 10:09

Matrix: Solid

Date Received: 11/11/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.336		0.194	0.197		0.195	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Actinium-227	0.131	U	0.528	0.528		0.901	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Bismuth-212	0.332	U	0.559	0.560		0.941	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Bismuth-214	0.349		0.123	0.128		0.122	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Cesium-137	0.0230	U	0.0440	0.0440		0.0747	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Lead-210	0.416	U	1.21	1.21		2.05	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Lead-212	0.365		0.0704	0.0848		0.0701	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Lead-214	0.417		0.0954	0.105		0.0869	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Potassium-40	11.3		1.32	1.76		0.594	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Protactinium-231	0.000	U	0.734	0.734		3.70	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Radium-226	0.349		0.123	0.128	0.500	0.122	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Radium-228	0.336		0.194	0.197		0.195	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Thallium-208	0.0982		0.0726	0.0733		0.0591	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Thorium-228	0.365		0.0704	0.0848		0.0701	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Thorium-232	0.336		0.194	0.197		0.195	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Thorium-234	0.491	U	1.06	1.06		1.77	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Uranium-235	0.0671	U	0.316	0.316		0.596	pCi/g	11/14/16 10:15	12/05/16 15:56	1
Uranium-238	0.491	U	1.06	1.06		1.77	pCi/g	11/14/16 10:15	12/05/16 15:56	1

TestAmerica St. Louis

reviewed by E-Lab Consultants 2/21/2017

12/06/2016

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S901

Lab Sample ID: 160-20016-1

Date Collected: 11/14/16 10:33

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.346		0.109	0.115		0.0648	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Actinium-227	0.0471	U	0.584	0.584		1.00	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Bismuth-212	0.185	U	0.474	0.474		0.820	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Bismuth-214	0.247		0.0900	0.0936		0.0947	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Cesium-137	0.0164	U	0.0360	0.0361		0.0621	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Lead-210	-0.595	U	1.17	1.17		1.97	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Lead-212	0.298		0.0638	0.0746		0.0672	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Lead-214	0.348		0.0731	0.0816		0.0827	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Potassium-40	10.9		1.27	1.69		0.565	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Protactinium-231	0.000	U	0.336	0.336		3.30	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Radium-226	0.247		0.0900	0.0936	0.500	0.0947	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Radium-228	0.346		0.109	0.115		0.0648	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Thallium-208	0.0776		0.0476	0.0483		0.0514	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Thorium-228	0.298		0.0638	0.0746		0.0672	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Thorium-232	0.346		0.109	0.115		0.0648	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Thorium-234	-0.505	U	1.06	1.06		1.77	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Uranium-235	0.000	U	0.0998	0.0998		0.637	pCi/g	11/17/16 14:27	12/08/16 11:29	1
Uranium-238	-0.505	U	1.06	1.06		1.77	pCi/g	11/17/16 14:27	12/08/16 11:29	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S902

Lab Sample ID: 160-20016-2

Date Collected: 11/14/16 10:33

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0963	U	0.176	0.176		0.204	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Actinium-227	0.0613	U	0.194	0.194		0.837	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Bismuth-212	0.273	U	0.635	0.635		1.09	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Bismuth-214	0.356		0.0947	0.102		0.0682	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Cesium-137	0.0214	U	0.0477	0.0477		0.0821	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Lead-210	0.175	U	0.642	0.642		1.05	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Lead-212	0.205		0.0564	0.0623		0.0621	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Lead-214	0.322		0.0648	0.0729		0.0881	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Potassium-40	4.22		0.946	1.04		0.553	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Protactinium-231	0.000	U	0.381	0.381		2.37	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Radium-226	0.356		0.0947	0.102	0.500	0.0682	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Radium-228	0.0963	U	0.176	0.176		0.204	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Thallium-208	0.102		0.0537	0.0547		0.0577	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Thorium-228	0.205		0.0564	0.0623		0.0621	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Thorium-232	0.0963	U	0.176	0.176		0.204	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Thorium-234	-0.160	U	0.879	0.879		1.53	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Uranium-235	-0.103	U	0.329	0.329		0.553	pCi/g	11/17/16 14:27	12/08/16 08:16	1
Uranium-238	-0.160	U	0.879	0.879		1.53	pCi/g	11/17/16 14:27	12/08/16 08:16	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S903

Lab Sample ID: 160-20016-3

Date Collected: 11/14/16 10:36

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.147	U	0.230	0.231		0.335	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Actinium-227	-0.0224	U	0.107	0.107		0.713	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Bismuth-212	-0.284	U	0.871	0.871		1.52	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Bismuth-214	0.267		0.106	0.110		0.114	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Cesium-137	0.000389	U	0.0593	0.0593		0.108	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Lead-210	2.05		1.14	1.17		1.39	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Lead-212	0.262		0.0755	0.0828		0.0818	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Lead-214	0.419		0.124	0.132		0.142	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Potassium-40	4.28		1.13	1.21		0.797	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Protactinium-231	0.327	U	0.971	0.972		3.22	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Radium-226	0.267		0.106	0.110	0.500	0.114	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Radium-228	0.147	U	0.230	0.231		0.335	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Thallium-208	0.0897		0.0698	0.0704		0.0711	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Thorium-228	0.262		0.0755	0.0828		0.0818	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Thorium-232	0.147	U	0.230	0.231		0.335	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Thorium-234	-0.0472	U	0.845	0.845		1.49	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Uranium-235	0.128	U	0.248	0.248		0.518	pCi/g	11/17/16 14:27	12/08/16 08:17	1
Uranium-238	-0.0472	U	0.845	0.845		1.49	pCi/g	11/17/16 14:27	12/08/16 08:17	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S904

Lab Sample ID: 160-20016-4

Date Collected: 11/14/16 10:37

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.498		0.160	0.168		0.0942	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Actinium-227	0.236	U	0.544	0.544		0.781	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Bismuth-212	-0.218	U	0.741	0.741		1.29	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Bismuth-214	0.362		0.114	0.120		0.108	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Cesium-137	0.0222	U	0.0449	0.0449		0.0773	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Lead-210	0.794	U	1.23	1.23		1.62	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Lead-212	0.318		0.0808	0.0906		0.0934	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Lead-214	0.249		0.108	0.111		0.148	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Potassium-40	10.3		1.49	1.83		0.696	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Protactinium-231	0.000	U	0.642	0.642		3.59	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Radium-226	0.362		0.114	0.120	0.500	0.108	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Radium-228	0.498		0.160	0.168		0.0942	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Thallium-208	0.169		0.0578	0.0604		0.0481	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Thorium-228	0.318		0.0808	0.0906		0.0934	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Thorium-232	0.498		0.160	0.168		0.0942	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Thorium-234	-0.0685	U	0.982	0.982		1.69	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Uranium-235	0.00240	U	0.00475	0.00475		0.547	pCi/g	11/17/16 14:27	12/08/16 09:01	1
Uranium-238	-0.0685	U	0.982	0.982		1.69	pCi/g	11/17/16 14:27	12/08/16 09:01	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S905

Lab Sample ID: 160-20016-5

Date Collected: 11/14/16 10:37

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.403		0.125	0.132		0.104	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Actinium-227	-0.381	U	0.888	0.889		1.49	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Bismuth-212	-0.0299	U	0.672	0.672		1.22	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Bismuth-214	0.315		0.102	0.107		0.0915	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Cesium-137	-0.0227	U	0.0717	0.0717		0.124	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Lead-210	-1.71	U	1.15	1.17		2.92	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Lead-212	0.206		0.0849	0.0889		0.119	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Lead-214	0.328		0.111	0.117		0.104	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Potassium-40	10.7		1.61	1.95		0.668	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Protactinium-231	0.000	U	0.164	0.164		3.80	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Radium-226	0.315		0.102	0.107	0.500	0.0915	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Radium-228	0.403		0.125	0.132		0.104	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Thallium-208	0.129		0.0655	0.0668		0.0870	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Thorium-228	0.206		0.0849	0.0889		0.119	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Thorium-232	0.403		0.125	0.132		0.104	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Thorium-234	0.0232	U	1.31	1.31		2.24	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Uranium-235	-0.0104	U	0.277	0.277		0.987	pCi/g	11/17/16 14:27	12/08/16 09:02	1
Uranium-238	0.0232	U	1.31	1.31		2.24	pCi/g	11/17/16 14:27	12/08/16 09:02	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S906

Lab Sample ID: 160-20016-6

Date Collected: 11/14/16 10:39

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.393		0.144	0.149		0.209	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Actinium-227	0.171	U	0.447	0.447		1.19	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Bismuth-212	-0.481	U	1.01	1.01		1.70	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Bismuth-214	0.142	U	0.0868	0.0881		0.272	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Cesium-137	0.000902	U	0.0477	0.0477		0.0858	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Lead-210	1.19	U	1.31	1.32		1.73	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Lead-212	0.271		0.0761	0.0837		0.0961	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Lead-214	0.177	U	0.0605	0.0632		0.228	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Potassium-40	10.7		1.35	1.74		0.730	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Protactinium-231	-0.422	U	1.92	1.93		3.26	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Radium-226	0.142	U	0.0868	0.0881	0.500	0.272	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Radium-228	0.393		0.144	0.149		0.209	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Thallium-208	0.158		0.0497	0.0524		0.0450	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Thorium-228	0.271		0.0761	0.0837		0.0961	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Thorium-232	0.393		0.144	0.149		0.209	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Thorium-234	1.38		0.898	0.909		1.17	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Uranium-235	-0.167	U	0.492	0.492		0.821	pCi/g	11/17/16 14:27	12/08/16 09:03	1
Uranium-238	1.38		0.898	0.909		1.17	pCi/g	11/17/16 14:27	12/08/16 09:03	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S907

Lab Sample ID: 160-20016-7

Date Collected: 11/14/16 10:39

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.375		0.133	0.138		0.0846	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Actinium-227	-0.180	U	0.662	0.662		0.955	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Bismuth-212	0.260	U	0.609	0.610		1.05	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Bismuth-214	0.153	U	0.0971	0.0984		0.413	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Cesium-137	0.0198	U	0.0435	0.0436		0.0752	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Lead-210	0.0878	U	1.44	1.44		2.09	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Lead-212	0.328		0.0798	0.0904		0.0905	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Lead-214	0.385		0.100	0.108		0.127	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Potassium-40	11.7		1.49	1.91		0.666	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Protactinium-231	0.000	U	0.327	0.327		3.32	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Radium-226	0.153	U	0.0971	0.0984	0.500	0.413	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Radium-228	0.375		0.133	0.138		0.0846	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Thallium-208	0.170		0.0592	0.0618		0.0523	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Thorium-228	0.328		0.0798	0.0904		0.0905	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Thorium-232	0.375		0.133	0.138		0.0846	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Thorium-234	0.439	U	0.951	0.952		1.59	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Uranium-235	0.0415	U	0.279	0.279		0.443	pCi/g	11/17/16 14:27	12/08/16 09:29	1
Uranium-238	0.439	U	0.951	0.952		1.59	pCi/g	11/17/16 14:27	12/08/16 09:29	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S908

Lab Sample ID: 160-20016-8

Date Collected: 11/14/16 10:43

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.322		0.160	0.164		0.261	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Actinium-227	0.302	U	0.657	0.658		1.10	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Bismuth-212	-0.288	U	0.820	0.820		1.41	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Bismuth-214	0.314		0.111	0.115		0.106	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Cesium-137	-0.0571	U	0.0482	0.0485		0.131	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Lead-210	-0.773	U	1.68	1.68		2.82	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Lead-212	0.341		0.0736	0.0858		0.0698	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Lead-214	0.183		0.111	0.112		0.166	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Potassium-40	11.1		1.55	1.92		0.570	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Protactinium-231	0.000	U	0.335	0.335		4.00	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Radium-226	0.314		0.111	0.115	0.500	0.106	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Radium-228	0.322		0.160	0.164		0.261	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Thallium-208	0.107		0.0455	0.0469		0.0461	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Thorium-228	0.341		0.0736	0.0858		0.0698	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Thorium-232	0.322		0.160	0.164		0.261	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Thorium-234	-1.40	U	0.734	0.748		2.49	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Uranium-235	-0.0367	U	0.350	0.350		0.600	pCi/g	11/17/16 14:27	12/08/16 09:05	1
Uranium-238	-1.40	U	0.734	0.748		2.49	pCi/g	11/17/16 14:27	12/08/16 09:05	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S909

Lab Sample ID: 160-20016-9

Date Collected: 11/14/16 10:43

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.533		0.157	0.166		0.0884	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Actinium-227	-0.256	U	0.669	0.669		1.13	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Bismuth-212	0.000	U	0.452	0.452		0.979	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Bismuth-214	0.390		0.0972	0.105		0.0699	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Cesium-137	0.0210	U	0.0430	0.0431		0.0741	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Lead-210	0.876	U	0.841	0.848		1.21	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Lead-212	0.276		0.0744	0.0825		0.0928	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Lead-214	0.380		0.0791	0.0884		0.0702	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Potassium-40	11.7		1.56	1.97		0.567	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Protactinium-231	0.000	U	0.411	0.411		2.86	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Radium-226	0.390		0.0972	0.105	0.500	0.0699	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Radium-228	0.533		0.157	0.166		0.0884	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Thallium-208	0.109		0.0411	0.0426		0.0379	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Thorium-228	0.276		0.0744	0.0825		0.0928	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Thorium-232	0.533		0.157	0.166		0.0884	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Thorium-234	-0.0843	U	0.858	0.858		1.49	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Uranium-235	0.145	U	0.281	0.281		0.576	pCi/g	11/17/16 14:27	12/08/16 09:06	1
Uranium-238	-0.0843	U	0.858	0.858		1.49	pCi/g	11/17/16 14:27	12/08/16 09:06	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S910

Lab Sample ID: 160-20016-10

Date Collected: 11/14/16 10:46

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.401		0.180	0.185		0.212	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Actinium-227	0.0915	U	0.289	0.289		0.939	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Bismuth-212	0.217	U	0.900	0.900		1.59	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Bismuth-214	0.483		0.139	0.147		0.123	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Cesium-137	-0.0367	U	0.0879	0.0880		0.132	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Lead-210	0.829	U	1.29	1.30		1.79	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Lead-212	0.270		0.0918	0.0982		0.117	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Lead-214	0.345		0.111	0.117		0.150	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Potassium-40	12.6		1.94	2.33		0.862	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Protactinium-231	0.362	U	1.05	1.05		3.57	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Radium-226	0.483		0.139	0.147	0.500	0.123	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Radium-228	0.401		0.180	0.185		0.212	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Thallium-208	0.169		0.0579	0.0605		0.0472	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Thorium-228	0.270		0.0918	0.0982		0.117	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Thorium-232	0.401		0.180	0.185		0.212	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Thorium-234	-0.0283	U	0.0912	0.0912		1.91	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Uranium-235	0.0272	U	0.0654	0.0655		0.626	pCi/g	11/17/16 14:27	12/08/16 09:07	1
Uranium-238	-0.0283	U	0.0912	0.0912		1.91	pCi/g	11/17/16 14:27	12/08/16 09:07	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20016-2

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S911

Lab Sample ID: 160-20016-11

Date Collected: 11/14/16 10:48

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.266		0.190	0.192		0.198	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Actinium-227	0.252	U	0.550	0.550		0.925	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Bismuth-212	-0.454	U	0.889	0.890		1.49	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Bismuth-214	0.327		0.0927	0.0988		0.0868	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Cesium-137	0.0135	U	0.0268	0.0268		0.0333	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Lead-210	0.532	U	1.18	1.18		1.99	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Lead-212	0.333		0.0733	0.0850		0.0832	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Lead-214	0.340		0.0805	0.0879		0.0787	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Potassium-40	10.7		1.30	1.69		0.602	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Protactinium-231	0.000	U	0.430	0.430		3.44	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Radium-226	0.327		0.0927	0.0988	0.500	0.0868	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Radium-228	0.266		0.190	0.192		0.198	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Thallium-208	0.139		0.0471	0.0493		0.0354	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Thorium-228	0.333		0.0733	0.0850		0.0832	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Thorium-232	0.266		0.190	0.192		0.198	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Thorium-234	0.455	U	0.986	0.987		1.65	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Uranium-235	-0.0200	U	0.0335	0.0336		0.714	pCi/g	11/17/16 14:27	12/08/16 09:32	1
Uranium-238	0.455	U	0.986	0.987		1.65	pCi/g	11/17/16 14:27	12/08/16 09:32	1

Client Sample ID: TITO04-BS-FSSSU4P1-RSY10-U9-S912

Lab Sample ID: 160-20016-12

Date Collected: 11/14/16 10:50

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.162	U	0.199	0.199		0.276	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Actinium-227	0.242	U	0.741	0.741		1.25	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Bismuth-212	0.388	U	0.887	0.888		1.51	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Bismuth-214	0.117	U	0.0739	0.0749		0.426	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Cesium-137	-0.0521	U	0.0525	0.0528		0.114	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Lead-210	1.28	U	1.18	1.19		1.68	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Lead-212	0.318		0.0784	0.0886		0.0867	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Lead-214	0.396		0.110	0.117		0.129	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Potassium-40	11.1		1.42	1.82		0.337	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Protactinium-231	0.000	U	0.517	0.517		3.75	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Radium-226	0.117	U	0.0739	0.0749	0.500	0.426	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Radium-228	0.162	U	0.199	0.199		0.276	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Thallium-208	0.127		0.0525	0.0541		0.0522	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Thorium-228	0.318		0.0784	0.0886		0.0867	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Thorium-232	0.162	U	0.199	0.199		0.276	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Thorium-234	0.635	U	1.04	1.04		1.45	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Uranium-235	0.0710	U	0.209	0.209		0.545	pCi/g	11/17/16 14:27	12/08/16 09:33	1
Uranium-238	0.635	U	1.04	1.04		1.45	pCi/g	11/17/16 14:27	12/08/16 09:33	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S901

Lab Sample ID: 160-20048-1

Date Collected: 11/15/16 12:45

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.320		0.130	0.134		0.131	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Actinium-227	-0.217	U	0.571	0.571		0.964	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Bismuth-212	-0.401	U	0.725	0.726		1.22	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Bismuth-214	0.290		0.0909	0.0957		0.0865	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Cesium-137	0.0132	U	0.0291	0.0292		0.0508	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Lead-210	0.288	U	0.981	0.982		1.68	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Lead-212	0.266		0.0614	0.0704		0.0647	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Lead-214	0.323		0.102	0.107		0.0997	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Potassium-40	10.3		1.26	1.65		0.591	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Protactinium-231	0.000	U	0.682	0.682		3.26	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Radium-226	0.290		0.0909	0.0957	0.500	0.0865	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Radium-228	0.320		0.130	0.134		0.131	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Thallium-208	0.0865		0.0668	0.0674		0.0679	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Thorium-228	0.266		0.0614	0.0704		0.0647	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Thorium-232	0.320		0.130	0.134		0.131	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Thorium-234	-0.0929	U	0.828	0.828		1.42	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Uranium-235	-0.145	U	0.402	0.403		0.673	pCi/g	11/18/16 13:40	12/09/16 16:13	1
Uranium-238	-0.0929	U	0.828	0.828		1.42	pCi/g	11/18/16 13:40	12/09/16 16:13	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S902

Lab Sample ID: 160-20048-2

Date Collected: 11/15/16 12:46

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.417		0.173	0.178		0.140	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Actinium-227	0.253	U	0.763	0.763		1.29	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Bismuth-212	-0.352	U	0.876	0.877		1.50	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Bismuth-214	0.112	U	0.0742	0.0751		0.251	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Cesium-137	-0.0157	U	0.0581	0.0581		0.108	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-210	0.477	U	1.34	1.34		1.97	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-212	0.395		0.134	0.143		0.194	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-214	0.365		0.111	0.118		0.118	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Potassium-40	10.5		1.46	1.81		0.375	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Protactinium-231	0.583	U	1.46	1.46		3.37	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Radium-226	0.112	U	0.0742	0.0751	0.500	0.251	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Radium-228	0.417		0.173	0.178		0.140	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thallium-208	0.129		0.0476	0.0494		0.0476	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-228	0.395		0.134	0.143		0.194	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-232	0.417		0.173	0.178		0.140	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-234	0.799	U	1.05	1.05		1.50	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Uranium-235	-0.153	U	0.368	0.368		0.619	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Uranium-238	0.799	U	1.05	1.05		1.50	pCi/g	11/18/16 13:40	12/09/16 16:14	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S903

Lab Sample ID: 160-20048-3

Date Collected: 11/15/16 12:48

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.378		0.123	0.129		0.204	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Actinium-227	-0.00901	U	0.696	0.696		1.20	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Bismuth-212	-0.0378	U	0.696	0.696		1.07	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Bismuth-214	0.416		0.125	0.133		0.115	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Cesium-137	0.0288	U	0.0566	0.0566		0.0958	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-210	-0.554	U	1.40	1.40		2.45	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-212	0.354		0.0788	0.0911		0.0885	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-214	0.247		0.0760	0.0802		0.0975	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Potassium-40	11.2		1.36	1.78		0.479	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Protactinium-231	0.165	U	0.976	0.976		3.15	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Radium-226	0.416		0.125	0.133	0.500	0.115	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Radium-228	0.378		0.123	0.129		0.204	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thallium-208	0.165		0.0441	0.0473		0.0328	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-228	0.354		0.0788	0.0911		0.0885	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-232	0.378		0.123	0.129		0.204	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-234	-0.180	U	1.36	1.36		2.32	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Uranium-235	0.0324	U	0.0749	0.0750		0.813	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Uranium-238	-0.180	U	1.36	1.36		2.32	pCi/g	11/18/16 13:40	12/09/16 16:15	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S904

Lab Sample ID: 160-20048-4

Date Collected: 11/15/16 12:49

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.188	U	0.107	0.108		0.223	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Actinium-227	-0.0633	U	0.695	0.696		1.18	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Bismuth-212	0.173	U	0.748	0.749		1.29	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Bismuth-214	0.0274	U	0.0997	0.0997		0.207	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Cesium-137	-0.0203	U	0.0555	0.0555		0.0948	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Lead-210	0.671	U	1.29	1.29		2.16	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Lead-212	0.258		0.0592	0.0680		0.0645	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Lead-214	0.340		0.0744	0.0824		0.0727	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Potassium-40	9.82		1.17	1.54		0.492	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Protactinium-231	-0.617	U	1.92	1.92		3.22	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Radium-226	0.0274	U	0.0997	0.0997	0.500	0.207	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Radium-228	0.188	U	0.107	0.108		0.223	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Thallium-208	0.118		0.0425	0.0442		0.0340	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Thorium-228	0.258		0.0592	0.0680		0.0645	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Thorium-232	0.188	U	0.107	0.108		0.223	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Thorium-234	0.336	U	0.984	0.984		1.66	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Uranium-235	0.0627	U	0.177	0.177		0.646	pCi/g	11/18/16 13:40	12/09/16 16:18	1
Uranium-238	0.336	U	0.984	0.984		1.66	pCi/g	11/18/16 13:40	12/09/16 16:18	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S905

Lab Sample ID: 160-20048-5

Date Collected: 11/15/16 12:56

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.220	U	0.202	0.203		0.223	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Actinium-227	0.235	U	0.265	0.267		0.454	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Bismuth-212	0.155	U	0.963	0.963		1.68	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Bismuth-214	0.288		0.115	0.119		0.127	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Cesium-137	-0.0361	U	0.0670	0.0671		0.113	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-210	0.951	U	1.08	1.08		1.52	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-212	0.224		0.0784	0.0836		0.103	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Lead-214	0.317		0.0940	0.0996		0.104	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Potassium-40	10.0		1.50	1.81		0.718	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Protactinium-231	0.385	U	1.12	1.12		2.99	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Radium-226	0.288		0.115	0.119	0.500	0.127	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Radium-228	0.220	U	0.202	0.203		0.223	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thallium-208	0.0758		0.0635	0.0640		0.0756	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-228	0.224		0.0784	0.0836		0.103	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-232	0.220	U	0.202	0.203		0.223	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Thorium-234	0.522	U	0.536	0.539		1.33	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Uranium-235	0.0894	U	0.286	0.286		0.485	pCi/g	11/18/16 13:40	12/09/16 16:14	1
Uranium-238	0.522	U	0.536	0.539		1.33	pCi/g	11/18/16 13:40	12/09/16 16:14	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S906

Lab Sample ID: 160-20048-6

Date Collected: 11/15/16 12:56

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.130	U	0.218	0.218		0.325	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Actinium-227	-0.383	U	0.842	0.843		1.41	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Bismuth-212	0.000	U	0.506	0.506		1.38	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Bismuth-214	0.398		0.154	0.160		0.137	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Cesium-137	-0.0348	U	0.0903	0.0904		0.155	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-210	-0.301	U	1.53	1.53		2.66	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-212	0.254		0.0800	0.0865		0.0953	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Lead-214	0.359		0.113	0.119		0.132	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Potassium-40	12.2		1.81	2.19		0.739	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Protactinium-231	0.690	U	1.53	1.53		3.56	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Radium-226	0.398		0.154	0.160	0.500	0.137	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Radium-228	0.130	U	0.218	0.218		0.325	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thallium-208	0.117		0.0590	0.0602		0.0565	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-228	0.254		0.0800	0.0865		0.0953	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-232	0.130	U	0.218	0.218		0.325	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Thorium-234	0.0628	U	1.43	1.43		2.45	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Uranium-235	-0.0583	U	0.497	0.497		0.839	pCi/g	11/18/16 13:40	12/09/16 16:15	1
Uranium-238	0.0628	U	1.43	1.43		2.45	pCi/g	11/18/16 13:40	12/09/16 16:15	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S907

Lab Sample ID: 160-20048-7

Date Collected: 11/15/16 12:57

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.363		0.198	0.202		0.192	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Actinium-227	-0.371	U	0.807	0.808		1.35	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Bismuth-212	0.337	U	0.753	0.753		1.28	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Bismuth-214	0.381		0.120	0.127		0.115	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Cesium-137	0.0385	U	0.0723	0.0724		0.122	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Lead-210	1.70		1.06	1.08		1.35	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Lead-212	0.287		0.0776	0.0861		0.0937	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Lead-214	0.370		0.110	0.116		0.121	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Potassium-40	11.5		1.46	1.88		0.794	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Protactinium-231	0.000	U	0.197	0.197		3.70	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Radium-226	0.381		0.120	0.127	0.500	0.115	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Radium-228	0.363		0.198	0.202		0.192	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Thallium-208	0.148		0.0545	0.0567		0.0515	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Thorium-228	0.287		0.0776	0.0861		0.0937	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Thorium-232	0.363		0.198	0.202		0.192	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Thorium-234	-0.664	U	1.36	1.37		2.36	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Uranium-235	-0.172	U	0.518	0.518		0.865	pCi/g	11/18/16 13:40	12/09/16 16:16	1
Uranium-238	-0.664	U	1.36	1.37		2.36	pCi/g	11/18/16 13:40	12/09/16 16:16	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S908

Lab Sample ID: 160-20048-8

Date Collected: 11/15/16 12:58

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.244		0.149	0.151		0.146	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Actinium-227	0.150	U	0.301	0.302		0.860	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Bismuth-212	0.000	U	0.420	0.420		1.19	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Bismuth-214	0.0347	U	0.268	0.268		0.364	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Cesium-137	0.0216	U	0.0499	0.0500		0.0622	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Lead-210	0.552	U	1.46	1.46		2.05	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Lead-212	0.332		0.0772	0.0884		0.0826	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Lead-214	0.347		0.0816	0.0892		0.106	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Potassium-40	11.8		1.49	1.92		0.663	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Protactinium-231	0.000	U	0.526	0.526		3.05	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Radium-226	0.0347	U	0.268	0.268	0.500	0.364	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Radium-228	0.244		0.149	0.151		0.146	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Thallium-208	0.110		0.0522	0.0535		0.0540	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Thorium-228	0.332		0.0772	0.0884		0.0826	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Thorium-232	0.244		0.149	0.151		0.146	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Thorium-234	-0.377	U	1.06	1.06		1.86	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Uranium-235	-0.201	U	0.284	0.284		0.578	pCi/g	11/18/16 13:40	12/09/16 16:50	1
Uranium-238	-0.377	U	1.06	1.06		1.86	pCi/g	11/18/16 13:40	12/09/16 16:50	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S909

Lab Sample ID: 160-20048-9

Date Collected: 11/15/16 13:01

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.449		0.179	0.185		0.291	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Actinium-227	0.0331	U	0.0906	0.0907		0.867	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Bismuth-212	0.371	U	0.963	0.964		1.66	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Bismuth-214	0.408		0.126	0.133		0.117	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Cesium-137	0.00423	U	0.0605	0.0605		0.109	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Lead-210	0.784	U	1.14	1.15		1.64	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Lead-212	0.194		0.0752	0.0792		0.0967	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Lead-214	0.293		0.118	0.122		0.141	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Potassium-40	10.5		1.73	2.03		0.815	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Protactinium-231	0.582	U	1.41	1.41		3.30	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Radium-226	0.408		0.126	0.133	0.500	0.117	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Radium-228	0.449		0.179	0.185		0.291	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Thallium-208	0.0301	U	0.0817	0.0817		0.107	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Thorium-228	0.194		0.0752	0.0792		0.0967	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Thorium-232	0.449		0.179	0.185		0.291	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Thorium-234	0.609	U	0.743	0.746		1.21	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Uranium-235	-0.141	U	0.500	0.500		0.547	pCi/g	11/18/16 13:40	12/09/16 16:52	1
Uranium-238	0.609	U	0.743	0.746		1.21	pCi/g	11/18/16 13:40	12/09/16 16:52	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S910

Lab Sample ID: 160-20048-10

Date Collected: 11/15/16 13:01

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.211	U	0.248	0.249		0.348	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Actinium-227	-0.401	U	0.820	0.821		1.37	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Bismuth-212	0.229	U	0.515	0.516		0.901	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Bismuth-214	0.0782	U	0.182	0.182		0.299	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Cesium-137	-0.0249	U	0.0633	0.0633		0.118	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Lead-210	-0.268	U	1.31	1.31		2.25	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Lead-212	0.321		0.0853	0.0949		0.102	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Lead-214	0.360		0.0875	0.0951		0.115	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Potassium-40	11.7		1.65	2.04		0.607	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Protactinium-231	0.000	U	0.391	0.391		4.11	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Radium-226	0.0782	U	0.182	0.182	0.500	0.299	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Radium-228	0.211	U	0.248	0.249		0.348	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Thallium-208	0.157		0.0496	0.0522		0.0399	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Thorium-228	0.321		0.0853	0.0949		0.102	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Thorium-232	0.211	U	0.248	0.249		0.348	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Thorium-234	1.20	U	1.06	1.07		1.35	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Uranium-235	0.0860	U	0.334	0.335		0.649	pCi/g	11/18/16 13:40	12/09/16 16:55	1
Uranium-238	1.20	U	1.06	1.07		1.35	pCi/g	11/18/16 13:40	12/09/16 16:55	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S911

Lab Sample ID: 160-20048-11

Date Collected: 11/15/16 12:59

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.203	U	0.165	0.166		0.209	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Actinium-227	-0.0380	U	0.633	0.633		1.09	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Bismuth-212	-0.240	U	0.641	0.641		1.10	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Bismuth-214	0.402		0.113	0.120		0.111	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Cesium-137	0.000	U	0.0197	0.0197		0.0702	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Lead-210	-0.440	U	1.29	1.30		2.19	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Lead-212	0.256		0.0644	0.0724		0.0712	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Lead-214	0.306		0.0753	0.0817		0.0845	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Potassium-40	11.9		1.41	1.86		0.636	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Protactinium-231	0.000	U	0.218	0.218		3.58	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Radium-226	0.402		0.113	0.120	0.500	0.111	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Radium-228	0.203	U	0.165	0.166		0.209	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Thallium-208	0.0305	U	0.0658	0.0659		0.0773	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Thorium-228	0.256		0.0644	0.0724		0.0712	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Thorium-232	0.203	U	0.165	0.166		0.209	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Thorium-234	0.00996	U	0.0476	0.0476		2.14	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Uranium-235	0.128	U	0.372	0.373		0.625	pCi/g	11/18/16 13:40	12/09/16 16:49	1
Uranium-238	0.00996	U	0.0476	0.0476		2.14	pCi/g	11/18/16 13:40	12/09/16 16:49	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S912

Lab Sample ID: 160-20048-12

Date Collected: 11/15/16 13:04

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.263		0.191	0.193		0.207	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Actinium-227	-0.334	U	0.889	0.889		1.49	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Bismuth-212	-0.179	U	0.227	0.228		1.20	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Bismuth-214	0.330		0.138	0.142		0.140	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Cesium-137	0.0184	U	0.0471	0.0471		0.0814	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-210	1.23	U	1.23	1.24		1.65	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-212	0.242		0.0723	0.0787		0.0900	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-214	0.305		0.0934	0.0987		0.0979	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Potassium-40	11.0		1.39	1.79		0.503	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Protactinium-231	0.000	U	0.807	0.807		3.48	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Radium-226	0.330		0.138	0.142	0.500	0.140	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Radium-228	0.263		0.191	0.193		0.207	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thallium-208	0.153		0.0487	0.0513		0.0429	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-228	0.242		0.0723	0.0787		0.0900	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-232	0.263		0.191	0.193		0.207	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-234	0.208	U	0.571	0.572		1.27	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Uranium-235	0.0710	U	0.0591	0.0595		0.727	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Uranium-238	0.208	U	0.571	0.572		1.27	pCi/g	11/18/16 13:40	12/09/16 16:51	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S913

Lab Sample ID: 160-20048-13

Date Collected: 11/15/16 13:03

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.263		0.149	0.151		0.208	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Actinium-227	0.352	U	0.207	0.211		0.762	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Bismuth-212	0.350	U	0.614	0.616		1.03	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Bismuth-214	0.293		0.0759	0.0818		0.0690	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Cesium-137	-0.0334	U	0.0519	0.0520		0.0867	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Lead-210	-0.357	U	1.13	1.13		1.92	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Lead-212	0.329		0.0723	0.0839		0.0615	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Lead-214	0.400		0.0781	0.0885		0.0391	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Potassium-40	10.4		1.22	1.61		0.505	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Protactinium-231	-0.0840	U	1.82	1.82		3.10	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Radium-226	0.293		0.0759	0.0818	0.500	0.0690	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Radium-228	0.263		0.149	0.151		0.208	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Thallium-208	0.145		0.0433	0.0459		0.0289	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Thorium-228	0.329		0.0723	0.0839		0.0615	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Thorium-232	0.263		0.149	0.151		0.208	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Thorium-234	0.458	U	0.972	0.973		1.63	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Uranium-235	0.0678	U	0.153	0.153		0.741	pCi/g	11/18/16 13:40	12/09/16 16:53	1
Uranium-238	0.458	U	0.972	0.973		1.63	pCi/g	11/18/16 13:40	12/09/16 16:53	1

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S914

Lab Sample ID: 160-20048-14

Date Collected: 11/15/16 13:06

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.408		0.152	0.157		0.163	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Actinium-227	0.173	U	0.502	0.502		0.728	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Bismuth-212	-0.487	U	0.851	0.852		1.43	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Bismuth-214	0.340		0.106	0.111		0.107	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Cesium-137	-0.00503	U	0.0476	0.0476		0.0864	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-210	-0.303	U	1.33	1.33		2.02	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-212	0.323		0.0830	0.0929		0.0982	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Lead-214	0.282		0.0904	0.0950		0.0916	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Potassium-40	10.3		1.49	1.83		0.695	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Protactinium-231	0.000	U	0.370	0.370		3.50	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Radium-226	0.340		0.106	0.111	0.500	0.107	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Radium-228	0.408		0.152	0.157		0.163	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thallium-208	0.121		0.0529	0.0544		0.0454	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-228	0.323		0.0830	0.0929		0.0982	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-232	0.408		0.152	0.157		0.163	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Thorium-234	-0.307	U	1.19	1.19		2.05	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Uranium-235	0.121	U	0.209	0.210		0.487	pCi/g	11/18/16 13:40	12/09/16 16:51	1
Uranium-238	-0.307	U	1.19	1.19		2.05	pCi/g	11/18/16 13:40	12/09/16 16:51	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20048-2

Client Sample ID: TITO04-BS-FSSSU3P2-RSY10-U9-S915

Lab Sample ID: 160-20048-15

Date Collected: 11/15/16 13:06

Matrix: Solid

Date Received: 11/17/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.177	U	0.303	0.304		0.365	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Actinium-227	-0.373	U	0.878	0.879		1.48	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Bismuth-212	-0.451	U	0.967	0.969		1.65	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Bismuth-214	0.355		0.164	0.168		0.163	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Cesium-137	-0.0423	U	0.0949	0.0950		0.111	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Lead-210	1.24	U	1.11	1.12		1.58	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Lead-212	0.246		0.0937	0.0989		0.129	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Lead-214	0.362		0.107	0.114		0.111	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Potassium-40	10.8		1.70	2.02		0.733	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Protactinium-231	0.559	U	1.36	1.36		3.17	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Radium-226	0.355		0.164	0.168	0.500	0.163	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Radium-228	0.177	U	0.303	0.304		0.365	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Thallium-208	0.170		0.0539	0.0567		0.0418	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Thorium-228	0.246		0.0937	0.0989		0.129	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Thorium-232	0.177	U	0.303	0.304		0.365	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Thorium-234	0.747	U	0.572	0.578		1.33	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Uranium-235	0.182	U	0.320	0.321		0.570	pCi/g	11/18/16 13:40	12/09/16 16:54	1
Uranium-238	0.747	U	0.572	0.578		1.33	pCi/g	11/18/16 13:40	12/09/16 16:54	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S901

Lab Sample ID: 160-20102-1

Date Collected: 11/17/16 15:30

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.331	U	0.144	0.148		0.347	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Actinium-227	-0.324	U	0.825	0.825		1.39	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Bismuth-212	-0.297	U	0.902	0.903		1.55	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Bismuth-214	0.359		0.143	0.148		0.143	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Cesium-137	0.0143	U	0.0709	0.0709		0.123	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Lead-210	1.32	U	1.36	1.37		1.82	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Lead-212	0.269		0.0869	0.0936		0.116	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Lead-214	0.282		0.0930	0.0975		0.117	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Potassium-40	11.4		1.49	1.90		0.828	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Protactinium-231	0.187	U	1.14	1.14		3.68	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Radium-226	0.359		0.143	0.148	0.500	0.143	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Radium-228	0.331	U	0.144	0.148		0.347	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Thallium-208	0.145		0.0474	0.0497		0.0430	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Thorium-228	0.269		0.0869	0.0936		0.116	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Thorium-232	0.331	U	0.144	0.148		0.347	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Thorium-234	0.146	U	0.222	0.223		2.44	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Uranium-235	-0.0442	U	0.278	0.278		1.02	pCi/g	11/22/16 13:10	12/13/16 17:37	1
Uranium-238	0.146	U	0.222	0.223		2.44	pCi/g	11/22/16 13:10	12/13/16 17:37	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S902

Lab Sample ID: 160-20102-2

Date Collected: 11/17/16 15:32

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.455		0.126	0.135		0.152	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Actinium-227	-0.199	U	0.571	0.572		0.967	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Bismuth-212	0.000	U	0.178	0.178		1.11	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Bismuth-214	0.321		0.102	0.107		0.0951	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Cesium-137	-0.0150	U	0.0519	0.0520		0.0907	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Lead-210	1.01	U	0.927	0.935		1.18	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Lead-212	0.288		0.0662	0.0759		0.0718	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Lead-214	0.355		0.0852	0.0928		0.111	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Potassium-40	11.0		1.56	1.92		0.769	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Protactinium-231	0.366	U	0.893	0.894		2.10	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Radium-226	0.321		0.102	0.107	0.500	0.0951	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Radium-228	0.455		0.126	0.135		0.152	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Thallium-208	0.114		0.0488	0.0502		0.0473	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Thorium-228	0.288		0.0662	0.0759		0.0718	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Thorium-232	0.455		0.126	0.135		0.152	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Thorium-234	-0.00828	U	0.815	0.815		1.41	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Uranium-235	-0.00806	U	0.0172	0.0172		0.603	pCi/g	11/22/16 13:10	12/13/16 11:23	1
Uranium-238	-0.00828	U	0.815	0.815		1.41	pCi/g	11/22/16 13:10	12/13/16 11:23	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S903

Lab Sample ID: 160-20102-3

Date Collected: 11/17/16 15:34

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.179	U	0.229	0.230		0.309	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Actinium-227	-0.341	U	0.544	0.545		1.05	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Bismuth-212	0.000	U	0.576	0.576		1.39	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Bismuth-214	0.410		0.131	0.138		0.124	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Cesium-137	-0.0473	U	0.0566	0.0568		0.156	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Lead-210	1.47	U	1.15	1.16		1.55	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Lead-212	0.296		0.0854	0.0936		0.0954	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Lead-214	0.430		0.119	0.127		0.164	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Potassium-40	11.3		1.85	2.19		0.867	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Protactinium-231	0.364	U	1.08	1.08		3.68	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Radium-226	0.410		0.131	0.138	0.500	0.124	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Radium-228	0.179	U	0.229	0.230		0.309	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Thallium-208	0.169		0.0695	0.0717		0.0628	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Thorium-228	0.296		0.0854	0.0936		0.0954	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Thorium-232	0.179	U	0.229	0.230		0.309	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Thorium-234	-0.107	U	1.21	1.21		1.82	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Uranium-235	-0.0385	U	0.286	0.286		0.619	pCi/g	11/22/16 13:10	12/13/16 11:24	1
Uranium-238	-0.107	U	1.21	1.21		1.82	pCi/g	11/22/16 13:10	12/13/16 11:24	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S904

Lab Sample ID: 160-20102-4

Date Collected: 11/17/16 15:40

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.291		0.177	0.180		0.174	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Actinium-227	0.268	U	0.483	0.484		1.24	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Bismuth-212	0.319	U	0.765	0.765		1.32	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Bismuth-214	0.386		0.116	0.123		0.107	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Cesium-137	-0.00272	U	0.0500	0.0500		0.0921	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Lead-210	-0.693	U	1.48	1.48		2.48	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Lead-212	0.327		0.0808	0.0911		0.0903	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Lead-214	0.349		0.103	0.109		0.112	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Potassium-40	9.55		1.48	1.78		0.599	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Protactinium-231	-0.842	U	2.67	2.67		4.49	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Radium-226	0.386		0.116	0.123	0.500	0.107	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Radium-228	0.291		0.177	0.180		0.174	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Thallium-208	0.0317	U	0.0639	0.0640		0.102	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Thorium-228	0.327		0.0808	0.0911		0.0903	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Thorium-232	0.291		0.177	0.180		0.174	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Thorium-234	-0.258	U	1.28	1.28		2.21	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Uranium-235	0.119	U	0.319	0.319		0.787	pCi/g	11/22/16 13:10	12/13/16 12:23	1
Uranium-238	-0.258	U	1.28	1.28		2.21	pCi/g	11/22/16 13:10	12/13/16 12:23	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S905

Lab Sample ID: 160-20102-5

Date Collected: 11/17/16 15:42

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.281		0.181	0.184		0.257	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Actinium-227	-0.275	U	0.631	0.632		0.903	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Bismuth-212	-0.487	U	0.938	0.940		1.59	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Bismuth-214	0.298		0.113	0.118		0.123	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Cesium-137	-0.0201	U	0.0561	0.0562		0.0975	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Lead-210	-0.335	U	1.26	1.27		1.94	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Lead-212	0.0222	U	0.106	0.106		0.180	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Lead-214	0.375		0.0855	0.0939		0.113	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Potassium-40	11.0		1.54	1.91		0.695	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Protactinium-231	0.300	U	0.910	0.911		3.02	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Radium-226	0.298		0.113	0.118	0.500	0.123	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Radium-228	0.281		0.181	0.184		0.257	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Thallium-208	0.101		0.0551	0.0561		0.0593	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Thorium-228	0.0222	U	0.106	0.106		0.180	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Thorium-232	0.281		0.181	0.184		0.257	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Thorium-234	-0.148	U	0.936	0.936		1.62	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Uranium-235	0.0591	U	0.153	0.154		0.540	pCi/g	11/22/16 13:10	12/13/16 12:27	1
Uranium-238	-0.148	U	0.936	0.936		1.62	pCi/g	11/22/16 13:10	12/13/16 12:27	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S906

Lab Sample ID: 160-20102-6

Date Collected: 11/17/16 15:44

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.386		0.164	0.169		0.122	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Actinium-227	0.0150	U	0.530	0.530		0.794	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Bismuth-212	0.260	U	0.539	0.540		0.943	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Bismuth-214	0.372		0.149	0.154		0.154	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Cesium-137	-0.0748	U	0.0921	0.0924		0.157	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Lead-210	-0.0854	U	1.34	1.34		2.03	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Lead-212	0.314		0.0831	0.0925		0.0894	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Lead-214	0.379		0.109	0.116		0.127	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Potassium-40	10.1		1.69	1.98		0.808	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Protactinium-231	0.339	U	0.997	0.997		3.30	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Radium-226	0.372		0.149	0.154	0.500	0.154	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Radium-228	0.386		0.164	0.169		0.122	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Thallium-208	0.131		0.0501	0.0519		0.0443	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Thorium-228	0.314		0.0831	0.0925		0.0894	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Thorium-232	0.386		0.164	0.169		0.122	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Thorium-234	0.120	U	0.256	0.256		1.94	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Uranium-235	0.109	U	0.332	0.332		0.562	pCi/g	11/22/16 13:10	12/13/16 12:56	1
Uranium-238	0.120	U	0.256	0.256		1.94	pCi/g	11/22/16 13:10	12/13/16 12:56	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S907

Lab Sample ID: 160-20102-7

Date Collected: 11/17/16 15:46

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.320		0.135	0.139		0.122	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Actinium-227	0.159	U	0.396	0.396		1.16	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Bismuth-212	0.301	U	0.748	0.748		1.28	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Bismuth-214	0.250		0.121	0.124		0.139	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Cesium-137	0.000	U	0.0231	0.0231		0.0777	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Lead-210	-0.0915	U	1.46	1.46		2.50	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Lead-212	0.276		0.0638	0.0732		0.0690	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Lead-214	0.400		0.0832	0.0930		0.0818	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Potassium-40	10.8		1.44	1.82		0.533	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Protactinium-231	0.471	U	1.22	1.22		2.77	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Radium-226	0.250		0.121	0.124	0.500	0.139	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Radium-228	0.320		0.135	0.139		0.122	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Thallium-208	0.0861		0.0371	0.0382		0.0365	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Thorium-228	0.276		0.0638	0.0732		0.0690	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Thorium-232	0.320		0.135	0.139		0.122	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Thorium-234	0.531	U	0.755	0.757		1.03	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Uranium-235	-0.00740	U	0.0180	0.0180		0.640	pCi/g	11/22/16 13:10	12/13/16 12:57	1
Uranium-238	0.531	U	0.755	0.757		1.03	pCi/g	11/22/16 13:10	12/13/16 12:57	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S908

Lab Sample ID: 160-20102-8

Date Collected: 11/17/16 15:48

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.311		0.143	0.146		0.235	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Actinium-227	0.306	U	0.786	0.786		1.32	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Bismuth-212	-0.325	U	0.824	0.824		1.42	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Bismuth-214	0.454		0.116	0.125		0.0936	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Cesium-137	-0.00753	U	0.0544	0.0544		0.101	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Lead-210	-0.869	U	1.89	1.89		3.16	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Lead-212	0.292		0.0796	0.0881		0.0931	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Lead-214	0.281		0.0935	0.0980		0.0939	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Potassium-40	10.8		1.59	1.94		0.610	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Protactinium-231	0.000	U	0.227	0.227		4.17	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Radium-226	0.454		0.116	0.125	0.500	0.0936	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Radium-228	0.311		0.143	0.146		0.235	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Thallium-208	0.123		0.0798	0.0809		0.0722	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Thorium-228	0.292		0.0796	0.0881		0.0931	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Thorium-232	0.311		0.143	0.146		0.235	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Thorium-234	-0.273	U	1.38	1.39		2.38	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Uranium-235	-0.0149	U	0.0592	0.0592		0.933	pCi/g	11/22/16 13:10	12/13/16 12:58	1
Uranium-238	-0.273	U	1.38	1.39		2.38	pCi/g	11/22/16 13:10	12/13/16 12:58	1

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Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S909

Lab Sample ID: 160-20102-9

Date Collected: 11/17/16 16:00

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.318		0.211	0.213		0.219	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Actinium-227	-0.273	U	0.628	0.628		0.898	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Bismuth-212	0.449	U	0.859	0.860		1.45	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Bismuth-214	0.332		0.116	0.121		0.119	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Cesium-137	-0.0317	U	0.0601	0.0602		0.102	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Lead-210	-0.317	U	1.32	1.32		2.02	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Lead-212	0.00333	U	0.124	0.124		0.211	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Lead-214	0.402		0.101	0.109		0.129	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Potassium-40	10.6		1.52	1.87		0.703	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Protactinium-231	0.498	U	1.12	1.12		2.62	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Radium-226	0.332		0.116	0.121	0.500	0.119	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Radium-228	0.318		0.211	0.213		0.219	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Thallium-208	0.158		0.0450	0.0479		0.0228	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Thorium-228	0.00333	U	0.124	0.124		0.211	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Thorium-232	0.318		0.211	0.213		0.219	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Thorium-234	0.238	U	0.398	0.398		1.21	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Uranium-235	0.0695	U	0.310	0.310		0.502	pCi/g	11/22/16 13:10	12/13/16 13:00	1
Uranium-238	0.238	U	0.398	0.398		1.21	pCi/g	11/22/16 13:10	12/13/16 13:00	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S910

Lab Sample ID: 160-20102-10

Date Collected: 11/17/16 16:05

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.131	U	0.237	0.237		0.326	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Actinium-227	-0.364	U	0.848	0.849		1.42	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Bismuth-212	0.328	U	0.542	0.543		0.919	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Bismuth-214	0.404		0.121	0.128		0.107	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Cesium-137	0.00519	U	0.0479	0.0479		0.0874	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Lead-210	0.710	U	1.37	1.37		1.82	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Lead-212	0.278		0.0799	0.0876		0.0960	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Lead-214	0.316		0.114	0.119		0.119	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Potassium-40	10.8		1.60	1.94		0.653	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Protactinium-231	0.136	U	1.07	1.07		3.46	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Radium-226	0.404		0.121	0.128	0.500	0.107	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Radium-228	0.131	U	0.237	0.237		0.326	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Thallium-208	0.118		0.0519	0.0533		0.0540	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Thorium-228	0.278		0.0799	0.0876		0.0960	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Thorium-232	0.131	U	0.237	0.237		0.326	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Thorium-234	0.233	U	0.365	0.365		2.20	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Uranium-235	-0.193	U	0.0741	0.0767		0.847	pCi/g	11/22/16 13:10	12/13/16 13:01	1
Uranium-238	0.233	U	0.365	0.365		2.20	pCi/g	11/22/16 13:10	12/13/16 13:01	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20102-2

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S911

Lab Sample ID: 160-20102-11

Date Collected: 11/17/16 16:07

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.427		0.152	0.158		0.112	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Actinium-227	0.126	U	0.505	0.506		1.12	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Bismuth-212	0.413	U	0.725	0.726		1.22	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Bismuth-214	0.413		0.116	0.124		0.107	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Cesium-137	-0.00559	U	0.0512	0.0512		0.0910	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Lead-210	-0.727	U	1.55	1.55		2.69	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Lead-212	0.275		0.0755	0.0835		0.0927	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Lead-214	0.345		0.115	0.121		0.122	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Potassium-40	11.1		1.40	1.81		0.753	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Protactinium-231	-0.0000000	U	2.12	2.12		3.62	pCi/g	11/22/16 13:10	12/13/16 13:02	1
	89									
Radium-226	0.413		0.116	0.124	0.500	0.107	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Radium-228	0.427		0.152	0.158		0.112	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Thallium-208	0.101		0.0435	0.0447		0.0462	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Thorium-228	0.275		0.0755	0.0835		0.0927	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Thorium-232	0.427		0.152	0.158		0.112	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Thorium-234	1.22		0.725	0.736		0.941	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Uranium-235	-0.0493	U	0.108	0.108		0.831	pCi/g	11/22/16 13:10	12/13/16 13:02	1
Uranium-238	1.22		0.725	0.736		0.941	pCi/g	11/22/16 13:10	12/13/16 13:02	1

Client Sample ID: TITO04-BS-FSSSU5-RSY11-U9-S912

Lab Sample ID: 160-20102-12

Date Collected: 11/17/16 16:10

Matrix: Solid

Date Received: 11/19/16 08:35

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.484		0.150	0.158		0.115	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Actinium-227	-0.133	U	0.595	0.595		0.863	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Bismuth-212	0.381	U	0.773	0.774		1.31	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Bismuth-214	0.367		0.115	0.121		0.110	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Cesium-137	0.0167	U	0.0445	0.0446		0.0775	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Lead-210	-0.238	U	1.39	1.39		2.14	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Lead-212	0.189		0.0702	0.0744		0.0948	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Lead-214	0.212		0.108	0.111		0.189	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Potassium-40	10.1		1.35	1.70		0.631	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Protactinium-231	0.164	U	0.851	0.852		2.78	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Radium-226	0.367		0.115	0.121	0.500	0.110	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Radium-228	0.484		0.150	0.158		0.115	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Thallium-208	0.122		0.0487	0.0503		0.0477	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Thorium-228	0.189		0.0702	0.0744		0.0948	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Thorium-232	0.484		0.150	0.158		0.115	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Thorium-234	1.18	U	1.14	1.14		1.48	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Uranium-235	0.0133	U	0.0609	0.0609		0.590	pCi/g	11/22/16 13:10	12/13/16 13:03	1
Uranium-238	1.18	U	1.14	1.14		1.48	pCi/g	11/22/16 13:10	12/13/16 13:03	1

TestAmerica St. Louis

COVER LETTER

March 2, 2017

Lynn Caragan
C, B, & I Federal services
420 Exchange, #150
Irvine, CA. 92602

Dear Mrs. Caragan:

Enclosed is Revision 0 of the data validation report for the Treasure Island Naval Shipyard, Site 12, project number 500060. This DVR encompasses the laboratory data produced by TestAmerica Laboratories, Inc. for the sample delivery groups (SDG) listed in Table 1-1 of the DVR.

The specific sample identifications are listed in the sample identification table(s). The data packages were reviewed per the data validation procedures referenced in the introduction of the report.

Sincerely,

A handwritten signature in cursive script, appearing to read "Larry W. Duty", is positioned above a solid horizontal line.

Larry Duty
Data Validation Project Manager

Data Validation Report 03022017
for Treasure Island Site 12, Navy
BRAC PMO West

Contract Number N62473-12-D-2005
TO004

San Francisco, California

TestAmerica Laboratories

Subcontract Number 203598

Prepared for CB&I Federal Services
420 Exchange, Suite 150
Irvine, CA 92602
CB&I Project Number 50060

Prepared by:
E-Lab Consultants
30710 S Holly Oaks Circle
Magnolia, Texas 77355

February 2017

Data Validation Report 03022017 for Treasure Island Site 12, Navy BRAC PMO West

Contract Number N62473-12-D-2005
TO004

San Francisco, California

TestAmerica Laboratories

Subcontract Number 203598

Prepared for CB&I Federal Services
420 Exchange, Suite 150
Irvine, CA 92602
CB&I Project Number 50060

Approved by:



Larry Duty
E-Lab Consultants

Date: 03/02/2017

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Appendix A	Annotated Laboratory Analytical Data Reporting Forms 1s
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Acronyms and Abbreviations

Following is a list of acronyms and abbreviations that may be used in data validation reports and/or data quality assessment reports.

%D	percent difference	DFTPP	decafluorotriphenylphosphine
%R	percent recovery	DOD	Department Of Defense
µg/L	microgram per liter	DQAR	data quality assessment report
mg/L	milligram per liter		
pg/L	picogram per liter	DUP	laboratory duplicate
µg/kg	microgram per kilogram	DVP	data validation procedure
mg/kg	milligram per kilogram	EDB	ethylene dibromide
ng/kg	nanogram per kilogram	EDL	estimated detection limit
pg/g	picogram per gram	EICP	extracted ion current profile
AA	atomic absorption	EPA	Environmental Protection Agency, United States
ARRF	average relative response factor	EB	equipment blank
BFB	bromofluorobenzene	FB	field blank
BNA	base/neutral/acid compounds	GC	gas chromatography
CCB	continuing calibration blank	GC/ECD	gas chromatography/electron capture detector
CCC	calibration check compound	GC/ELCD	gas chromatography/electrolytic conductivity detector (Hall detector)
CCV	continuing calibration verification	GC/FPD	gas chromatography/flame photometric detector
CF	calibration factor	GC/MS	gas chromatography/mass spectrometry
CLP	Contract Laboratory Program	GC/PID	gas chromatography/photoionization detector
COC	chain of custody record	GFAA	graphite furnace atomic

			absorption
COD	chemical oxygen demand	GPC	gel permeation chromatography
CTO	contract task order	Hg	mercury
CVAA	cold vapor atomic absorption	HPLC	high-performance liquid chromatography
DBCP	dibromochloropropane	HRGC/HR MS	high resolution gas chromatography/high resolution mass spectrometry
DCB	decachlorobiphenyl	RF r2	response factor coefficient of determination
4,4'-DDD	4,4'-dichlorodiphenyldichloroethane	RICRF	reconstructed ion chromatogram response factor
4,4'-DDE	4,4'-dichlorodiphenyldichloroethylene	RLRIC	reporting limit reconstructed ion chromatogram
4,4'-DDT	4,4'-dichlorodiphenyltrichloroethane	RPDRL	relative percent difference reporting limit
ICV	initial calibration verification	RRFRPD	relative response factor relative percent difference
IDL	instrument detection limit	RRTRRF	relative retention time relative response factor
IR	infrared spectroscopy	RSDRRT	relative standard deviation relative retention time
IRP	installation restoration program	RTRSD	retention time relative standard deviation
IS	internal standards	RT	retention time
LCS	laboratory control sample	HT	holding time
MBAS	methyl blue active substance	ICB	initial calibration blank
MDL	method detection limit	ICP	inductively coupled plasma
MS	matrix spike	ICS	interference check sample
MSA	method of standard addition	SDG	sample delivery group

MSD	matrix spike duplicate	SICP	selected ion current profiles
m/z	mass to charge ratio	s/n	signal to noise ratio
NFESC	Naval Facilities Engineering Services Center	SOP	standard operating procedure
OP	organophosphorus	SOW	statement of work
PAH	polynuclear aromatic hydrocarbon	SPCC	system performance check compound
PARCC	precision, accuracy, representativeness, comparability, completeness	SRM	standard reference material
PCB	polychlorinated biphenyl	SVOC	semivolatile organic compound
PCDD	polychlorinated dibenzodioxin	TB	trip blank
PCDF	polychlorinated dibenzofuran	TCDD	tetrachlorodibenzodioxin
PE	performance evaluation	TCX	tetrachloro-m-xylene
PEM	performance evaluation mixture	TDS	total dissolved solids
PFK	perfluorokerosene	TIC	tentatively identified compound
PQO	project quality objective	TOC	total organic carbon
QAPFK	quality assurance perfluorokerosene	TOX	total organic halides
QACQA	quality assurance coordinator quality assurance	TPHE	total petroleum hydrocarbons as extractables
QAPPQA C	quality assurance project plan quality assurance coordinator	UV/VIS	ultraviolet/visible
QCQAPP	quality control quality assurance project plan	VOA	volatile organic analysis
QSM QC	quality system manual quality control	VOC	volatile organic compound
rQSM	correlation coefficient quality system manual	VTSR	validated time of sample receipt

r ² r	coefficient of determination correlation coefficient	WDM	window defining mixture
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1.0 INTRODUCTION

This Data Validation Report (DVR) contains the results of the data validation conducted for samples collected and analyzed as part of the Treasure Island Naval Shipyard Site 12 investigation. The project was conducted per contract number N62473-12-D-2005 under task order 004 for the Base Realignment and Closure Program Management Office, West Naval Facilities Engineering Command, 1455 Frazee Road, #600, San Diego CA. 92108. This DVR was subcontracted to E-Lab Consultants from Chicago, Bridge, and Iron (CB&I) to serve third party data assessment purposes and evaluates the laboratory data contained in Sample Delivery Groups (SDGs) list in **Table 1-1** produced by TestAmerica Laboratories, Inc.

These samples were analyzed in accordance with the approved *United States Department of Defense (DOD) Quality Systems Manual (QSM) for Environmental Laboratories Version 5.0, July 2013* and the analytical methods specified for the analytes requested on the Chain of Custody (COC) documentation. **Table 1-1** provides a list of the samples collected, a laboratory sample number cross-reference, sample matrix, date collected, sample purpose, and analytical methods performed for each sample pertaining to this DVR. This DVR is conducted per the analysis requested on the COC in accordance with the; *Sampling and Analysis Plan (SAP) October 2013, Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Organic (NFGO) Data Review (August 2014), NFG for Inorganic (NFGIO) Data Review (August 2014)*, and the method specified for the analysis.

The data were evaluated against the quantitative acceptance limits given in the DOD QSM for the data quality parameters of sensitivity, accuracy, precision, and completeness. **Appendix A** contains the Laboratory Data Report Form 1s that has been annotated with qualifiers assigned during the validation process in accordance with the project procedures manual.

In accordance with SAP, a review of the data was conducted independent of the laboratory. This review consisted of an evaluation of laboratory performance criteria from the case narrative, and an evaluation of the sample-specific criteria included in the laboratory data packages analyzed in accordance with the DOD QSM.

The validation consists of an evaluation of the chain of custody and associated laboratory sample receipt forms, proper sample preservations, holding times, initial calibration and continuing calibration procedures and results, laboratory control sample (LCS) (and duplicate [LCSD] if reported) accuracy and precision and matrix spike (MS) and matrix spike duplicate (MSD) sample analyses, method blanks, field blanks, and field duplicate precision.

Additional review included;

- Organic Analysis; internal standards, surrogate recoveries, instrument tuning, initial calibration, second source calibration verification, continuing calibration verification, internal standards, degradation summary, retention times, second column or second detector confirmations
- Inorganic Analysis; laboratory duplicate precision, instrument tuning, initial calibration, low-level calibration check standards, initial and continuing calibration verification, initial and continuing calibration blanks, interference check sample, internal standards, serial dilution results, post digestion spike recoveries, and interelement correction factors

The results of the independent data review are presented in **Section 2.0**.

Table 1-1
Sample Field and Laboratory ID Numbers

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04-BS-SWSU9-9-01-S001	160-19924-1	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SWSU9-9-01-S002	160-19924-2	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SWSU9-9-01-S003	160-19924-3	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SWSU9-9-01-S004	160-19924-4	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SWSU9-9-01-S005	160-19924-5	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SWSU9-9-01-S006	160-19924-6	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SWSU9-9-01-S007	160-19924-7	Solid	11/08/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-1209-SW-700-P3001	160-20018-1	Solid	11/14/16	Normal	EPAGA_01_R	Level 3

Following the specifications in the SAP related to the data validation process, the data were annotated with data validation qualifiers and codes on the analytical data sheets that are required qualifier flags as described in the SAP. **Table 1-2** provides definitions of the data qualifiers references, and **Table 1-3** lists and defines the data review qualifier codes.

Table 1-2
Data Qualifier References

Qualifier	Organics	Inorganics
U	The analyte was analyzed for, but was not detected above the method detection limit.	The analyte was analyzed for, but was not detected above the method detection limit.

J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."	Not applicable.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.	Not applicable.
UJ	The analyte was not detected above the method detection limit. However, the associated value is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.	The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and to meet quality control criteria. The presence or absence of the analyte cannot be verified.	The data are unusable. The sample results are rejected due to serious deficiencies in meeting the Quality Control (QC) criteria. The analyte may or may not be present in the sample.

Table 1-3
Data Review Qualifier Codes

Reason Code	Description
A	Serial dilution outside criteria (Level IV).
B1	Method blank contaminants above reporting limit.
B2	Calibration blank contaminants above reporting limit.
B2 (Bias flag –)	Calibration blank indicates negative interference, false negatives may be present

B3	Trip blank contamination
B4	Equipment rinsate contamination.
B5	Ambient blank contamination
C	ICV or CCV % D outside control limits.
C1	Initial calibration RSD outside control limit.
C2	Initial calibration RRF outside control limit.
C3	Continuing calibration RRF outside control limit.
D1	Sample Duplicate RPD outside control limit.
D2	Matrix Duplicate RPD outside control limit
E	The sample results exceed the linear calibration range of the instrument.
F	Hydrocarbon pattern does not match hydrocarbon pattern in the standard.
H	Holding time exceeded.
I	Internal standard recovery outside control limit.
L	LCS outside control limits.
M	MS outside control limits.
M1	MS, MSD or RPD outside of control limits
O	Interference check sample outside acceptance criteria
P	Analyte qualified based on the professional judgement of the reviewer.
S	Surrogate recovery outside control limit.
T	Temperature outside acceptance criteria.
Tr	Value reported detected between the DL and LOQ
W	Pesticide breakdown outside criteria (Level IV).
X	Raised reporting limit due to matrix interference or high analyte concentration.
Y	Analyte was not confirmed by a second column.
Y1	Primary and Confirmation Sample Duplicate RPD outside control limit.

2.0 DATA VALIDATION RESULTS

Laboratory Data Package Review

The samples reported, QC designations, and validation level is listed in **Table 1-1**. The data packages were reviewed in accordance with the project procedures manual.

Sample Documentation, Preservation, Handling, and Transport

All samples arrived at the laboratory on time, intact and within preservation requirements.

A cross reference of the COC and analytical reports has concluded all extractions and analysis were performed within the required holding times. The validation met all QC requirements listed in the method and data validation requirements of the SAP. None of the data is qualified based on sample documentation, preservation, handling, or transport

2.1 Radium-226 by GAMMA SPEC (21 DAY INGROWTH)

2.1.1 Instrument Performance Checks

Data verification included the recalculation of raw data, verifying the mass spectral abundance and assignment are correct and within the method requirements. All samples were analyzed with an acceptable BFB performance check and within the 12-hour window requirement.

2.1.2 Instrument Initial Calibrations

Relative Retention Factors (RRF) was verified against the quantitation reports, mass spectra, and chromatograms. Average RRF and percent relative Standard Deviations (%RSD) were verified for one compound associated with each internal standard. All initial calibration average relative response factors were within the project DoD QSM requirements.

2.1.3 Initial Calibration Verifications

The initial calibration curve was verified with a second source standard mix that contained all target compounds.

2.1.4 Continuing Calibrations

Continuing calibration average relative response factors were within the DoD QSM requirements (<20%). Continuing calibrations were performed on a 12-hour basis.

2.1.5 Blanks

Each analytical batch was represented with a method blank. The laboratory reports none of the target compounds were detected in any of the method blanks

2.1.6 Laboratory Control Sample Recovery (Blank Spikes)

The LCS values were validated by recalculating two compounds per LCS. None of the data are qualified based on LCS recoveries.

2.1.7 Matrix Spike/Matrix Spike Duplicate Recoveries

MS/MSD samples were not submitted for this analysis.

2.1.8 Laboratory Duplicate Recoveries

All laboratory generated duplicate recoveries are within QC limits.

2.1.9 Field QC Samples

2.1.9.1 Trip, Equipment and Field Blanks

Field blank samples were not submitted for this analysis.

2.1.10 Target Compound Identification

None of the identified target compounds were qualified based compound identification.

2.1.11 Compound Quantitation and Reporting Limits

Reporting limits were verified to be equal to the Level of Detection (LOD). The LODs have been verified to meet or exceed the project required performance standards. Sample dilutions, cleanup concentrations, and moisture correction have been applied to all reportable results. The results are reported on a dry weight basis where applicable.

2.1.12 Tentatively Identified Compounds

No Tentatively Identified Compounds are reported.

Appendix A

Annotated Laboratory Analytical Data Reporting Forms 1s

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19924-2

Client Sample ID: TITO04-BS-SWSU9-9-01-S001

Lab Sample ID: 160-19924-1

Date Collected: 11/08/16 09:16

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.340		0.194	0.197		0.186	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Actinium-227	0.129	U	0.768	0.768		1.31	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Bismuth-212	0.483	U	0.915	0.917		1.55	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Bismuth-214	0.638		0.140	0.155		0.0958	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Cesium-137	-0.00113	U	0.0664	0.0664		0.119	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Lead-210	-0.275	U	1.76	1.76		3.00	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Lead-212	0.412		0.0873	0.102		0.0848	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Lead-214	0.604		0.113	0.129		0.113	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Potassium-40	7.48		1.50	1.68		0.945	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Protactinium-231	0.000	U	0.937	0.937		4.91	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Radium-226	0.638		0.140	0.155	0.500	0.0958	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Radium-228	0.340		0.194	0.197		0.186	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Thallium-208	0.0971		0.0902	0.0908		0.0818	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Thorium-228	0.412		0.0873	0.102		0.0848	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Thorium-232	0.340		0.194	0.197		0.186	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Thorium-234	0.676	U	0.611	0.615		1.48	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Uranium-235	-0.0640	U	0.386	0.386		0.849	pCi/g	11/11/16 13:08	12/02/16 09:18	1
Uranium-238	0.676	U	0.611	0.615		1.48	pCi/g	11/11/16 13:08	12/02/16 09:18	1

Client Sample ID: TITO04-BS-SWSU9-9-02-S002

Lab Sample ID: 160-19924-2

Date Collected: 11/08/16 09:28

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.117	U	0.141	0.142		0.202	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Actinium-227	0.188	U	0.314	0.314		0.874	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Bismuth-212	0.325	U	0.595	0.596		1.01	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Bismuth-214	0.319		0.0967	0.102		0.0792	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Cesium-137	0.0208	U	0.0446	0.0447		0.0768	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Lead-210	-0.721	U	1.09	1.10		2.31	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Lead-212	0.222		0.0609	0.0673		0.0716	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Lead-214	0.343		0.0878	0.0948		0.0727	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Potassium-40	7.64		1.23	1.46		0.542	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Protactinium-231	0.000	U	0.696	0.696		2.71	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Radium-226	0.319		0.0967	0.102	0.500	0.0792	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Radium-228	0.117	U	0.141	0.142		0.202	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Thallium-208	0.132		0.0387	0.0410		0.0250	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Thorium-228	0.222		0.0609	0.0673		0.0716	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Thorium-232	0.117	U	0.141	0.142		0.202	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Thorium-234	1.15		0.834	0.843		1.11	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Uranium-235	-0.121	U	0.324	0.324		0.589	pCi/g	11/11/16 13:08	12/02/16 09:19	1
Uranium-238	1.15		0.834	0.843		1.11	pCi/g	11/11/16 13:08	12/02/16 09:19	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19924-2

Client Sample ID: TITO04-BS-SWSU9-9-03-S003

Lab Sample ID: 160-19924-3

Date Collected: 11/08/16 09:42

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.345		0.170	0.173		0.316	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Actinium-227	0.153	U	0.660	0.660		0.966	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Bismuth-212	-0.405	U	1.09	1.09		1.88	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Bismuth-214	0.593		0.187	0.197		0.168	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Cesium-137	-0.0167	U	0.0628	0.0628		0.120	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Lead-210	-0.156	U	1.45	1.45		2.23	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Lead-212	0.393		0.0965	0.109		0.0990	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Lead-214	0.329		0.145	0.149		0.237	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Potassium-40	9.33		1.72	1.97		0.819	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Protactinium-231	0.165	U	1.17	1.17		3.84	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Radium-226	0.593		0.187	0.197	0.500	0.168	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Radium-228	0.345		0.170	0.173		0.316	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Thallium-208	0.147		0.0726	0.0742		0.0649	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Thorium-228	0.393		0.0965	0.109		0.0990	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Thorium-232	0.345		0.170	0.173		0.316	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Thorium-234	0.138	U	0.132	0.133		2.17	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Uranium-235	-0.0470	U	0.328	0.328		0.620	pCi/g	11/11/16 13:08	12/02/16 09:22	1
Uranium-238	0.138	U	0.132	0.133		2.17	pCi/g	11/11/16 13:08	12/02/16 09:22	1

Client Sample ID: TITO04-BS-SWSU9-9-04-S004

Lab Sample ID: 160-19924-4

Date Collected: 11/08/16 10:04

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.416		0.176	0.181		0.249	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Actinium-227	-0.0215	U	0.0400	0.0400		1.28	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Bismuth-212	0.329	U	0.507	0.509		0.852	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Bismuth-214	0.575		0.150	0.162		0.139	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Cesium-137	0.0339	U	0.0627	0.0628		0.106	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Lead-210	-0.753	U	1.66	1.66		2.79	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Lead-212	0.422		0.0883	0.104		0.100	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Lead-214	0.732		0.122	0.143		0.105	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Potassium-40	9.95		1.33	1.68		0.653	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Protactinium-231	0.000	U	0.425	0.425		4.50	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Radium-226	0.575		0.150	0.162	0.500	0.139	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Radium-228	0.416		0.176	0.181		0.249	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Thallium-208	0.147		0.0534	0.0555		0.0411	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Thorium-228	0.422		0.0883	0.104		0.100	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Thorium-232	0.416		0.176	0.181		0.249	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Thorium-234	0.103	U	1.40	1.40		2.38	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Uranium-235	0.00709	U	0.136	0.136		0.978	pCi/g	11/11/16 13:08	12/02/16 09:43	1
Uranium-238	0.103	U	1.40	1.40		2.38	pCi/g	11/11/16 13:08	12/02/16 09:43	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19924-2

Client Sample ID: TITO04-BS-SWSU9-9-05-S005

Lab Sample ID: 160-19924-5

Date Collected: 11/08/16 10:14

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.702		0.203	0.215		0.106	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Actinium-227	0.254	U	0.639	0.639		1.55	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Bismuth-212	0.160	U	0.914	0.914		1.60	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Bismuth-214	0.537		0.165	0.174		0.156	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Cesium-137	0.0178	U	0.0824	0.0824		0.143	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Lead-210	-0.782	U	1.99	1.99		3.46	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Lead-212	0.454		0.102	0.117		0.108	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Lead-214	0.579		0.154	0.165		0.151	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Potassium-40	10.8		1.60	1.95		0.754	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Protactinium-231	0.0748	U	2.58	2.58		4.42	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Radium-226	0.537		0.165	0.174	0.500	0.156	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Radium-228	0.702		0.203	0.215		0.106	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Thallium-208	0.138		0.0971	0.0981		0.0904	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Thorium-228	0.454		0.102	0.117		0.108	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Thorium-232	0.702		0.203	0.215		0.106	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Thorium-234	1.51	U	1.48	1.49		1.89	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Uranium-235	0.0397	U	0.183	0.183		0.714	pCi/g	11/11/16 13:08	12/02/16 09:44	1
Uranium-238	1.51	U	1.48	1.49		1.89	pCi/g	11/11/16 13:08	12/02/16 09:44	1

Client Sample ID: TITO04-BS-SWSU9-9-06-S006

Lab Sample ID: 160-19924-6

Date Collected: 11/08/16 10:22

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.281	U	0.269	0.271		0.348	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Actinium-227	-0.129	U	0.864	0.864		1.47	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Bismuth-212	0.0183	U	0.808	0.808		1.44	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Bismuth-214	0.526		0.129	0.140		0.115	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Cesium-137	0.0167	U	0.0380	0.0380		0.0665	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Lead-210	0.296	U	1.21	1.21		1.86	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Lead-212	0.373		0.103	0.114		0.134	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Lead-214	0.597		0.118	0.134		0.132	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Potassium-40	10.3		1.44	1.78		0.591	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Protactinium-231	-0.0000001	U	2.61	2.61		4.45	pCi/g	11/11/16 13:08	12/02/16 09:45	1
	07									
Radium-226	0.526		0.129	0.140	0.500	0.115	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Radium-228	0.281	U	0.269	0.271		0.348	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Thallium-208	0.145		0.0459	0.0483		0.0377	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Thorium-228	0.373		0.103	0.114		0.134	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Thorium-232	0.281	U	0.269	0.271		0.348	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Thorium-234	0.939	U	1.01	1.01		1.63	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Uranium-235	-0.0442	U	0.0902	0.0903		1.09	pCi/g	11/11/16 13:08	12/02/16 09:45	1
Uranium-238	0.939	U	1.01	1.01		1.63	pCi/g	11/11/16 13:08	12/02/16 09:45	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19924-2

Client Sample ID: TITO04-BS-SWSU9-9-07-S007

Lab Sample ID: 160-19924-7

Date Collected: 11/08/16 10:50

Matrix: Solid

Date Received: 11/10/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.343		0.194	0.197		0.195	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Actinium-227	-0.351	U	0.821	0.822		1.38	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Bismuth-212	-0.545	U	0.875	0.877		1.46	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Bismuth-214	0.561		0.125	0.138		0.102	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Cesium-137	-0.0384	U	0.0722	0.0724		0.104	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Lead-210	-0.839	U	1.81	1.81		3.03	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Lead-212	0.426		0.0741	0.0923		0.0581	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Lead-214	0.391		0.102	0.110		0.113	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Potassium-40	12.9		1.49	1.99		0.533	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Protactinium-231	0.664	U	1.56	1.57		3.56	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Radium-226	0.561		0.125	0.138	0.500	0.102	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Radium-228	0.343		0.194	0.197		0.195	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Thallium-208	0.210		0.0549	0.0591		0.0354	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Thorium-228	0.426		0.0741	0.0923		0.0581	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Thorium-232	0.343		0.194	0.197		0.195	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Thorium-234	0.148	U	0.610	0.610		2.20	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Uranium-235	0.0844	U	0.151	0.151		0.732	pCi/g	11/11/16 13:08	12/02/16 09:47	1
Uranium-238	0.148	U	0.610	0.610		2.20	pCi/g	11/11/16 13:08	12/02/16 09:47	1

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-20018-2

Client Sample ID: TITO04-BS-1209-SW-700-P3001

Lab Sample ID: 160-20018-1

Date Collected: 11/14/16 14:30

Matrix: Solid

Date Received: 11/16/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.782		0.188	0.205		0.0844	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Actinium-227	-0.216	U	0.859	0.860		1.45	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Bismuth-212	0.498	U	0.773	0.775		1.29	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Bismuth-214	0.499		0.123	0.134		0.110	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Cesium-137	-0.0158	U	0.0843	0.0844		0.145	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Lead-210	0.786	U	1.35	1.35		1.90	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Lead-212	0.556		0.107	0.129		0.124	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Lead-214	0.628		0.147	0.161		0.135	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Potassium-40	12.6		1.56	2.03		0.828	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Protactinium-231	-1.00	U	3.12	3.13		5.23	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Radium-226	0.499		0.123	0.134	0.500	0.110	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Radium-228	0.782		0.188	0.205		0.0844	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Thallium-208	0.263		0.0728	0.0777		0.0618	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Thorium-228	0.556		0.107	0.129		0.124	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Thorium-232	0.782		0.188	0.205		0.0844	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Thorium-234	0.0467	U	0.213	0.213		2.61	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Uranium-235	-0.208	U	0.614	0.614		1.02	pCi/g	11/17/16 13:41	12/08/16 11:33	1
Uranium-238	0.0467	U	0.213	0.213		2.61	pCi/g	11/17/16 13:41	12/08/16 11:33	1

TestAmerica St. Louis

COVER LETTER

December 14, 2017

Lynn Caragan
C, B, & I Federal services
420 Exchange, #150
Irvine, CA. 92602

Dear Mrs. Caragan:

Enclosed is Revision 0 of the data validation report for the Treasure Island Naval Shipyard, Site 12, project number 500060. This DVR encompasses the laboratory data produced by TestAmerica Laboratories, Inc. for the sample delivery groups (SDG) listed in Table 1-1 of the DVR.

The specific sample identifications are listed in the sample identification table(s). The data packages were reviewed per the data validation procedures referenced in the introduction of the report.

Sincerely,



Larry Duty
Data Validation Project Manager

Data Validation Report 102017 for Treasure Island Site 12, Navy BRAC PMO West

Contract Number N62473-12-D-2005
TO004

San Francisco, California

TestAmerica Laboratories

Subcontract Number 203598

Prepared for CB&I Federal Services
420 Exchange, Suite 150
Irvine, CA 92602
CB&I Project Number 50060

Prepared by:
E-Lab Consultants
30710 S Holly Oaks Circle
Magnolia, Texas 77355

December 2017

Approved by:



Larry Duty
E-Lab Consultants

Date: 12/14/2017

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Appendix A	Annotated Laboratory Analytical Data Reporting Forms 1s
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Acronyms and Abbreviations

Following is a list of acronyms and abbreviations that may be used in data validation reports and/or data quality assessment reports.

%D	percent difference	DFTPP	decafluorotriphenylphosphine
%R	percent recovery	DOD	Department Of Defense
µg/L	microgram per liter	DQAR	data quality assessment report
mg/L	milligram per liter		
pg/L	picogram per liter	DUP	laboratory duplicate
µg/kg	microgram per kilogram	DVP	data validation procedure
mg/kg	milligram per kilogram	EDB	ethylene dibromide
ng/kg	nanogram per kilogram	EDL	estimated detection limit
pg/g	picogram per gram	EICP	extracted ion current profile
AA	atomic absorption	EPA	Environmental Protection Agency, United States
ARRF	average relative response factor	EB	equipment blank
BFB	bromofluorobenzene	FB	field blank
BNA	base/neutral/acid compounds	GC	gas chromatography
CCB	continuing calibration blank	GC/ECD	gas chromatography/electron capture detector
CCC	calibration check compound	GC/ELCD	gas chromatography/electrolytic conductivity detector (Hall detector)
CCV	continuing calibration verification	GC/FPD	gas chromatography/flame photometric detector
CF	calibration factor	GC/MS	gas chromatography/mass spectrometry
CLP	Contract Laboratory Program	GC/PID	gas chromatography/photoionization detector
COC	chain of custody record	GFAA	graphite furnace atomic

			absorption
COD	chemical oxygen demand	GPC	gel permeation chromatography
CTO	contract task order	Hg	mercury
CVAA	cold vapor atomic absorption	HPLC	high-performance liquid chromatography
DBCP	dibromochloropropane	HRGC/HR MS	high resolution gas chromatography/high resolution mass spectrometry
DCB	decachlorobiphenyl	RF r2	response factor coefficient of determination
4,4'-DDD	4,4'-dichlorodiphenyldichloroethane	RICRF	reconstructed ion chromatogram response factor
4,4'-DDE	4,4'-dichlorodiphenyldichloroethylene	RLRIC	reporting limit reconstructed ion chromatogram
4,4'-DDT	4,4'-dichlorodiphenyltrichloroethane	RPDRL	relative percent difference reporting limit
ICV	initial calibration verification	RRFRPD	relative response factor relative percent difference
IDL	instrument detection limit	RRTRRF	relative retention time relative response factor
IR	infrared spectroscopy	RSDRRT	relative standard deviation relative retention time
IRP	installation restoration program	RTRSD	retention time relative standard deviation
IS	internal standards	RT	retention time
LCS	laboratory control sample	HT	holding time
MBAS	methyl blue active substance	ICB	initial calibration blank
MDL	method detection limit	ICP	inductively coupled plasma
MS	matrix spike	ICS	interference check sample
MSA	method of standard addition	SDG	sample delivery group

MSD	matrix spike duplicate	SICP	selected ion current profiles
m/z	mass to charge ratio	s/n	signal to noise ratio
NFESC	Naval Facilities Engineering Services Center	SOP	standard operating procedure
OP	organophosphorus	SOW	statement of work
PAH	polynuclear aromatic hydrocarbon	SPCC	system performance check compound
PARCC	precision, accuracy, representativeness, comparability, completeness	SRM	standard reference material
PCB	polychlorinated biphenyl	SVOC	semivolatile organic compound
PCDD	polychlorinated dibenzodioxin	TB	trip blank
PCDF	polychlorinated dibenzofuran	TCDD	tetrachlorodibenzodioxin
PE	performance evaluation	TCX	tetrachloro-m-xylene
PEM	performance evaluation mixture	TDS	total dissolved solids
PFK	perfluorokerosene	TIC	tentatively identified compound
PQO	project quality objective	TOC	total organic carbon
QAPFK	quality assurance perfluorokerosene	TOX	total organic halides
QACQA	quality assurance coordinator quality assurance	TPHE	total petroleum hydrocarbons as extractables
QAPPQA C	quality assurance project plan quality assurance coordinator	UV/VIS	ultraviolet/visible
QCQAPP	quality control quality assurance project plan	VOA	volatile organic analysis
QSM QC	quality system manual quality control	VOC	volatile organic compound
rQSM	correlation coefficient quality system manual	VTSR	validated time of sample receipt

r ² r	coefficient of determination correlation coefficient	WDM	window defining mixture
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1.0 INTRODUCTION

This Data Validation Report (DVR) contains the results of the data validation conducted for samples collected and analyzed as part of the Treasure Island Naval Shipyard Site 12 investigation. The project was conducted per contract number N62473-12-D-2005 under task order 004 for the Base Realignment and Closure Program Management Office, West Naval Facilities Engineering Command, 1455 Frazee Road, #600, San Diego CA. 92108. This DVR was subcontracted to E-Lab Consultants from Chicago, Bridge, and Iron (CB&I) to serve third party data assessment purposes and evaluates the laboratory data contained in Sample Delivery Groups (SDGs) list in **Table 1-1** produced by TestAmerica Laboratories, Inc.

These samples were analyzed in accordance with the approved *United States Department of Defense (DOD) Quality Systems Manual (QSM) for Environmental Laboratories Version 5.0, July 2013* and the analytical methods specified for the analytes requested on the Chain of Custody (COC) documentation. **Table 1-1** provides a list of the samples collected, a laboratory sample number cross-reference, sample matrix, date collected, sample purpose, and analytical methods performed for each sample pertaining to this DVR. This DVR is conducted per the analysis requested on the COC in accordance with the; *Sampling and Analysis Plan (SAP) October 2013, Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Organic (NFGO) Data Review (August 2014), NFG for Inorganic (NFGIO) Data Review (August 2014)*, and the method specified for the analysis.

The data were evaluated against the quantitative acceptance limits given in the DOD QSM for the data quality parameters of sensitivity, accuracy, precision, and completeness. **Appendix A** contains the Laboratory Data Report Form 1s that has been annotated with qualifiers assigned during the validation process in accordance with the project procedures manual.

In accordance with SAP, a review of the data was conducted independent of the laboratory. This review consisted of an evaluation of laboratory performance criteria from the case narrative, and an evaluation of the sample-specific criteria included in the laboratory data packages analyzed in accordance with the DOD QSM.

The validation consists of an evaluation of the chain of custody and associated laboratory sample receipt forms, proper sample preservations, holding times, initial calibration and continuing calibration procedures and results, laboratory control sample (LCS) (and duplicate [LCSD] if reported) accuracy and precision and matrix spike (MS) and matrix spike duplicate (MSD) sample analyses, method blanks, field blanks, and field duplicate precision.

Additional review included;

- Organic Analysis; internal standards, surrogate recoveries, instrument tuning, initial calibration, second source calibration verification, continuing calibration verification, internal standards, degradation summary, retention times, second column or second detector confirmations
- Inorganic Analysis; laboratory duplicate precision, instrument tuning, initial calibration, low-level calibration check standards, initial and continuing calibration verification, initial and continuing calibration blanks, interference check sample, internal standards, serial dilution results, post digestion spike recoveries, and interelement correction factors

The results of the independent data review are presented in **Section 2.0**.

Table 1-1
Sample Field and Laboratory ID Numbers

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04_RSY10_4-P1 FSSSU3-S001	160-16646-1	Solid	03/21/16	Normal	EPAGA_01_R	Level 4
TITO04_RSY10_4-P1 FSSSU3-S002	160-16646-2	Solid	03/21/16	Normal	EPAGA_01_R	Level 4
TITO04_RSY10_4-P1 FSSSU3-S003	160-16646-3	Solid	03/21/16	Normal	EPAGA_01_R	Level 4
TITO04_RSY10_4-P1 FSSSU3-S004	160-16646-4	Solid	03/21/16	Normal	EPAGA_01_R	Level 4
TITO04_RSY10_4-P1 FSSSU3-S005	160-16646-5	Solid	03/21/16	Normal	EPAGA_01_R	Level 4
TITO04_RSY10_4-P1 FSSSU3-S006	160-16646-6	Solid	03/21/16	Normal	EPAGA_01_R	Level 4
TITO04_RSY10_4-P1 FSSSU3-S007	160-16646-7	Solid	03/21/16	Normal	EPAGA_01_R	Level 4
TITO04_RSY10_4-P1 FSSSU3-S008	160-16646-8	Solid	03/21/16	Normal	EPAGA_01_R	Level 4
TITO04_RSY10_4-P1 FSSSU3-S009	160-16646-9	Solid	03/21/16	Normal	EPAGA_01_R	Level 4
TITO04_RSY10_4-P1 FSSSU3-S010	160-16646-10	Solid	03/21/16	Normal	EPAGA_01_R	Level 4
TITO04_RSY10_4-P1 FSSSU3-S011	160-16646-11	Solid	03/21/16	Normal	EPAGA_01_R	Level 4
TITO04_RSY10_4-P1 FSSSU3-S012	160-16646-12	Solid	03/21/16	Normal	EPAGA_01_R	Level 4
TITO04_RSY10_4-P1 FSSSU3-S013	160-16646-13	Solid	03/21/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_4-P1 FSSSU3-S014	160-16646-14	Solid	03/21/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_4-P1 FSSSU3-S015	160-16646-15	Solid	03/21/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_4-P1 FSSSU3-S016	160-16646-16	Solid	03/21/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_4-P1 FSSSU3-S017	160-16646-17	Solid	03/21/16	Normal	EPAGA_01_R	Level 3

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04_RSY10_4-P1 FSSSU3-S018	160-16646-18	Solid	03/21/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_4-P1 FSSSU3-S019	160-16646-19	Solid	03/21/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_4-P1 FSSSU3-S020	160-16646-20	Solid	03/21/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_6P1-CH-S601	160-17137-1	Solid	04/20/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_6P1-CH-S602	160-17137-2	Solid	04/20/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_6P1-CH-S603	160-17137-3	Solid	04/20/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_6P1-CH-S604	160-17137-4	Solid	04/20/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_6P1-CH-S605	160-17137-5	Solid	04/20/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_6P1-CH-S606	160-17137-6	Solid	04/20/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_6P1-CH-S607	160-17137-7	Solid	04/20/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_6P1-CH-S608	160-17137-8	Solid	04/20/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_6P1-CH-S609	160-17137-9	Solid	04/20/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_6P1-CH-S610	160-17137-10	Solid	04/20/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_6P1-CH-S611	160-17137-11	Solid	04/20/16	Normal	EPAGA_01_R	Level 3
TITO04_RSY10_6P1-CH-S612	160-17137-12	Solid	04/20/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS SU5-LLRO518CH-S001	160-17240-1	Solid	05/3/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS SU5-LLRO518CH-S002	160-17240-2	Solid	05/3/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS SU5-LLRO518CH-S003	160-17240-3	Solid	05/3/16	Normal	EPAGA_01_R	Level 3

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04-NP-FSS SU5-LLRO518CH-S004	160-17240-4	Solid	05/3/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-FSS SU5-LLRO518CH-S005	160-17240-5	Solid	05/3/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SU3RSY11-U6-S601	160-19854-1	Solid	11/2/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SU3RSY11-U6-S602	160-19854-2	Solid	11/2/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SU3RSY11-U6-S603	160-19854-3	Solid	11/2/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SU3RSY11-U6-S604	160-19854-4	Solid	11/2/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SU3RSY11-U6-S605	160-19854-5	Solid	11/2/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SU3RSY11-U6-S606	160-19854-6	Solid	11/2/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SU3RSY11-U6-S607	160-19854-7	Solid	11/2/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SU3RSY11-U6-S608	160-19854-8	Solid	11/2/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SU3RSY11-U6-S609	160-19854-9	Solid	11/2/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SU3RSY11-U6-S610	160-19854-10	Solid	11/2/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SU3RSY11-U6-S611	160-19854-11	Solid	11/2/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SU3RSY11-U6-S612	160-19854-12	Solid	11/2/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SU3RSY11-U6-S613	160-19854-13	Solid	11/2/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-SU3RSY11-U6-S614	160-19854-14	Solid	11/2/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-SU5-SWFSS-5-16-S002*	160-19909-1	Solid	10/24/16	Normal	EPAGA_01_R	Level 3
TITO04-NP-SU5-SWFSS-5-16-S002	160-19909-2	Solid	10/26/16	Normal	EPAGA_01_R	Level 3



Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04-NP-SU5-SWFSS-5-17-S003	160-19909-3	Solid	11/07/16	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B001	160-21129-1	Solid	2/14/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B002	160-21129-2	Solid	2/14/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B003	160-21129-3	Solid	2/14/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B004	160-21129-4	Solid	2/14/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B005	160-21129-5	Solid	2/14/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U8-BS-FSSSU6-S001	160-21509-1	Solid	3/15/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U8-BS-FSSSU6-S002	160-21509-2	Solid	3/15/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U8-BS-FSSSU6-S003	160-21509-3	Solid	3/15/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U8-BS-FSSSU6-S004	160-21509-4	Solid	3/15/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U8-BS-FSSSU6-S005	160-21509-5	Solid	3/15/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U8-BS-FSSSU6-S006	160-21509-6	Solid	3/15/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U8-BS-FSSSU6-S007	160-21509-7	Solid	3/15/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U8-BS-FSSSU6-S008	160-21509-8	Solid	3/15/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U8-BS-FSSSU6-S009	160-21509-9	Solid	3/15/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U8-BS-FSSSU6-S010	160-21509-10	Solid	3/15/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U8-BS-FSSSU6-S011	160-21509-11	Solid	3/15/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U8-BS-FSSSU6-S012	160-21509-12	Solid	3/15/17	Normal	EPAGA_01_R	Level 3

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04-RSY15-U9-BS-FSSSU5-S001	160-21561-1	Solid	03/20/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U9-BS-FSSSU5-S002	160-21561-2	Solid	03/20/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U9-BS-FSSSU5-S003	160-21561-3	Solid	03/20/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U9-BS-FSSSU5-S004	160-21561-4	Solid	03/20/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U9-BS-FSSSU5-S005	160-21561-5	Solid	03/20/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U9-BS-FSSSU5-S006	160-21561-6	Solid	03/20/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U9-BS-FSSSU5-S007	160-21561-7	Solid	03/20/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U9-BS-FSSSU5-S008	160-21561-8	Solid	03/20/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U9-BS-FSSSU5-S009	160-21561-9	Solid	03/20/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U9-BS-FSSSU5-S010	160-21561-10	Solid	03/20/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U9-BS-FSSSU5-S011	160-21561-11	Solid	03/20/17	Normal	EPAGA_01_R	Level 3
TITO04-RSY15-U9-BS-FSSSU5-S012	160-21561-12	Solid	03/20/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU09-9-12	160-21651-1	Solid	03/28/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU09-9-13	160-21651-2	Solid	03/28/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU09-9-14	160-21651-3	Solid	03/28/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU09-9-15	160-21651-4	Solid	03/28/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU9-B001	160-21652-1	Solid	3/28/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSSSU9-B002	160-21668-1	Solid	3/29/17	Normal	EPAGA_01_R	Level 3



Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04-BS-FSS-SU7C-RSY13-U15-S001	160-24829-1	Solid	10/3/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7C-RSY13-U15-S002	160-24829-2	Solid	10/3/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7C-RSY13-U15-S003	160-24829-3	Solid	10/3/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7C-RSY13-U15-S004	160-24829-4	Solid	10/3/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7C-RSY13-U15-S005	160-24829-5	Solid	10/3/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7C-RSY13-U15-S006	160-24829-6	Solid	10/3/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7C-RSY13-U15-S007	160-24829-7	Solid	10/3/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7D-U1-S001	160-24992-1	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7D-U1-S002	160-24992-2	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7D-U1-S003	160-24992-3	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7D-U1-S004	160-24992-4	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7D-U1-S005	160-24992-5	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7D-U1-S006	160-24992-6	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7A-U1-S007	160-24995-1	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7A-U1-S008	160-24995-2	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7A-U1-S009	160-24995-3	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7A-U1-S010	160-24995-4	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7A-U1-S011	160-24995-5	Solid	10/11/17	Normal	EPAGA_01_R	Level 3

Field I.D.	Lab Sample Number	Matrix	Date Collected	Purpose	Analytical Methods	Validation Level
TITO04-BS-FSS-SU7A-U1-S012	160-24995-6	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7B-LANE1-U1-S013	160-24996-1	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7B-LANE1-U1-S014	160-24996-2	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7B-LANE1-U1-S015	160-24996-3	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7B-LANE2-U1-S016	160-24996-4	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7B-LANE2-U1-S017	160-24996-5	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7B-LANE2-U1-S018	160-24996-6	Solid	10/11/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7B-LANE3-U2-S021	160-25032-1	Solid	10/13/17	Normal	EPAGA_01_R	Level 3
TITO04-BS-FSS-SU7B-LANE3-U2-S022	160-25032-2	Solid	10/13/17	Normal	EPAGA_01_R	Level 3

- Sample id represents a resample of the location. Refer to the Project reporting documents for additional explanation

Following the specifications in the SAP related to the data validation process, the data were annotated with data validation qualifiers and codes on the analytical data sheets that are required qualifier flags as described in the SAP. **Table 1-2** provides definitions of the data qualifiers references, and **Table 1-3** lists and defines the data review qualifier codes.

Table 1-2
Data Qualifier References

Qualifier	Organics	Inorganics
U	The analyte was analyzed for, but was not detected above the method detection limit.	The analyte was analyzed for, but was not detected above the method detection limit.

J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."	Not applicable.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.	Not applicable.
UJ	The analyte was not detected above the method detection limit. However, the associated value is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.	The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and to meet quality control criteria. The presence or absence of the analyte cannot be verified.	The data are unusable. The sample results are rejected due to serious deficiencies in meeting the Quality Control (QC) criteria. The analyte may or may not be present in the sample.

**Table 1-3
Data Review Qualifier Codes**

Reason Code	Description
A	Serial dilution outside criteria (Level IV).
B1	Method blank contaminants above reporting limit.
B2	Calibration blank contaminants above reporting limit.

B2 (Bias flag –)	Calibration blank indicates negative interference, false negatives may be present
B3	Trip blank contamination
B4	Equipment rinsate contamination.
B5	Ambient blank contamination
C	ICV or CCV % D outside control limits.
C1	Initial calibration RSD outside control limit.
C2	Initial calibration RRF outside control limit.
C3	Continuing calibration RRF outside control limit.
D1	Sample Duplicate RPD outside control limit.
D2	Matrix Duplicate RPD outside control limit
E	The sample results exceed the linear calibration range of the instrument.
F	Hydrocarbon pattern does not match hydrocarbon pattern in the standard.
H	Holding time exceeded.
I	Internal standard recovery outside control limit.
L	LCS outside control limits.
M	MS outside control limits.
M1	MS, MSD or RPD outside of control limits
O	Interference check sample outside acceptance criteria
P	Analyte qualified based on the professional judgement of the reviewer.
S	Surrogate recovery outside control limit.
T	Temperature outside acceptance criteria.
Tr	Value reported detected between the DL and LOQ
W	Pesticide breakdown outside criteria (Level IV).
X	Raised reporting limit due to matrix interference or high analyte concentration.
Y	Analyte was not confirmed by a second column.
Y1	Primary and Confirmation Sample Duplicate RPD outside control limit.

2.0 DATA VALIDATION RESULTS

Laboratory Data Package Review

The samples reported, QC designations, and validation level is listed in **Table 1-1**. The data packages were reviewed in accordance with the project procedures manual.

Sample Documentation, Preservation, Handling, and Transport

All samples arrived at the laboratory on time, intact and within preservation requirements.

A cross reference of the COC and analytical reports has concluded all extractions and analysis were performed within the required holding times. The validation met all QC requirements listed in the method and data validation requirements of the SAP. None of the data is qualified based on sample documentation, preservation, handling, or transport

2.1 Radium-226 by GAMMA SPEC (21 DAY INGROWTH)

2.1.1 Instrument Performance Checks

Data verification included the recalculation of raw data, verifying the mass spectral abundance and assignment are correct and within the method requirements. All samples were analyzed with an acceptable BFB performance check and within the 12-hour window requirement.

2.1.2 Instrument Initial Calibrations

Relative Retention Factors (RRF) was verified against the quantitation reports, mass spectra, and chromatograms. Average RRF and percent relative Standard Deviations (%RSD) were verified for one compound associated with each internal standard. All initial calibration average relative response factors were within the project DoD QSM requirements.

2.1.3 Initial Calibration Verifications

The initial calibration curve was verified with a second source standard mix that contained all target compounds.

2.1.4 Continuing Calibrations

Continuing calibration average relative response factors were within the DoD QSM requirements (<20%). Continuing calibrations were performed on a 12-hour basis.

2.1.5 Blanks

Each analytical batch was represented with a method blank. The laboratory reports none of the target compounds were detected in any of the method blanks

2.1.6 Laboratory Control Sample Recovery (Blank Spikes)

The LCS values were validated by recalculating two compounds per LCS. None of the data are qualified based on LCS recoveries.

2.1.7 Matrix Spike/Matrix Spike Duplicate Recoveries

MS/MSD samples were not submitted for this analysis.

2.1.8 Laboratory Duplicate Recoveries

All laboratory generated duplicate recoveries are within QC limits.

2.1.9 Field QC Samples

2.1.9.1 Trip, Equipment and Field Blanks

Field blank samples were not submitted for this analysis.

2.1.10 Target Compound Identification

None of the identified target compounds were qualified based compound identification.

2.1.11 Compound Quantitation and Reporting Limits

Reporting limits were verified to be equal to the Level of Detection (LOD). The LODs have been verified to meet or exceed the project required performance standards. Sample dilutions, cleanup concentrations, and moisture correction have been applied to all reportable results. The results are reported on a dry weight basis where applicable.

- Sample TITO04-NP-SU5-SWFSS-5-16-S002 (160-19909-1) was reported twice in the Laboratory SDG. The recount analysis have been determined to be the accurate reportable result.

2.1.12 Tentatively Identified Compounds

No Tentatively Identified Compounds are reported.

Appendix A

Annotated Laboratory Analytical Data Reporting Forms 1s

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16646-2

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S001

Lab Sample ID: 160-16646-1

Date Collected: 03/21/16 09:49

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.176	U	0.106	0.107		0.230	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Actinium-227	-0.0229	U	0.0374	0.0374		0.728	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Bismuth-212	0.471	U	0.397	0.400		0.601	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Bismuth-214	0.403		0.0981	0.107		0.0895	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Cesium-137	0.00416	U	0.0354	0.0354		0.0644	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Lead-210	0.0604	U	0.771	0.771		1.54	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Lead-212	0.292		0.0726	0.0819		0.0842	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Lead-214	0.507		0.101	0.114		0.0818	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Potassium-40	10.1		1.26	1.62		0.678	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Protactinium-231	0.0347	U	0.216	0.216		1.37	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Radium-226	0.403		0.0981	0.107	0.500	0.0895	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Radium-228	0.176	U	0.106	0.107		0.230	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Thallium-208	0.105		0.0434	0.0447		0.0557	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Thorium-228	0.292		0.0726	0.0819		0.0842	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Thorium-232	0.176	U	0.106	0.107		0.230	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Thorium-234	0.816	U	0.794	0.799		1.37	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Uranium-235	0.0529	U	0.158	0.158		0.395	pCi/g	03/28/16 12:37	04/18/16 10:55	1
Uranium-238	0.816	U	0.794	0.799		1.37	pCi/g	03/28/16 12:37	04/18/16 10:55	1

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S002

Lab Sample ID: 160-16646-2

Date Collected: 03/21/16 09:53

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.416		0.120	0.127		0.128	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Actinium-227	0.260	U	0.409	0.410		0.685	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Bismuth-212	0.0912	U	0.366	0.366		0.668	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Bismuth-214	0.271		0.110	0.114		0.112	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Cesium-137	0.0132	U	0.0304	0.0304		0.0536	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Lead-210	0.503	U	0.865	0.867		1.65	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Lead-212	0.254		0.0736	0.0806		0.0823	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Lead-214	0.351		0.0897	0.0969		0.107	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Potassium-40	10.1		1.32	1.68		0.573	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Protactinium-231	0.0503	U	0.210	0.210		1.37	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Radium-226	0.271		0.110	0.114	0.500	0.112	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Radium-228	0.416		0.120	0.127		0.128	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Thallium-208	0.112		0.0473	0.0487		0.0492	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Thorium-228	0.254		0.0736	0.0806		0.0823	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Thorium-232	0.416		0.120	0.127		0.128	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Thorium-234	0.0791	U	0.144	0.144		1.59	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Uranium-235	0.137	U	0.173	0.174		0.285	pCi/g	03/28/16 12:37	04/18/16 10:54	1
Uranium-238	0.0791	U	0.144	0.144		1.59	pCi/g	03/28/16 12:37	04/18/16 10:54	1

LAB CONSULTANTS
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16646-2

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S003

Lab Sample ID: 160-16646-3

Date Collected: 03/21/16 09:57

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.404		0.136	0.142		0.131	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Actinium-227	0.0203	U	0.0628	0.0629		0.794	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Bismuth-212	0.175	U	0.457	0.457		0.811	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Bismuth-214	0.267		0.0911	0.0953		0.0914	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Cesium-137	-0.00716	U	0.0946	0.0946		0.0851	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Lead-210	0.870	U	0.901	0.907		1.46	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Lead-212	0.297		0.0903	0.0981		0.0964	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Lead-214	0.327		0.0899	0.0961		0.0651	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Potassium-40	8.98		1.39	1.67		0.529	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Protactinium-231	0.125	U	0.763	0.763		1.37	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Radium-226	0.267		0.0911	0.0953	0.500	0.0914	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Radium-228	0.404		0.136	0.142		0.131	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Thallium-208	0.116		0.0484	0.0499		0.0468	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Thorium-228	0.297		0.0903	0.0981		0.0964	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Thorium-232	0.404		0.136	0.142		0.131	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Thorium-234	0.769	U	0.771	0.775		1.36	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Uranium-235	0.0778	U	0.183	0.183		0.321	pCi/g	03/28/16 12:37	04/18/16 11:00	1
Uranium-238	0.769	U	0.771	0.775		1.36	pCi/g	03/28/16 12:37	04/18/16 11:00	1

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S004

Lab Sample ID: 160-16646-4

Date Collected: 03/21/16 10:00

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.145	U	0.109	0.110		0.181	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Actinium-227	0.0245	U	0.0887	0.0888		0.496	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Bismuth-212	0.000553	U	0.332	0.332		0.640	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Bismuth-214	0.398		0.103	0.111		0.0612	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Cesium-137	0.00382	U	0.0334	0.0334		0.0616	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Lead-210	0.465	U	0.748	0.750		1.15	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Lead-212	0.235		0.0784	0.0840		0.0873	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Lead-214	0.296		0.0722	0.0784		0.0902	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Potassium-40	9.17		1.33	1.63		0.720	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Protactinium-231	0.111	U	0.462	0.462		0.840	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Radium-226	0.398		0.103	0.111	0.500	0.0612	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Radium-228	0.145	U	0.109	0.110		0.181	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Thallium-208	0.142		0.0444	0.0468		0.0312	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Thorium-228	0.235		0.0784	0.0840		0.0873	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Thorium-232	0.145	U	0.109	0.110		0.181	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Thorium-234	0.272	U	0.640	0.641		1.14	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Uranium-235	-0.0309	U	1.24	1.24		0.231	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Uranium-238	0.272	U	0.640	0.641		1.14	pCi/g	03/28/16 12:37	04/18/16 10:59	1

E-Lab Consultants
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16646-2

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S005

Lab Sample ID: 160-16646-5

Date Collected: 03/21/16 10:03

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.192	U	0.152	0.154		0.269	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Actinium-227	0.0294	U	0.323	0.323		0.584	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Bismuth-212	0.0925	U	0.573	0.573		1.05	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Bismuth-214	0.431		0.116	0.124		0.0990	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Cesium-137	-0.0192	U	0.770	0.770		0.0768	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Lead-210	0.711	U	1.05	1.05		1.55	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Lead-212	0.349		0.0938	0.104		0.0940	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Lead-214	0.319		0.0967	0.102		0.0999	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Potassium-40	9.74		1.59	1.88		0.737	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Protactinium-231	0.279	U	0.320	0.321		1.78	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Radium-226	0.431		0.116	0.124	0.500	0.0990	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Radium-228	0.192	U	0.152	0.154		0.269	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Thallium-208	0.141		0.0453	0.0476		0.0274	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Thorium-228	0.349		0.0938	0.104		0.0940	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Thorium-232	0.192	U	0.152	0.154		0.269	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Thorium-234	0.117	U	0.463	0.464		1.56	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Uranium-235	0.161	U	0.185	0.186		0.288	pCi/g	03/28/16 12:37	04/18/16 10:58	1
Uranium-238	0.117	U	0.463	0.464		1.56	pCi/g	03/28/16 12:37	04/18/16 10:58	1

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S006

Lab Sample ID: 160-16646-6

Date Collected: 03/21/16 10:00

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.458		0.144	0.151		0.138	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Actinium-227	0.00602	U	0.415	0.415		0.730	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Bismuth-212	0.000	U	0.306	0.306		1.09	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Bismuth-214	0.349		0.0973	0.104		0.0993	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Cesium-137	0.00889	U	0.0328	0.0328		0.0589	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Lead-210	1.11	U	1.18	1.19		1.58	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Lead-212	0.313		0.0958	0.104		0.103	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Lead-214	0.318		0.0975	0.103		0.110	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Potassium-40	9.62		1.26	1.60		0.689	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Protactinium-231	-0.293	U	0.727	0.728		1.26	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Radium-226	0.349		0.0973	0.104	0.500	0.0993	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Radium-228	0.458		0.144	0.151		0.138	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Thallium-208	0.0728		0.0468	0.0474		0.0674	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Thorium-228	0.313		0.0958	0.104		0.103	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Thorium-232	0.458		0.144	0.151		0.138	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Thorium-234	0.197	U	0.283	0.284		1.19	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Uranium-235	0.0751	U	0.170	0.170		0.283	pCi/g	03/28/16 12:37	04/18/16 10:59	1
Uranium-238	0.197	U	0.283	0.284		1.19	pCi/g	03/28/16 12:37	04/18/16 10:59	1

E-Lab Consultants
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16646-2

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S007

Lab Sample ID: 160-16646-7

Date Collected: 03/21/16 10:03

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.162	U	0.0938	0.0953		0.199	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Actinium-227	0.132	U	0.217	0.217		0.623	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Bismuth-212	0.181	U	0.324	0.325		0.555	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Bismuth-214	0.266		0.0936	0.0976		0.0868	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Cesium-137	0.00602	U	0.0272	0.0272		0.0493	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Lead-210	0.0386	U	0.765	0.765		1.34	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Lead-212	0.335		0.0932	0.103		0.0866	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Lead-214	0.397		0.0863	0.0957		0.0824	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Potassium-40	9.39		1.21	1.54		0.689	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Protactinium-231	-0.102	U	0.627	0.627		1.12	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Radium-226	0.266		0.0936	0.0976	0.500	0.0868	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Radium-228	0.162	U	0.0938	0.0953		0.199	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Thallium-208	0.114		0.0367	0.0385		0.0319	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Thorium-228	0.335		0.0932	0.103		0.0866	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Thorium-232	0.162	U	0.0938	0.0953		0.199	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Thorium-234	0.606	U	0.650	0.653		1.06	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Uranium-235	0.0894	U	0.137	0.138		0.197	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Uranium-238	0.606	U	0.650	0.653		1.06	pCi/g	03/28/16 12:37	04/18/16 11:27	1

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S008

Lab Sample ID: 160-16646-8

Date Collected: 03/21/16 10:06

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.243		0.115	0.118		0.193	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Actinium-227	0.0235	U	0.0666	0.0666		0.653	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Bismuth-212	0.391	U	0.402	0.404		0.639	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Bismuth-214	0.232		0.0855	0.0889		0.120	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Cesium-137	0.000	U	0.0328	0.0328		0.0703	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Lead-210	-0.604	U	2.58	2.58		1.85	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Lead-212	0.214		0.0656	0.0712		0.0760	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Lead-214	0.402		0.0923	0.101		0.0862	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Potassium-40	9.03		1.22	1.53		0.798	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Protactinium-231	-0.239	U	0.811	0.811		1.41	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Radium-226	0.232		0.0855	0.0889	0.500	0.120	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Radium-228	0.243		0.115	0.118		0.193	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Thallium-208	0.167		0.0531	0.0559		0.0481	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Thorium-228	0.214		0.0656	0.0712		0.0760	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Thorium-232	0.243		0.115	0.118		0.193	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Thorium-234	0.108	U	0.184	0.184		1.53	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Uranium-235	-0.0183	U	1.38	1.38		0.294	pCi/g	03/28/16 12:37	04/18/16 11:27	1
Uranium-238	0.108	U	0.184	0.184		1.53	pCi/g	03/28/16 12:37	04/18/16 11:27	1

E-Lab Consultants
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16646-2

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S009

Lab Sample ID: 160-16646-9

Date Collected: 03/21/16 10:06

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.256		0.125	0.128		0.200	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Actinium-227	0.0189	U	0.376	0.376		0.664	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Bismuth-212	0.274	U	0.387	0.388		0.645	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Bismuth-214	0.168		0.0788	0.0807		0.110	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Cesium-137	-0.0174	U	0.0454	0.0455		0.0792	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Lead-210	-0.219	U	1.51	1.51		1.59	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Lead-212	0.00441	U	0.0821	0.0821		0.145	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Lead-214	0.271		0.0935	0.0977		0.122	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Potassium-40	8.93		1.31	1.60		0.550	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Protactinium-231	0.207	U	0.344	0.345		1.21	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Radium-226	0.168		0.0788	0.0807	0.500	0.110	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Radium-228	0.256		0.125	0.128		0.200	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Thallium-208	0.0919		0.0348	0.0361		0.0382	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Thorium-228	0.00441	U	0.0821	0.0821		0.145	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Thorium-232	0.256		0.125	0.128		0.200	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Thorium-234	0.370	U	0.366	0.368		1.17	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Uranium-235	0.126	U	0.152	0.153		0.275	pCi/g	03/28/16 12:37	04/18/16 11:31	1
Uranium-238	0.370	U	0.366	0.368		1.17	pCi/g	03/28/16 12:37	04/18/16 11:31	1

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S010

Lab Sample ID: 160-16646-10

Date Collected: 03/21/16 10:10

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.131	U	0.101	0.102		0.269	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Actinium-227	0.167	U	0.255	0.256		0.576	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Bismuth-212	0.125	U	0.442	0.442		0.786	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Bismuth-214	0.263		0.0986	0.102		0.136	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Cesium-137	0.0105	U	0.0350	0.0350		0.0622	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Lead-210	0.396	U	0.712	0.714		1.36	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Lead-212	0.335		0.0979	0.107		0.109	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Lead-214	0.378		0.106	0.113		0.105	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Potassium-40	9.99		1.28	1.64		0.708	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Protactinium-231	0.448	U	0.666	0.668		1.48	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Radium-226	0.263		0.0986	0.102	0.500	0.136	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Radium-228	0.131	U	0.101	0.102		0.269	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Thallium-208	0.0634	U	0.0522	0.0526		0.0696	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Thorium-228	0.335		0.0979	0.107		0.109	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Thorium-232	0.131	U	0.101	0.102		0.269	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Thorium-234	0.281	U	0.313	0.315		1.51	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Uranium-235	0.0941	U	0.175	0.176		0.295	pCi/g	03/28/16 12:37	04/18/16 11:33	1
Uranium-238	0.281	U	0.313	0.315		1.51	pCi/g	03/28/16 12:37	04/18/16 11:33	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16646-2

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S011

Lab Sample ID: 160-16646-11

Date Collected: 03/21/16 10:12

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.406		0.133	0.140		0.0809	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Actinium-227	0.138	U	0.381	0.382		0.657	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Bismuth-212	0.108	U	0.425	0.425		0.766	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Bismuth-214	0.338		0.110	0.115		0.102	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Cesium-137	-0.00733	U	0.0363	0.0363		0.0658	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Lead-210	0.737	U	1.21	1.21		1.84	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Lead-212	0.288		0.0763	0.0849		0.0808	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Lead-214	0.337		0.0978	0.104		0.0973	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Potassium-40	8.52		1.25	1.53		0.746	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Protactinium-231	0.222	U	0.324	0.325		1.23	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Radium-226	0.338		0.110	0.115	0.500	0.102	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Radium-228	0.406		0.133	0.140		0.0809	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Thallium-208	0.0480	U	0.0442	0.0444		0.0724	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Thorium-228	0.288		0.0763	0.0849		0.0808	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Thorium-232	0.406		0.133	0.140		0.0809	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Thorium-234	0.908	U	0.869	0.875		1.35	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Uranium-235	0.000	U	0.165	0.165		0.358	pCi/g	03/28/16 12:37	04/18/16 11:34	1
Uranium-238	0.908	U	0.869	0.875		1.35	pCi/g	03/28/16 12:37	04/18/16 11:34	1

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S012

Lab Sample ID: 160-16646-12

Date Collected: 03/21/16 10:14

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.175	U	0.130	0.131		0.242	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Actinium-227	0.110	U	0.147	0.147		0.943	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Bismuth-212	0.0721	U	0.571	0.571		1.04	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Bismuth-214	0.266		0.0948	0.0988		0.0920	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Cesium-137	-0.00350	U	0.0498	0.0498		0.0729	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Lead-210	0.425	U	0.787	0.789		1.33	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Lead-212	0.301		0.0797	0.0887		0.0816	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Lead-214	0.262		0.0889	0.0930		0.103	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Potassium-40	9.02		1.41	1.68		0.538	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Protactinium-231	0.331	U	0.531	0.532		1.57	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Radium-226	0.266		0.0948	0.0988	0.500	0.0920	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Radium-228	0.175	U	0.130	0.131		0.242	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Thallium-208	0.0708	U	0.0480	0.0486		0.0715	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Thorium-228	0.301		0.0797	0.0887		0.0816	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Thorium-232	0.175	U	0.130	0.131		0.242	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Thorium-234	0.208	U	0.304	0.305		1.63	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Uranium-235	-0.0236	U	0.0856	0.0857		0.370	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Uranium-238	0.208	U	0.304	0.305		1.63	pCi/g	03/28/16 12:37	04/18/16 11:36	1

E-Lab Consultants
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16646-2

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S013

Lab Sample ID: 160-16646-13

Date Collected: 03/21/16 10:13

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.228		0.115	0.118		0.112	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Actinium-227	0.122	U	0.219	0.219		0.481	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Bismuth-212	0.186	U	0.350	0.350		0.605	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Bismuth-214	0.364		0.0834	0.0916		0.0353	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Cesium-137	0.000	U	0.0111	0.0111		0.0684	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Lead-210	0.699	U	0.794	0.798		1.13	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Lead-212	0.251		0.0673	0.0747		0.0717	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Lead-214	0.314		0.0729	0.0799		0.0778	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Potassium-40	9.10		1.29	1.59		0.455	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Protactinium-231	0.100	U	0.106	0.107		1.30	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Radium-226	0.364		0.0834	0.0916	0.500	0.0353	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Radium-228	0.228		0.115	0.118		0.112	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Thallium-208	0.0878		0.0403	0.0413		0.0399	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Thorium-228	0.251		0.0673	0.0747		0.0717	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Thorium-232	0.228		0.115	0.118		0.112	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Thorium-234	0.212	U	0.259	0.260		0.828	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Uranium-235	-0.0184	U	0.472	0.472		0.222	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Uranium-238	0.212	U	0.259	0.260		0.828	pCi/g	03/28/16 12:37	04/18/16 11:36	1

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S014

Lab Sample ID: 160-16646-14

Date Collected: 03/21/16 10:17

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.552		0.192	0.200		0.123	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Actinium-227	0.0242	U	0.176	0.176		0.903	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Bismuth-212	0.169	U	0.596	0.596		1.07	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Bismuth-214	0.279		0.117	0.120		0.136	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Cesium-137	-0.0215	U	1.99	1.99		0.104	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Lead-210	-0.0226	U	0.978	0.978		1.77	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Lead-212	0.250		0.0904	0.0960		0.100	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Lead-214	0.273		0.0959	0.100		0.120	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Potassium-40	10.8		1.73	2.06		0.784	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Protactinium-231	-0.0477	U	0.887	0.887		1.63	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Radium-226	0.279		0.117	0.120	0.500	0.136	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Radium-228	0.552		0.192	0.200		0.123	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Thallium-208	0.117		0.0436	0.0453		0.0291	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Thorium-228	0.250		0.0904	0.0960		0.100	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Thorium-232	0.552		0.192	0.200		0.123	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Thorium-234	0.352	U	0.444	0.445		1.54	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Uranium-235	0.0816	U	0.179	0.179		0.327	pCi/g	03/28/16 12:37	04/18/16 11:38	1
Uranium-238	0.352	U	0.444	0.445		1.54	pCi/g	03/28/16 12:37	04/18/16 11:38	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16646-2

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S015

Lab Sample ID: 160-16646-15

Date Collected: 03/21/16 10:19

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.343		0.153	0.157		0.206	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Actinium-227	0.0373	U	0.0567	0.0568		0.614	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Bismuth-212	0.000	U	0.282	0.282		0.906	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Bismuth-214	0.393		0.0987	0.107		0.0980	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Cesium-137	0.0140	U	0.0286	0.0287		0.0499	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Lead-210	0.528	U	0.988	0.990		1.48	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Lead-212	0.239		0.0730	0.0793		0.0876	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Lead-214	0.347		0.0873	0.0944		0.105	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Potassium-40	9.29		1.31	1.62		0.998	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Protactinium-231	0.231	U	0.724	0.724		1.27	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Radium-226	0.393		0.0987	0.107	0.500	0.0980	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Radium-228	0.343		0.153	0.157		0.206	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Thallium-208	0.0691	U	0.0457	0.0463		0.0712	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Thorium-228	0.239		0.0730	0.0793		0.0876	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Thorium-232	0.343		0.153	0.157		0.206	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Thorium-234	0.112	U	0.163	0.163		1.33	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Uranium-235	-0.00941	U	0.0160	0.0160		0.311	pCi/g	03/28/16 12:37	04/18/16 11:36	1
Uranium-238	0.112	U	0.163	0.163		1.33	pCi/g	03/28/16 12:37	04/18/16 11:36	1

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S016

Lab Sample ID: 160-16646-16

Date Collected: 03/21/16 10:16

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.222		0.119	0.121		0.191	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Actinium-227	-0.00258	U	0.0118	0.0118		0.494	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Bismuth-212	0.119	U	0.390	0.391		0.697	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Bismuth-214	0.391		0.0920	0.101		0.0826	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Cesium-137	0.000317	U	0.0293	0.0293		0.0554	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Lead-210	0.867	U	1.32	1.33		1.84	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Lead-212	0.312		0.0738	0.0841		0.0777	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Lead-214	0.305		0.0811	0.0871		0.0959	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Potassium-40	10.3		1.32	1.69		0.626	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Protactinium-231	0.404	U	0.775	0.776		1.32	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Radium-226	0.391		0.0920	0.101	0.500	0.0826	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Radium-228	0.222		0.119	0.121		0.191	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Thallium-208	0.0630		0.0488	0.0493		0.0566	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Thorium-228	0.312		0.0738	0.0841		0.0777	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Thorium-232	0.222		0.119	0.121		0.191	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Thorium-234	0.120	U	0.200	0.201		1.41	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Uranium-235	0.155	U	0.180	0.181		0.328	pCi/g	03/28/16 12:37	04/18/16 12:00	1
Uranium-238	0.120	U	0.200	0.201		1.41	pCi/g	03/28/16 12:37	04/18/16 12:00	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16646-2

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S017

Lab Sample ID: 160-16646-17

Date Collected: 03/21/16 10:21

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.184	U	0.142	0.144		0.271	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Actinium-227	0.181	U	0.242	0.243		0.609	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Bismuth-212	0.0944	U	0.462	0.462		0.841	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Bismuth-214	0.294		0.101	0.106		0.101	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Cesium-137	0.000	U	0.0130	0.0130		0.0777	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Lead-210	0.265	U	0.800	0.801		1.51	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Lead-212	0.239		0.0822	0.0878		0.115	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Lead-214	0.370		0.109	0.115		0.105	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Potassium-40	9.89		1.44	1.76		0.756	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Protactinium-231	0.279	U	0.369	0.370		1.32	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Radium-226	0.294		0.101	0.106	0.500	0.101	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Radium-228	0.184	U	0.142	0.144		0.271	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Thallium-208	0.120		0.0725	0.0736		0.0719	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Thorium-228	0.239		0.0822	0.0878		0.115	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Thorium-232	0.184	U	0.142	0.144		0.271	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Thorium-234	0.349	U	0.364	0.366		1.19	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Uranium-235	0.0231	U	0.121	0.121		0.294	pCi/g	03/28/16 12:37	04/18/16 12:04	1
Uranium-238	0.349	U	0.364	0.366		1.19	pCi/g	03/28/16 12:37	04/18/16 12:04	1

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S018

Lab Sample ID: 160-16646-18

Date Collected: 03/21/16 10:23

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.171	U	0.115	0.116		0.207	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Actinium-227	0.0444	U	0.401	0.401		0.700	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Bismuth-212	0.265	U	0.413	0.414		0.697	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Bismuth-214	0.404		0.0927	0.102		0.0816	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Cesium-137	-0.00714	U	0.0389	0.0389		0.0699	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Lead-210	0.159	U	1.20	1.20		1.81	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Lead-212	0.315		0.0891	0.0980		0.0949	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Lead-214	0.307		0.113	0.117		0.123	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Potassium-40	10.2		1.30	1.67		0.714	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Protactinium-231	0.186	U	0.307	0.307		1.42	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Radium-226	0.404		0.0927	0.102	0.500	0.0816	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Radium-228	0.171	U	0.115	0.116		0.207	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Thallium-208	0.0995		0.0402	0.0415		0.0518	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Thorium-228	0.315		0.0891	0.0980		0.0949	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Thorium-232	0.171	U	0.115	0.116		0.207	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Thorium-234	0.776	U	0.893	0.896		1.28	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Uranium-235	0.209	U	0.201	0.202		0.297	pCi/g	03/28/16 12:37	04/18/16 12:07	1
Uranium-238	0.776	U	0.893	0.896		1.28	pCi/g	03/28/16 12:37	04/18/16 12:07	1

E-LAB CONSULTANTS
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-16646-2

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S019

Lab Sample ID: 160-16646-19

Date Collected: 03/21/16 10:21

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.333		0.119	0.124		0.0791	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Actinium-227	-0.0158	U	0.337	0.337		0.603	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Bismuth-212	0.341	U	0.455	0.456		0.752	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Bismuth-214	0.343		0.0860	0.0931		0.0681	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Cesium-137	0.00652	U	0.0374	0.0374		0.0678	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Lead-210	0.839	U	1.09	1.10		1.71	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Lead-212	0.316		0.0881	0.0972		0.0929	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Lead-214	0.285		0.0720	0.0779		0.0825	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Potassium-40	10.2		1.32	1.68		0.567	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Protactinium-231	0.251	U	0.494	0.495		1.17	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Radium-226	0.343		0.0860	0.0931	0.500	0.0681	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Radium-228	0.333		0.119	0.124		0.0791	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Thallium-208	0.143		0.0465	0.0489		0.0425	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Thorium-228	0.316		0.0881	0.0972		0.0929	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Thorium-232	0.333		0.119	0.124		0.0791	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Thorium-234	0.627	U	0.439	0.444		1.40	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Uranium-235	0.210	U	0.158	0.160		0.295	pCi/g	03/28/16 12:37	04/18/16 12:08	1
Uranium-238	0.627	U	0.439	0.444		1.40	pCi/g	03/28/16 12:37	04/18/16 12:08	1

Client Sample ID: TITO04_RSY10_4-P1 FSSSU3-S020

Lab Sample ID: 160-16646-20

Date Collected: 03/21/16 10:23

Matrix: Solid

Date Received: 03/23/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.215	U	0.167	0.169		0.294	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Actinium-227	-0.00839	U	0.0306	0.0306		0.944	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Bismuth-212	0.168	U	0.543	0.543		0.966	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Bismuth-214	0.376		0.115	0.122		0.0996	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Cesium-137	-0.000694	U	0.0428	0.0428		0.0808	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Lead-210	-0.231	U	0.915	0.915		1.59	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Lead-212	0.309		0.0760	0.0859		0.0731	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Lead-214	0.334		0.0989	0.105		0.109	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Potassium-40	10.0		1.50	1.81		0.549	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Protactinium-231	0.000	U	0.813	0.813		1.60	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Radium-226	0.376		0.115	0.122	0.500	0.0996	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Radium-228	0.215	U	0.167	0.169		0.294	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Thallium-208	0.0734		0.0498	0.0504		0.0657	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Thorium-228	0.309		0.0760	0.0859		0.0731	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Thorium-232	0.215	U	0.167	0.169		0.294	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Thorium-234	0.464	U	0.768	0.770		1.40	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Uranium-235	0.0716	U	0.144	0.144		0.236	pCi/g	03/28/16 12:37	04/18/16 12:12	1
Uranium-238	0.464	U	0.768	0.770		1.40	pCi/g	03/28/16 12:37	04/18/16 12:12	1

E-LAB CONSULTANTS
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17137-2

Client Sample ID: TITO04_RSY10_6P1-CH-S601

Lab Sample ID: 160-17137-1

Date Collected: 04/20/16 08:30

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.347		0.164	0.168		0.160	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Actinium-227	0.112	U	0.560	0.560		0.815	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Bismuth-212	0.508	U	1.06	1.06		1.79	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Bismuth-214	0.438		0.107	0.117		0.0789	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Cesium-137	0.000	U	0.0183	0.0183		0.117	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Lead-210	-0.410	U	1.28	1.28		1.95	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Lead-212	0.363		0.0854	0.0975		0.0989	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Lead-214	0.259		0.0949	0.0986		0.195	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Potassium-40	10.8		1.49	1.85		0.589	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Protactinium-231	0.290	U	0.865	0.866		2.86	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Radium-226	0.438		0.107	0.117	0.500	0.0789	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Radium-228	0.347		0.164	0.168		0.160	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Thallium-208	0.148		0.0418	0.0445		0.0218	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Thorium-228	0.363		0.0854	0.0975		0.0989	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Thorium-232	0.347		0.164	0.168		0.160	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Thorium-234	-0.101	U	0.933	0.933		1.61	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Uranium-235	-0.0216	U	0.322	0.322		0.509	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Uranium-238	-0.101	U	0.933	0.933		1.61	pCi/g	04/28/16 09:32	05/19/16 08:27	1

Client Sample ID: TITO04_RSY10_6P1-CH-S602

Lab Sample ID: 160-17137-2


Date Collected: 04/20/16 08:31

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.217	U	0.100	0.103		0.251	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Actinium-227	0.0457	U	0.521	0.521		1.24	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Bismuth-212	0.0304	U	0.703	0.703		1.27	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Bismuth-214	0.269		0.0964	0.100		0.0924	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Cesium-137	0.0241	U	0.0526	0.0526		0.0909	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Lead-210	-0.136	U	1.41	1.41		2.43	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Lead-212	0.309		0.0881	0.0968		0.107	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Lead-214	0.434		0.113	0.122		0.116	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Potassium-40	11.3		1.63	2.00		0.435	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Protactinium-231	0.0673	U	0.858	0.858		3.45	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Radium-226	0.269		0.0964	0.100	0.500	0.0924	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Radium-228	0.217	U	0.100	0.103		0.251	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Thallium-208	0.104		0.0430	0.0444		0.0416	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Thorium-228	0.309		0.0881	0.0968		0.107	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Thorium-232	0.217	U	0.100	0.103		0.251	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Thorium-234	0.133	U	0.348	0.348		2.36	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Uranium-235	0.158	U	0.378	0.378		0.783	pCi/g	04/28/16 09:32	05/19/16 08:27	1
Uranium-238	0.133	U	0.348	0.348		2.36	pCi/g	04/28/16 09:32	05/19/16 08:27	1


 This data has been validated
 according to the procedures
 noted in the attached Data
 Validation Report by E-Lab
 Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17137-2

Client Sample ID: TITO04_RSY10_6P1-CH-S603

Lab Sample ID: 160-17137-3

Date Collected: 04/20/16 08:35

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.272		0.217	0.219		0.250	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Actinium-227	-0.300	U	0.720	0.720		1.21	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Bismuth-212	0.0109	U	0.673	0.673		1.20	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Bismuth-214	0.539		0.112	0.125		0.0809	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Cesium-137	-0.0490	U	0.0658	0.0660		0.118	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Lead-210	-0.805	U	1.39	1.39		2.43	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Lead-212	0.304		0.0748	0.0845		0.0840	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Lead-214	0.368		0.0979	0.105		0.120	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Potassium-40	10.8		1.39	1.78		0.730	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Protactinium-231	0.000	U	0.406	0.406		3.66	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Radium-226	0.539		0.112	0.125	0.500	0.0809	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Radium-228	0.272		0.217	0.219		0.250	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Thallium-208	0.117		0.0471	0.0486		0.0502	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Thorium-228	0.304		0.0748	0.0845		0.0840	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Thorium-232	0.272		0.217	0.219		0.250	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Thorium-234	-0.228	U	1.28	1.28		2.20	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Uranium-235	-0.136	U	0.355	0.355		0.595	pCi/g	04/28/16 09:32	05/19/16 08:28	1
Uranium-238	-0.228	U	1.28	1.28		2.20	pCi/g	04/28/16 09:32	05/19/16 08:28	1

Client Sample ID: TITO04_RSY10_6P1-CH-S604

Lab Sample ID: 160-17137-4

Date Collected: 04/20/16 08:38

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.522		0.172	0.180		0.104	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Actinium-227	0.154	U	0.454	0.455		1.22	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Bismuth-212	0.203	U	0.424	0.424		0.744	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Bismuth-214	0.394		0.134	0.140		0.120	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Cesium-137	0.0163	U	0.0803	0.0803		0.139	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Lead-210	0.716	U	1.56	1.57		2.63	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Lead-212	0.308		0.0786	0.0882		0.0861	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Lead-214	0.312		0.115	0.119		0.115	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Potassium-40	12.5		1.73	2.15		0.699	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Protactinium-231	0.418	U	1.62	1.62		4.39	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Radium-226	0.394		0.134	0.140	0.500	0.120	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Radium-228	0.522		0.172	0.180		0.104	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Thallium-208	0.0994		0.0750	0.0757		0.0809	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Thorium-228	0.308		0.0786	0.0882		0.0861	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Thorium-232	0.522		0.172	0.180		0.104	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Thorium-234	0.0674	U	0.152	0.152		2.33	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Uranium-235	0.0915	U	0.430	0.430		0.842	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Uranium-238	0.0674	U	0.152	0.152		2.33	pCi/g	04/28/16 09:32	05/19/16 08:31	1

E-LAB CONSULTANTS
this data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17137-2

Client Sample ID: TITO04_RSY10_6P1-CH-S605

Lab Sample ID: 160-17137-5

Date Collected: 04/20/16 08:40

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.128	U	0.159	0.159		0.287	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Actinium-227	-0.251	U	0.598	0.598		1.01	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Bismuth-212	-0.0382	U	0.538	0.538		0.986	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Bismuth-214	0.329		0.0906	0.0968		0.0569	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Cesium-137	0.0109	U	0.0427	0.0428		0.0755	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Lead-210	0.0548	U	0.699	0.699		1.14	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Lead-212	0.266		0.0657	0.0742		0.0770	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Lead-214	0.392		0.0977	0.106		0.0777	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Potassium-40	9.29		1.33	1.64		0.570	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Protactinium-231	0.000	U	0.460	0.460		3.12	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Radium-226	0.329		0.0906	0.0968	0.500	0.0569	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Radium-228	0.128	U	0.159	0.159		0.287	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Thallium-208	0.0981		0.0364	0.0378		0.0316	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Thorium-228	0.266		0.0657	0.0742		0.0770	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Thorium-232	0.128	U	0.159	0.159		0.287	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Thorium-234	-0.0272	U	1.00	1.00		1.41	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Uranium-235	-0.112	U	0.191	0.191		0.375	pCi/g	04/28/16 09:32	05/19/16 08:32	1
Uranium-238	-0.0272	U	1.00	1.00		1.41	pCi/g	04/28/16 09:32	05/19/16 08:32	1

Client Sample ID: TITO04_RSY10_6P1-CH-S606

Lab Sample ID: 160-17137-6

Date Collected: 04/20/16 08:42

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.379		0.259	0.262		0.271	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Actinium-227	0.201	U	0.206	0.207		0.906	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Bismuth-212	0.161	U	0.970	0.970		1.71	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Bismuth-214	0.233		0.112	0.114		0.128	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Cesium-137	0.00652	U	0.0931	0.0931		0.163	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Lead-210	-0.582	U	1.36	1.36		2.10	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Lead-212	0.358		0.0829	0.0950		0.0785	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Lead-214	0.394		0.102	0.110		0.114	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Potassium-40	10.7		1.69	2.01		0.699	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Protactinium-231	0.000	U	0.257	0.257		3.11	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Radium-226	0.233		0.112	0.114	0.500	0.128	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Radium-228	0.379		0.259	0.262		0.271	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Thallium-208	0.156		0.0600	0.0622		0.0498	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Thorium-228	0.358		0.0829	0.0950		0.0785	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Thorium-232	0.379		0.259	0.262		0.271	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Thorium-234	-0.0983	U	1.01	1.01		1.76	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Uranium-235	-0.0195	U	0.461	0.461		0.585	pCi/g	04/28/16 09:32	05/19/16 08:30	1
Uranium-238	-0.0983	U	1.01	1.01		1.76	pCi/g	04/28/16 09:32	05/19/16 08:30	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17137-2

Client Sample ID: TITO04_RSY10_6P1-CH-S607

Lab Sample ID: 160-17137-7

Date Collected: 04/20/16 08:44

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0829	U	0.266	0.266		0.314	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Actinium-227	0.230	U	0.660	0.660		1.11	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Bismuth-212	0.246	U	0.458	0.459		0.783	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Bismuth-214	0.199	U	0.0966	0.0988		0.351	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Cesium-137	0.0218	U	0.0408	0.0409		0.0694	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Lead-210	0.145	U	1.15	1.15		1.95	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Lead-212	0.264		0.0717	0.0794		0.0854	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Lead-214	0.352		0.0938	0.101		0.124	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Potassium-40	10.4		1.35	1.72		0.721	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Protactinium-231	0.535	U	1.29	1.29		2.97	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Radium-226	0.199	U	0.0966	0.0988	0.500	0.351	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Radium-228	0.0829	U	0.266	0.266		0.314	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Thallium-208	0.0570		0.0415	0.0419		0.0539	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Thorium-228	0.264		0.0717	0.0794		0.0854	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Thorium-232	0.0829	U	0.266	0.266		0.314	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Thorium-234	-0.0400	U	1.03	1.03		1.76	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Uranium-235	0.121	U	0.290	0.290		0.451	pCi/g	04/28/16 09:32	05/19/16 08:31	1
Uranium-238	-0.0400	U	1.03	1.03		1.76	pCi/g	04/28/16 09:32	05/19/16 08:31	1

Client Sample ID: TITO04_RSY10_6P1-CH-S608

Lab Sample ID: 160-17137-8

Date Collected: 04/20/16 08:46

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.507		0.132	0.142		0.0754	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Actinium-227	0.207	U	0.719	0.719		1.21	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Bismuth-212	0.363	U	0.672	0.673		1.14	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Bismuth-214	0.286		0.116	0.120		0.120	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Cesium-137	-0.0446	U	0.0679	0.0680		0.114	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Lead-210	1.52	U	1.39	1.40		1.74	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Lead-212	0.301		0.0760	0.0854		0.0898	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Lead-214	0.381		0.0981	0.106		0.117	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Potassium-40	11.0		1.37	1.77		0.702	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Protactinium-231	-0.915	U	2.85	2.85		4.77	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Radium-226	0.286		0.116	0.120	0.500	0.120	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Radium-228	0.507		0.132	0.142		0.0754	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Thallium-208	0.0730	U	0.0801	0.0804		0.0744	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Thorium-228	0.301		0.0760	0.0854		0.0898	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Thorium-232	0.507		0.132	0.142		0.0754	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Thorium-234	-0.268	U	1.19	1.19		2.04	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Uranium-235	0.0685	U	0.167	0.167		0.720	pCi/g	04/28/16 09:32	05/19/16 09:14	1
Uranium-238	-0.268	U	1.19	1.19		2.04	pCi/g	04/28/16 09:32	05/19/16 09:14	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17137-2

Client Sample ID: TITO04_RSY10_6P1-CH-S609

Lab Sample ID: 160-17137-9

Date Collected: 04/20/16 08:48

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.356		0.125	0.130		0.251	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Actinium-227	-0.296	U	0.774	0.775		1.30	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Bismuth-212	-0.242	U	0.709	0.709		1.22	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Bismuth-214	0.328		0.118	0.123		0.103	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Cesium-137	-0.0188	U	0.0553	0.0553		0.105	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Lead-210	0.756	U	1.11	1.12		1.54	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Lead-212	0.328		0.0777	0.0885		0.0873	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Lead-214	0.336		0.0913	0.0978		0.118	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Potassium-40	9.92		1.35	1.69		0.742	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Protactinium-231	-0.702	U	2.41	2.42		4.06	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Radium-226	0.328		0.118	0.123	0.500	0.103	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Radium-228	0.356		0.125	0.130		0.251	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Thallium-208	0.140		0.0543	0.0562		0.0560	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Thorium-228	0.328		0.0777	0.0885		0.0873	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Thorium-232	0.356		0.125	0.130		0.251	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Thorium-234	-1.02	U	0.899	0.905		2.05	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Uranium-235	-0.0139	U	0.0706	0.0706		0.525	pCi/g	04/28/16 09:32	05/19/16 19:23	1
Uranium-238	-1.02	U	0.899	0.905		2.05	pCi/g	04/28/16 09:32	05/19/16 19:23	1

Client Sample ID: TITO04_RSY10_6P1-CH-S610

Lab Sample ID: 160-17137-10

Date Collected: 04/20/16 08:51

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.505		0.244	0.250		0.220	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Actinium-227	0.152	U	0.364	0.364		0.749	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Bismuth-212	-0.605	U	1.15	1.15		1.94	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Bismuth-214	0.421		0.141	0.148		0.141	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Cesium-137	0.000840	U	0.0679	0.0679		0.122	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Lead-210	1.67		1.26	1.27		1.65	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Lead-212	0.322		0.0875	0.0969		0.0958	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Lead-214	0.374		0.131	0.137		0.141	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Potassium-40	11.3		1.81	2.14		0.752	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Protactinium-231	-0.686	U	2.58	2.58		4.38	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Radium-226	0.421		0.141	0.148	0.500	0.141	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Radium-228	0.505		0.244	0.250		0.220	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Thallium-208	0.127		0.0562	0.0578		0.0492	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Thorium-228	0.322		0.0875	0.0969		0.0958	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Thorium-232	0.505		0.244	0.250		0.220	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Thorium-234	0.456	U	0.530	0.532		1.50	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Uranium-235	-0.0143	U	0.311	0.311		0.619	pCi/g	04/28/16 09:32	05/19/16 19:27	1
Uranium-238	0.456	U	0.530	0.532		1.50	pCi/g	04/28/16 09:32	05/19/16 19:27	1

E-LAB CONSULTANTS
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17137-2

Client Sample ID: TITO04_RSY10_6P1-CH-S611

Lab Sample ID: 160-17137-11

Date Collected: 04/20/16 08:53

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.386		0.103	0.110		0.0642	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Actinium-227	0.121	U	0.233	0.233		0.859	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Bismuth-212	0.210	U	0.377	0.378		0.643	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Bismuth-214	0.340		0.0883	0.0952		0.0733	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Cesium-137	-0.0290	U	0.0443	0.0444		0.0740	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Lead-210	-0.503	U	0.877	0.879		1.71	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Lead-212	0.339		0.0626	0.0764		0.0610	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Lead-214	0.312		0.0751	0.0818		0.0851	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Potassium-40	9.89		1.15	1.53		0.411	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Protactinium-231	0.483	U	1.30	1.30		2.95	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Radium-226	0.340		0.0883	0.0952	0.500	0.0733	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Radium-228	0.386		0.103	0.110		0.0642	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Thallium-208	0.0924		0.0356	0.0369		0.0357	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Thorium-228	0.339		0.0626	0.0764		0.0610	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Thorium-232	0.386		0.103	0.110		0.0642	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Thorium-234	-0.127	U	1.15	1.15		1.95	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Uranium-235	0.0419	U	0.154	0.154		0.577	pCi/g	04/28/16 09:32	05/19/16 09:07	1
Uranium-238	-0.127	U	1.15	1.15		1.95	pCi/g	04/28/16 09:32	05/19/16 09:07	1

Client Sample ID: TITO04_RSY10_6P1-CH-S612

Lab Sample ID: 160-17137-12

Date Collected: 04/20/16 08:56

Matrix: Solid

Date Received: 04/27/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.382		0.122	0.128		0.0722	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Actinium-227	-0.267	U	0.656	0.657		1.10	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Bismuth-212	0.238	U	0.598	0.598		1.03	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Bismuth-214	0.404		0.111	0.119		0.102	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Cesium-137	0.0219	U	0.0439	0.0440		0.0749	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Lead-210	0.215	U	0.880	0.880		1.41	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Lead-212	0.321		0.0734	0.0843		0.0826	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Lead-214	0.352		0.0883	0.0955		0.0902	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Potassium-40	10.6		1.30	1.69		0.508	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Protactinium-231	-0.237	U	2.05	2.05		3.48	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Radium-226	0.404		0.111	0.119	0.500	0.102	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Radium-228	0.382		0.122	0.128		0.0722	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Thallium-208	0.0560	U	0.0771	0.0773		0.0858	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Thorium-228	0.321		0.0734	0.0843		0.0826	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Thorium-232	0.382		0.122	0.128		0.0722	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Thorium-234	-0.0427	U	0.289	0.289		1.92	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Uranium-235	0.0596	U	0.165	0.165		0.716	pCi/g	04/28/16 09:32	05/19/16 09:06	1
Uranium-238	-0.0427	U	0.289	0.289		1.92	pCi/g	04/28/16 09:32	05/19/16 09:06	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-1

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S001

Lab Sample ID: 160-17240-1

Date Collected: 05/03/16 09:18

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.494	U	1.05	1.05		1.77	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Actinium 228	0.517		0.250	0.256		0.247	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Bismuth-212	-0.0118	U	1.07	1.07		1.93	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Bismuth-214	0.550		0.158	0.168		0.128	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Lead-210	-1.03	U	2.54	2.54		4.27	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Lead-212	0.702		0.136	0.163		0.140	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Lead-214	0.653		0.188	0.199		0.178	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Potassium-40	12.9		2.07	2.45		0.958	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Protactinium-231	0.872	U	2.39	2.39		5.46	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Radium-226	0.550		0.158	0.168	0.500	0.128	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Radium-228	0.517		0.250	0.256		0.247	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Thorium-232	0.517		0.250	0.256		0.247	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Thorium-234	0.549	U	0.477	0.480		3.54	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Thallium-208	0.163		0.116	0.118		0.137	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Uranium-235	0.0374	U	0.0335	0.0337		1.18	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Uranium-238	0.549	U	0.477	0.480		3.54	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Cesium-137	-0.0885	U	0.0997	0.100		0.229	pCi/g	05/06/16 09:55	05/16/16 11:50	1
Thorium-228	0.702		0.136	0.163		0.140	pCi/g	05/06/16 09:55	05/16/16 11:50	1

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S002

Lab Sample ID: 160-17240-2

Date Collected: 05/03/16 09:26

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.338	U	0.900	0.901		1.51	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Actinium 228	0.665		0.169	0.182		0.202	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Bismuth-212	0.0180	U	0.916	0.916		1.63	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Bismuth-214	0.599		0.136	0.149		0.0755	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Lead-210	1.67	U	1.33	1.35		1.76	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Lead-212	0.628		0.106	0.134		0.106	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Lead-214	0.647		0.122	0.139		0.142	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Potassium-40	13.6		1.87	2.33		0.769	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Protactinium-231	0.368	U	1.19	1.19		3.96	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Radium-226	0.599		0.136	0.149	0.500	0.0755	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Radium-228	0.665		0.169	0.182		0.202	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Thorium-232	0.665		0.169	0.182		0.202	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Thorium-234	1.38	U	0.974	0.984		1.52	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Thallium-208	0.271		0.0682	0.0738		0.0456	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Uranium-235	-0.0135	U	0.0233	0.0234		0.841	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Uranium-238	1.38	U	0.974	0.984		1.52	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Cesium-137	0.0247	U	0.0516	0.0516		0.0888	pCi/g	05/06/16 09:55	05/16/16 11:48	1
Thorium-228	0.628		0.106	0.134		0.106	pCi/g	05/06/16 09:55	05/16/16 11:48	1

LAB CONSULTANTS
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-1

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S003

Lab Sample ID: 160-17240-3

Date Collected: 05/03/16 09:35

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.207	U	0.448	0.448		1.32	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Actinium 228	0.714		0.250	0.260		0.422	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Bismuth-212	0.466	U	1.02	1.03		1.76	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Bismuth-214	0.236	U	0.161	0.163		0.429	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Lead-210	0.877	U	1.68	1.68		2.46	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Lead-212	0.682		0.135	0.161		0.135	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Lead-214	0.799		0.161	0.181		0.189	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Potassium-40	14.1		2.22	2.65		0.915	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Protactinium-231	0.000	U	0.532	0.532		5.84	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Radium-226	0.236	U	0.161	0.163	0.500	0.429	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Radium-228	0.714		0.250	0.260		0.422	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Thorium-232	0.714		0.250	0.260		0.422	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Thorium-234	1.06	U	1.31	1.31		2.14	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Thallium-208	0.289		0.0856	0.0907		0.0652	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Uranium-235	0.159	U	0.460	0.460		0.717	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Uranium-238	1.06	U	1.31	1.31		2.14	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Cesium-137	-0.00490	U	0.0612	0.0612		0.0964	pCi/g	05/06/16 09:55	05/16/16 11:47	1
Thorium-228	0.682		0.135	0.161		0.135	pCi/g	05/06/16 09:55	05/16/16 11:47	1

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S004

Lab Sample ID: 160-17240-4

Date Collected: 05/03/16 09:48

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.384	U	1.02	1.02		1.72	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Actinium 228	0.640		0.187	0.198		0.212	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Bismuth-212	1.14		0.531	0.544		0.460	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Bismuth-214	0.586		0.157	0.168		0.139	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Lead-210	0.911	U	1.25	1.26		1.83	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Lead-212	0.627		0.118	0.143		0.127	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Lead-214	0.623		0.141	0.155		0.123	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Potassium-40	14.1		1.79	2.30		0.935	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Protactinium-231	0.405	U	1.42	1.42		4.58	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Radium-226	0.586		0.157	0.168	0.500	0.139	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Radium-228	0.640		0.187	0.198		0.212	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Thorium-232	0.640		0.187	0.198		0.212	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Thorium-234	0.662	U	0.684	0.687		1.84	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Thallium-208	0.216		0.0868	0.0896		0.0915	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Uranium-235	0.101	U	0.154	0.154		0.759	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Uranium-238	0.662	U	0.684	0.687		1.84	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Cesium-137	0.0195	U	0.0543	0.0544		0.0946	pCi/g	05/06/16 09:55	05/16/16 11:40	1
Thorium-228	0.627		0.118	0.143		0.127	pCi/g	05/06/16 09:55	05/16/16 11:40	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-1

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S005

Lab Sample ID: 160-17240-5

Date Collected: 05/03/16 09:58

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.470	U	1.18	1.18		1.97	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Actinium 228	0.816		0.154	0.175		0.101	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Bismuth-212	0.377	U	0.929	0.930		1.59	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Bismuth-214	0.549		0.151	0.161		0.169	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Lead-210	1.21	U	1.72	1.73		2.36	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Lead-212	0.656		0.119	0.146		0.124	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Lead-214	0.709		0.136	0.154		0.170	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Potassium-40	12.6		1.68	2.12		0.710	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Protactinium-231	0.831	U	1.85	1.86		4.25	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Radium-226	0.549		0.151	0.161	0.500	0.169	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Radium-228	0.816		0.154	0.175		0.101	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Thorium-232	0.816		0.154	0.175		0.101	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Thorium-234	1.82		1.39	1.40		1.79	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Thallium-208	0.300		0.0679	0.0747		0.0487	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Uranium-235	0.111	U	0.241	0.241		0.954	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Uranium-238	1.82		1.39	1.40		1.79	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Cesium-137	-0.0599	U	0.0869	0.0872		0.166	pCi/g	05/06/16 09:55	05/16/16 12:16	1
Thorium-228	0.656		0.119	0.146		0.124	pCi/g	05/06/16 09:55	05/16/16 12:16	1



TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-2

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S001

Lab Sample ID: 160-17240-1

Date Collected: 05/03/16 09:18

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.388	U	0.323	0.326		0.404	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Actinium-227	-0.186	U	0.900	0.901		1.30	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Bismuth-212	0.432	U	1.01	1.01		1.74	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Bismuth-214	0.846		0.207	0.225		0.173	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Cesium-137	0.00154	U	0.0802	0.0802		0.144	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Lead-210	1.45	U	1.60	1.61		2.18	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Lead-212	0.721		0.134	0.163		0.138	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Lead-214	0.627		0.135	0.150		0.160	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Potassium-40	13.8		2.01	2.46		0.841	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Protactinium-231	0.000	U	0.511	0.511		4.69	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Radium-226	0.846		0.207	0.225	0.500	0.173	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Radium-228	0.388	U	0.323	0.326		0.404	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Thallium-208	0.302		0.0756	0.0818		0.0425	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Thorium-228	0.721		0.134	0.163		0.138	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Thorium-232	0.388	U	0.323	0.326		0.404	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Thorium-234	0.392	U	1.40	1.40		2.36	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Uranium-235	0.0999	U	0.339	0.339		0.707	pCi/g	05/06/16 09:55	05/30/16 20:54	1
Uranium-238	0.392	U	1.40	1.40		2.36	pCi/g	05/06/16 09:55	05/30/16 20:54	1

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S002

Lab Sample ID: 160-17240-2

Date Collected: 05/03/16 09:26

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.05		0.281	0.301		0.138	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Actinium-227	-0.495	U	1.22	1.22		2.04	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Bismuth-212	0.315	U	0.810	0.810		1.42	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Bismuth-214	0.629		0.166	0.179		0.121	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Cesium-137	0.00488	U	0.0779	0.0779		0.140	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Lead-210	1.66	U	1.81	1.82		2.31	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Lead-212	0.662		0.132	0.157		0.137	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Lead-214	0.752		0.176	0.193		0.183	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Potassium-40	14.4		2.11	2.58		0.569	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Protactinium-231	0.392	U	1.64	1.65		5.33	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Radium-226	0.629		0.166	0.179	0.500	0.121	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Radium-228	1.05		0.281	0.301		0.138	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Thallium-208	0.218		0.0748	0.0782		0.0681	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Thorium-228	0.662		0.132	0.157		0.137	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Thorium-232	1.05		0.281	0.301		0.138	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Thorium-234	-0.982	U	1.45	1.45		3.49	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Uranium-235	0.115	U	0.242	0.242		1.15	pCi/g	05/06/16 09:55	05/30/16 20:55	1
Uranium-238	-0.982	U	1.45	1.45		3.49	pCi/g	05/06/16 09:55	05/30/16 20:55	1

LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-2

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S003

Lab Sample ID: 160-17240-3

Date Collected: 05/03/16 09:35

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.352		0.191	0.194		0.350	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Actinium-227	-0.422	U	1.05	1.05		1.76	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Bismuth-212	0.226	U	0.836	0.837		1.46	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Bismuth-214	0.629		0.167	0.179		0.146	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Cesium-137	-0.0648	U	0.0639	0.0643		0.178	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Lead-210	-0.195	U	1.89	1.89		3.24	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Lead-212	0.614		0.174	0.192		0.181	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Lead-214	0.800		0.191	0.208		0.244	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Potassium-40	14.6		1.82	2.36		0.935	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Protactinium-231	0.0000001	U	2.98	2.98		5.07	pCi/g	05/06/16 09:55	05/30/16 20:58	1
	16									
Radium-226	0.629		0.167	0.179	0.500	0.146	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Radium-228	0.352		0.191	0.194		0.350	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Thallium-208	0.285		0.0960	0.100		0.0975	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Thorium-228	0.614		0.174	0.192		0.181	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Thorium-232	0.352		0.191	0.194		0.350	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Thorium-234	0.761	U	1.43	1.43		2.38	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Uranium-235	0.131	U	0.391	0.391		0.688	pCi/g	05/06/16 09:55	05/30/16 20:58	1
Uranium-238	0.761	U	1.43	1.43		2.38	pCi/g	05/06/16 09:55	05/30/16 20:58	1

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S004

Lab Sample ID: 160-17240-4


Date Collected: 05/03/16 09:48

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.720		0.456	0.462		0.479	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Actinium-227	0.209	U	0.600	0.600		1.19	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Bismuth-212	-0.411	U	1.32	1.32		2.29	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Bismuth-214	0.624		0.226	0.235		0.221	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Cesium-137	0.00648	U	0.104	0.104		0.183	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Lead-210	-0.00848	U	2.00	2.00		2.97	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Lead-212	0.628		0.134	0.156		0.142	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Lead-214	0.920		0.187	0.210		0.179	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Potassium-40	12.1		2.07	2.41		0.915	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Protactinium-231	0.000	U	0.532	0.532		5.01	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Radium-226	0.624		0.226	0.235	0.500	0.221	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Radium-228	0.720		0.456	0.462		0.479	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Thallium-208	0.311		0.0928	0.0983		0.0754	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Thorium-228	0.628		0.134	0.156		0.142	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Thorium-232	0.720		0.456	0.462		0.479	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Thorium-234	-0.0406	U	1.38	1.38		2.39	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Uranium-235	-0.0857	U	0.630	0.630		0.866	pCi/g	05/06/16 09:55	05/30/16 20:56	1
Uranium-238	-0.0406	U	1.38	1.38		2.39	pCi/g	05/06/16 09:55	05/30/16 20:56	1



 This data has been validated
 according to the procedures
 noted in the attached Data
 Validation Report by E-Lab
 Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Environmental & Infrastructure, Inc
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-17240-2

Client Sample ID: TITO04-NP-FSS SU5-LLRO518CH-S005

Lab Sample ID: 160-17240-5

Date Collected: 05/03/16 09:58

Matrix: Solid

Date Received: 05/05/16 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.864		0.199	0.217		0.318	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Actinium-227	-0.394	U	1.00	1.00		1.68	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Bismuth-212	0.229	U	0.826	0.827		1.44	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Bismuth-214	0.593		0.137	0.150		0.0772	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Cesium-137	-0.00103	U	0.0674	0.0674		0.0881	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Lead-210	1.01	U	1.25	1.25		1.77	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Lead-212	0.572		0.112	0.134		0.128	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Lead-214	0.657		0.138	0.154		0.101	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Potassium-40	12.0		1.78	2.16		0.787	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Protactinium-231	0.757	U	1.78	1.79		4.08	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Radium-226	0.593		0.137	0.150	0.500	0.0772	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Radium-228	0.864		0.199	0.217		0.318	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Thallium-208	0.256		0.0681	0.0731		0.0473	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Thorium-228	0.572		0.112	0.134		0.128	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Thorium-232	0.864		0.199	0.217		0.318	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Thorium-234	-0.708	U	1.43	1.44		2.20	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Uranium-235	-0.181	U	0.268	0.268		0.962	pCi/g	05/06/16 09:55	05/30/16 20:57	1
Uranium-238	-0.708	U	1.43	1.44		2.20	pCi/g	05/06/16 09:55	05/30/16 20:57	1



TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19854-2

Client Sample ID: TITO04-BS-SU3RSY11-U6-S601

Lab Sample ID: 160-19854-1

Date Collected: 11/02/16 15:58

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.465		0.170	0.176		0.267	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Actinium-227	0.289	U	0.517	0.518		1.41	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Bismuth-212	1.12		0.466	0.480		0.358	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Bismuth-214	0.337		0.118	0.123		0.120	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Cesium-137	0.0391	U	0.0763	0.0765		0.130	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Lead-210	-1.94	U	1.37	1.39		3.18	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Lead-212	0.342		0.0900	0.100		0.103	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Lead-214	0.441		0.130	0.138		0.129	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Potassium-40	9.30		1.58	1.84		0.771	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Protactinium-231	0.000	U	0.870	0.870		4.62	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Radium-226	0.337		0.118	0.123	0.500	0.120	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Radium-228	0.465		0.170	0.176		0.267	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Thallium-208	0.152		0.0468	0.0494		0.0266	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Thorium-228	0.342		0.0900	0.100		0.103	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Thorium-232	0.465		0.170	0.176		0.267	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Thorium-234	-0.559	U	1.16	1.17		2.05	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Uranium-235	0.00335	U	0.0618	0.0618		0.946	pCi/g	11/07/16 10:15	11/28/16 15:05	1
Uranium-238	-0.559	U	1.16	1.17		2.05	pCi/g	11/07/16 10:15	11/28/16 15:05	1

Client Sample ID: TITO04-BS-SU3RSY11-U6-S602

Lab Sample ID: 160-19854-2

Date Collected: 11/02/16 15:57

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.134	U	0.169	0.169		0.257	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Actinium-227	0.250	U	0.711	0.712		1.20	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Bismuth-212	0.0237	U	0.616	0.616		1.11	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Bismuth-214	0.156	U	0.115	0.116		0.321	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Cesium-137	0.00447	U	0.0577	0.0577		0.102	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Lead-210	1.54	U	1.30	1.32		1.73	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Lead-212	0.302		0.0824	0.0912		0.103	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Lead-214	0.297		0.113	0.117		0.144	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Potassium-40	11.8		1.46	1.89		0.722	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Protactinium-231	0.0553	U	0.773	0.773		3.46	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Radium-226	0.156	U	0.115	0.116	0.500	0.321	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Radium-228	0.134	U	0.169	0.169		0.257	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Thallium-208	0.0798	U	0.0867	0.0871		0.0839	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Thorium-228	0.302		0.0824	0.0912		0.103	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Thorium-232	0.134	U	0.169	0.169		0.257	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Thorium-234	-1.34	U	1.33	1.34		2.46	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Uranium-235	0.207	U	0.287	0.288		0.697	pCi/g	11/07/16 10:15	11/28/16 15:06	1
Uranium-238	-1.34	U	1.33	1.34		2.46	pCi/g	11/07/16 10:15	11/28/16 15:06	1

LAB CONSULTANTS
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19854-2

Client Sample ID: TITO04-BS-SU3RSY11-U6-S603

Lab Sample ID: 160-19854-3

Date Collected: 11/02/16 15:55

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.186	U	0.105	0.106		0.367	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Actinium-227	0.260	U	0.580	0.581		0.833	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Bismuth-212	0.254	U	0.670	0.671		1.16	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Bismuth-214	0.350		0.142	0.147		0.147	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Cesium-137	0.000	U	0.00890	0.00890		0.0982	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Lead-210	0.875	U	1.46	1.46		2.04	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Lead-212	0.269		0.0775	0.0849		0.0942	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Lead-214	0.366		0.111	0.117		0.119	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Potassium-40	11.5		1.50	1.90		0.692	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Protactinium-231	0.000	U	0.474	0.474		3.51	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Radium-226	0.350		0.142	0.147	0.500	0.147	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Radium-228	0.186	U	0.105	0.106		0.367	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Thallium-208	0.124		0.0476	0.0493		0.0482	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Thorium-228	0.269		0.0775	0.0849		0.0942	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Thorium-232	0.186	U	0.105	0.106		0.367	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Thorium-234	0.658	U	1.25	1.25		2.08	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Uranium-235	0.0533	U	0.302	0.302		0.515	pCi/g	11/07/16 10:15	11/28/16 15:07	1
Uranium-238	0.658	U	1.25	1.25		2.08	pCi/g	11/07/16 10:15	11/28/16 15:07	1

Client Sample ID: TITO04-BS-SU3RSY11-U6-S604

Lab Sample ID: 160-19854-4

Date Collected: 11/02/16 15:56

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.181	U	0.154	0.155		0.207	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Actinium-227	-0.266	U	0.557	0.558		0.716	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Bismuth-212	-0.233	U	0.580	0.580		0.992	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Bismuth-214	0.262		0.0900	0.0941		0.0936	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Cesium-137	-0.0195	U	0.0246	0.0247		0.0890	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Lead-210	0.0318	U	0.954	0.954		1.65	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Lead-212	0.259		0.0599	0.0687		0.0669	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Lead-214	0.240		0.0753	0.0794		0.0982	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Potassium-40	10.2		1.26	1.64		0.601	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Protactinium-231	-0.606	U	1.92	1.92		3.23	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Radium-226	0.262		0.0900	0.0941	0.500	0.0936	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Radium-228	0.181	U	0.154	0.155		0.207	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Thallium-208	0.147		0.0355	0.0387		0.0153	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Thorium-228	0.259		0.0599	0.0687		0.0669	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Thorium-232	0.181	U	0.154	0.155		0.207	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Thorium-234	-0.529	U	1.10	1.10		1.84	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Uranium-235	-0.0324	U	0.0532	0.0533		0.662	pCi/g	11/07/16 10:15	11/28/16 15:08	1
Uranium-238	-0.529	U	1.10	1.10		1.84	pCi/g	11/07/16 10:15	11/28/16 15:08	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19854-2

Client Sample ID: TITO04-BS-SU3RSY11-U6-S605

Lab Sample ID: 160-19854-5

Date Collected: 11/02/16 15:54

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.368		0.183	0.186		0.163	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Actinium-227	-0.377	U	0.810	0.811		1.36	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Bismuth-212	0.430	U	0.744	0.745		1.26	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Bismuth-214	0.320		0.122	0.127		0.128	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Cesium-137	-0.0333	U	0.0679	0.0680		0.116	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Lead-210	-0.577	U	1.44	1.44		2.53	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Lead-212	0.225		0.0801	0.0853		0.103	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Lead-214	0.392		0.106	0.114		0.108	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Potassium-40	10.4		1.64	1.95		0.745	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Protactinium-231	-0.929	U	2.99	2.99		5.03	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Radium-226	0.320		0.122	0.127	0.500	0.128	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Radium-228	0.368		0.183	0.186		0.163	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Thallium-208	0.150		0.0458	0.0484		0.0257	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Thorium-228	0.225		0.0801	0.0853		0.103	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Thorium-232	0.368		0.183	0.186		0.163	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Thorium-234	0.431	U	0.321	0.324		2.26	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Uranium-235	-0.210	U	0.285	0.285		0.966	pCi/g	11/07/16 10:15	11/28/16 15:44	1
Uranium-238	0.431	U	0.321	0.324		2.26	pCi/g	11/07/16 10:15	11/28/16 15:44	1

Client Sample ID: TITO04-BS-SU3RSY11-U6-S606

Lab Sample ID: 160-19854-6

Date Collected: 11/02/16 15:53

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.145	U	0.236	0.236		0.262	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Actinium-227	0.237	U	0.663	0.664		1.12	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Bismuth-212	-0.0976	U	0.665	0.665		1.17	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Bismuth-214	0.343		0.0979	0.104		0.101	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Cesium-137	-0.0151	U	0.0595	0.0595		0.122	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Lead-210	-0.664	U	1.35	1.35		2.35	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Lead-212	0.213		0.0729	0.0779		0.0980	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Lead-214	0.402		0.125	0.132		0.122	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Potassium-40	10.9		1.35	1.75		0.666	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Protactinium-231	0.0000000	U	2.09	2.09		3.56	pCi/g	11/07/16 10:15	11/28/16 15:47	1
	43									
Radium-226	0.343		0.0979	0.104	0.500	0.101	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Radium-228	0.145	U	0.236	0.236		0.262	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Thallium-208	0.122		0.0454	0.0471		0.0448	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Thorium-228	0.213		0.0729	0.0779		0.0980	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Thorium-232	0.145	U	0.236	0.236		0.262	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Thorium-234	-0.130	U	1.28	1.28		2.18	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Uranium-235	0.106	U	0.213	0.214		0.720	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Uranium-238	-0.130	U	1.28	1.28		2.18	pCi/g	11/07/16 10:15	11/28/16 15:47	1

LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19854-2

Client Sample ID: TITO04-BS-SU3RSY11-U6-S607

Lab Sample ID: 160-19854-7

Date Collected: 11/02/16 15:53

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.280		0.106	0.110		0.245	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Actinium-227	0.0749	U	0.592	0.593		0.864	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Bismuth-212	-0.255	U	0.761	0.762		1.31	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Bismuth-214	0.349		0.107	0.113		0.104	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Cesium-137	0.00287	U	0.0490	0.0491		0.0880	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Lead-210	1.45	U	1.43	1.44		1.93	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Lead-212	0.243		0.0713	0.0779		0.0878	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Lead-214	0.310		0.0924	0.0979		0.116	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Potassium-40	10.3		1.35	1.72		0.631	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Protactinium-231	0.000	U	0.530	0.530		3.15	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Radium-226	0.349		0.107	0.113	0.500	0.104	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Radium-228	0.280		0.106	0.110		0.245	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Thallium-208	0.111		0.0500	0.0513		0.0503	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Thorium-228	0.243		0.0713	0.0779		0.0878	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Thorium-232	0.280		0.106	0.110		0.245	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Thorium-234	-0.505	U	1.08	1.08		1.89	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Uranium-235	0.0802	U	0.281	0.281		0.502	pCi/g	11/07/16 10:15	11/28/16 15:49	1
Uranium-238	-0.505	U	1.08	1.08		1.89	pCi/g	11/07/16 10:15	11/28/16 15:49	1

Client Sample ID: TITO04-BS-SU3RSY11-U6-S608

Lab Sample ID: 160-19854-8

Date Collected: 11/02/16 15:52

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.105	U	0.215	0.215		0.347	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Actinium-227	0.130	U	0.456	0.456		0.849	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Bismuth-212	-0.0548	U	0.884	0.884		1.59	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Bismuth-214	0.332		0.156	0.160		0.156	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Cesium-137	-0.0784	U	0.0834	0.0838		0.175	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Lead-210	0.627	U	0.854	0.857		1.33	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Lead-212	0.313		0.0880	0.0969		0.100	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Lead-214	0.0922	U	0.0620	0.0627		0.266	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Potassium-40	11.8		1.85	2.21		0.758	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Protactinium-231	0.000	U	0.758	0.758		4.49	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Radium-226	0.332		0.156	0.160	0.500	0.156	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Radium-228	0.105	U	0.215	0.215		0.347	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Thallium-208	0.132		0.0604	0.0620		0.0601	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Thorium-228	0.313		0.0880	0.0969		0.100	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Thorium-232	0.105	U	0.215	0.215		0.347	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Thorium-234	-0.454	U	1.13	1.14		2.01	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Uranium-235	0.0391	U	0.130	0.130		0.584	pCi/g	11/07/16 10:15	11/28/16 15:45	1
Uranium-238	-0.454	U	1.13	1.14		2.01	pCi/g	11/07/16 10:15	11/28/16 15:45	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19854-2

Client Sample ID: TITO04-BS-SU3RSY11-U6-S609

Lab Sample ID: 160-19854-9

Date Collected: 11/02/16 15:47

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.288	U	0.200	0.202		0.291	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Actinium-227	-0.241	U	0.590	0.591		0.798	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Bismuth-212	-0.261	U	0.670	0.670		1.15	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Bismuth-214	0.303		0.0820	0.0879		0.0577	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Cesium-137	-0.0454	U	0.0764	0.0765		0.128	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Lead-210	0.0208	U	1.09	1.09		1.88	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Lead-212	0.274		0.0650	0.0740		0.0731	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Lead-214	0.314		0.0785	0.0850		0.0935	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Potassium-40	11.0		1.45	1.84		0.530	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Protactinium-231	0.393	U	1.00	1.00		2.33	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Radium-226	0.303		0.0820	0.0879	0.500	0.0577	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Radium-228	0.288	U	0.200	0.202		0.291	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Thallium-208	0.0817		0.0624	0.0630		0.0652	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Thorium-228	0.274		0.0650	0.0740		0.0731	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Thorium-232	0.288	U	0.200	0.202		0.291	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Thorium-234	-0.0509	U	0.757	0.757		1.31	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Uranium-235	-0.135	U	0.164	0.164		0.666	pCi/g	11/07/16 10:15	11/28/16 15:46	1
Uranium-238	-0.0509	U	0.757	0.757		1.31	pCi/g	11/07/16 10:15	11/28/16 15:46	1

Client Sample ID: TITO04-BS-SU3RSY11-U6-S610

Lab Sample ID: 160-19854-10

Date Collected: 11/02/16 15:49

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.196	U	0.180	0.181		0.233	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Actinium-227	0.356	U	0.346	0.348		1.05	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Bismuth-212	0.394	U	0.700	0.701		1.19	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Bismuth-214	0.336		0.110	0.115		0.0957	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Cesium-137	-0.0725	U	0.111	0.111		0.144	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Lead-210	-0.860	U	1.87	1.87		3.13	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Lead-212	0.252		0.0780	0.0845		0.0971	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Lead-214	0.342		0.106	0.112		0.115	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Potassium-40	9.87		1.51	1.82		0.580	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Protactinium-231	0.000	U	0.317	0.317		4.15	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Radium-226	0.336		0.110	0.115	0.500	0.0957	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Radium-228	0.196	U	0.180	0.181		0.233	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Thallium-208	0.111		0.0970	0.0977		0.0841	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Thorium-228	0.252		0.0780	0.0845		0.0971	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Thorium-232	0.196	U	0.180	0.181		0.233	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Thorium-234	0.478	U	0.470	0.472		1.18	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Uranium-235	-0.0603	U	0.263	0.263		0.710	pCi/g	11/07/16 10:15	11/28/16 15:47	1
Uranium-238	0.478	U	0.470	0.472		1.18	pCi/g	11/07/16 10:15	11/28/16 15:47	1

E-LAB CONSULTANTS
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19854-2

Client Sample ID: TITO04-BS-SU3RSY11-U6-S611

Lab Sample ID: 160-19854-11

Date Collected: 11/02/16 15:48

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.379		0.0992	0.106		0.0667	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Actinium-227	0.262	U	0.573	0.574		0.963	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Bismuth-212	-0.385	U	0.671	0.672		1.13	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Bismuth-214	0.262		0.0929	0.0968		0.0958	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Cesium-137	0.00161	U	0.0390	0.0390		0.0705	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Lead-210	-0.656	U	1.26	1.26		2.10	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Lead-212	0.301		0.0638	0.0748		0.0643	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Lead-214	0.330		0.0974	0.103		0.106	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Potassium-40	11.1		1.29	1.72		0.559	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Protactinium-231	0.000	U	0.115	0.115		3.51	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Radium-226	0.262		0.0929	0.0968	0.500	0.0958	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Radium-228	0.379		0.0992	0.106		0.0667	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Thallium-208	0.137		0.0349	0.0377		0.0163	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Thorium-228	0.301		0.0638	0.0748		0.0643	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Thorium-232	0.379		0.0992	0.106		0.0667	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Thorium-234	-0.571	U	1.11	1.11		1.98	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Uranium-235	0.158	U	0.304	0.304		0.679	pCi/g	11/07/16 10:15	11/28/16 16:17	1
Uranium-238	-0.571	U	1.11	1.11		1.98	pCi/g	11/07/16 10:15	11/28/16 16:17	1

Client Sample ID: TITO04-BS-SU3RSY11-U6-S612

Lab Sample ID: 160-19854-12

Date Collected: 11/02/16 15:50

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.110	U	0.209	0.210		0.381	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Actinium-227	-0.292	U	0.783	0.784		1.32	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Bismuth-212	0.000	U	0.356	0.356		1.26	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Bismuth-214	0.336		0.126	0.130		0.125	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Cesium-137	-0.0321	U	0.0725	0.0726		0.111	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Lead-210	0.0842	U	0.947	0.947		1.63	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Lead-212	0.266		0.0814	0.0883		0.105	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Lead-214	0.259		0.107	0.110		0.121	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Potassium-40	10.2		1.37	1.72		0.589	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Protactinium-231	-0.810	U	2.76	2.76		4.63	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Radium-226	0.336		0.126	0.130	0.500	0.125	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Radium-228	0.110	U	0.209	0.210		0.381	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Thallium-208	0.136		0.0520	0.0538		0.0535	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Thorium-228	0.266		0.0814	0.0883		0.105	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Thorium-232	0.110	U	0.209	0.210		0.381	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Thorium-234	0.719	U	0.855	0.858		1.27	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Uranium-235	0.0307	U	0.145	0.145		0.498	pCi/g	11/07/16 10:15	11/28/16 16:18	1
Uranium-238	0.719	U	0.855	0.858		1.27	pCi/g	11/07/16 10:15	11/28/16 16:18	1


E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19854-2

Client Sample ID: TITO04-BS-SU3RSY11-U6-S613

Lab Sample ID: 160-19854-13

Date Collected: 11/02/16 15:51

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.283		0.186	0.188		0.194	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Actinium-227	-0.0310	U	0.0535	0.0536		1.00	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Bismuth-212	-0.00968	U	0.475	0.475		0.860	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Bismuth-214	0.289		0.0896	0.0945		0.0904	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Cesium-137	0.0286	U	0.0504	0.0505		0.0849	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Lead-210	-0.162	U	1.06	1.06		1.81	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Lead-212	0.288		0.0593	0.0701		0.0557	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Lead-214	0.261		0.0715	0.0765		0.0903	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Potassium-40	10.5		1.24	1.64		0.453	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Protactinium-231	0.457	U	1.55	1.55		3.23	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Radium-226	0.289		0.0896	0.0945	0.500	0.0904	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Radium-228	0.283		0.186	0.188		0.194	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Thallium-208	0.104		0.0405	0.0419		0.0376	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Thorium-228	0.288		0.0593	0.0701		0.0557	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Thorium-232	0.283		0.186	0.188		0.194	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Thorium-234	-0.0564	U	1.25	1.25		2.12	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Uranium-235	0.159	U	0.270	0.270		0.464	pCi/g	11/07/16 10:15	11/28/16 16:19	1
Uranium-238	-0.0564	U	1.25	1.25		2.12	pCi/g	11/07/16 10:15	11/28/16 16:19	1

Client Sample ID: TITO04-BS-SU3RSY11-U6-S614

Lab Sample ID: 160-19854-14

Date Collected: 11/02/16 15:45

Matrix: Solid

Date Received: 11/04/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.453		0.160	0.167		0.104	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Actinium-227	0.220	U	0.416	0.417		1.04	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Bismuth-212	-0.475	U	0.931	0.932		1.58	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Bismuth-214	0.341		0.142	0.147		0.140	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Cesium-137	0.00900	U	0.0497	0.0497		0.0896	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Lead-210	-1.03	U	1.27	1.27		2.95	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Lead-212	0.246		0.0770	0.0833		0.0933	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Lead-214	0.372		0.0978	0.105		0.107	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Potassium-40	8.66		1.46	1.71		0.713	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Protactinium-231	-0.616	U	2.64	2.64		4.46	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Radium-226	0.341		0.142	0.147	0.500	0.140	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Radium-228	0.453		0.160	0.167		0.104	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Thallium-208	0.0415	U	0.0782	0.0784		0.101	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Thorium-228	0.246		0.0770	0.0833		0.0933	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Thorium-232	0.453		0.160	0.167		0.104	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Thorium-234	-1.16	U	1.04	1.04		2.37	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Uranium-235	0.0496	U	0.164	0.164		0.759	pCi/g	11/07/16 10:15	11/28/16 16:20	1
Uranium-238	-1.16	U	1.04	1.04		2.37	pCi/g	11/07/16 10:15	11/28/16 16:20	1


E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-2

Client Sample ID: TITO04-NP-SU5-SWFSS-5-13-S001

Lab Sample ID: 160-19909-1

Date Collected: 10/24/16 09:45

Matrix: Solid

Date Received: 11/09/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.06		0.232	0.256		0.362	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Actinium-227	0.119	U	0.258	0.258		1.27	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Bismuth-212	0.000	U	0.915	0.915		1.95	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Bismuth-214	1.13		0.197	0.230		0.127	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Cesium-137	-0.0413	U	0.0857	0.0858		0.145	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Lead-210	-0.0770	U	1.91	1.91		3.25	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Lead-212	0.878		0.138	0.179		0.143	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Lead-214	1.11		0.180	0.214		0.148	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Potassium-40	5.61		1.25	1.38		0.774	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Protactinium-231	-1.15	U	3.63	3.63		6.09	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Radium-226	1.13		0.197	0.230	0.500	0.127	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Radium-228	1.06		0.232	0.256		0.362	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Thallium-208	0.409		0.0845	0.0946		0.0450	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Thorium-228	0.878		0.138	0.179		0.143	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Thorium-232	1.06		0.232	0.256		0.362	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Thorium-234	0.157	U	1.59	1.59		2.68	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Uranium-235	0.109	U	0.255	0.255		0.782	pCi/g	11/11/16 13:26	12/02/16 08:01	1
Uranium-238	0.157	U	1.59	1.59		2.68	pCi/g	11/11/16 13:26	12/02/16 08:01	1

Client Sample ID: TITO04-NP-SU5-SWFSS-5-16-S002

Lab Sample ID: 160-19909-2

Date Collected: 10/26/16 10:32

Matrix: Solid

Date Received: 11/09/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.474		0.133	0.141		0.0769	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Actinium-227	0.166	U	0.471	0.472		1.20	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Bismuth-212	0.000	U	0.533	0.533		1.30	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Bismuth-214	0.345		0.112	0.117		0.115	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Cesium-137	-0.0233	U	0.0651	0.0652		0.123	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Lead-210	0.399	U	1.13	1.13		1.66	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Lead-212	0.384		0.0850	0.0985		0.0990	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Lead-214	0.466		0.125	0.134		0.113	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Potassium-40	11.1		1.39	1.80		0.689	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Protactinium-231	-0.802	U	2.52	2.53		4.24	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Radium-226	0.345		0.112	0.117	0.500	0.115	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Radium-228	0.474		0.133	0.141		0.0769	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Thallium-208	0.131		0.0482	0.0501		0.0469	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Thorium-228	0.384		0.0850	0.0985		0.0990	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Thorium-232	0.474		0.133	0.141		0.0769	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Thorium-234	0.905	U	0.956	0.961		1.31	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Uranium-235	-0.193	U	0.276	0.277		0.983	pCi/g	11/11/16 13:26	12/02/16 08:03	1
Uranium-238	0.905	U	0.956	0.961		1.31	pCi/g	11/11/16 13:26	12/02/16 08:03	1

LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-19909-2

Client Sample ID: TITO04-NP-SU5-SWFSS-5-17-S003

Lab Sample ID: 160-19909-3

Date Collected: 11/07/16 15:41

Matrix: Solid

Date Received: 11/09/16 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.516		0.185	0.192		0.306	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Actinium-227	0.170	U	0.618	0.618		0.896	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Bismuth-212	-0.159	U	0.669	0.669		1.18	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Bismuth-214	0.323		0.106	0.112		0.113	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Cesium-137	-0.000158	U	0.0766	0.0766		0.135	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Lead-210	-0.0592	U	1.53	1.53		2.34	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Lead-212	0.301		0.0834	0.0921		0.101	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Lead-214	0.370		0.0953	0.103		0.126	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Potassium-40	11.9		1.55	1.97		0.715	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Protactinium-231	-0.486	U	2.33	2.33		3.94	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Radium-226	0.323		0.106	0.112	0.500	0.113	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Radium-228	0.516		0.185	0.192		0.306	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Thallium-208	0.174		0.0557	0.0586		0.0483	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Thorium-228	0.301		0.0834	0.0921		0.101	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Thorium-232	0.516		0.185	0.192		0.306	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Thorium-234	0.427	U	0.898	0.899		1.50	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Uranium-235	0.147	U	0.308	0.308		0.581	pCi/g	11/11/16 13:26	12/02/16 08:06	1
Uranium-238	0.427	U	0.898	0.899		1.50	pCi/g	11/11/16 13:26	12/02/16 08:06	1



TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21129-2

Client Sample ID:
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B001

Lab Sample ID: 160-21129-1

Date Collected: 02/14/17 10:48

Matrix: Solid

Date Received: 02/20/17 08:31

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.586		0.150	0.162		0.0708	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Actinium-227	-0.326	U	0.672	0.673		1.13	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Bismuth-212	0.175	U	0.543	0.544		0.946	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Bismuth-214	0.556		0.115	0.129		0.0810	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Cesium-137	0.0313	U	0.0482	0.0483		0.0807	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Lead-210	0.578	U	0.726	0.729		1.19	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Lead-212	0.403		0.0761	0.0923		0.0770	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Lead-214	0.531		0.119	0.132		0.103	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Potassium-40	8.90		1.19	1.50		0.516	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Protactinium-231	-0.0000001	U	2.59	2.59		4.39	pCi/g	02/22/17 14:19	03/15/17 09:09	1
	64									
Radium-226	0.556		0.115	0.129	0.500	0.0810	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Radium-228	0.586		0.150	0.162		0.0708	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Thallium-208	0.152		0.0526	0.0549		0.0482	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Thorium-228	0.403		0.0761	0.0923		0.0770	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Thorium-232	0.586		0.150	0.162		0.0708	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Thorium-234	0.582	U	1.07	1.08		1.79	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Uranium-235	-0.00984	U	0.0208	0.0208		0.740	pCi/g	02/22/17 14:19	03/15/17 09:09	1
Uranium-238	0.582	U	1.07	1.08		1.79	pCi/g	02/22/17 14:19	03/15/17 09:09	1

Client Sample ID:
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B002

Lab Sample ID: 160-21129-2

Date Collected: 02/14/17 10:49

Matrix: Solid

Date Received: 02/20/17 08:31

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.295	U	0.150	0.153		0.369	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Actinium-227	0.172	U	0.389	0.390		0.930	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Bismuth-212	0.387	U	0.709	0.710		1.21	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Bismuth-214	0.487		0.136	0.145		0.115	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Cesium-137	-0.0188	U	0.0779	0.0779		0.136	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Lead-210	0.686	U	1.17	1.17		1.69	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Lead-212	0.346		0.0850	0.0961		0.0919	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Lead-214	0.321		0.137	0.141		0.212	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Potassium-40	11.5		1.67	2.05		0.791	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Protactinium-231	-0.0000000	U	2.20	2.20		3.78	pCi/g	02/22/17 14:19	03/15/17 09:06	1
	57									
Radium-226	0.487		0.136	0.145	0.500	0.115	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Radium-228	0.295	U	0.150	0.153		0.369	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Thallium-208	0.128		0.0559	0.0574		0.0588	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Thorium-228	0.346		0.0850	0.0961		0.0919	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Thorium-232	0.295	U	0.150	0.153		0.369	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Thorium-234	0.746	U	0.542	0.548		1.45	pCi/g	02/22/17 14:19	03/15/17 09:06	1



This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21129-2

Client Sample ID:
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B002

Lab Sample ID: 160-21129-2

Date Collected: 02/14/17 10:49

Matrix: Solid

Date Received: 02/20/17 08:31

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-235	-0.0176	U	0.129	0.129		0.575	pCi/g	02/22/17 14:19	03/15/17 09:06	1
Uranium-238	0.746	U	0.542	0.548		1.45	pCi/g	02/22/17 14:19	03/15/17 09:06	1

Client Sample ID:
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B003

Lab Sample ID: 160-21129-3

Date Collected: 02/14/17 10:56

Matrix: Solid

Date Received: 02/20/17 08:31

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.166	U	0.262	0.263		0.426	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Actinium-227	0.283	U	0.798	0.798		1.35	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Bismuth-212	-0.546	U	0.963	0.964		1.63	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Bismuth-214	0.431		0.125	0.133		0.105	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Cesium-137	-0.000812	U	0.0578	0.0578		0.107	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Lead-210	-0.891	U	1.71	1.71		3.01	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Lead-212	0.336		0.0943	0.104		0.110	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Lead-214	0.394		0.120	0.126		0.156	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Potassium-40	10.2		1.69	1.99		0.767	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Protactinium-231	0.661	U	1.53	1.53		3.57	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Radium-226	0.431		0.125	0.133	0.500	0.105	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Radium-228	0.166	U	0.262	0.263		0.426	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Thallium-208	0.173		0.0649	0.0673		0.0529	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Thorium-228	0.336		0.0943	0.104		0.110	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Thorium-232	0.166	U	0.262	0.263		0.426	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Thorium-234	0.503	U	0.396	0.399		2.67	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Uranium-235	0.0698	U	0.221	0.222		0.876	pCi/g	02/22/17 14:19	03/15/17 09:07	1
Uranium-238	0.503	U	0.396	0.399		2.67	pCi/g	02/22/17 14:19	03/15/17 09:07	1

Client Sample ID:
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B004

Lab Sample ID: 160-21129-4

Date Collected: 02/14/17 10:55

Matrix: Solid

Date Received: 02/20/17 08:31

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.423		0.229	0.233		0.225	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Actinium-227	-0.357	U	0.838	0.839		1.40	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Bismuth-212	0.322	U	0.564	0.565		0.954	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Bismuth-214	0.476		0.127	0.136		0.111	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Cesium-137	0.0121	U	0.0533	0.0533		0.0935	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Lead-210	0.840	U	1.05	1.05		1.55	pCi/g	02/22/17 14:19	03/15/17 09:08	1



This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21129-2

Client Sample ID:
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B004

Lab Sample ID: 160-21129-4

Date Collected: 02/14/17 10:55

Matrix: Solid

Date Received: 02/20/17 08:31

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Lead-212	0.322		0.0834	0.0932		0.101	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Lead-214	0.424		0.101	0.110		0.0977	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Potassium-40	8.29		1.26	1.52		0.801	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Protactinium-231	0.688	U	1.52	1.53		3.49	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Radium-226	0.476		0.127	0.136	0.500	0.111	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Radium-228	0.423		0.229	0.233		0.225	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Thallium-208	0.116		0.0499	0.0513		0.0532	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Thorium-228	0.322		0.0834	0.0932		0.101	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Thorium-232	0.423		0.229	0.233		0.225	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Thorium-234	0.458	U	0.884	0.885		1.47	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Uranium-235	0.110	U	0.210	0.210		0.839	pCi/g	02/22/17 14:19	03/15/17 09:08	1
Uranium-238	0.458	U	0.884	0.885		1.47	pCi/g	02/22/17 14:19	03/15/17 09:08	1

Client Sample ID:
TITO04-BS-FSSSU9-LLRO#711-SWSU2-B005

Lab Sample ID: 160-21129-5

Date Collected: 02/14/17 11:00

Matrix: Solid

Date Received: 02/20/17 08:31

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.437		0.173	0.179		0.149	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Actinium-227	-0.265	U	0.785	0.786		1.12	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Bismuth-212	-0.410	U	0.759	0.760		1.28	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Bismuth-214	0.931		0.160	0.187		0.113	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Cesium-137	-0.00815	U	0.0694	0.0694		0.122	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Lead-210	1.55	U	1.67	1.68		2.24	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Lead-212	0.387		0.0881	0.101		0.0997	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Lead-214	1.20		0.170	0.211		0.116	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Potassium-40	9.03		1.33	1.62		0.666	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Protactinium-231	0.671	U	1.49	1.50		3.43	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Radium-226	0.931		0.160	0.187	0.500	0.113	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Radium-228	0.437		0.173	0.179		0.149	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Thallium-208	0.124		0.0489	0.0506		0.0458	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Thorium-228	0.387		0.0881	0.101		0.0997	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Thorium-232	0.437		0.173	0.179		0.149	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Thorium-234	0.818	U	0.548	0.555		1.61	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Uranium-235	0.171	U	0.373	0.373		0.629	pCi/g	02/22/17 14:19	03/15/17 09:10	1
Uranium-238	0.818	U	0.548	0.555		1.61	pCi/g	02/22/17 14:19	03/15/17 09:10	1

E-Lab Consultants
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S001

Lab Sample ID: 160-21509-1

Date Collected: 03/15/17 14:31

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.368		0.111	0.117		0.0661	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Actinium-227	-0.294	U	0.625	0.626		1.05	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Bismuth-212	0.133	U	0.373	0.373		0.655	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Bismuth-214	0.379		0.0993	0.107		0.0857	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Cesium-137	-0.0189	U	0.0564	0.0565		0.0968	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Lead-210	-0.151	U	1.13	1.13		1.94	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Lead-212	0.329		0.0664	0.0789		0.0681	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Lead-214	0.433		0.123	0.131		0.106	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Potassium-40	10.0		1.19	1.57		0.261	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Protactinium-231	-0.357	U	2.06	2.06		3.48	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Radium-226	0.379		0.0993	0.107	0.500	0.0857	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Radium-228	0.368		0.111	0.117		0.0661	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Thallium-208	0.116		0.0398	0.0416		0.0350	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Thorium-228	0.329		0.0664	0.0789		0.0681	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Thorium-232	0.368		0.111	0.117		0.0661	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Thorium-234	0.489	U	1.03	1.03		1.73	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Uranium-235	-0.140	U	0.414	0.414		0.693	pCi/g	03/20/17 21:59	04/11/17 19:16	1
Uranium-238	0.489	U	1.03	1.03		1.73	pCi/g	03/20/17 21:59	04/11/17 19:16	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S002

Lab Sample ID: 160-21509-2

Date Collected: 03/15/17 14:39

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.425		0.145	0.152		0.0866	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Actinium-227	0.312	U	0.777	0.778		1.31	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Bismuth-212	0.000	U	0.285	0.285		0.985	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Bismuth-214	0.305		0.110	0.115		0.132	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Cesium-137	-0.0122	U	0.0609	0.0609		0.107	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Lead-210	-1.02	U	1.75	1.75		3.05	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Lead-212	0.255		0.0842	0.0905		0.111	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Lead-214	0.377		0.117	0.123		0.128	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Potassium-40	9.24		1.34	1.64		0.646	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Protactinium-231	0.000	U	0.367	0.367		4.16	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Radium-226	0.305		0.110	0.115	0.500	0.132	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Radium-228	0.425		0.145	0.152		0.0866	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Thallium-208	0.111		0.0525	0.0538		0.0570	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Thorium-228	0.255		0.0842	0.0905		0.111	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Thorium-232	0.425		0.145	0.152		0.0866	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Thorium-234	-0.569	U	1.09	1.09		1.92	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Uranium-235	-0.0255	U	0.178	0.178		0.554	pCi/g	03/20/17 21:59	04/11/17 20:01	1
Uranium-238	-0.569	U	1.09	1.09		1.92	pCi/g	03/20/17 21:59	04/11/17 20:01	1


E-LAB CONSULTANTS
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S003

Lab Sample ID: 160-21509-3

Date Collected: 03/15/17 14:39

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.348		0.131	0.135		0.109	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Actinium-227	-0.0576	U	0.100	0.100		1.20	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Bismuth-212	0.245	U	0.599	0.599		1.03	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Bismuth-214	0.473		0.131	0.140		0.121	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Cesium-137	0.0188	U	0.0481	0.0482		0.0832	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Lead-210	0.488	U	1.13	1.13		1.61	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Lead-212	0.388		0.0812	0.0955		0.0860	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Lead-214	0.376		0.0985	0.106		0.126	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Potassium-40	10.6		1.39	1.76		0.701	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Protactinium-231	0.000	U	0.276	0.276		4.05	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Radium-226	0.473		0.131	0.140	0.500	0.121	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Radium-228	0.348		0.131	0.135		0.109	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Thallium-208	0.106		0.0407	0.0422		0.0395	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Thorium-228	0.388		0.0812	0.0955		0.0860	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Thorium-232	0.348		0.131	0.135		0.109	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Thorium-234	-0.189	U	1.18	1.18		2.02	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Uranium-235	0.0376	U	0.0824	0.0825		0.606	pCi/g	03/20/17 21:59	04/12/17 11:37	1
Uranium-238	-0.189	U	1.18	1.18		2.02	pCi/g	03/20/17 21:59	04/12/17 11:37	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S004

Lab Sample ID: 160-21509-4

Date Collected: 03/15/17 14:40

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.423		0.127	0.135		0.0708	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Actinium-227	-0.296	U	0.626	0.627		1.05	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Bismuth-212	-0.489	U	0.754	0.756		1.26	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Bismuth-214	0.296		0.0864	0.0917		0.0762	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Cesium-137	0.000	U	0.0178	0.0178		0.0879	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Lead-210	0.361	U	1.26	1.26		2.14	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Lead-212	0.385		0.0739	0.0892		0.0745	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Lead-214	0.402		0.108	0.116		0.105	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Potassium-40	11.3		1.35	1.78		0.624	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Protactinium-231	0.000	U	0.423	0.423		3.80	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Radium-226	0.296		0.0864	0.0917	0.500	0.0762	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Radium-228	0.423		0.127	0.135		0.0708	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Thallium-208	0.101		0.0598	0.0607		0.0656	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Thorium-228	0.385		0.0739	0.0892		0.0745	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Thorium-232	0.423		0.127	0.135		0.0708	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Thorium-234	0.182	U	1.21	1.21		2.05	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Uranium-235	-0.0281	U	0.0493	0.0494		0.795	pCi/g	03/20/17 21:59	04/11/17 20:47	1
Uranium-238	0.182	U	1.21	1.21		2.05	pCi/g	03/20/17 21:59	04/11/17 20:47	1

E-Lab Consultants
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S005

Lab Sample ID: 160-21509-5

Date Collected: 03/15/17 14:45

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.539		0.162	0.171		0.0861	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Actinium-227	-0.299	U	0.866	0.867		1.46	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Bismuth-212	-0.227	U	0.643	0.643		1.12	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Bismuth-214	0.382		0.121	0.128		0.120	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Cesium-137	0.0310	U	0.0587	0.0588		0.0996	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Lead-210	0.946	U	1.40	1.41		1.93	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Lead-212	0.310		0.0792	0.0888		0.0899	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Lead-214	0.365		0.113	0.119		0.114	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Potassium-40	10.1		1.40	1.74		0.642	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Protactinium-231	-0.629	U	2.20	2.20		3.72	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Radium-226	0.382		0.121	0.128	0.500	0.120	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Radium-228	0.539		0.162	0.171		0.0861	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Thallium-208	0.133		0.0538	0.0556		0.0573	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Thorium-228	0.310		0.0792	0.0888		0.0899	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Thorium-232	0.539		0.162	0.171		0.0861	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Thorium-234	-0.608	U	1.39	1.40		2.01	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Uranium-235	0.0887	U	0.291	0.291		0.491	pCi/g	03/20/17 21:59	04/11/17 20:48	1
Uranium-238	-0.608	U	1.39	1.40		2.01	pCi/g	03/20/17 21:59	04/11/17 20:48	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S006

Lab Sample ID: 160-21509-6

Date Collected: 03/15/17 15:02

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.269		0.187	0.189		0.193	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Actinium-227	-0.579	U	1.35	1.35		2.25	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Bismuth-212	0.208	U	0.460	0.460		0.791	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Bismuth-214	0.353		0.110	0.116		0.101	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Cesium-137	0.0182	U	0.0472	0.0472		0.0812	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Lead-210	-1.22	U	2.98	2.98		4.95	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Lead-212	0.360		0.0717	0.0856		0.0754	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Lead-214	0.395		0.0937	0.102		0.102	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Potassium-40	10.9		1.26	1.69		0.270	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Protactinium-231	0.578	U	1.68	1.68		3.67	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Radium-226	0.353		0.110	0.116	0.500	0.101	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Radium-228	0.269		0.187	0.189		0.193	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Thallium-208	0.108		0.0613	0.0623		0.0616	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Thorium-228	0.360		0.0717	0.0856		0.0754	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Thorium-232	0.269		0.187	0.189		0.193	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Thorium-234	0.340	U	0.689	0.690		1.72	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Uranium-235	0.0852	U	0.192	0.192		0.662	pCi/g	03/20/17 21:59	04/11/17 20:50	1
Uranium-238	0.340	U	0.689	0.690		1.72	pCi/g	03/20/17 21:59	04/11/17 20:50	1

E-Lab Consultants
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S007

Lab Sample ID: 160-21509-7

Date Collected: 03/15/17 15:01

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.452		0.128	0.136		0.123	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Actinium-227	0.183	U	0.275	0.276		0.629	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Bismuth-212	0.351	U	0.677	0.678		1.15	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Bismuth-214	0.310		0.110	0.115		0.122	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Cesium-137	-0.0454	U	0.0679	0.0680		0.131	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-210	0.186	U	1.01	1.01		1.73	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-212	0.335		0.118	0.126		0.174	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-214	0.418		0.0998	0.109		0.126	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Potassium-40	10.7		1.38	1.76		0.563	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Protactinium-231	0.284	U	1.08	1.08		3.49	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Radium-226	0.310		0.110	0.115	0.500	0.122	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Radium-228	0.452		0.128	0.136		0.123	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thallium-208	0.164		0.0533	0.0559		0.0492	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-228	0.335		0.118	0.126		0.174	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-232	0.452		0.128	0.136		0.123	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-234	0.209	U	0.385	0.386		1.31	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Uranium-235	-0.0429	U	0.365	0.365		0.736	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Uranium-238	0.209	U	0.385	0.386		1.31	pCi/g	03/20/17 21:59	04/11/17 20:49	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S008

Lab Sample ID: 160-21509-8

Date Collected: 03/15/17 15:17

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.140	U	0.226	0.226		0.298	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Actinium-227	-0.387	U	0.828	0.829		1.39	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Bismuth-212	0.968		0.380	0.393		0.274	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Bismuth-214	0.311		0.115	0.120		0.119	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Cesium-137	-0.0323	U	0.0673	0.0673		0.114	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-210	-1.07	U	1.45	1.46		2.57	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-212	0.315		0.0852	0.0944		0.105	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Lead-214	0.466		0.130	0.139		0.137	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Potassium-40	9.65		1.39	1.71		0.874	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Protactinium-231	-0.932	U	2.92	2.92		4.90	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Radium-226	0.311		0.115	0.120	0.500	0.119	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Radium-228	0.140	U	0.226	0.226		0.298	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thallium-208	0.136		0.0562	0.0580		0.0568	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-228	0.315		0.0852	0.0944		0.105	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-232	0.140	U	0.226	0.226		0.298	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Thorium-234	0.609	U	0.910	0.913		1.34	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Uranium-235	0.135	U	0.284	0.285		0.805	pCi/g	03/20/17 21:59	04/11/17 20:49	1
Uranium-238	0.609	U	0.910	0.913		1.34	pCi/g	03/20/17 21:59	04/11/17 20:49	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S009

Lab Sample ID: 160-21509-9

Date Collected: 03/15/17 15:07

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.262		0.130	0.132		0.153	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Actinium-227	-0.0623	U	0.554	0.554		0.949	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Bismuth-212	0.213	U	0.463	0.464		0.796	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Bismuth-214	0.383		0.104	0.111		0.0867	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Cesium-137	0.0160	U	0.0322	0.0322		0.0554	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Lead-210	0.198	U	1.05	1.05		1.80	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Lead-212	0.379		0.0688	0.0845		0.0665	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Lead-214	0.417		0.0947	0.104		0.0898	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Potassium-40	10.6		1.30	1.69		0.693	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Protactinium-231	0.000	U	0.581	0.581		3.51	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Radium-226	0.383		0.104	0.111	0.500	0.0867	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Radium-228	0.262		0.130	0.132		0.153	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Thallium-208	0.149		0.0498	0.0521		0.0470	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Thorium-228	0.379		0.0688	0.0845		0.0665	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Thorium-232	0.262		0.130	0.132		0.153	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Thorium-234	-0.526	U	1.11	1.11		1.86	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Uranium-235	-0.131	U	0.224	0.225		0.375	pCi/g	03/20/17 21:59	04/11/17 21:40	1
Uranium-238	-0.526	U	1.11	1.11		1.86	pCi/g	03/20/17 21:59	04/11/17 21:40	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S010

Lab Sample ID: 160-21509-10

Date Collected: 03/15/17 15:06

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.391		0.140	0.146		0.233	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Actinium-227	-0.261	U	0.877	0.877		1.48	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Bismuth-212	0.0348	U	0.761	0.761		1.36	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Bismuth-214	0.439		0.132	0.140		0.127	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Cesium-137	0.0241	U	0.0539	0.0539		0.0928	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Lead-210	0.709	U	1.52	1.52		2.17	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Lead-212	0.304		0.0942	0.102		0.122	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Lead-214	0.480		0.105	0.116		0.0978	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Potassium-40	12.3		1.61	2.05		0.707	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Protactinium-231	0.389	U	1.28	1.28		4.17	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Radium-226	0.439		0.132	0.140	0.500	0.127	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Radium-228	0.391		0.140	0.146		0.233	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Thallium-208	0.125		0.0538	0.0553		0.0608	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Thorium-228	0.304		0.0942	0.102		0.122	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Thorium-232	0.391		0.140	0.146		0.233	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Thorium-234	0.737	U	1.20	1.20		1.70	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Uranium-235	-0.0601	U	0.380	0.380		0.662	pCi/g	03/20/17 21:59	04/11/17 21:41	1
Uranium-238	0.737	U	1.20	1.20		1.70	pCi/g	03/20/17 21:59	04/11/17 21:41	1


E-LAB CONSULTANTS
this data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21509-2

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S011

Lab Sample ID: 160-21509-11

Date Collected: 03/15/17 15:11

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.392		0.118	0.124		0.120	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Actinium-227	0.185	U	0.743	0.743		1.26	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Bismuth-212	-0.244	U	0.556	0.556		1.20	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Bismuth-214	0.410		0.109	0.117		0.0954	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Cesium-137	-0.0110	U	0.0448	0.0448		0.0969	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Lead-210	0.444	U	1.17	1.17		1.76	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Lead-212	0.335		0.0827	0.0934		0.0994	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Lead-214	0.420		0.102	0.111		0.103	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Potassium-40	8.02		1.19	1.45		0.550	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Protactinium-231	0.578	U	1.35	1.35		3.10	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Radium-226	0.410		0.109	0.117	0.500	0.0954	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Radium-228	0.392		0.118	0.124		0.120	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Thallium-208	0.161		0.0461	0.0490		0.0395	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Thorium-228	0.335		0.0827	0.0934		0.0994	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Thorium-232	0.392		0.118	0.124		0.120	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Thorium-234	0.879	U	0.895	0.900		1.24	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Uranium-235	-0.0524	U	0.0855	0.0856		0.752	pCi/g	03/20/17 21:59	04/11/17 21:42	1
Uranium-238	0.879	U	0.895	0.900		1.24	pCi/g	03/20/17 21:59	04/11/17 21:42	1

Client Sample ID: TITO04-RSY15-U8-BS-FSSSU6-S012

Lab Sample ID: 160-21509-12

Date Collected: 03/15/17 15:09

Matrix: Solid

Date Received: 03/17/17 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.484		0.130	0.139		0.0659	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Actinium-227	-0.0118	U	0.0802	0.0802		0.941	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Bismuth-212	-0.0206	U	0.526	0.526		0.948	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Bismuth-214	0.489		0.120	0.130		0.0956	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Cesium-137	0.0175	U	0.0377	0.0378		0.0649	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Lead-210	0.529	U	0.967	0.969		1.62	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Lead-212	0.279		0.107	0.113		0.163	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Lead-214	0.426		0.0837	0.0947		0.0854	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Potassium-40	11.6		1.28	1.75		0.260	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Protactinium-231	-0.676	U	2.28	2.28		3.82	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Radium-226	0.489		0.120	0.130	0.500	0.0956	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Radium-228	0.484		0.130	0.139		0.0659	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Thallium-208	0.0299	U	0.0900	0.0900		0.0908	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Thorium-228	0.279		0.107	0.113		0.163	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Thorium-232	0.484		0.130	0.139		0.0659	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Thorium-234	0.344	U	0.321	0.323		1.79	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Uranium-235	0.0173	U	0.202	0.202		0.765	pCi/g	03/20/17 21:59	04/11/17 21:43	1
Uranium-238	0.344	U	0.321	0.323		1.79	pCi/g	03/20/17 21:59	04/11/17 21:43	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S001

Lab Sample ID: 160-21561-1

Date Collected: 03/20/17 14:12

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.515		0.147	0.156		0.0775	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Actinium-227	-0.291	U	0.728	0.728		1.22	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Bismuth-212	0.306	U	0.547	0.548		0.928	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Bismuth-214	0.361		0.123	0.128		0.130	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Cesium-137	0.0242	U	0.0438	0.0439		0.0743	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Lead-210	-0.0875	U	1.27	1.27		2.20	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Lead-212	0.323		0.0772	0.0878		0.0890	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Lead-214	0.355		0.113	0.119		0.121	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Potassium-40	11.0		1.39	1.78		0.682	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Protactinium-231	0.000	U	0.446	0.446		3.51	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Radium-226	0.361		0.123	0.128	0.500	0.130	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Radium-228	0.515		0.147	0.156		0.0775	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Thallium-208	0.173		0.0597	0.0624		0.0512	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Thorium-228	0.323		0.0772	0.0878		0.0890	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Thorium-232	0.515		0.147	0.156		0.0775	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Thorium-234	-0.167	U	0.836	0.837		1.46	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Uranium-235	0.0576	U	0.142	0.142		0.516	pCi/g	03/27/17 20:40	04/18/17 07:17	1
Uranium-238	-0.167	U	0.836	0.837		1.46	pCi/g	03/27/17 20:40	04/18/17 07:17	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S002

Lab Sample ID: 160-21561-2


Date Collected: 03/20/17 14:09

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.253		0.135	0.138		0.162	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Actinium-227	0.185	U	0.766	0.767		1.00	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Bismuth-212	0.00782	U	0.636	0.636		1.17	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Bismuth-214	0.397		0.123	0.130		0.106	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Cesium-137	-0.0163	U	0.0702	0.0702		0.128	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Lead-210	-0.0243	U	1.75	1.75		3.00	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Lead-212	0.313		0.0813	0.0909		0.0898	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Lead-214	0.364		0.106	0.113		0.120	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Potassium-40	11.9		1.72	2.11		0.620	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Protactinium-231	0.000	U	2.35	2.35		4.00	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Radium-226	0.397		0.123	0.130	0.500	0.106	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Radium-228	0.253		0.135	0.138		0.162	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Thallium-208	0.198		0.0571	0.0607		0.0420	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Thorium-228	0.313		0.0813	0.0909		0.0898	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Thorium-232	0.253		0.135	0.138		0.162	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Thorium-234	-0.441	U	1.30	1.30		2.26	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Uranium-235	-0.0902	U	0.187	0.187		0.772	pCi/g	03/27/17 20:40	04/18/17 07:27	1
Uranium-238	-0.441	U	1.30	1.30		2.26	pCi/g	03/27/17 20:40	04/18/17 07:27	1


 This data has been validated
 according to the procedures
 noted in the attached Data
 Validation Report by E-Lab
 Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S003

Lab Sample ID: 160-21561-3

Date Collected: 03/20/17 14:13

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.282		0.163	0.166		0.155	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Actinium-227	0.203	U	0.528	0.528		0.893	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Bismuth-212	0.0370	U	0.528	0.528		0.961	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Bismuth-214	0.292		0.105	0.109		0.0850	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Cesium-137	0.0305	U	0.0561	0.0562		0.0950	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Lead-210	0.302	U	1.06	1.06		1.79	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Lead-212	0.315		0.0929	0.101		0.0920	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Lead-214	0.266		0.0954	0.0993		0.134	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Potassium-40	10.8		1.47	1.84		0.370	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Protactinium-231	-0.141	U	2.11	2.11		3.59	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Radium-226	0.292		0.105	0.109	0.500	0.0850	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Radium-228	0.282		0.163	0.166		0.155	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Thallium-208	0.0629	U	0.0680	0.0684		0.0731	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Thorium-228	0.315		0.0929	0.101		0.0920	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Thorium-232	0.282		0.163	0.166		0.155	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Thorium-234	0.268	U	0.404	0.405		1.14	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Uranium-235	-0.0638	U	0.224	0.224		0.562	pCi/g	03/27/17 20:40	04/18/17 07:29	1
Uranium-238	0.268	U	0.404	0.405		1.14	pCi/g	03/27/17 20:40	04/18/17 07:29	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S004

Lab Sample ID: 160-21561-4

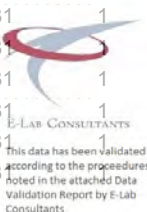
Date Collected: 03/20/17 14:17

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.132	U	0.205	0.205		0.284	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Actinium-227	0.245	U	0.542	0.542		0.782	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Bismuth-212	-0.00355	U	0.830	0.830		1.49	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Bismuth-214	0.360		0.161	0.165		0.154	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Cesium-137	-0.0351	U	0.0897	0.0897		0.182	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Lead-210	1.40		1.03	1.04		1.35	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Lead-212	0.238		0.0745	0.0806		0.0852	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Lead-214	0.328		0.105	0.111		0.105	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Potassium-40	10.9		1.73	2.06		0.731	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Protactinium-231	0.000	U	0.371	0.371		3.09	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Radium-226	0.360		0.161	0.165	0.500	0.154	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Radium-228	0.132	U	0.205	0.205		0.284	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Thallium-208	0.120		0.0535	0.0549		0.0454	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Thorium-228	0.238		0.0745	0.0806		0.0852	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Thorium-232	0.132	U	0.205	0.205		0.284	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Thorium-234	0.651	U	0.343	0.349		1.66	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Uranium-235	0.0325	U	0.0504	0.0505		0.547	pCi/g	03/27/17 20:40	04/18/17 07:31	1
Uranium-238	0.651	U	0.343	0.349		1.66	pCi/g	03/27/17 20:40	04/18/17 07:31	1



TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S005

Lab Sample ID: 160-21561-5

Date Collected: 03/20/17 14:26

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.379		0.213	0.217		0.213	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Actinium-227	0.132	U	0.513	0.513		1.29	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Bismuth-212	-0.0163	U	0.835	0.835		1.51	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Bismuth-214	0.125	U	0.251	0.252		0.330	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Cesium-137	0.00801	U	0.0588	0.0588		0.106	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Lead-210	-0.614	U	1.78	1.78		3.10	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Lead-212	0.349		0.0932	0.104		0.110	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Lead-214	0.394		0.123	0.129		0.120	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Potassium-40	9.95		1.63	1.92		0.748	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Protactinium-231	-0.932	U	3.01	3.01		5.07	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Radium-226	0.125	U	0.251	0.252	0.500	0.330	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Radium-228	0.379		0.213	0.217		0.213	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Thallium-208	0.107		0.0678	0.0687		0.0742	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Thorium-228	0.349		0.0932	0.104		0.110	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Thorium-232	0.379		0.213	0.217		0.213	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Thorium-234	0.0369	U	1.56	1.56		2.65	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Uranium-235	-0.0146	U	0.0575	0.0575		1.12	pCi/g	03/27/17 20:40	04/18/17 07:35	1
Uranium-238	0.0369	U	1.56	1.56		2.65	pCi/g	03/27/17 20:40	04/18/17 07:35	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S006

Lab Sample ID: 160-21561-6

Date Collected: 03/20/17 14:18

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.410		0.145	0.151		0.107	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Actinium-227	0.270	U	0.575	0.576		0.964	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Bismuth-212	-0.0198	U	0.743	0.743		1.30	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Bismuth-214	0.350		0.102	0.108		0.0830	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Cesium-137	0.000	U	0.0215	0.0215		0.0712	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-210	-0.611	U	1.13	1.13		1.89	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-212	0.341		0.0644	0.0781		0.0622	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-214	0.391		0.0779	0.0878		0.0719	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Potassium-40	11.8		1.27	1.75		0.250	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Protactinium-231	0.000	U	0.554	0.554		3.39	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Radium-226	0.350		0.102	0.108	0.500	0.0830	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Radium-228	0.410		0.145	0.151		0.107	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thallium-208	0.183		0.0410	0.0452		0.0255	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-228	0.341		0.0644	0.0781		0.0622	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-232	0.410		0.145	0.151		0.107	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-234	0.288	U	0.668	0.669		1.63	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Uranium-235	-0.157	U	0.418	0.419		0.699	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Uranium-238	0.288	U	0.668	0.669		1.63	pCi/g	03/27/17 20:40	04/18/17 08:00	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S007

Lab Sample ID: 160-21561-7

Date Collected: 03/20/17 14:25

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.446		0.124	0.132		0.0798	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Actinium-227	-0.0486	U	0.0853	0.0855		1.28	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Bismuth-212	0.0351	U	0.583	0.583		1.05	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Bismuth-214	0.370		0.119	0.125		0.108	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Cesium-137	0.0204	U	0.0404	0.0405		0.0694	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Lead-210	0.818	U	1.02	1.02		1.48	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Lead-212	0.295		0.0747	0.0839		0.0862	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Lead-214	0.333		0.0907	0.0971		0.125	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Potassium-40	10.2		1.36	1.72		0.703	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Protactinium-231	-0.388	U	2.42	2.42		4.09	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Radium-226	0.370		0.119	0.125	0.500	0.108	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Radium-228	0.446		0.124	0.132		0.0798	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Thallium-208	0.124		0.0453	0.0471		0.0426	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Thorium-228	0.295		0.0747	0.0839		0.0862	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Thorium-232	0.446		0.124	0.132		0.0798	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Thorium-234	0.270	U	0.397	0.398		1.22	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Uranium-235	0.0849	U	0.283	0.283		0.479	pCi/g	03/27/17 20:40	04/18/17 07:57	1
Uranium-238	0.270	U	0.397	0.398		1.22	pCi/g	03/27/17 20:40	04/18/17 07:57	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S008

Lab Sample ID: 160-21561-8

Date Collected: 03/20/17 14:30

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.132	U	0.0627	0.0642		0.313	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Actinium-227	-0.330	U	0.783	0.784		1.31	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Bismuth-212	0.409	U	0.689	0.690		1.16	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Bismuth-214	0.326		0.104	0.110		0.0980	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Cesium-137	0.000	U	0.0323	0.0323		0.0882	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-210	0.745	U	1.28	1.28		1.76	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-212	0.264		0.0798	0.0868		0.105	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Lead-214	0.415		0.0983	0.107		0.109	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Potassium-40	10.2		1.35	1.70		0.787	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Protactinium-231	0.000	U	0.455	0.455		3.49	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Radium-226	0.326		0.104	0.110	0.500	0.0980	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Radium-228	0.132	U	0.0627	0.0642		0.313	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thallium-208	0.0986		0.0749	0.0756		0.0742	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-228	0.264		0.0798	0.0868		0.105	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-232	0.132	U	0.0627	0.0642		0.313	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Thorium-234	0.180	U	0.197	0.198		2.30	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Uranium-235	-0.223	U	0.257	0.258		0.957	pCi/g	03/27/17 20:40	04/18/17 08:00	1
Uranium-238	0.180	U	0.197	0.198		2.30	pCi/g	03/27/17 20:40	04/18/17 08:00	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S009

Lab Sample ID: 160-21561-9

Date Collected: 03/20/17 14:32

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0899	U	0.173	0.173		0.368	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Actinium-227	-0.344	U	0.323	0.325		1.37	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Bismuth-212	0.000	U	0.392	0.392		1.36	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Bismuth-214	0.324		0.107	0.113		0.0994	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Cesium-137	-0.0609	U	0.114	0.114		0.128	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Lead-210	-0.858	U	0.681	0.688		2.91	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Lead-212	0.313		0.0786	0.0885		0.0867	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Lead-214	0.315		0.112	0.116		0.112	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Potassium-40	11.6		1.64	2.03		0.578	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Protactinium-231	0.181	U	1.27	1.27		4.07	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Radium-226	0.324		0.107	0.113	0.500	0.0994	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Radium-228	0.0899	U	0.173	0.173		0.368	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Thallium-208	0.108		0.0873	0.0880		0.0789	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Thorium-228	0.313		0.0786	0.0885		0.0867	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Thorium-232	0.0899	U	0.173	0.173		0.368	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Thorium-234	0.870	U	0.774	0.779		1.15	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Uranium-235	0.0274	U	0.0956	0.0956		0.687	pCi/g	03/27/17 20:40	04/18/17 08:04	1
Uranium-238	0.870	U	0.774	0.779		1.15	pCi/g	03/27/17 20:40	04/18/17 08:04	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S010

Lab Sample ID: 160-21561-10

Date Collected: 03/20/17 14:28

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.225	U	0.216	0.217		0.283	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Actinium-227	-0.0287	U	0.592	0.592		1.02	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Bismuth-212	0.000	U	0.400	0.400		1.08	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Bismuth-214	0.524		0.106	0.119		0.0390	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Cesium-137	0.0220	U	0.0430	0.0431		0.0738	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Lead-210	-0.255	U	1.21	1.21		2.12	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Lead-212	0.269		0.0748	0.0825		0.0951	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Lead-214	0.323		0.0888	0.0949		0.0819	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Potassium-40	10.6		1.47	1.82		0.378	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Protactinium-231	-0.420	U	2.08	2.08		3.53	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Radium-226	0.524		0.106	0.119	0.500	0.0390	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Radium-228	0.225	U	0.216	0.217		0.283	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Thallium-208	0.108		0.0542	0.0554		0.0559	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Thorium-228	0.269		0.0748	0.0825		0.0951	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Thorium-232	0.225	U	0.216	0.217		0.283	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Thorium-234	0.391	U	0.395	0.397		1.10	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Uranium-235	-0.119	U	0.210	0.210		0.633	pCi/g	03/27/17 20:40	04/18/17 08:10	1
Uranium-238	0.391	U	0.395	0.397		1.10	pCi/g	03/27/17 20:40	04/18/17 08:10	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21561-2

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S011

Lab Sample ID: 160-21561-11

Date Collected: 03/20/17 14:19

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.243	U	0.212	0.214		0.406	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Actinium-227	0.216	U	0.577	0.578		0.839	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Bismuth-212	0.547	U	1.14	1.15		1.94	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Bismuth-214	0.396		0.147	0.152		0.145	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Cesium-137	0.00874	U	0.0643	0.0643		0.0913	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Lead-210	0.483	U	1.31	1.32		1.96	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Lead-212	0.235		0.0801	0.0857		0.0968	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Lead-214	0.348		0.122	0.127		0.140	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Potassium-40	11.1		1.81	2.14		0.784	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Protactinium-231	0.306	U	1.11	1.11		3.67	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Radium-226	0.396		0.147	0.152	0.500	0.145	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Radium-228	0.243	U	0.212	0.214		0.406	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Thallium-208	0.0562	U	0.0803	0.0805		0.108	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Thorium-228	0.235		0.0801	0.0857		0.0968	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Thorium-232	0.243	U	0.212	0.214		0.406	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Thorium-234	-0.0498	U	1.37	1.37		2.03	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Uranium-235	0.137	U	0.307	0.307		0.545	pCi/g	03/27/17 20:40	04/18/17 08:29	1
Uranium-238	-0.0498	U	1.37	1.37		2.03	pCi/g	03/27/17 20:40	04/18/17 08:29	1

Client Sample ID: TITO04-RSY15-U9-BS-FSSSU5-S012

Lab Sample ID: 160-21561-12

Date Collected: 03/20/17 14:23

Matrix: Solid

Date Received: 03/22/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.390		0.172	0.176		0.229	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Actinium-227	-0.208	U	0.692	0.693		0.943	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Bismuth-212	0.0119	U	0.632	0.632		1.14	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Bismuth-214	0.271		0.106	0.110		0.122	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Cesium-137	-0.0201	U	0.0428	0.0428		0.0982	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Lead-210	-0.0591	U	1.62	1.62		2.77	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Lead-212	0.324		0.0799	0.0902		0.0930	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Lead-214	0.310		0.103	0.108		0.118	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Potassium-40	10.2		1.38	1.73		0.717	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Protactinium-231	-0.819	U	2.79	2.79		4.68	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Radium-226	0.271		0.106	0.110	0.500	0.122	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Radium-228	0.390		0.172	0.176		0.229	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Thallium-208	0.157		0.0447	0.0475		0.0341	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Thorium-228	0.324		0.0799	0.0902		0.0930	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Thorium-232	0.390		0.172	0.176		0.229	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Thorium-234	-0.129	U	1.07	1.07		1.85	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Uranium-235	0.00805	U	0.0466	0.0466		0.561	pCi/g	03/27/17 20:40	04/18/17 08:31	1
Uranium-238	-0.129	U	1.07	1.07		1.85	pCi/g	03/27/17 20:40	04/18/17 08:31	1

E-LAB CONSULTANTS
this data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21651-2

Client Sample ID: TITO04-BS-FSSSU09-9-12

Date Collected: 03/28/17 16:04

Date Received: 03/30/17 08:40

Lab Sample ID: 160-21651-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.498		0.143	0.152		0.0716	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Actinium-227	-0.222	U	0.650	0.651		1.10	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Bismuth-212	0.223	U	0.600	0.600		1.03	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Bismuth-214	0.409		0.105	0.113		0.0885	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Cesium-137	0.0241	U	0.0484	0.0484		0.0824	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Lead-210	0.580	U	1.10	1.10		1.84	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Lead-212	0.393		0.0751	0.0907		0.0759	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Lead-214	0.459		0.107	0.117		0.0882	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Potassium-40	11.9		1.39	1.85		0.631	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Protactinium-231	0.000	U	0.579	0.579		4.12	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Radium-226	0.409		0.105	0.113	0.500	0.0885	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Radium-228	0.498		0.143	0.152		0.0716	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Thallium-208	0.156		0.0434	0.0464		0.0334	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Thorium-228	0.393		0.0751	0.0907		0.0759	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Thorium-232	0.498		0.143	0.152		0.0716	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Thorium-234	0.000	U	0.786	0.786		2.14	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Uranium-235	0.0530	U	0.222	0.222		0.734	pCi/g	04/05/17 09:50	04/26/17 06:16	1
Uranium-238	0.000	U	0.786	0.786		2.14	pCi/g	04/05/17 09:50	04/26/17 06:16	1

Client Sample ID: TITO04-BS-FSSSU09-9-13

Date Collected: 03/28/17 16:10

Date Received: 03/30/17 08:40

Lab Sample ID: 160-21651-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.933		0.272	0.289		0.142	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Actinium-227	-0.533	U	1.21	1.21		2.03	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Bismuth-212	-0.480	U	1.18	1.19		2.03	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Bismuth-214	0.640		0.188	0.199		0.153	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Cesium-137	0.0444	U	0.0832	0.0833		0.142	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Lead-210	0.787	U	2.19	2.19		3.67	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Lead-212	0.652		0.130	0.155		0.132	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Lead-214	0.655		0.142	0.158		0.135	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Potassium-40	11.1		1.93	2.24		0.937	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Protactinium-231	0.778	U	1.91	1.91		4.44	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Radium-226	0.640		0.188	0.199	0.500	0.153	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Radium-228	0.933		0.272	0.289		0.142	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Thallium-208	0.227		0.0722	0.0760		0.0553	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Thorium-228	0.652		0.130	0.155		0.132	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Thorium-232	0.933		0.272	0.289		0.142	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Thorium-234	-0.672	U	1.97	1.97		3.40	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Uranium-235	-0.0230	U	0.604	0.604		1.10	pCi/g	04/05/17 09:50	04/25/17 16:40	1
Uranium-238	-0.672	U	1.97	1.97		3.40	pCi/g	04/05/17 09:50	04/25/17 16:40	1

LAB CONSULTANTS
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21651-2

Client Sample ID: TITO04-BS-FSSSU09-9-14

Lab Sample ID: 160-21651-3

Date Collected: 03/28/17 16:34

Matrix: Solid

Date Received: 03/30/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.542		0.154	0.164		0.0788	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Actinium-227	0.331	U	0.718	0.719		1.20	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Bismuth-212	-0.116	U	0.891	0.891		1.55	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Bismuth-214	0.340		0.103	0.109		0.0973	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Cesium-137	0.0148	U	0.0528	0.0529		0.0921	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Lead-210	-0.890	U	1.72	1.72		2.98	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Lead-212	0.315		0.0797	0.0895		0.0953	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Lead-214	0.355		0.102	0.108		0.108	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Potassium-40	10.4		1.39	1.75		0.815	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Protactinium-231	0.606	U	1.41	1.41		3.22	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Radium-226	0.340		0.103	0.109	0.500	0.0973	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Radium-228	0.542		0.154	0.164		0.0788	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Thallium-208	0.131		0.0568	0.0584		0.0551	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Thorium-228	0.315		0.0797	0.0895		0.0953	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Thorium-232	0.542		0.154	0.164		0.0788	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Thorium-234	-0.256	U	1.28	1.28		2.19	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Uranium-235	-0.0497	U	0.391	0.391		0.869	pCi/g	04/05/17 09:50	04/25/17 16:41	1
Uranium-238	-0.256	U	1.28	1.28		2.19	pCi/g	04/05/17 09:50	04/25/17 16:41	1

Client Sample ID: TITO04-BS-FSSSU09-9-15

Lab Sample ID: 160-21651-4

Date Collected: 03/28/17 16:41

Matrix: Solid

Date Received: 03/30/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.370		0.148	0.153		0.173	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Actinium-227	0.229	U	0.526	0.527		0.757	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Bismuth-212	-0.0174	U	0.643	0.643		1.16	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Bismuth-214	0.435		0.132	0.140		0.129	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Cesium-137	-0.0332	U	0.0611	0.0612		0.103	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Lead-210	0.395	U	0.988	0.989		1.59	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Lead-212	0.270		0.0755	0.0831		0.0923	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Lead-214	0.240		0.0879	0.0914		0.111	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Potassium-40	9.66		1.33	1.66		0.661	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Protactinium-231	0.000	U	0.311	0.311		2.91	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Radium-226	0.435		0.132	0.140	0.500	0.129	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Radium-228	0.370		0.148	0.153		0.173	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Thallium-208	0.117		0.0489	0.0503		0.0478	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Thorium-228	0.270		0.0755	0.0831		0.0923	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Thorium-232	0.370		0.148	0.153		0.173	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Thorium-234	-0.661	U	1.26	1.26		2.21	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Uranium-235	-0.0476	U	0.464	0.464		0.569	pCi/g	04/05/17 09:50	04/25/17 16:44	1
Uranium-238	-0.661	U	1.26	1.26		2.21	pCi/g	04/05/17 09:50	04/25/17 16:44	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21652-2

Client Sample ID: TITO04-BS-FSSSU9-B001

Lab Sample ID: 160-21652-1

Date Collected: 03/28/17 16:25

Matrix: Solid

Date Received: 03/30/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.658		0.192	0.203		0.127	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Actinium-227	0.109	U	0.286	0.286		1.46	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Bismuth-212	1.50		0.532	0.555		0.395	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Bismuth-214	0.796		0.154	0.175		0.115	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Cesium-137	0.00429	U	0.0788	0.0788		0.137	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Lead-210	0.164	U	1.63	1.63		2.78	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Lead-212	0.756		0.108	0.146		0.103	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Lead-214	0.782		0.124	0.148		0.122	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Potassium-40	14.9		1.65	2.25		0.708	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Protactinium-231	-0.919	U	3.14	3.14		5.26	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Radium-226	0.796		0.154	0.175	0.500	0.115	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Radium-228	0.658		0.192	0.203		0.127	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Thallium-208	0.264		0.0720	0.0771		0.0613	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Thorium-228	0.756		0.108	0.146		0.103	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Thorium-232	0.658		0.192	0.203		0.127	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Thorium-234	-0.544	U	1.52	1.52		2.56	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Uranium-235	-0.209	U	0.380	0.380		0.633	pCi/g	04/05/17 09:50	04/25/17 16:55	1
Uranium-238	-0.544	U	1.52	1.52		2.56	pCi/g	04/05/17 09:50	04/25/17 16:55	1



TestAmerica St. Louis

Client Sample Results

Client: CB&I Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-21668-2

Client Sample ID: TITO04-BS-FSSSU9-B002

Lab Sample ID: 160-21668-1

Date Collected: 03/29/17 13:35

Matrix: Solid

Date Received: 03/31/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.736		0.275	0.285		0.250	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Actinium-227	0.203	U	1.21	1.21		2.05	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Bismuth-212	0.343	U	0.637	0.638		1.09	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Bismuth-214	0.824		0.185	0.204		0.139	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Cesium-137	0.0255	U	0.0715	0.0716		0.124	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Lead-210	1.79	U	2.15	2.16		2.87	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Lead-212	0.883		0.140	0.181		0.133	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Lead-214	0.783		0.163	0.182		0.173	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Potassium-40	13.8		1.87	2.34		0.796	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Protactinium-231	0.511	U	1.62	1.62		5.27	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Radium-226	0.824		0.185	0.204	0.500	0.139	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Radium-228	0.736		0.275	0.285		0.250	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Thallium-208	0.326		0.0905	0.0966		0.0848	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Thorium-228	0.883		0.140	0.181		0.133	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Thorium-232	0.736		0.275	0.285		0.250	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Thorium-234	0.199	U	2.17	2.17		3.68	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Uranium-235	0.0737	U	0.187	0.187		1.36	pCi/g	04/05/17 09:50	04/25/17 16:57	1
Uranium-238	0.199	U	2.17	2.17		3.68	pCi/g	04/05/17 09:50	04/25/17 16:57	1



TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S001

Lab Sample ID: 160-24829-1

Date Collected: 10/03/17 09:13

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.147	U	0.181	0.182		0.273	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Actinium-227	0.0212	U	0.312	0.312		1.18	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Bismuth-212	0.000	U	0.395	0.395		0.626	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Bismuth-214	0.432		0.111	0.120		0.0771	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Cesium-137	-0.0127	U	0.0603	0.0603		0.104	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Lead-210	-0.713	U	1.54	1.54		2.58	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Lead-212	0.325		0.0689	0.0807		0.0718	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Lead-214	0.418		0.101	0.110		0.0994	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Potassium-40	11.0		1.29	1.71		0.281	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Protactinium-231	-0.731	U	2.27	2.27		3.80	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Radium-226	0.432		0.111	0.120	0.500	0.0771	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Radium-228	0.147	U	0.181	0.182		0.273	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Thallium-208	0.0884		0.0395	0.0405		0.0386	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Thorium-228	0.325		0.0689	0.0807		0.0718	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Thorium-232	0.147	U	0.181	0.182		0.273	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Thorium-234	0.587	U	1.23	1.23		2.06	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Uranium-235	0.000	U	0.120	0.120		0.661	pCi/g	10/06/17 21:19	10/27/17 12:10	1
Uranium-238	0.587	U	1.23	1.23		2.06	pCi/g	10/06/17 21:19	10/27/17 12:10	1

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S002

Lab Sample ID: 160-24829-2

Date Collected: 10/03/17 09:14

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.482		0.165	0.172		0.0984	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Actinium-227	-0.126	U	0.431	0.432		0.945	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Bismuth-212	0.360	U	0.677	0.678		1.15	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Bismuth-214	0.409		0.149	0.155		0.141	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Cesium-137	-0.0234	U	0.0543	0.0544		0.0939	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Lead-210	0.747	U	0.908	0.912		1.36	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Lead-212	0.279		0.0765	0.0847		0.0881	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Lead-214	0.357		0.120	0.126		0.121	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Potassium-40	11.7		1.62	2.02		0.667	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Protactinium-231	-0.650	U	1.70	1.71		2.89	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Radium-226	0.409		0.149	0.155	0.500	0.141	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Radium-228	0.482		0.165	0.172		0.0984	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Thallium-208	0.132		0.0596	0.0612		0.0546	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Thorium-228	0.279		0.0765	0.0847		0.0881	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Thorium-232	0.482		0.165	0.172		0.0984	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Thorium-234	0.153	U	0.260	0.261		1.82	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Uranium-235	0.114	U	0.261	0.261		0.475	pCi/g	10/06/17 21:19	10/27/17 12:30	1
Uranium-238	0.153	U	0.260	0.261		1.82	pCi/g	10/06/17 21:19	10/27/17 12:30	1

LAB CONSULTANTS
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S003

Lab Sample ID: 160-24829-3

Date Collected: 10/03/17 09:16

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.340		0.300	0.302		0.320	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Actinium-227	0.00979	U	0.0200	0.0201		1.45	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Bismuth-212	0.000	U	0.692	0.692		0.751	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Bismuth-214	0.537		0.146	0.157		0.0884	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Cesium-137	-0.0543	U	0.0903	0.0905		0.151	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-210	-1.29	U	1.80	1.81		2.98	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-212	0.186		0.0985	0.101		0.147	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-214	0.397		0.135	0.142		0.119	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Potassium-40	10.9		1.70	2.04		0.722	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Protactinium-231	0.206	U	2.74	2.74		4.66	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Radium-226	0.537		0.146	0.157	0.500	0.0884	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Radium-228	0.340		0.300	0.302		0.320	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thallium-208	0.103		0.0668	0.0676		0.0724	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-228	0.186		0.0985	0.101		0.147	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-232	0.340		0.300	0.302		0.320	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-234	-0.0426	U	1.33	1.33		2.27	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Uranium-235	-0.229	U	0.412	0.412		1.08	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Uranium-238	-0.0426	U	1.33	1.33		2.27	pCi/g	10/06/17 21:19	10/27/17 12:25	1

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S004

Lab Sample ID: 160-24829-4

Date Collected: 10/03/17 09:18

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.509		0.181	0.189		0.233	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Actinium-227	-0.299	U	0.810	0.811		1.36	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Bismuth-212	0.231	U	0.626	0.627		1.09	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Bismuth-214	0.386		0.141	0.147		0.130	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Cesium-137	-0.0284	U	0.0377	0.0378		0.102	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Lead-210	1.42	U	1.38	1.39		1.82	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Lead-212	0.293		0.0853	0.0934		0.109	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Lead-214	0.447		0.117	0.126		0.112	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Potassium-40	9.74		1.38	1.70		0.842	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Protactinium-231	0.636	U	1.40	1.41		3.23	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Radium-226	0.386		0.141	0.147	0.500	0.130	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Radium-228	0.509		0.181	0.189		0.233	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Thallium-208	0.157		0.0533	0.0558		0.0486	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Thorium-228	0.293		0.0853	0.0934		0.109	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Thorium-232	0.509		0.181	0.189		0.233	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Thorium-234	-0.0680	U	0.370	0.370		2.35	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Uranium-235	0.0615	U	0.417	0.417		0.703	pCi/g	10/06/17 21:19	10/27/17 12:23	1
Uranium-238	-0.0680	U	0.370	0.370		2.35	pCi/g	10/06/17 21:19	10/27/17 12:23	1


E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
Consultants

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S005

Lab Sample ID: 160-24829-5

Date Collected: 10/03/17 09:19

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.535		0.144	0.154		0.118	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Actinium-227	0.110	U	0.275	0.275		0.948	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Bismuth-212	0.319	U	0.591	0.592		1.01	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Bismuth-214	0.399		0.126	0.132		0.120	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Cesium-137	0.00653	U	0.0661	0.0661		0.116	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Lead-210	1.17	U	1.39	1.40		1.92	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Lead-212	0.438		0.0955	0.111		0.110	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Lead-214	0.438		0.111	0.120		0.116	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Potassium-40	11.0		1.46	1.84		0.661	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Protactinium-231	0.000	U	0.212	0.212		3.70	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Radium-226	0.399		0.126	0.132	0.500	0.120	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Radium-228	0.535		0.144	0.154		0.118	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Thallium-208	0.149		0.0629	0.0648		0.0592	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Thorium-228	0.438		0.0955	0.111		0.110	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Thorium-232	0.535		0.144	0.154		0.118	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Thorium-234	1.56		0.862	0.878		1.30	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Uranium-235	0.0768	U	0.267	0.268		0.526	pCi/g	10/06/17 21:19	10/27/17 12:21	1
Uranium-238	1.56		0.862	0.878		1.30	pCi/g	10/06/17 21:19	10/27/17 12:21	1

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S006

Lab Sample ID: 160-24829-6

Date Collected: 10/03/17 09:21

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.502		0.184	0.191		0.288	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Actinium-227	0.00599	U	0.826	0.826		1.42	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Bismuth-212	0.325	U	0.775	0.776		1.34	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Bismuth-214	0.634		0.132	0.148		0.0508	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Cesium-137	-0.0239	U	0.0699	0.0700		0.130	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Lead-210	0.703	U	1.44	1.45		2.43	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Lead-212	0.384		0.0923	0.105		0.102	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Lead-214	0.217	U	0.0952	0.0978		0.254	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Potassium-40	9.94		1.61	1.90		0.663	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Protactinium-231	0.235	U	1.52	1.52		4.88	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Radium-226	0.634		0.132	0.148	0.500	0.0508	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Radium-228	0.502		0.184	0.191		0.288	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Thallium-208	0.125		0.0540	0.0555		0.0512	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Thorium-228	0.384		0.0923	0.105		0.102	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Thorium-232	0.502		0.184	0.191		0.288	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Thorium-234	-0.986	U	1.69	1.69		2.94	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Uranium-235	-0.282	U	0.494	0.495		0.931	pCi/g	10/06/17 21:19	10/27/17 12:22	1
Uranium-238	-0.986	U	1.69	1.69		2.94	pCi/g	10/06/17 21:19	10/27/17 12:22	1


E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
Consultants

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24829-2

Client Sample ID: TITO04-BS-FSS-SU7C-RSY13-U15-S007

Lab Sample ID: 160-24829-7

Date Collected: 10/03/17 09:22

Matrix: Solid

Date Received: 10/04/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.440		0.262	0.266		0.266	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Actinium-227	-0.225	U	0.689	0.689		1.16	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Bismuth-212	-0.301	U	1.00	1.00		1.72	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Bismuth-214	0.386		0.125	0.131		0.117	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Cesium-137	-0.0362	U	0.0606	0.0607		0.102	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-210	0.0809	U	1.23	1.23		2.11	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-212	0.289		0.0784	0.0869		0.0982	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Lead-214	0.447		0.102	0.112		0.0967	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Potassium-40	8.17		1.33	1.57		0.529	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Protactinium-231	-0.128	U	2.30	2.30		3.91	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Radium-226	0.386		0.125	0.131	0.500	0.117	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Radium-228	0.440		0.262	0.266		0.266	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thallium-208	0.145		0.0450	0.0474		0.0368	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-228	0.289		0.0784	0.0869		0.0982	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-232	0.440		0.262	0.266		0.266	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Thorium-234	0.533	U	0.355	0.359		1.29	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Uranium-235	0.0568	U	0.393	0.393		0.663	pCi/g	10/06/17 21:19	10/27/17 12:25	1
Uranium-238	0.533	U	0.355	0.359		1.29	pCi/g	10/06/17 21:19	10/27/17 12:25	1



TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S001

Lab Sample ID: 160-24992-1

Date Collected: 10/11/17 12:15

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.290		0.213	0.216		0.232	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Actinium-227	0.227	U	0.504	0.504		0.730	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-212	-0.0280	U	0.744	0.744		1.38	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Bismuth-214	0.279		0.124	0.127		0.137	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Cesium-137	-0.0226	U	0.0608	0.0608		0.118	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-210	-0.132	U	1.24	1.24		1.91	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-212	0.238		0.0803	0.0860		0.0994	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Lead-214	0.218		0.129	0.131		0.151	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Potassium-40	10.4		1.71	2.02		0.746	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Protactinium-231	-0.912	U	2.17	2.17		3.66	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-226	0.279		0.124	0.127	0.500	0.137	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Radium-228	0.290		0.213	0.216		0.232	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thallium-208	0.0350	U	0.0879	0.0879		0.114	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-228	0.238		0.0803	0.0860		0.0994	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-232	0.290		0.213	0.216		0.232	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Thorium-234	-0.113	U	0.936	0.936		1.65	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-235	-0.00738	U	0.0196	0.0196		0.566	pCi/g	10/16/17 21:43	11/06/17 12:53	1
Uranium-238	-0.113	U	0.936	0.936		1.65	pCi/g	10/16/17 21:43	11/06/17 12:53	1

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S002

Lab Sample ID: 160-24992-2

Date Collected: 10/11/17 12:18

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.285		0.188	0.190		0.214	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Actinium-227	-0.346	U	0.408	0.410		1.23	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Bismuth-212	-0.292	U	0.573	0.574		1.24	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Bismuth-214	0.323		0.133	0.137		0.127	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Cesium-137	-0.0306	U	0.102	0.103		0.107	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Lead-210	1.01	U	0.865	0.873		1.11	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Lead-212	0.311		0.0728	0.0832		0.0729	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Lead-214	0.418		0.122	0.129		0.0921	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Potassium-40	10.3		1.51	1.84		0.569	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Protactinium-231	0.544	U	1.64	1.65		3.75	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Radium-226	0.323		0.133	0.137	0.500	0.127	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Radium-228	0.285		0.188	0.190		0.214	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Thallium-208	0.113		0.0493	0.0506		0.0493	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Thorium-228	0.311		0.0728	0.0832		0.0729	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Thorium-232	0.285		0.188	0.190		0.214	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Thorium-234	0.521	U	0.856	0.858		1.43	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Uranium-235	0.0150	U	0.0556	0.0556		0.691	pCi/g	10/16/17 21:43	11/06/17 12:54	1
Uranium-238	0.521	U	0.856	0.858		1.43	pCi/g	10/16/17 21:43	11/06/17 12:54	1

LAB CONSULTANTS
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S003

Lab Sample ID: 160-24992-3

Date Collected: 10/11/17 12:21

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.316		0.0978	0.103		0.150	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Actinium-227	-0.264	U	0.566	0.567		0.950	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Bismuth-212	0.302	U	0.550	0.551		0.930	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Bismuth-214	0.318		0.0929	0.0986		0.0890	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Cesium-137	-0.0361	U	0.0555	0.0557		0.0926	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Lead-210	0.476	U	1.14	1.14		1.91	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Lead-212	0.306		0.0606	0.0723		0.0591	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Lead-214	0.304		0.0715	0.0782		0.0679	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Potassium-40	10.1		1.18	1.57		0.509	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Protactinium-231	0.000	U	0.320	0.320		3.21	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Radium-226	0.318		0.0929	0.0986	0.500	0.0890	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Radium-228	0.316		0.0978	0.103		0.150	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Thallium-208	0.135		0.0414	0.0437		0.0309	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Thorium-228	0.306		0.0606	0.0723		0.0591	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Thorium-232	0.316		0.0978	0.103		0.150	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Thorium-234	-0.377	U	0.840	0.841		1.41	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Uranium-235	-0.0366	U	0.0690	0.0691		0.629	pCi/g	10/16/17 21:43	11/06/17 12:52	1
Uranium-238	-0.377	U	0.840	0.841		1.41	pCi/g	10/16/17 21:43	11/06/17 12:52	1

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S004

Lab Sample ID: 160-24992-4

Date Collected: 10/11/17 12:23

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.478		0.108	0.118		0.171	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Actinium-227	0.0621	U	0.278	0.279		1.12	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Bismuth-212	0.225	U	0.892	0.892		1.53	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Bismuth-214	0.382		0.118	0.125		0.113	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Cesium-137	0.00152	U	0.0486	0.0486		0.0872	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-210	-0.203	U	1.47	1.47		2.53	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-212	0.290		0.0797	0.0880		0.101	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-214	0.341		0.104	0.110		0.105	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Potassium-40	10.5		1.36	1.73		0.692	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Protactinium-231	0.000	U	0.421	0.421		3.93	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Radium-226	0.382		0.118	0.125	0.500	0.113	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Radium-228	0.478		0.108	0.118		0.171	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thallium-208	0.0836		0.0735	0.0740		0.0747	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-228	0.290		0.0797	0.0880		0.101	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-232	0.478		0.108	0.118		0.171	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-234	-0.133	U	1.01	1.01		1.74	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Uranium-235	-0.174	U	0.310	0.311		0.592	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Uranium-238	-0.133	U	1.01	1.01		1.74	pCi/g	10/16/17 21:43	11/06/17 13:30	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24992-2

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S005

Lab Sample ID: 160-24992-5

Date Collected: 10/11/17 12:26

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.458		0.190	0.196		0.125	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Actinium-227	0.281	U	0.620	0.621		0.892	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Bismuth-212	-0.00138	U	0.814	0.814		1.49	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Bismuth-214	0.423		0.170	0.175		0.155	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Cesium-137	-0.0213	U	0.0650	0.0650		0.127	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-210	0.0954	U	1.19	1.19		1.82	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-212	0.200		0.0826	0.0865		0.113	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Lead-214	0.364		0.112	0.119		0.111	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Potassium-40	11.3		1.78	2.12		0.747	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Protactinium-231	-0.876	U	2.82	2.82		4.75	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Radium-226	0.423		0.170	0.175	0.500	0.155	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Radium-228	0.458		0.190	0.196		0.125	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thallium-208	0.0948		0.0694	0.0701		0.0826	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-228	0.200		0.0826	0.0865		0.113	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-232	0.458		0.190	0.196		0.125	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Thorium-234	0.122	U	0.258	0.258		1.71	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Uranium-235	0.0450	U	0.320	0.320		0.614	pCi/g	10/16/17 21:43	11/06/17 13:30	1
Uranium-238	0.122	U	0.258	0.258		1.71	pCi/g	10/16/17 21:43	11/06/17 13:30	1

Client Sample ID: TITO04-BS-FSS-SU7D-U1-S006

Lab Sample ID: 160-24992-6

Date Collected: 10/11/17 12:29

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.337		0.186	0.189		0.185	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Actinium-227	0.216	U	0.502	0.503		0.847	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Bismuth-212	0.000	U	0.417	0.417		0.964	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Bismuth-214	0.323		0.0887	0.0948		0.0810	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Cesium-137	0.0252	U	0.0463	0.0464		0.0784	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Lead-210	0.460	U	1.11	1.11		1.87	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Lead-212	0.329		0.0653	0.0780		0.0658	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Lead-214	0.316		0.0829	0.0891		0.0756	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Potassium-40	9.40		1.17	1.52		0.534	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Protactinium-231	0.000	U	0.274	0.274		3.51	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Radium-226	0.323		0.0887	0.0948	0.500	0.0810	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Radium-228	0.337		0.186	0.189		0.185	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Thallium-208	0.116		0.0328	0.0350		0.0194	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Thorium-228	0.329		0.0653	0.0780		0.0658	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Thorium-232	0.337		0.186	0.189		0.185	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Thorium-234	0.362	U	0.884	0.884		1.49	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Uranium-235	0.0719	U	0.147	0.147		0.582	pCi/g	10/16/17 21:43	11/06/17 13:29	1
Uranium-238	0.362	U	0.884	0.884		1.49	pCi/g	10/16/17 21:43	11/06/17 13:29	1

E-LAB CONSULTANTS
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S007

Date Collected: 10/11/17 13:13

Date Received: 10/13/17 08:30

Lab Sample ID: 160-24995-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.481		0.210	0.215		0.224	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Actinium-227	-0.327	U	0.717	0.718		1.02	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Bismuth-212	0.265	U	0.868	0.869		1.52	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Bismuth-214	0.394		0.124	0.131		0.115	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Cesium-137	0.000343	U	0.0678	0.0678		0.122	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-210	-0.0646	U	1.14	1.14		1.76	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-212	0.294		0.0833	0.0915		0.0962	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-214	0.441		0.125	0.133		0.134	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Potassium-40	10.6		1.70	2.02		0.721	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Protactinium-231	0.000	U	0.843	0.843		4.15	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Radium-226	0.394		0.124	0.131	0.500	0.115	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Radium-228	0.481		0.210	0.215		0.224	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thallium-208	0.109		0.0616	0.0626		0.0698	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-228	0.294		0.0833	0.0915		0.0962	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-232	0.481		0.210	0.215		0.224	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-234	-0.881	U	0.957	0.961		1.85	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Uranium-235	0.140	U	0.273	0.274		0.488	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Uranium-238	-0.881	U	0.957	0.961		1.85	pCi/g	10/16/17 21:43	11/06/17 14:10	1

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S008

Date Collected: 10/11/17 13:11

Date Received: 10/13/17 08:30

Lab Sample ID: 160-24995-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.366		0.200	0.204		0.216	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Actinium-227	0.266	U	0.418	0.419		1.08	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Bismuth-212	0.269	U	0.698	0.699		1.21	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Bismuth-214	0.359		0.0980	0.105		0.0652	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Cesium-137	-0.0192	U	0.0538	0.0538		0.101	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Lead-210	-0.775	U	1.16	1.17		2.74	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Lead-212	0.0235	U	0.107	0.107		0.181	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Lead-214	0.332		0.115	0.120		0.118	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Potassium-40	10.7		1.55	1.90		0.573	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Protactinium-231	0.599	U	1.54	1.54		3.52	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Radium-226	0.359		0.0980	0.105	0.500	0.0652	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Radium-228	0.366		0.200	0.204		0.216	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thallium-208	0.132		0.0481	0.0500		0.0445	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thorium-228	0.0235	U	0.107	0.107		0.181	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thorium-232	0.366		0.200	0.204		0.216	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Thorium-234	0.375	U	0.804	0.805		1.22	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Uranium-235	0.0344	U	0.0930	0.0930		0.757	pCi/g	10/16/17 21:43	11/06/17 14:11	1
Uranium-238	0.375	U	0.804	0.805		1.22	pCi/g	10/16/17 21:43	11/06/17 14:11	1

E-LAB CONSULTANTS
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S009

Lab Sample ID: 160-24995-3

Date Collected: 10/11/17 13:16

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.419		0.123	0.130		0.156	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Actinium-227	0.138	U	0.391	0.391		0.958	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Bismuth-212	0.220	U	0.510	0.511		0.876	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Bismuth-214	0.286		0.0971	0.102		0.100	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Cesium-137	0.00155	U	0.0408	0.0408		0.0733	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-210	-0.431	U	0.748	0.750		2.23	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-212	0.230		0.0625	0.0692		0.0768	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Lead-214	0.305		0.0704	0.0773		0.0644	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Potassium-40	9.94		1.20	1.57		0.529	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Protactinium-231	0.000	U	0.429	0.429		3.14	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Radium-226	0.286		0.0971	0.102	0.500	0.100	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Radium-228	0.419		0.123	0.130		0.156	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thallium-208	0.123		0.0411	0.0431		0.0364	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-228	0.230		0.0625	0.0692		0.0768	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-232	0.419		0.123	0.130		0.156	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Thorium-234	0.0980	U	1.01	1.01		1.73	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Uranium-235	0.156	U	0.276	0.276		0.576	pCi/g	10/16/17 21:43	11/06/17 14:10	1
Uranium-238	0.0980	U	1.01	1.01		1.73	pCi/g	10/16/17 21:43	11/06/17 14:10	1

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S010

Lab Sample ID: 160-24995-4

Date Collected: 10/11/17 13:14

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.197		0.130	0.132		0.148	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Actinium-227	0.169	U	0.417	0.417		0.707	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Bismuth-212	0.155	U	0.274	0.275		0.472	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Bismuth-214	0.335		0.0837	0.0906		0.0509	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Cesium-137	0.0156	U	0.0336	0.0336		0.0579	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Lead-210	0.804	U	0.845	0.850		1.02	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Lead-212	0.279		0.0602	0.0702		0.0636	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Lead-214	0.406		0.0829	0.0930		0.0853	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Potassium-40	9.88		1.15	1.53		0.247	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Protactinium-231	-0.682	U	2.08	2.08		3.48	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Radium-226	0.335		0.0837	0.0906	0.500	0.0509	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Radium-228	0.197		0.130	0.132		0.148	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Thallium-208	0.0836		0.0315	0.0326		0.0237	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Thorium-228	0.279		0.0602	0.0702		0.0636	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Thorium-232	0.197		0.130	0.132		0.148	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Thorium-234	0.334	U	1.04	1.05		1.76	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Uranium-235	0.0210	U	0.198	0.198		0.580	pCi/g	10/16/17 21:43	11/06/17 14:12	1
Uranium-238	0.334	U	1.04	1.05		1.76	pCi/g	10/16/17 21:43	11/06/17 14:12	1


E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
Consultants

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24995-2

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S011

Lab Sample ID: 160-24995-5

Date Collected: 10/11/17 13:22

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.415		0.141	0.147		0.195	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Actinium-227	-0.0617	U	0.101	0.102		1.26	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Bismuth-212	0.180	U	0.585	0.586		1.02	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Bismuth-214	0.0268	U	0.118	0.118		0.283	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Cesium-137	0.0273	U	0.0489	0.0490		0.0827	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-210	0.273	U	0.871	0.872		1.38	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-212	0.237		0.0708	0.0772		0.0889	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-214	0.353		0.0937	0.101		0.0878	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Potassium-40	10.3		1.35	1.71		0.693	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Protactinium-231	-0.603	U	2.32	2.32		3.91	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Radium-226	0.0268	U	0.118	0.118	0.500	0.283	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Radium-228	0.415		0.141	0.147		0.195	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thallium-208	0.0913		0.0389	0.0400		0.0418	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-228	0.237		0.0708	0.0772		0.0889	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-232	0.415		0.141	0.147		0.195	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-234	0.734	U	1.04	1.04		1.72	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Uranium-235	-0.0345	U	0.337	0.337		0.563	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Uranium-238	0.734	U	1.04	1.04		1.72	pCi/g	10/16/17 21:43	11/06/17 15:19	1

Client Sample ID: TITO04-BS-FSS-SU7A-U1-S012

Lab Sample ID: 160-24995-6

Date Collected: 10/11/17 13:23

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.229	U	0.182	0.184		0.365	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Actinium-227	0.168	U	0.591	0.591		0.864	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Bismuth-212	-0.513	U	0.762	0.764		2.19	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Bismuth-214	0.343		0.156	0.160		0.166	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Cesium-137	-0.0480	U	0.0595	0.0598		0.153	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-210	-0.0134	U	1.37	1.37		2.09	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-212	0.285		0.0930	0.100		0.118	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Lead-214	0.377		0.119	0.125		0.148	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Potassium-40	9.64		1.69	1.96		0.781	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Protactinium-231	0.000	U	0.345	0.345		4.69	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Radium-226	0.343		0.156	0.160	0.500	0.166	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Radium-228	0.229	U	0.182	0.184		0.365	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thallium-208	0.0991	U	0.114	0.114		0.112	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-228	0.285		0.0930	0.100		0.118	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-232	0.229	U	0.182	0.184		0.365	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Thorium-234	-0.313	U	1.07	1.07		1.90	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Uranium-235	0.108	U	0.336	0.336		0.503	pCi/g	10/16/17 21:43	11/06/17 15:19	1
Uranium-238	-0.313	U	1.07	1.07		1.90	pCi/g	10/16/17 21:43	11/06/17 15:19	1

E-LAB CONSULTANTS
This data has been validated
according to the procedures
noted in the attached Data
Validation Report by E-Lab
consultants

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Client Sample ID: TITO04-BS-FSS-SU7B-LANE1-U1-S013

Lab Sample ID: 160-24996-1

Date Collected: 10/11/17 13:27

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.100	U	0.204	0.204		0.339	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Actinium-227	0.320	U	0.692	0.693		1.16	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Bismuth-212	0.406	U	0.707	0.708		1.19	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Bismuth-214	0.272		0.0970	0.101		0.0847	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Cesium-137	0.00360	U	0.0495	0.0495		0.0890	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-210	-0.824	U	1.32	1.33		2.91	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-212	0.302		0.107	0.114		0.155	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-214	0.285		0.105	0.109		0.138	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Potassium-40	10.7		1.50	1.86		0.542	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Protactinium-231	-0.778	U	2.52	2.52		4.24	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Radium-226	0.272		0.0970	0.101	0.500	0.0847	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Radium-228	0.100	U	0.204	0.204		0.339	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thallium-208	0.0751	U	0.0703	0.0707		0.0834	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-228	0.302		0.107	0.114		0.155	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-232	0.100	U	0.204	0.204		0.339	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-234	0.550	U	0.470	0.474		1.42	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Uranium-235	0.249	U	0.149	0.151		0.784	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Uranium-238	0.550	U	0.470	0.474		1.42	pCi/g	10/16/17 21:43	11/06/17 15:21	1

Client Sample ID: TITO04-BS-FSS-SU7B-LANE1-U1-S014

Lab Sample ID: 160-24996-2

Date Collected: 10/11/17 13:29

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.274		0.140	0.142		0.152	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Actinium-227	-0.0200	U	0.576	0.576		0.988	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Bismuth-212	0.266	U	0.430	0.431		0.725	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Bismuth-214	0.339		0.0826	0.0899		0.0692	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Cesium-137	-0.0144	U	0.0512	0.0513		0.0884	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-210	-0.635	U	0.676	0.680		1.86	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-212	0.285		0.0648	0.0746		0.0740	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Lead-214	0.347		0.0741	0.0825		0.0801	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Potassium-40	9.02		1.13	1.46		0.518	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Protactinium-231	-0.639	U	2.01	2.01		3.37	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Radium-226	0.339		0.0826	0.0899	0.500	0.0692	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Radium-228	0.274		0.140	0.142		0.152	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thallium-208	0.0998		0.0408	0.0421		0.0356	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-228	0.285		0.0648	0.0746		0.0740	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-232	0.274		0.140	0.142		0.152	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Thorium-234	0.445	U	0.946	0.947		1.58	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Uranium-235	0.000	U	0.0539	0.0539		0.561	pCi/g	10/16/17 21:43	11/06/17 15:21	1
Uranium-238	0.445	U	0.946	0.947		1.58	pCi/g	10/16/17 21:43	11/06/17 15:21	1


 This data has been validated
 according to the procedures
 noted in the attached Data
 Validation Report by E-Lab
 Consultants

TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Client Sample ID: TITO04-BS-FSS-SU7B-LANE1-U1-S015

Lab Sample ID: 160-24996-3

Date Collected: 10/11/17 13:31

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.409		0.0959	0.105		0.107	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Actinium-227	-0.147	U	0.534	0.534		0.905	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Bismuth-212	0.210	U	0.348	0.349		0.590	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Bismuth-214	0.251		0.0798	0.0839		0.0671	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Cesium-137	-0.0410	U	0.0661	0.0663		0.110	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Lead-210	0.493	U	0.943	0.945		1.58	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Lead-212	0.312		0.0958	0.104		0.140	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Lead-214	0.346		0.0713	0.0799		0.0808	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Potassium-40	10.1		1.14	1.54		0.237	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Protactinium-231	0.502	U	1.71	1.71		2.88	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Radium-226	0.251		0.0798	0.0839	0.500	0.0671	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Radium-228	0.409		0.0959	0.105		0.107	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Thallium-208	0.0925		0.0296	0.0311		0.0200	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Thorium-228	0.312		0.0958	0.104		0.140	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Thorium-232	0.409		0.0959	0.105		0.107	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Thorium-234	0.405	U	0.844	0.845		1.42	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Uranium-235	0.0352	U	0.165	0.165		0.569	pCi/g	10/16/17 21:43	11/06/17 15:18	1
Uranium-238	0.405	U	0.844	0.845		1.42	pCi/g	10/16/17 21:43	11/06/17 15:18	1

Client Sample ID: TITO04-BS-FSS-SU7B-LANE2-U1-S016

Lab Sample ID: 160-24996-4

Date Collected: 10/11/17 13:33

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0954	U	0.0531	0.0540		0.363	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Actinium-227	0.0779	U	0.610	0.610		1.04	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-212	-0.400	U	1.22	1.22		1.12	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-214	0.00893	U	0.173	0.173		0.296	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Cesium-137	-0.0285	U	0.0996	0.0997		0.102	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-210	-0.213	U	1.22	1.22		2.11	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-212	0.251		0.0711	0.0782		0.0895	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-214	0.325		0.0980	0.104		0.116	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Potassium-40	11.1		1.34	1.76		0.647	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Protactinium-231	-0.175	U	2.25	2.25		3.81	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-226	0.00893	U	0.173	0.173	0.500	0.296	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-228	0.0954	U	0.0531	0.0540		0.363	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thallium-208	0.0960		0.0386	0.0399		0.0399	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-228	0.251		0.0711	0.0782		0.0895	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-232	0.0954	U	0.0531	0.0540		0.363	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-234	-0.0499	U	0.902	0.902		1.55	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-235	-0.0156	U	0.290	0.290		0.498	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-238	-0.0499	U	0.902	0.902		1.55	pCi/g	10/16/17 21:43	11/06/17 16:41	1



TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-24996-2

Client Sample ID: TITO04-BS-FSS-SU7B-LANE2-U1-S017

Lab Sample ID: 160-24996-5

Date Collected: 10/11/17 13:36

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.208	U	0.273	0.273		0.397	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Actinium-227	-0.311	U	0.684	0.685		0.980	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-212	0.321	U	0.781	0.782		1.36	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-214	0.384		0.157	0.162		0.169	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Cesium-137	-0.00824	U	0.0699	0.0699		0.128	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-210	-0.915	U	1.41	1.41		2.32	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-212	0.242		0.0863	0.0918		0.112	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-214	0.306		0.129	0.132		0.167	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Potassium-40	11.6		1.82	2.17		0.754	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Protactinium-231	-0.0000000	U	2.44	2.44		4.20	pCi/g	10/16/17 21:43	11/06/17 16:41	1
	243									
Radium-226	0.384		0.157	0.162	0.500	0.169	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-228	0.208	U	0.273	0.273		0.397	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thallium-208	0.0615	U	0.0802	0.0804		0.101	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-228	0.242		0.0863	0.0918		0.112	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-232	0.208	U	0.273	0.273		0.397	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-234	0.0266	U	1.22	1.22		1.82	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-235	0.110	U	0.309	0.309		0.511	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-238	0.0266	U	1.22	1.22		1.82	pCi/g	10/16/17 21:43	11/06/17 16:41	1

Client Sample ID: TITO04-BS-FSS-SU7B-LANE2-U1-S018

Lab Sample ID: 160-24996-6

Date Collected: 10/11/17 13:38

Matrix: Solid

Date Received: 10/13/17 08:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.321		0.191	0.194		0.212	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Actinium-227	-0.201	U	0.649	0.650		1.25	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-212	0.167	U	0.621	0.621		1.10	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Bismuth-214	0.350		0.118	0.124		0.0888	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Cesium-137	-0.0279	U	0.113	0.113		0.111	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-210	0.605	U	1.38	1.38		2.32	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-212	0.0199	U	0.101	0.101		0.171	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Lead-214	0.343		0.123	0.128		0.117	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Potassium-40	10.5		1.52	1.86		0.563	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Protactinium-231	-0.867	U	3.04	3.04		5.11	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-226	0.350		0.118	0.124	0.500	0.0888	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Radium-228	0.321		0.191	0.194		0.212	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thallium-208	0.152		0.0569	0.0590		0.0487	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-228	0.0199	U	0.101	0.101		0.171	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-232	0.321		0.191	0.194		0.212	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Thorium-234	1.82		1.26	1.27		1.49	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-235	-0.224	U	0.256	0.257		0.886	pCi/g	10/16/17 21:43	11/06/17 16:41	1
Uranium-238	1.82		1.26	1.27		1.49	pCi/g	10/16/17 21:43	11/06/17 16:41	1



TestAmerica St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: Treasure Island - 500060

TestAmerica Job ID: 160-25032-2

Client Sample ID: TITO04-BS-FSS-SU7B-LANE3-U2-S021

Lab Sample ID: 160-25032-1

Date Collected: 10/13/17 08:39

Matrix: Solid

Date Received: 10/16/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.405		0.143	0.149		0.267	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Actinium-227	-0.293	U	0.724	0.725		0.977	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Bismuth-212	-0.111	U	0.618	0.618		1.12	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Bismuth-214	0.372		0.127	0.132		0.123	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Cesium-137	0.0268	U	0.0463	0.0464		0.0782	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Lead-210	-0.0749	U	1.50	1.50		2.57	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Lead-212	0.325		0.0843	0.0942		0.107	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Lead-214	0.413		0.100	0.109		0.0843	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Potassium-40	10.5		1.39	1.76		0.792	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Protactinium-231	0.000	U	0.262	0.262		4.03	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Radium-226	0.372		0.127	0.132	0.500	0.123	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Radium-228	0.405		0.143	0.149		0.267	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Thallium-208	0.155		0.0618	0.0638		0.0613	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Thorium-228	0.325		0.0843	0.0942		0.107	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Thorium-232	0.405		0.143	0.149		0.267	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Thorium-234	0.785	U	1.14	1.14		1.55	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Uranium-235	0.0760	U	0.281	0.281		0.475	pCi/g	10/17/17 22:41	11/07/17 09:28	1
Uranium-238	0.785	U	1.14	1.14		1.55	pCi/g	10/17/17 22:41	11/07/17 09:28	1

Client Sample ID: TITO04-BS-FSS-SU7B-LANE3-U2-S022

Lab Sample ID: 160-25032-2

Date Collected: 10/13/17 08:38

Matrix: Solid

Date Received: 10/16/17 08:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.127	U	0.180	0.181		0.321	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Actinium-227	-0.0430	U	0.0729	0.0731		0.824	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Bismuth-212	-0.211	U	0.663	0.663		1.15	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Bismuth-214	0.377		0.116	0.122		0.0981	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Cesium-137	0.0259	U	0.0556	0.0557		0.0949	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Lead-210	-0.657	U	1.30	1.30		1.98	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Lead-212	0.284		0.0749	0.0834		0.0896	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Lead-214	0.318		0.0904	0.0963		0.109	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Potassium-40	10.7		1.44	1.81		0.546	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Protactinium-231	-0.662	U	2.15	2.15		3.62	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Radium-226	0.377		0.116	0.122	0.500	0.0981	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Radium-228	0.127	U	0.180	0.181		0.321	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Thallium-208	0.0919		0.0449	0.0459		0.0466	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Thorium-228	0.284		0.0749	0.0834		0.0896	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Thorium-232	0.127	U	0.180	0.181		0.321	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Thorium-234	0.608	U	0.451	0.455		1.08	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Uranium-235	-0.00770	U	0.286	0.286		0.513	pCi/g	10/17/17 22:41	11/07/17 09:51	1
Uranium-238	0.608	U	0.451	0.455		1.08	pCi/g	10/17/17 22:41	11/07/17 09:51	1

E-LAB CONSULTANTS
This data has been validated according to the procedures noted in the attached Data Validation Report by E-Lab Consultants

TestAmerica St. Louis

Appendix G

Field Work Variances

Non-Time Critical Removal Action, Solid Waste Disposal Areas Westside, Bayside, and North Point Former Naval Station Treasure Island, San Francisco, Californian, (IR)		
Project Name: <u>Site 12-Phase III)</u>	DCN: <u>CBI-2005-0004-0065</u>	
Project Number: <u>500060</u>	Project Manager: <u>Ulrika Messer</u>	WV #: <u>003</u>
Contract Number: <u>N62473-12-D-2005</u>	SWDIV RPM: <u>Chris Yantos, Dave Clark</u>	Date: <u>1/6/2016</u>
CTO Number: <u>CTO 0004</u>	SWDIV CS: <u>Steve Miliner</u>	
Modification 04-Changes to Final Approved SAP to add Chemical and Radiological sampling to Bldg 1235 footprint - originally not included in Item: the SWDA North Point sampling areas.		
Primary WBS: <u>500060</u>		
Description (include recommended action to resolve changed condition and action taken to date) Modification 04 to CTO 004 adds Building 1235 demolition, excavation, chemical confirmation and radiological characterization sampling under the footprint of the demolished building. All chemical and radiological sampling will be consistent with existing approved Final SAP for the SWDA North Point area.		
Action This FWV documents the additions to Work Sheets (WS)#2 and #18 and revised applicable figures to describe the required sampling to complete the additional requirements of Contract Modification 04. All sampling and analytical procedures described in the Final SAP for CTO 004 (CBI, 2015) remain in place for this FWV. Data Quality Objectives for these additional samples have not changed from the original approved SAP. This FWV only describes numbers and types of additional samples to be collected under the new area added to the contract, i.e. Building 1235 footprint upon completion of demolition and excavation. See attached additions to SAP WS#2 (crosswalk), WS#18 and Figures 1, 2 and 3.		
Reason for Change To complete chemical confirmation sampling and radiological characterization sampling under Building 1235 footprint upon completion of demolition and excavation.		
Technical Justification Navy awarded additional scope to the original contract, including Bldg 1235 footprint.		
Estimated Cost Impact Captured in CTO Modification 04	Estimated Schedule Impact Captured in CTO Modification 04	WBS Information X WBS Code Opened to Capture Cost Task Title: WBS Code: 07012702
Applicable Document(s) Final Sampling and Analysis Plan for the Non-Time Critical Removal Action Solid Waste Disposal Areas Westside, Bayside, and North Point, Former Naval Station Treasure Island, San Francisco, California, June 2015 (CB&I) (DCN-CBI-2005-0004-0039)		
PMO Disposition of Work Variance		Type of Change: <u>Additional Sampling at SWDA North Point, Building 1235</u>
<input type="checkbox"/> Monitor; No notice to Navy Review by _____ (Date) _____		Additional Comments Prepared by Rose Condit, Program Chemist
<input checked="" type="checkbox"/> E-Mail Notification to Navy <i>Navy/CRS approved 1/14/2016 [Signature]</i>		
<input type="checkbox"/> Notice of Potential Impact (NOPI)		
<input type="checkbox"/> Request for Additional Funds (RAF)		
<input type="checkbox"/> Other (Please Comment)		Approvals
		Project Manager <u>Ulrika Messer</u> <i>[Signature]</i> Date: <u>1/14/2016</u>
		Project Technical Manager _____ Date: _____
		Project QC Manager _____ Date: _____

SAP Worksheet #2: SAP Identifying Information

Site Name/Number: Solid Waste Disposal Area (SWDA), Installation Restoration Site 12 (Site 12)
Contractor Name: CB&I Federal Services LLC (CB&I)
Contract Number: N62473-12-D-2005
Contract Title: EMAC III
Work Assignment Number (optional): Contract Task Order 0004

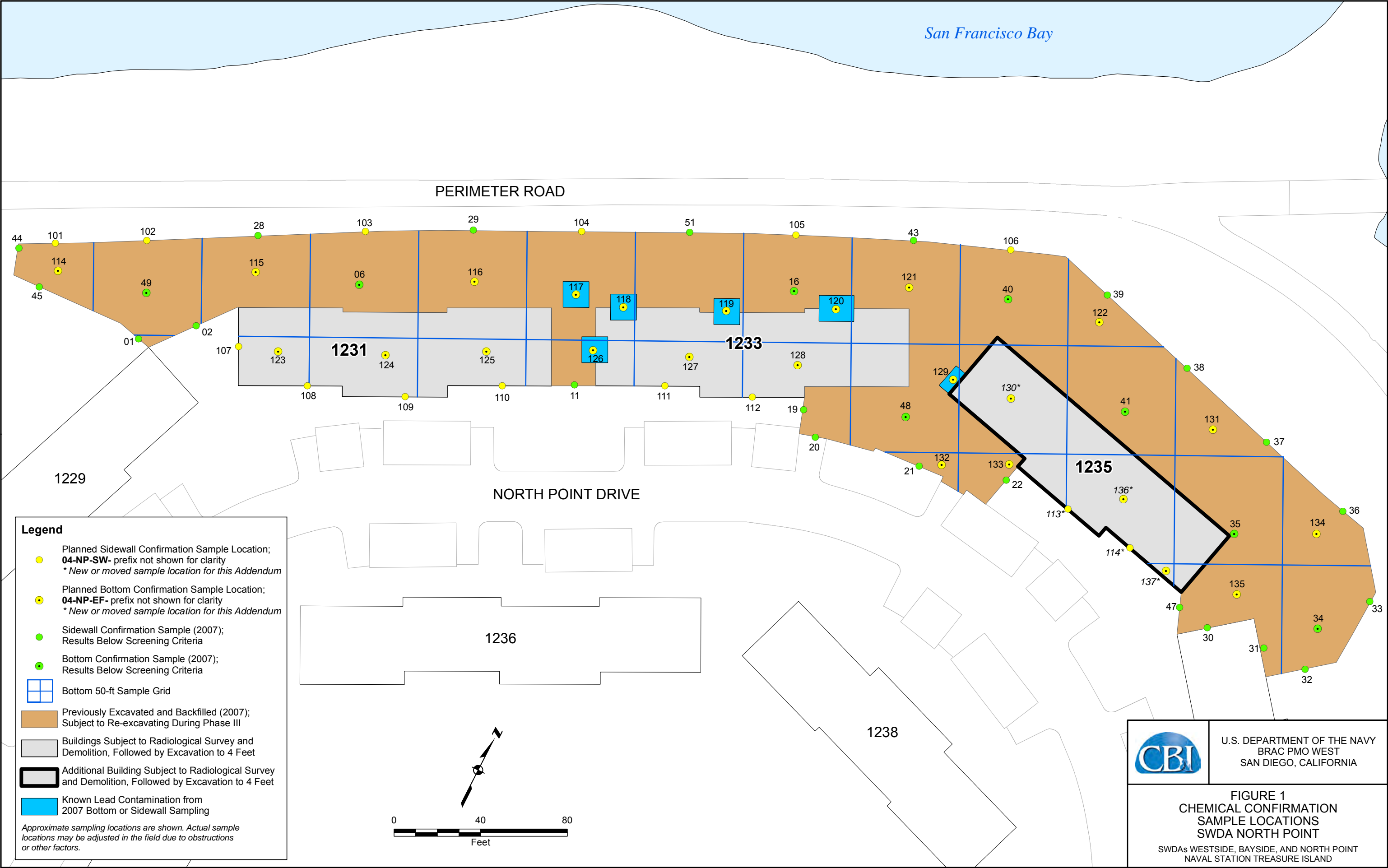
UFP-QAPP Worksheet #	Required Information	Crosswalk to Related Information
A. Project Management		
Documentation		
1	Title and Approval Page	FWV-003-No Changes to Final SAP
2	Table of Contents; SAP Identifying Information	FWV-003-No Changes to Final SAP
3	Distribution List	FWV-003-No Changes to Final SAP
4	Project Personnel Sign-Off Sheet	FWV-003-No Changes to Final SAP
Project Organization		
5	Project Organizational Chart	FWV-003-No Changes to Final SAP
6	Communication Pathways	FWV-003-No Changes to Final SAP
7	Personnel Responsibilities and Qualifications Table	FWV-003-No Changes to Final SAP
8	Special Personnel Training Requirements Table	FWV-003-No Changes to Final SAP
Project Planning/Problem Definition		
9	Project Planning Session Documentation (Including Data Needs Tables); Project Scoping Session Participants Sheet	FWV-003-No Changes to Final SAP
10	Problem Definition, Site History, and Background Site Maps (Historical and Present)	FWV-003-No Changes to Final SAP
11	Site-Specific Project Quality Objectives	FWV-003-No Changes to Final SAP
12	Measurement Performance Criteria Table	FWV-003-No Changes to Final SAP
13	Sources of Secondary Data and Information Secondary Data Criteria and Limitations Table	FWV-003-No Changes to Final SAP
14	Summary of Project Tasks	FWV-003-No Changes to Final SAP
15	Reference Limits and Evaluation Table	FWV-003-No Changes to Final SAP
16	Project Schedule/Timeline Table	FWV-003-No Changes to Final SAP
B. Measurement Data Acquisition		
Sampling Tasks		
17	Sampling Design and Rationale	FWV-003-No Changes to Final SAP
18	Sampling Locations and Methods/Standard Operating Procedure (SOP) Requirements Table	Updated for FWV-003

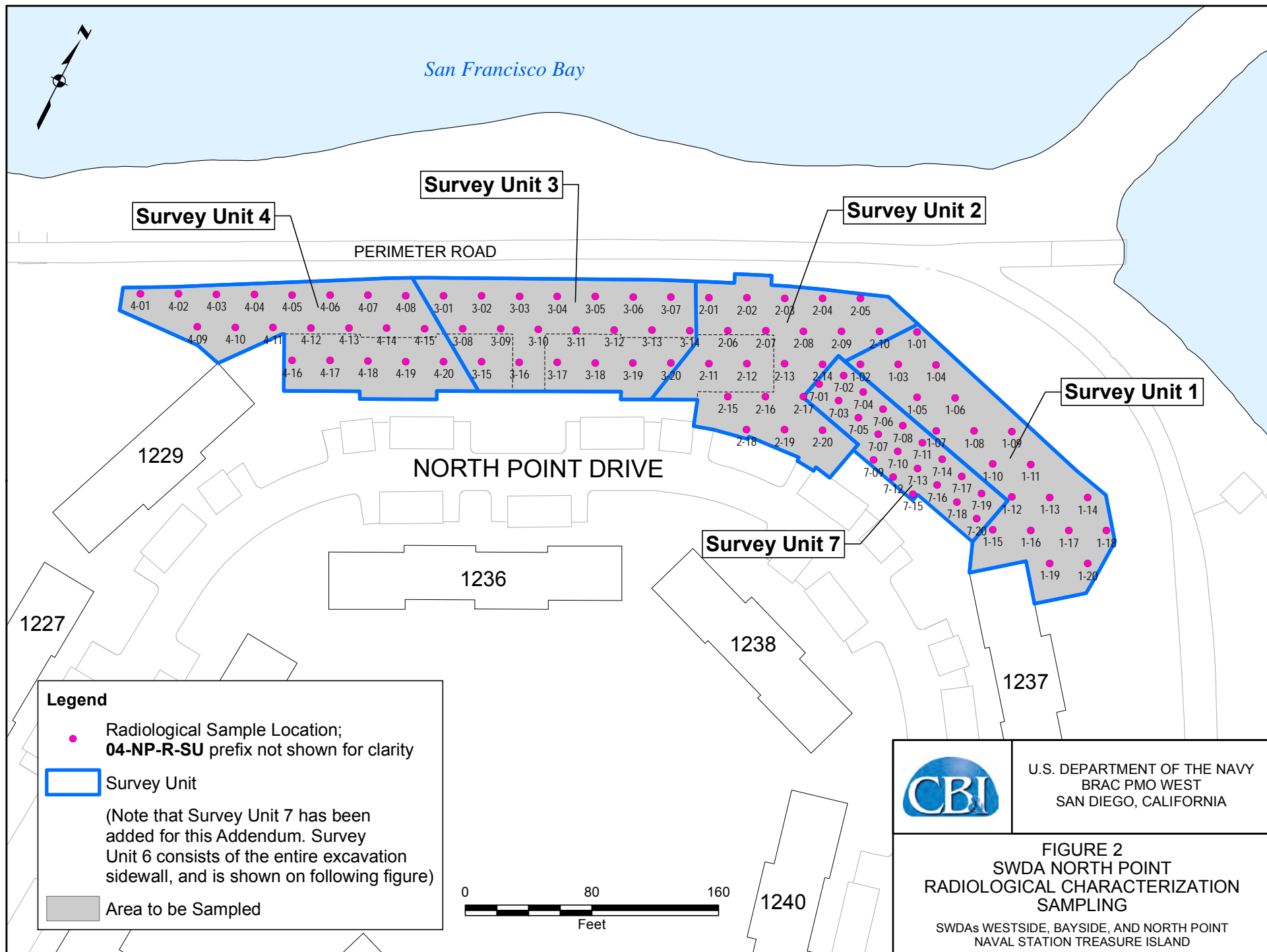
UFP-QAPP Worksheet #	Required Information	Crosswalk to Related Information
	Sample Location Map(s)	
19	Analytical Methods/SOP Requirements Table	FWV-003-No Changes to Final SAP
20	Field Quality Control (QC) Sample Summary Table	FWV-003-No Changes to Final SAP
21	Project Sampling SOP References Table Sampling SOPs	FWV-003-No Changes to Final SAP
22	Field Equipment Calibration, Maintenance, Testing, and Inspection Table	FWV-003-No Changes to Final SAP
Analytical Tasks		
23	Analytical SOPs /Analytical SOP References Table	FWV-003-No Changes to Final SAP
24	Analytical Instrument Calibration Table	FWV-003-No Changes to Final SAP
25	Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	FWV-003-No Changes to Final SAP
Sample Collection		
26	Sample Handling System, Documentation Collection, Tracking, Archiving and Disposal / Sample Handling Flow Diagram	FWV-003-No Changes to Final SAP
27	Sample Custody Requirements, Procedures/SOPs Sample Container Identification / Example Chain of Custody Form and Seal	FWV-003-No Changes to Final SAP
QC Samples		
28	QC Samples Table -Screening/Confirmatory Analysis Decision Tree	FWV-003-No Changes to Final SAP
Data Management Tasks		
29	Project Documents and Records Table	FWV-003-No Changes to Final SAP
30	Analytical Services Table / Analytical and Data Management SOPs	FWV-003-No Changes to Final SAP
C. Assessment Oversight		
31	Planned Project Assessments Table /Audit Checklists	FWV-003-No Changes to Final SAP
32	Assessment Findings and Corrective Action Responses	FWV-003-No Changes to Final SAP
33	Quality Assurance (QA) Management Reports Table	FWV-003-No Changes to Final SAP
D. Data Review		
34	Verification (Step I) Process Table	FWV-003-No Changes to Final SAP
35	Validation (Steps IIa and IIb) Process Table	FWV-003-No Changes to Final SAP
36	Validation (Steps IIa and IIb) Summary Table	FWV-003-No Changes to Final SAP
37	Usability Assessment	FWV-003-No Changes to Final SAP

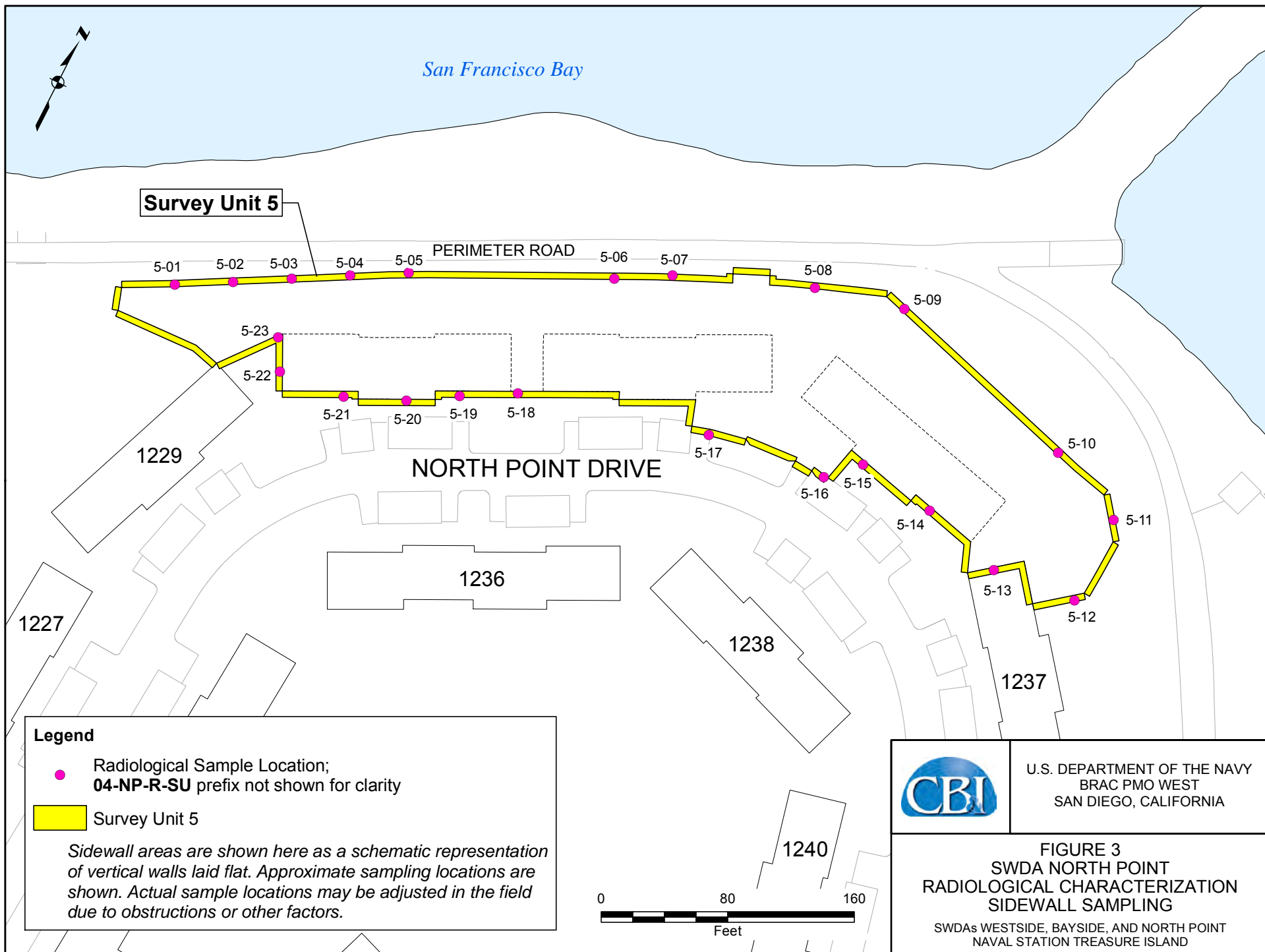
SAP Worksheet #18: Sampling Locations and Methods/Standard Operating Procedures Requirements Table

FWV-003 – Additional samples planned for Building 1235 footprint chemical confirmation and radiological characterization.

Sampling Location	Purpose	Sample ID Number	Matrix	Depth (feet bgs)	Analytical Group	Number of Samples	Sampling SOP Reference
SWDA North Point (NP) – Additional building 1235 footprint (Figure 1)	Excavation chemical confirmation	NP-SW-113 NP-SW-114 (sidewalls)	Soil	Sidewalls—2 (Depth estimated)	Lead (all samples) PCB (all samples) PAH (all samples) Dioxin/Furans (25% of the total samples)	2	Final SAP Worksheet #14
		NP-EF-130 NP-EF-136 NP-EF-137 (bottom)	Soil	Bottom—4 (Depth estimated)	Lead (all samples) PCB (all samples) PAH (all samples) Dioxin/Furans (25% of the total samples)	3	Final SAP Worksheet #14
SWDA North Point – Additional building 1235 footprint (Figure 2 and 3)	Radiological characterization of excavation bottom and sidewall soils	NP-R-SU07-01 through NP-R-SU07-20	Soil	Excavation bottom: 4 to 4.5 feet bgs	²²⁶ Ra (gamma spec)	20	Final SAP Worksheet #14
		NP-R-SU5-14 NP-R-SU5-15 (Moved from previous North Point SW locations that will no longer exist with removal of Bldg 1235 and excavation of building footprint)	Soil	Excavation sidewall: Between 0 and 4 feet bgs,	²²⁶ Ra (gamma spec)	2	Final SAP Worksheet #14







Non-Time Critical Removal Action, Solid Waste Disposal Areas Westside, Bayside, and North Point Former Naval Station Treasure Island, San Francisco, California, (IR		
Project Name: <u>Site 12-Phase III)</u>	DCN:	<u>CBI-2005-0004-0094</u>
Project Number: <u>500060</u>	Project Manager: <u>Ulrika Messer</u>	WV #: <u>005</u>
Contract Number: <u>N62473-12-D-2005</u>	SWDIV RPM: <u>Chris Yantos, Dave Clark</u>	Date: <u>12/7/2016</u>
CTO Number: <u>CTO 0004</u>	SWDIV CS: <u>Steve Miliner</u>	
Item: <u>Section 6.5 Radiological Characterization Survey and Sampling</u>	Primary WBS:	<u>500060</u>

Description *(include recommended action to resolve changed condition and action taken to date)*

The Final WP Section 6.5 states that "Radiological soil samples will be collected when the planned extent of excavation is reached. Radiological samples will be collected from the excavation bottom on a random-start triangular systematic grid at a frequency of 20 samples per 1,000 square meters, or 50 square meters per sample (Figures 15 through 20)." This FWV is issued to clarify that if the bottom is submerged and the bottom soil layer is excavated in accordance with Section 6.5.6 and transported to an RSY pad for final gamma scan and systematic soil sampling, those systematic soil samples are the equivalent samples and will thereby represent the excavation bottom systematic grid samples as required by Section 6.5.

Action

Modify text to Final Work Plan Section 6.5, third row "Radiological Characterization Survey and Sampling" to: (changed text in *italics*)
Radiological soil samples will be collected when the planned extent of excavation is reached. Radiological samples will be collected from the excavation bottom on a random-start triangular systematic grid at a frequency of 20 samples per 1,000 square meters, or 50 square meters per sample (Figures 15 through 20). *If the bottom of the excavation is submerged by water and 6 inches of submerged soil at the excavation extent is removed and placed on an RSY pad for final gamma scanning in accordance with Section 6.5.6, the soil layer on the RSY pad representing the bottom will be radiologically sampled systematically at the same frequency as if the soil layer was still in situ. The samples collected from the representative soil layer on the bottom will be equivalent to in situ samples.*

Although some radiological samples were collected during Phase I of the NTCRA, results from those samples will be used only for guiding specific remediation activities (Section 6.6) and not for final release. All samples used to support the radiological release of the SWDAs will be collected during Phase III and analyzed by a laboratory accredited in the Department of Defense Environmental Accreditation Program. Additional details are provided in the following subsections.

Reason for Change

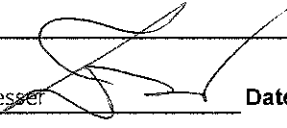
As the project was planned, excavation depths were generally expected to reach 4 ft bgs and not anticipated to extend beyond the water table. Because excavation surfaces can not be radiologically gamma scanned under water, the submerged bottom (and sidewalls as applicable) soil layer is excavated and placed on an RSY pad. This FWV clarifies that the samples collected on the representative soil layer on an RSY pad are equivalent to, and represent, the excavated bottoms and sidewalls as applicable.

Technical Justification

See above. Given that the origin and volumes of soils are closely tracked, systematic sampling on the RSY Pad is equivalent to the systematic sampling originally planned to be mainly executed in situ.

Estimated Cost Impact	Estimated Schedule Impact	WBS Information
Firm-fixed price contract; None	None	WBS Code Open to Capture Cost
		WBS Code: 500060

Applicable Documents(s): *Final Work Plan Non-Time Critical Removal Action Solid Waste Disposal Areas Westside, Bayside, and North Point, Former Naval Station Treasure Island, San Francisco, California*, June 2015 (CB&I) (DCN-CBI-2005-0004-0039)

PMO Disposition of Work Variance		Type of Change: <u>N/A</u>
<input type="checkbox"/> Monitor; No notice to Navy Review by _____ (Date)	Additional Comments <i>FWV prepared by Natalie Rothell 12/7/2016</i> <i>Input by Ray Schul 12/17/2016</i>	
<input checked="" type="checkbox"/> E-Mail Notification to Navy (RPM 12/27/2016)		
<input type="checkbox"/> Notice of Potential Impact (NOPI)		
<input type="checkbox"/> Request for Additional Funds (RAF)	Approvals	
<input type="checkbox"/> Other (Please Comment)	Project Manager <u>Ulrika Messer</u> 	Date: <u>12/20/2016</u>
	Project Technical Manager <u>N/A</u>	Date: _____
	Project QC Manager <u>N/A</u>	Date: _____