ZION STATION RESTORATION PROJECT
FINAL STATUS SURVEY RELEASE RECORD

UNIT 2 DIESEL FUEL OIL STORAGE TANK ROOM
SURVEY UNIT 06202

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LIST OF ACRONYMS AND ABBREVIATIONS

ALARA	As Low As Reasonably Achievable
AMCG	Average Member of the Critical Group
BFM	Basement Fill Model
DQA	Data Quality Assessment
DQO	Data Quality Objective
DCGL	Derived Concentration Guideline Level
FSS	Final Status Survey
HTD	Hard-to-Detect
IC	Insignificant Contributor
ISOCS	In Situ Object Counting System
LTP	License Termination Plan
LBGR	Lower Bound of the Gray Region
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDC	Minimum Detectable Concentration
OpDCGL	Operational Derived Concentration Guideline Level
QAPP	Quality Assurance Project Plan
QC	Quality Control
RE	Radiological Engineer
ROC	Radionuclides of Concern
SOF	Sum of Fractions
TEDE	Total Effective Dose Equivalent
UBGR	Upper Bound of the Gray Region
UCL	Upper Confidence Level
ZNPS	Zion Nuclear Power Station
ZSRP	Zion Station Restoration Project

1. EXECUTIVE SUMMARY

This Final Status Survey (FSS) Release Record for survey unit 06202, Unit 2 Diesel Fuel Oil Storage Tank Room, has been generated for the Zion Station Restoration Project (ZSRP) in accordance with Zion*Solutions* procedure ZS-LT-300-001-005, *"Final Status Survey Data Reporting"* (Reference 1) and satisfies the requirements of Section 5.11 of the *"Zion Station Restoration Project License Termination Plan"* (LTP) (Reference 2).

The FSS Sample Plan B1-06202AF was developed in accordance with Zion*Solutions* procedure ZS-LT-300-001-001, *"Final Status Survey Package Development"* (Reference 3) the ZSRP LTP, and guidance from NUREG-1575, *"Multi-Agency Radiation Survey and Site Investigation Manual"* (MARSSIM) (Reference 4).

In April of 2016, an FSS was conducted on the Turbine Building basement structure. The sample plan design for the FSS of the Turbine Building did not include the surface area of the Unit 1 and Unit 2 Diesel Fuel Oil Storage Tank Rooms. A separate sample plan was written to include fifty-one (51) judgmental measurements to represent the surface area of the Diesel Fuel Oil Storage Tank Room. The weighted average of the judgmental In Situ Object Counting System (ISOCS) measurements will be added to the systematic mean of the Turbine Building basement.

In accordance with ZSRP LTP Chapter 5, section 5.5.2.1.2 and Table 5-19, the Turbine Building survey unit has a MARSSIM classification of 3. The Diesel Fuel Oil Storage Tank Room was re-classified as a Class 1 due to it becoming a pathway for radioactive waste removed from the Auxiliary Building during decommissioning.

Final Status Survey was performed on the Diesel Oil rooms to demonstrate that the concentrations of residual radioactivity were equal to or below site-specific Derived Concentration Guideline Levels (DCGL) corresponding to the dose criterion in 10 CFR 20.1402. The Unit 2 Diesel Fuel Oil Storage Tank Room has a MARSSIM Classification of 1. A Sample Plan was designed based upon use of the Sign Test as the nonparametric statistical test for compliance. Both the Type I (α) and Type II (β) decision error rates were set at 0.05. The Canberra ISOCS was selected as the primary instrument used to perform FSS. To ensure 100% of the surface area was surveyed in accordance with the classification, fifty-one (51) ISOCS measurement locations were selected using several adjusted Field of View (FOV) geometry's as specified in Zion*Solutions* TSD 14-022, "*Use of In-Situ Gamma Spectroscopy for Final Status Survey of End State Structures*" (Reference 5).

The results of the 51 ISOCS judgmental measurement results showed that the Sum of Fractions (SOF) for each measurement was less than one (1) when applying the respective Operational Derived Concentration Guideline Levels (OpDCGL) for the

Turbine Building Basement from Zion*Solutions* TSD 17-004, "*Operational Derived Concentration Guideline Levels for Final Status Survey*" (Reference 6). Therefore, the null hypothesis is rejected and the Unit 2 Diesel Fuel Oil Storage Tank Room is acceptable for unrestricted release.

2. SURVEY UNIT DESCRIPTION

Unit 2 Diesel Fuel Oil Storage Tank Room was located on the 570 foot elevation and housed the oil for the Unit 2 Diesel Generator. The rooms were adjacent to the Turbine Building on the West side of the "G" (Column) Wall which divided the Turbine Building and Auxiliary Building. The entrance into the Unit 2 Diesel Fuel Oil room was from the Steam Tunnel stair wells from elevation 592 of the TB to the 570 foot elevation (See Figure 1). The area of this structural survey unit is estimated at approximately 813 $m^{2.}$.

Figure 1 - Unit 2 Diesel Fuel Oil Storage Tank Room

3. CLASSIFICATION BASIS

The Turbine Building basement (survey unit 06100) was classified in accordance with ZionSolutions procedure ZS-LT-300-001-002, "*Survey Unit Classification*" (Reference 7). The Diesel Fuel Oil Storage Tank Room is part of the Turbine Building basement survey unit. The Turbine Building was classified as a mixture of Class 2 and Class 3 structural survey units in accordance with the "*Zion Station Historical Site Assessment"* (HSA) (Reference 8). In LTP Chapter 5, section 5.5.2, it states that the survey units designated for structures below 588 foot elevation from the HSA that were presented in LTP Chapter 2, Table 2-2 were based on screening values and source term

assumptions that are significantly different from the Basement Fill Model (BFM) and are therefore not applicable. LTP Chapter 5, section 5.5.2.1.1 states that the FSS units for the basements of the Turbine Building, the Crib House/Forebay and the Circulating Water Discharge Tunnels are designated as Class 3 as defined in MARSSIM section 2.2 in that the FSS units are not expected to contain any residual radioactivity, or are expected to contain levels of residual radioactivity at a small fraction of the DCGLs, based on site operating history and previous radiation surveys.

During decommissioning, the primary pathway into and out of the basement of the Auxiliary Building became the Unit 1 and Unit 2 570 foot elevation Diesel Fuel Oil floors. Ramps were constructed through each into the 542 foot elevation to allow for the transit of heavy equipment and removal of radioactive commodities. Due to the introduction of radioactive material into both of these areas, they were reclassified as Class 1 survey units in accordance with ZS-LT-300-001-002.

The FSS Radiological Engineer (RE) performed a visual inspection and walk-down of the survey unit on 05/30/2018 prior to performing FSS. The purpose of the walk-down was to assess the physical condition of the survey unit, evaluate access points and travel paths and identify potentially hazardous conditions. A final classification assessment was performed in accordance with procedure ZS-LT-300-001-002 as part of the survey design for FSS.

4. DATA QUALITY OBJECTIVES (DQO)

Final Status Survey planning and design hinges on coherence with the Data Quality Objective (DQO) process to ensure, through compliance with explicitly defined inputs and boundaries, that the primary objectives of the survey is satisfied. The DQO process is described in the ZSRP LTP. The appropriate design for a given survey is developed using the DQO process as outlined in Appendix D of MARSSIM.

The DQO process incorporated hypothesis testing and probabilistic sampling distributions to control decision errors during data analysis. Hypothesis testing is a process based on the scientific method that compares a baseline condition to an alternate condition. The baseline condition is technically known as the null hypothesis. Hypothesis testing rests on the premise that the null hypothesis is true and that sufficient evidence must be provided for rejection. In designing the survey plan, the underlying assumption, or null hypothesis was that residual activity in the survey unit exceeded the release criteria. Rejection of the null hypothesis would indicate that residual activity within the survey unit does not exceed the release criteria. Therefore, the survey unit would satisfy the primary objective of the FSS sample plan.

The primary objective of the FSS sample plan is to demonstrate that the level of residual radioactivity in survey unit 06202 did not exceed the release criteria specified in the LTP and that the potential dose from residual radioactivity is As Low As Reasonably Achievable (ALARA).

Zion*Solutions* TSD 11-001, *"Technical Support Document for Potential Radionuclides of Concern During the Decommissioning of the Zion Station"* (Reference 9) established the basis for an initial suite of potential Radionuclides of Concern (ROC) for the decommissioning of the Zion Nuclear Power Station (ZNPS). LTP Chapter 2 provides detailed characterization data that described contamination levels in the basements. Concrete core samples were collected during characterization surveys were obtained at biased locations where there were elevated contact dose rates and/or evidence of leaks/spills. The collected core samples were analyzed for the presence of plant-derived radionuclides.

LTP Chapter 6, section 6.5.2 discusses the process used to derive the ROC for the decommissioning of ZNPS, including the elimination of insignificant dose contributors (IC) from the initial suite. LTP section 6.5.2 also states that the Auxiliary Basement ROC and the IC percentage of 5% for adjusting ROC DCGLs will also be applied to all other basements including the Diesel Fuel Oil Storage unless different values are justified by the results of continuing characterization or FSS Hard-to-Detect (HTD) analysis. Table 1 presents the ROC for the Auxiliary Basement structural surfaces and the normalized fractions based on the radionuclide mixture.

Table 1 - Dose Significant Radionuclides and Mixture

Radionuclide	% of Total Activity (normalized)(1)
Co-60	0.92%
Cs-134	0.01%
Cs-137	75.32%
Ni-63	23.71%
Sr-90	0.05%

(1) Based on maximum percent of total activity from Table 20 of TSD 14-019, normalized to one for the dose significant radionuclides.

A fundamental precursor to survey design is to establish a relationship between the release criteria and some measurable quantity. This is done through the development of DCGLs. The DCGLs represent average levels of radioactivity above background levels and are presented in terms of surface or mass activity concentrations. Chapter 6 of the LTP describes in detail the modeling used to develop the DCGLs for structures.

The End State basements will be comprised of steel and/or concrete structures which will be covered by at least three feet of clean soil and physically altered to a condition which would not realistically allow the remaining structures, if excavated, to be occupied. The exposure pathways in the BFM are associated with residual radioactivity in floors and walls that is released through leaching into water contained in the interstitial spaces of the fill material. The BFM assumes that the inventory of residual radioactivity in a given building is released either instantly or over time by diffusion, depending on whether the activity is surficial or volumetric, respectively. The activity released into the fill water will adsorb onto the clean fill, as a function of the radionuclide-specific distribution coefficients, resulting in equilibrium concentrations between the fill and the water. Consequently, the only potential exposure pathways after backfill, assuming the 'as-left' geometry, are associated with the residual radioactivity in the water contained in the fill.

The final outputs of the BFM are the Basement Derived Concentration Guideline Levels (DCGL), in units of pCi/m^2, which are calculated using the BFM GW and BFM Drilling Spoils Dose Factors (LTP Chapter 6, Tables 6-24 and 6-25). The DCGLs for basement structure surfaces are calculated separately for the GW and Drilling Spoils scenarios and for the summation of both scenarios. The summation DCGL is designated as the Base Case DCGL (BcDCGL) and is used during FSS to demonstrate compliance (analogous to the $DCGL_W$ as defined in MARSSIM). The BcDCGLs are radionuclide-specific concentrations that represent the 10 CFR 20.1402 dose criterion of 25 mrem/year and are calculated for each ROC and each backfilled basement.

When applied to structures, the DCGLs are expressed in units of activity per unit of area (pCi/m^2). The "unity rule" is applied when there is more than one ROC. The measurement results for each singular ROC present in the mixture are compared against their respective DCGL to derive a dose fraction.

The BcDCGLs for the unrestricted release of the Turbine Building (including the Diesel Fuel Oil Storage Tank Rooms) are provided in Table 2. The IC dose percentage of 5% was used to adjust the Turbine Building BcDCGLs to account for the dose from the eliminated IC radionuclides.

Table 2 - Base Case DCGLs ($BcDCGL_B$) from LTP Chapter 5, Table 5-3

Radionuclide	Turbine Building $BcDCGL_B$ (pCi/m^2)
Co-60	7.03E+07
Ni-63	2.18E+09
Sr-90	7.74E+05
Cs-134	1.59E+07
Cs-137	2.11E+07

Each radionuclide-specific BcDCGL is equivalent to the level of residual radioactivity (above background levels) that could, when considered independently, result in a Total Effective Dose Equivalent (TEDE) of 25 mrem per year to an Average Member of the Critical Group (AMCG). To ensure that the summation of dose from each source term is 25 mrem/yr or less after all FSS is completed, the BcDCGLs are reduced based on an expected, or *a priori*, fraction of the 25 mrem/year dose limit from each source term. The reduced DCGLs, or "Operational" DCGLs (OpDCGL) can be related to the BcDCGLs as an expected fraction of dose based on an *a priori* assessment of what the expected dose should be based on the results of site characterization, process knowledge and the extent of planned remediation. The OpDCGL is then used as the DCGL for the FSS design of the survey unit (calculation of surrogate DCGLs, investigations levels, etc.). Details of the OpDCGLs derived for each dose component and the basis for the applied *a priori* dose fractions are provided in TSD 17-004. The $OpDCGL_B$ for FSS of the Diesel Fuel Oil Storage Tank Room is provided in Table 3.

Instrument DQOs included a verification of the ability of the survey instrument to detect the radiation(s) of interest relative to the Operational DCGL. The Canberra ISOCS was selected as the primary instrument used to perform FSS of basement surfaces. Response checks were required prior to issuance and after use. Control and accountability of ISOCS units was required to assure data quality.

Table 3 - Operational DCGLs ($OpDCGL_B$) from LTP Chapter 5, Table 5-4

Radionuclide	Turbine Building $OpDCGL_B$ (pCi/m^2)
Co-60	5.98E+06
Ni-63	1.85E+08
Sr-90	6.58E+04
Cs-134	1.35E+06
Cs-137	1.79E+06

As part of the DQOs applied to laboratory processes, analysis results were reported as actual calculated results. The actual recorded value was used as the recorded FSS result for measurement and/or sample values that are less than Minimum Detectable Concentration (MDC). Negative values were recorded as "zero". For radionuclides less than MDC, the value representing the highest abundance was selected. Results were not reported as "less than MDC". Sample report summaries included unique sample identification, analytical method, radionuclide, result, uncertainty, laboratory data qualifiers, units, and the observed MDC.

In accordance with the LTP, for laboratory analysis, MDCs less than 10% of the OpDCGL were preferable while MDCs up to 50% of the OpDCGL were acceptable. The maximum acceptable MDC for measurements obtained using field instruments was 50 percent of the applicable OpDCGL.

5. SURVEY DESIGN

Guidance for preparing FSS plans was provided in procedure ZS-LT-300-001-001 "*Final Status Survey Package Development*". The Canberra ISOCS was selected as the primary instrument for performing FSS of basement surfaces. The ISOCS was selected as the instrument of choice to perform FSS of basement surfaces due to the fact that an ISOCS measurement will provide results that can be used directly to determine total activity with depth in concrete and, the surface area covered by a single ISOCS measurement is large (a nominal FOV of 10-30 m^2) which essentially eliminates the need for a scan surveys. In addition, after an ISOCS measurement is collected, it can be tested against a variety of geometry assumptions to address uncertainty in the source term geometry if necessary.

The source term geometry for ISOCS efficiency calibration, i.e., concentration depth profile and areal distribution of the residual radioactivity in structures, is required to generate efficiency curves (i.e., efficiency as a function of energy) for the ISOCS gamma spectroscopy measurements. The basis for the chosen ISOCS efficiency calibrations for

the FSS of the Diesel Fuel Oil Storage Tank Rooms concrete are documented in Zion*Solutions* TSD 14-022. Several different ISOCS geometries were developed for the Diesel Fuel Oil Storage Tank Rooms that ranged from a Field of View (FOV) of 50.3 m^2 to a FOV of 7.06 ^{m2}. The basis for the selection of this latter geometry was the result of accessibility into open door frames with limited space.

LTP Chapter 5, section 5.5.2.1.1 states that the FSS units for the basements of the Turbine Building, the Crib House/Forebay and the Circulating Water Discharge Tunnels are designated as Class 3. During decommissioning, the primary pathway into and out of the basement of the Auxiliary Building became the Unit 1 and Unit 2 570 foot elevation Diesel Fuel Oil floors. Due to the introduction of radioactive material into both of these areas, they were reclassified as Class 1 survey units in accordance with ZS-LT-300-001-002. Consequently, the weighted average of the judgmental ISOCS measurements will be added to the systematic mean of the Turbine Building basement FSS. This is addressed in LTP Chapter 5, section 5.5.6.1. In accordance with TSD 14-014, "*End State Surface Areas, Volumes, and Source Terms of Ancillary Buildings*" (Reference 10), the total surface area of the Diesel Fuel Oil Storage Tank Room is 813 m^2 .

The area-weighted SOF is calculated in accordance with LTP Chapter 5, Equation 5-8, which is reproduced as follows. The $SOF_{Bi,B}$ variable in the equation is based on the mean of the judgmental samples.

Equation 1

$$SOF_{B,B} = \sum_{i=1}^{n} \frac{SA_{SUi,B}}{SA_{Adjust,B}} * SOF_{Bi,B}$$

where:

$SOF_{B,B}$	=	total surface SOF including all surface survey units in basement (B)
$SA_{SUi,B}$	=	surface area of survey unit (i) in basement (B)
$SA_{Adjust,B}$	=	adjusted surface area for DCGL calculation (Table 5-23) for basement (B)
$SOF_{Bi,B}$	=	SOF_B for survey unit (i) in basement (B)

The sample plan for the Unit 2 Diesel Fuel Oil Storage Tank Room consisted of fifty-one judgmental locations, to capture 100% of the surface area. Attachment 1, "Figures and Maps", illustrates the locations of the ISOCS measurements taken.

The DQO process determined that Co-60, Ni-63, Sr-90, Cs-134, Cs-137 would be the ROC in survey unit 06202. During FSS, concentrations for HTD ROC Ni-63 and Sr-90 are inferred using a surrogate approach specified in LTP section 5.2.11. Cs-137 is the

principle surrogate radionuclide for Sr-90 and Co-60 is the principle surrogate radionuclide for Ni-63. The mean, maximum and 95% Upper Confidence Level (UCL) of the surrogate ratios were calculated in TSD 14-019 , *"Radionuclides of Concern for Soil and Basement Fill Model Source Terms"* (Reference 11) and are presented in LTP Chapter 5, Table 5-15, which is reproduced in Table 4 below.

Table 4 - Surrogate Ratios

Ratios	Auxiliary Building		
	Mean	**Max**	**95%UCL**
Ni-63/Co-60	44.143	180.450	154.632
Sr-90/Cs-137	0.001	0.002	0.002

For the FSS of survey unit 06202, the surrogate OpDCGLs for Co-60 and Cs-137 are based on the maximum ratios from Table 4.

Equation 2

$$Surrogate_{DCGL} = \frac{1}{\left[\left(\frac{1}{DCGL_{Sur}}\right) + \left(\frac{R_2}{DCGL_2}\right) + \left(\frac{R_3}{DCGL_3}\right) + \cdots \left(\frac{R_n}{DCGL_n}\right)\right]}$$

Where: $DCGL_{Sur}$ = Surrogate radionuclide DCGL

$DCGL_{2,3\ldots n}$ = DCGL for radionuclides to be represented by the surrogate

R_n = Ratio of concentration (or nuclide mixture fraction) of radionuclide "n" to surrogate radionuclide

Using the OpDCGLs for the Turbine Building presented in Table 3 and the maximum ratios from Table 4, the following surrogate calculations were performed for FSS unit 06202;

Equation 3

$$Surrogate_{DCGL\,(Cs-137)} = \frac{1}{\left[\left(\frac{1}{1.79E+06_{(Cs-137)}}\right) + \left(\frac{0.002}{6.58E+04_{(Sr-90)}}\right)\right]} = 1.70E+06\ pCi/m2$$

The surrogate OpDCGL that was used for Cs-137 in FSS unit 06202 for direct comparison of sample results to demonstrate compliance is 1.70E+06 ρCi/m^2.

Equation 4

$$Surrogate_{DCGL\,(Co-60)} = \frac{1}{\left[\left(\frac{1}{5.98E+06_{(Co-60)}}\right)+\left(\frac{180.45}{1.85E+08_{(Ni-63)}}\right)\right]} = 8.75E+05\ pCi/m2$$

The surrogate OpDCGL that was used for Co-60 in FSS unit 06202 for direct comparison of sample results to demonstrate compliance is 8.75E+05 ρCi/m^2.

For this Class 3 basement structure survey units the "Investigation Levels" for ISOCS measurement results are those levels specified in LTP Chapter 5, Table 5-25 and are reproduced below in Table 5.

Table 5 - Investigation Levels

Classification	Direct Investigation Levels
Class 1	>Operational $DCGL_W$

In compliance with ZS-LT-01, *"Quality Assurance Project Plan (for Characterization and FSS)"* (QAPP) (Reference 12), replicate measurements were to be performed on 5% of the static measurement locations.

Table 6 provides a synopsis of the survey design for survey unit 06202.

Table 6 - Synopsis of the Survey Design

FEATURE	DESIGN CRITERIA	BASIS
Survey Unit Area	813 m^2	TSD-14-014
Number of Static Measurements	51 (judgmental) [(1)]	• $\sigma = 0.3$ • UBGR = SOF of 1 • LBGR = SOF of 0.5 • Type I error = 0.05 • Type II error = 0.05 • $\Delta/\sigma = 3$ (adjusted) MARSSIM Table 5-5
Measurement Spacing	100% Areal Coverage (Planned for 28 m^2 FOV)	LTP Chapter 5, Sec. 5.5.2.2
O_pDCGL_B	• Co-60 – 5.98E+06 pCi/m^2 • Cs-134 – 1.35E+06 pCi/m^2 • Cs-137 – 1.79E+06 pCi/m^2 • Ni-63 – 1.85E+08 pCi/m^2 • Sr-90 – 6.58E+04 pCi/m^2	Operational DCGLs for Turbine Building Basement Unit 2 Diesel Fuel Oil Storage Tank Rooms , (LTP Chapter 5, Table 5-4)
HTD ROC Analysis	2 Concrete Core samples selected for HTD ROC analysis	(LTP Chapter 5, section 5.1)
Measurement Investigation Level	>Operational $DCGL_W$	(LTP Chapter 5, Table 5-25)
Scan Survey Area Coverage	813 m^2 100% areal scan coverage	ZS-LT-300-001-001, Attachment 4
QC	5% Duplicate ISOCS Measurements	(LTP Chapter 5, section 5.9)

6. SURVEY IMPLEMENTATION

For the judgmental measurements performed in this survey unit 06202, compliance with the unrestricted release criteria was demonstrated through a combination of direct measurements using the ISOCS and analysis of concrete core samples obtained from the Diesel Fuel Oil Storage Tank Room. The concrete core data was used to validate the ratios of gamma emitters to HTD ROC.

A walk down was performed by FSS personnel on 05/30/18. A turnover survey was not required to accept the Diesel Fuel Oil Storage Tank Room survey unit for FSS as the implementation of the continuous characterization survey provided sufficient information pertaining to the radiological condition. The continuing characterization surveys included smears for loose surface contamination, eight (8) concrete core samples and several biased ISOCS measurements in suspect areas. All smear results were less than 1,000 dpm/100 cm^2 and all ISOCS measurements indicated sum of fractions (OpSOF) of less than one when compared against the OpDCGLs. The Diesel Fuel Oil Storage Tank Room was deemed acceptable for turnover and FSS commenced on 06/01/18.

"Field Logs" (ZS-LT-300-001-001 Attachment 14) were used to document field activities and other information pertaining to the performance of the FSS. Daily briefings were conducted to discuss the expectations for job performance and to review safety aspects of the job.

Zion*Solutions* TSD 14-022 provides the initial justification for the selection of reasonably conservative geometries and efficiency calibrations for the ISOCS based on the physical conditions of the remediated surface and the anticipated depth and distribution of activity. All ISOCS measurements were acquired using approved geometries. Various sources to detector distances were utilized due to space constraints and to ensure 100% measurement coverage.

The ISOCS detector was positioned horizontal or vertical to the surface at the center-point of each selected measurement location. In most cases, the exposed face of the detector was positioned at a distance of 4 meters from the surface with the 90-degree collimation shield installed; this orientation corresponded to a nominal FOV of 50.3 m^2, respectively. As necessary, the detector to source distance and subsequent FOV was reduced to accommodate physical constraints or obstructions while the number of measurements increased to ensure 100% areal coverage was achieved.

The measured activity for each gamma-emitting ROC (and any other gamma emitting radionuclide that was positively detected by ISOCS) was recorded (in units of pCi/m^2). Background was not subtracted from any measurement. An OpSOF calculation was performed for each measurement by dividing the reported concentration of each ROC by

the OpDCGL for each ROC to derive an individual ROC fraction. The individual ROC fractions were then summed to provide a total OpSOF value for the measurement.

Three (3) duplicate measurements were taken with the ISOCS on the Diesel Fuel Oil Storage Tank Room concrete during FSS. The locations selected for taking duplicate measurements were at locations 005, 012 and 038. These locations were randomly selected using the Microsoft® Excel RANDBETWEEN function. The number of replicate measurements satisfies the requirement that a minimum of 5% percent of the number of measurements that will be used for duplicate samples in accordance with the QAPP.

7. SURVEY RESULTS

The SOF or "unity rule" was applied to the data used for the survey planning, data evaluation and statistical tests for basement surfaces since multiple radionuclide-specific measurements were performed and concentrations inferred based on known relationships. The application of the unity rule served to normalize the data to allow for an accurate comparison of the various data measurements to the release criteria. When the unity rule was applied, the $DCGL_w$ (used for the nonparametric statistical test) becomes one (1). The $BcDCGL_B$ are directly analogous to the $DCGL_W$ as defined in MARSSIM. The use and application of the unity rule was performed in accordance with section 4.3.3 of MARSSIM.

As previously stated, as the extent of this survey was the acquisition of judgmental measurements at biased locations, compliance was demonstrated by direct comparison of each measurement result to the release criterion. For building surfaces, areas of elevated activity were defined as any area identified by measurement/sample (systematic or judgmental) that exceeded the OpDCGL but was less than the BcDCGL. Any area that exceeded the BcDCGL would have required remediation. This was not the case for the FSS of the Unit 2 Diesel Fuel Oil Storage Room. All measurements taken, when compared against the OpDCGL was less than an OpSOF of one. The ISOCS measured concentration results from the Unit 2 Diesel Fuel Oil Storage are listed in Table 7. Table 8 presents the mean concentration of the judgmental measurements and the Base Case SOF (BcSOF) when compared against BcDCGL.

The sample population consisted of fifty-one (51) direct measurements that were acquired using the ISOCS. The concentrations for Ni-63 and Sr-90 are inferred based on the maximum ratios as specified in LTP Chapter 5, Table 5-15. The complete ISOCS gamma spectroscopy reports are presented in Attachment 4.

Table 7 - Unit 2 Diesel Fuel Oil Storage Tank Room- Measured Concentrations of ROC for FSS

MEASUREMENT ID	Co-60 (pCi/m^2)	Ni-63[(1)] (pCi/m^2)	Sr-90[(1)] (pCi/m^2)	Cs-134 (pCi/m^2)	Cs-137 (pCi/m^2)	OpSOF[(2)]
B1-06202A-FSFC-001-GD	2.10E+04	3.79E+06	3.30E+01	0.00E+00	1.65E+04	0.034
B1-06202A-FSFC-002-GD	3.04E+03	5.49E+05	1.41E+01	7.33E+03	7.05E+03	0.013
B1-06202A-FSFC-003-GD	3.93E+03	7.09E+05	3.76E+01	0.00E+00	1.88E+04	0.016
B1-06202A-FSFC-004-GD	2.72E+04	4.91E+06	4.48E+01	1.15E+04	2.24E+04	0.053
B1-06202A-FSFC-005-GD	2.54E+04	4.58E+06	3.34E+01	3.30E+04	1.67E+04	0.063
B1-06202A-FSFC-006-GD	1.02E+04	1.84E+06	1.52E+01	5.48E+04	7.58E+03	0.057
B1-06202A-FSFC-007-GD	5.12E+03	9.24E+05	4.94E+00	7.18E+03	2.47E+03	0.013
B1-06202A-FSFC-008-GD	1.83E+04	3.30E+06	1.22E+02	1.85E+04	6.11E+04	0.071
B1-06202A-FSFC-009-GD	4.74E+04	8.55E+06	2.16E+02	0.00E+00	1.08E+05	0.118
B1-06202A-FSFC-010-GD	2.28E+04	4.11E+06	1.46E+01	1.78E+04	7.32E+03	0.044
B1-06202A-FSFC-011-GD	6.33E+03	1.14E+06	2.46E+01	0.00E+00	1.23E+04	0.014
B1-06202A-FSFC-012-GD	0.00E+00	0.00E+00	3.98E+01	8.19E+03	1.99E+04	0.018
B1-06202A-FSFC-013-GD	9.99E+03	1.80E+06	4.52E+01	0.00E+00	2.26E+04	0.025
B1-06202A-FSFC-014-GD	8.15E+03	1.47E+06	5.54E+01	1.92E+04	2.77E+04	0.040
B1-06202A-FSFC-015-GD	8.56E+03	1.54E+06	2.48E+01	0.00E+00	1.24E+04	0.017
B1-06202A-FSFC-016-GD	1.77E+04	3.19E+06	4.70E+01	1.63E+04	2.35E+04	0.046
B1-06202A-FSFC-017-GD	1.88E+04	3.39E+06	3.78E+01	3.60E+03	1.89E+04	0.035
B1-06202A-FSFC-018-GD	1.57E+03	2.83E+05	0.00E+00	2.65E+04	0.00E+00	0.021
B1-06202A-FSFC-019-GD	2.44E+04	4.40E+06	6.44E+01	1.21E+04	3.22E+04	0.056
B1-06202A-FSFC-020-GD	8.31E+03	1.50E+06	2.96E+01	0.00E+00	1.48E+04	0.018
B1-06202A-FSFC-021-GD	0.00E+00	0.00E+00	4.76E+01	1.60E+04	2.38E+04	0.026
B1-06202A-FSFC-022-GD	1.74E+04	3.14E+06	2.60E+01	8.77E+02	1.30E+04	0.028
B1-06202A-FSFC-023-GD	2.96E+04	5.34E+06	1.63E+01	0.00E+00	8.15E+03	0.039
B1-06202A-FSFC-024-GD	3.47E+04	6.26E+06	2.04E+02	7.78E+03	1.02E+05	0.105
B1-06202A-FSFC-025-GD	4.74E+04	8.55E+06	3.12E+02	2.09E+04	1.56E+05	0.162
B1-06202A-FSFC-026-GD	9.79E+03	1.77E+06	5.50E+01	1.94E+04	2.75E+04	0.042
B1-06202A-FSFC-027-GD	2.05E+03	3.70E+05	4.14E+01	0.00E+00	2.07E+04	0.015
B1-06202A-FSFC-028-GD	5.51E+04	9.94E+06	5.02E+02	2.31E+04	2.51E+05	0.228
B1-06202A-FSWC-029-GD	2.16E+04	3.90E+06	5.90E+01	4.08E+04	2.95E+04	0.072
B1-06202A-FSWC-030-GD	1.84E+04	3.32E+06	3.20E+01	3.23E+04	1.60E+04	0.054
B1-06202A-FSWC-031-GD	1.40E+04	2.53E+06	3.66E+01	3.62E+04	1.83E+04	0.054
B1-06202A-FSWC-032-GD	7.41E+03	1.34E+06	0.00E+00	0.00E+00	0.00E+00	0.008
B1-06202A-FSWC-033-GD	1.91E+04	3.45E+06	2.34E+01	1.33E+04	1.17E+04	0.039
B1-06202A-FSWC-034-GD	2.77E+03	5.00E+05	1.30E+01	2.02E+02	6.51E+03	0.007
B1-06202A-FSWC-035-GD	4.88E+03	8.81E+05	0.00E+00	0.00E+00	0.00E+00	0.006
B1-06202A-FSWC-036-GD	5.29E+03	9.55E+05	0.00E+00	1.48E+04	0.00E+00	0.017

Table 7 (continued) - Unit 2 Diesel Fuel Oil Storage Tank Room- Measured Concentrations of ROC for FSS

MEASUREMENT ID	Co-60 (pCi/m^2)	Ni-63(1) (pCi/m^2)	Sr-90(1) (pCi/m^2)	Cs-134 (pCi/m^2)	Cs-137 (pCi/m^2)	OpSOF(2)
B1-06202A-FSWC-037-GD	2.29E+02	4.13E+04	0.00E+00	0.00E+00	0.00E+00	0.000
B1-06202A-FSWC-038-GD	1.09E+04	1.97E+06	1.75E+02	1.28E+04	8.73E+04	0.073
B1-06202A-FSWC-039-GD	1.19E+04	2.15E+06	4.56E+01	6.52E+03	2.28E+04	0.032
B1-06202A-FSWC-040-GD	7.02E+03	1.27E+06	2.84E+01	1.85E+03	1.42E+04	0.018
B1-06202A-FSWC-041-GD	5.67E+03	1.02E+06	4.68E+01	1.36E+04	2.34E+04	0.030
B1-06202A-FSWC-042-GD	6.86E+03	1.24E+06	5.90E+01	1.66E+04	2.95E+04	0.038
B1-06202A-FSWC-043-GD	1.79E+04	3.23E+06	6.50E+01	6.32E+02	3.25E+04	0.040
B1-06202A-FSWC-044-GD	1.18E+04	2.13E+06	1.67E+01	3.88E+04	8.35E+03	0.047
B1-06202A-FSWC-045-GD	1.88E+04	3.39E+06	1.88E+01	1.30E+04	9.38E+03	0.037
B1-06202A-FSWC-046-GD	6.86E+03	1.24E+06	1.94E+01	0.00E+00	9.71E+03	0.014
B1-06202A-FSWC-047-GD	1.04E+04	1.88E+06	2.75E+01	0.00E+00	1.38E+04	0.020
B1-06202A-FSWC-048-GD	2.35E+04	4.24E+06	3.52E+01	2.88E+04	1.76E+04	0.059
B1-06202A-FSWC-049-GD	3.12E+04	5.63E+06	9.02E+01	4.13E+03	4.51E+04	0.065
B1-06202A-FSWC-050-GD	1.65E+04	2.98E+06	4.92E+01	1.71E+03	2.46E+04	0.035
B1-06202A-FSWC-051-GD	1.29E+04	2.33E+06	0.00E+00	1.66E+03	0.00E+00	0.016

(1) Inferred concentration
(2) Compared against OpDCGL

Direct measurement locations were denoted on the concrete surfaces of the Diesel Fuel Oil Storage Tank Room by marking an approximate 4 meter by 4 meter grid pattern using a random start point that was overlaid over the exposed surface, providing sufficient overlap between locations to ensure 100% areal coverage. ISOCS measurement locations are shown below in Figure 2 as well as in Attachment 1.

Figure 2 – Diesel Fuel Oil Storage Tank Room

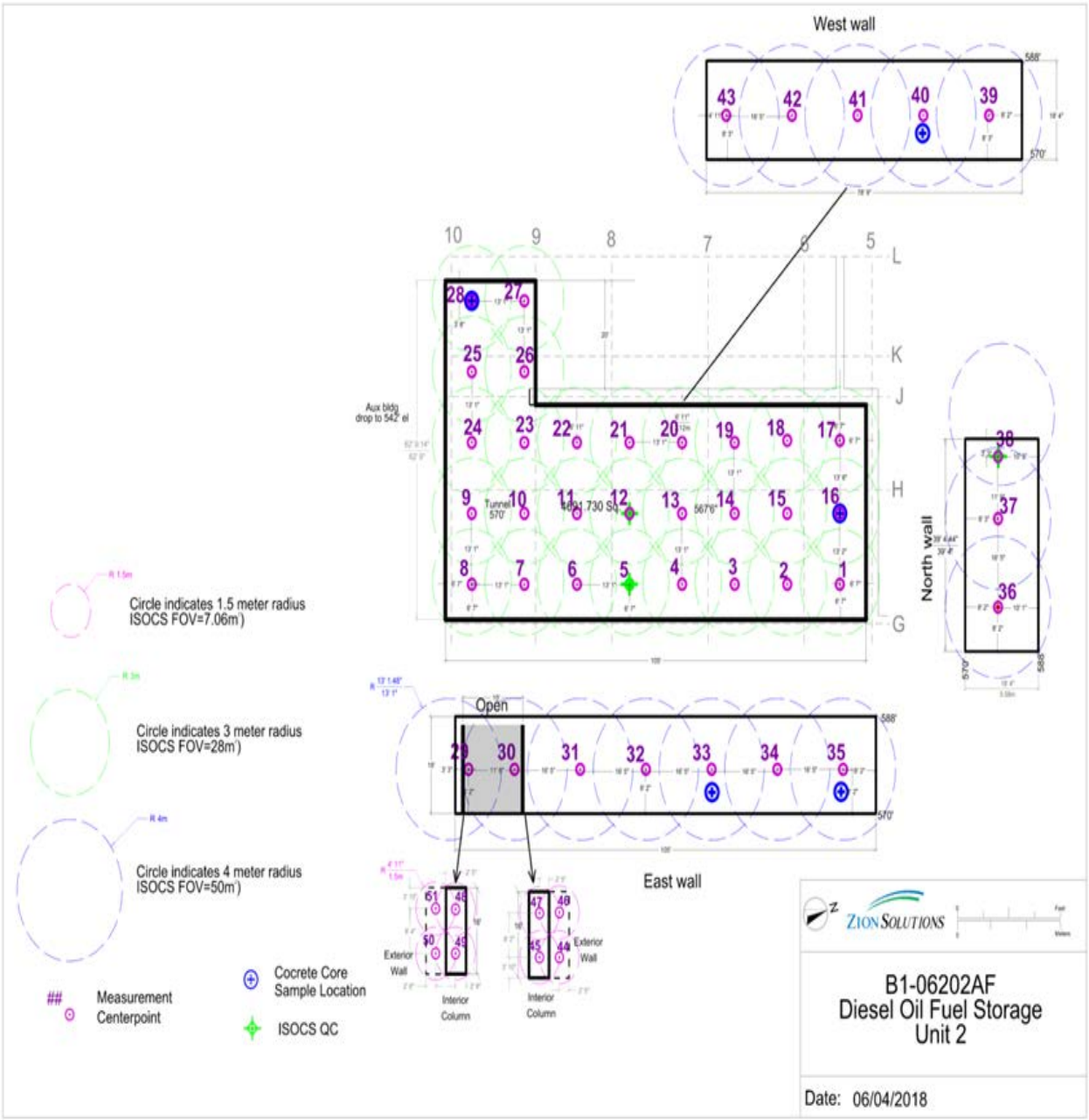


Table 8 - Diesel Fuel Oil Storage Tank Room Statistical Quantities

INDIVIDUAL MEASUREMENT METRICS

Total Number of Judgmental Measurements	**=**	**51**
Number of Quality Control Measurements	**=**	**3**
Total Number of Measurements	**=**	**54**
Mean Measurement SOF	**=**	**0.043**
Max Judgmental Measurement SOF	**=**	**0.228**
Number of Judgmental Measurements with SOF ≥ = 1	**=**	**0**

STATISTICAL QUANTITIES

ROC	MEAN (pCi/m^2)	MEDIAN (pCi/m^2)	MAX (pCi/m^2)	MIN (pCi/m^2)	δ	BcDCGL (pCi/m^2)	AVG SOF PER ROC	AVG DOSE PER ROC
Co-60	1.51E+04	1.18E+04	5.51E+04	0.00E+00	1.24E+04	7.03E+07	0.000	0.005
Ni-63	2.72E+06	2.13E+06	9.94E+06	0.00E+00	2.23E+06	2.18E+09	0.001	0.031
Sr-90	5.78E+01	3.52E+01	5.02E+02	0.00E+00	8.67E+01	7.74E+05	0.000	0.002
Cs-134	1.18E+04	7.78E+03	5.48E+04	0.00E+00	1.32E+04	1.59E+07	0.001	0.019
Cs-137	2.89E+04	1.76E+04	2.51E+05	0.00E+00	4.34E+04	2.11E+07	0.001	0.034

Mean SOF for Survey Unit	**=**	**0.004**
Dose (based on Mean SOF)	**=**	**0.091 mrem/yr**

The implementation of required QC measures included the collection of three (3) additional ISOCS measurements in the Diesel Fuel Oil Storage Tank Room for "replicate measurement" analysis. The concentrations for Ni-63 and Sr-90 are inferred based on the maximum ratios as specified in LTP Chapter 5, Table 5-15. The replicate ISOCS measurement results are provided in Table 9.

Table 9 - Summary of ISOCS Replicate Measurements for QC

MEASUREMENT ID	Co-60 (pCi/m^2)	Ni-63(1) (pCi/m^2)	Sr-90(1) (pCi/m^2)	Cs-134 (pCi/m^2)	Cs-137 (pCi/m^2)	OpSOF (2)
B106202A-FQFC-005-GD	1.40E+04	2.53E+06	0.00E+00	1.95E+04	0.00E+00	0.030
B106202A-FQFC-012-GD	1.89E+04	3.41E+06	4.30E+01	9.07E+03	2.15E+04	0.041
B106202A-FQFC-038-GD	0.00E+00	0.00E+00	1.22E+01	1.10E+04	6.12E+03	0.012

(1) Inferred concentration
(2) Compared against OpDCGL

Five (5) concrete core samples were acquired at 10% of the locations where an ISOCS measurement was collected with the locations selected at random. Only HTD radionuclides included as ROC (Ni-63 and Sr-90) were analyzed in the FSS confirmatory samples. The top ½ inch puck from each of the five concrete core samples, representing

the concrete from the exposed surface to a depth of ½ inch was analyzed by the on-site gamma spectroscopy system. Of the five samples, only two samples indicated plant derived radionuclides at concentrations greater than MDC. These two samples were sent to Eberline Laboratory for analysis of HTD ROC (Ni-63 and Sr-90). Cs-137 was positively detected in sample B1-06202A-FSFC-016-CV. Otherwise, the remaining analysis results indicated no detectable activity for any other ROC at concentrations greater than MDC. No further action or analysis was performed. The results of the Eberline analysis are presented in Table 10 below.

Table 10 - Summary of FSS Concrete Core Analysis by Eberline

B1-06202A-FSFC-016-CV			
ROC	**Result (pCi/g)**	**Uncertainty (pCi/g)**	**MDC (pCi/g)**
Co-60	9.14E-03	8.12E-02	1.12E-01
Ni-63	0.00E+00	1.12E+00	1.93E+00
Sr-90	5.45E-01	3.79E-01	6.09E-01
Cs-134	0.00E+00	4.78E-02	1.40E-01
Cs-137	3.58E-01	1.21E-01	1.48E-01

B1-06202A-FSWC-035-CV			
ROC	**Result (pCi/g)**	**Uncertainty (pCi/g)**	**MDC (pCi/g)**
Co-60	4.45E-02	7.80E-02	1.17E-01
Ni-63	0.00E+00	1.22E+00	2.10E+00
Sr-90	1.93E-02	5.27E-01	9.40E-01
Cs-134	0.00E+00	3.64E-02	1.16E-01
Cs-137	1.74E-02	1.05E-01	1.65E-01

8. QUALITY CONTROL

The implementation of required QC measures included the collection of three additional ISOCS measurements in (survey unit 06202) for "replicate measurement" analysis. The complete ISOCS gamma spectroscopy reports for the duplicate measurements are presented in Attachment 4. All replicate ISOCS measurements met the required acceptance criteria. The completed Replicate Sample Assessment Forms are included in Attachment 3 of this Release Record.

9. INVESTIGATION AND RESULTS

No measurements were taken for an investigation during the performance of FSS in this survey unit.

10. REMEDIATION AND RESULTS

No remediation was required prior to performance of FSS.

11. CHANGES FROM THE FINAL STATUS SURVEY PLAN

There were no addendums to the FSS plan, however, there were changes to the ISOCS survey plans as noted earlier in this Release Record. Those changes were required due to constraints on placement of ISOCS detectors that were not obvious when the FSS plan was first written. The changes in ISOCS measurement locations were made to ensure 100% areal coverage of the survey unit.

12. DATA QUALITY ASSESSMENT (DQA)

In accordance with procedure ZS-LT-300-001-004, *"Final Status Survey Data Assessment"* (Reference 12), the DQOs, sample design, and data were reviewed for completeness, accuracy, and consistency. Documentation was complete and legible. The FSS unit was properly classified as Class 1. All measurement results were individually reviewed and validated. The FOV for the number of measurements ensured 100% areal coverage of the exposed structural surfaces. The instrumentation used to perform the FSS were in calibration, capable of detecting the activity with an adequate MDC and successfully response checked prior to and following use. An adequate number of replicate measurements were taken and the results meet the acceptance criteria as specified in the QAPP.

The analytical results of the fifty-one (51) judgmental measurements were less than an OpSOF of one.

The preliminary data review consisted of calculating basic statistical quantities (e.g., mean, median, standard deviation). All data was considered valid and the values reported below the MDC, and values with uncertainties that exceeded two standard deviations.

13. ANOMALIES

No anomalies were observed during the performance or analyses of the survey.

14. CONCLUSION

Fifty-one (51) judgmental measurements were taken in Unit 2 Diesel Fuel Oil Storage Tank Room. The FOV of each measurement included the floor and three walls. The total surface area is 813 m^2. The FOV for the Circular Plan geometry used for the majority of the ISOCS measurements was 28 m^2, which equated to an areal coverage 100% of the surface area of the remaining Diesel Fuel Oil Storage Tank Room.

All of the measurements were below an OpSOF of one (1). The mean BcSOF for the survey unit was 0.004, which equates to a dose of 0.091 mrem/yr. The requirements for a Class 1 survey unit have been met.

Survey unit 06202 is acceptable for unrestricted release.

15. REFERENCES

1. Zion*Solutions* procedure ZS-LT-300-001-005, "Final Status Survey Data Reporting"
2. "Zion Station Restoration Project License Termination Plan"
3. Zion*Solutions* procedure ZS-LT-300-001-001, "Final Status Survey Package Development"
4. NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual"
5. Zion*Solutions* TSD 14-022, "Use of In-Situ Gamma Spectroscopy for Final Status Survey of End State Structures"
6. Zion*Solutions* TSD 17-004, "Operational Derived Concentration Guideline Levels for Final Status Survey"
7. Zion*Solutions* procedure ZS-LT-300-001-002, "Survey Unit Classification"
8. "Zion Station Historical Site Assessment"
9. Zion*Solutions* TSD 11-001, "Technical Support Document for Potential Radionuclides of Concern During the Decommissioning of the Zion Station"
10. Zion*Solutions* TSD 14-014, "End State Surface Areas, Volumes, and Source Terms of Ancillary Buildings"
11. Zion*Solutions* procedure ZS-LT-01, "Quality Assurance Project Plan (for Characterization and FSS)"
12. Zion*Solutions* procedure ZS-LT-300-001-004, "Final Status Survey Data Assessment"

16. ATTACHMENTS

Attachment 1 - Figure and Maps

Attachment 2 - ISOCS Geometry

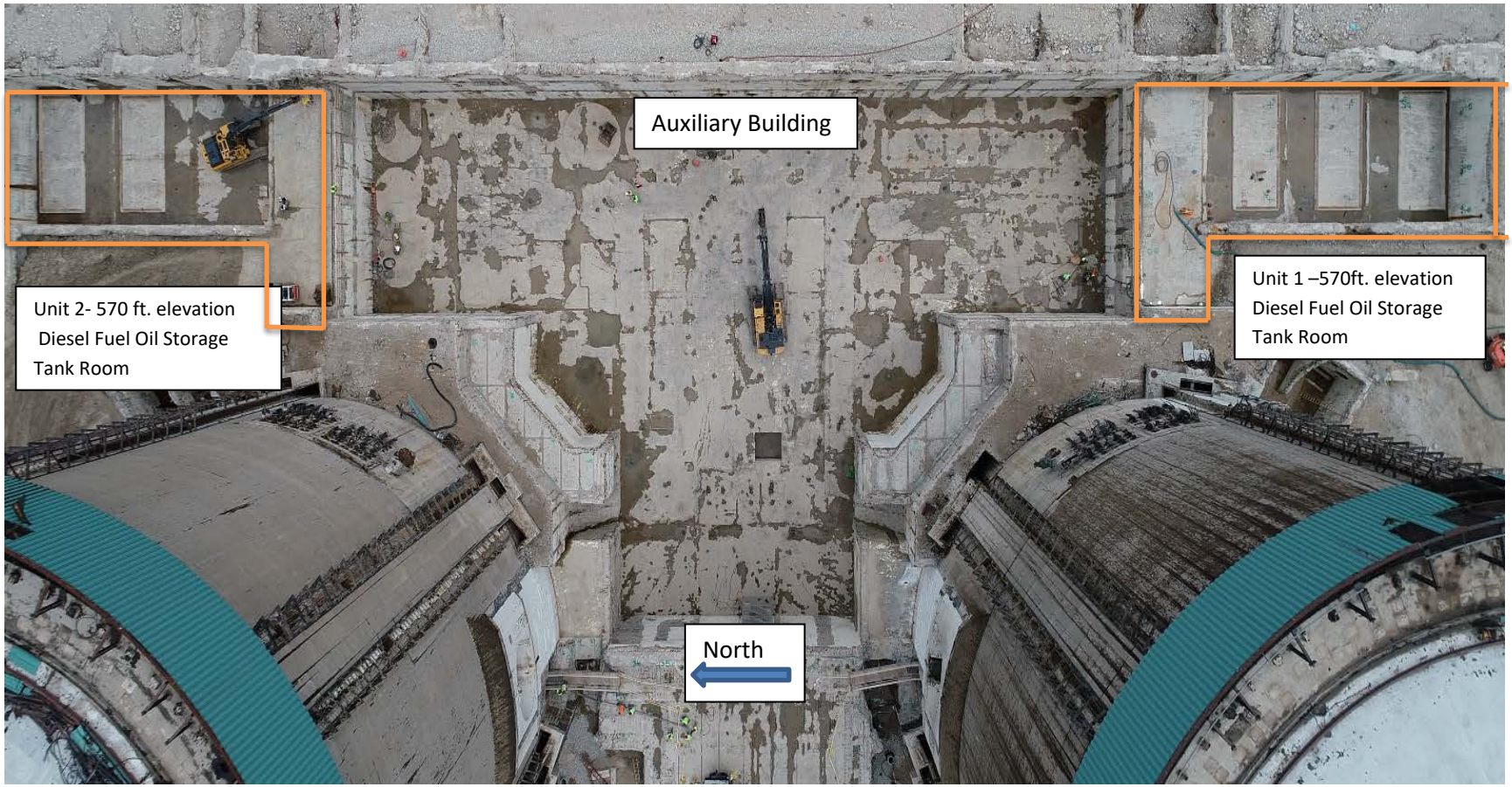
Attachment 3 - QC Measurement Assessment

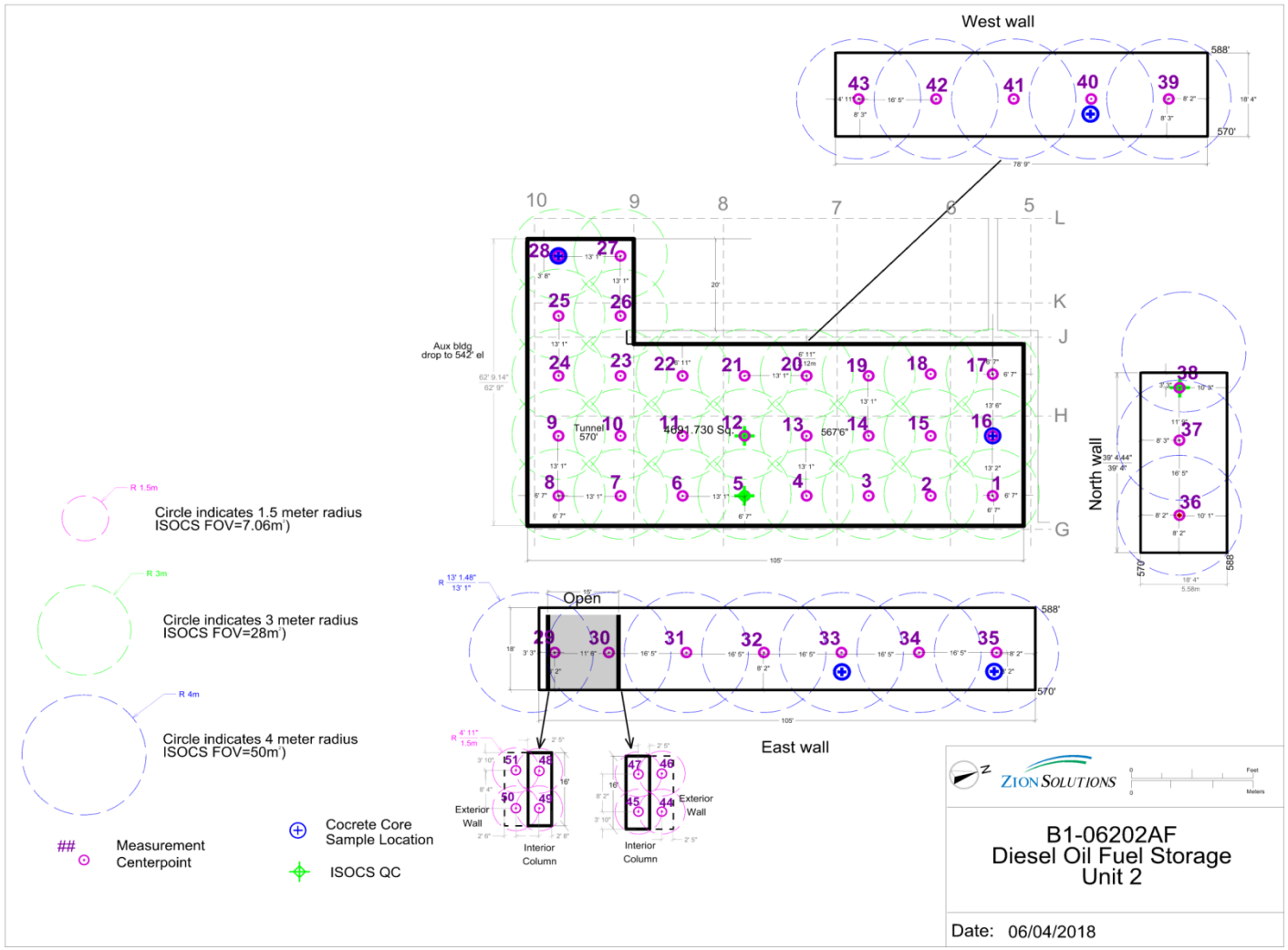
Attachment 4 - ISOCS Analytical Report

Attachment 5 - Eberline Reports

ATTACHMENT 1
FIGURES AND MAPS

Figure 3 - Overview of Structural Survey Unit




West wall
East wall
North wall
Aux bldg drop to 542' el
Tunnel 570'
Open
Circle indicates 1.5 meter radius ISOCS FOV=7.06m²)
Circle indicates 3 meter radius ISOCS FOV=28m²)
Circle indicates 4 meter radius ISOCS FOV=50m²)
Measurement Centerpoint
Cocrete Core Sample Location
ISOCS QC
Exterior Wall
Interior Column
ZION SOLUTIONS
B1-06202AF
Diesel Oil Fuel Storage
Unit 2
Date: 06/04/2018

ATTACHMENT 2
ISOCS GEOMETRY

Units 1 and 2 Diesel Fuel Oil Storage Rooms Geometries

The Diesel Fuel Oil Storage Room geometries are based on a Geometry Composer Circular Plane (CP) Template. The contamination thickness was set to a 2.54 cm thickness Based on the core samples acquired from the rooms. The Relative Concentration was set at 1.0 which states the contamination resides in a single layer 2.54 cm thick. Three geometries were designed for the Diesel Fuel Oil Storage Room for Units 1 and 2. These are:

- 4M90D_CP_1IN.geo
- 3M90D_CP_1IN.geo
- 1.5M90D_CP_1IN.geo

Each of the geometries is found in Attachment 4.6-1 through 4.6-3 along with the associated efficiency (.ecc) file.

Units 1 and 2 Diesel Fuel Oil Storage Rooms 4M90D_CP_1IN

Geometry Composer Report

CANBERRA

Date: Sunday, August 05, 2018 - 12:01:36
Description: 4M90D_CP_1In
Comment: 4M90D_CP_1In
File Name: C:\GENIE2K\GENIE2K 6279\isocs\data\GEOMETRY\In-Situ\CIRCULAR_PLANE\4M90D_CP_1IN.geo
Software: ISOCS
Template: CIRCULAR_PLANE, Version: (default)
Detector: 6279
Collimator: 50mm-90d new (newISOCS 50mm side 90deg collimation [large hole collimator])
Environment: Temperature = 22 °C, Pressure = 760 mm Hg, Relative Humidity = 30%
Integration: Convergence = 1.00%, MDRPN = 2^4 (16), CRPN = 2^4 (16)

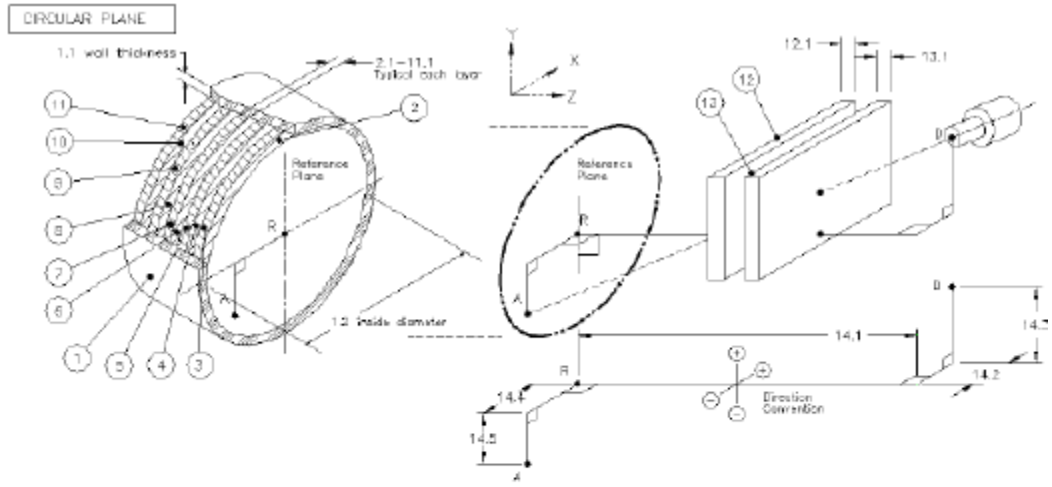
Dimensions (cm)

No.	Description	d.1	d.2	d.3	d.4	d.5	d.6	Material	Density	Rel. Conc.
1	Side Walls	0	800					none		
2	Layer 1	2.54						concrete	2.3	1.00
3	Layer 2	0						<none>		
4	Layer 3	0						<none>		
5	Layer 4	0						<none>		
6	Layer 5	0						<none>		
7	Layer 6	0						<none>		
8	Layer 7	0						<none>		
9	Layer 8	0						<none>		
10	Layer 9	0						<none>		
11	Layer 10	0						<none>		
12	Absorber1									
13	Absorber2									
14	Source-Detector	400	0	0	0	0				

List of energies for efficiency curve generation

45.0	60.0	80.0	100.0	130.0	150.0	200.0	300.0
500.0	661.6	700.0	1000.0	1172.0	1332.5	1400.0	2000.0

Units 1 and 2 Diesel Fuel Oil Storage Rooms 4M90D_CP_1IN



Geometry Composer Report

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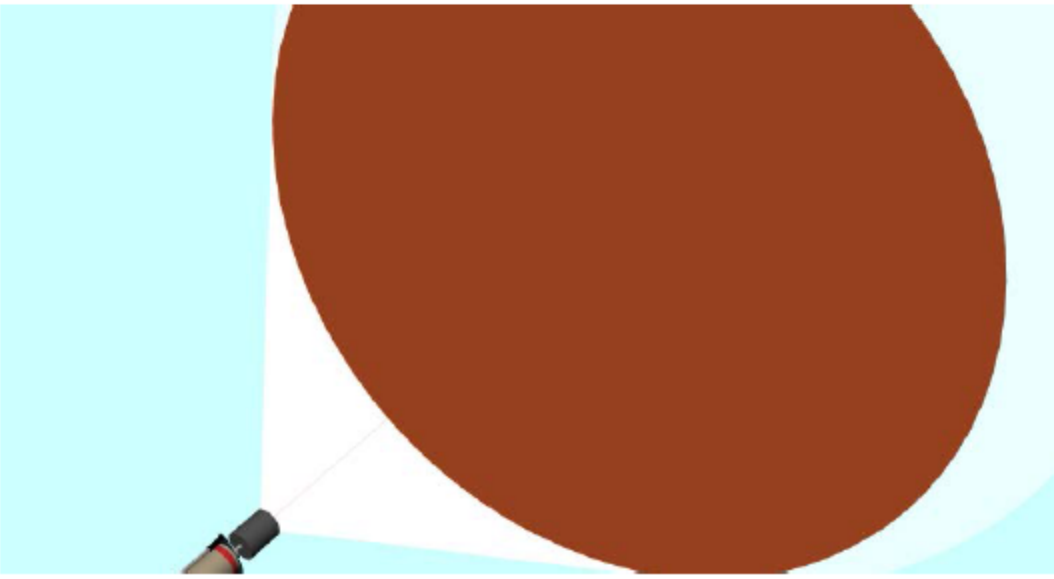
Software:	ISOCS
Template:	CIRCULAR_PLANE, Version: (default)



Units 1 and 2 Diesel Fuel Oil Storage Rooms 4M90D_CP_1IN Efficiency

ISOCS/LABSOCS RESULTS

ISOCS/LabSOCS File: 0:\ZIIL\SiteChar-LTP\ISOCS\Det 6279 Genie 2K Data\GENIE2K 6279\i
ISOCS/LabSOCS Time: 06/02/18 15:50:08
Template: CIRCULAR_PLANE
Geom Description: 4M90D_CP_1IN
Comment: ISOCS:4M90D_CP_1IN
Detector: 6279
Collimator: 50MM-90D_NEW
Convergence: 1.00 %
Area [Sq Meters]: 5.0266e+001 (C)
Mass [Grams]: 3.0004e+006 (C)
Length [Meters]: not used
(C) = Value calculated by ISOCS
(U) = Value modified by user

Energy	Efficiency	%Uncertainty	%Convergence	Final # of Voxels
45.00	1.22533e-006	15.0	-0.112719	8178
60.00	1.98468e-006	10.0	-0.081870	8178
80.00	2.54861e-006	10.0	-0.049124	8178
100.00	2.72094e-006	10.0	-0.021337	8178
130.00	2.73330e-006	10.0	0.001680	8178
150.00	2.65114e-006	10.0	0.003044	8178
200.00	2.35180e-006	8.0	-0.010492	8178
300.00	1.84368e-006	8.0	-0.042249	8178
500.00	1.32435e-006	6.0	-0.105696	8178
661.62	1.11449e-006	6.0	-0.132399	8178
700.00	1.08070e-006	6.0	-0.136586	8178
1000.00	8.80525e-007	4.0	-0.155067	8178
1172.00	8.04372e-007	4.0	-0.159324	8178
1332.50	7.50144e-007	4.0	-0.161521	8178
1400.00	7.25157e-007	4.0	-0.161995	8178
2000.00	5.64866e-007	4.0	-0.164515	8178

Units 1 and 2 Diesel Fuel Oil Storage Rooms 3M90D_CP_1IN

Geometry Composer Report

CANBERRA

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Comment: 3M90D_CP_1In
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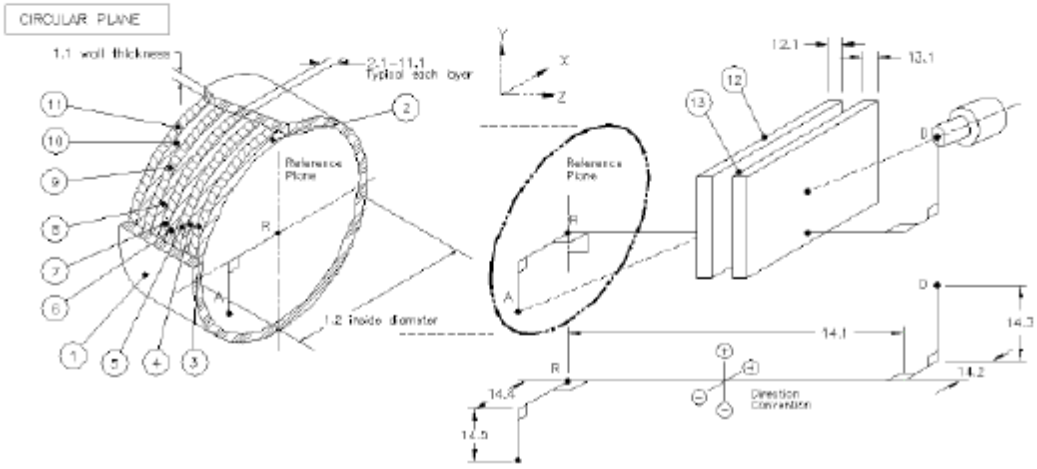
Software: ISOCS
Template: CIRCULAR_PLANE, Version: (default)
Detector: 6279
Collimator: 50mm-90d new (newISOCS 50mm side 90deg collimation [large hole collimator])
Environment: Temperature = 22 °C, Pressure = 760 mm Hg, Relative Humidity = 30%
Integration: Convergence = 1.00%, MDRPN = 2^4 (16), CRPN = 2^4 (16)

Dimensions (cm)

No.	Description	d.1	d.2	d.3	d.4	d.5	d.6	Material	Density	Rel. Conc.
1	Side Walls	0	600					none		
2	Layer 1	2.54						concrete	2.3	1.00
3	Layer 2	0						<none>		
4	Layer 3	0						<none>		
5	Layer 4	0						<none>		
6	Layer 5	0						<none>		
7	Layer 6	0						<none>		
8	Layer 7	0						<none>		
9	Layer 8	0						<none>		
10	Layer 9	0						<none>		
11	Layer 10	0						<none>		
12	Absorber1									
13	Absorber2									
14	Source-Detector	300	0	0	0	0				

List of energies for efficiency curve generation

45.0	60.0	80.0	100.0	130.0	150.0	200.0	300.0
500.0	661.6	700.0	1000.0	1172.0	1332.5	1400.0	2000.0



Units 1 and 2 Diesel Fuel Oil Storage Rooms 3M90D_CP_1IN

Geometry Composer Report

CANBERRA

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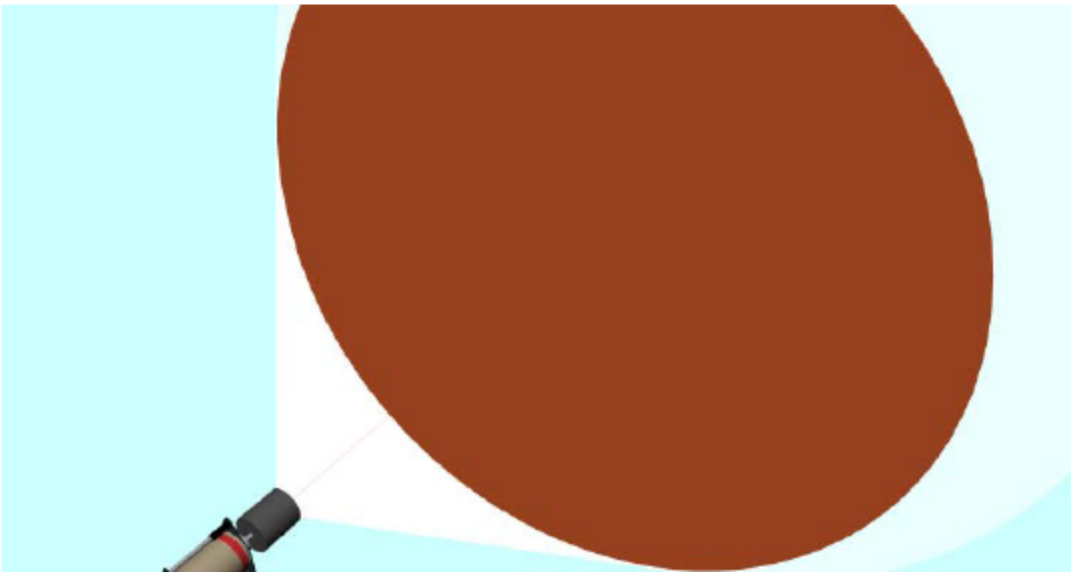


Units 1 and 2 Diesel Fuel Oil Storage Rooms 3M90D_CP_1IN Efficiency

ISOCS/LABSOCS RESULTS

```
ISOCS/LabSOCS File:   O:\ZIIL\SiteChar-LTP\ISOCS\Det 6279 Genie 2K Data\GENIE2K 6279\1
ISOCS/LabSOCS Time:   06/02/18 15:55:46
Template:             CIRCULAR_PLANE
Geom Description:     3M90D_CP_1IN
Comment:              ISOCS:3M90D_CP_1IN
Detector:             6279
Collimator:           50MM-90D_NEW
Convergence:          1.00 %
Area [Sq Meters]:     2.8274e+001 (C)
Mass [Grams]:         1.6877e+006 (C)
Length [Meters]:      not used
 (C) - Value calculated by ISOCS
 (U) - Value modified by user
```

Energy	Efficiency	%Uncertainty	%Convergence	Final # of Voxels
45.00	2.23356e-006	15.0	0.078114	8185
60.00	3.60646e-006	10.0	-0.070470	8185
80.00	4.62201e-006	10.0	-0.133201	8185
100.00	4.93019e-006	10.0	-0.135252	8185
130.00	4.94564e-006	10.0	-0.158546	8185
150.00	4.79542e-006	10.0	-0.168284	8185
200.00	4.24557e-006	8.0	-0.186465	8185
300.00	3.31993e-006	8.0	-0.209655	8185
500.00	2.38093e-006	6.0	-0.226227	8185
661.62	2.00383e-006	6.0	-0.223050	8185
700.00	1.94052e-006	6.0	-0.223099	8185
1000.00	1.58055e-006	4.0	-0.212886	8185
1172.00	1.44267e-006	4.0	-0.207917	8185
1332.50	1.34290e-006	4.0	-0.203528	8185
1400.00	1.29853e-006	4.0	-0.202349	8185
2000.00	1.01105e-006	4.0	-0.192884	8185

Units 1 and 2 Diesel Fuel Oil Storage Rooms 1.5M90D_CP_1IN

Geometry Composer Report

CANBERRA

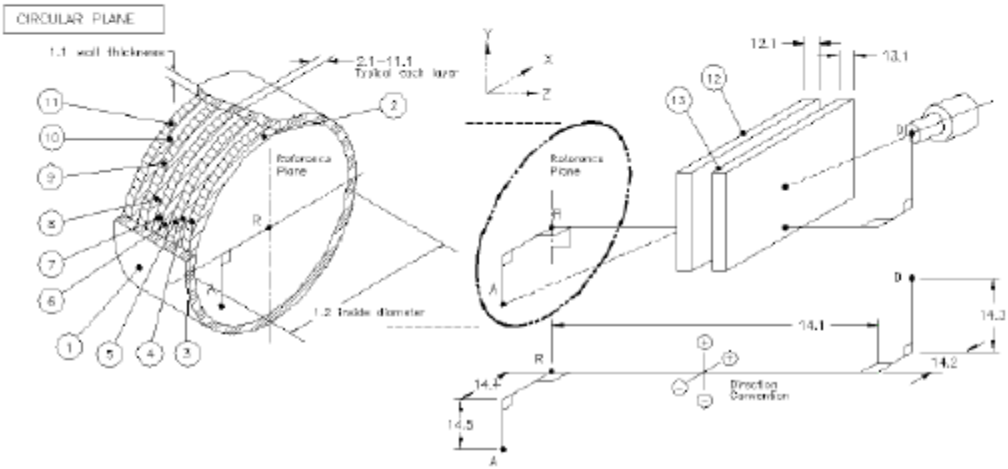
Date: Sunday, August 05, 2018 - 12:03:46
Description: 1.5M90D_CP_1In
Comment: 1,5M90D_CP_1In
File Name: C:\GENIE2K\GENIE2K 6279\isocs\data\GEOMETRY\In-Situ\CIRCULAR_PLANE\1.5M90D_CP_1IN.geo
Software: ISOCS
Template: CIRCULAR_PLANE, Version: (default)
Detector: 6279
Collimator: 50mm-90d new (newISOCS 50mm side 90deg collimation [large hole collimator])
Environment: Temperature = 22 °C, Pressure = 760 mm Hg, Relative Humidity = 30%
Integration: Convergence = 1.00%, MDRPN = 2^4 (16), CRPN = 2^4 (16)

Dimensions (cm)

No.	Description	d.1	d.2	d.3	d.4	d.5	d.6	Material	Density	Rel. Conc.
1	Side Walls	0	300					none		
2	Layer 1	2.54						concrete	2.3	1.00
3	Layer 2	0						<none>		
4	Layer 3	0						<none>		
5	Layer 4	0						<none>		
6	Layer 5	0						<none>		
7	Layer 6	0						<none>		
8	Layer 7	0						<none>		
9	Layer 8	0						<none>		
10	Layer 9	0						<none>		
11	Layer 10	0						<none>		
12	Absorber1									
13	Absorber2									
14	Source-Detector	150	0	0	0	0				

List of energies for efficiency curve generation

45.0	60.0	80.0	100.0	130.0	150.0	200.0	300.0
500.0	661.6	700.0	1000.0	1172.0	1332.5	1400.0	2000.0

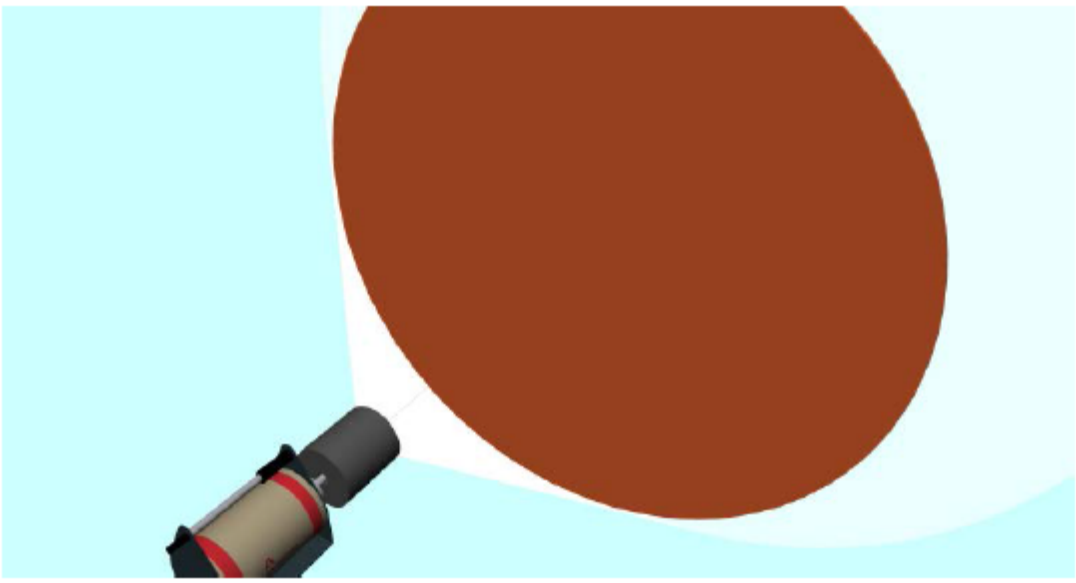


Units 1 and 2 Diesel Fuel Oil Storage Rooms 1.5M90D_CP_1IN

Geometry Composer Report

CANBERRA

Date:	Sunday, August 05, 2018 - 12:03:46
Description:	1.5M90D_CP_1In
Comment:	1,5M90D_CP_1In
File Name:	C:\GENIE2K\GENIE2K 6279\isocs\data\GEOMETRY\In-Situ\CIRCULAR_PLANE\1.5M90D_CP_1IN.geo
Software:	ISOCS
Template:	CIRCULAR_PLANE, Version: (default)



U1 and U2 Diesel Generator Oil Storage Rooms: 15M90D_CP_1IN Efficiency

ISOCS/LABSOCS RESULTS

ISOCS/LabSOCS File:	C:\GENIE2K\GENIE2K 6279\isocs\data\GEOMETRY\In-Situ\CIRCULAR_PL
ISOCS/LabSOCS Time:	06/04/18 16:39:44
Template:	CIRCULAR_PLANE
Geom Description:	1.5M90D_CP_1IN
Comment:	ISOCS:1,5M90D_CP_1IN
Detector:	6279
Collimator:	50MM-90D_NEW
Convergence:	1.00 %
Area [Sq Meters]:	7.0686e+000 (C)
Mass [Grams]:	4.2192e+005 (C)
Length [Meters]:	not used

(C) - Value calculated by ISOCS
(U) - Value modified by user

Energy	Efficiency	%Uncertainty	%Convergence	Final # of Voxels
45.00	9.34863e-006	15.0	-0.337839	8230
60.00	1.49755e-005	10.0	-0.306108	8230
80.00	1.91161e-005	10.0	-0.271229	8230
100.00	2.03182e-005	10.0	-0.269698	8230
130.00	2.03095e-005	10.0	-0.247201	8230
150.00	1.96615e-005	10.0	-0.236177	8230
200.00	1.73687e-005	8.0	-0.227853	8230
300.00	1.35518e-005	8.0	-0.249457	8230
500.00	9.66736e-006	6.0	-0.288305	8230
661.62	8.11772e-006	6.0	-0.300811	8230
700.00	7.86629e-006	6.0	-0.302521	8230
1000.00	6.37160e-006	4.0	-0.312012	8230
1172.00	5.80523e-006	4.0	-0.314223	8230
1332.50	5.40258e-006	4.0	-0.314632	8230
1400.00	5.22312e-006	4.0	-0.315100	8230
2000.00	4.06122e-006	4.0	-0.311765	8230

ATTACHMENT 3
QC MEASUREMENT ASSESSMENTS

Replicate Measurement Assessment

Survey Unit # 06200 Survey Unit Name Diesel Fuel Oil Storage Room Unit 2

Sample Plan # B1-06202A-F

Sample Description: Comparison of replicate ISOCS measurements collected from measurement locations 05, 12 and 38. The standard measurements are IDs B1-06202AF-SFC-005-GD, B1-06202AF-SFC-012-GD and B1-06202AF-SWC-038-GD. The comparison measurements are IDs B1-06202AF-QFC-005-GD, B1-06202AF-QFC-012-GD and B1-06202AF-QWC-038-GD.

STANDARD					COMPARISON			
Radionuclide	Activity Value (pCi/m^2)	Standard Error (pCi/m^2)	Resolution	Agreement Range	Activity Value (pCi/m^2)	Standard Error (pCi/m^2)	Comparison Ratio	Acceptable (Y/N)
B1-06202AF-SFC-005-GD					B1-06202AF-QFC-005-GD			
K-40	1.19E+06	2.77E+05	4	0.5-2.0	1.00E+06	2.56E+05	1.2	Y
B1-06202AF-SFC-012-GD					B1-06202AF-QFC-012-GD			
K-40	1.04E+06	2.40E+05	4	0.5-2.0	9.24E+05	2.64E+05	1.1	Y
B1-06202AF-SWC-038-GD					B1-06202AF-QWC-038-GD			
K-40	9.88E+05	2.49E+05	4	0.4-2.5	1.13E+06	2.60E+05	0.9	Y

Comments/Corrective Actions: There was acceptable agreement between the standard measurement and the replicate measurement. Based on the professional judgment of the Radiological Engineer, the same conclusion was reached for each measurement. No further action is necessary.

The acceptance criterion for replicate static measurements is as per the following Table.

Resolution	Acceptable Ratio
<4	0.4-2.5
4-7	0.5-2.0
8-15	0.6-1.66
16-50	0.75-1.33
51-200	0.80-1.25
>200	0.85-1.18

ATTACHMENT 4
ISOCS ANALYTICAL REPORT

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 9:20:27 AM
Sample Title	: B106202AFSFC001GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 9:10:00 AM
Acquisition Started	: 6/13/2018 9:10:26 AM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.14 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE ~~113~~ 11-5-18
TIME 1130

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC001GD
Peak Analysis Performed on: 6/13/2018 9:20:27 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	305	300.47	75.24	0.59	3.98E+001	45.29	2.04E+002
2	948-	960	954.77	238.81	0.39	3.23E+001	25.36	4.87E+001
3	1176-	1186	1180.79	295.31	0.29	1.24E+001	18.84	3.06E+001
4	1401-	1413	1407.12	351.89	0.98	3.73E+001	18.96	1.97E+001
5	2326-	2338	2332.23	583.16	0.31	2.18E+001	13.18	8.17E+000
6	2432-	2444	2438.22	609.65	1.17	4.79E+001	17.58	1.11E+001
7	5839-	5857	5847.64	1461.96	0.85	8.10E+001	18.00	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC001GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.998	1460.82*	10.66	9.60134E+005	2.29074E+005
Tl-208	1.000	583.19*	85.00	1.88777E+004	1.16228E+004
Pb-212	1.000	238.63*	43.60	3.08864E+004	2.47922E+004
Bi-214	0.454	609.32*	45.49	7.94881E+004	3.07089E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	3.19560E+004	4.88390E+004
		351.93*	35.60	5.56808E+004	2.95250E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.998	9.601342E+005	2.290744E+005
Tl-208	1.000	1.887770E+004	1.162282E+004
Pb-212	1.000	3.088639E+004	2.479221E+004
Bi-214	0.454	7.948808E+004	3.070892E+004
Pb-214	1.000	4.933088E+004	2.526673E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 9:20:27 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.24	6.6405E-002	113.67		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC001GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	3.208E+004	3.21E+004	9.601E+005	0.000E+000
	Co-60	1173.23	99.85	2.541E+004	2.54E+004	2.101E+004	1.121E+004
		1332.49	99.98	2.725E+004		5.647E+003	1.202E+004
	Nb-94	702.65	99.81	2.390E+004	2.09E+004	-8.834E+003	1.084E+004
		871.09	99.89	2.090E+004		-1.698E+004	9.191E+003
	Ag-108m	433.90	90.50	2.308E+004	2.31E+004	-8.588E+003	1.063E+004
		614.30	89.80	3.832E+004		3.260E+004	1.802E+004
		722.90	90.80	2.853E+004		1.500E+004	1.302E+004
	Cs-134	604.72	97.62	3.511E+004	3.00E+004	-1.602E+004	1.651E+004
		795.86	85.46	2.999E+004		-8.800E+003	1.360E+004
	Cs-137	661.66	85.10	3.503E+004	3.50E+004	1.657E+004	1.625E+004
	Eu-152	121.78	28.67	9.596E+004	8.37E+004	3.833E+004	4.646E+004
		344.28	26.60	8.370E+004		-3.399E+004	3.918E+004
		1408.01	21.07	1.343E+005		1.898E+004	5.923E+004
	Eu-154	123.07	40.40	6.693E+004	6.69E+004	3.908E+004	3.239E+004
		723.30	20.06	1.308E+005		1.583E+005	5.975E+004
		1274.43	34.80	8.149E+004		2.243E+004	3.625E+004
	Eu-155	86.55	30.70	1.160E+005	1.16E+005	1.460E+005	5.652E+004
		105.31	21.10	1.426E+005		-9.616E+003	6.925E+004
+	Tl-208	583.19*	85.00	1.557E+004	1.56E+004	1.888E+004	6.613E+003
	Bi-212	727.33	6.67	3.946E+005	3.95E+005	5.955E+004	1.803E+005
+	Pb-212	238.63*	43.60	3.831E+004	3.83E+004	3.089E+004	1.786E+004
+	Bi-214	609.32*	45.49	3.409E+004	3.41E+004	7.949E+004	1.480E+004
		1120.29	14.92	2.469E+005		1.658E+005	1.137E+005
		1764.49	15.30	2.009E+005		5.978E+004	8.769E+004
+	Pb-214	295.22*	18.42	8.108E+004	3.97E+004	3.196E+004	3.705E+004
		351.93*	35.60	3.969E+004		5.568E+004	1.782E+004
	Ra-226	186.21	3.64	6.976E+005	6.98E+005	1.323E+005	3.353E+005
	Ac-228	338.32	11.27	1.990E+005	1.25E+005	1.867E+004	9.330E+004
		911.20	25.80	1.255E+005		8.674E+003	5.774E+004
		968.97	15.80	1.764E+005		2.139E+004	7.976E+004
	Am-241	59.54	35.90	1.078E+005	1.08E+005	9.015E+004	5.222E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 9:55:07 AM
Sample Title	: B106202AFSFC002GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 9:45:00 AM
Acquisition Started	: 6/13/2018 9:45:05 AM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.15 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1100
R. Vega

```
*************************************************************************
*****          P E A K   A N A L Y S I S   R E P O R T           *****
*************************************************************************
```

Detector Name: 6279
Sample Title: B106202AFSFC002GD
Peak Analysis Performed on: 6/13/2018 9:55:06 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	295-	304	299.71	75.05	0.53	5.19E+001	43.16	1.82E+002
2	950-	960	954.90	238.84	0.58	2.43E+001	21.82	3.98E+001
3	1401-	1415	1408.19	352.16	0.80	4.35E+001	21.97	2.65E+001
4	2327-	2338	2332.12	583.13	0.32	1.73E+001	12.52	8.69E+000
5	2431-	2446	2438.34	609.68	1.60	5.10E+001	15.88	4.00E+000
6	5839-	5857	5847.24	1461.86	0.41	6.24E+001	16.96	2.61E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC002GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.998	1460.82*	10.66	7.39532E+005	2.11040E+005
Tl-208	1.000	583.19*	85.00	1.49643E+004	1.09754E+004
Pb-212	1.000	238.63*	43.60	2.32221E+004	2.12253E+004
Bi-214	0.454	609.32*	45.49	8.46828E+004	2.82624E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	6.50142E+004	3.42519E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.998	7.395322E+005	2.110397E+005
Tl-208	1.000	1.496427E+004	1.097541E+004
Pb-212	1.000	2.322211E+004	2.122529E+004
Bi-214	0.454	8.468284E+004	2.826240E+004
Pb-214	0.434	6.501415E+004	3.425189E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 9:55:06 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.05	8.6581E-002	83.07		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC002GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.524E+005	1.52E+005	7.395E+005	6.017E+004
	Co-60	1173.23	99.85	2.482E+004	2.31E+004	3.040E+003	1.091E+004
		1332.49	99.98	2.310E+004		-2.667E+003	9.944E+003
	Nb-94	702.65	99.81	2.356E+004	2.36E+004	1.021E+004	1.067E+004
		871.09	99.89	2.375E+004		8.652E+003	1.061E+004
	Ag-108m	433.90	90.50	2.650E+004	2.47E+004	5.997E+003	1.234E+004
		614.30	89.80	3.767E+004		-7.849E+003	1.769E+004
		722.90	90.80	2.474E+004		-9.799E+003	1.112E+004
	Cs-134	604.72	97.62	3.432E+004	2.82E+004	-4.825E+003	1.612E+004
		795.86	85.46	2.824E+004		7.335E+003	1.272E+004
	Cs-137	661.66	85.10	2.965E+004	2.96E+004	7.055E+003	1.356E+004
	Eu-152	121.78	28.67	9.522E+004	8.58E+004	-2.118E+004	4.609E+004
		344.28	26.60	8.582E+004		-1.689E+004	4.024E+004
		1408.01	21.07	9.267E+004		-1.119E+005	3.843E+004
	Eu-154	123.07	40.40	6.778E+004	6.78E+004	5.412E+004	3.281E+004
		723.30	20.06	1.139E+005		4.635E+004	5.129E+004
		1274.43	34.80	7.082E+004		3.296E+004	3.092E+004
	Eu-155	86.55	30.70	1.076E+005	1.08E+005	3.980E+004	5.234E+004
		105.31	21.10	1.282E+005		-5.856E+004	6.202E+004
+	Tl-208	583.19*	85.00	1.565E+004	1.57E+004	1.496E+004	6.655E+003
	Bi-212	727.33	6.67	3.544E+005	3.54E+005	-1.869E+005	1.602E+005
+	Pb-212	238.63*	43.60	3.326E+004	3.33E+004	2.322E+004	1.533E+004
+	Bi-214	609.32*	45.49	2.344E+004	2.34E+004	8.468E+004	9.475E+003
		1120.29	14.92	1.969E+005		-1.801E+004	8.870E+004
		1764.49	15.30	1.953E+005		6.361E+004	8.491E+004
+	Pb-214	295.22	18.42	1.356E+005	4.73E+004	6.444E+004	6.430E+004
		351.93*	35.60	4.725E+004		6.501E+004	2.160E+004
	Ra-226	186.21	3.64	6.829E+005	6.83E+005	1.449E+005	3.279E+005
	Ac-228	338.32	11.27	2.177E+005	9.61E+004	-1.443E+004	1.027E+005
		911.20	25.80	9.609E+004		3.977E+004	4.304E+004
		968.97	15.80	1.683E+005		3.558E+004	7.566E+004
	Am-241	59.54	35.90	1.022E+005	1.02E+005	-1.600E+004	4.942E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 10:31:39 AM
Sample Title	: B106202AFSFC003GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 10:21:00 AM
Acquisition Started	: 6/13/2018 10:21:37 AM
Live Time	: 600.0 seconds
Real Time	: 600.8 seconds
Dead Time	: 0.13 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1100

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC003GD
Peak Analysis Performed on: 6/13/2018 10:31:39 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	287-	306	301.12	75.40	0.59	1.76E+002	65.96	2.58E+002
2	333-	346	339.67	85.04	0.71	3.50E+001	44.76	1.66E+002
3	470-	484	479.00	119.87	0.60	1.75E+001	37.73	1.17E+002
4	948-	960	955.15	238.90	0.32	4.55E+001	23.62	3.55E+001
5	1400-	1416	1407.79	352.06	0.80	4.53E+001	24.04	3.17E+001
6	2328-	2339	2333.70	583.52	0.67	1.36E+001	12.72	1.04E+001
7	2431-	2445	2437.96	609.59	0.83	4.90E+001	18.59	1.30E+001
8	5839-	5857	5848.57	1462.19	0.71	7.33E+001	18.90	4.75E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC003GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.997	1460.82*	10.66	8.68366E+005	2.36415E+005
Eu-152	0.679	121.78*	28.67	1.96743E+004	4.25819E+004
		344.28*	26.60	9.06072E+004	5.00820E+004
		1408.01	21.07		
Eu-155	0.338	86.55*	30.70	3.85728E+004	4.99321E+004
		105.31	21.10		
Tl-208	1.000	583.19*	85.00	1.17581E+004	1.10890E+004
Pb-212	1.000	238.63*	43.60	4.36137E+004	2.36966E+004
Bi-214	0.454	609.32*	45.49	8.13273E+004	3.23689E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	6.77009E+004	3.73351E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

```
*************************************************************************
*****  I N T E R F E R E N C E   C O R R E C T E D   R E P O R T  *****
*************************************************************************
```

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
	K-40	0.997	8.683662E+005	2.364147E+005
	Eu-152	0.679	1.967426E+004	4.258140E+004
X	Eu-154	0.301		
	Eu-155	0.338	3.857280E+004	4.993210E+004
	Tl-208	1.000	1.175807E+004	1.108903E+004
	Pb-212	1.000	4.361375E+004	2.369656E+004
	Bi-214	0.454	8.132733E+004	3.236892E+004
	Pb-214	0.434	5.300045E+004	4.905226E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 10:31:39 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.40	2.9253E-001	37.58		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC003GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.884E+005	1.88E+005	8.684E+005	7.815E+004
	Co-60	1173.23	99.85	2.482E+004	2.38E+004	-2.405E+004	1.091E+004
		1332.49	99.98	2.385E+004		3.937E+003	1.032E+004
	Nb-94	702.65	99.81	2.214E+004	2.21E+004	-7.946E+003	9.955E+003
		871.09	99.89	2.503E+004		-1.327E+004	1.126E+004
	Ag-108m	433.90	90.50	2.842E+004	2.75E+004	1.627E+004	1.330E+004
		614.30	89.80	3.789E+004		-6.760E+003	1.780E+004
		722.90	90.80	2.746E+004		-8.702E+003	1.248E+004
	Cs-134	604.72	97.62	3.472E+004	2.82E+004	-8.736E+003	1.632E+004
		795.86	85.46	2.824E+004		-2.021E+004	1.272E+004
	Cs-137	661.66	85.10	3.560E+004	3.56E+004	1.885E+004	1.654E+004
+	Eu-152	121.78*	28.67	7.105E+004	7.10E+004	1.967E+004	3.400E+004
		344.28*	26.60	7.096E+004		9.061E+004	3.278E+004
		1408.01	21.07	1.279E+005		9.930E+004	5.603E+004
	Eu-154	123.07*	40.40	5.042E+004	5.04E+004	1.396E+004	2.413E+004
		723.30	20.06	1.243E+005		-5.438E+004	5.652E+004
		1274.43	34.80	7.812E+004		6.645E+004	3.456E+004
+	Eu-155	86.55*	30.70	8.125E+004	8.12E+004	3.857E+004	3.913E+004
		105.31	21.10	1.363E+005		5.204E+004	6.607E+004
+	Tl-208	583.19*	85.00	1.708E+004	1.71E+004	1.176E+004	7.370E+003
	Bi-212	727.33	6.67	3.946E+005	3.95E+005	6.509E+004	1.803E+005
+	Pb-212	238.63*	43.60	3.313E+004	3.31E+004	4.361E+004	1.527E+004
+	Bi-214	609.32*	45.49	3.789E+004	3.79E+004	8.133E+004	1.670E+004
		1120.29	14.92	1.803E+005		1.151E+005	8.039E+004
		1764.49	15.30	2.166E+005		4.265E+004	9.556E+004
+	Pb-214	295.22	18.42	1.458E+005	5.30E+004	1.594E+004	6.941E+004
		351.93*	35.60	5.302E+004		6.770E+004	2.449E+004
	Ra-226	186.21	3.64	7.088E+005	7.09E+005	5.337E+004	3.409E+005
	Ac-228	338.32	11.27	2.177E+005	1.15E+005	8.972E+004	1.027E+005
		911.20	25.80	1.147E+005		1.128E+005	5.236E+004
		968.97	15.80	1.626E+005		2.967E+004	7.281E+004
	Am-241	59.54	35.90	1.073E+005	1.07E+005	3.091E+004	5.198E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 1:10:31 PM
Sample Title	: B106202AFSFC004GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 1:00:00 PM
Acquisition Started	: 6/13/2018 1:00:29 PM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.15 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1100

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC004GD
Peak Analysis Performed on: 6/13/2018 1:10:31 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	287-	306	300.54	75.26	1.08	1.18E+002	66.95	2.85E+002
2	951-	962	955.82	239.07	0.94	2.40E+001	24.10	4.80E+001
3	1174-	1188	1182.11	295.64	0.42	3.57E+001	22.26	3.03E+001
4	1401-	1415	1407.26	351.93	1.34	4.55E+001	21.61	2.45E+001
5	2326-	2339	2333.02	583.35	0.31	2.47E+001	12.58	5.32E+000
6	2430-	2445	2437.36	609.44	1.35	5.40E+001	17.68	8.00E+000
7	3069-	3080	3074.75	768.78	0.25	1.35E+001	10.01	4.54E+000
8	5837-	5856	5845.95	1461.54	0.49	7.15E+001	18.61	4.51E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

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************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
************************************************************************
```

Sample Title: B106202AFSFC004GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.999	1460.82*	10.66	8.47276E+005	2.32503E+005
Tl-208	1.000	583.19*	85.00	2.13463E+004	1.11771E+004
Pb-212	1.000	238.63*	43.60	2.29961E+004	2.33932E+004
Bi-214	0.454	609.32*	45.49	8.96421E+004	3.12587E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	9.21693E+004	5.92841E+004
		351.93*	35.60	6.79318E+004	3.38468E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.999	8.472758E+005	2.325031E+005
Tl-208	1.000	2.134633E+004	1.117715E+004
Pb-212	1.000	2.299611E+004	2.339317E+004
Bi-214	0.454	8.964206E+004	3.125865E+004
Pb-214	1.000	7.389008E+004	2.939365E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 1:10:31 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.26	1.9658E-001	56.76		
7	768.78	2.2431E-002	74.35		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC004GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.836E+005	1.84E+005	8.473E+005	7.574E+004
	Co-60	1173.23	99.85	3.117E+004	2.97E+004	1.623E+004	1.409E+004
		1332.49	99.98	2.966E+004		2.727E+004	1.323E+004
	Nb-94	702.65	99.81	2.286E+004	2.29E+004	6.248E+003	1.032E+004
		871.09	99.89	2.585E+004		2.111E+004	1.167E+004
	Ag-108m	433.90	90.50	2.610E+004	2.61E+004	1.105E+004	1.214E+004
		614.30	89.80	3.789E+004		2.979E+003	1.780E+004
		722.90	90.80	2.923E+004		1.225E+004	1.337E+004
	Cs-134	604.72	97.62	3.530E+004	2.59E+004	-1.529E+004	1.661E+004
		795.86	85.46	2.585E+004		1.157E+004	1.153E+004
	Cs-137	661.66	85.10	3.101E+004	3.10E+004	2.249E+004	1.424E+004
	Eu-152	121.78	28.67	8.988E+004	8.79E+004	-6.125E+004	4.342E+004
		344.28	26.60	8.788E+004		-3.368E+004	4.127E+004
		1408.01	21.07	1.211E+005		-9.638E+004	5.263E+004
	Eu-154	123.07	40.40	6.411E+004	6.41E+004	-1.735E+004	3.098E+004
		723.30	20.06	1.308E+005		2.385E+004	5.975E+004
		1274.43	34.80	6.683E+004		-6.894E+004	2.892E+004
	Eu-155	86.55	30.70	1.162E+005	1.16E+005	6.628E+004	5.664E+004
		105.31	21.10	1.344E+005		-7.504E+004	6.511E+004
+	Tl-208	583.19*	85.00	1.331E+004	1.33E+004	2.135E+004	5.487E+003
	Bi-212	727.33	6.67	3.544E+005	3.54E+005	8.549E+004	1.602E+005
+	Pb-212	238.63*	43.60	3.731E+004	3.73E+004	2.300E+004	1.736E+004
+	Bi-214	609.32*	45.49	3.131E+004	3.13E+004	8.964E+004	1.341E+004
		1120.29	14.92	2.262E+005		1.626E+005	1.033E+005
		1764.49	15.30	2.216E+005		1.885E+005	9.804E+004
+	Pb-214	295.22*	18.42	8.665E+004	4.55E+004	9.217E+004	3.984E+004
		351.93*	35.60	4.554E+004		6.793E+004	2.075E+004
	Ra-226	186.21	3.64	7.072E+005	7.07E+005	4.445E+005	3.401E+005
	Ac-228	338.32	11.27	2.086E+005	1.06E+005	1.714E+005	9.809E+004
		911.20	25.80	1.059E+005		2.903E+004	4.793E+004
		968.97	15.80	1.917E+005		2.173E+002	8.737E+004
	Am-241	59.54	35.90	1.067E+005	1.07E+005	6.910E+004	5.166E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 1:50:32 PM
Sample Title	: B106202AFSFC005GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 1:40:00 PM
Acquisition Started	: 6/13/2018 1:40:31 PM
Live Time	: 600.0 seconds
Real Time	: 600.8 seconds
Dead Time	: 0.13 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1100

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC005GD
Peak Analysis Performed on: 6/13/2018 1:50:32 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	305	300.45	75.24	0.84	4.32E+001	45.92	2.14E+002
2	333-	346	339.83	85.08	0.35	2.88E+001	47.38	1.92E+002
3	740-	750	744.56	186.26	0.89	3.45E+001	24.11	4.65E+001
4	949-	961	954.89	238.84	1.32	3.14E+001	22.97	3.76E+001
5	1176-	1185	1180.50	295.24	0.40	1.82E+001	17.22	2.48E+001
6	1400-	1413	1406.41	351.71	0.67	5.12E+001	20.83	2.08E+001
7	2431-	2444	2437.18	609.39	0.78	4.28E+001	17.81	1.32E+001
8	5835-	5854	5845.19	1461.35	1.18	1.01E+002	21.71	4.82E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC005GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.19903E+006	2.77542E+005
Eu-155	0.338	86.55*	30.70	3.17427E+004	5.25909E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	3.00536E+004	2.25267E+004
Bi-214	0.454	609.32*	45.49	7.09929E+004	3.07753E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	4.68477E+004	4.50257E+004
		351.93*	35.60	7.64223E+004	3.31472E+004
Ra-226	1.000	186.21*	3.64	3.44976E+005	2.48156E+005

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.199031E+006	2.775423E+005
Eu-155	0.338	3.174274E+004	5.259090E+004
Pb-212	1.000	3.005365E+004	2.252667E+004
Bi-214	0.454	7.099294E+004	3.077530E+004
Pb-214	1.000	6.602748E+004	2.669376E+004
Ra-226	1.000	3.449762E+005	2.481562E+005

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 1:50:32 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.24	7.1984E-002	106.32		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC005GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.912E+005	1.91E+005	1.199E+006	7.955E+004
	Co-60	1173.23	99.85	2.766E+004	2.31E+004	2.543E+004	1.234E+004
		1332.49	99.98	2.310E+004		-2.667E+003	9.944E+003
	Nb-94	702.65	99.81	2.214E+004	2.14E+004	-2.448E+003	9.955E+003
		871.09	99.89	2.141E+004		-1.400E+004	9.443E+003
	Ag-108m	433.90	90.50	2.189E+004	2.19E+004	-4.908E+003	1.003E+004
		614.30	89.80	3.565E+004		-1.806E+004	1.668E+004
		722.90	90.80	2.671E+004		5.061E+003	1.211E+004
	Cs-134	604.72	97.62	3.412E+004	3.00E+004	-2.189E+004	1.602E+004
		795.86	85.46	2.999E+004		3.307E+004	1.360E+004
	Cs-137	661.66	85.10	3.133E+004	3.13E+004	1.678E+004	1.440E+004
	Eu-152	121.78	28.67	9.492E+004	8.53E+004	3.169E+004	4.594E+004
		344.28	26.60	8.530E+004		2.831E+004	3.998E+004
		1408.01	21.07	1.017E+005		9.053E+003	4.297E+004
	Eu-154	123.07	40.40	6.725E+004	6.72E+004	-3.467E+004	3.255E+004
		723.30	20.06	1.226E+005		1.106E+005	5.568E+004
		1274.43	34.80	7.457E+004		9.136E+003	3.279E+004
+	Eu-155	86.55*	30.70	8.663E+004	8.66E+004	3.174E+004	4.182E+004
		105.31	21.10	1.445E+005		-4.030E+004	7.016E+004
	Tl-208	583.19	85.00	3.298E+004	3.30E+004	1.108E+004	1.532E+004
	Bi-212	727.33	6.67	3.850E+005	3.85E+005	2.123E+005	1.755E+005
+	Pb-212	238.63*	43.60	3.418E+004	3.42E+004	3.005E+004	1.579E+004
+	Bi-214	609.32*	45.49	3.751E+004	3.75E+004	7.099E+004	1.651E+004
		1120.29	14.92	2.262E+005		5.423E+004	1.033E+005
		1764.49	15.30	2.403E+005		2.262E+005	1.074E+005
+	Pb-214	295.22*	18.42	7.043E+004	4.12E+004	4.685E+004	3.173E+004
		351.93*	35.60	4.124E+004		7.642E+004	1.860E+004
+	Ra-226	186.21*	3.64	3.731E+005	3.73E+005	3.450E+005	1.730E+005
	Ac-228	338.32	11.27	2.039E+005	1.18E+005	1.326E+005	9.572E+004
		911.20	25.80	1.175E+005		7.742E+004	5.375E+004
		968.97	15.80	1.764E+005		-5.148E+004	7.976E+004
	Am-241	59.54	35.90	1.085E+005	1.08E+005	5.784E+004	5.254E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 2:01:48 PM
Sample Title	: B106202AFQFC005GD
Sample Description	: U2 Diesel Fuel Storage Floor QC
Sample Identification	: QC
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 1:51:00 PM
Acquisition Started	: 6/13/2018 1:51:46 PM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.14 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1100

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFQFC005GD
Peak Analysis Performed on: 6/13/2018 2:01:48 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	285-	305	291.50	73.00	1.07	1.33E+002	73.16	3.32E+002
2	335-	344	339.29	84.95	0.84	1.66E+001	35.72	1.32E+002
3	945-	959	953.30	238.44	0.55	3.64E+001	28.60	5.66E+001
4	1175-	1185	1180.24	295.17	0.79	4.52E+000	17.86	3.15E+001
5	1401-	1413	1407.56	352.00	0.40	5.12E+001	21.10	2.28E+001
6	2431-	2445	2437.16	609.39	1.24	5.28E+001	15.49	2.20E+000
7	5835-	5854	5845.17	1461.34	0.58	8.48E+001	20.40	5.24E+000
8	7055-	7070	7062.53	1765.67	0.37	1.79E+001	9.92	2.09E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: B106202AFQFC005GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.00435E+006	2.56980E+005
Eu-155	0.338	86.55*	30.70	1.83419E+004	3.95517E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	3.47837E+004	2.79277E+004
Bi-214	0.710	609.32*	45.49	8.76380E+004	2.77818E+004
		1120.29	14.92		
		1764.49*	15.30	1.68881E+005	9.45001E+004
Pb-214	1.000	295.22*	18.42	1.16517E+004	4.60656E+004
		351.93*	35.60	7.65266E+004	3.35421E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.004353E+006	2.569800E+005
Eu-155	0.338	1.834190E+004	3.955169E+004
Pb-212	1.000	3.478370E+004	2.792769E+004
Bi-214	0.710	9.410109E+004	2.665381E+004
Pb-214	1.000	5.404843E+004	2.711557E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 2:01:48 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	73.00	2.2249E-001	54.80		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFQFC005GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.032E+005	2.03E+005	1.004E+006	8.558E+004
	Co-60	1173.23	99.85	3.386E+004	2.15E+004	1.405E+004	1.543E+004
		1332.49	99.98	2.150E+004		-1.369E+004	9.147E+003
	Nb-94	702.65	99.81	2.250E+004	2.09E+004	7.169E+003	1.014E+004
		871.09	99.89	2.090E+004		-8.846E+003	9.191E+003
	Ag-108m	433.90	90.50	2.442E+004	2.44E+004	-4.547E+003	1.130E+004
		614.30	89.80	3.701E+004		-1.449E+004	1.736E+004
		722.90	90.80	2.474E+004		-2.166E+004	1.112E+004
	Cs-134	604.72	97.62	3.392E+004	3.12E+004	-2.908E+004	1.592E+004
		795.86	85.46	3.124E+004		1.952E+004	1.422E+004
	Cs-137	661.66	85.10	2.785E+004	2.79E+004	-4.434E+003	1.266E+004
	Eu-152	121.78	28.67	9.358E+004	7.93E+004	-4.131E+003	4.527E+004
		344.28	26.60	7.928E+004		-4.928E+004	3.697E+004
		1408.01	21.07	1.099E+005		-3.529E+004	4.707E+004
	Eu-154	123.07	40.40	6.629E+004	6.63E+004	2.343E+004	3.207E+004
		723.30	20.06	1.120E+005		-7.002E+004	5.037E+004
		1274.43	34.80	7.082E+004		2.352E+004	3.092E+004
+	Eu-155	86.55*	30.70	6.605E+004	6.61E+004	1.834E+004	3.154E+004
		105.31	21.10	1.388E+005		-6.095E+004	6.731E+004
	Tl-208	583.19	85.00	3.324E+004	3.32E+004	1.301E+004	1.545E+004
	Bi-212	727.33	6.67	3.993E+005	3.99E+005	3.481E+005	1.826E+005
+	Pb-212	238.63*	43.60	4.339E+004	4.34E+004	3.478E+004	2.040E+004
+	Bi-214	609.32*	45.49	1.911E+004	1.91E+004	8.764E+004	7.308E+003
		1120.29	14.92	2.444E+005		2.144E+005	1.124E+005
		1764.49*	15.30	1.057E+005		1.689E+005	4.011E+004
+	Pb-214	295.22*	18.42	8.051E+004	4.21E+004	1.165E+004	3.677E+004
		351.93*	35.60	4.215E+004		7.653E+004	1.905E+004
	Ra-226	186.21	3.64	6.679E+005	6.68E+005	-4.747E+004	3.204E+005
	Ac-228	338.32	11.27	2.109E+005	1.15E+005	1.481E+005	9.925E+004
		911.20	25.80	1.147E+005		3.517E+004	5.236E+004
		968.97	15.80	1.941E+005		1.424E+005	8.857E+004
	Am-241	59.54	35.90	1.118E+005	1.12E+005	2.978E+004	5.419E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 3:12:05 PM
Sample Title	: B106202AFSFC006GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 3:02:00 PM
Acquisition Started	: 6/13/2018 3:02:03 PM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.15 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1100

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC006GD
Peak Analysis Performed on: 6/13/2018 3:12:04 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	305	300.85	75.34	0.59	9.01E+001	45.37	1.85E+002
2	740-	749	744.14	186.15	0.82	9.17E+000	21.73	4.78E+001
3	950-	959	954.67	238.79	0.73	2.81E+001	21.13	3.69E+001
4	1400-	1415	1407.57	352.00	1.37	3.90E+001	22.22	2.80E+001
5	2326-	2337	2331.59	583.00	0.67	2.60E+001	13.94	9.00E+000
6	2429-	2441	2435.26	608.91	1.10	3.31E+001	17.36	1.59E+001
7	5835-	5851	5843.63	1460.96	0.89	7.40E+001	17.20	0.00E+000
8	7051-	7066	7058.41	1764.64	0.62	2.00E+001	10.27	2.03E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC006GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	8.76737E+005	2.17591E+005
Tl-208	1.000	583.19*	85.00	2.24765E+004	1.23510E+004
Pb-212	1.000	238.63*	43.60	2.69346E+004	2.06946E+004
Bi-214	0.710	609.32*	45.49	5.49976E+004	2.95484E+004
		1120.29	14.92		
		1764.49*	15.30	1.88164E+005	9.79181E+004
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	5.82812E+004	3.43315E+004
Ra-226	1.000	186.21*	3.64	9.16332E+004	2.17663E+005

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	8.767371E+005	2.175908E+005
Tl-208	1.000	2.247653E+004	1.235096E+004
Pb-212	1.000	2.693457E+004	2.069455E+004
Bi-214	0.710	6.611203E+004	2.828846E+004
Pb-214	0.434	5.828121E+004	3.433150E+004
Ra-226	1.000	9.163325E+004	2.176635E+005

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 3:12:04 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.34	1.5012E-001	50.37		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC006GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	3.206E+004	3.21E+004	8.767E+005	0.000E+000
	Co-60	1173.23	99.85	3.163E+004	2.15E+004	1.022E+004	1.432E+004
		1332.49	99.98	2.150E+004		-5.038E+003	9.147E+003
	Nb-94	702.65	99.81	2.139E+004	1.75E+004	-9.142E+003	9.580E+003
		871.09	99.89	1.753E+004		9.312E+002	7.504E+003
	Ag-108m	433.90	90.50	2.139E+004	2.14E+004	-5.389E+003	9.786E+003
		614.30	89.80	3.565E+004		-2.901E+004	1.668E+004
		722.90	90.80	2.782E+004		3.175E+003	1.267E+004
	Cs-134	604.72	97.62	3.310E+004	2.68E+004	5.486E+004	1.551E+004
		795.86	85.46	2.684E+004		6.241E+003	1.202E+004
	Cs-137	661.66	85.10	2.509E+004	2.51E+004	7.588E+003	1.128E+004
	Eu-152	121.78	28.67	1.004E+005	8.04E+004	6.342E+004	4.868E+004
		344.28	26.60	8.041E+004		-6.743E+004	3.754E+004
		1408.01	21.07	1.138E+005		-6.257E+004	4.899E+004
	Eu-154	123.07	40.40	6.964E+004	6.96E+004	-4.818E+004	3.374E+004
		723.30	20.06	1.243E+005		-6.703E+004	5.652E+004
		1274.43	34.80	7.983E+004		4.576E+004	3.542E+004
	Eu-155	86.55	30.70	1.191E+005	1.19E+005	5.784E+004	5.806E+004
		105.31	21.10	1.466E+005		1.194E+005	7.124E+004
+	Tl-208	583.19*	85.00	1.586E+004	1.59E+004	2.248E+004	6.759E+003
	Bi-212	727.33	6.67	4.085E+005	4.09E+005	2.287E+005	1.873E+005
+	Pb-212	238.63*	43.60	3.137E+004	3.14E+004	2.693E+004	1.439E+004
+	Bi-214	609.32*	45.49	3.994E+004	3.99E+004	5.500E+004	1.772E+004
		1120.29	14.92	2.262E+005		1.703E+005	1.033E+005
		1764.49*	15.30	1.038E+005		1.882E+005	3.917E+004
+	Pb-214	295.22	18.42	1.356E+005	4.92E+004	-3.639E+004	6.430E+004
		351.93*	35.60	4.922E+004		5.828E+004	2.259E+004
+	Ra-226	186.21*	3.64	3.700E+005	3.70E+005	9.163E+004	1.715E+005
	Ac-228	338.32	11.27	2.063E+005	1.13E+005	1.724E+005	9.691E+004
		911.20	25.80	1.133E+005		2.775E+004	5.165E+004
		968.97	15.80	1.965E+005		5.320E+004	8.976E+004
	Am-241	59.54	35.90	1.127E+005	1.13E+005	4.473E+004	5.466E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 3:23:55 PM
Sample Title	: B106202AFSFC007GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 3:13:00 PM
Acquisition Started	: 6/13/2018 3:13:54 PM
Live Time	: 600.0 seconds
Real Time	: 600.7 seconds
Dead Time	: 0.12 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1100

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC007GD
Peak Analysis Performed on: 6/13/2018 3:23:55 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	307	300.64	75.29	1.22	7.73E+001	51.54	2.33E+002
2	947-	958	952.84	238.33	0.55	4.06E+001	24.53	4.34E+001
3	1400-	1414	1406.95	351.85	0.74	3.80E+001	21.78	2.80E+001
4	2430-	2444	2436.54	609.23	0.73	4.12E+001	17.07	1.08E+001
5	5834-	5854	5843.74	1460.99	1.12	9.54E+001	22.14	7.61E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC007GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.13013E+006	2.80119E+005
Pb-212	1.000	238.63*	43.60	3.88324E+004	2.42861E+004
Bi-214	0.454	609.32*	45.49	6.83665E+004	2.95040E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	5.66970E+004	3.36282E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

```
*************************************************************************
*****  I N T E R F E R E N C E   C O R R E C T E D   R E P O R T  *****
*************************************************************************
```

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.130128E+006	2.801192E+005
Pb-212	1.000	3.883241E+004	2.428607E+004
Bi-214	0.454	6.836654E+004	2.950403E+004
Pb-214	0.434	5.669700E+004	3.362824E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 3:23:55 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.29	1.2883E-001	66.67		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC007GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.354E+005	2.35E+005	1.130E+006	1.017E+005
	Co-60	1173.23	99.85	3.163E+004	2.79E+004	5.528E+002	1.432E+004
		1332.49	99.98	2.787E+004		5.127E+003	1.233E+004
	Nb-94	702.65	99.81	2.061E+004	2.06E+004	-2.703E+004	9.188E+003
		871.09	99.89	2.585E+004		-3.050E+004	1.167E+004
	Ag-108m	433.90	90.50	2.709E+004	2.55E+004	-6.314E+003	1.263E+004
		614.30	89.80	3.723E+004		-3.115E+004	1.747E+004
		722.90	90.80	2.555E+004		2.301E+003	1.153E+004
	Cs-134	604.72	97.62	3.511E+004	2.82E+004	-9.171E+002	1.651E+004
		795.86	85.46	2.824E+004		7.187E+003	1.272E+004
	Cs-137	661.66	85.10	3.198E+004	3.20E+004	2.471E+003	1.473E+004
	Eu-152	121.78	28.67	9.985E+004	9.28E+004	3.857E+004	4.840E+004
		344.28	26.60	9.283E+004		-1.803E+004	4.375E+004
		1408.01	21.07	1.175E+005		-5.580E+004	5.084E+004
	Eu-154	123.07	40.40	6.953E+004	6.95E+004	2.391E+004	3.369E+004
		723.30	20.06	1.157E+005		-1.045E+004	5.220E+004
		1274.43	34.80	7.812E+004		4.037E+004	3.456E+004
	Eu-155	86.55	30.70	1.255E+005	1.26E+005	2.301E+005	6.127E+004
		105.31	21.10	1.436E+005		-1.484E+005	6.971E+004
	Tl-208	583.19	85.00	3.298E+004	3.30E+004	-1.061E+004	1.532E+004
	Bi-212	727.33	6.67	3.801E+005	3.80E+005	1.844E+005	1.730E+005
+	Pb-212	238.63*	43.60	3.556E+004	3.56E+004	3.883E+004	1.649E+004
+	Bi-214	609.32*	45.49	3.523E+004	3.52E+004	6.837E+004	1.537E+004
		1120.29	14.92	2.178E+005		2.054E+005	9.917E+004
		1764.49	15.30	2.115E+005		1.696E+005	9.301E+004
+	Pb-214	295.22	18.42	1.400E+005	4.82E+004	7.097E+004	6.650E+004
		351.93*	35.60	4.818E+004		5.670E+004	2.207E+004
	Ra-226	186.21	3.64	6.813E+005	6.81E+005	-5.260E+005	3.271E+005
	Ac-228	338.32	11.27	2.243E+005	1.34E+005	1.316E+005	1.059E+005
		911.20	25.80	1.342E+005		3.422E+004	6.207E+004
		968.97	15.80	2.166E+005		2.101E+005	9.983E+004
	Am-241	59.54	35.90	1.108E+005	1.11E+005	-1.032E+005	5.373E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 1:22:39 PM
Sample Title	: B106202AFSFC008GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/14/2018 1:12:00 PM
Acquisition Started	: 6/14/2018 1:12:37 PM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.16 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1100
Patrye Hyi

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC008GD
Peak Analysis Performed on: 6/14/2018 1:22:38 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	295-	306	300.29	75.20	0.71	6.74E+001	56.58	2.87E+002
2	334-	343	338.62	84.78	0.28	3.56E+001	40.41	1.64E+002
3	946-	959	954.97	238.86	0.80	4.29E+001	28.10	5.61E+001
4	1173-	1188	1180.18	295.16	0.39	2.60E+001	24.21	4.00E+001
5	1401-	1416	1407.34	351.95	0.37	4.21E+001	23.25	3.09E+001
6	2429-	2442	2435.27	608.92	0.68	2.90E+001	16.44	1.40E+001
7	2639-	2655	2646.31	661.67	1.34	6.55E+001	20.71	1.35E+001
8	4686-	4699	4692.40	1173.17	0.58	1.88E+001	12.55	7.15E+000
9	5836-	5855	5844.38	1461.14	1.91	1.09E+002	22.14	4.31E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: B106202AFSFC008GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.28791E+006	2.85213E+005
Cs-137	1.000	661.66*	85.10	6.11791E+004	2.06767E+004
Eu-155	0.337	86.55*	30.70	3.92277E+004	4.52555E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	4.11284E+004	2.77172E+004
Bi-214	0.454	609.32*	45.49	4.81157E+004	2.78832E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	6.68912E+004	6.32944E+004
		351.93*	35.60	6.28808E+004	3.59876E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.287909E+006	2.852126E+005
Cs-137	1.000	6.117911E+004	2.067672E+004
Eu-155	0.337	3.922775E+004	4.525555E+004
Pb-212	1.000	4.112837E+004	2.771718E+004
Bi-214	0.454	4.811569E+004	2.788324E+004
Pb-214	1.000	6.386052E+004	3.128440E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 1:22:38 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.20	1.1233E-001	83.95		
8	1173.17	3.1410E-002	66.61		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_2IN
Sample Title: B106202AFSFC008GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.773E+005	1.77E+005	1.288E+006	7.263E+004
	Co-60	1173.23	99.85	3.711E+004	3.71E+004	3.939E+004	1.706E+004
		1332.49	99.98	3.721E+004		1.839E+004	1.700E+004
	Nb-94	702.65	99.81	2.286E+004	2.29E+004	-2.584E+003	1.032E+004
		871.09	99.89	2.503E+004		-6.949E+003	1.126E+004
	Ag-108m	433.90	90.50	2.804E+004	2.59E+004	6.579E+003	1.311E+004
		614.30	89.80	3.634E+004		-1.450E+004	1.703E+004
		722.90	90.80	2.594E+004		-1.238E+004	1.173E+004
	Cs-134	604.72	97.62	3.412E+004	2.91E+004	1.851E+004	1.602E+004
		795.86	85.46	2.913E+004		9.102E+003	1.317E+004
+	Cs-137	661.66*	85.10	2.234E+004	2.23E+004	6.118E+004	9.908E+003
	Eu-152	121.78	28.67	1.082E+005	9.28E+004	-4.750E+004	5.260E+004
		344.28	26.60	9.283E+004		-6.392E+004	4.375E+004
		1408.01	21.07	9.734E+004		-4.867E+002	4.076E+004
	Eu-154	123.07	40.40	7.559E+004	7.56E+004	-4.537E+004	3.672E+004
		723.30	20.06	1.157E+005		-9.605E+004	5.220E+004
		1274.43	34.80	8.781E+004		1.329E+004	3.941E+004
+	Eu-155	86.55*	30.70	7.304E+004	7.30E+004	3.923E+004	3.503E+004
		105.31	21.10	1.626E+005		3.304E+004	7.923E+004
	Tl-208	583.19	85.00	3.324E+004	3.32E+004	1.368E+004	1.545E+004
	Bi-212	727.33	6.67	3.700E+005	3.70E+005	2.347E+005	1.680E+005
+	Pb-212	238.63*	43.60	4.174E+004	4.17E+004	4.113E+004	1.958E+004
+	Bi-214	609.32*	45.49	3.839E+004	3.84E+004	4.812E+004	1.695E+004
		1120.29	14.92	2.342E+005		2.401E+005	1.073E+005
		1764.49	15.30	2.403E+005		2.262E+005	1.074E+005
+	Pb-214	295.22*	18.42	1.001E+005	5.15E+004	6.689E+004	4.654E+004
		351.93*	35.60	5.146E+004		6.288E+004	2.371E+004
	Ra-226	186.21	3.64	7.796E+005	7.80E+005	9.297E+005	3.763E+005
	Ac-228	338.32	11.27	2.254E+005	1.09E+005	-2.681E+005	1.065E+005
		911.20	25.80	1.089E+005		-1.079E+005	4.945E+004
		968.97	15.80	1.941E+005		5.320E+004	8.857E+004
	Am-241	59.54	35.90	1.252E+005	1.25E+005	9.277E+004	6.090E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*********************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*********************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 1:34:05 PM
Sample Title	: B106202AFSFC009GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/14/2018 1:23:00 PM
Acquisition Started	: 6/14/2018 1:24:03 PM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.17 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1100

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC009GD
Peak Analysis Performed on: 6/14/2018 1:34:04 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	305	300.73	75.31	0.34	7.82E+001	48.36	2.24E+002
2	1009-	1018	1013.40	253.47	0.27	1.20E+001	17.18	2.70E+001
3	1400-	1413	1407.05	351.87	0.29	4.32E+001	21.22	2.48E+001
4	2431-	2445	2437.08	609.37	0.93	4.81E+001	16.45	6.93E+000
5	2636-	2655	2645.69	661.52	1.32	1.16E+002	25.37	1.26E+001
6	4685-	4698	4691.66	1172.98	0.79	4.29E+001	15.85	7.07E+000
7	5323-	5339	5330.93	1332.79	0.44	4.00E+001	13.59	2.01E+000
8	5835-	5853	5844.55	1461.19	1.00	7.65E+001	18.46	2.47E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*********************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*********************************************************************
```

Sample Title: B106202AFSFC009GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	9.06757E+005	2.32495E+005
Co-60	1.000	1173.23*	99.85	4.74580E+004	1.79263E+004
		1332.49*	99.98	4.74119E+004	1.65548E+004
Cs-137	1.000	661.66*	85.10	1.08625E+005	2.70361E+004
Bi-214	0.454	609.32*	45.49	7.97893E+004	2.89378E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	6.45181E+004	3.31418E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	9.067574E+005	2.324951E+005
Co-60	1.000	4.743313E+004	1.216202E+004
Cs-137	1.000	1.086245E+005	2.703614E+004
Bi-214	0.454	7.978930E+004	2.893778E+004
Pb-214	0.434	6.451811E+004	3.314175E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 1:34:04 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.31	1.3029E-001	61.86		
2	253.47	2.0000E-002	143.15		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_2IN
Sample Title: B106202AFSFC009GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.469E+005	1.47E+005	9.068E+005	5.744E+004
+	Co-60	1173.23*	99.85	1.920E+004	1.29E+004	4.746E+004	8.104E+003
		1332.49*	99.98	1.292E+004		4.741E+004	4.853E+003
	Nb-94	702.65	99.81	2.490E+004	2.49E+004	-8.030E+003	1.133E+004
		871.09	99.89	2.664E+004		2.163E+004	1.206E+004
	Ag-108m	433.90	90.50	2.932E+004	2.71E+004	2.745E+004	1.375E+004
		614.30	89.80	3.789E+004		4.022E+003	1.780E+004
		722.90	90.80	2.709E+004		1.246E+004	1.230E+004
	Cs-134	604.72	97.62	3.269E+004	2.73E+004	-7.071E+003	1.530E+004
		795.86	85.46	2.731E+004		-8.734E+003	1.226E+004
+	Cs-137	661.66*	85.10	2.302E+004	2.30E+004	1.086E+005	1.025E+004
	Eu-152	121.78	28.67	1.075E+005	9.23E+004	-2.541E+004	5.221E+004
		344.28	26.60	9.235E+004		-9.115E+004	4.351E+004
		1408.01	21.07	1.017E+005		5.841E+004	4.297E+004
	Eu-154	123.07	40.40	7.596E+004	7.27E+004	-1.886E+004	3.690E+004
		723.30	20.06	1.226E+005		5.537E+004	5.568E+004
		1274.43	34.80	7.272E+004		2.980E+004	3.187E+004
	Eu-155	86.55	30.70	1.291E+005	1.29E+005	1.669E+005	6.305E+004
		105.31	21.10	1.562E+005		1.254E+005	7.605E+004
	Tl-208	583.19	85.00	3.190E+004	3.19E+004	2.464E+004	1.478E+004
	Bi-212	727.33	6.67	3.544E+005	3.54E+005	-2.891E+005	1.602E+005
	Pb-212	238.63	43.60	6.681E+004	6.68E+004	2.749E+004	3.211E+004
+	Bi-214	609.32*	45.49	2.865E+004	2.86E+004	7.979E+004	1.208E+004
		1120.29	14.92	2.262E+005		1.060E+005	1.033E+005
		1764.49	15.30	2.115E+005		1.696E+005	9.301E+004
+	Pb-214	295.22	18.42	1.427E+005	4.50E+004	-3.987E+003	6.784E+004
		351.93*	35.60	4.499E+004		6.452E+004	2.047E+004
	Ra-226	186.21	3.64	7.666E+005	7.67E+005	1.676E+005	3.698E+005
	Ac-228	338.32	11.27	2.276E+005	1.32E+005	7.801E+004	1.076E+005
		911.20	25.80	1.317E+005		1.307E+005	6.086E+004
		968.97	15.80	1.941E+005		5.739E+004	8.857E+004
	Am-241	59.54	35.90	1.248E+005	1.25E+005	4.975E+004	6.069E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
***********************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
***********************************************************************


Filename: 6279

Report Generated On                : 6/14/2018   2:09:08 PM

Sample Title                       : B106202AFSFC010GD
Sample Description                 : U2 Diesel Fuel Storage Floor
Sample Identification              :
Sample Type                        : Gamma Direct
Sample Geometry                    : 3M90D_CP_2IN

Peak Locate Threshold              :  3.00
Peak Locate Range (in channels)    :    85 -  8192
Peak Area Range (in channels)      :    85 -  8192
Identification Energy Tolerance    :   10.000 keV

Sample Size                        :  2.830E+001 M^2

Sample Taken On                    : 6/14/2018   1:59:00 PM
Acquisition Started                : 6/14/2018   1:59:07 PM

Live Time                          :      600.0 seconds
Real Time                          :      600.9 seconds

Dead Time                          :   0.15 %

            Energy Calibration Used Done On        : 6/9/2018
            Efficiency Calibration Used Done On    : 6/2/2018
            Efficiency ID                          : 3M90D_CP_1IN
```

DATA VALIDATED
DATE 10-24-18
TIME 1100
P. Hija

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC010GD
Peak Analysis Performed on: 6/14/2018 2:09:08 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	305	300.22	75.18	0.82	5.12E+001	44.98	2.00E+002
2	948-	960	954.08	238.64	0.50	4.01E+001	24.36	4.09E+001
3	1172-	1185	1179.48	294.98	0.63	5.41E+001	19.88	1.59E+001
4	1398-	1414	1406.59	351.76	1.32	5.63E+001	23.98	2.78E+001
5	2429-	2444	2437.08	609.37	1.56	4.50E+001	18.00	1.20E+001
6	3638-	3651	3644.04	911.09	0.38	1.44E+001	11.09	5.55E+000
7	4475-	4488	4481.18	1120.36	0.58	1.39E+001	10.49	4.11E+000
8	5836-	5854	5844.19	1461.10	0.39	8.70E+001	18.65	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC010GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.03083E+006	2.38470E+005
Pb-212	1.000	238.63*	43.60	3.84176E+004	2.41247E+004
Bi-214	0.743	609.32*	45.49	7.46964E+004	3.11996E+004
		1120.29*	14.92	1.00078E+005	7.60021E+004
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	1.39269E+005	5.58467E+004
		351.93*	35.60	8.40215E+004	3.79703E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

```
************************************************************************
*****  I N T E R F E R E N C E   C O R R E C T E D   R E P O R T  *****
************************************************************************
```

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.030828E+006	2.384701E+005
Pb-212	1.000	3.841762E+004	2.412473E+004
Bi-214	0.743	7.835678E+004	2.886229E+004
Pb-214	1.000	1.014869E+005	3.140008E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 2:09:08 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.18	8.5339E-002	87.85		
6	911.09	2.4083E-002	76.74	Sum	

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_2IN
Sample Title: B106202AFSFC010GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	3.206E+004	3.21E+004	1.031E+006	0.000E+000
	Co-60	1173.23	99.85	3.069E+004	2.79E+004	2.289E+004	1.385E+004
		1332.49	99.98	2.787E+004		-1.185E+004	1.233E+004
	Nb-94	702.65	99.81	2.177E+004	2.18E+004	5.947E+003	9.769E+003
		871.09	99.89	2.461E+004		1.295E+004	1.105E+004
	Ag-108m	433.90	90.50	2.528E+004	2.53E+004	1.395E+004	1.173E+004
		614.30	89.80	3.917E+004		-7.790E+002	1.844E+004
		722.90	90.80	2.555E+004		2.073E+004	1.153E+004
	Cs-134	604.72	97.62	3.472E+004	2.96E+004	-7.699E+002	1.632E+004
		795.86	85.46	2.957E+004		1.783E+004	1.338E+004
	Cs-137	661.66	85.10	2.999E+004	3.00E+004	7.322E+003	1.373E+004
	Eu-152	121.78	28.67	1.006E+005	8.74E+004	-1.432E+004	4.875E+004
		344.28	26.60	8.737E+004		-3.431E+004	4.102E+004
		1408.01	21.07	1.099E+005		-3.432E+004	4.707E+004
	Eu-154	123.07	40.40	7.045E+004	6.68E+004	-8.899E+003	3.414E+004
		723.30	20.06	1.120E+005		2.870E+004	5.037E+004
		1274.43	34.80	6.683E+004		-6.324E+004	2.892E+004
	Eu-155	86.55	30.70	1.184E+005	1.18E+005	-1.225E+004	5.772E+004
		105.31	21.10	1.410E+005		6.568E+004	6.843E+004
	Tl-208	583.19	85.00	3.576E+004	3.58E+004	3.035E+004	1.671E+004
	Bi-212	727.33	6.67	2.956E+005	2.96E+005	6.914E+003	1.308E+005
+	Pb-212	238.63*	43.60	3.534E+004	3.53E+004	3.842E+004	1.638E+004
+	Bi-214	609.32*	45.49	3.726E+004	3.73E+004	7.470E+004	1.638E+004
		1120.29*	14.92	1.070E+005		1.001E+005	4.374E+004
		1764.49	15.30	2.063E+005		1.602E+005	9.039E+004
+	Pb-214	295.22*	18.42	6.364E+004	5.00E+004	1.393E+005	2.833E+004
		351.93*	35.60	5.003E+004		8.402E+004	2.299E+004
	Ra-226	186.21	3.64	6.796E+005	6.80E+005	5.833E+005	3.263E+005
	Ac-228	338.32	11.27	2.200E+005	1.13E+005	4.238E+004	1.038E+005
		911.20	25.80	1.133E+005		1.051E+005	5.165E+004
		968.97	15.80	1.817E+005		7.179E+004	8.237E+004
	Am-241	59.54	35.90	1.154E+005	1.15E+005	8.627E+003	5.602E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 3:00:26 PM
Sample Title	: B106202AFSFC011GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 2:50:00 PM
Acquisition Started	: 6/13/2018 2:50:24 PM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.17 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1100

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC011GD
Peak Analysis Performed on: 6/13/2018 3:00:25 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	287-	319	300.29	75.20	0.78	2.45E+002	98.57	4.27E+002
2	950-	959	954.70	238.79	0.92	4.85E+001	22.16	3.25E+001
3	1175-	1187	1181.12	295.39	1.14	3.26E+001	18.96	2.14E+001
4	1401-	1412	1406.37	351.70	1.01	2.26E+001	17.64	2.14E+001
5	2327-	2338	2332.40	583.20	0.74	1.94E+001	11.19	4.63E+000
6	2429-	2443	2436.29	609.17	1.09	5.00E+001	18.70	1.30E+001
7	5834-	5853	5842.99	1460.80	0.85	1.12E+002	22.08	2.62E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC011GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.33141E+006	2.86013E+005
Tl-208	1.000	583.19*	85.00	1.67529E+004	9.88217E+003
Pb-212	1.000	238.63*	43.60	4.64385E+004	2.25042E+004
Bi-214	0.454	609.32*	45.49	8.29003E+004	3.25961E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	8.40160E+004	5.07143E+004
		351.93*	35.60	3.38089E+004	2.68249E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.331410E+006	2.860127E+005
Tl-208	1.000	1.675289E+004	9.882166E+003
Pb-212	1.000	4.643850E+004	2.250423E+004
Bi-214	0.454	8.290033E+004	3.259610E+004
Pb-214	1.000	4.478493E+004	2.371210E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 3:00:25 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.20	4.0881E-001	40.19		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC011GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.523E+005	1.52E+005	1.331E+006	6.013E+004
	Co-60	1173.23	99.85	2.922E+004	2.38E+004	-1.937E+004	1.311E+004
		1332.49	99.98	2.385E+004		6.330E+003	1.032E+004
	Nb-94	702.65	99.81	2.736E+004	2.04E+004	2.491E+004	1.256E+004
		871.09	99.89	2.038E+004		7.765E+003	8.932E+003
	Ag-108m	433.90	90.50	2.709E+004	2.55E+004	-2.160E+004	1.263E+004
		614.30	89.80	3.917E+004		-9.875E+003	1.844E+004
		722.90	90.80	2.555E+004		-6.577E+003	1.153E+004
	Cs-134	604.72	97.62	3.718E+004	2.53E+004	-2.310E+003	1.755E+004
		795.86	85.46	2.535E+004		-7.562E+003	1.128E+004
	Cs-137	661.66	85.10	2.709E+004	2.71E+004	1.232E+004	1.228E+004
	Eu-152	121.78	28.67	1.003E+005	8.15E+004	6.989E+002	4.861E+004
		344.28	26.60	8.152E+004		-6.522E+004	3.809E+004
		1408.01	21.07	1.279E+005		9.930E+004	5.603E+004
	Eu-154	123.07	40.40	7.155E+004	7.15E+004	5.583E+004	3.469E+004
		723.30	20.06	1.157E+005		-3.394E+004	5.220E+004
		1274.43	34.80	8.472E+004		5.430E+004	3.786E+004
	Eu-155	86.55	30.70	1.169E+005	1.17E+005	9.129E+004	5.698E+004
		105.31	21.10	1.471E+005		9.417E+003	7.150E+004
+	Tl-208	583.19*	85.00	1.216E+004	1.22E+004	1.675E+004	4.912E+003
	Bi-212	727.33	6.67	3.649E+005	3.65E+005	5.854E+004	1.654E+005
+	Pb-212	238.63*	43.60	2.973E+004	2.97E+004	4.644E+004	1.357E+004
+	Bi-214	609.32*	45.49	3.792E+004	3.79E+004	8.290E+004	1.671E+004
		1120.29	14.92	2.150E+005		-8.466E+004	9.774E+004
		1764.49	15.30	2.358E+005		2.167E+005	1.051E+005
+	Pb-214	295.22*	18.42	7.121E+004	4.05E+004	8.402E+004	3.212E+004
		351.93*	35.60	4.053E+004		3.381E+004	1.824E+004
	Ra-226	186.21	3.64	7.024E+005	7.02E+005	3.713E+005	3.377E+005
	Ac-228	338.32	11.27	2.003E+005	1.19E+005	4.370E+004	9.391E+004
		911.20	25.80	1.189E+005		4.773E+004	5.444E+004
		968.97	15.80	1.738E+005		4.743E+004	7.842E+004
	Am-241	59.54	35.90	1.097E+005	1.10E+005	-1.185E+004	5.318E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 2:13:50 PM
Sample Title	: B106202AFSFC012GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 2:03:00 PM
Acquisition Started	: 6/13/2018 2:03:48 PM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.14 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1130
R. Sy

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC012GD
Peak Analysis Performed on: 6/13/2018 2:13:49 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	305	300.60	75.28	0.81	9.70E+001	46.46	1.93E+002
2	950-	961	954.29	238.69	0.51	4.62E+001	23.11	3.38E+001
3	1401-	1415	1407.36	351.95	1.23	4.79E+001	19.39	1.61E+001
4	2328-	2339	2333.67	583.52	0.28	2.20E+001	12.19	6.00E+000
5	2429-	2443	2436.25	609.16	1.37	4.15E+001	20.15	1.95E+001
6	2640-	2651	2645.60	661.49	0.27	2.14E+001	13.12	8.65E+000
7	4476-	4489	4482.62	1120.72	0.37	2.20E+001	12.89	7.00E+000
8	5836-	5854	5845.27	1461.37	0.69	8.80E+001	18.76	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: B106202AFSFC012GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.04281E+006	2.40062E+005
Cs-137	1.000	661.66*	85.10	1.99259E+004	1.24807E+004
Tl-208	1.000	583.19*	85.00	1.90290E+004	1.07861E+004
Pb-212	1.000	238.63*	43.60	4.42546E+004	2.32517E+004
Bi-214	0.743	609.32*	45.49	6.89538E+004	3.44603E+004
		1120.29*	14.92	1.58553E+005	9.37798E+004
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	7.16422E+004	3.08893E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.042812E+006	2.400620E+005
Cs-137	1.000	1.992585E+004	1.248066E+004
Tl-208	1.000	1.902902E+004	1.078610E+004
Pb-212	1.000	4.425462E+004	2.325166E+004
Bi-214	0.743	7.961277E+004	3.234566E+004
Pb-214	0.434	7.164223E+004	3.088930E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 2:13:49 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.28	1.6167E-001	47.90		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC012GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	3.207E+004	3.21E+004	1.043E+006	0.000E+000
	Co-60	1173.23	99.85	2.819E+004	1.98E+004	-5.090E+003	1.260E+004
		1332.49	99.98	1.976E+004		-7.409E+003	8.274E+003
	Nb-94	702.65	99.81	2.390E+004	1.99E+004	5.353E+003	1.084E+004
		871.09	99.89	1.985E+004		2.677E+003	8.665E+003
	Ag-108m	433.90	90.50	2.063E+004	2.06E+004	-7.531E+003	9.402E+003
		614.30	89.80	4.000E+004		-3.591E+003	1.886E+004
		722.90	90.80	2.390E+004		-2.142E+004	1.070E+004
	Cs-134	604.72	97.62	3.530E+004	2.82E+004	-4.250E+003	1.661E+004
		795.86	85.46	2.824E+004		8.193E+003	1.272E+004
+	Cs-137	661.66*	85.10	1.683E+004	1.68E+004	1.993E+004	7.154E+003
	Eu-152	121.78	28.67	9.159E+004	8.37E+004	-9.210E+004	4.428E+004
		344.28	26.60	8.370E+004		-6.561E+004	3.918E+004
		1408.01	21.07	1.059E+005		1.474E+004	4.507E+004
	Eu-154	123.07	40.40	6.543E+004	6.54E+004	-3.714E+004	3.164E+004
		723.30	20.06	1.082E+005		-9.067E+004	4.847E+004
		1274.43	34.80	6.683E+004		1.798E+004	2.892E+004
	Eu-155	86.55	30.70	1.204E+005	1.20E+005	1.508E+004	5.873E+004
		105.31	21.10	1.391E+005		-6.498E+004	6.750E+004
+	Tl-208	583.19*	85.00	1.341E+004	1.34E+004	1.903E+004	5.534E+003
	Bi-212	727.33	6.67	3.544E+005	3.54E+005	4.400E+004	1.602E+005
+	Pb-212	238.63*	43.60	3.202E+004	3.20E+004	4.425E+004	1.471E+004
+	Bi-214	609.32*	45.49	4.679E+004	4.68E+004	6.895E+004	2.115E+004
		1120.29*	14.92	1.244E+005		1.586E+005	5.243E+004
		1764.49	15.30	1.774E+005		3.475E+004	7.594E+004
+	Pb-214	295.22	18.42	1.394E+005	3.74E+004	2.580E+004	6.623E+004
		351.93*	35.60	3.739E+004		7.164E+004	1.667E+004
	Ra-226	186.21	3.64	7.213E+005	7.21E+005	2.823E+005	3.472E+005
	Ac-228	338.32	11.27	2.063E+005	1.24E+005	1.702E+005	9.691E+004
		911.20	25.80	1.242E+005		3.341E+004	5.710E+004
		968.97	15.80	1.738E+005		9.232E+004	7.842E+004
	Am-241	59.54	35.90	1.138E+005	1.14E+005	4.209E+004	5.519E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 2:24:41 PM
Sample Title	: B106202AFQFC012GD
Sample Description	: U2 Diesel Fuel Storage Floor QC
Sample Identification	: QC
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 2:14:00 PM
Acquisition Started	: 6/13/2018 2:14:39 PM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.14 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1130

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFQFC012GD
Peak Analysis Performed on: 6/13/2018 2:24:41 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	306	300.50	75.25	1.06	1.11E+002	47.06	1.84E+002
2	336-	347	340.78	85.32	0.65	4.01E+000	43.91	1.86E+002
3	697-	706	701.65	175.53	0.69	7.05E+000	20.59	4.30E+001
4	1400-	1416	1407.40	351.96	0.84	5.93E+001	20.01	1.27E+001
5	2429-	2444	2436.51	609.22	0.87	4.75E+001	17.44	9.51E+000
6	5837-	5855	5845.04	1461.31	1.04	7.80E+001	21.29	9.97E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFQFC012GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	9.24690E+005	2.64769E+005
Eu-155	0.339	86.55*	30.70	4.41574E+003	4.83600E+004
		105.31	21.10		
Bi-214	0.454	609.32*	45.49	7.88129E+004	3.04503E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	8.85774E+004	3.27061E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	9.246895E+005	2.647690E+005
Eu-155	0.339	4.415739E+003	4.835998E+004
Bi-214	0.454	7.881293E+004	3.045026E+004
Pb-214	0.434	8.857737E+004	3.270607E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 2:24:41 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.25	1.8440E-001	42.53		
3	175.53	1.1750E-002	292.00	Sum	

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFQFC012GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.637E+005	2.64E+005	9.247E+005	1.158E+005
	Co-60	1173.23	99.85	3.117E+004	2.53E+004	1.631E+004	1.409E+004
		1332.49	99.98	2.527E+004		1.897E+004	1.103E+004
	Nb-94	702.65	99.81	2.522E+004	2.46E+004	8.647E+003	1.150E+004
		871.09	99.89	2.461E+004		-1.143E+004	1.105E+004
	Ag-108m	433.90	90.50	2.528E+004	2.12E+004	-1.281E+003	1.173E+004
		614.30	89.80	3.656E+004		-2.068E+004	1.714E+004
		722.90	90.80	2.115E+004		-6.902E+003	9.332E+003
	Cs-134	604.72	97.62	3.569E+004	3.20E+004	-1.013E+004	1.680E+004
		795.86	85.46	3.204E+004		9.070E+003	1.462E+004
	Cs-137	661.66	85.10	3.473E+004	3.47E+004	2.159E+004	1.610E+004
	Eu-152	121.78	28.67	9.236E+004	9.24E+004	-4.578E+004	4.466E+004
		344.28	26.60	9.426E+004		3.252E+004	4.446E+004
		1408.01	21.07	1.138E+005		7.593E+004	4.899E+004
	Eu-154	123.07	40.40	6.521E+004	6.52E+004	-1.357E+004	3.153E+004
		723.30	20.06	9.353E+004		-9.063E+004	4.113E+004
		1274.43	34.80	6.683E+004		-3.334E+004	2.892E+004
+	Eu-155	86.55*	30.70	8.219E+004	8.22E+004	4.416E+003	3.960E+004
		105.31	21.10	1.401E+005		2.450E+004	6.796E+004
	Tl-208	583.19	85.00	3.376E+004	3.38E+004	1.967E+004	1.571E+004
	Bi-212	727.33	6.67	3.021E+005	3.02E+005	-6.914E+004	1.340E+005
	Pb-212	238.63	43.60	6.099E+004	6.10E+004	6.652E+004	2.920E+004
+	Bi-214	609.32*	45.49	3.365E+004	3.37E+004	7.881E+004	1.458E+004
		1120.29	14.92	2.342E+005		1.308E+005	1.073E+005
		1764.49	15.30	1.774E+005		1.131E+005	7.594E+004
+	Pb-214	295.22	18.42	1.411E+005	3.55E+004	1.174E+005	6.704E+004
		351.93*	35.60	3.545E+004		8.858E+004	1.570E+004
	Ra-226	186.21	3.64	6.763E+005	6.76E+005	2.540E+005	3.246E+005
	Ac-228	338.32	11.27	2.276E+005	1.22E+005	2.586E+004	1.076E+005
		911.20	25.80	1.216E+005		-2.775E+003	5.578E+004
		968.97	15.80	2.057E+005		1.737E+005	9.437E+004
	Am-241	59.54	35.90	1.111E+005	1.11E+005	2.941E+004	5.388E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 1:22:46 PM
Sample Title	: B106202AFSFC013GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 1:12:00 PM
Acquisition Started	: 6/13/2018 1:12:44 PM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.16 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1130

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC013GD
Peak Analysis Performed on: 6/13/2018 1:22:46 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	305	300.36	75.22	0.88	6.58E+001	44.05	1.85E+002
2	332-	345	339.73	85.06	0.83	5.08E+001	48.53	1.95E+002
3	947-	960	954.66	238.78	1.16	4.45E+001	26.16	4.55E+001
4	1176-	1186	1180.96	295.35	0.56	1.76E+001	19.87	3.34E+001
5	1403-	1414	1408.29	352.18	0.81	3.84E+001	18.17	1.76E+001
6	2429-	2443	2436.74	609.28	0.90	4.24E+001	15.29	5.57E+000
7	2641-	2652	2646.34	661.68	0.54	2.42E+001	12.15	4.77E+000
8	5836-	5855	5845.34	1461.38	1.56	9.64E+001	20.59	2.62E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC013GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.999	1460.82*	10.66	1.14208E+006	2.63352E+005
Cs-137	1.000	661.66*	85.10	2.26201E+004	1.16597E+004
Eu-155	0.338	86.55*	30.70	5.59744E+004	5.46390E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	4.25914E+004	2.59763E+004
Bi-214	0.454	609.32*	45.49	7.04282E+004	2.67495E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	4.53600E+004	5.17446E+004
		351.93*	35.60	5.74066E+004	2.84845E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.999	1.142081E+006	2.633524E+005
Cs-137	1.000	2.262015E+004	1.165975E+004
Eu-155	0.338	5.597440E+004	5.463902E+004
Pb-212	1.000	4.259137E+004	2.597631E+004
Bi-214	0.454	7.042816E+004	2.674948E+004
Pb-214	1.000	5.460504E+004	2.495346E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 1:22:45 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.22	1.0960E-001	66.98		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC013GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.528E+005	1.53E+005	1.142E+006	6.035E+004
	Co-60	1173.23	99.85	3.021E+004	2.46E+004	-2.132E+004	1.361E+004
		1332.49	99.98	2.457E+004		9.997E+003	1.068E+004
	Nb-94	702.65	99.81	2.490E+004	2.49E+004	1.335E+004	1.133E+004
		871.09	99.89	2.703E+004		5.253E+003	1.225E+004
	Ag-108m	433.90	90.50	2.376E+004	2.38E+004	5.815E+003	1.097E+004
		614.30	89.80	3.518E+004		-1.819E+003	1.645E+004
		722.90	90.80	3.153E+004		3.057E+004	1.452E+004
	Cs-134	604.72	97.62	3.184E+004	3.18E+004	-1.060E+004	1.488E+004
		795.86	85.46	3.320E+004		-3.265E+004	1.520E+004
+	Cs-137	661.66*	85.10	1.345E+004	1.35E+004	2.262E+004	5.463E+003
	Eu-152	121.78	28.67	9.312E+004	8.63E+004	-1.206E+004	4.504E+004
		344.28	26.60	8.634E+004		-5.992E+004	4.050E+004
		1408.01	21.07	1.211E+005		-1.010E+005	5.263E+004
	Eu-154	123.07	40.40	6.575E+004	6.47E+004	-1.126E+004	3.180E+004
		723.30	20.06	1.399E+005		7.453E+004	6.430E+004
		1274.43	34.80	6.472E+004		-3.469E+004	2.787E+004
+	Eu-155	86.55*	30.70	8.708E+004	8.71E+004	5.597E+004	4.205E+004
		105.31	21.10	1.412E+005		1.163E+004	6.852E+004
	Tl-208	583.19	85.00	3.050E+004	3.05E+004	1.497E+004	1.408E+004
	Bi-212	727.33	6.67	3.898E+005	3.90E+005	-2.496E+005	1.779E+005
+	Pb-212	238.63*	43.60	3.804E+004	3.80E+004	4.259E+004	1.772E+004
+	Bi-214	609.32*	45.49	2.633E+004	2.63E+004	7.043E+004	1.092E+004
		1120.29	14.92	2.444E+005		-1.481E+004	1.124E+005
		1764.49	15.30	1.709E+005		1.242E+004	7.271E+004
+	Pb-214	295.22*	18.42	8.338E+004	3.67E+004	4.536E+004	3.820E+004
		351.93*	35.60	3.671E+004		5.741E+004	1.633E+004
	Ra-226	186.21	3.64	6.911E+005	6.91E+005	-3.173E+005	3.320E+005
	Ac-228	338.32	11.27	2.051E+005	1.18E+005	1.430E+005	9.632E+004
		911.20	25.80	1.175E+005		8.908E+004	5.375E+004
		968.97	15.80	1.941E+005		6.450E+004	8.857E+004
	Am-241	59.54	35.90	1.044E+005	1.04E+005	-4.286E+004	5.051E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 12:47:00 PM
Sample Title	: B106202AFSFC014GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 12:36:00 PM
Acquisition Started	: 6/13/2018 12:36:59 PM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.15 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1130
R. Nye

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC014GD
Peak Analysis Performed on: 6/13/2018 12:47:00 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	306	300.18	75.17	0.82	5.53E+001	45.21	1.91E+002
2	334-	344	339.79	85.07	0.82	3.44E+001	36.77	1.28E+002
3	1401-	1414	1406.59	351.76	0.96	4.27E+001	19.90	2.03E+001
4	2325-	2336	2330.51	582.73	0.78	1.48E+001	13.76	1.22E+001
5	2429-	2444	2437.95	609.58	1.24	5.40E+001	20.81	1.80E+001
6	2640-	2654	2646.58	661.74	0.40	2.98E+001	15.77	1.13E+001
7	4476-	4489	4482.33	1120.65	0.86	2.16E+001	10.05	1.43E+000
8	4949-	4962	4955.19	1238.86	0.44	1.64E+001	9.10	1.57E+000
9	5839-	5855	5846.52	1461.68	1.28	9.12E+001	20.85	5.79E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: B106202AFSFC014GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.999	1460.82*	10.66	1.08100E+006	2.64396E+005
Cs-137	1.000	661.66*	85.10	2.77716E+004	1.50971E+004
Eu-155	0.338	86.55*	30.70	3.79006E+004	4.12203E+004
		105.31	21.10		
Tl-208	1.000	583.19*	85.00	1.27715E+004	1.19932E+004
Bi-214	0.743	609.32*	45.49	8.95918E+004	3.61849E+004
		1120.29*	14.92	1.55414E+005	7.35116E+004
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	6.37082E+004	3.12241E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.999	1.080999E+006	2.643959E+005
Cs-137	1.000	2.777163E+004	1.509709E+004
Eu-155	0.338	3.790060E+004	4.122033E+004
Tl-208	1.000	1.277148E+004	1.199323E+004
Bi-214	0.743	1.024296E+005	3.246500E+004
Pb-214	0.434	6.370819E+004	3.122414E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 12:47:00 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.17	9.2241E-002	81.69		
8	1238.86	2.7384E-002	55.38	Sum	

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC014GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.953E+005	1.95E+005	1.081E+006	8.161E+004
	Co-60	1173.23	99.85	3.117E+004	2.38E+004	8.154E+003	1.409E+004
		1332.49	99.98	2.385E+004		-1.672E+004	1.032E+004
	Nb-94	702.65	99.81	2.139E+004	2.14E+004	1.548E+004	9.580E+003
		871.09	99.89	2.237E+004		-1.804E+004	9.927E+003
	Ag-108m	433.90	90.50	2.548E+004	2.55E+004	-5.672E+002	1.183E+004
		614.30	89.80	4.000E+004		-1.077E+004	1.886E+004
		722.90	90.80	2.671E+004		4.802E+003	1.211E+004
	Cs-134	604.72	97.62	3.718E+004	3.28E+004	-2.091E+004	1.755E+004
		795.86	85.46	3.282E+004		1.926E+004	1.501E+004
+	Cs-137	661.66*	85.10	2.002E+004	2.00E+004	2.777E+004	8.747E+003
	Eu-152	121.78	28.67	9.082E+004	9.08E+004	-6.748E+004	4.389E+004
		344.28	26.60	9.089E+004		-5.989E+004	4.278E+004
		1408.01	21.07	9.734E+004		6.814E+003	4.076E+004
	Eu-154	123.07	40.40	6.499E+004	6.50E+004	3.350E+004	3.142E+004
		723.30	20.06	1.209E+005		-3.320E+004	5.483E+004
		1274.43	34.80	7.082E+004		3.379E+004	3.092E+004
+	Eu-155	86.55*	30.70	6.615E+004	6.62E+004	3.790E+004	3.158E+004
		105.31	21.10	1.351E+005		3.079E+004	6.550E+004
+	Tl-208	583.19*	85.00	1.857E+004	1.86E+004	1.277E+004	8.114E+003
	Bi-212	727.33	6.67	4.040E+005	4.04E+005	1.034E+005	1.850E+005
	Pb-212	238.63	43.60	5.803E+004	5.80E+004	5.052E+004	2.772E+004
+	Bi-214	609.32*	45.49	4.473E+004	4.47E+004	8.959E+004	2.012E+004
		1120.29*	14.92	6.512E+004		1.554E+005	2.281E+004
		1764.49	15.30	2.115E+005		1.696E+005	9.301E+004
+	Pb-214	295.22	18.42	1.293E+005	4.09E+004	-4.027E+004	6.115E+004
		351.93*	35.60	4.095E+004		6.371E+004	1.845E+004
	Ra-226	186.21	3.64	6.780E+005	6.78E+005	1.601E+005	3.255E+005
	Ac-228	338.32	11.27	2.074E+005	1.13E+005	4.478E+004	9.750E+004
		911.20	25.80	1.133E+005		2.996E+004	5.165E+004
		968.97	15.80	1.791E+005		1.440E+005	8.107E+004
	Am-241	59.54	35.90	1.075E+005	1.07E+005	1.506E+005	5.206E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************


Filename: 6279

Report Generated On                : 6/13/2018  10:06:55 AM

Sample Title                       : B106202AFSFC015GD
Sample Description                 : U2 Diesel Fuel Storage Floor
Sample Identification              :
Sample Type                        : Gamma Direct
Sample Geometry                    : 3M90D_CP_1IN

Peak Locate Threshold              :  3.00
Peak Locate Range (in channels)    :    85 -  8192
Peak Area Range (in channels)      :    85 -  8192
Identification Energy Tolerance    :   10.000 keV

Sample Size                        :  2.830E+001 M^2

Sample Taken On                    : 6/13/2018   9:56:00 AM
Acquisition Started                : 6/13/2018   9:56:53 AM

Live Time                          :      600.0 seconds
Real Time                          :      600.9 seconds

Dead Time                          :   0.14 %


          Energy Calibration Used Done On        : 6/9/2018
          Efficiency Calibration Used Done On    : 6/2/2018
          Efficiency ID                          : 3M90D_CP_1IN
```

DATA VALIDATED
DATE 10-24-18
TIME 1130

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC015GD
Peak Analysis Performed on: 6/13/2018 10:06:55 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	287-	305	300.58	75.27	0.57	9.11E+001	64.98	2.85E+002
2	949-	961	954.22	238.67	0.57	3.27E+001	23.42	3.93E+001
3	1400-	1415	1407.66	352.03	0.58	4.22E+001	21.89	2.58E+001
4	2430-	2444	2437.60	609.50	1.48	6.54E+001	18.08	5.64E+000
5	2642-	2653	2647.28	661.91	0.54	1.34E+001	11.86	8.61E+000
6	4477-	4490	4483.22	1120.87	0.47	1.04E+001	11.67	8.55E+000
7	5839-	5857	5847.61	1461.95	1.32	8.65E+001	19.54	2.52E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: B106202AFSFC015GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.998	1460.82*	10.66	1.02506E+006	2.48119E+005
Cs-137	1.000	661.66*	85.10	1.24981E+004	1.11740E+004
Pb-212	1.000	238.63*	43.60	3.13219E+004	2.29824E+004
Bi-214	0.743	609.32*	45.49	1.08499E+005	3.27191E+004
		1120.29*	14.92	7.52993E+004	8.43206E+004
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	6.30198E+004	3.40431E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

```
*************************************************************************
*****  I N T E R F E R E N C E   C O R R E C T E D   R E P O R T  *****
*************************************************************************
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Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.998	1.025059E+006	2.481190E+005
Cs-137	1.000	1.249807E+004	1.117396E+004
Pb-212	1.000	3.132186E+004	2.298242E+004
Bi-214	0.743	1.041547E+005	3.050316E+004
Pb-214	0.434	6.301984E+004	3.404314E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

```
**********  U N I D E N T I F I E D   P E A K S   **********
```

Peak Locate Performed on: 6/13/2018 10:06:55 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.27	1.5185E-001	71.32		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC015GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.488E+005	1.49E+005	1.025E+006	5.838E+004
	Co-60	1173.23	99.85	2.712E+004	2.31E+004	8.568E+003	1.206E+004
		1332.49	99.98	2.310E+004		-1.258E+004	9.944E+003
	Nb-94	702.65	99.81	2.356E+004	2.24E+004	-1.182E+004	1.067E+004
		871.09	99.89	2.237E+004		1.346E+004	9.927E+003
	Ag-108m	433.90	90.50	2.548E+004	2.55E+004	1.190E+004	1.183E+004
		614.30	89.80	4.020E+004		-1.611E+004	1.896E+004
		722.90	90.80	2.709E+004		2.006E+004	1.230E+004
	Cs-134	604.72	97.62	3.736E+004	2.53E+004	-4.464E+003	1.764E+004
		795.86	85.46	2.535E+004		-2.031E+004	1.128E+004
+	Cs-137	661.66*	85.10	1.686E+004	1.69E+004	1.250E+004	7.167E+003
	Eu-152	121.78	28.67	9.581E+004	8.69E+004	7.247E+004	4.639E+004
		344.28	26.60	8.686E+004		-5.062E+004	4.076E+004
		1408.01	21.07	1.099E+005		1.339E+004	4.707E+004
	Eu-154	123.07	40.40	6.714E+004	6.71E+004	-8.658E+003	3.249E+004
		723.30	20.06	1.209E+005		3.138E+004	5.483E+004
		1274.43	34.80	7.457E+004		3.631E+004	3.279E+004
	Eu-155	86.55	30.70	1.101E+005	1.10E+005	9.546E+004	5.357E+004
		105.31	21.10	1.330E+005		2.592E+004	6.443E+004
	Tl-208	583.19	85.00	3.376E+004	3.38E+004	1.860E+004	1.571E+004
	Bi-212	727.33	6.67	3.700E+005	3.70E+005	2.483E+005	1.680E+005
+	Pb-212	238.63*	43.60	3.477E+004	3.48E+004	3.132E+004	1.609E+004
+	Bi-214	609.32*	45.49	2.656E+004	2.66E+004	1.085E+005	1.103E+004
		1120.29*	14.92	1.347E+005		7.530E+004	5.759E+004
		1764.49	15.30	2.063E+005		7.581E+004	9.039E+004
+	Pb-214	295.22	18.42	1.214E+005	4.74E+004	-7.411E+004	5.720E+004
		351.93*	35.60	4.736E+004		6.302E+004	2.166E+004
	Ra-226	186.21	3.64	6.746E+005	6.75E+005	9.493E+004	3.238E+005
	Ac-228	338.32	11.27	2.015E+005	1.20E+005	7.551E+004	9.452E+004
		911.20	25.80	1.202E+005		4.625E+004	5.512E+004
		968.97	15.80	1.868E+005		8.155E+004	8.491E+004
	Am-241	59.54	35.90	1.039E+005	1.04E+005	-1.252E+004	5.026E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 9:32:16 AM
Sample Title	: B106202AFSFC016GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 9:22:00 AM
Acquisition Started	: 6/13/2018 9:22:14 AM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.14 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1130
D. Hyg

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*************************************************************************
*****          P E A K   A N A L Y S I S   R E P O R T           *****
*************************************************************************
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Detector Name: 6279
Sample Title: B106202AFSFC016GD
Peak Analysis Performed on: 6/13/2018 9:32:16 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	306	300.72	75.31	0.52	5.54E+001	46.48	2.00E+002
2	331-	345	339.70	85.05	0.46	2.04E+001	51.69	2.25E+002
3	949-	959	954.83	238.82	0.43	1.06E+001	21.76	4.54E+001
4	1399-	1415	1408.17	352.15	0.52	4.90E+001	23.02	2.60E+001
5	2429-	2442	2436.22	609.15	0.40	4.27E+001	17.56	1.23E+001
6	5838-	5856	5847.09	1461.82	1.75	8.10E+001	19.88	5.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*********************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*********************************************************************
```

Sample Title: B106202AFSFC016GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.998	1460.82*	10.66	9.60071E+005	2.49964E+005
Eu-155	0.338	86.55*	30.70	2.24526E+004	5.71372E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	1.01870E+004	2.09040E+004
Bi-214	0.454	609.32*	45.49	7.09009E+004	3.03668E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	7.33052E+004	3.61175E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.998	9.600708E+005	2.499639E+005
Eu-155	0.338	2.245257E+004	5.713721E+004
Pb-212	1.000	1.018704E+004	2.090403E+004
Bi-214	0.454	7.090089E+004	3.036681E+004
Pb-214	0.434	7.330520E+004	3.611746E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 9:32:16 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.31	9.2356E-002	83.88		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC016GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.967E+005	1.97E+005	9.601E+005	8.231E+004
	Co-60	1173.23	99.85	3.021E+004	2.46E+004	3.096E+004	1.361E+004
		1332.49	99.98	2.457E+004		1.778E+004	1.068E+004
	Nb-94	702.65	99.81	2.390E+004	2.39E+004	9.381E+003	1.084E+004
		871.09	99.89	2.461E+004		-1.200E+003	1.105E+004
	Ag-108m	433.90	90.50	2.528E+004	2.53E+004	2.189E+004	1.173E+004
		614.30	89.80	3.679E+004		-1.528E+004	1.725E+004
		722.90	90.80	2.923E+004		1.150E+004	1.337E+004
	Cs-134	604.72	97.62	3.331E+004	2.82E+004	1.636E+004	1.561E+004
		795.86	85.46	2.824E+004		-1.163E+003	1.272E+004
	Cs-137	661.66	85.10	2.930E+004	2.93E+004	2.357E+004	1.339E+004
	Eu-152	121.78	28.67	9.611E+004	8.69E+004	6.557E+004	4.653E+004
		344.28	26.60	8.686E+004		-7.096E+004	4.076E+004
		1408.01	21.07	1.311E+005		-3.675E+004	5.765E+004
	Eu-154	123.07	40.40	6.746E+004	6.75E+004	1.564E+004	3.265E+004
		723.30	20.06	1.339E+005		1.063E+005	6.131E+004
		1274.43	34.80	7.812E+004		3.779E+003	3.456E+004
+	Eu-155	86.55*	30.70	9.524E+004	9.52E+004	2.245E+004	4.613E+004
		105.31	21.10	1.355E+005		-1.231E+005	6.569E+004
	Tl-208	583.19	85.00	3.350E+004	3.35E+004	1.299E+004	1.558E+004
	Bi-212	727.33	6.67	3.801E+005	3.80E+005	2.734E+005	1.730E+005
+	Pb-212	238.63*	43.60	3.530E+004	3.53E+004	1.019E+004	1.635E+004
+	Bi-214	609.32*	45.49	3.651E+004	3.65E+004	7.090E+004	1.601E+004
		1120.29	14.92	2.121E+005		1.279E+005	9.629E+004
		1764.49	15.30	2.009E+005		8.732E+004	8.769E+004
+	Pb-214	295.22	18.42	1.427E+005	4.90E+004	4.152E+004	6.784E+004
		351.93*	35.60	4.897E+004		7.331E+004	2.246E+004
	Ra-226	186.21	3.64	7.443E+005	7.44E+005	5.346E+005	3.586E+005
	Ac-228	338.32	11.27	2.074E+005	1.22E+005	1.026E+005	9.750E+004
		911.20	25.80	1.216E+005		7.697E+004	5.578E+004
		968.97	15.80	1.654E+005		1.216E+005	7.425E+004
	Am-241	59.54	35.90	1.046E+005	1.05E+005	-3.205E+004	5.059E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 9:43:18 AM
Sample Title	: B106202AFSFC017GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 9:33:00 AM
Acquisition Started	: 6/13/2018 9:33:16 AM
Live Time	: 600.0 seconds
Real Time	: 600.8 seconds
Dead Time	: 0.14 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1130
R. Nip

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC017GD
Peak Analysis Performed on: 6/13/2018 9:43:17 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	305	300.30	75.20	0.57	8.02E+001	44.07	1.78E+002
2	950-	960	955.14	238.90	0.41	3.16E+001	22.85	4.14E+001
3	1401-	1416	1408.05	352.12	1.03	6.02E+001	22.42	2.18E+001
4	2327-	2339	2333.41	583.45	0.41	2.22E+001	11.79	4.78E+000
5	2432-	2445	2437.37	609.44	1.31	4.19E+001	17.95	1.31E+001
6	5838-	5856	5846.87	1461.77	1.30	8.37E+001	20.91	7.28E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC017GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.999	1460.82*	10.66	9.92314E+005	2.62375E+005
Tl-208	1.000	583.19*	85.00	1.92199E+004	1.04569E+004
Pb-212	1.000	238.63*	43.60	3.02547E+004	2.24214E+004
Bi-214	0.454	609.32*	45.49	6.96085E+004	3.09544E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	8.99753E+004	3.61198E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.999	9.923139E+005	2.623745E+005
Tl-208	1.000	1.921990E+004	1.045687E+004
Pb-212	1.000	3.025474E+004	2.242136E+004
Bi-214	0.454	6.960846E+004	3.095439E+004
Pb-214	0.434	8.997526E+004	3.611977E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 9:43:17 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.20	1.3362E-001	54.96		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

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*****************************************************************************
*****                    N U C L I D E   M D A   R E P O R T                *****
*****************************************************************************
```

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC017GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.293E+005	2.29E+005	9.923E+005	9.860E+004
	Co-60	1173.23	99.85	2.871E+004	1.88E+004	1.887E+004	1.286E+004
		1332.49	99.98	1.881E+004		-1.597E+004	7.800E+003
	Nb-94	702.65	99.81	2.457E+004	2.14E+004	2.234E+004	1.117E+004
		871.09	99.89	2.141E+004		-1.079E+004	9.443E+003
	Ag-108m	433.90	90.50	2.689E+004	2.69E+004	8.733E+003	1.254E+004
		614.30	89.80	3.789E+004		1.869E+004	1.780E+004
		722.90	90.80	2.709E+004		1.159E+004	1.230E+004
	Cs-134	604.72	97.62	3.588E+004	2.96E+004	-3.216E+004	1.690E+004
		795.86	85.46	2.957E+004		3.608E+003	1.338E+004
	Cs-137	661.66	85.10	3.198E+004	3.20E+004	1.896E+004	1.473E+004
	Eu-152	121.78	28.67	9.785E+004	8.53E+004	5.441E+003	4.741E+004
		344.28	26.60	8.530E+004		-4.434E+004	3.998E+004
		1408.01	21.07	1.279E+005		-8.469E+004	5.603E+004
	Eu-154	123.07	40.40	6.984E+004	6.98E+004	7.242E+004	3.384E+004
		723.30	20.06	1.243E+005		8.260E+004	5.652E+004
		1274.43	34.80	7.637E+004		-2.802E+004	3.369E+004
	Eu-155	86.55	30.70	1.156E+005	1.16E+005	1.654E+005	5.629E+004
		105.31	21.10	1.457E+005		8.270E+004	7.079E+004
+	Tl-208	583.19*	85.00	1.242E+004	1.24E+004	1.922E+004	5.038E+003
	Bi-212	727.33	6.67	3.435E+005	3.44E+005	-7.554E+004	1.548E+005
+	Pb-212	238.63*	43.60	3.393E+004	3.39E+004	3.025E+004	1.567E+004
+	Bi-214	609.32*	45.49	3.844E+004	3.84E+004	6.961E+004	1.698E+004
		1120.29	14.92	2.393E+005		9.007E+004	1.099E+005
		1764.49	15.30	2.312E+005		2.073E+005	1.028E+005
+	Pb-214	295.22	18.42	1.432E+005	4.38E+004	1.444E+005	6.811E+004
		351.93*	35.60	4.385E+004		8.998E+004	1.990E+004
	Ra-226	186.21	3.64	6.829E+005	6.83E+005	2.919E+005	3.279E+005
	Ac-228	338.32	11.27	2.233E+005	1.15E+005	-6.781E+004	1.054E+005
		911.20	25.80	1.147E+005		5.822E+004	5.236E+004
		968.97	15.80	1.817E+005		7.076E+004	8.237E+004
	Am-241	59.54	35.90	1.062E+005	1.06E+005	8.997E+003	5.141E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 10:17:55 AM
Sample Title	: B106202AFSFC018GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 10:07:00 AM
Acquisition Started	: 6/13/2018 10:07:53 AM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.14 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1130
R. Hig

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC018GD
Peak Analysis Performed on: 6/13/2018 10:17:55 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	306	300.47	75.24	0.71	2.83E+001	48.20	2.29E+002
2	1401-	1415	1407.95	352.10	0.67	4.72E+001	20.46	1.98E+001
3	2037-	2048	2042.96	510.84	0.98	1.31E+001	14.23	1.49E+001
4	2429-	2444	2436.89	609.32	0.40	4.76E+001	18.98	1.34E+001
5	3638-	3651	3644.77	911.27	0.39	1.18E+001	10.24	5.19E+000
6	5838-	5857	5846.88	1461.77	1.10	9.70E+001	21.41	5.00E+000
7	7058-	7073	7065.74	1766.47	1.66	1.59E+001	9.48	2.06E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC018GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.999	1460.82*	10.66	1.14969E+006	2.72684E+005
Bi-214	0.709	609.32*	45.49	7.89649E+004	3.29081E+004
		1120.29	14.92		
		1764.49*	15.30	1.50374E+005	9.02561E+004
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	7.05555E+004	3.23453E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.999	1.149686E+006	2.726841E+005
Bi-214	0.709	8.734406E+004	3.091715E+004
Pb-214	0.434	7.055549E+004	3.234531E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 10:17:55 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.24	4.7117E-002	170.50		
3	510.84	2.1786E-002	108.90		
5	911.27	1.9681E-002	86.71	Tol.	Ac-228

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC018GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.956E+005	1.96E+005	1.150E+006	8.177E+004
	Co-60	1173.23	99.85	2.005E+004	2.01E+004	-7.991E+003	8.531E+003
		1332.49	99.98	2.065E+004		1.571E+003	8.721E+003
	Nb-94	702.65	99.81	2.286E+004	2.29E+004	-1.923E+004	1.032E+004
		871.09	99.89	2.375E+004		-3.259E+003	1.061E+004
	Ag-108m	433.90	90.50	2.569E+004	2.57E+004	-5.699E+003	1.193E+004
		614.30	89.80	4.020E+004		-1.792E+004	1.896E+004
		722.90	90.80	2.853E+004		-2.711E+003	1.302E+004
	Cs-134	604.72	97.62	3.392E+004	3.00E+004	-8.742E+003	1.592E+004
		795.86	85.46	2.999E+004		2.654E+004	1.360E+004
	Cs-137	661.66	85.10	2.822E+004	2.82E+004	-3.034E+003	1.285E+004
	Eu-152	121.78	28.67	1.003E+005	8.74E+004	6.152E+004	4.861E+004
		344.28	26.60	8.737E+004		1.977E+004	4.102E+004
		1408.01	21.07	1.059E+005		7.832E+003	4.507E+004
	Eu-154	123.07	40.40	6.943E+004	6.94E+004	1.951E+004	3.364E+004
		723.30	20.06	1.308E+005		4.775E+004	5.975E+004
		1274.43	34.80	8.472E+004		2.907E+004	3.786E+004
	Eu-155	86.55	30.70	1.158E+005	1.16E+005	1.006E+005	5.641E+004
		105.31	21.10	1.378E+005		-3.786E+004	6.684E+004
	Tl-208	583.19	85.00	3.135E+004	3.14E+004	1.103E+004	1.451E+004
	Bi-212	727.33	6.67	3.649E+005	3.65E+005	1.571E+005	1.654E+005
	Pb-212	238.63	43.60	5.944E+004	5.94E+004	2.062E+004	2.843E+004
+	Bi-214	609.32*	45.49	4.010E+004	4.01E+004	7.896E+004	1.780E+004
		1120.29	14.92	2.234E+005		2.080E+005	1.020E+005
		1764.49*	15.30	1.049E+005		1.504E+005	3.969E+004
+	Pb-214	295.22	18.42	1.316E+005	4.13E+004	6.507E+004	6.232E+004
		351.93*	35.60	4.130E+004		7.056E+004	1.863E+004
	Ra-226	186.21	3.64	6.796E+005	6.80E+005	8.339E+004	3.263E+005
	Ac-228	338.32	11.27	2.200E+005	1.16E+005	2.288E+004	1.038E+005
		911.20	25.80	1.161E+005		-4.596E+004	5.306E+004
		968.97	15.80	1.710E+005		3.566E+004	7.705E+004
	Am-241	59.54	35.90	1.055E+005	1.06E+005	-5.050E+004	5.109E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 12:58:21 PM
Sample Title	: B106202AFSFC019GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 12:48:00 PM
Acquisition Started	: 6/13/2018 12:48:20 PM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.15 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1145
R. Hija

```
*************************************************************************
*****          P E A K   A N A L Y S I S   R E P O R T           *****
*************************************************************************
```

Detector Name: 6279
Sample Title: B106202AFSFC019GD
Peak Analysis Performed on: 6/13/2018 12:58:21 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	305	300.40	75.23	0.79	4.85E+001	44.56	1.98E+002
2	945-	960	955.07	238.88	0.35	4.60E+001	28.49	5.20E+001
3	1402-	1414	1407.53	351.99	0.45	2.63E+001	16.47	1.57E+001
4	2430-	2444	2437.87	609.56	1.08	4.98E+001	18.76	1.32E+001
5	2641-	2654	2647.15	661.88	1.27	3.45E+001	15.95	1.05E+001
6	3637-	3650	3643.91	911.06	0.56	1.28E+001	10.42	5.17E+000
7	4477-	4490	4483.07	1120.84	0.40	1.70E+001	12.07	7.00E+000
8	5839-	5857	5847.60	1461.95	0.92	8.78E+001	19.46	2.15E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC019GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.998	1460.82*	10.66	1.04133E+006	2.47795E+005
Cs-137	1.000	661.66*	85.10	3.22097E+004	1.53885E+004
Pb-212	1.000	238.63*	43.60	4.40549E+004	2.81996E+004
Bi-214	0.743	609.32*	45.49	8.26962E+004	3.26887E+004
		1120.29*	14.92	1.22525E+005	8.75474E+004
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	3.92449E+004	2.52970E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.998	1.041325E+006	2.477949E+005
Cs-137	1.000	3.220974E+004	1.538852E+004
Pb-212	1.000	4.405493E+004	2.819963E+004
Bi-214	0.743	8.756954E+004	3.062366E+004
Pb-214	0.434	3.924495E+004	2.529696E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 12:58:21 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.23	8.0833E-002	91.88		
6	911.06	2.1389E-002	81.17	Tol.	Ac-228

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC019GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.342E+005	1.34E+005	1.041E+006	5.105E+004
	Co-60	1173.23	99.85	3.209E+004	3.19E+004	1.658E+003	1.455E+004
		1332.49	99.98	3.187E+004		2.446E+004	1.433E+004
	Nb-94	702.65	99.81	2.554E+004	2.33E+004	4.652E+003	1.165E+004
		871.09	99.89	2.330E+004		2.510E+003	1.039E+004
	Ag-108m	433.90	90.50	2.528E+004	2.53E+004	-1.751E+004	1.173E+004
		614.30	89.80	3.979E+004		9.551E+003	1.875E+004
		722.90	90.80	2.746E+004		1.868E+004	1.248E+004
	Cs-134	604.72	97.62	3.663E+004	3.00E+004	-1.925E+003	1.727E+004
		795.86	85.46	2.999E+004		1.215E+004	1.360E+004
+	Cs-137	661.66*	85.10	1.910E+004	1.91E+004	3.221E+004	8.289E+003
	Eu-152	121.78	28.67	9.828E+004	9.38E+004	7.968E+004	4.762E+004
		344.28	26.60	9.379E+004		-2.133E+004	4.423E+004
		1408.01	21.07	1.211E+005		5.091E+004	5.263E+004
	Eu-154	123.07	40.40	6.861E+004	6.86E+004	-4.749E+002	3.323E+004
		723.30	20.06	1.226E+005		2.554E+004	5.568E+004
		1274.43	34.80	7.457E+004		-5.731E+004	3.279E+004
	Eu-155	86.55	30.70	1.127E+005	1.13E+005	1.837E+004	5.489E+004
		105.31	21.10	1.473E+005		1.744E+005	7.159E+004
	Tl-208	583.19	85.00	2.963E+004	2.96E+004	2.303E+004	1.364E+004
	Bi-212	727.33	6.67	3.435E+005	3.44E+005	1.106E+005	1.548E+005
+	Pb-212	238.63*	43.60	4.206E+004	4.21E+004	4.405E+004	1.974E+004
+	Bi-214	609.32*	45.49	3.823E+004	3.82E+004	8.270E+004	1.687E+004
		1120.29*	14.92	1.240E+005		1.225E+005	5.225E+004
		1764.49	15.30	1.896E+005		6.681E+004	8.203E+004
+	Pb-214	295.22	18.42	1.405E+005	3.57E+004	1.029E+005	6.677E+004
		351.93*	35.60	3.572E+004		3.924E+004	1.584E+004
	Ra-226	186.21	3.64	6.350E+005	6.35E+005	3.915E+004	3.040E+005
	Ac-228	338.32	11.27	2.063E+005	1.10E+005	-4.112E+004	9.691E+004
		911.20	25.80	1.104E+005		1.932E+004	5.019E+004
		968.97	15.80	1.596E+005		1.502E+005	7.134E+004
	Am-241	59.54	35.90	1.039E+005	1.04E+005	8.420E+003	5.026E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 1:34:16 PM
Sample Title	: B106202AFSFC020GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 1:24:00 PM
Acquisition Started	: 6/13/2018 1:24:14 PM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.15 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1145
P. Miga

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC020GD
Peak Analysis Performed on: 6/13/2018 1:34:16 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	281-	305	300.51	75.25	0.94	1.57E+002	77.47	3.26E+002
2	555-	566	559.96	140.11	0.32	1.50E+001	27.55	6.90E+001
3	949-	960	953.77	238.56	1.01	5.47E+001	22.64	2.93E+001
4	1177-	1186	1181.47	295.48	0.92	2.24E+001	17.41	2.36E+001
5	1401-	1414	1407.73	352.04	0.97	5.22E+001	20.39	1.88E+001
6	2430-	2443	2436.75	609.28	0.60	4.35E+001	17.77	1.25E+001
7	2643-	2654	2648.05	662.11	0.66	1.59E+001	10.76	5.12E+000
8	5837-	5854	5845.01	1461.30	0.89	6.59E+001	17.76	4.11E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: B106202AFSFC020GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	7.80730E+005	2.21083E+005
Cs-137	1.000	661.66*	85.10	1.48296E+004	1.02040E+004
Pb-212	1.000	238.63*	43.60	5.23461E+004	2.32569E+004
Bi-214	0.454	609.32*	45.49	7.22153E+004	3.07444E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	5.77884E+004	4.58539E+004
		351.93*	35.60	7.79722E+004	3.26307E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	7.807301E+005	2.210834E+005
Cs-137	1.000	1.482958E+004	1.020400E+004
Pb-212	1.000	5.234612E+004	2.325693E+004
Bi-214	0.454	7.221530E+004	3.074437E+004
Pb-214	1.000	7.118705E+004	2.658614E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 1:34:16 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.25	2.6153E-001	49.37		
2	140.11	2.5000E-002	183.69		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC020GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.724E+005	1.72E+005	7.807E+005	7.016E+004
	Co-60	1173.23	99.85	2.712E+004	2.38E+004	-2.764E+002	1.206E+004
		1332.49	99.98	2.385E+004		8.319E+003	1.032E+004
	Nb-94	702.65	99.81	2.554E+004	1.99E+004	-1.778E+004	1.165E+004
		871.09	99.89	1.985E+004		2.270E+003	8.665E+003
	Ag-108m	433.90	90.50	2.689E+004	2.69E+004	-8.178E+003	1.254E+004
		614.30	89.80	3.832E+004		-3.029E+004	1.802E+004
		722.90	90.80	2.709E+004		1.758E+004	1.230E+004
	Cs-134	604.72	97.62	3.491E+004	2.38E+004	-1.460E+004	1.641E+004
		795.86	85.46	2.375E+004		-9.123E+003	1.048E+004
+	Cs-137	661.66*	85.10	1.363E+004	1.36E+004	1.483E+004	5.552E+003
	Eu-152	121.78	28.67	9.552E+004	8.63E+004	-2.569E+003	4.624E+004
		344.28	26.60	8.634E+004		-5.692E+004	4.050E+004
		1408.01	21.07	1.175E+005		-5.768E+004	5.084E+004
	Eu-154	123.07	40.40	6.672E+004	6.25E+004	-2.799E+004	3.228E+004
		723.30	20.06	1.226E+005		8.229E+004	5.568E+004
		1274.43	34.80	6.254E+004		-6.146E+004	2.677E+004
	Eu-155	86.55	30.70	1.184E+005	1.18E+005	1.556E+005	5.772E+004
		105.31	21.10	1.430E+005		8.969E+004	6.944E+004
	Tl-208	583.19	85.00	3.298E+004	3.30E+004	2.270E+004	1.532E+004
	Bi-212	727.33	6.67	3.700E+005	3.70E+005	1.673E+005	1.680E+005
+	Pb-212	238.63*	43.60	2.957E+004	2.96E+004	5.235E+004	1.349E+004
+	Bi-214	609.32*	45.49	3.699E+004	3.70E+004	7.222E+004	1.625E+004
		1120.29	14.92	2.566E+005		2.504E+005	1.185E+005
		1764.49	15.30	1.836E+005		3.371E+004	7.905E+004
+	Pb-214	295.22*	18.42	6.899E+004	3.94E+004	5.779E+004	3.100E+004
		351.93*	35.60	3.942E+004		7.797E+004	1.769E+004
	Ra-226	186.21	3.64	6.628E+005	6.63E+005	-4.899E+005	3.179E+005
	Ac-228	338.32	11.27	2.051E+005	1.15E+005	-1.690E+005	9.632E+004
		911.20	25.80	1.147E+005		-4.220E+004	5.236E+004
		968.97	15.80	1.941E+005		9.427E+004	8.857E+004
	Am-241	59.54	35.90	1.124E+005	1.12E+005	7.870E+004	5.450E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 2:36:17 PM
Sample Title	: B106202AFSFC021GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 2:26:00 PM
Acquisition Started	: 6/13/2018 2:26:16 PM
Live Time	: 600.0 seconds
Real Time	: 600.8 seconds
Dead Time	: 0.13 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1145
R. Hyg

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC021GD
Peak Analysis Performed on: 6/13/2018 2:36:17 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	285-	306	300.72	75.31	1.14	1.70E+002	73.53	3.15E+002
2	332-	344	339.40	84.98	0.32	5.05E+001	42.48	1.53E+002
3	948-	959	953.95	238.61	1.40	3.84E+001	24.97	4.66E+001
4	1175-	1186	1180.17	295.16	0.56	1.96E+001	18.57	2.64E+001
5	1401-	1413	1406.91	351.84	1.19	4.27E+001	19.94	2.13E+001
6	2037-	2048	2042.13	510.63	0.37	2.44E+001	15.35	1.36E+001
7	2429-	2443	2436.32	609.18	1.08	4.37E+001	16.98	9.29E+000
8	5835-	5855	5845.61	1461.45	0.88	7.74E+001	18.66	2.64E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC021GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.999	1460.82*	10.66	9.16720E+005	2.35068E+005
Eu-155	0.338	86.55*	30.70	5.56159E+004	4.81322E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	3.67475E+004	2.46235E+004
Bi-214	0.454	609.32*	45.49	7.25372E+004	2.95053E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	5.05362E+004	4.85305E+004
		351.93*	35.60	6.37725E+004	3.12879E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.999	9.167198E+005	2.350676E+005
Eu-155	0.338	5.561586E+004	4.813218E+004
Pb-212	1.000	3.674753E+004	2.462355E+004
Bi-214	0.454	7.253718E+004	2.950534E+004
Pb-214	1.000	5.988619E+004	2.629658E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 2:36:17 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.31	2.8353E-001	43.22		
6	510.63	4.0603E-002	63.01		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC021GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.537E+005	1.54E+005	9.167E+005	6.080E+004
	Co-60	1173.23	99.85	3.021E+004	2.53E+004	-1.082E+004	1.361E+004
		1332.49	99.98	2.527E+004		-8.428E+003	1.103E+004
	Nb-94	702.65	99.81	2.286E+004	2.29E+004	3.245E+003	1.032E+004
		871.09	99.89	2.375E+004		-4.772E+003	1.061E+004
	Ag-108m	433.90	90.50	2.689E+004	2.69E+004	1.736E+004	1.254E+004
		614.30	89.80	4.000E+004		2.210E+003	1.886E+004
		722.90	90.80	2.818E+004		6.467E+003	1.284E+004
	Cs-134	604.72	97.62	3.310E+004	3.16E+004	-3.849E+003	1.551E+004
		795.86	85.46	3.164E+004		1.605E+004	1.442E+004
	Cs-137	661.66	85.10	3.354E+004	3.35E+004	2.380E+004	1.551E+004
	Eu-152	121.78	28.67	1.029E+005	9.09E+004	9.399E+003	4.993E+004
		344.28	26.60	9.089E+004		1.339E+004	4.278E+004
		1408.01	21.07	1.175E+005		2.232E+004	5.084E+004
	Eu-154	123.07	40.40	7.398E+004	6.25E+004	3.632E+004	3.591E+004
		723.30	20.06	1.276E+005		6.259E+004	5.816E+004
		1274.43	34.80	6.254E+004		1.502E+004	2.677E+004
+	Eu-155	86.55*	30.70	7.558E+004	7.56E+004	5.562E+004	3.630E+004
		105.31	21.10	1.430E+005		-2.368E+004	6.944E+004
	Tl-208	583.19	85.00	3.600E+004	3.60E+004	3.302E+004	1.683E+004
	Bi-212	727.33	6.67	3.801E+005	3.80E+005	1.069E+005	1.730E+005
+	Pb-212	238.63*	43.60	3.672E+004	3.67E+004	3.675E+004	1.706E+004
+	Bi-214	609.32*	45.49	3.359E+004	3.36E+004	7.254E+004	1.455E+004
		1120.29	14.92	2.062E+005		5.520E+004	9.333E+004
		1764.49	15.30	2.312E+005		1.256E+005	1.028E+005
+	Pb-214	295.22*	18.42	7.616E+004	4.11E+004	5.054E+004	3.459E+004
		351.93*	35.60	4.107E+004		6.377E+004	1.851E+004
	Ra-226	186.21	3.64	6.879E+005	6.88E+005	3.599E+005	3.304E+005
	Ac-228	338.32	11.27	2.109E+005	1.25E+005	6.216E+004	9.925E+004
		911.20	25.80	1.255E+005		7.899E+004	5.774E+004
		968.97	15.80	1.791E+005		5.608E+004	8.107E+004
	Am-241	59.54	35.90	1.064E+005	1.06E+005	-7.026E+004	5.149E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/13/2018 2:49:11 PM
Sample Title	: B106202AFSFC022GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/13/2018 2:39:00 PM
Acquisition Started	: 6/13/2018 2:39:09 PM
Live Time	: 600.0 seconds
Real Time	: 600.8 seconds
Dead Time	: 0.13 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1145
D. Miga

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC022GD
Peak Analysis Performed on: 6/13/2018 2:49:10 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	287-	306	300.57	75.27	0.81	1.14E+002	71.14	3.26E+002
2	333-	355	338.50	84.75	0.67	1.10E+002	67.29	2.63E+002
3	1176-	1186	1180.96	295.35	1.15	3.43E+001	19.16	2.37E+001
4	1402-	1415	1407.86	352.08	0.48	4.62E+001	20.26	1.98E+001
5	2430-	2443	2436.61	609.25	1.51	5.24E+001	17.43	8.61E+000
6	2640-	2651	2645.42	661.45	1.08	1.40E+001	13.28	1.20E+001
7	5835-	5855	5844.60	1461.20	1.37	8.08E+001	19.99	5.25E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC022GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	9.56821E+005	2.50972E+005
Cs-137	1.000	661.66*	85.10	1.30656E+004	1.24926E+004
Eu-155	0.337	86.55*	30.70	1.21237E+005	7.80896E+004
		105.31	21.10		
Bi-214	0.454	609.32*	45.49	8.69517E+004	3.07658E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	8.83728E+004	5.13741E+004
		351.93*	35.60	6.90401E+004	3.19909E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	9.568211E+005	2.509719E+005
Cs-137	1.000	1.306560E+004	1.249257E+004
Eu-155	0.337	1.212366E+005	7.808961E+004
Bi-214	0.454	8.695168E+004	3.076584E+004
Pb-214	1.000	7.444195E+004	2.715618E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/13/2018 2:49:10 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.27	1.9008E-001	62.38		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_1IN
Sample Title: B106202AFSFC022GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.025E+005	2.02E+005	9.568E+005	8.521E+004
	Co-60	1173.23	99.85	2.819E+004	2.82E+004	1.288E+004	1.260E+004
		1332.49	99.98	2.908E+004		1.742E+004	1.294E+004
	Nb-94	702.65	99.81	2.522E+004	2.37E+004	3.414E+003	1.150E+004
		871.09	99.89	2.375E+004		-1.697E+004	1.061E+004
	Ag-108m	433.90	90.50	2.709E+004	2.71E+004	1.251E+004	1.263E+004
		614.30	89.80	3.875E+004		-6.127E+003	1.823E+004
		722.90	90.80	3.121E+004		1.548E+004	1.436E+004
	Cs-134	604.72	97.62	3.700E+004	2.53E+004	8.774E+002	1.746E+004
		795.86	85.46	2.535E+004		-1.744E+004	1.128E+004
+	Cs-137	661.66*	85.10	1.937E+004	1.94E+004	1.307E+004	8.421E+003
	Eu-152	121.78	28.67	9.654E+004	8.37E+004	-6.131E+004	4.675E+004
		344.28	26.60	8.370E+004		3.174E+004	3.918E+004
		1408.01	21.07	1.373E+005		6.053E+004	6.077E+004
	Eu-154	123.07	40.40	6.892E+004	6.89E+004	3.823E+004	3.338E+004
		723.30	20.06	1.413E+005		7.708E+004	6.502E+004
		1274.43	34.80	7.272E+004		5.814E+003	3.187E+004
+	Eu-155	86.55*	30.70	1.190E+005	1.19E+005	1.212E+005	5.801E+004
		105.31	21.10	1.461E+005		1.391E+005	7.097E+004
	Tl-208	583.19	85.00	2.992E+004	2.99E+004	1.260E+004	1.379E+004
	Bi-212	727.33	6.67	4.085E+005	4.09E+005	9.582E+004	1.873E+005
	Pb-212	238.63	43.60	6.430E+004	6.43E+004	5.997E+004	3.085E+004
+	Bi-214	609.32*	45.49	3.102E+004	3.10E+004	8.695E+004	1.326E+004
		1120.29	14.92	2.121E+005		1.790E+005	9.629E+004
		1764.49	15.30	2.358E+005		2.167E+005	1.051E+005
+	Pb-214	295.22*	18.42	7.128E+004	4.10E+004	8.837E+004	3.215E+004
		351.93*	35.60	4.097E+004		6.904E+004	1.846E+004
	Ra-226	186.21	3.64	6.746E+005	6.75E+005	2.961E+005	3.238E+005
	Ac-228	338.32	11.27	1.890E+005	1.15E+005	5.625E+004	8.825E+004
		911.20	25.80	1.147E+005		-2.127E+004	5.236E+004
		968.97	15.80	2.079E+005		2.691E+005	9.549E+004
	Am-241	59.54	35.90	1.111E+005	1.11E+005	-7.911E+004	5.388E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 1:57:38 PM
Sample Title	: B106202AFSFC023GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/14/2018 1:47:00 PM
Acquisition Started	: 6/14/2018 1:47:36 PM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.16 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1145
R. Vega

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC023GD
Peak Analysis Performed on: 6/14/2018 1:57:38 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	287-	306	300.48	75.25	0.84	1.74E+002	70.04	2.97E+002
2	347-	356	351.73	88.06	0.88	6.01E+000	35.13	1.34E+002
3	949-	958	953.49	238.49	0.59	2.63E+001	20.98	3.57E+001
4	1400-	1413	1407.07	351.88	0.59	5.08E+001	20.37	1.92E+001
5	2430-	2446	2436.88	609.32	0.42	5.59E+001	19.95	1.41E+001
6	5834-	5856	5844.12	1461.08	0.78	1.13E+002	21.26	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC023GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.33888E+006	2.77438E+005
Eu-155	0.338	86.55*	30.70	6.56176E+003	3.83530E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	2.51225E+004	2.04805E+004
Bi-214	0.454	609.32*	45.49	9.28499E+004	3.49408E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	7.58391E+004	3.24772E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.338880E+006	2.774382E+005
Eu-155	0.338	6.561762E+003	3.835301E+004
Pb-212	1.000	2.512255E+004	2.048053E+004
Bi-214	0.454	9.284994E+004	3.494077E+004
Pb-214	0.434	7.583909E+004	3.247721E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 1:57:38 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.25	2.9018E-001	40.23		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_2IN
Sample Title: B106202AFSFC023GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	3.206E+004	3.21E+004	1.339E+006	0.000E+000
	Co-60	1173.23	99.85	3.021E+004	3.02E+004	1.410E+004	1.361E+004
		1332.49	99.98	3.079E+004		2.964E+004	1.379E+004
	Nb-94	702.65	99.81	2.286E+004	2.04E+004	-8.228E+003	1.032E+004
		871.09	99.89	2.038E+004		-4.656E+003	8.932E+003
	Ag-108m	433.90	90.50	2.670E+004	2.67E+004	-7.003E+002	1.244E+004
		614.30	89.80	4.121E+004		-2.070E+004	1.946E+004
		722.90	90.80	2.746E+004		6.902E+003	1.248E+004
	Cs-134	604.72	97.62	3.718E+004	2.91E+004	-6.236E+003	1.755E+004
		795.86	85.46	2.913E+004		-1.851E+004	1.317E+004
	Cs-137	661.66	85.10	3.293E+004	3.29E+004	8.158E+003	1.520E+004
	Eu-152	121.78	28.67	1.006E+005	9.28E+004	1.010E+005	4.875E+004
		344.28	26.60	9.283E+004		-6.799E+004	4.375E+004
		1408.01	21.07	1.175E+005		-5.705E+004	5.084E+004
	Eu-154	123.07	40.40	6.974E+004	6.68E+004	1.023E+003	3.379E+004
		723.30	20.06	1.243E+005		7.567E+004	5.652E+004
		1274.43	34.80	6.683E+004		-1.290E+005	2.892E+004
+	Eu-155	86.55*	30.70	6.539E+004	6.54E+004	6.562E+003	3.122E+004
		105.31	21.10	1.468E+005		1.395E+005	7.132E+004
	Tl-208	583.19	85.00	3.245E+004	3.24E+004	4.273E+004	1.505E+004
	Bi-212	727.33	6.67	3.898E+005	3.90E+005	3.406E+004	1.779E+005
+	Pb-212	238.63*	43.60	3.140E+004	3.14E+004	2.512E+004	1.441E+004
+	Bi-214	609.32*	45.49	4.053E+004	4.05E+004	9.285E+004	1.802E+004
		1120.29	14.92	2.368E+005		8.363E+004	1.086E+005
		1764.49	15.30	1.836E+005		1.225E+005	7.905E+004
+	Pb-214	295.22	18.42	1.458E+005	3.98E+004	1.084E+004	6.941E+004
		351.93*	35.60	3.981E+004		7.584E+004	1.788E+004
	Ra-226	186.21	3.64	6.862E+005	6.86E+005	2.812E+005	3.296E+005
	Ac-228	338.32	11.27	2.243E+005	1.24E+005	1.156E+004	1.059E+005
		911.20	25.80	1.242E+005		8.085E+004	5.710E+004
		968.97	15.80	1.892E+005		-1.176E+004	8.615E+004
	Am-241	59.54	35.90	1.148E+005	1.15E+005	3.559E+004	5.572E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 1:46:08 PM
Sample Title	: B106202AFSFC024GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/14/2018 1:36:00 PM
Acquisition Started	: 6/14/2018 1:36:06 PM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.14 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1145
P. Hija

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC024GD
Peak Analysis Performed on: 6/14/2018 1:46:08 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	285-	310	300.53	75.26	1.32	3.50E+002	85.44	3.47E+002
2	334-	344	339.38	84.97	0.88	4.09E+001	42.35	1.70E+002
3	950-	959	954.46	238.73	0.36	2.88E+001	23.51	4.82E+001
4	1175-	1188	1181.90	295.59	1.17	2.50E+001	22.07	3.50E+001
5	1401-	1413	1407.32	351.94	0.78	2.79E+001	20.44	2.91E+001
6	2429-	2445	2436.41	609.20	0.82	5.79E+001	18.86	9.07E+000
7	2638-	2655	2645.72	661.52	0.73	1.10E+002	24.31	1.15E+001
8	3638-	3651	3644.64	911.24	0.51	1.39E+001	13.74	1.21E+001
9	4687-	4702	4694.22	1173.62	0.39	3.34E+001	14.97	7.57E+000
10	5323-	5336	5329.48	1332.43	0.81	2.77E+001	13.07	5.35E+000
11	5835-	5853	5843.78	1461.00	1.75	9.09E+001	21.42	7.06E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: B106202AFSFC024GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.07750E+006	2.70454E+005
Co-60	1.000	1173.23*	99.85	3.69637E+004	1.68134E+004
		1332.49*	99.98	3.27792E+004	1.57091E+004
Cs-137	1.000	661.66*	85.10	1.02206E+005	2.57966E+004
Eu-155	0.338	86.55*	30.70	4.51324E+004	4.75510E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	2.75860E+004	2.29457E+004
Bi-214	0.454	609.32*	45.49	9.61352E+004	3.33703E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	6.44883E+004	5.78539E+004
		351.93*	35.60	4.16677E+004	3.11655E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

```
*********************************************************************
*****  I N T E R F E R E N C E   C O R R E C T E D   R E P O R T  *****
*********************************************************************
```

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.077504E+006	2.704542E+005
Co-60	1.000	3.472955E+004	1.147857E+004
Cs-137	1.000	1.022064E+005	2.579662E+004
Eu-155	0.338	4.513237E+004	4.755099E+004
Pb-212	1.000	2.758599E+004	2.294568E+004
Bi-214	0.454	9.613524E+004	3.337031E+004
Pb-214	1.000	4.680057E+004	2.743770E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 1:46:07 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.26	5.8298E-001	24.43		
8	911.24	2.3189E-002	98.77	Sum	

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*****************************************************************************
*****                    N U C L I D E   M D A   R E P O R T                *****
*****************************************************************************
```

Detector Name: 6279
Sample Geometry: 3M90D_CP_2IN
Sample Title: B106202AFSFC024GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.220E+005	2.22E+005	1.078E+006	9.495E+004
+	Co-60	1173.23*	99.85	2.028E+004	1.83E+004	3.696E+004	8.644E+003
		1332.49*	99.98	1.833E+004		3.278E+004	7.559E+003
	Nb-94	702.65	99.81	2.585E+004	2.58E+004	-1.071E+004	1.181E+004
		871.09	99.89	2.625E+004		-5.137E+003	1.187E+004
	Ag-108m	433.90	90.50	2.878E+004	2.88E+004	6.372E+003	1.348E+004
		614.30	89.80	4.180E+004		-1.690E+003	1.976E+004
		722.90	90.80	3.121E+004		-6.493E+002	1.436E+004
	Cs-134	604.72	97.62	3.607E+004	3.04E+004	-7.366E+003	1.699E+004
		795.86	85.46	3.042E+004		7.789E+003	1.381E+004
+	Cs-137	661.66*	85.10	2.151E+004	2.15E+004	1.022E+005	9.494E+003
	Eu-152	121.78	28.67	1.068E+005	8.94E+004	-5.538E+004	5.188E+004
		344.28	26.60	8.940E+004		-1.049E+005	4.203E+004
		1408.01	21.07	1.373E+005		2.482E+004	6.077E+004
	Eu-154	123.07	40.40	7.643E+004	6.47E+004	5.390E+004	3.714E+004
		723.30	20.06	1.428E+005		5.593E+004	6.574E+004
		1274.43	34.80	6.472E+004		4.319E+004	2.787E+004
+	Eu-155	86.55*	30.70	7.619E+004	7.62E+004	4.513E+004	3.660E+004
		105.31	21.10	1.539E+005		-1.534E+005	7.487E+004
	Tl-208	583.19	85.00	3.427E+004	3.43E+004	-3.925E+004	1.597E+004
	Bi-212	727.33	6.67	4.517E+005	4.52E+005	3.005E+005	2.089E+005
+	Pb-212	238.63*	43.60	3.553E+004	3.55E+004	2.759E+004	1.647E+004
+	Bi-214	609.32*	45.49	3.491E+004	3.49E+004	9.614E+004	1.521E+004
		1120.29	14.92	2.469E+005		2.780E+005	1.137E+005
		1764.49	15.30	2.575E+005		2.639E+005	1.160E+005
+	Pb-214	295.22*	18.42	9.046E+004	4.70E+004	6.449E+004	4.174E+004
		351.93*	35.60	4.705E+004		4.167E+004	2.150E+004
	Ra-226	186.21	3.64	7.398E+005	7.40E+005	4.643E+005	3.564E+005
	Ac-228	338.32	11.27	2.390E+005	1.31E+005	1.259E+005	1.133E+005
		911.20	25.80	1.305E+005		4.123E+004	6.025E+004
		968.97	15.80	2.249E+005		9.772E+004	1.040E+005
	Am-241	59.54	35.90	1.241E+005	1.24E+005	-2.483E+004	6.035E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 2:29:50 PM
Sample Title	: B106202AFSFC025GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/14/2018 2:19:00 PM
Acquisition Started	: 6/14/2018 2:19:49 PM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.16 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1145

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC025GD
Peak Analysis Performed on: 6/14/2018 2:29:50 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	285-	306	300.90	75.35	0.86	1.61E+002	84.72	4.35E+002
2	589-	599	594.06	148.64	0.48	-2.16E+001	28.25	9.06E+001
3	950-	961	954.84	238.83	0.88	4.10E+001	25.91	5.00E+001
4	1173-	1188	1181.09	295.39	0.35	2.29E+001	24.71	4.21E+001
5	1400-	1413	1407.57	352.00	0.90	3.86E+001	20.62	2.44E+001
6	2430-	2442	2436.65	609.26	0.52	4.23E+001	16.48	9.75E+000
7	2637-	2656	2645.56	661.48	1.34	1.68E+002	27.76	7.24E+000
8	4474-	4487	4480.00	1120.07	0.35	7.03E+000	12.23	9.97E+000
9	4684-	4700	4692.22	1173.12	1.22	5.40E+001	15.52	2.02E+000
10	5836-	5854	5845.40	1461.40	1.52	6.84E+001	19.03	6.64E+000
11	7055-	7070	7062.12	1765.56	0.79	2.00E+001	8.94	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC025GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.999	1460.82*	10.66	8.10088E+005	2.36240E+005
Cs-137	1.000	661.66*	85.10	1.56569E+005	3.20142E+004
Pb-212	1.000	238.63*	43.60	3.92817E+004	2.56106E+004
Bi-214	1.000	609.32*	45.49	7.01240E+004	2.86142E+004
		1120.29*	14.92	5.06435E+004	8.82183E+004
		1764.49*	15.30	1.88555E+005	8.56660E+004
Pb-214	1.000	295.22*	18.42	5.91656E+004	6.44008E+004
		351.93*	35.60	5.77475E+004	3.19965E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

```
*************************************************************************
*****  I N T E R F E R E N C E   C O R R E C T E D   R E P O R T  *****
*************************************************************************
```

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.999	8.100878E+005	2.362398E+005
Cs-137	1.000	1.565694E+005	3.201424E+004
Pb-212	1.000	3.928165E+004	2.561056E+004
Bi-214	1.000	7.929887E+004	2.594036E+004
Pb-214	1.000	5.802826E+004	2.865476E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 2:29:50 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.35	2.6874E-001	52.54		
2	148.64	-3.5996E-002	-130.82		
9	1173.12	8.9963E-002	28.75	Tol.	Co-60

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_2IN
Sample Title: B106202AFSFC025GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.157E+005	2.16E+005	8.101E+005	9.182E+004
	Co-60	1173.23	99.85	4.414E+004	3.81E+004	5.327E+004	2.058E+004
		1332.49	99.98	3.809E+004		4.742E+004	1.744E+004
	Nb-94	702.65	99.81	2.676E+004	2.42E+004	-9.551E+003	1.227E+004
		871.09	99.89	2.418E+004		-1.513E+004	1.083E+004
	Ag-108m	433.90	90.50	3.188E+004	3.19E+004	-9.309E+003	1.503E+004
		614.30	89.80	3.896E+004		-4.690E+004	1.834E+004
		722.90	90.80	3.215E+004		1.490E+004	1.483E+004
	Cs-134	604.72	97.62	3.392E+004	3.39E+004	2.091E+004	1.592E+004
		795.86	85.46	3.396E+004		5.831E+003	1.558E+004
+	Cs-137	661.66*	85.10	1.786E+004	1.79E+004	1.566E+005	7.666E+003
	Eu-152	121.78	28.67	1.081E+005	9.57E+004	4.859E+004	5.253E+004
		344.28	26.60	9.567E+004		-4.869E+004	4.517E+004
		1408.01	21.07	1.099E+005		7.009E+004	4.707E+004
	Eu-154	123.07	40.40	7.550E+004	6.47E+004	2.229E+004	3.667E+004
		723.30	20.06	1.456E+005		8.060E+004	6.716E+004
		1274.43	34.80	6.472E+004		-7.475E+003	2.787E+004
	Eu-155	86.55	30.70	1.306E+005	1.31E+005	1.521E+005	6.382E+004
		105.31	21.10	1.557E+005		8.068E+003	7.580E+004
	Tl-208	583.19	85.00	3.218E+004	3.22E+004	3.506E+004	1.492E+004
	Bi-212	727.33	6.67	4.220E+005	4.22E+005	3.279E+005	1.940E+005
+	Pb-212	238.63*	43.60	3.807E+004	3.81E+004	3.928E+004	1.774E+004
+	Bi-214	609.32*	45.49	3.212E+004	2.55E+004	7.012E+004	1.382E+004
		1120.29*	14.92	1.501E+005		5.064E+004	6.532E+004
		1764.49*	15.30	2.551E+004		1.886E+005	0.000E+000
+	Pb-214	295.22*	18.42	1.036E+005	4.45E+004	5.917E+004	4.829E+004
		351.93*	35.60	4.447E+004		5.775E+004	2.021E+004
	Ra-226	186.21	3.64	7.811E+005	7.81E+005	3.126E+005	3.770E+005
	Ac-228	338.32	11.27	2.233E+005	1.29E+005	7.446E+003	1.054E+005
		911.20	25.80	1.293E+005		1.500E+005	5.964E+004
		968.97	15.80	1.892E+005		8.749E+004	8.615E+004
	Am-241	59.54	35.90	1.231E+005	1.23E+005	2.068E+004	5.986E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 3:06:17 PM
Sample Title	: B106202AFSFC026GD
Sample Description	: U2 Diesel Fuel Storage Floor
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 3M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 2.830E+001 M^2
Sample Taken On	: 6/14/2018 2:56:00 PM
Acquisition Started	: 6/14/2018 2:56:16 PM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.15 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 3M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1145
R. Higa

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC026GD
Peak Analysis Performed on: 6/14/2018 3:06:17 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	287-	305	300.36	75.22	0.89	1.51E+002	68.33	3.01E+002
2	798-	807	802.88	200.84	0.43	5.31E+000	19.09	3.77E+001
3	949-	960	954.57	238.76	0.46	5.40E+001	25.26	4.20E+001
4	1174-	1186	1180.20	295.17	0.36	1.37E+001	20.43	3.43E+001
5	1400-	1413	1406.95	351.85	0.39	4.88E+001	20.20	1.92E+001
6	2327-	2338	2332.30	583.17	0.41	1.94E+001	13.60	9.62E+000
7	2429-	2444	2436.01	609.10	0.57	4.91E+001	19.05	1.39E+001
8	2640-	2651	2645.93	661.58	0.63	2.95E+001	15.91	1.35E+001
9	5834-	5855	5844.86	1461.27	0.29	1.07E+002	21.67	2.70E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: B106202AFSFC026GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.27140E+006	2.79503E+005
Cs-137	1.000	661.66*	85.10	2.75452E+004	1.52132E+004
Tl-208	1.000	583.19*	85.00	1.67562E+004	1.19312E+004
Pb-212	1.000	238.63*	43.60	5.17005E+004	2.55858E+004
Bi-214	0.454	609.32*	45.49	8.15182E+004	3.30915E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	3.54242E+004	5.29481E+004
		351.93*	35.60	7.28801E+004	3.20921E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.271403E+006	2.795029E+005
Cs-137	1.000	2.754521E+004	1.521323E+004
Tl-208	1.000	1.675620E+004	1.193121E+004
Pb-212	1.000	5.170047E+004	2.558576E+004
Bi-214	0.454	8.151817E+004	3.309147E+004
Pb-214	1.000	6.281699E+004	2.744455E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 3:06:17 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.22	2.5137E-001	45.31		
2	200.84	8.8566E-003	359.33		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_2IN
Sample Title: B106202AFSFC026GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.559E+005	1.56E+005	1.271E+006	6.194E+004
	Co-60	1173.23	99.85	3.254E+004	3.25E+004	-1.166E+004	1.478E+004
		1332.49	99.98	3.441E+004		9.799E+003	1.560E+004
	Nb-94	702.65	99.81	2.554E+004	2.46E+004	1.997E+004	1.165E+004
		871.09	99.89	2.461E+004		-2.364E+003	1.105E+004
	Ag-108m	433.90	90.50	2.650E+004	2.65E+004	2.330E+003	1.234E+004
		614.30	89.80	3.979E+004		-2.403E+004	1.875E+004
		722.90	90.80	2.709E+004		-2.508E+004	1.230E+004
	Cs-134	604.72	97.62	3.607E+004	3.00E+004	-2.092E+004	1.699E+004
		795.86	85.46	2.999E+004		1.947E+004	1.360E+004
+	Cs-137	661.66*	85.10	2.037E+004	2.04E+004	2.755E+004	8.922E+003
	Eu-152	121.78	28.67	9.713E+004	7.93E+004	-7.034E+003	4.704E+004
		344.28	26.60	7.928E+004		-3.206E+004	3.697E+004
		1408.01	21.07	1.059E+005		6.425E+004	4.507E+004
	Eu-154	123.07	40.40	6.830E+004	6.25E+004	2.061E+004	3.307E+004
		723.30	20.06	1.226E+005		-1.125E+005	5.568E+004
		1274.43	34.80	6.254E+004		-3.038E+004	2.677E+004
	Eu-155	86.55	30.70	1.172E+005	1.17E+005	7.612E+004	5.710E+004
		105.31	21.10	1.522E+005		5.963E+004	7.402E+004
+	Tl-208	583.19*	85.00	1.708E+004	1.71E+004	1.676E+004	7.372E+003
	Bi-212	727.33	6.67	3.544E+005	3.54E+005	1.999E+005	1.602E+005
+	Pb-212	238.63*	43.60	3.494E+004	3.49E+004	5.170E+004	1.618E+004
+	Bi-214	609.32*	45.49	3.969E+004	3.97E+004	8.152E+004	1.760E+004
		1120.29	14.92	2.062E+005		3.271E+004	9.333E+004
		1764.49	15.30	2.063E+005		1.602E+005	9.039E+004
+	Pb-214	295.22*	18.42	8.767E+004	3.99E+004	3.542E+004	4.035E+004
		351.93*	35.60	3.991E+004		7.288E+004	1.793E+004
	Ra-226	186.21	3.64	6.713E+005	6.71E+005	3.293E+005	3.221E+005
	Ac-228	338.32	11.27	2.144E+005	1.39E+005	1.211E+005	1.010E+005
		911.20	25.80	1.388E+005		1.517E+005	6.441E+004
		968.97	15.80	1.817E+005		1.111E+005	8.237E+004
	Am-241	59.54	35.90	1.159E+005	1.16E+005	-1.454E+004	5.625E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************


Filename: 6279

Report Generated On                : 6/14/2018   2:54:36 PM

Sample Title                       : B106202AFSFC027GD
Sample Description                 : U2 Diesel Fuel Storage Floor
Sample Identification              :
Sample Type                        : Gamma Direct
Sample Geometry                    : 3M90D_CP_2IN

Peak Locate Threshold              :  3.00
Peak Locate Range (in channels)    :    85 -  8192
Peak Area Range (in channels)      :    85 -  8192
Identification Energy Tolerance    :   10.000 keV

Sample Size                        :  2.830E+001 M^2

Sample Taken On                    : 6/14/2018   2:44:00 PM
Acquisition Started                : 6/14/2018   2:44:34 PM

Live Time                          :      600.0 seconds
Real Time                          :      600.9 seconds

Dead Time                          :   0.14 %


            Energy Calibration Used Done On        : 6/9/2018
            Efficiency Calibration Used Done On    : 6/2/2018
            Efficiency ID                          : 3M90D_CP_1IN
```

DATA VALIDATED
DATE 10-24-18
TIME 1145
D. Hiza

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC027GD
Peak Analysis Performed on: 6/14/2018 2:54:36 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	288-	306	292.18	73.17	0.40	9.71E+001	70.81	3.35E+002
2	335-	355	339.10	84.90	0.72	8.02E+001	61.04	2.34E+002
3	951-	974	955.57	239.01	0.54	6.43E+001	38.19	7.47E+001
4	1174-	1185	1179.39	294.96	0.47	2.62E+001	18.58	2.38E+001
5	1400-	1415	1407.66	352.03	1.01	6.27E+001	24.91	3.03E+001
6	2431-	2444	2437.13	609.38	0.50	3.65E+001	18.39	1.65E+001
7	2640-	2651	2645.43	661.45	0.81	2.22E+001	13.03	7.76E+000
8	3636-	3649	3642.96	910.82	0.43	1.75E+001	13.70	1.05E+001
9	5835-	5854	5845.15	1461.34	1.00	9.60E+001	21.31	4.96E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSFC027GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.13807E+006	2.71224E+005
Cs-137	1.000	661.66*	85.10	2.07572E+004	1.24176E+004
Eu-155	0.337	86.55*	30.70	8.83831E+004	6.95895E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	6.16338E+004	3.79145E+004
Bi-214	0.454	609.32*	45.49	6.05878E+004	3.13771E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	6.74964E+004	4.90776E+004
		351.93*	35.60	9.37568E+004	3.97863E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.138065E+006	2.712236E+005
Cs-137	1.000	2.075722E+004	1.241760E+004
Eu-155	0.337	8.838309E+004	6.958946E+004
Pb-212	1.000	6.163384E+004	3.791448E+004
Bi-214	0.454	6.058775E+004	3.137710E+004
Pb-214	1.000	8.334264E+004	3.090617E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 2:54:36 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	73.17	1.6181E-001	72.94		
8	910.82	2.9137E-002	78.38	Sum	

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_2IN
Sample Title: B106202AFSFC027GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.953E+005	1.95E+005	1.138E+006	8.164E+004
	Co-60	1173.23	99.85	2.482E+004	2.48E+004	1.990E+004	1.091E+004
		1332.49	99.98	2.595E+004		2.057E+003	1.137E+004
	Nb-94	702.65	99.81	2.356E+004	2.14E+004	4.530E+003	1.067E+004
		871.09	99.89	2.141E+004		-1.344E+004	9.443E+003
	Ag-108m	433.90	90.50	2.528E+004	2.53E+004	1.218E+004	1.173E+004
		614.30	89.80	3.745E+004		-8.302E+003	1.758E+004
		722.90	90.80	2.818E+004		-3.067E+003	1.284E+004
	Cs-134	604.72	97.62	3.392E+004	2.64E+004	-3.443E+004	1.592E+004
		795.86	85.46	2.635E+004		-1.060E+004	1.178E+004
+	Cs-137	661.66*	85.10	1.634E+004	1.63E+004	2.076E+004	6.906E+003
	Eu-152	121.78	28.67	9.684E+004	9.09E+004	3.481E+004	4.690E+004
		344.28	26.60	9.089E+004		-1.303E+005	4.278E+004
		1408.01	21.07	1.138E+005		7.593E+004	4.899E+004
	Eu-154	123.07	40.40	6.861E+004	6.86E+004	3.124E+004	3.323E+004
		723.30	20.06	1.276E+005		-1.563E+004	5.816E+004
		1274.43	34.80	7.983E+004		6.977E+004	3.542E+004
+	Eu-155	86.55*	30.70	1.088E+005	1.09E+005	8.838E+004	5.292E+004
		105.31	21.10	1.425E+005		-4.149E+004	6.916E+004
	Tl-208	583.19	85.00	3.427E+004	3.43E+004	-6.485E+002	1.597E+004
	Bi-212	727.33	6.67	3.700E+005	3.70E+005	6.410E+004	1.680E+005
+	Pb-212	238.63*	43.60	5.720E+004	5.72E+004	6.163E+004	2.730E+004
+	Bi-214	609.32*	45.49	4.233E+004	4.23E+004	6.059E+004	1.892E+004
		1120.29	14.92	2.342E+005		1.327E+005	1.073E+005
		1764.49	15.30	1.709E+005		2.913E+004	7.271E+004
+	Pb-214	295.22*	18.42	7.270E+004	5.13E+004	6.750E+004	3.286E+004
		351.93*	35.60	5.131E+004		9.376E+004	2.363E+004
	Ra-226	186.21	3.64	7.008E+005	7.01E+005	7.147E+004	3.369E+005
	Ac-228	338.32	11.27	2.200E+005	1.41E+005	1.487E+005	1.038E+005
		911.20	25.80	1.411E+005		1.044E+005	6.555E+004
		968.97	15.80	1.842E+005		-2.433E+004	8.365E+004
	Am-241	59.54	35.90	1.119E+005	1.12E+005	-2.965E+004	5.427E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************


Filename: 6279

Report Generated On                : 6/14/2018   2:41:35 PM

Sample Title                       : B106202AFSFC028GD
Sample Description                 : U2 Diesel Fuel Storage Floor
Sample Identification              :
Sample Type                        : Gamma Direct
Sample Geometry                    : 3M90D_CP_2IN

Peak Locate Threshold              :  3.00
Peak Locate Range (in channels)    :    85 -  8192
Peak Area Range (in channels)      :    85 -  8192
Identification Energy Tolerance    :   10.000 keV

Sample Size                        :  2.830E+001 M^2

Sample Taken On                    : 6/14/2018   2:31:00 PM
Acquisition Started                : 6/14/2018   2:31:33 PM

Live Time                          :      600.0 seconds
Real Time                          :      600.8 seconds

Dead Time                          :   0.13 %


            Energy Calibration Used Done On        : 6/9/2018
            Efficiency Calibration Used Done On    : 6/2/2018
            Efficiency ID                          : 3M90D_CP_1IN
```

DATA VALIDATED
DATE 10-24-18
TIME 1145
D. Higa

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSFC028GD
Peak Analysis Performed on: 6/14/2018 2:41:35 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	326	300.21	75.18	0.64	8.37E+001	114.49	6.44E+002
2	1402-	1414	1407.64	352.02	0.91	4.05E+001	20.54	2.45E+001
3	2428-	2442	2435.66	609.01	0.78	3.03E+001	18.35	1.88E+001
4	2637-	2655	2645.52	661.48	1.14	2.70E+002	34.34	7.28E+000
5	4476-	4489	4482.01	1120.57	0.61	1.36E+001	11.92	7.38E+000
6	4687-	4701	4693.73	1173.50	0.88	3.96E+001	18.46	1.54E+001
7	5324-	5340	5331.64	1332.97	0.90	5.58E+001	16.63	4.25E+000
8	5836-	5854	5844.93	1461.28	1.58	7.60E+001	17.44	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: B106202AFSFC028GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	9.00573E+005	2.20911E+005
Co-60	1.000	1173.23*	99.85	4.38127E+004	2.07083E+004
		1332.49*	99.98	6.61061E+004	2.04117E+004
Cs-137	1.000	661.66*	85.10	2.51726E+005	4.40542E+004
Bi-214	0.743	609.32*	45.49	5.01946E+004	3.10436E+004
		1120.29*	14.92	9.81440E+004	8.62788E+004
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	6.04962E+004	3.19991E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	9.005734E+005	2.209106E+005
Co-60	1.000	5.512016E+004	1.453699E+004
Cs-137	1.000	2.517259E+005	4.405416E+004
Bi-214	0.743	5.569059E+004	2.921032E+004
Pb-214	0.434	6.049615E+004	3.199913E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 2:41:35 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.18	1.3945E-001	136.84		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 3M90D_CP_2IN
Sample Title: B106202AFSFC028GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	3.207E+004	3.21E+004	9.006E+005	0.000E+000
+	Co-60	1173.23*	99.85	2.754E+004	1.75E+004	4.381E+004	1.228E+004
		1332.49*	99.98	1.747E+004		6.611E+004	7.129E+003
	Nb-94	702.65	99.81	2.322E+004	2.32E+004	-1.517E+003	1.049E+004
		871.09	99.89	2.852E+004		-1.045E+004	1.300E+004
	Ag-108m	433.90	90.50	3.424E+004	2.85E+004	1.320E+004	1.621E+004
		614.30	89.80	3.701E+004		-1.344E+004	1.736E+004
		722.90	90.80	2.853E+004		-1.472E+004	1.302E+004
	Cs-134	604.72	97.62	3.432E+004	3.43E+004	2.310E+004	1.612E+004
		795.86	85.46	3.541E+004		3.422E+004	1.630E+004
+	Cs-137	661.66*	85.10	1.788E+004	1.79E+004	2.517E+005	7.680E+003
	Eu-152	121.78	28.67	1.118E+005	8.24E+004	7.865E+004	5.438E+004
		344.28	26.60	1.041E+005		3.139E+004	4.939E+004
		1408.01	21.07	8.237E+004		3.505E+004	3.328E+004
	Eu-154	123.07	40.40	7.762E+004	6.68E+004	8.733E+003	3.773E+004
		723.30	20.06	1.292E+005		-5.718E+004	5.896E+004
		1274.43	34.80	6.683E+004		4.651E+004	2.892E+004
	Eu-155	86.55	30.70	1.325E+005	1.33E+005	2.356E+005	6.478E+004
		105.31	21.10	1.599E+005		7.509E+004	7.786E+004
	Tl-208	583.19	85.00	3.600E+004	3.60E+004	6.510E+003	1.683E+004
	Bi-212	727.33	6.67	4.176E+005	4.18E+005	2.974E+005	1.918E+005
	Pb-212	238.63	43.60	7.143E+004	7.14E+004	2.135E+004	3.442E+004
+	Bi-214	609.32*	45.49	4.459E+004	4.46E+004	5.019E+004	2.005E+004
		1120.29*	14.92	1.305E+005		9.814E+004	5.550E+004
		1764.49	15.30	2.312E+005		2.073E+005	1.028E+005
+	Pb-214	295.22	18.42	1.615E+005	4.37E+004	1.379E+005	7.726E+004
		351.93*	35.60	4.367E+004		6.050E+004	1.981E+004
	Ra-226	186.21	3.64	7.853E+005	7.85E+005	4.091E+005	3.792E+005
	Ac-228	338.32	11.27	2.479E+005	1.23E+005	6.434E+004	1.177E+005
		911.20	25.80	1.229E+005		1.064E+005	5.644E+004
		968.97	15.80	1.965E+005		5.584E+004	8.976E+004
	Am-241	59.54	35.90	1.208E+005	1.21E+005	3.252E+004	5.873E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 1:08:27 PM
Sample Title	: B106202AFSWC029GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 4M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 5.030E+001 M^2
Sample Taken On	: 6/14/2018 12:58:00 PM
Acquisition Started	: 6/14/2018 12:58:25 PM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.16 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 4M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1145
D. Higa

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC029GD
Peak Analysis Performed on: 6/14/2018 1:08:27 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	295-	307	300.25	75.19	0.91	7.93E+001	54.61	2.52E+002
2	336-	346	340.02	85.13	0.32	2.72E+001	40.69	1.60E+002
3	1401-	1413	1407.39	351.96	0.44	2.60E+001	16.51	1.60E+001
4	2326-	2337	2331.34	582.93	1.78	2.34E+001	11.85	4.58E+000
5	2429-	2442	2436.33	609.18	1.04	4.68E+001	15.72	5.25E+000
6	5837-	5852	5844.68	1461.22	0.53	5.70E+001	18.00	8.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: B106202AFSWC029GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	6.80429E+005	2.22859E+005
Eu-155	0.338	86.55*	30.70	3.06062E+004	4.61424E+004
		105.31	21.10		
Tl-208	1.000	583.19*	85.00	2.04782E+004	1.06512E+004
Bi-214	0.453	609.32*	45.49	7.84833E+004	2.80289E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	3.92689E+004	2.56690E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	6.804291E+005	2.228589E+005
Eu-155	0.338	3.060625E+004	4.614235E+004
Tl-208	1.000	2.047821E+004	1.065124E+004
Bi-214	0.453	7.848327E+004	2.802886E+004
Pb-214	0.434	3.926889E+004	2.566897E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 1:08:27 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.19	1.3213E-001	68.88		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC029GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.247E+005	2.25E+005	6.804E+005	9.622E+004
	Co-60	1173.23	99.85	3.544E+004	3.10E+004	3.596E+004	1.621E+004
		1332.49	99.98	3.101E+004		2.168E+004	1.389E+004
	Nb-94	702.65	99.81	2.161E+004	2.00E+004	5.391E+003	9.678E+003
		871.09	99.89	2.005E+004		-1.667E+004	8.752E+003
	Ag-108m	433.90	90.50	2.359E+004	2.36E+004	-1.359E+004	1.087E+004
		614.30	89.80	3.606E+004		-6.673E+003	1.687E+004
		722.90	90.80	2.660E+004		1.041E+004	1.204E+004
	Cs-134	604.72	97.62	3.492E+004	2.66E+004	4.080E+004	1.641E+004
		795.86	85.46	2.662E+004		2.505E+004	1.190E+004
	Cs-137	661.66	85.10	3.170E+004	3.17E+004	2.951E+004	1.457E+004
	Eu-152	121.78	28.67	1.055E+005	7.71E+004	9.950E+004	5.120E+004
		344.28	26.60	8.584E+004		1.061E+004	4.022E+004
		1408.01	21.07	7.715E+004		-1.206E+004	3.061E+004
	Eu-154	123.07	40.40	7.366E+004	7.33E+004	8.725E+003	3.573E+004
		723.30	20.06	1.204E+005		4.545E+004	5.452E+004
		1274.43	34.80	7.329E+004		5.860E+003	3.212E+004
+	Eu-155	86.55*	30.70	7.576E+004	7.58E+004	3.061E+004	3.636E+004
		105.31	21.10	1.509E+005		8.910E+004	7.332E+004
+	Tl-208	583.19*	85.00	1.220E+004	1.22E+004	2.048E+004	4.919E+003
	Bi-212	727.33	6.67	3.298E+005	3.30E+005	6.337E+004	1.477E+005
	Pb-212	238.63	43.60	6.066E+004	6.07E+004	2.150E+004	2.902E+004
+	Bi-214	609.32*	45.49	2.596E+004	2.60E+004	7.848E+004	1.071E+004
		1120.29	14.92	1.922E+005		-1.526E+005	8.627E+004
		1764.49	15.30	1.722E+005		1.044E+005	7.323E+004
+	Pb-214	295.22	18.42	1.164E+005	3.64E+004	-4.184E+004	5.468E+004
		351.93*	35.60	3.644E+004		3.927E+004	1.617E+004
	Ra-226	186.21	3.64	7.089E+005	7.09E+005	-1.226E+005	3.407E+005
	Ac-228	338.32	11.27	1.991E+005	1.17E+005	-7.454E+004	9.323E+004
		911.20	25.80	1.173E+005		1.155E+005	5.359E+004
		968.97	15.80	1.642E+005		2.604E+004	7.353E+004
	Am-241	59.54	35.90	1.256E+005	1.26E+005	5.678E+004	6.106E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************


Filename: 6279

Report Generated On                : 6/14/2018  12:53:49 PM

Sample Title                       : B106202AFSWC030GD
Sample Description                 : U2 Diesel Fuel Storage Wall
Sample Identification              :
Sample Type                        : Gamma Direct
Sample Geometry                    : 4M90D_CP_2IN

Peak Locate Threshold              :  3.00
Peak Locate Range (in channels)    :    85 -  8192
Peak Area Range (in channels)      :    85 -  8192
Identification Energy Tolerance    :   10.000 keV

Sample Size                        :  5.030E+001 M^2

Sample Taken On                    : 6/14/2018  12:43:00 PM
Acquisition Started                : 6/14/2018  12:43:46 PM

Live Time                          :      600.0 seconds
Real Time                          :      601.1 seconds

Dead Time                          :   0.19 %

            Energy Calibration Used Done On       : 6/9/2018
            Efficiency Calibration Used Done On   : 6/2/2018
            Efficiency ID                         : 4M90D_CP_1IN
```

DATA VALIDATED
DATE 10-24-18
TIME 1145
Q. Hija

```
***********************************************************************
*****          P E A K   A N A L Y S I S   R E P O R T          *****
***********************************************************************
```

Detector Name: 6279
Sample Title: B106202AFSWC030GD
Peak Analysis Performed on: 6/14/2018 12:53:48 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	307	300.29	75.20	0.97	5.89E+001	46.85	1.94E+002
2	332-	344	338.87	84.84	0.50	3.46E+001	42.28	1.56E+002
3	948-	959	954.40	238.72	0.44	3.17E+001	23.07	4.03E+001
4	1400-	1412	1406.33	351.69	0.34	3.30E+001	18.01	1.80E+001
5	2430-	2442	2436.13	609.13	0.74	4.25E+001	15.44	6.50E+000
6	2639-	2650	2644.20	661.14	0.32	1.70E+001	9.91	3.00E+000
7	5834-	5855	5844.25	1461.11	0.41	9.69E+001	21.49	5.12E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC030GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.15646E+006	2.75485E+005
Cs-137	1.000	661.66*	85.10	1.60446E+004	9.54964E+003
Eu-155	0.337	86.55*	30.70	3.89289E+004	4.81943E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	3.07798E+004	2.29548E+004
Bi-214	0.453	609.32*	45.49	7.13449E+004	2.73028E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	4.98861E+004	2.82435E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.156458E+006	2.754849E+005
Cs-137	1.000	1.604464E+004	9.549643E+003
Eu-155	0.337	3.892890E+004	4.819427E+004
Pb-212	1.000	3.077983E+004	2.295479E+004
Bi-214	0.453	7.134493E+004	2.730279E+004
Pb-214	0.434	4.988614E+004	2.824352E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 12:53:48 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.20	9.8159E-002	79.55		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC030GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.016E+005	2.02E+005	1.156E+006	8.464E+004
	Co-60	1173.23	99.85	3.097E+004	2.99E+004	-1.127E+004	1.398E+004
		1332.49	99.98	2.987E+004		1.846E+004	1.332E+004
	Nb-94	702.65	99.81	2.345E+004	2.35E+004	-2.880E+004	1.060E+004
		871.09	99.89	2.651E+004		2.822E+004	1.198E+004
	Ag-108m	433.90	90.50	2.515E+004	2.51E+004	1.278E+004	1.165E+004
		614.30	89.80	3.744E+004		-2.591E+004	1.756E+004
		722.90	90.80	2.736E+004		1.369E+004	1.242E+004
	Cs-134	604.72	97.62	3.264E+004	3.07E+004	3.238E+004	1.527E+004
		795.86	85.46	3.072E+004		2.733E+004	1.395E+004
+	Cs-137	661.66*	85.10	1.109E+004	1.11E+004	1.604E+004	4.267E+003
	Eu-152	121.78	28.67	9.483E+004	7.55E+004	1.200E+004	4.587E+004
		344.28	26.60	7.553E+004		-9.629E+004	3.506E+004
		1408.01	21.07	1.184E+005		8.238E+004	5.122E+004
	Eu-154	123.07	40.40	6.783E+004	6.78E+004	2.619E+004	3.282E+004
		723.30	20.06	1.239E+005		-1.687E+004	5.625E+004
		1274.43	34.80	7.873E+004		2.101E+004	3.484E+004
+	Eu-155	86.55*	30.70	7.819E+004	7.82E+004	3.893E+004	3.757E+004
		105.31	21.10	1.437E+005		1.011E+005	6.974E+004
	Tl-208	583.19	85.00	3.171E+004	3.17E+004	6.173E+003	1.467E+004
	Bi-212	727.33	6.67	3.986E+005	3.99E+005	2.197E+005	1.821E+005
+	Pb-212	238.63*	43.60	3.480E+004	3.48E+004	3.078E+004	1.609E+004
+	Bi-214	609.32*	45.49	2.739E+004	2.74E+004	7.134E+004	1.142E+004
		1120.29	14.92	1.820E+005		1.060E+005	8.114E+004
		1764.49	15.30	1.849E+005		1.234E+005	7.961E+004
+	Pb-214	295.22	18.42	1.385E+005	3.86E+004	1.293E+005	6.572E+004
		351.93*	35.60	3.860E+004		4.989E+004	1.726E+004
	Ra-226	186.21	3.64	6.889E+005	6.89E+005	-1.455E+005	3.307E+005
	Ac-228	338.32	11.27	2.028E+005	1.16E+005	-5.321E+004	9.511E+004
		911.20	25.80	1.159E+005		-2.050E+004	5.288E+004
		968.97	15.80	1.727E+005		8.376E+004	7.782E+004
	Am-241	59.54	35.90	1.097E+005	1.10E+005	-4.102E+004	5.315E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 12:40:41 PM
Sample Title	: B106202AFSWC031GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 4M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 5.030E+001 M^2
Sample Taken On	: 6/14/2018 12:30:00 PM
Acquisition Started	: 6/14/2018 12:30:39 PM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.17 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 4M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1145

```
*************************************************************************
*****          P E A K   A N A L Y S I S   R E P O R T           *****
*************************************************************************
```

Detector Name: 6279
Sample Title: B106202AFSWC031GD
Peak Analysis Performed on: 6/14/2018 12:40:41 PM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	286-	305	300.04	75.14	0.67	1.07E+002	70.48	3.24E+002
2	950-	959	954.08	238.64	0.35	2.57E+001	19.33	2.93E+001
3	1400-	1413	1406.64	351.77	1.11	3.61E+001	19.95	2.29E+001
4	2430-	2441	2435.56	608.99	1.12	2.63E+001	14.93	1.18E+001
5	5834-	5853	5843.30	1460.88	0.69	7.41E+001	20.38	7.94E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*********************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*********************************************************************
```

Sample Title: B106202AFSWC031GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	8.83945E+005	2.55083E+005
Pb-212	1.000	238.63*	43.60	2.49737E+004	1.91966E+004
Bi-214	0.453	609.32*	45.49	4.40596E+004	2.56062E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	5.46392E+004	3.12702E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

```
*********************************************************************
*****  I N T E R F E R E N C E   C O R R E C T E D   R E P O R T  *****
*********************************************************************
```

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	8.839452E+005	2.550827E+005
Pb-212	1.000	2.497369E+004	1.919656E+004
Bi-214	0.453	4.405957E+004	2.560625E+004
Pb-214	0.434	5.463924E+004	3.127018E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 12:40:41 PM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.14	1.7813E-001	65.95		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC031GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.466E+005	2.47E+005	8.839E+005	1.072E+005
	Co-60	1173.23	99.85	2.999E+004	2.81E+004	3.502E+003	1.349E+004
		1332.49	99.98	2.808E+004		1.401E+004	1.242E+004
	Nb-94	702.65	99.81	2.515E+004	2.49E+004	1.851E+004	1.145E+004
		871.09	99.89	2.486E+004		-1.411E+003	1.116E+004
	Ag-108m	433.90	90.50	2.780E+004	2.78E+004	3.637E+002	1.298E+004
		614.30	89.80	3.766E+004		-1.680E+004	1.768E+004
		722.90	90.80	3.055E+004		8.157E+003	1.402E+004
	Cs-134	604.72	97.62	3.285E+004	2.45E+004	3.621E+004	1.537E+004
		795.86	85.46	2.454E+004		-2.176E+004	1.086E+004
	Cs-137	661.66	85.10	2.964E+004	2.96E+004	1.832E+004	1.354E+004
	Eu-152	121.78	28.67	9.169E+004	7.97E+004	-3.425E+004	4.430E+004
		344.28	26.60	7.971E+004		-1.216E+005	3.715E+004
		1408.01	21.07	1.067E+005		-2.025E+005	4.540E+004
	Eu-154	123.07	40.40	6.460E+004	6.46E+004	4.384E+004	3.120E+004
		723.30	20.06	1.383E+005		6.524E+004	6.346E+004
		1274.43	34.80	7.873E+004		3.934E+004	3.484E+004
	Eu-155	86.55	30.70	1.201E+005	1.20E+005	1.446E+005	5.853E+004
		105.31	21.10	1.422E+005		-6.949E+004	6.898E+004
	Tl-208	583.19	85.00	3.056E+004	3.06E+004	3.148E+003	1.410E+004
	Bi-212	727.33	6.67	4.127E+005	4.13E+005	2.817E+005	1.892E+005
+	Pb-212	238.63*	43.60	2.891E+004	2.89E+004	2.497E+004	1.314E+004
+	Bi-214	609.32*	45.49	3.451E+004	3.45E+004	4.406E+004	1.498E+004
		1120.29	14.92	2.227E+005		2.110E+005	1.015E+005
		1764.49	15.30	2.182E+005		1.803E+005	9.625E+004
+	Pb-214	295.22	18.42	1.467E+005	4.37E+004	1.391E+005	6.981E+004
		351.93*	35.60	4.372E+004		5.464E+004	1.981E+004
	Ra-226	186.21	3.64	6.872E+005	6.87E+005	6.589E+005	3.299E+005
	Ac-228	338.32	11.27	1.900E+005	1.11E+005	7.680E+004	8.872E+004
		911.20	25.80	1.115E+005		-3.446E+004	5.069E+004
		968.97	15.80	1.911E+005		1.733E+005	8.700E+004
	Am-241	59.54	35.90	1.091E+005	1.09E+005	-3.270E+004	5.282E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 10:09:03 AM
Sample Title	: B106202AFSWC032GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 4M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 5.030E+001 M^2
Sample Taken On	: 6/14/2018 9:58:00 AM
Acquisition Started	: 6/14/2018 9:59:01 AM
Live Time	: 600.0 seconds
Real Time	: 600.8 seconds
Dead Time	: 0.14 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 4M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1145
R. Higa

```
*************************************************************************
*****          P E A K   A N A L Y S I S   R E P O R T          *****
*************************************************************************
```

Detector Name: 6279
Sample Title: B106202AFSWC032GD
Peak Analysis Performed on: 6/14/2018 10:09:03 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	306	300.44	75.24	0.80	3.21E+001	46.03	2.08E+002
2	1400-	1413	1406.85	351.82	1.41	3.42E+001	21.05	2.78E+001
3	2430-	2443	2436.75	609.28	0.57	3.45E+001	16.28	1.15E+001
4	3868-	3881	3874.06	968.59	0.30	5.26E+000	13.65	1.27E+001
5	5838-	5856	5846.13	1461.58	1.46	8.33E+001	20.56	6.75E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*********************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*********************************************************************
```

Sample Title: B106202AFSWC032GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.999	1460.82*	10.66	9.93957E+005	2.60180E+005
Bi-214	0.453	609.32*	45.49	5.78422E+004	2.81987E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	5.17137E+004	3.27652E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

```
*********************************************************************
*****  I N T E R F E R E N C E   C O R R E C T E D   R E P O R T  *****
*********************************************************************
```

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.999	9.939565E+005	2.601797E+005
Bi-214	0.453	5.784216E+004	2.819868E+004
Pb-214	0.434	5.171374E+004	3.276518E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 10:09:03 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.24	5.3427E-002	143.58		
4	968.59	8.7731E-003	259.33	Sum	

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC032GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.182E+005	2.18E+005	9.940E+005	9.296E+004
	Co-60	1173.23	99.85	2.378E+004	2.33E+004	3.173E+003	1.038E+004
		1332.49	99.98	2.326E+004		7.417E+003	1.002E+004
	Nb-94	702.65	99.81	2.237E+004	2.11E+004	-1.459E+004	1.006E+004
		871.09	99.89	2.111E+004		-1.199E+004	9.283E+003
	Ag-108m	433.90	90.50	2.006E+004	2.01E+004	-1.326E+004	9.109E+003
		614.30	89.80	3.653E+004		-1.128E+004	1.711E+004
		722.90	90.80	2.660E+004		4.183E+003	1.204E+004
	Cs-134	604.72	97.62	3.221E+004	2.56E+004	-1.961E+004	1.505E+004
		795.86	85.46	2.560E+004		1.186E+002	1.139E+004
	Cs-137	661.66	85.10	2.779E+004	2.78E+004	-6.796E+003	1.262E+004
	Eu-152	121.78	28.67	9.514E+004	9.00E+004	7.896E+004	4.602E+004
		344.28	26.60	9.002E+004		-5.889E+004	4.231E+004
		1408.01	21.07	1.220E+005		-4.413E+003	5.302E+004
	Eu-154	123.07	40.40	6.607E+004	6.61E+004	7.933E+002	3.194E+004
		723.30	20.06	1.187E+005		-1.263E+004	5.364E+004
		1274.43	34.80	6.940E+004		-3.348E+002	3.017E+004
	Eu-155	86.55	30.70	1.161E+005	1.16E+005	1.267E+005	5.653E+004
		105.31	21.10	1.422E+005		-8.296E+004	6.898E+004
	Tl-208	583.19	85.00	3.114E+004	3.11E+004	2.261E+004	1.439E+004
	Bi-212	727.33	6.67	3.738E+005	3.74E+005	-2.081E+005	1.697E+005
	Pb-212	238.63	43.60	5.960E+004	5.96E+004	7.489E+004	2.849E+004
+	Bi-214	609.32*	45.49	3.568E+004	3.57E+004	5.784E+004	1.557E+004
		1120.29	14.92	1.672E+005		-2.354E+004	7.375E+004
		1764.49	15.30	2.078E+005		1.614E+005	9.104E+004
+	Pb-214	295.22	18.42	1.351E+005	4.76E+004	4.199E+004	6.401E+004
		351.93*	35.60	4.764E+004		5.171E+004	2.177E+004
	Ra-226	186.21	3.64	6.872E+005	6.87E+005	1.128E+005	3.299E+005
	Ac-228	338.32	11.27	2.182E+005	1.02E+005	-2.795E+003	1.028E+005
		911.20	25.80	1.021E+005		7.551E+004	4.600E+004
		968.97	15.80	2.272E+005		4.840E+004	1.050E+005
	Am-241	59.54	35.90	1.050E+005	1.05E+005	-3.773E+004	5.079E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 9:40:32 AM
Sample Title	: B106202AFSWC033GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 4M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 5.030E+001 M^2
Sample Taken On	: 6/14/2018 9:30:00 AM
Acquisition Started	: 6/14/2018 9:30:30 AM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.17 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 4M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1145
R. Hija

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC033GD
Peak Analysis Performed on: 6/14/2018 9:40:32 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	286-	306	300.39	75.22	0.92	1.53E+002	67.25	2.68E+002
2	366-	381	372.05	93.14	0.69	2.10E+001	44.41	1.57E+002
3	950-	960	954.71	238.79	0.44	5.52E+001	20.93	2.28E+001
4	1176-	1186	1181.20	295.41	0.41	1.85E+001	17.58	2.45E+001
5	1401-	1416	1407.28	351.93	1.23	4.90E+001	20.03	1.70E+001
6	2431-	2443	2437.87	609.57	0.34	2.97E+001	15.46	1.13E+001
7	5839-	5859	5848.33	1462.13	0.96	8.48E+001	20.38	5.25E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC033GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.997	1460.82*	10.66	1.01213E+006	2.58775E+005
Pb-212	1.000	238.63*	43.60	5.36533E+004	2.21031E+004
Bi-214	0.453	609.32*	45.49	4.99532E+004	2.66484E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	4.83802E+004	4.65850E+004
		351.93*	35.60	7.41733E+004	3.22804E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.997	1.012132E+006	2.587750E+005
Pb-212	1.000	5.365332E+004	2.210311E+004
Bi-214	0.453	4.995317E+004	2.664837E+004
Pb-214	1.000	6.580611E+004	2.653287E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 9:40:32 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.22	2.5476E-001	44.00		
2	93.14	3.4956E-002	211.74	Tol.	Eu-155

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC033GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.040E+005	2.04E+005	1.012E+006	8.583E+004
	Co-60	1173.23	99.85	2.737E+004	2.55E+004	7.531E+003	1.217E+004
		1332.49	99.98	2.545E+004		1.910E+004	1.111E+004
	Nb-94	702.65	99.81	2.310E+004	2.16E+004	2.912E+003	1.042E+004
		871.09	99.89	2.162E+004		-2.599E+003	9.538E+003
	Ag-108m	433.90	90.50	2.034E+004	2.03E+004	-9.192E+003	9.246E+003
		614.30	89.80	3.286E+004		-1.866E+004	1.528E+004
		722.90	90.80	2.811E+004		7.902E+003	1.279E+004
	Cs-134	604.72	97.62	3.370E+004	2.90E+004	1.334E+004	1.579E+004
		795.86	85.46	2.898E+004		1.070E+004	1.308E+004
	Cs-137	661.66	85.10	2.892E+004	2.89E+004	1.172E+004	1.318E+004
	Eu-152	121.78	28.67	9.137E+004	9.14E+004	7.480E+003	4.414E+004
		344.28	26.60	9.204E+004		3.893E+004	4.332E+004
		1408.01	21.07	1.025E+005		-3.384E+004	4.329E+004
	Eu-154	123.07	40.40	6.494E+004	5.31E+004	-1.613E+004	3.137E+004
		723.30	20.06	1.273E+005		3.966E+004	5.793E+004
		1274.43	34.80	5.313E+004		2.679E+004	2.203E+004
	Eu-155	86.55	30.70	1.166E+005	1.17E+005	1.146E+005	5.677E+004
		105.31	21.10	1.379E+005		1.483E+004	6.685E+004
	Tl-208	583.19	85.00	3.363E+004	3.36E+004	1.355E+004	1.563E+004
	Bi-212	727.33	6.67	3.686E+005	3.69E+005	-8.989E+004	1.671E+005
+	Pb-212	238.63*	43.60	2.617E+004	2.62E+004	5.365E+004	1.177E+004
+	Bi-214	609.32*	45.49	3.481E+004	3.48E+004	4.995E+004	1.513E+004
		1120.29	14.92	2.081E+005		2.721E+004	9.420E+004
		1764.49	15.30	2.328E+005		2.088E+005	1.036E+005
+	Pb-214	295.22*	18.42	7.296E+004	3.98E+004	4.838E+004	3.295E+004
		351.93*	35.60	3.975E+004		7.417E+004	1.783E+004
	Ra-226	186.21	3.64	6.906E+005	6.91E+005	2.838E+005	3.316E+005
	Ac-228	338.32	11.27	2.041E+005	1.04E+005	1.043E+005	9.572E+004
		911.20	25.80	1.037E+005		5.032E+004	4.682E+004
		968.97	15.80	1.936E+005		1.814E+005	8.824E+004
	Am-241	59.54	35.90	1.045E+005	1.04E+005	-4.192E+004	5.053E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 9:10:49 AM
Sample Title	: B106202AFSWC034GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 4M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 5.030E+001 M^2
Sample Taken On	: 6/14/2018 9:00:00 AM
Acquisition Started	: 6/14/2018 9:00:47 AM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.16 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 4M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1145
R. Hija

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC034GD
Peak Analysis Performed on: 6/14/2018 9:10:49 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	310	300.36	75.22	0.70	7.90E+001	55.74	2.38E+002
2	949-	961	955.91	239.10	0.91	5.03E+001	24.66	3.87E+001
3	1067-	1077	1071.57	268.01	0.42	1.63E+001	16.12	1.97E+001
4	1400-	1413	1407.54	351.99	0.90	3.30E+001	16.26	1.19E+001
5	2040-	2051	2045.85	511.56	0.50	1.20E+001	15.13	1.80E+001
6	2328-	2340	2334.43	583.71	0.97	3.60E+001	14.07	5.01E+000
7	2430-	2445	2437.45	609.46	1.07	4.61E+001	16.74	7.92E+000
8	5842-	5860	5849.82	1462.50	1.85	6.89E+001	17.36	2.05E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC034GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.995	1460.82*	10.66	8.23553E+005	2.19324E+005
Tl-208	1.000	583.19*	85.00	3.14935E+004	1.28840E+004
Pb-212	1.000	238.63*	43.60	4.89418E+004	2.52461E+004
Bi-214	0.453	609.32*	45.49	7.73860E+004	2.96030E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	5.00118E+004	2.57158E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.995	8.235529E+005	2.193240E+005
Tl-208	1.000	3.149350E+004	1.288405E+004
Pb-212	1.000	4.894179E+004	2.524609E+004
Bi-214	0.453	7.738596E+004	2.960299E+004
Pb-214	0.434	5.001177E+004	2.571581E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 9:10:49 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.22	1.3174E-001	70.51		
3	268.01	2.7106E-002	99.12		
5	511.56	2.0000E-002	126.10		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC034GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.316E+005	1.32E+005	8.236E+005	4.963E+004
	Co-60	1173.23	99.85	2.623E+004	2.08E+004	5.299E+003	1.161E+004
		1332.49	99.98	2.080E+004		2.776E+003	8.784E+003
	Nb-94	702.65	99.81	2.199E+004	2.20E+004	-4.392E+003	9.869E+003
		871.09	99.89	2.691E+004		1.079E+004	1.218E+004
	Ag-108m	433.90	90.50	2.240E+004	2.24E+004	1.075E+003	1.028E+004
		614.30	89.80	3.744E+004		-1.322E+004	1.756E+004
		722.90	90.80	2.621E+004		-9.064E+003	1.185E+004
	Cs-134	604.72	97.62	3.370E+004	2.85E+004	2.028E+002	1.579E+004
		795.86	85.46	2.852E+004		5.219E+002	1.285E+004
	Cs-137	661.66	85.10	2.496E+004	2.50E+004	6.510E+003	1.120E+004
	Eu-152	121.78	28.67	9.606E+004	8.85E+004	-6.358E+003	4.648E+004
		344.28	26.60	8.848E+004		3.806E+004	4.154E+004
		1408.01	21.07	9.337E+004		-8.735E+004	3.872E+004
	Eu-154	123.07	40.40	6.848E+004	6.85E+004	5.506E+003	3.314E+004
		723.30	20.06	1.204E+005		-2.519E+004	5.452E+004
		1274.43	34.80	7.330E+004		-1.758E+004	3.212E+004
	Eu-155	86.55	30.70	1.108E+005	1.11E+005	5.882E+004	5.389E+004
		105.31	21.10	1.424E+005		1.698E+005	6.908E+004
+	Tl-208	583.19*	85.00	1.296E+004	1.30E+004	3.149E+004	5.294E+003
	Bi-212	727.33	6.67	3.634E+005	3.63E+005	-1.111E+005	1.645E+005
+	Pb-212	238.63*	43.60	3.489E+004	3.49E+004	4.894E+004	1.613E+004
+	Bi-214	609.32*	45.49	3.157E+004	3.16E+004	7.739E+004	1.352E+004
		1120.29	14.92	1.955E+005		1.350E+005	8.791E+004
		1764.49	15.30	1.653E+005		9.492E+004	6.983E+004
+	Pb-214	295.22	18.42	1.298E+005	3.27E+004	3.208E+004	6.136E+004
		351.93*	35.60	3.271E+004		5.001E+004	1.431E+004
	Ra-226	186.21	3.64	6.666E+005	6.67E+005	4.520E+005	3.196E+005
	Ac-228	338.32	11.27	2.194E+005	1.10E+005	1.464E+005	1.034E+005
		911.20	25.80	1.100E+005		4.445E+004	4.994E+004
		968.97	15.80	1.960E+005		9.183E+004	8.945E+004
	Am-241	59.54	35.90	1.087E+005	1.09E+005	8.731E+004	5.265E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 8:44:11 AM
Sample Title	: B106202AFSWC035GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 4M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 5.030E+001 M^2
Sample Taken On	: 6/14/2018 8:34:00 AM
Acquisition Started	: 6/14/2018 8:34:10 AM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.16 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 4M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1145
R. Hija

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC035GD
Peak Analysis Performed on: 6/14/2018 8:44:11 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	283-	305	300.44	75.24	0.91	9.92E+001	73.49	3.23E+002
2	951-	961	955.15	238.90	0.57	3.32E+001	23.20	4.18E+001
3	1174-	1187	1181.09	295.39	0.58	3.13E+001	20.73	2.67E+001
4	1402-	1415	1408.16	352.15	0.76	3.65E+001	18.71	1.85E+001
5	2433-	2447	2439.13	609.88	0.69	2.96E+001	16.72	1.34E+001
6	4478-	4492	4484.15	1121.11	0.43	1.99E+001	13.58	9.12E+000
7	5841-	5859	5849.66	1462.47	1.69	7.93E+001	19.54	4.75E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

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*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC035GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.996	1460.82*	10.66	9.46599E+005	2.47461E+005
Pb-212	1.000	238.63*	43.60	3.22346E+004	2.31370E+004
Bi-214	0.743	609.32*	45.49	4.97644E+004	2.87269E+004
		1120.29*	14.92	1.44632E+005	9.94981E+004
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	8.17095E+004	5.57060E+004
		351.93*	35.60	5.52276E+004	2.94998E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.996	9.465992E+005	2.474613E+005
Pb-212	1.000	3.223465E+004	2.313698E+004
Bi-214	0.743	5.706394E+004	2.759959E+004
Pb-214	1.000	6.102758E+004	2.606993E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 8:44:11 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.24	1.6537E-001	74.07		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC035GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.906E+005	1.91E+005	9.466E+005	7.912E+004
	Co-60	1173.23	99.85	2.681E+004	2.25E+004	4.888E+003	1.189E+004
		1332.49	99.98	2.248E+004		-5.821E+003	9.622E+003
	Nb-94	702.65	99.81	2.199E+004	2.20E+004	-3.714E+004	9.869E+003
		871.09	99.89	2.260E+004		5.912E+003	1.003E+004
	Ag-108m	433.90	90.50	2.382E+004	2.38E+004	1.666E+004	1.099E+004
		614.30	89.80	3.438E+004		3.217E+004	1.603E+004
		722.90	90.80	2.774E+004		9.447E+003	1.261E+004
	Cs-134	604.72	97.62	3.264E+004	2.34E+004	-9.029E+003	1.527E+004
		795.86	85.46	2.343E+004		5.074E+003	1.030E+004
	Cs-137	661.66	85.10	2.452E+004	2.45E+004	-2.687E+004	1.098E+004
	Eu-152	121.78	28.67	9.024E+004	8.80E+004	-5.501E+004	4.357E+004
		344.28	26.60	8.796E+004		5.543E+004	4.128E+004
		1408.01	21.07	9.337E+004		6.252E+003	3.872E+004
	Eu-154	123.07	40.40	6.391E+004	6.39E+004	-1.227E+004	3.086E+004
		723.30	20.06	1.239E+005		-1.728E+004	5.625E+004
		1274.43	34.80	8.045E+004		4.018E+004	3.570E+004
	Eu-155	86.55	30.70	1.156E+005	1.16E+005	-1.610E+004	5.629E+004
		105.31	21.10	1.412E+005		2.946E+004	6.850E+004
	Tl-208	583.19	85.00	2.810E+004	2.81E+004	1.064E+004	1.287E+004
	Bi-212	727.33	6.67	4.034E+005	4.03E+005	7.978E+004	1.845E+005
+	Pb-212	238.63*	43.60	3.482E+004	3.48E+004	3.223E+004	1.609E+004
+	Bi-214	609.32*	45.49	3.964E+004	3.96E+004	4.976E+004	1.755E+004
		1120.29*	14.92	1.423E+005		1.446E+005	6.131E+004
		1764.49	15.30	1.582E+005		1.134E+004	6.624E+004
+	Pb-214	295.22*	18.42	8.206E+004	3.97E+004	8.171E+004	3.750E+004
		351.93*	35.60	3.967E+004		5.523E+004	1.779E+004
	Ra-226	186.21	3.64	6.684E+005	6.68E+005	1.301E+005	3.204E+005
	Ac-228	338.32	11.27	2.077E+005	1.05E+005	8.865E+004	9.755E+004
		911.20	25.80	1.053E+005		5.774E+004	4.762E+004
		968.97	15.80	1.671E+005		1.963E+004	7.499E+004
	Am-241	59.54	35.90	1.069E+005	1.07E+005	-2.404E+004	5.173E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 8:57:12 AM
Sample Title	: B106202AFSWC036GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 4M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 5.030E+001 M^2
Sample Taken On	: 6/14/2018 8:47:00 AM
Acquisition Started	: 6/14/2018 8:47:10 AM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.16 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 4M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1200
P. Hip

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC036GD
Peak Analysis Performed on: 6/14/2018 8:57:12 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	305	300.54	75.26	0.80	7.54E+001	43.02	1.72E+002
2	1175-	1188	1180.93	295.35	0.39	2.70E+001	18.49	2.10E+001
3	1402-	1416	1408.57	352.25	1.08	5.07E+001	20.35	1.83E+001
4	2040-	2051	2045.55	511.49	0.87	2.03E+001	15.60	1.57E+001
5	2328-	2340	2334.31	583.68	0.40	1.73E+001	12.00	6.75E+000
6	2431-	2445	2437.85	609.56	0.53	4.23E+001	19.01	1.67E+001
7	4478-	4491	4484.52	1121.20	0.87	1.42E+001	8.86	1.84E+000
8	5841-	5857	5849.19	1462.35	0.97	6.08E+001	16.50	2.24E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

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*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC036GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.996	1460.82*	10.66	7.25727E+005	2.06952E+005
Tl-208	1.000	583.19*	85.00	1.50953E+004	1.06597E+004
Bi-214	0.743	609.32*	45.49	7.10983E+004	3.30480E+004
		1120.29*	14.92	1.02999E+005	6.50157E+004
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	7.05329E+004	4.95952E+004
		351.93*	35.60	7.67883E+004	3.28854E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.996	7.257274E+005	2.069516E+005
Tl-208	1.000	1.509527E+004	1.065967E+004
Bi-214	0.743	7.764833E+004	2.946047E+004
Pb-214	1.000	7.487794E+004	2.740762E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 8:57:12 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.26	1.2575E-001	57.03		
4	511.49	3.3831E-002	76.85		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC036GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.387E+005	1.39E+005	7.257E+005	5.321E+004
	Co-60	1173.23	99.85	2.623E+004	1.99E+004	5.299E+003	1.161E+004
		1332.49	99.98	1.990E+004		-7.463E+003	8.333E+003
	Nb-94	702.65	99.81	2.122E+004	2.12E+004	4.177E+003	9.482E+003
		871.09	99.89	2.398E+004		2.038E+003	1.072E+004
	Ag-108m	433.90	90.50	2.449E+004	2.45E+004	-1.199E+004	1.132E+004
		614.30	89.80	4.004E+004		1.597E+004	1.887E+004
		722.90	90.80	2.918E+004		1.069E+004	1.333E+004
	Cs-134	604.72	97.62	3.512E+004	2.85E+004	-2.149E+003	1.651E+004
		795.86	85.46	2.852E+004		1.487E+004	1.285E+004
	Cs-137	661.66	85.10	2.855E+004	2.85E+004	-9.753E+003	1.300E+004
	Eu-152	121.78	28.67	9.606E+004	8.90E+004	4.739E+004	4.648E+004
		344.28	26.60	8.900E+004		-2.995E+003	4.180E+004
		1408.01	21.07	1.184E+005		8.238E+004	5.122E+004
	Eu-154	123.07	40.40	6.816E+004	6.52E+004	1.529E+004	3.298E+004
		723.30	20.06	1.321E+005		2.512E+004	6.036E+004
		1274.43	34.80	6.523E+004		-4.050E+004	2.809E+004
	Eu-155	86.55	30.70	1.224E+005	1.22E+005	1.726E+005	5.968E+004
		105.31	21.10	1.503E+005		1.643E+005	7.305E+004
+	Tl-208	583.19*	85.00	1.484E+004	1.48E+004	1.510E+004	6.237E+003
	Bi-212	727.33	6.67	3.889E+005	3.89E+005	1.071E+005	1.773E+005
	Pb-212	238.63	43.60	6.205E+004	6.21E+004	-2.119E+002	2.971E+004
+	Bi-214	609.32*	45.49	4.282E+004	4.28E+004	7.110E+004	1.914E+004
		1120.29*	14.92	7.575E+004		1.030E+005	2.803E+004
		1764.49	15.30	2.023E+005		8.557E+004	8.832E+004
+	Pb-214	295.22*	18.42	7.277E+004	4.03E+004	7.053E+004	3.285E+004
		351.93*	35.60	4.030E+004		7.679E+004	1.810E+004
	Ra-226	186.21	3.64	6.838E+005	6.84E+005	-2.366E+005	3.282E+005
	Ac-228	338.32	11.27	2.053E+005	1.24E+005	5.358E+004	9.633E+004
		911.20	25.80	1.241E+005		1.113E+005	5.701E+004
		968.97	15.80	2.054E+005		7.902E+004	9.417E+004
	Am-241	59.54	35.90	1.146E+005	1.15E+005	7.517E+004	5.557E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************


Filename: 6279

Report Generated On                : 6/14/2018   8:14:55 AM

Sample Title                       : B106202AFSWC037GD
Sample Description                 : U2 Diesel Fuel Storage Wall
Sample Identification              :
Sample Type                        : Gamma Direct
Sample Geometry                    : 4M90D_CP_2IN

Peak Locate Threshold              :  3.00
Peak Locate Range (in channels)    :    85 -  8192
Peak Area Range (in channels)      :    85 -  8192
Identification Energy Tolerance    :   10.000 keV

Sample Size                        :  5.030E+001 M^2

Sample Taken On                    : 6/14/2018   8:04:00 AM
Acquisition Started                : 6/14/2018   8:04:53 AM

Live Time                          :      600.0 seconds
Real Time                          :      600.9 seconds

Dead Time                          :   0.15 %


            Energy Calibration Used Done On        : 6/9/2018
            Efficiency Calibration Used Done On    : 6/2/2018
            Efficiency ID                          : 4M90D_CP_1IN
```

DATA VALIDATED
DATE 10-24-18
TIME 1200

```
*************************************************************************
*****          P E A K   A N A L Y S I S   R E P O R T           *****
*************************************************************************
```

Detector Name: 6279
Sample Title: B106202AFSWC037GD
Peak Analysis Performed on: 6/14/2018 8:14:55 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	297-	306	301.27	75.44	0.88	4.96E+001	43.55	1.84E+002
2	949-	961	954.77	238.81	0.57	2.52E+001	25.88	5.28E+001
3	1176-	1185	1180.60	295.26	0.56	2.33E+001	17.51	2.37E+001
4	1400-	1412	1406.54	351.75	0.52	4.04E+001	19.21	1.96E+001
5	2328-	2339	2333.18	583.39	0.33	2.10E+001	13.21	9.00E+000
6	2429-	2443	2436.68	609.27	0.71	5.75E+001	17.79	7.45E+000
7	5837-	5856	5846.35	1461.64	0.86	8.34E+001	19.28	2.62E+000
8	7057-	7072	7064.65	1766.20	0.50	2.20E+001	9.38	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC037GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.999	1460.82*	10.66	9.95580E+005	2.45900E+005
Tl-208	1.000	583.19*	85.00	1.83714E+004	1.17631E+004
Pb-212	1.000	238.63*	43.60	2.44488E+004	2.54458E+004
Bi-214	0.709	609.32*	45.49	9.66229E+004	3.20463E+004
		1120.29	14.92		
		1764.49*	15.30	2.08955E+005	9.06568E+004
Pb-214	1.000	295.22*	18.42	6.09626E+004	4.67671E+004
		351.93*	35.60	6.10933E+004	3.04662E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.999	9.955797E+005	2.458995E+005
Tl-208	1.000	1.837136E+004	1.176305E+004
Pb-212	1.000	2.444884E+004	2.544584E+004
Bi-214	0.709	1.091002E+005	3.021414E+004
Pb-214	1.000	6.105439E+004	2.552732E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 8:14:55 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.44	8.2650E-002	87.82		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC037GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.537E+005	1.54E+005	9.956E+005	6.069E+004
	Co-60	1173.23	99.85	2.681E+004	2.33E+004	-7.929E+003	1.189E+004
		1332.49	99.98	2.326E+004		2.296E+002	1.002E+004
	Nb-94	702.65	99.81	2.082E+004	2.08E+004	-7.895E+003	9.283E+003
		871.09	99.89	2.398E+004		-9.180E+003	1.072E+004
	Ag-108m	433.90	90.50	2.449E+004	2.45E+004	3.682E+003	1.132E+004
		614.30	89.80	3.898E+004		-2.799E+004	1.833E+004
		722.90	90.80	2.847E+004		1.400E+004	1.298E+004
	Cs-134	604.72	97.62	3.648E+004	3.28E+004	-2.068E+004	1.719E+004
		795.86	85.46	3.276E+004		-3.434E+003	1.497E+004
	Cs-137	661.66	85.10	3.331E+004	3.33E+004	-1.888E+003	1.538E+004
	Eu-152	121.78	28.67	9.575E+004	8.42E+004	-2.443E+004	4.633E+004
		344.28	26.60	8.422E+004		-3.781E+004	3.941E+004
		1408.01	21.07	1.025E+005		1.221E+004	4.329E+004
	Eu-154	123.07	40.40	6.805E+004	6.80E+004	1.027E+004	3.293E+004
		723.30	20.06	1.273E+005		3.548E+003	5.793E+004
		1274.43	34.80	7.330E+004		5.860E+003	3.212E+004
	Eu-155	86.55	30.70	1.189E+005	1.19E+005	1.591E+005	5.795E+004
		105.31	21.10	1.426E+005		-1.042E+004	6.917E+004
+	Tl-208	583.19*	85.00	1.605E+004	1.61E+004	1.837E+004	6.842E+003
	Bi-212	727.33	6.67	3.738E+005	3.74E+005	-6.254E+003	1.697E+005
+	Pb-212	238.63*	43.60	4.074E+004	4.07E+004	2.445E+004	1.906E+004
+	Bi-214	609.32*	45.49	3.020E+004	2.57E+004	9.662E+004	1.283E+004
		1120.29	14.92	2.170E+005		2.545E+004	9.865E+004
		1764.49*	15.30	2.570E+004		2.090E+005	0.000E+000
+	Pb-214	295.22*	18.42	6.982E+004	3.99E+004	6.096E+004	3.137E+004
		351.93*	35.60	3.994E+004		6.109E+004	1.792E+004
	Ra-226	186.21	3.64	6.736E+005	6.74E+005	4.383E+005	3.230E+005
	Ac-228	338.32	11.27	1.991E+005	1.14E+005	-7.974E+004	9.323E+004
		911.20	25.80	1.144E+005		8.128E+004	5.216E+004
		968.97	15.80	1.671E+005		2.924E+004	7.499E+004
	Am-241	59.54	35.90	1.136E+005	1.14E+005	-2.751E+004	5.509E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 7:50:30 AM
Sample Title	: B106202AFSWC038GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 4M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 5.030E+001 M^2
Sample Taken On	: 6/14/2018 7:40:00 AM
Acquisition Started	: 6/14/2018 7:40:28 AM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.15 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 4M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1200
R. Nye

```
*********************************************************************
*****          P E A K   A N A L Y S I S   R E P O R T          *****
*********************************************************************
```

Detector Name: 6279
Sample Title: B106202AFSWC038GD
Peak Analysis Performed on: 6/14/2018 7:50:30 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	286-	305	300.51	75.25	0.64	1.25E+002	68.69	3.00E+002
2	332-	344	339.22	84.93	0.45	3.20E+001	45.46	1.84E+002
3	950-	960	954.65	238.78	0.61	2.91E+001	21.68	3.69E+001
4	1400-	1414	1407.21	351.91	1.07	4.63E+001	20.04	1.87E+001
5	2039-	2050	2044.78	511.30	0.70	1.75E+001	14.35	1.35E+001
6	2429-	2445	2437.15	609.39	1.30	5.05E+001	16.90	6.54E+000
7	5838-	5857	5846.77	1461.74	1.42	8.28E+001	19.63	4.21E+000
8	7056-	7071	7063.24	1765.84	1.00	2.00E+001	8.94	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC038GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.999	1460.82*	10.66	9.88508E+005	2.49563E+005
Eu-155	0.337	86.55*	30.70	3.59943E+004	5.16287E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	2.82295E+004	2.15489E+004
Bi-214	0.710	609.32*	45.49	8.47375E+004	3.01508E+004
		1120.29	14.92		
		1764.49*	15.30	1.89932E+005	8.62918E+004
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	6.99932E+004	3.20732E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.999	9.885083E+005	2.495633E+005
Eu-155	0.337	3.599434E+004	5.162868E+004
Pb-212	1.000	2.822947E+004	2.154891E+004
Bi-214	0.710	9.618281E+004	2.846333E+004
Pb-214	0.434	6.999317E+004	3.207323E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 7:50:30 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.25	2.0821E-001	54.98		
5	511.30	2.9099E-002	82.18		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC038GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.767E+005	1.77E+005	9.885E+005	7.218E+004
	Co-60	1173.23	99.85	3.145E+004	2.55E+004	-1.757E+004	1.422E+004
		1332.49	99.98	2.545E+004		1.099E+004	1.111E+004
	Nb-94	702.65	99.81	2.415E+004	2.21E+004	5.408E+003	1.095E+004
		871.09	99.89	2.212E+004		-6.372E+003	9.785E+003
	Ag-108m	433.90	90.50	2.240E+004	2.24E+004	-7.234E+003	1.028E+004
		614.30	89.80	3.653E+004		2.094E+003	1.711E+004
		722.90	90.80	2.811E+004		-3.758E+003	1.279E+004
	Cs-134	604.72	97.62	3.328E+004	3.32E+004	-9.962E+003	1.558E+004
		795.86	85.46	3.315E+004		1.280E+004	1.516E+004
	Cs-137	661.66	85.10	2.741E+004	2.74E+004	8.734E+003	1.243E+004
	Eu-152	121.78	28.67	9.742E+004	7.91E+004	-6.173E+004	4.716E+004
		344.28	26.60	7.913E+004		-4.480E+004	3.686E+004
		1408.01	21.07	1.146E+005		2.173E+004	4.936E+004
	Eu-154	123.07	40.40	6.816E+004	6.07E+004	-4.544E+004	3.298E+004
		723.30	20.06	1.305E+005		7.395E+004	5.957E+004
		1274.43	34.80	6.073E+004		3.683E+004	2.584E+004
+	Eu-155	86.55*	30.70	8.450E+004	8.45E+004	3.599E+004	4.073E+004
		105.31	21.10	1.458E+005		2.463E+004	7.077E+004
	Tl-208	583.19	85.00	2.936E+004	2.94E+004	4.979E+003	1.350E+004
	Bi-212	727.33	6.67	3.889E+005	3.89E+005	9.790E+003	1.773E+005
+	Pb-212	238.63*	43.60	3.269E+004	3.27E+004	2.823E+004	1.503E+004
+	Bi-214	609.32*	45.49	2.982E+004	2.57E+004	8.474E+004	1.264E+004
		1120.29	14.92	2.441E+005		1.510E+005	1.122E+005
		1764.49*	15.30	2.570E+004		1.899E+005	0.000E+000
+	Pb-214	295.22	18.42	1.351E+005	4.07E+004	7.025E+004	6.401E+004
		351.93*	35.60	4.071E+004		6.999E+004	1.831E+004
	Ra-226	186.21	3.64	6.507E+005	6.51E+005	-5.270E+005	3.116E+005
	Ac-228	338.32	11.27	2.101E+005	1.19E+005	7.123E+004	9.874E+004
		911.20	25.80	1.187E+005		1.109E+005	5.429E+004
		968.97	15.80	1.984E+005		-2.836E+004	9.065E+004
	Am-241	59.54	35.90	1.045E+005	1.04E+005	-3.492E+004	5.053E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*********************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*********************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 8:01:51 AM
Sample Title	: B106202AFQWC038GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 4M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 5.030E+001 M^2
Sample Taken On	: 6/14/2018 7:51:00 AM
Acquisition Started	: 6/14/2018 7:51:50 AM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.16 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 4M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1200
P. Hija

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFQWC038GD
Peak Analysis Performed on: 6/14/2018 8:01:51 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	295-	304	299.87	75.09	1.04	7.27E+001	43.27	1.72E+002
2	732-	741	736.33	184.20	0.77	1.37E+000	23.25	5.56E+001
3	948-	958	953.33	238.45	0.85	3.34E+001	21.73	3.56E+001
4	1402-	1414	1407.67	352.03	0.63	2.31E+001	21.70	3.49E+001
5	2429-	2441	2435.80	609.05	0.70	2.84E+001	16.68	1.56E+001
6	3638-	3651	3644.56	911.22	0.89	2.23E+001	11.97	4.72E+000
7	5837-	5855	5845.53	1461.43	1.64	9.48E+001	20.18	2.18E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFQWC038GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.999	1460.82*	10.66	1.13201E+006	2.60225E+005
Pb-212	1.000	238.63*	43.60	3.24375E+004	2.17306E+004
Bi-214	0.453	609.32*	45.49	4.76102E+004	2.85799E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	3.50149E+004	3.32556E+004
Ra-226	0.994	186.21*	3.64	1.38329E+004	2.35083E+005

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.999	1.132009E+006	2.602250E+005
Pb-212	1.000	3.243751E+004	2.173057E+004
Bi-214	0.453	4.761017E+004	2.857992E+004
Pb-214	0.434	3.501491E+004	3.325556E+004
Ra-226	0.994	1.383294E+004	2.350829E+005

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 8:01:51 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.09	1.2112E-001	59.55		
6	911.22	3.7130E-002	53.74	Tol.	Ac-228

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFQWC038GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.363E+005	1.36E+005	1.132E+006	5.199E+004
	Co-60	1173.23	99.85	2.897E+004	2.40E+004	-9.316E+003	1.298E+004
		1332.49	99.98	2.402E+004		-1.279E+002	1.039E+004
	Nb-94	702.65	99.81	2.580E+004	2.31E+004	4.784E+003	1.177E+004
		871.09	99.89	2.307E+004		1.646E+003	1.026E+004
	Ag-108m	433.90	90.50	2.190E+004	2.19E+004	2.888E+003	1.003E+004
		614.30	89.80	3.721E+004		-2.938E+004	1.745E+004
		722.90	90.80	2.883E+004		-4.134E+004	1.316E+004
	Cs-134	604.72	97.62	3.328E+004	2.85E+004	1.106E+004	1.558E+004
		795.86	85.46	2.852E+004		1.487E+004	1.285E+004
	Cs-137	661.66	85.10	2.892E+004	2.89E+004	6.125E+003	1.318E+004
	Eu-152	121.78	28.67	9.437E+004	7.61E+004	-7.451E+003	4.564E+004
		344.28	26.60	7.614E+004		-2.934E+004	3.537E+004
		1408.01	21.07	9.806E+004		5.296E+004	4.107E+004
	Eu-154	123.07	40.40	6.750E+004	6.75E+004	-1.336E+003	3.265E+004
		723.30	20.06	1.305E+005		-1.547E+005	5.957E+004
		1274.43	34.80	8.378E+004		2.548E+004	3.736E+004
	Eu-155	86.55	30.70	1.164E+005	1.16E+005	1.556E+005	5.671E+004
		105.31	21.10	1.397E+005		3.597E+004	6.773E+004
	Tl-208	583.19	85.00	3.363E+004	3.36E+004	1.906E+004	1.563E+004
	Bi-212	727.33	6.67	3.686E+005	3.69E+005	-1.754E+005	1.671E+005
+	Pb-212	238.63*	43.60	3.200E+004	3.20E+004	3.244E+004	1.469E+004
+	Bi-214	609.32*	45.49	3.999E+004	4.00E+004	4.761E+004	1.772E+004
		1120.29	14.92	2.050E+005		5.933E+004	9.267E+004
		1764.49	15.30	2.182E+005		1.803E+005	9.625E+004
+	Pb-214	295.22	18.42	1.445E+005	5.25E+004	1.874E+005	6.874E+004
		351.93*	35.60	5.252E+004		3.501E+004	2.421E+004
+	Ra-226	186.21*	3.64	4.121E+005	4.12E+005	1.383E+004	1.924E+005
	Ac-228	338.32	11.27	2.028E+005	1.38E+005	6.554E+004	9.511E+004
		911.20	25.80	1.379E+005		7.650E+004	6.389E+004
		968.97	15.80	1.936E+005		1.830E+005	8.824E+004
	Am-241	59.54	35.90	1.060E+005	1.06E+005	8.173E+004	5.130E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************


Filename: 6279

Report Generated On                : 6/14/2018   8:28:19 AM

Sample Title                       : B106202AFSWC039GD
Sample Description                 : U2 Diesel Fuel Storage Wall
Sample Identification              :
Sample Type                        : Gamma Direct
Sample Geometry                    : 4M90D_CP_2IN

Peak Locate Threshold              :  3.00
Peak Locate Range (in channels)    :    85 -  8192
Peak Area Range (in channels)      :    85 -  8192
Identification Energy Tolerance    :   10.000 keV

Sample Size                        :  5.030E+001 M^2

Sample Taken On                    : 6/14/2018   8:18:00 AM
Acquisition Started                : 6/14/2018   8:18:17 AM

Live Time                          :      600.0 seconds
Real Time                          :      600.9 seconds

Dead Time                          :   0.15 %


          Energy Calibration Used Done On        : 6/9/2018
          Efficiency Calibration Used Done On    : 6/2/2018
          Efficiency ID                          : 4M90D_CP_1IN
```

DATA VALIDATED
DATE 10-24-18
TIME 1200

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC039GD
Peak Analysis Performed on: 6/14/2018 8:28:19 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	287-	305	300.53	75.26	0.63	1.39E+002	65.11	2.73E+002
2	799-	808	803.04	200.88	0.34	5.41E-001	18.82	3.65E+001
3	950-	960	954.96	238.86	0.87	2.90E+001	21.40	3.50E+001
4	1175-	1186	1180.75	295.30	0.76	2.15E+001	19.26	2.85E+001
5	1403-	1414	1408.07	352.13	0.81	2.37E+001	19.50	2.83E+001
6	2429-	2444	2436.49	609.22	1.04	4.47E+001	16.15	6.32E+000
7	5838-	5857	5847.11	1461.83	1.08	9.20E+001	19.18	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC039GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.998	1460.82*	10.66	1.09856E+006	2.48134E+005
Pb-212	1.000	238.63*	43.60	2.81610E+004	2.12868E+004
Bi-214	0.453	609.32*	45.49	7.50053E+004	2.85734E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	5.61861E+004	5.11162E+004
		351.93*	35.60	3.59040E+004	3.00027E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.998	1.098556E+006	2.481345E+005
Pb-212	1.000	2.816100E+004	2.128685E+004
Bi-214	0.453	7.500529E+004	2.857335E+004
Pb-214	1.000	4.110101E+004	2.587486E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 8:28:19 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.26	2.3228E-001	46.72		
2	200.88	9.0090E-004	3482.50		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC039GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	3.231E+004	3.23E+004	1.099E+006	0.000E+000
	Co-60	1173.23	99.85	2.949E+004	2.08E+004	1.111E+004	1.323E+004
		1332.49	99.98	2.080E+004		1.194E+004	8.784E+003
	Nb-94	702.65	99.81	2.122E+004	2.12E+004	-1.343E+004	9.482E+003
		871.09	99.89	2.486E+004		-4.486E+003	1.116E+004
	Ag-108m	433.90	90.50	2.471E+004	2.47E+004	-5.492E+003	1.143E+004
		614.30	89.80	3.487E+004		-8.602E+003	1.628E+004
		722.90	90.80	2.581E+004		1.464E+004	1.165E+004
	Cs-134	604.72	97.62	3.221E+004	2.45E+004	-4.543E+003	1.505E+004
		795.86	85.46	2.454E+004		6.524E+003	1.086E+004
	Cs-137	661.66	85.10	2.702E+004	2.70E+004	2.288E+004	1.223E+004
	Eu-152	121.78	28.67	9.606E+004	8.42E+004	-8.158E+002	4.648E+004
		344.28	26.60	8.422E+004		-3.926E+004	3.941E+004
		1408.01	21.07	1.353E+005		1.118E+005	5.967E+004
	Eu-154	123.07	40.40	6.848E+004	6.85E+004	-1.681E+004	3.314E+004
		723.30	20.06	1.150E+005		6.314E+003	5.182E+004
		1274.43	34.80	7.697E+004		-1.273E+004	3.395E+004
	Eu-155	86.55	30.70	1.158E+005	1.16E+005	7.964E+004	5.641E+004
		105.31	21.10	1.437E+005		7.110E+004	6.974E+004
	Tl-208	583.19	85.00	3.027E+004	3.03E+004	6.904E+003	1.395E+004
	Bi-212	727.33	6.67	3.580E+005	3.58E+005	-3.167E+005	1.618E+005
+	Pb-212	238.63*	43.60	3.219E+004	3.22E+004	2.816E+004	1.478E+004
+	Bi-214	609.32*	45.49	2.957E+004	2.96E+004	7.501E+004	1.251E+004
		1120.29	14.92	2.310E+005		1.703E+005	1.057E+005
		1764.49	15.30	1.849E+005		1.698E+004	7.961E+004
+	Pb-214	295.22*	18.42	7.962E+004	4.62E+004	5.619E+004	3.627E+004
		351.93*	35.60	4.616E+004		3.590E+004	2.103E+004
	Ra-226	186.21	3.64	6.753E+005	6.75E+005	2.964E+005	3.239E+005
	Ac-228	338.32	11.27	1.874E+005	9.53E+004	2.415E+004	8.738E+004
		911.20	25.80	9.529E+004		3.644E+004	4.259E+004
		968.97	15.80	1.984E+005		1.443E+004	9.065E+004
	Am-241	59.54	35.90	1.107E+005	1.11E+005	5.518E+003	5.364E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 9:27:26 AM
Sample Title	: B106202AFSWC040GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 4M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 5.030E+001 M^2
Sample Taken On	: 6/14/2018 9:17:00 AM
Acquisition Started	: 6/14/2018 9:17:24 AM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.17 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 4M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1200
R. Hijo

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC040GD
Peak Analysis Performed on: 6/14/2018 9:27:25 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	306	300.26	75.19	0.42	7.92E+001	44.86	1.76E+002
2	949-	960	955.83	239.07	0.40	4.01E+001	22.72	3.49E+001
3	1403-	1416	1408.79	352.31	0.80	2.75E+001	19.55	2.45E+001
4	2040-	2051	2045.70	511.53	0.61	2.25E+001	15.01	1.35E+001
5	2327-	2339	2333.76	583.54	0.36	2.11E+001	12.68	6.86E+000
6	2431-	2446	2438.71	609.77	1.56	5.40E+001	17.67	8.00E+000
7	5841-	5856	5848.86	1462.26	0.75	5.40E+001	15.52	2.03E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC040GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.997	1460.82*	10.66	6.44566E+005	1.93607E+005
Tl-208	1.000	583.19*	85.00	1.84992E+004	1.13159E+004
Pb-212	1.000	238.63*	43.60	3.89983E+004	2.29640E+004
Bi-214	0.453	609.32*	45.49	9.07091E+004	3.16217E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	4.16375E+004	3.02546E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.997	6.445661E+005	1.936065E+005
Tl-208	1.000	1.849918E+004	1.131594E+004
Pb-212	1.000	3.899827E+004	2.296403E+004
Bi-214	0.453	9.070906E+004	3.162166E+004
Pb-214	0.434	4.163750E+004	3.025462E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 9:27:25 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.19	1.3200E-001	56.64		
4	511.53	3.7500E-002	66.71		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC040GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.304E+005	1.30E+005	6.446E+005	4.906E+004
	Co-60	1173.23	99.85	2.681E+004	2.47E+004	7.517E+003	1.189E+004
		1332.49	99.98	2.475E+004		7.025E+003	1.076E+004
	Nb-94	702.65	99.81	2.161E+004	2.16E+004	-3.205E+004	9.678E+003
		871.09	99.89	2.398E+004		3.400E+003	1.072E+004
	Ag-108m	433.90	90.50	2.641E+004	2.64E+004	2.482E+004	1.228E+004
		614.30	89.80	3.789E+004		-8.073E+003	1.779E+004
		722.90	90.80	2.987E+004		2.302E+004	1.368E+004
	Cs-134	604.72	97.62	3.532E+004	2.40E+004	1.858E+003	1.660E+004
		795.86	85.46	2.399E+004		-1.147E+004	1.058E+004
	Cs-137	661.66	85.10	3.103E+004	3.10E+004	1.424E+004	1.424E+004
	Eu-152	121.78	28.67	9.606E+004	8.37E+004	2.241E+004	4.648E+004
		344.28	26.60	8.367E+004		-4.556E+004	3.913E+004
		1408.01	21.07	9.806E+004		5.296E+004	4.107E+004
	Eu-154	123.07	40.40	6.848E+004	6.85E+004	2.883E+004	3.314E+004
		723.30	20.06	1.353E+005		8.158E+004	6.193E+004
		1274.43	34.80	6.940E+004		-8.371E+002	3.017E+004
	Eu-155	86.55	30.70	1.133E+005	1.13E+005	3.998E+004	5.513E+004
		105.31	21.10	1.325E+005		-5.136E+004	6.414E+004
+	Tl-208	583.19*	85.00	1.493E+004	1.49E+004	1.850E+004	6.283E+003
	Bi-212	727.33	6.67	3.839E+005	3.84E+005	-2.002E+005	1.748E+005
+	Pb-212	238.63*	43.60	3.278E+004	3.28E+004	3.900E+004	1.508E+004
+	Bi-214	609.32*	45.49	3.165E+004	3.17E+004	9.071E+004	1.355E+004
		1120.29	14.92	1.955E+005		2.680E+004	8.791E+004
		1764.49	15.30	1.967E+005		1.424E+005	8.552E+004
+	Pb-214	295.22	18.42	1.280E+005	4.52E+004	-2.899E+004	6.045E+004
		351.93*	35.60	4.520E+004		4.164E+004	2.055E+004
	Ra-226	186.21	3.64	6.923E+005	6.92E+005	3.300E+004	3.324E+005
	Ac-228	338.32	11.27	2.003E+005	1.07E+005	3.741E+004	9.386E+004
		911.20	25.80	1.069E+005		3.852E+004	4.840E+004
		968.97	15.80	1.699E+005		8.060E+004	7.642E+004
	Am-241	59.54	35.90	1.109E+005	1.11E+005	6.499E+004	5.372E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 9:53:46 AM
Sample Title	: B106202AFSWC041GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 4M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 5.030E+001 M^2
Sample Taken On	: 6/14/2018 9:43:00 AM
Acquisition Started	: 6/14/2018 9:43:45 AM
Live Time	: 600.0 seconds
Real Time	: 600.9 seconds
Dead Time	: 0.15 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 4M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1200
D. Hye

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC041GD
Peak Analysis Performed on: 6/14/2018 9:53:46 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	295-	306	300.01	75.13	0.73	2.90E+001	50.66	2.42E+002
2	950-	959	954.46	238.73	0.41	1.86E+001	18.97	3.14E+001
3	1176-	1186	1181.14	295.40	1.01	2.03E+001	16.70	2.07E+001
4	1402-	1416	1407.79	352.06	1.39	4.14E+001	22.62	2.96E+001
5	2431-	2442	2436.53	609.23	0.41	2.94E+001	13.96	7.60E+000
6	2642-	2653	2647.85	662.06	0.35	2.48E+001	12.79	6.16E+000
7	5839-	5857	5848.00	1462.05	0.50	7.35E+001	18.15	2.51E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: B106202AFSWC041GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.998	1460.82*	10.66	8.77665E+005	2.29780E+005
Cs-137	1.000	661.66*	85.10	2.34617E+004	1.24033E+004
Pb-212	1.000	238.63*	43.60	1.80708E+004	1.86586E+004
Bi-214	0.453	609.32*	45.49	4.93566E+004	2.41682E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	5.30487E+004	4.44378E+004
		351.93*	35.60	6.26618E+004	3.54878E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

```
************************************************************************
*****  I N T E R F E R E N C E   C O R R E C T E D   R E P O R T  *****
************************************************************************
```

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.998	8.776655E+005	2.297802E+005
Cs-137	1.000	2.346165E+004	1.240330E+004
Pb-212	1.000	1.807080E+004	1.865857E+004
Bi-214	0.453	4.935656E+004	2.416820E+004
Pb-214	1.000	5.891841E+004	2.773030E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 9:53:46 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.13	4.8392E-002	174.47		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC041GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.494E+005	1.49E+005	8.777E+005	5.854E+004
	Co-60	1173.23	99.85	2.999E+004	2.81E+004	1.311E+004	1.349E+004
		1332.49	99.98	2.808E+004		5.672E+003	1.242E+004
	Nb-94	702.65	99.81	2.161E+004	2.16E+004	1.098E+004	9.678E+003
		871.09	99.89	2.260E+004		1.402E+004	1.003E+004
	Ag-108m	433.90	90.50	2.190E+004	2.19E+004	3.238E+003	1.003E+004
		614.30	89.80	3.181E+004		-3.935E+004	1.475E+004
		722.90	90.80	2.499E+004		-4.597E+003	1.124E+004
	Cs-134	604.72	97.62	3.017E+004	2.71E+004	1.366E+004	1.403E+004
		795.86	85.46	2.711E+004		-9.050E+003	1.214E+004
+	Cs-137	661.66*	85.10	1.500E+004	1.50E+004	2.346E+004	6.224E+003
	Eu-152	121.78	28.67	9.545E+004	9.00E+004	-1.696E+004	4.618E+004
		344.28	26.60	9.002E+004		-3.643E+004	4.231E+004
		1408.01	21.07	1.146E+005		3.112E+004	4.936E+004
	Eu-154	123.07	40.40	6.685E+004	6.68E+004	-3.576E+004	3.232E+004
		723.30	20.06	1.169E+005		4.082E+004	5.273E+004
		1274.43	34.80	6.940E+004		2.723E+004	3.017E+004
	Eu-155	86.55	30.70	1.181E+005	1.18E+005	1.394E+005	5.754E+004
		105.31	21.10	1.383E+005		-2.177E+003	6.705E+004
	Tl-208	583.19	85.00	3.114E+004	3.11E+004	-2.195E+003	1.439E+004
	Bi-212	727.33	6.67	3.789E+005	3.79E+005	1.924E+004	1.723E+005
+	Pb-212	238.63*	43.60	2.963E+004	2.96E+004	1.807E+004	1.350E+004
+	Bi-214	609.32*	45.49	2.880E+004	2.88E+004	4.936E+004	1.213E+004
		1120.29	14.92	2.170E+005		1.379E+005	9.865E+004
		1764.49	15.30	2.328E+005		2.088E+005	1.036E+005
+	Pb-214	295.22*	18.42	6.747E+004	5.04E+004	5.305E+004	3.020E+004
		351.93*	35.60	5.039E+004		6.266E+004	2.315E+004
	Ra-226	186.21	3.64	6.666E+005	6.67E+005	-3.658E+004	3.196E+005
	Ac-228	338.32	11.27	2.194E+005	1.04E+005	1.882E+005	1.034E+005
		911.20	25.80	1.037E+005		4.929E+003	4.682E+004
		968.97	15.80	1.727E+005		3.748E+004	7.782E+004
	Am-241	59.54	35.90	1.124E+005	1.12E+005	-5.756E+004	5.445E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*********************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*********************************************************************
```

Filename: 6279

Report Generated On	: 6/14/2018 10:21:19 AM
Sample Title	: B106202AFSWC042GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 4M90D_CP_2IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 5.030E+001 M^2
Sample Taken On	: 6/14/2018 10:11:00 AM
Acquisition Started	: 6/14/2018 10:11:17 AM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.16 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/2/2018
Efficiency ID	: 4M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1200
R. Hize

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC042GD
Peak Analysis Performed on: 6/14/2018 10:21:18 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	286-	306	300.63	75.28	0.46	1.38E+002	72.49	3.22E+002
2	334-	344	339.21	84.93	1.18	5.24E+001	37.99	1.29E+002
3	950-	960	954.41	238.72	0.88	2.64E+001	20.71	3.36E+001
4	1401-	1414	1407.18	351.90	1.35	3.32E+001	20.94	2.68E+001
5	2432-	2444	2437.01	609.35	0.30	3.10E+001	16.30	1.30E+001
6	5839-	5855	5846.63	1461.71	0.97	5.19E+001	16.81	6.08E+000
7	7057-	7072	7064.24	1766.09	0.53	1.40E+001	8.97	1.95E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

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*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
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Sample Title: B106202AFSWC042GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.999	1460.82*	10.66	6.19961E+005	2.07830E+005
Eu-155	0.337	86.55*	30.70	5.88834E+004	4.43166E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	2.56169E+004	2.05362E+004
Bi-214	0.709	609.32*	45.49	5.20513E+004	2.80759E+004
		1120.29	14.92		
		1764.49*	15.30	1.33411E+005	8.58465E+004
Pb-214	0.434	295.22	18.42		
		351.93*	35.60	5.02431E+004	3.25647E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.999	6.199609E+005	2.078298E+005
Eu-155	0.337	5.888343E+004	4.431656E+004
Pb-212	1.000	2.561689E+004	2.053616E+004
Bi-214	0.709	5.991271E+004	2.668503E+004
Pb-214	0.434	5.024308E+004	3.256469E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 10:21:18 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.28	2.3073E-001	52.36		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC042GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.024E+005	2.02E+005	6.200E+005	8.502E+004
	Co-60	1173.23	99.85	3.373E+004	2.87E+004	2.139E+004	1.535E+004
		1332.49	99.98	2.869E+004		6.866E+003	1.273E+004
	Nb-94	702.65	99.81	1.999E+004	2.00E+004	1.664E+003	8.870E+003
		871.09	99.89	2.398E+004		-8.445E+003	1.072E+004
	Ag-108m	433.90	90.50	2.288E+004	2.29E+004	-1.576E+004	1.052E+004
		614.30	89.80	3.286E+004		6.839E+003	1.528E+004
		722.90	90.80	2.457E+004		-2.510E+004	1.103E+004
	Cs-134	604.72	97.62	3.242E+004	3.24E+004	-5.263E+004	1.516E+004
		795.86	85.46	3.237E+004		1.663E+004	1.477E+004
	Cs-137	661.66	85.10	3.543E+004	3.54E+004	2.958E+004	1.644E+004
	Eu-152	121.78	28.67	9.375E+004	7.43E+004	-6.448E+004	4.532E+004
		344.28	26.60	7.429E+004		-6.040E+004	3.444E+004
		1408.01	21.07	9.806E+004		-1.061E+005	4.107E+004
	Eu-154	123.07	40.40	6.740E+004	5.31E+004	3.177E+004	3.260E+004
		723.30	20.06	1.150E+005		-2.860E+004	5.182E+004
		1274.43	34.80	5.313E+004		2.679E+004	2.203E+004
+	Eu-155	86.55*	30.70	6.802E+004	6.80E+004	5.888E+004	3.249E+004
		105.31	21.10	1.381E+005		4.159E+004	6.695E+004
	Tl-208	583.19	85.00	3.415E+004	3.42E+004	3.647E+004	1.589E+004
	Bi-212	727.33	6.67	3.526E+005	3.53E+005	1.047E+005	1.591E+005
+	Pb-212	238.63*	43.60	3.136E+004	3.14E+004	2.562E+004	1.437E+004
+	Bi-214	609.32*	45.49	3.742E+004	3.74E+004	5.205E+004	1.644E+004
		1120.29	14.92	2.255E+005		2.691E+005	1.029E+005
		1764.49*	15.30	1.026E+005		1.334E+005	3.847E+004
+	Pb-214	295.22	18.42	1.261E+005	4.76E+004	-9.794E+003	5.953E+004
		351.93*	35.60	4.761E+004		5.024E+004	2.176E+004
	Ra-226	186.21	3.64	6.753E+005	6.75E+005	-1.043E+005	3.239E+005
	Ac-228	338.32	11.27	2.003E+005	1.04E+005	5.870E+004	9.386E+004
		911.20	25.80	1.037E+005		-5.386E+004	4.682E+004
		968.97	15.80	1.936E+005		4.741E+004	8.824E+004
	Am-241	59.54	35.90	1.097E+005	1.10E+005	1.461E+004	5.315E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************


Filename: 6279

Report Generated On                : 6/14/2018  10:36:39 AM

Sample Title                       : B106202AFSWC043GD
Sample Description                 : U2 Diesel Fuel Storage Wall
Sample Identification              :
Sample Type                        : Gamma Direct
Sample Geometry                    : 4M90D_CP_2IN

Peak Locate Threshold              :  3.00
Peak Locate Range (in channels)    :    85 -  8192
Peak Area Range (in channels)      :    85 -  8192
Identification Energy Tolerance    :   10.000 keV

Sample Size                        :  5.030E+001 M^2

Sample Taken On                    : 6/14/2018  10:26:00 AM
Acquisition Started                : 6/14/2018  10:26:37 AM

Live Time                          :      600.0 seconds
Real Time                          :      601.0 seconds

Dead Time                          :   0.16 %

            Energy Calibration Used Done On       : 6/9/2018
            Efficiency Calibration Used Done On   : 6/2/2018
            Efficiency ID                         : 4M90D_CP_1IN
```

DATA VALIDATED
DATE 10-24-18
TIME 1200
R. Higa

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC043GD
Peak Analysis Performed on: 6/14/2018 10:36:39 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	306	300.25	75.19	0.51	5.95E+001	47.12	2.06E+002
2	949-	960	954.45	238.73	1.42	2.90E+001	21.82	3.60E+001
3	1176-	1187	1180.76	295.30	0.55	2.11E+001	18.58	2.39E+001
4	1401-	1415	1408.46	352.23	0.92	4.40E+001	18.68	1.50E+001
5	2429-	2444	2436.46	609.21	1.08	5.10E+001	17.33	8.00E+000
6	2640-	2653	2646.23	661.65	0.66	3.45E+001	13.29	3.50E+000
7	5838-	5855	5846.67	1461.72	1.06	5.47E+001	16.55	4.26E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC043GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	0.999	1460.82*	10.66	6.53574E+005	2.05641E+005
Cs-137	1.000	661.66*	85.10	3.25764E+004	1.31490E+004
Pb-212	1.000	238.63*	43.60	2.81671E+004	2.16781E+004
Bi-214	0.453	609.32*	45.49	8.56211E+004	3.08580E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	5.49992E+004	4.93129E+004
		351.93*	35.60	6.66098E+004	2.99796E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	0.999	6.535739E+005	2.056406E+005
Cs-137	1.000	3.257643E+004	1.314903E+004
Pb-212	1.000	2.816708E+004	2.167810E+004
Bi-214	0.453	8.562107E+004	3.085795E+004
Pb-214	1.000	6.347660E+004	2.561709E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/14/2018 10:36:39 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.19	9.9159E-002	79.20		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 4M90D_CP_2IN
Sample Title: B106202AFSWC043GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.781E+005	1.78E+005	6.536E+005	7.288E+004
	Co-60	1173.23	99.85	2.791E+004	2.47E+004	1.710E+004	1.245E+004
		1332.49	99.98	2.475E+004		1.791E+004	1.076E+004
	Nb-94	702.65	99.81	2.274E+004	2.16E+004	-3.625E+003	1.024E+004
		871.09	99.89	2.162E+004		1.131E+004	9.538E+003
	Ag-108m	433.90	90.50	2.215E+004	2.22E+004	-4.647E+003	1.015E+004
		614.30	89.80	3.766E+004		-1.625E+004	1.768E+004
		722.90	90.80	2.953E+004		-6.972E+003	1.351E+004
	Cs-134	604.72	97.62	3.667E+004	2.40E+004	6.327E+002	1.728E+004
		795.86	85.46	2.399E+004		3.846E+002	1.058E+004
+	Cs-137	661.66*	85.10	1.222E+004	1.22E+004	3.258E+004	4.835E+003
	Eu-152	121.78	28.67	9.233E+004	7.24E+004	2.469E+004	4.462E+004
		344.28	26.60	7.238E+004		-3.325E+004	3.349E+004
		1408.01	21.07	1.025E+005		5.885E+004	4.329E+004
	Eu-154	123.07	40.40	6.483E+004	6.48E+004	3.057E+004	3.132E+004
		723.30	20.06	1.368E+005		8.811E+004	6.270E+004
		1274.43	34.80	7.516E+004		3.432E+004	3.305E+004
	Eu-155	86.55	30.70	1.166E+005	1.17E+005	8.221E+004	5.677E+004
		105.31	21.10	1.353E+005		8.600E+004	6.556E+004
	Tl-208	583.19	85.00	3.143E+004	3.14E+004	1.115E+004	1.453E+004
	Bi-212	727.33	6.67	3.738E+005	3.74E+005	1.654E+005	1.697E+005
+	Pb-212	238.63*	43.60	3.295E+004	3.30E+004	2.817E+004	1.516E+004
+	Bi-214	609.32*	45.49	3.164E+004	3.16E+004	8.562E+004	1.355E+004
		1120.29	14.92	2.081E+005		5.654E+004	9.420E+004
		1764.49	15.30	2.232E+005		1.898E+005	9.875E+004
+	Pb-214	295.22*	18.42	7.646E+004	3.68E+004	5.500E+004	3.470E+004
		351.93*	35.60	3.684E+004		6.661E+004	1.637E+004
	Ra-226	186.21	3.64	6.380E+005	6.38E+005	2.116E+005	3.053E+005
	Ac-228	338.32	11.27	1.927E+005	1.17E+005	8.697E+004	9.003E+004
		911.20	25.80	1.173E+005		-1.221E+005	5.359E+004
		968.97	15.80	1.911E+005		4.109E+004	8.700E+004
	Am-241	59.54	35.90	1.151E+005	1.15E+005	-6.320E+004	5.581E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/18/2018 9:54:20 AM
Sample Title	: B106202AFSWC044GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 1.5M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 7.070E+000 M^2
Sample Taken On	: 6/18/2018 9:44:00 AM
Acquisition Started	: 6/18/2018 9:44:18 AM
Live Time	: 600.0 seconds
Real Time	: 601.1 seconds
Dead Time	: 0.18 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/4/2018
Efficiency ID	: 1.5M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1200
R. Hyc

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC044GD
Peak Analysis Performed on: 6/18/2018 9:54:19 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	286-	305	291.45	72.99	1.06	1.18E+002	69.12	3.04E+002
2	333-	344	339.21	84.93	0.68	2.72E+001	40.75	1.53E+002
3	1400-	1413	1406.70	351.79	0.31	3.95E+001	20.70	2.45E+001
4	2429-	2442	2435.43	608.95	1.11	3.53E+001	15.41	8.74E+000
5	3637-	3650	3643.52	910.96	0.35	1.45E+001	9.83	3.50E+000
6	5834-	5852	5844.58	1461.20	0.66	6.93E+001	19.14	6.70E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: B106202AFSWC044GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	8.17291E+005	2.36669E+005
Eu-155	0.338	86.55*	30.70	2.90125E+004	4.39069E+004
		105.31	21.10		
Bi-214	0.455	609.32*	45.49	5.77705E+004	2.61819E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.433	295.22	18.42		
		351.93*	35.60	5.79570E+004	3.15871E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	8.172908E+005	2.366689E+005
Eu-155	0.338	2.901251E+004	4.390687E+004
Bi-214	0.455	5.777047E+004	2.618192E+004
Pb-214	0.433	5.795696E+004	3.158714E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/18/2018 9:54:19 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	72.99	1.9588E-001	58.81		
5	910.96	2.4167E-002	67.77	Tol.	Ac-228

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 1.5M90D_CP_1IN
Sample Title: B106202AFSWC044GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.152E+005	2.15E+005	8.173E+005	9.166E+004
	Co-60	1173.23	99.85	2.907E+004	2.58E+004	1.182E+004	1.305E+004
		1332.49	99.98	2.582E+004		-6.279E+003	1.131E+004
	Nb-94	702.65	99.81	2.327E+004	2.26E+004	8.408E+003	1.053E+004
		871.09	99.89	2.263E+004		2.275E+003	1.007E+004
	Ag-108m	433.90	90.50	2.425E+004	2.43E+004	1.345E+002	1.123E+004
		614.30	89.80	3.633E+004		-1.234E+004	1.703E+004
		722.90	90.80	3.115E+004		2.399E+004	1.434E+004
	Cs-134	604.72	97.62	3.122E+004	2.56E+004	3.882E+004	1.458E+004
		795.86	85.46	2.558E+004		7.846E+003	1.141E+004
	Cs-137	661.66	85.10	2.997E+004	3.00E+004	8.357E+003	1.374E+004
	Eu-152	121.78	28.67	8.950E+004	8.58E+004	-7.478E+003	4.327E+004
		344.28	26.60	8.580E+004		-1.936E+004	4.028E+004
		1408.01	21.07	1.272E+005		4.607E+004	5.576E+004
	Eu-154	123.07	40.40	6.287E+004	6.29E+004	5.967E+002	3.039E+004
		723.30	20.06	1.424E+005		1.419E+005	6.565E+004
		1274.43	34.80	7.235E+004		1.225E+004	3.170E+004
+	Eu-155	86.55*	30.70	7.210E+004	7.21E+004	2.901E+004	3.461E+004
		105.31	21.10	1.289E+005		-1.012E+005	6.243E+004
	Tl-208	583.19	85.00	2.804E+004	2.80E+004	1.408E+004	1.287E+004
	Bi-212	727.33	6.67	3.554E+005	3.55E+005	-5.497E+005	1.609E+005
	Pb-212	238.63	43.60	6.313E+004	6.31E+004	6.468E+004	3.030E+004
+	Bi-214	609.32*	45.49	3.089E+004	3.09E+004	5.777E+004	1.323E+004
		1120.29	14.92	2.249E+005		1.021E+005	1.027E+005
		1764.49	15.30	1.945E+005		-3.442E+003	8.457E+004
+	Pb-214	295.22	18.42	1.318E+005	4.37E+004	3.636E+004	6.250E+004
		351.93*	35.60	4.367E+004		5.796E+004	1.985E+004
	Ra-226	186.21	3.64	6.931E+005	6.93E+005	-5.152E+004	3.333E+005
	Ac-228	338.32	11.27	1.880E+005	1.08E+005	-1.581E+004	8.791E+004
		911.20	25.80	1.080E+005		-1.142E+004	4.903E+004
		968.97	15.80	1.878E+005		-6.855E+004	8.550E+004
	Am-241	59.54	35.90	1.023E+005	1.02E+005	-1.118E+004	4.955E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*********************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*********************************************************************
```

Filename: 6279

Report Generated On	: 6/18/2018 9:41:57 AM
Sample Title	: B106202AFSWC045GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 1.5M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 7.070E+000 M^2
Sample Taken On	: 6/18/2018 9:31:00 AM
Acquisition Started	: 6/18/2018 9:31:55 AM
Live Time	: 600.0 seconds
Real Time	: 601.1 seconds
Dead Time	: 0.17 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/4/2018
Efficiency ID	: 1.5M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1200
R. Hyo

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC045GD
Peak Analysis Performed on: 6/18/2018 9:41:57 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	295-	305	300.01	75.13	1.20	1.13E+002	49.77	2.11E+002
2	334-	346	339.27	84.94	0.75	2.49E+001	49.53	2.19E+002
3	1172-	1185	1178.99	294.86	0.36	2.23E+001	20.41	2.98E+001
4	1399-	1413	1406.73	351.79	0.44	5.60E+001	24.44	3.20E+001
5	2429-	2443	2435.14	608.88	0.79	5.24E+001	18.00	9.64E+000
6	3638-	3651	3644.17	911.12	0.52	1.45E+001	9.83	3.50E+000
7	3867-	3880	3873.74	968.51	0.72	1.48E+001	10.81	5.20E+000
8	5832-	5852	5842.30	1460.62	1.07	1.11E+002	22.79	5.25E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: B106202AFSWC045GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.30578E+006	2.91632E+005
Eu-155	0.338	86.55*	30.70	2.66357E+004	5.31665E+004
		105.31	21.10		
Bi-214	0.455	609.32*	45.49	8.57824E+004	3.12368E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	5.61924E+004	5.23213E+004
		351.93*	35.60	8.21848E+004	3.79155E+004
Ac-228	0.566	338.32	11.27		
		911.20*	25.80	5.31918E+004	3.64378E+004
		968.97*	15.80	9.19124E+004	6.76571E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.305785E+006	2.916317E+005
Eu-155	0.338	2.663570E+004	5.316648E+004
Bi-214	0.455	8.578243E+004	3.123677E+004
Pb-214	1.000	7.323501E+004	3.070166E+004
Ac-228	0.566	6.189764E+004	3.208107E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/18/2018 9:41:57 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.13	1.8831E-001	44.05		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 1.5M90D_CP_1IN
Sample Title: B106202AFSWC045GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	2.013E+005	2.01E+005	1.306E+006	8.472E+004
	Co-60	1173.23	99.85	2.752E+004	2.75E+004	-1.554E+002	1.227E+004
		1332.49	99.98	3.008E+004		1.888E+004	1.344E+004
	Nb-94	702.65	99.81	2.459E+004	2.46E+004	-3.300E+003	1.119E+004
		871.09	99.89	2.789E+004		1.435E+004	1.270E+004
	Ag-108m	433.90	90.50	2.589E+004	2.59E+004	-8.911E+003	1.205E+004
		614.30	89.80	3.909E+004		2.913E+003	1.842E+004
		722.90	90.80	2.749E+004		2.117E+003	1.251E+004
	Cs-134	604.72	97.62	3.329E+004	2.97E+004	-2.501E+004	1.562E+004
		795.86	85.46	2.968E+004		1.300E+004	1.346E+004
	Cs-137	661.66	85.10	3.432E+004	3.43E+004	9.387E+003	1.591E+004
	Eu-152	121.78	28.67	1.013E+005	8.58E+004	9.634E+004	4.916E+004
		344.28	26.60	8.580E+004		-8.090E+004	4.028E+004
		1408.01	21.07	1.239E+005		-5.949E+004	5.409E+004
	Eu-154	123.07	40.40	7.121E+004	7.12E+004	4.715E+003	3.456E+004
		723.30	20.06	1.261E+005		3.911E+004	5.746E+004
		1274.43	34.80	7.942E+004		-8.181E+004	3.524E+004
+	Eu-155	86.55*	30.70	8.812E+004	8.81E+004	2.664E+004	4.262E+004
		105.31	21.10	1.427E+005		9.087E+004	6.933E+004
	Tl-208	583.19	85.00	3.383E+004	3.38E+004	2.625E+004	1.576E+004
	Bi-212	727.33	6.67	3.283E+005	3.28E+005	-1.476E+005	1.473E+005
	Pb-212	238.63	43.60	6.281E+004	6.28E+004	2.315E+004	3.014E+004
+	Bi-214	609.32*	45.49	3.327E+004	3.33E+004	8.578E+004	1.442E+004
		1120.29	14.92	2.109E+005		7.289E+004	9.574E+004
		1764.49	15.30	1.945E+005		-2.910E+004	8.457E+004
+	Pb-214	295.22*	18.42	8.202E+004	5.06E+004	5.619E+004	3.759E+004
		351.93*	35.60	5.061E+004		8.218E+004	2.332E+004
	Ra-226	186.21	3.64	7.396E+005	7.40E+005	8.346E+005	3.566E+005
+	Ac-228	338.32	11.27	2.127E+005	4.75E+004	1.606E+005	1.002E+005
		911.20*	25.80	4.746E+004		5.319E+004	1.877E+004
		968.97*	15.80	9.435E+004		9.191E+004	3.877E+004
	Am-241	59.54	35.90	1.125E+005	1.13E+005	-3.196E+003	5.464E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************


Filename: 6279

Report Generated On                : 6/18/2018  10:09:03 AM

Sample Title                       : B106202AFSWC046GD
Sample Description                 : U2 Diesel Fuel Storage Wall
Sample Identification              :
Sample Type                        : Gamma Direct
Sample Geometry                    : 1.5M90D_CP_1IN

Peak Locate Threshold              :  3.00
Peak Locate Range (in channels)    :    85 -  8192
Peak Area Range (in channels)      :    85 -  8192
Identification Energy Tolerance    :   10.000 keV

Sample Size                        :  7.070E+000 M^2

Sample Taken On                    : 6/18/2018   9:58:00 AM
Acquisition Started                : 6/18/2018   9:59:01 AM

Live Time                          :      600.0 seconds
Real Time                          :      601.0 seconds

Dead Time                          :   0.16 %


            Energy Calibration Used Done On       : 6/9/2018
            Efficiency Calibration Used Done On   : 6/4/2018
            Efficiency ID                         : 1.5M90D_CP_1IN
```

DATA VALIDATED
DATE 10-24-18
TIME 1200
R. Hiza

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC046GD
Peak Analysis Performed on: 6/18/2018 10:09:03 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	296-	306	300.08	75.15	0.84	9.47E+001	45.19	1.73E+002
2	334-	346	339.32	84.96	0.65	2.79E+001	42.54	1.59E+002
3	948-	959	953.81	238.57	1.04	2.95E+001	25.30	5.15E+001
4	1174-	1184	1179.26	294.93	0.38	1.94E+001	16.68	2.06E+001
5	1400-	1415	1407.02	351.87	0.36	4.60E+001	22.90	2.70E+001
6	2428-	2443	2436.08	609.12	1.53	4.08E+001	17.69	1.22E+001
7	3637-	3650	3643.92	911.06	0.26	9.50E+000	12.39	1.05E+001
8	5834-	5854	5844.23	1461.11	0.53	8.10E+001	18.00	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*********************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*********************************************************************
```

Sample Title: B106202AFSWC046GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	9.55244E+005	2.27908E+005
Eu-155	0.338	86.55*	30.70	2.97459E+004	4.58208E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	2.76771E+004	2.41264E+004
Bi-214	0.455	609.32*	45.49	6.68435E+004	3.00864E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	4.90963E+004	4.28601E+004
		351.93*	35.60	6.75244E+004	3.50909E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	9.552438E+005	2.279076E+005
Eu-155	0.338	2.974588E+004	4.582083E+004
Pb-212	1.000	2.767709E+004	2.412643E+004
Bi-214	0.455	6.684346E+004	3.008641E+004
Pb-214	1.000	6.012899E+004	2.715155E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/18/2018 10:09:03 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.15	1.5777E-001	47.74		
7	911.06	1.5833E-002	130.44	Sum	

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 1.5M90D_CP_1IN
Sample Title: B106202AFSWC046GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	3.191E+004	3.19E+004	9.552E+005	0.000E+000
	Co-60	1173.23	99.85	2.804E+004	2.37E+004	-2.424E+004	1.253E+004
		1332.49	99.98	2.373E+004		6.866E+003	1.027E+004
	Nb-94	702.65	99.81	2.426E+004	2.35E+004	1.265E+004	1.103E+004
		871.09	99.89	2.353E+004		2.214E+004	1.052E+004
	Ag-108m	433.90	90.50	2.425E+004	2.40E+004	1.770E+003	1.123E+004
		614.30	89.80	3.474E+004		1.293E+003	1.624E+004
		722.90	90.80	2.403E+004		3.479E+003	1.078E+004
	Cs-134	604.72	97.62	3.207E+004	2.93E+004	-9.142E+003	1.501E+004
		795.86	85.46	2.925E+004		-1.113E+004	1.324E+004
	Cs-137	661.66	85.10	3.031E+004	3.03E+004	9.717E+003	1.391E+004
	Eu-152	121.78	28.67	9.069E+004	7.50E+004	4.804E+004	4.386E+004
		344.28	26.60	7.501E+004		-7.986E+004	3.488E+004
		1408.01	21.07	1.367E+005		6.932E+004	6.048E+004
	Eu-154	123.07	40.40	6.330E+004	5.76E+004	-8.353E+002	3.060E+004
		723.30	20.06	1.107E+005		7.478E+004	4.976E+004
		1274.43	34.80	5.758E+004		7.520E+003	2.432E+004
+	Eu-155	86.55*	30.70	7.529E+004	7.53E+004	2.975E+004	3.620E+004
		105.31	21.10	1.334E+005		4.590E+004	6.469E+004
	Tl-208	583.19	85.00	2.804E+004	2.80E+004	2.548E+004	1.287E+004
	Bi-212	727.33	6.67	3.605E+005	3.61E+005	1.436E+005	1.635E+005
+	Pb-212	238.63*	43.60	3.775E+004	3.78E+004	2.768E+004	1.761E+004
+	Bi-214	609.32*	45.49	3.744E+004	3.74E+004	6.684E+004	1.650E+004
		1120.29	14.92	2.020E+005		-5.355E+004	9.128E+004
		1764.49	15.30	1.945E+005		1.408E+005	8.457E+004
+	Pb-214	295.22*	18.42	6.567E+004	4.85E+004	4.910E+004	2.942E+004
		351.93*	35.60	4.850E+004		6.752E+004	2.227E+004
	Ra-226	186.21	3.64	6.499E+005	6.50E+005	-1.249E+005	3.117E+005
	Ac-228	338.32	11.27	1.790E+005	1.22E+005	-4.151E+004	8.340E+004
		911.20	25.80	1.219E+005		1.052E+005	5.596E+004
		968.97	15.80	1.950E+005		1.475E+005	8.909E+004
	Am-241	59.54	35.90	1.027E+005	1.03E+005	-2.365E+004	4.971E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************


Filename: 6279

Report Generated On                : 6/18/2018  10:29:21 AM

Sample Title                       : B106202AFSWC047GD
Sample Description                 : U2 Diesel Fuel Storage Wall
Sample Identification              :
Sample Type                        : Gamma Direct
Sample Geometry                    : 1.5M90D_CP_1IN

Peak Locate Threshold              :  3.00
Peak Locate Range (in channels)    :    85 -  8192
Peak Area Range (in channels)      :    85 -  8192
Identification Energy Tolerance    :   10.000 keV

Sample Size                        :  7.070E+000 M^2

Sample Taken On                    : 6/18/2018  10:19:00 AM
Acquisition Started                : 6/18/2018  10:19:19 AM

Live Time                          :      600.0 seconds
Real Time                          :      600.8 seconds

Dead Time                          :   0.14 %


            Energy Calibration Used Done On        : 6/9/2018
            Efficiency Calibration Used Done On    : 6/4/2018
            Efficiency ID                          : 1.5M90D_CP_1IN
```

DATA VALIDATED
DATE 10-24-18
TIME 1200
R. Hija

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*************************************************************************
*****          P E A K   A N A L Y S I S   R E P O R T            *****
*************************************************************************
```

Detector Name: 6279
Sample Title: B106202AFSWC047GD
Peak Analysis Performed on: 6/18/2018 10:29:21 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	286-	309	300.00	75.13	1.08	1.78E+002	72.98	2.88E+002
2	334-	344	339.81	85.08	0.77	3.75E+001	39.48	1.47E+002
3	882-	892	887.80	222.07	1.19	2.44E+001	17.18	2.06E+001
4	950-	960	954.47	238.74	0.86	2.70E+001	19.65	2.90E+001
5	1175-	1187	1180.47	295.23	0.56	3.32E+001	18.83	2.08E+001
6	1401-	1414	1407.38	351.96	1.51	4.33E+001	17.99	1.37E+001
7	2429-	2442	2436.15	609.13	0.83	3.09E+001	18.32	1.91E+001
8	5835-	5853	5843.92	1461.03	1.70	7.60E+001	17.44	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC047GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	8.96245E+005	2.19849E+005
Eu-155	0.339	86.55*	30.70	4.00717E+004	4.29042E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	2.53034E+004	1.88731E+004
Bi-214	0.455	609.32*	45.49	5.05852E+004	3.06267E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	8.38856E+004	4.94573E+004
		351.93*	35.60	6.35761E+004	2.80624E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	8.962448E+005	2.198488E+005
Eu-155	0.339	4.007166E+004	4.290422E+004
Pb-212	1.000	2.530337E+004	1.887313E+004
Bi-214	0.455	5.058523E+004	3.062674E+004
Pb-214	1.000	6.852233E+004	2.440719E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/18/2018 10:29:21 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.13	2.9638E-001	41.04		
3	222.07	4.0611E-002	70.53		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 1.5M90D_CP_1IN
Sample Title: B106202AFSWC047GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	3.191E+004	3.19E+004	8.962E+005	0.000E+000
	Co-60	1173.23	99.85	2.804E+004	2.51E+004	2.640E+004	1.253E+004
		1332.49	99.98	2.514E+004		1.049E+004	1.098E+004
	Nb-94	702.65	99.81	2.522E+004	2.40E+004	1.972E+004	1.151E+004
		871.09	99.89	2.396E+004		-2.168E+004	1.073E+004
	Ag-108m	433.90	90.50	2.569E+004	2.14E+004	-1.395E+003	1.195E+004
		614.30	89.80	3.677E+004		-5.424E+003	1.725E+004
		722.90	90.80	2.138E+004		-5.909E+003	9.459E+003
	Cs-134	604.72	97.62	3.122E+004	2.40E+004	-2.118E+003	1.458E+004
		795.86	85.46	2.404E+004		-2.979E+004	1.064E+004
	Cs-137	661.66	85.10	2.964E+004	2.96E+004	1.377E+004	1.357E+004
	Eu-152	121.78	28.67	9.273E+004	8.27E+004	-5.559E+004	4.489E+004
		344.28	26.60	8.272E+004		2.557E+004	3.874E+004
		1408.01	21.07	9.223E+004		4.650E+004	3.825E+004
	Eu-154	123.07	40.40	6.519E+004	6.52E+004	1.736E+004	3.155E+004
		723.30	20.06	9.679E+004		-6.782E+004	4.283E+004
		1274.43	34.80	6.649E+004		1.948E+004	2.877E+004
+	Eu-155	86.55*	30.70	6.880E+004	6.88E+004	4.007E+004	3.296E+004
		105.31	21.10	1.332E+005		6.066E+004	6.459E+004
	Tl-208	583.19	85.00	3.067E+004	3.07E+004	3.483E+004	1.418E+004
	Bi-212	727.33	6.67	3.283E+005	3.28E+005	-8.157E+004	1.473E+005
+	Pb-212	238.63*	43.60	2.826E+004	2.83E+004	2.530E+004	1.286E+004
+	Bi-214	609.32*	45.49	4.369E+004	4.37E+004	5.059E+004	1.963E+004
		1120.29	14.92	2.079E+005		9.403E+003	9.428E+004
		1764.49	15.30	1.829E+005		1.220E+005	7.873E+004
+	Pb-214	295.22*	18.42	6.878E+004	3.36E+004	8.389E+004	3.097E+004
		351.93*	35.60	3.357E+004		6.358E+004	1.480E+004
	Ra-226	186.21	3.64	6.532E+005	6.53E+005	2.027E+005	3.134E+005
	Ac-228	338.32	11.27	1.830E+005	1.00E+005	1.526E+004	8.536E+004
		911.20	25.80	1.002E+005		5.044E+004	4.516E+004
		968.97	15.80	1.554E+005		2.397E+004	6.931E+004
	Am-241	59.54	35.90	1.074E+005	1.07E+005	-4.804E+003	5.208E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/18/2018 10:44:12 AM
Sample Title	: B106202AFSWC048GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 1.5M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 7.070E+000 M^2
Sample Taken On	: 6/18/2018 10:34:00 AM
Acquisition Started	: 6/18/2018 10:34:10 AM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.17 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/4/2018
Efficiency ID	: 1.5M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1200
R. Higa

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC048GD
Peak Analysis Performed on: 6/18/2018 10:44:12 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	284-	305	300.52	75.26	0.68	1.67E+002	82.24	4.06E+002
2	949-	959	954.79	238.82	0.37	3.16E+001	22.25	3.84E+001
3	1402-	1415	1407.89	352.08	0.85	3.71E+001	20.95	2.59E+001
4	2325-	2337	2331.74	583.03	0.72	2.49E+001	13.62	8.14E+000
5	2430-	2442	2436.35	609.18	1.17	3.25E+001	15.97	1.15E+001
6	2641-	2652	2646.16	661.63	0.55	1.92E+001	14.85	1.38E+001
7	3680-	3693	3686.13	921.61	0.25	8.96E+000	8.51	3.04E+000
8	5834-	5854	5844.35	1461.14	1.10	1.01E+002	20.10	0.00E+000
9	7054-	7069	7061.68	1765.45	0.35	1.51E+001	9.12	1.87E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC048GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.19112E+006	2.58626E+005
Cs-137	1.000	661.66*	85.10	1.76982E+004	1.38640E+004
Tl-208	1.000	583.19*	85.00	2.12106E+004	1.18965E+004
Pb-212	1.000	238.63*	43.60	2.96618E+004	2.14058E+004
Bi-214	0.711	609.32*	45.49	5.31845E+004	2.69333E+004
		1120.29	14.92		
		1764.49*	15.30	1.42092E+005	8.63758E+004
Pb-214	0.433	295.22	18.42		
		351.93*	35.60	5.44938E+004	3.18247E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.191123E+006	2.586259E+005
Cs-137	1.000	1.769825E+004	1.386398E+004
Tl-208	1.000	2.121061E+004	1.189648E+004
Pb-212	1.000	2.966183E+004	2.140584E+004
Bi-214	0.711	6.106288E+004	2.571229E+004
Pb-214	0.433	5.449385E+004	3.182472E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/18/2018 10:44:12 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.26	2.7767E-001	49.36		
7	921.61	1.4931E-002	94.97		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 1.5M90D_CP_1IN
Sample Title: B106202AFSWC048GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	3.191E+004	3.19E+004	1.191E+006	0.000E+000
	Co-60	1173.23	99.85	3.147E+004	2.77E+004	8.053E+003	1.425E+004
		1332.49	99.98	2.773E+004		2.359E+004	1.227E+004
	Nb-94	702.65	99.81	2.490E+004	2.44E+004	-5.682E+003	1.135E+004
		871.09	99.89	2.439E+004		-7.834E+003	1.094E+004
	Ag-108m	433.90	90.50	2.488E+004	2.48E+004	7.273E+003	1.154E+004
		614.30	89.80	3.356E+004		-3.121E+004	1.565E+004
		722.90	90.80	2.484E+004		-1.059E+004	1.119E+004
	Cs-134	604.72	97.62	3.207E+004	2.88E+004	2.884E+004	1.501E+004
		795.86	85.46	2.882E+004		2.363E+004	1.303E+004
+	Cs-137	661.66*	85.10	2.070E+004	2.07E+004	1.770E+004	9.100E+003
	Eu-152	121.78	28.67	9.806E+004	9.26E+004	-1.993E+003	4.755E+004
		344.28	26.60	9.257E+004		-7.014E+004	4.366E+004
		1408.01	21.07	1.013E+005		1.308E+004	4.276E+004
	Eu-154	123.07	40.40	6.753E+004	6.75E+004	-3.485E+004	3.271E+004
		723.30	20.06	1.088E+005		-1.151E+005	4.883E+004
		1274.43	34.80	7.235E+004		-1.808E+004	3.170E+004
	Eu-155	86.55	30.70	1.241E+005	1.24E+005	1.335E+005	6.060E+004
		105.31	21.10	1.496E+005		8.065E+004	7.277E+004
+	Tl-208	583.19*	85.00	1.533E+004	1.53E+004	2.121E+004	6.509E+003
	Bi-212	727.33	6.67	3.283E+005	3.28E+005	-8.743E+004	1.473E+005
+	Pb-212	238.63*	43.60	3.215E+004	3.21E+004	2.966E+004	1.480E+004
+	Bi-214	609.32*	45.49	3.458E+004	3.46E+004	5.318E+004	1.507E+004
		1120.29	14.92	2.109E+005		1.272E+005	9.574E+004
		1764.49*	15.30	9.887E+004		1.421E+005	3.673E+004
+	Pb-214	295.22	18.42	1.445E+005	4.51E+004	1.032E+005	6.882E+004
		351.93*	35.60	4.514E+004		5.449E+004	2.058E+004
	Ra-226	186.21	3.64	7.024E+005	7.02E+005	-4.397E+004	3.380E+005
	Ac-228	338.32	11.27	2.181E+005	1.12E+005	1.051E+005	1.030E+005
		911.20	25.80	1.123E+005		5.442E+004	5.121E+004
		968.97	15.80	1.613E+005		6.299E+004	7.226E+004
	Am-241	59.54	35.90	1.194E+005	1.19E+005	-6.330E+004	5.810E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/18/2018 9:26:22 AM
Sample Title	: B106202AFSWC049GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 1.5M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 7.070E+000 M^2
Sample Taken On	: 6/18/2018 9:16:00 AM
Acquisition Started	: 6/18/2018 9:16:20 AM
Live Time	: 600.0 seconds
Real Time	: 601.1 seconds
Dead Time	: 0.18 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/4/2018
Efficiency ID	: 1.5M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1200
R. Hizo

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC049GD
Peak Analysis Performed on: 6/18/2018 9:26:22 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	286-	304	299.99	75.12	0.89	2.30E+002	69.75	2.92E+002
2	1174-	1186	1179.85	295.08	1.14	1.94E+001	18.65	2.56E+001
3	1400-	1412	1406.27	351.68	0.52	2.28E+001	20.76	3.22E+001
4	2325-	2336	2330.71	582.77	0.25	1.44E+001	13.84	1.26E+001
5	2429-	2442	2435.60	609.00	1.10	2.45E+001	14.63	1.05E+001
6	2638-	2651	2644.95	661.33	0.29	4.89E+001	16.59	7.08E+000
7	4685-	4699	4691.82	1173.02	1.15	3.27E+001	12.98	3.35E+000
8	5323-	5336	5329.87	1332.52	0.57	2.23E+001	12.64	5.65E+000
9	5833-	5852	5842.08	1460.57	1.00	1.03E+002	20.30	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC049GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	1.21438E+006	2.61516E+005
Co-60	1.000	1173.23*	99.85	3.59081E+004	1.45633E+004
		1332.49*	99.98	2.63603E+004	1.50571E+004
Cs-137	1.000	661.66*	85.10	4.51055E+004	1.62264E+004
Tl-208	1.000	583.19*	85.00	1.22673E+004	1.18976E+004
Bi-214	0.455	609.32*	45.49	4.01413E+004	2.44540E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	1.000	295.22*	18.42	4.90870E+004	4.77664E+004
		351.93*	35.60	3.34736E+004	3.08594E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	1.214378E+006	2.615158E+005
Co-60	1.000	3.129331E+004	1.046804E+004
Cs-137	1.000	4.510549E+004	1.622641E+004
Tl-208	1.000	1.226727E+004	1.189765E+004
Bi-214	0.455	4.014134E+004	2.445402E+004
Pb-214	1.000	3.807132E+004	2.592057E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/18/2018 9:26:22 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.12	3.8305E-001	30.35		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 1.5M90D_CP_1IN
Sample Title: B106202AFSWC049GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	3.190E+004	3.19E+004	1.214E+006	0.000E+000
+	Co-60	1173.23*	99.85	1.412E+004	1.41E+004	3.591E+004	5.572E+003
		1332.49*	99.98	1.947E+004		2.636E+004	8.138E+003
	Nb-94	702.65	99.81	2.490E+004	2.49E+004	-1.830E+003	1.135E+004
		871.09	99.89	2.998E+004		1.914E+004	1.374E+004
	Ag-108m	433.90	90.50	2.647E+004	2.64E+004	1.099E+004	1.234E+004
		614.30	89.80	3.520E+004		-9.950E+002	1.647E+004
		722.90	90.80	2.639E+004		-7.046E+003	1.196E+004
	Cs-134	604.72	97.62	3.035E+004	3.04E+004	4.130E+003	1.415E+004
		795.86	85.46	3.050E+004		-1.575E+004	1.387E+004
+	Cs-137	661.66*	85.10	1.602E+004	1.60E+004	4.511E+004	6.763E+003
	Eu-152	121.78	28.67	1.045E+005	8.73E+004	-6.090E+004	5.078E+004
		344.28	26.60	8.730E+004		2.061E+004	4.103E+004
		1408.01	21.07	1.013E+005		1.003E+004	4.276E+004
	Eu-154	123.07	40.40	7.578E+004	7.58E+004	3.563E+004	3.684E+004
		723.30	20.06	1.228E+005		5.748E+004	5.584E+004
		1274.43	34.80	7.942E+004		-8.657E+003	3.524E+004
	Eu-155	86.55	30.70	1.230E+005	1.23E+005	1.321E+005	6.004E+004
		105.31	21.10	1.523E+005		-1.983E+004	7.416E+004
+	Tl-208	583.19*	85.00	1.855E+004	1.86E+004	1.227E+004	8.122E+003
	Bi-212	727.33	6.67	3.656E+005	3.66E+005	-1.594E+005	1.660E+005
	Pb-212	238.63	43.60	6.589E+004	6.59E+004	5.842E+004	3.168E+004
+	Bi-214	609.32*	45.49	3.347E+004	3.35E+004	4.014E+004	1.452E+004
		1120.29	14.92	2.166E+005		3.224E+004	9.860E+004
		1764.49	15.30	1.888E+005		1.314E+005	8.170E+004
+	Pb-214	295.22*	18.42	7.514E+004	4.84E+004	4.909E+004	3.415E+004
		351.93*	35.60	4.844E+004		3.347E+004	2.223E+004
	Ra-226	186.21	3.64	7.596E+005	7.60E+005	7.886E+005	3.666E+005
	Ac-228	338.32	11.27	2.037E+005	1.23E+005	-8.451E+004	9.573E+004
		911.20	25.80	1.232E+005		3.102E+004	5.661E+004
		968.97	15.80	1.853E+005		1.227E+005	8.427E+004
	Am-241	59.54	35.90	1.185E+005	1.18E+005	-1.899E+004	5.762E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: 6279

Report Generated On	: 6/18/2018 8:59:00 AM
Sample Title	: B106202AFSWC050GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 1.5M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 7.070E+000 M^2
Sample Taken On	: 6/18/2018 8:48:00 AM
Acquisition Started	: 6/18/2018 8:48:58 AM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.17 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/4/2018
Efficiency ID	: 1.5M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1200

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC050GD
Peak Analysis Performed on: 6/18/2018 8:59:00 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	285-	310	300.59	75.27	0.61	2.32E+002	78.27	3.06E+002
2	346-	355	350.17	87.67	0.93	1.46E+001	35.32	1.27E+002
3	574-	583	578.59	144.77	0.66	1.88E+001	24.11	5.62E+001
4	948-	959	953.48	238.49	0.81	4.69E+001	22.73	3.21E+001
5	1402-	1414	1407.38	351.96	0.41	1.55E+001	18.23	2.55E+001
6	2429-	2442	2436.01	609.10	0.34	3.71E+001	15.98	8.91E+000
7	3636-	3649	3642.76	910.77	1.22	1.44E+001	10.05	3.58E+000
8	5835-	5852	5843.56	1460.94	0.88	7.85E+001	19.31	4.50E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC050GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	9.25686E+005	2.41443E+005
Eu-155	0.339	86.55*	30.70	1.54462E+004	3.75222E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	4.39752E+004	2.24550E+004
Bi-214	0.455	609.32*	45.49	6.07705E+004	2.71881E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.433	295.22	18.42		
		351.93*	35.60	2.28125E+004	2.69702E+004

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	9.256860E+005	2.414429E+005
Eu-155	0.339	1.544624E+004	3.752216E+004
Pb-212	1.000	4.397523E+004	2.245505E+004
Bi-214	0.455	6.077053E+004	2.718811E+004
Pb-214	0.433	2.281247E+004	2.697019E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/18/2018 8:59:00 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	75.27	3.8741E-001	33.67		
3	144.77	3.1294E-002	128.40		
7	910.77	2.4028E-002	69.69	Tol.	Ac-228

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 1.5M90D_CP_1IN
Sample Title: B106202AFSWC050GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.806E+005	1.81E+005	9.257E+005	7.434E+004
	Co-60	1173.23	99.85	2.957E+004	2.37E+004	1.292E+004	1.329E+004
		1332.49	99.98	2.373E+004		1.651E+004	1.027E+004
	Nb-94	702.65	99.81	2.394E+004	2.39E+004	-4.270E+003	1.087E+004
		871.09	99.89	2.439E+004		-1.418E+004	1.094E+004
	Ag-108m	433.90	90.50	2.529E+004	2.53E+004	-4.270E+003	1.175E+004
		614.30	89.80	3.677E+004		-1.457E+004	1.725E+004
		722.90	90.80	2.639E+004		2.193E+004	1.196E+004
	Cs-134	604.72	97.62	3.079E+004	2.35E+004	1.710E+003	1.437E+004
		795.86	85.46	2.350E+004		5.368E+003	1.037E+004
	Cs-137	661.66	85.10	3.031E+004	3.03E+004	2.462E+004	1.391E+004
	Eu-152	121.78	28.67	8.920E+004	8.32E+004	-5.036E+004	4.312E+004
		344.28	26.60	8.324E+004		-5.082E+004	3.900E+004
		1408.01	21.07	1.054E+005		9.908E+003	4.485E+004
	Eu-154	123.07	40.40	6.415E+004	6.41E+004	1.693E+004	3.102E+004
		723.30	20.06	1.178E+005		6.268E+004	5.332E+004
		1274.43	34.80	7.046E+004		2.479E+003	3.076E+004
+	Eu-155	86.55*	30.70	6.292E+004	6.29E+004	1.545E+004	3.003E+004
		105.31	21.10	1.349E+005		6.500E+004	6.542E+004
	Tl-208	583.19	85.00	3.203E+004	3.20E+004	-9.335E+002	1.486E+004
	Bi-212	727.33	6.67	3.755E+005	3.76E+005	-1.374E+005	1.710E+005
+	Pb-212	238.63*	43.60	3.049E+004	3.05E+004	4.398E+004	1.398E+004
+	Bi-214	609.32*	45.49	3.233E+004	3.23E+004	6.077E+004	1.395E+004
		1120.29	14.92	1.958E+005		4.381E+004	8.819E+004
		1764.49	15.30	2.001E+005		7.054E+004	8.734E+004
+	Pb-214	295.22	18.42	1.233E+005	4.37E+004	-3.665E+004	5.821E+004
		351.93*	35.60	4.365E+004		2.281E+004	1.984E+004
	Ra-226	186.21	3.64	6.743E+005	6.74E+005	2.206E+005	3.239E+005
	Ac-228	338.32	11.27	2.037E+005	1.11E+005	4.879E+004	9.573E+004
		911.20	25.80	1.109E+005		4.525E+004	5.049E+004
		968.97	15.80	1.584E+005		-1.165E+005	7.080E+004
	Am-241	59.54	35.90	1.047E+005	1.05E+005	-5.840E+003	5.072E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

```
*********************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*********************************************************************
```

Filename: 6279

Report Generated On	: 6/18/2018 9:12:23 AM
Sample Title	: B106202AFSWC051GD
Sample Description	: U2 Diesel Fuel Storage Wall
Sample Identification	:
Sample Type	: Gamma Direct
Sample Geometry	: 1.5M90D_CP_1IN
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 85 - 8192
Peak Area Range (in channels)	: 85 - 8192
Identification Energy Tolerance	: 10.000 keV
Sample Size	: 7.070E+000 M^2
Sample Taken On	: 6/18/2018 9:02:00 AM
Acquisition Started	: 6/18/2018 9:02:21 AM
Live Time	: 600.0 seconds
Real Time	: 601.0 seconds
Dead Time	: 0.17 %

Energy Calibration Used Done On	: 6/9/2018
Efficiency Calibration Used Done On	: 6/4/2018
Efficiency ID	: 1.5M90D_CP_1IN

DATA VALIDATED
DATE 10-24-18
TIME 1200
R. Hij

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: 6279
Sample Title: B106202AFSWC051GD
Peak Analysis Performed on: 6/18/2018 9:12:23 AM
Peak Analysis From Channel: 85
Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	181-	191	185.44	46.49	0.76	1.85E+001	25.49	6.05E+001
2	287-	305	300.63	75.28	0.94	1.50E+002	70.16	3.20E+002
3	332-	344	338.51	84.75	0.30	2.88E+001	45.42	1.85E+002
4	947-	959	953.97	238.61	1.38	4.21E+001	24.07	3.89E+001
5	1349-	1358	1353.10	338.39	0.60	1.52E+001	15.03	1.78E+001
6	1398-	1412	1406.43	351.72	0.75	5.07E+001	17.66	9.32E+000
7	2428-	2444	2435.69	609.02	0.37	3.85E+001	16.14	8.50E+000
8	3638-	3651	3644.69	911.25	0.68	1.96E+001	12.44	6.38E+000
9	5835-	5852	5843.06	1460.82	0.46	7.60E+001	19.46	5.97E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

```
*************************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*************************************************************************
```

Sample Title: B106202AFSWC051GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/M^2)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	8.96476E+005	2.42282E+005
Eu-155	0.338	86.55*	30.70	3.08239E+004	4.89249E+004
		105.31	21.10		
Pb-212	1.000	238.63*	43.60	3.94198E+004	2.34402E+004
Bi-214	0.455	609.32*	45.49	6.30807E+004	2.75035E+004
		1120.29	14.92		
		1764.49	15.30		
Pb-214	0.433	295.22	18.42		
		351.93*	35.60	7.43441E+004	2.81997E+004
Ac-228	0.562	338.32*	11.27	6.84446E+004	6.87213E+004
		911.20*	25.80	7.19631E+004	4.61837E+004
		968.97	15.80		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 10.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/M^2)	Wt mean Activity Uncertainty
K-40	1.000	8.964756E+005	2.422816E+005
Eu-155	0.338	3.082388E+004	4.892487E+004
Pb-212	1.000	3.941979E+004	2.344017E+004
Bi-214	0.455	6.308072E+004	2.750352E+004
Pb-214	0.433	7.434414E+004	2.819970E+004
Ac-228	0.562	7.086838E+004	3.833179E+004

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 6/18/2018 9:12:23 AM
Peak Locate From Channel: 85
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	46.49	3.0833E-002	137.79		
2	75.28	2.4957E-001	46.86		

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 6279
Sample Geometry: 1.5M90D_CP_1IN
Sample Title: B106202AFSWC051GD
Nuclide Library Used: C:\GENIE2K\CAMFILES\Zion Lib-BNL.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/M^2)	Nuclide MDA (pCi/M^2)	Activity (pCi/M^2)	Dec. Level (pCi/M^2)
+	K-40	1460.82*	10.66	1.993E+005	1.99E+005	8.965E+005	8.371E+004
	Co-60	1173.23	99.85	2.957E+004	2.83E+004	1.292E+004	1.329E+004
		1332.49	99.98	2.834E+004		-3.216E+003	1.257E+004
	Nb-94	702.65	99.81	2.222E+004	2.22E+004	-8.336E+003	1.001E+004
		871.09	99.89	2.480E+004		-3.173E+004	1.115E+004
	Ag-108m	433.90	90.50	2.425E+004	2.43E+004	-7.925E+003	1.123E+004
		614.30	89.80	3.566E+004		-1.914E+004	1.670E+004
		722.90	90.80	2.819E+004		1.635E+004	1.287E+004
	Cs-134	604.72	97.62	3.408E+004	2.61E+004	1.661E+003	1.601E+004
		795.86	85.46	2.607E+004		4.090E+003	1.165E+004
	Cs-137	661.66	85.10	2.929E+004	2.93E+004	-9.235E+003	1.340E+004
	Eu-152	121.78	28.67	9.244E+004	8.43E+004	6.483E+004	4.474E+004
		344.28	26.60	8.428E+004		-1.820E+004	3.952E+004
		1408.01	21.07	9.223E+004		4.650E+004	3.825E+004
	Eu-154	123.07	40.40	6.499E+004	6.50E+004	1.646E+004	3.144E+004
		723.30	20.06	1.276E+005		6.653E+004	5.825E+004
		1274.43	34.80	8.108E+004		2.231E+004	3.607E+004
+	Eu-155	86.55*	30.70	8.047E+004	8.05E+004	3.082E+004	3.879E+004
		105.31	21.10	1.392E+005		-1.574E+005	6.758E+004
	Tl-208	583.19	85.00	3.203E+004	3.20E+004	1.515E+004	1.486E+004
	Bi-212	727.33	6.67	3.605E+005	3.61E+005	-9.025E+003	1.635E+005
+	Pb-212	238.63*	43.60	3.379E+004	3.38E+004	3.942E+004	1.563E+004
+	Bi-214	609.32*	45.49	3.223E+004	3.22E+004	6.308E+004	1.390E+004
		1120.29	14.92	1.989E+005		-1.075E+004	8.975E+004
		1764.49	15.30	2.001E+005		1.502E+005	8.734E+004
+	Pb-214	295.22	18.42	1.378E+005	2.92E+004	1.587E+004	6.547E+004
		351.93*	35.60	2.919E+004		7.434E+004	1.261E+004
	Ra-226	186.21	3.64	6.822E+005	6.82E+005	-1.566E+004	3.279E+005
+	Ac-228	338.32*	11.27	1.077E+005	6.27E+004	6.844E+004	4.776E+004
		911.20*	25.80	6.268E+004		7.196E+004	2.637E+004
		968.97	15.80	2.191E+005		1.338E+005	1.012E+005
	Am-241	59.54	35.90	1.130E+005	1.13E+005	-1.106E+004	5.485E+004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or MDA has not been calculated
@ = Half-life too short to be able to perform the decay correction

ATTACHMENT 5
EBERLINE REPORTS

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD
OAK RIDGE, TENNESSEE 37830
PHONE (865) 481-0683
FAX (865) 483-4621

EBS-OR-43977

July 19, 2018

Patricia Giza
Zion Solutions, LLC
101 Shiloh Blvd
Zion, IL 60099

CASE NARRATIVE
Work Order # 18-06123-OR

SAMPLE RECEIPT

This work order contains four solid samples received 06/28/2018. Samples were analyzed for Total Strontium, Tritium, Nickel-63 and by Gamma Spectroscopy.

CLIENT ID	LAB ID
B1-06202A-FSFC-016CV	18-06123-04
B1-06202A-FSWC-035CV	18-06123-05
B1-06201AFSWC-027CV	18-06123-06
B1-06201A-FSWC-024CV	18-06123-07

ANALYTICAL METHODS

Total Strontium was analyzed using EIChroM Method SRW01 Modified. Tritium was performed using Method LANL ER-210 Modified. Nickel-63 was performed using Method ASTM 3500-Ni Modified. Gamma Spectroscopy was performed using EPA Method 901.1 Modified.

Laboratory qualifiers are as follows:

U - Result is less than the MDA.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 1-sigma value.

Minimum Detectable Activity (MDA) values for data represented in this report are sample-specific. MDA measurements are determined based on factors and conditions including instrument settings, aliquot size and matrix type.

ANALYTICAL RESULTS CONTINUED

TOTAL STRONTIUM

Samples were prepared by digesting with acids and diluting as appropriate. Aliquots were removed from dilution followed by adding Strontium recovery carriers to the samples. Chemical separations were conducted using selective extractions. Strontium precipitated was mounted on tared filter media. Chemical recovery was determined by Strontium carrier mass determinations. Samples were counted by gas flow proportional counting and corrected for Yttrium-90 ingrowth.

Samples demonstrated acceptable results for all Total Strontium analyses. Strontium-90 results are reported from Total Strontium assuming secular equilibrium. Chemical recovery was acceptable for all samples. The Total Strontium method blank demonstrated an acceptable result. Results for the Total Strontium duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Total Strontium laboratory control sample demonstrated an acceptable percent recovery.

TRITIUM

A representative aliquot of each sample was equilibrated with Tritium free water. Equilibrates were transferred into round-bottomed distillation flasks and attached to single stage stills. A portion of each middle distillation fraction was transferred to a liquid scintillation vial and cocktail was added. Samples were then counted by beta liquid scintillation.

Samples demonstrated acceptable results for all Tritium analyses. The Tritium method blank demonstrated an acceptable result. Results for the Tritium duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Tritium laboratory control sample demonstrated an acceptable percent recovery.

NICKEL-63

Samples were prepared by digesting with acids and diluting as appropriate. Aliquots were removed from dilution and placed into appropriately sized beakers. Stable elemental Nickel carrier was added to each sample prior to digestion. After digestion, sample pH was adjusted and Nickel-63 was precipitated selectively with Dimethylglyoxime. Precipitates were selectively separated, redissolved, and residual acid was effectively neutralized. Sample residuals were placed into scintillation vials, scintillation cocktail was added and Nickel-63 activity was determined by beta liquid scintillation.

Samples demonstrated acceptable results for all Nickel-63 analyses. The Nickel-63 method blank demonstrated an acceptable result. Results for the Nickel-63 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Nickel-63 laboratory control sample demonstrated an acceptable percent recovery.

GAMMA SPECTROSCOPY

Samples for Gamma Spectroscopy analysis were prepared by transferring a known mass of each homogenized sample to a standard geometry container. Samples were counted on a High Purity Germanium (HPGe) gamma ray detector.

ANALYTICAL RESULTS CONTINUED

GAMMA SPECTROSCOPY CONTINUED

Samples demonstrated acceptable results for all gamma-emitting radionuclides as reported. Some samples demonstrated results that are greater than the method detection limit. These results are reported from the Canberra Gamma Apex "Nuclide MDA Report" and are not positive. These results are qualified as non-detect (U). The method blank demonstrated acceptable results for all radionuclides as reported. Results for the Bismuth-214 and Potassium-40 replicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Cesium-137 replicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Cobalt-60 and Cesium-137 laboratory control sample demonstrated an acceptable percent recovery.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

M.R. McDougall
Laboratory Manager

Date: 7/19/2018

Eberline Analytical wants and encourages your feedback regarding our performance providing radioanalytical services. Please visit http://eberlineanalytical.com/ to provide us with feedback on our services.

Eberline Analytical
Final Report of Analysis

Report To:

Patricia Giza
Zion Solutions
101 Shiloh Blvd
Zion, IL 60099

Work Order Details:

SDG: **18-06123**
Purchase Order: 677118
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Qualifier	Report Units
18-06123-01	LCS	KNOWN	06/28/18 00:00	6/28/2018	6/30/2018	18-06123	Tritium	LANL ER-210 Modified	2.22E+02	7.99E+00				pCi/g
18-06123-01	LCS	SPIKE	06/28/18 00:00	6/28/2018	6/30/2018	18-06123	Tritium	LANL ER-210 Modified	2.01E+02	5.41E+00	1.25E+01	3.80E+00		pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/30/2018	18-06123	Tritium	LANL ER-210 Modified	7.50E-01	2.20E+00	2.20E+00	3.76E+00	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/30/2018	18-06123	Tritium	LANL ER-210 Modified	1.12E+00	2.20E+00	2.21E+00	3.74E+00	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/30/2018	18-06123	Tritium	LANL ER-210 Modified	-1.86E-01	2.16E+00	2.16E+00	3.73E+00	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/30/2018	18-06123	Tritium	LANL ER-210 Modified	9.13E-01	2.15E+00	2.15E+00	3.66E+00	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/30/2018	18-06123	Tritium	LANL ER-210 Modified	1.86E+00	2.21E+00	2.22E+00	3.72E+00	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/30/2018	18-06123	Tritium	LANL ER-210 Modified	9.48E-01	2.23E+00	2.23E+00	3.80E+00	U	pCi/g
18-06123-01	LCS	KNOWN	06/28/18 00:00	6/28/2018	7/2/2018	18-06123	Nickel-63	ASTM 3500-Ni Modified	1.59E+03	4.76E+01				pCi/g
18-06123-01	LCS	SPIKE	06/28/18 00:00	6/28/2018	7/2/2018	18-06123	Nickel-63	ASTM 3500-Ni Modified	1.55E+03	8.94E+00	9.18E+01	2.00E+00		pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	7/2/2018	18-06123	Nickel-63	ASTM 3500-Ni Modified	0.00E+00	1.22E+00	1.22E+00	2.08E+00	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	7/2/2018	18-06123	Nickel-63	ASTM 3500-Ni Modified	1.54E-01	1.14E+00	1.14E+00	1.95E+00	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	7/2/2018	18-06123	Nickel-63	ASTM 3500-Ni Modified	-6.88E-01	1.12E+00	1.12E+00	1.93E+00	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	7/2/2018	18-06123	Nickel-63	ASTM 3500-Ni Modified	-5.81E-01	1.22E+00	1.22E+00	2.10E+00	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	7/2/2018	18-06123	Nickel-63	ASTM 3500-Ni Modified	-8.63E-01	1.26E+00	1.26E+00	2.19E+00	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	7/2/2018	18-06123	Nickel-63	ASTM 3500-Ni Modified	2.14E+02	3.30E+00	1.30E+01	1.80E+00		pCi/g
18-06123-01	LCS	KNOWN	06/28/18 00:00	6/28/2018	7/6/2018	18-06123	Strontium-90	ElChroM SRW01 Modified	4.98E+01	2.79E-01				pCi/g
18-06123-01	LCS	SPIKE	06/28/18 00:00	6/28/2018	7/6/2018	18-06123	Strontium-90	ElChroM SRW01 Modified	4.49E+01	1.79E+00	1.57E+01	7.44E-01		pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	7/6/2018	18-06123	Strontium-90	ElChroM SRW01 Modified	1.30E-01	4.40E-01	4.42E-01	7.76E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	7/6/2018	18-06123	Strontium-90	ElChroM SRW01 Modified	2.64E-01	4.92E-01	5.01E-01	8.47E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	7/6/2018	18-06123	Strontium-90	ElChroM SRW01 Modified	5.45E-01	3.79E-01	4.24E-01	6.09E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	7/6/2018	18-06123	Strontium-90	ElChroM SRW01 Modified	1.93E-02	5.27E-01	5.27E-01	9.40E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	7/6/2018	18-06123	Strontium-90	ElChroM SRW01 Modified	1.05E-01	4.75E-01	4.76E-01	8.37E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	7/6/2018	18-06123	Strontium-90	ElChroM SRW01 Modified	-3.19E-02	4.19E-01	4.19E-01	7.55E-01	U	pCi/g
18-06123-01	LCS	KNOWN	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Cobalt-60	EPA 901.1 Modified	2.71E+02	1.06E+01				pCi/g
18-06123-01	LCS	KNOWN	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Cesium-137	EPA 901.1 Modified	1.69E+02	6.75E+00				pCi/g
18-06123-01	LCS	SPIKE	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Cobalt-60	EPA 901.1 Modified	2.68E+02	1.58E+01	2.10E+01	1.85E+00		pCi/g
18-06123-01	LCS	SPIKE	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Cesium-137	EPA 901.1 Modified	1.93E+02	2.02E+01	2.25E+01	2.16E+00		pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (1-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample;MBL=Blank;DUP=Duplicate;TRG=Normal Sample;DO=Duplicate Original;U=Non-detect

EBERLINE ANALYTICAL

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

Eberline Analytical
Final Report of Analysis

Report To:

Patricia Giza
Zion Solutions
101 Shiloh Blvd
Zion, IL 60099

Work Order Details:

SDG: **18-06123**
Purchase Order: 677118
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Qualifier	Report Units
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Actinium-228	EPA 901.1 Modified	-1.91E-02	7.80E-02	7.80E-02	1.22E-01	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Silver-108m	EPA 901.1 Modified	9.34E-04	2.57E-02	2.57E-02	2.83E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Americium-241	EPA 901.1 Modified	2.96E-02	3.76E-02	3.77E-02	5.72E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Barium-133	EPA 901.1 Modified	-8.22E-03	3.61E-02	3.61E-02	4.72E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Bismuth-214	EPA 901.1 Modified	3.61E-02	6.44E-02	6.44E-02	1.09E-01	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Cobalt-60	EPA 901.1 Modified	9.34E-04	2.45E-02	2.45E-02	3.81E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Cesium-134	EPA 901.1 Modified	3.06E-03	2.21E-02	2.21E-02	3.93E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Cesium-137	EPA 901.1 Modified	3.15E-02	3.09E-02	3.10E-02	5.82E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Europium-152	EPA 901.1 Modified	-8.89E-02	1.16E-01	1.16E-01	8.97E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Europium-154	EPA 901.1 Modified	3.33E-02	5.74E-02	5.74E-02	4.39E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Europium-155	EPA 901.1 Modified	1.17E-02	4.81E-02	4.81E-02	6.66E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Holmium-166m	EPA 901.1 Modified	9.64E-03	4.01E-02	4.01E-02	3.25E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Iodine-129	EPA 901.1 Modified	-5.23E-04	6.89E-02	6.89E-02	9.03E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Potassium-40	EPA 901.1 Modified	2.65E-01	2.20E-01	2.21E-01	3.14E-01	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Manganese-54	EPA 901.1 Modified	6.25E-03	1.36E-02	1.36E-02	4.49E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Niobium-94	EPA 901.1 Modified	-3.25E-03	2.60E-02	2.60E-02	4.01E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Lead-210	EPA 901.1 Modified	4.17E-01	4.01E-01	4.02E-01	6.91E-01	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Lead-212	EPA 901.1 Modified	3.68E-02	3.88E-02	3.88E-02	6.10E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Lead-214	EPA 901.1 Modified	1.54E-02	5.74E-02	5.74E-02	8.32E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Promethium-145	EPA 901.1 Modified	8.74E-02	7.27E-02	7.28E-02	1.18E-01	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Radium-226	EPA 901.1 Modified	3.61E-02	6.44E-02	6.44E-02	1.09E-01	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Antimony-125	EPA 901.1 Modified	-1.97E-02	5.93E-02	5.93E-02	9.60E-02	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Thorium-234	EPA 901.1 Modified	2.24E-01	4.43E-01	4.44E-01	6.18E-01	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Thallium-208	EPA 901.1 Modified	-5.42E-03	6.57E-02	6.57E-02	1.15E-01	U	pCi/g
18-06123-02	MBL	BLANK	06/28/18 00:00	6/28/2018	6/28/2018	18-06123	Uranium-235	EPA 901.1 Modified	-4.49E-02	3.13E-01	3.13E-01	1.85E-01	U	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (1-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample;MBL=Blank;DUP=Duplicate;TRG=Normal Sample;DO=Duplicate Original;U=Non-detect

Eberline Analytical
Final Report of Analysis

Report To:

Patricia Giza
Zion Solutions
101 Shiloh Blvd
Zion, IL 60099

Work Order Details:

SDG: **18-06123**
Purchase Order: 677118
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Qualifier	Report Units
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Actinium-228	EPA 901.1 Modified	9.14E-01	3.27E-01	3.31E-01	5.06E-01		pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Silver-108m	EPA 901.1 Modified	2.49E-02	9.35E-02	9.35E-02	1.07E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Americium-241	EPA 901.1 Modified	-4.60E-03	6.88E-02	6.88E-02	2.08E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Barium-133	EPA 901.1 Modified	0.00E+00	3.90E-02	3.90E-02	1.95E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Bismuth-214	EPA 901.1 Modified	7.17E-01	2.45E-01	2.48E-01	3.52E-01		pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Cobalt-60	EPA 901.1 Modified	1.79E-02	7.72E-02	7.72E-02	1.31E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Cesium-134	EPA 901.1 Modified	9.49E-04	4.02E-02	4.02E-02	1.18E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Cesium-137	EPA 901.1 Modified	2.15E-01	1.26E-01	1.27E-01	1.92E-01		pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Europium-152	EPA 901.1 Modified	5.33E-02	1.34E-01	1.34E-01	2.77E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Europium-154	EPA 901.1 Modified	-1.52E-01	2.64E-01	2.64E-01	1.43E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Europium-155	EPA 901.1 Modified	8.24E-02	1.45E-01	1.45E-01	2.45E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Holmium-166m	EPA 901.1 Modified	-4.16E-02	1.56E-01	1.56E-01	1.21E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Iodine-129	EPA 901.1 Modified	-7.08E-02	1.23E-01	1.23E-01	1.48E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Potassium-40	EPA 901.1 Modified	6.29E+00	1.83E+00	1.85E+00	2.12E+00		pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Manganese-54	EPA 901.1 Modified	-1.04E-01	9.37E-02	9.39E-02	1.00E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Niobium-94	EPA 901.1 Modified	3.75E-02	7.23E-02	7.23E-02	1.29E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Lead-210	EPA 901.1 Modified	2.40E+00	1.23E+00	1.24E+00	2.22E+00	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Lead-212	EPA 901.1 Modified	4.60E-01	1.66E-01	1.67E-01	3.39E-01		pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Lead-214	EPA 901.1 Modified	6.03E-01	2.03E-01	2.06E-01	3.62E-01		pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Promethium-145	EPA 901.1 Modified	-4.29E-02	1.68E-01	1.68E-01	2.15E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Radium-226	EPA 901.1 Modified	7.17E-01	2.45E-01	2.48E-01	3.52E-01		pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Antimony-125	EPA 901.1 Modified	-1.19E-01	2.49E-01	2.49E-01	3.48E-01	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Thorium-234	EPA 901.1 Modified	1.71E+00	1.90E+00	1.91E+00	3.18E+00	U	pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Thallium-208	EPA 901.1 Modified	4.14E-01	2.50E-01	2.51E-01	4.11E-01		pCi/g
18-06123-03	DUP	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Uranium-235	EPA 901.1 Modified	-3.10E-01	8.71E-01	8.72E-01	6.14E-01	U	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (1-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample;MBL=Blank;DUP=Duplicate;TRG=Normal Sample;DO=Duplicate Original;U=Non-detect

Eberline Analytical
Final Report of Analysis

Report To:

Patricia Giza
Zion Solutions
101 Shiloh Blvd
Zion, IL 60099

Work Order Details:

SDG: **18-06123**
Purchase Order: 677118
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Qualifier	Report Units
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Actinium-228	EPA 901.1 Modified	6.10E-01	2.58E-01	2.59E-01	4.56E-01		pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Silver-108m	EPA 901.1 Modified	1.55E-02	9.16E-02	9.16E-02	1.07E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Americium-241	EPA 901.1 Modified	-2.57E-01	1.67E-01	1.67E-01	2.22E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Barium-133	EPA 901.1 Modified	-2.50E-02	5.88E-02	5.88E-02	2.02E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Bismuth-214	EPA 901.1 Modified	7.39E-01	2.58E-01	2.60E-01	3.54E-01		pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Cobalt-60	EPA 901.1 Modified	9.14E-03	8.12E-02	8.12E-02	1.12E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Cesium-134	EPA 901.1 Modified	-2.29E-02	4.78E-02	4.78E-02	1.40E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Cesium-137	EPA 901.1 Modified	3.58E-01	1.21E-01	1.23E-01	1.48E-01		pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Europium-152	EPA 901.1 Modified	-6.97E-02	2.43E-01	2.43E-01	2.72E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Europium-154	EPA 901.1 Modified	6.99E-02	2.21E-01	2.21E-01	1.44E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Europium-155	EPA 901.1 Modified	1.78E-02	1.50E-01	1.50E-01	2.49E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Holmium-166m	EPA 901.1 Modified	3.81E-02	1.32E-01	1.32E-01	1.24E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Iodine-129	EPA 901.1 Modified	-5.22E-02	1.22E-01	1.22E-01	1.53E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Potassium-40	EPA 901.1 Modified	7.38E+00	1.86E+00	1.90E+00	1.88E+00		pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Manganese-54	EPA 901.1 Modified	1.67E-02	7.88E-02	7.88E-02	1.28E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Niobium-94	EPA 901.1 Modified	-6.74E-03	7.30E-02	7.30E-02	1.16E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Lead-210	EPA 901.1 Modified	2.23E+00	1.24E+00	1.25E+00	2.22E+00	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Lead-212	EPA 901.1 Modified	4.09E-01	1.53E-01	1.55E-01	5.73E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Lead-214	EPA 901.1 Modified	8.34E-01	2.60E-01	2.64E-01	3.14E-01		pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Promethium-145	EPA 901.1 Modified	7.15E-02	1.54E-01	1.54E-01	2.14E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Radium-226	EPA 901.1 Modified	7.39E-01	2.58E-01	2.60E-01	3.54E-01		pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Antimony-125	EPA 901.1 Modified	1.12E-01	2.07E-01	2.07E-01	3.48E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Thorium-234	EPA 901.1 Modified	2.27E+00	1.98E+00	1.99E+00	3.28E+00	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Thallium-208	EPA 901.1 Modified	5.49E-01	3.17E-01	3.19E-01	5.77E-01	U	pCi/g
18-06123-04	DO	B1-06202A-FSFC-016CV	06/18/18 14:10	6/28/2018	6/28/2018	18-06123	Uranium-235	EPA 901.1 Modified	5.61E-01	9.30E-01	9.31E-01	6.59E-01	U	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (1-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample;MBL=Blank;DUP=Duplicate;TRG=Normal Sample;DO=Duplicate Original;U=Non-detect

EBERLINE ANALYTICAL

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

Eberline Analytical
Final Report of Analysis

Report To:

Patricia Giza
Zion Solutions
101 Shiloh Blvd
Zion, IL 60099

Work Order Details:

SDG: **18-06123**
Purchase Order: 677118
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Qualifier	Report Units
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Actinium-228	EPA 901.1 Modified	4.52E-01	3.79E-01	3.80E-01	7.06E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Silver-108m	EPA 901.1 Modified	-1.97E-02	5.56E-02	5.56E-02	1.05E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Americium-241	EPA 901.1 Modified	7.54E-02	1.02E-01	1.02E-01	2.15E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Barium-133	EPA 901.1 Modified	1.59E-02	6.00E-02	6.00E-02	1.15E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Bismuth-214	EPA 901.1 Modified	5.86E-01	2.75E-01	2.76E-01	3.96E-01		pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Cobalt-60	EPA 901.1 Modified	4.45E-02	7.80E-02	7.81E-02	1.17E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Cesium-134	EPA 901.1 Modified	-1.55E-03	3.64E-02	3.64E-02	1.16E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Cesium-137	EPA 901.1 Modified	1.74E-02	1.05E-01	1.05E-01	1.65E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Europium-152	EPA 901.1 Modified	-1.56E-01	3.23E-01	3.23E-01	2.68E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Europium-154	EPA 901.1 Modified	-8.51E-03	2.95E-01	2.95E-01	1.42E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Europium-155	EPA 901.1 Modified	2.30E-01	1.69E-01	1.70E-01	2.54E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Holmium-166m	EPA 901.1 Modified	-7.56E-02	1.56E-01	1.56E-01	1.16E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Iodine-129	EPA 901.1 Modified	-3.29E-03	2.03E-01	2.03E-01	2.69E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Potassium-40	EPA 901.1 Modified	7.10E+00	1.67E+00	1.71E+00	3.75E+00	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Manganese-54	EPA 901.1 Modified	3.23E-02	8.54E-02	8.54E-02	1.47E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Niobium-94	EPA 901.1 Modified	-7.88E-04	8.07E-02	8.07E-02	1.22E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Lead-210	EPA 901.1 Modified	2.09E+00	1.92E+00	1.92E+00	3.18E+00	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Lead-212	EPA 901.1 Modified	4.37E-01	1.33E-01	1.34E-01	2.76E-01		pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Lead-214	EPA 901.1 Modified	5.88E-01	2.07E-01	2.09E-01	5.94E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Promethium-145	EPA 901.1 Modified	1.71E-01	2.29E-01	2.29E-01	3.60E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Radium-226	EPA 901.1 Modified	5.86E-01	2.75E-01	2.76E-01	3.96E-01		pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Antimony-125	EPA 901.1 Modified	5.36E-02	2.10E-01	2.10E-01	3.59E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Thorium-234	EPA 901.1 Modified	1.88E+00	1.86E+00	1.86E+00	3.09E+00	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Thallium-208	EPA 901.1 Modified	2.43E-01	2.18E-01	2.18E-01	4.36E-01	U	pCi/g
18-06123-05	TRG	B1-06202A-FSWC-035CV	06/18/18 12:30	6/28/2018	6/28/2018	18-06123	Uranium-235	EPA 901.1 Modified	6.23E-01	1.13E+00	1.13E+00	6.32E-01	U	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (1-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample;MBL=Blank;DUP=Duplicate;TRG=Normal Sample;DO=Duplicate Original;U=Non-detect

Eberline Analytical
Final Report of Analysis

Report To:

Patricia Giza
Zion Solutions
101 Shiloh Blvd
Zion, IL 60099

Work Order Details:

SDG: **18-06123**
Purchase Order: 677118
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Qualifier	Report Units
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Actinium-228	EPA 901.1 Modified	4.49E-01	4.91E-01	4.92E-01	8.84E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Silver-108m	EPA 901.1 Modified	2.23E-02	1.14E-01	1.14E-01	1.13E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Americium-241	EPA 901.1 Modified	8.21E-02	1.90E-01	1.90E-01	2.61E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Barium-133	EPA 901.1 Modified	5.55E-02	1.13E-01	1.13E-01	1.81E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Bismuth-214	EPA 901.1 Modified	1.08E+00	3.08E-01	3.13E-01	3.50E-01		pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Cobalt-60	EPA 901.1 Modified	4.12E-02	8.87E-02	8.87E-02	1.61E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Cesium-134	EPA 901.1 Modified	-3.21E-02	6.38E-02	6.38E-02	1.46E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Cesium-137	EPA 901.1 Modified	1.98E-01	1.41E-01	1.41E-01	2.18E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Europium-152	EPA 901.1 Modified	-7.84E-02	4.64E-01	4.64E-01	4.11E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Europium-154	EPA 901.1 Modified	2.77E-02	2.49E-01	2.49E-01	2.06E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Europium-155	EPA 901.1 Modified	2.61E-01	2.34E-01	2.34E-01	3.45E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Holmium-166m	EPA 901.1 Modified	2.92E-02	2.05E-01	2.05E-01	1.56E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Iodine-129	EPA 901.1 Modified	-3.55E-02	2.70E-01	2.70E-01	3.46E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Potassium-40	EPA 901.1 Modified	7.81E+00	2.25E+00	2.29E+00	2.42E+00		pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Manganese-54	EPA 901.1 Modified	-2.73E-02	1.22E-01	1.22E-01	1.88E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Niobium-94	EPA 901.1 Modified	7.19E-03	1.04E-01	1.04E-01	1.61E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Lead-210	EPA 901.1 Modified	2.21E+00	2.20E+00	2.21E+00	3.66E+00	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Lead-212	EPA 901.1 Modified	3.76E-01	2.31E-01	2.32E-01	3.52E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Lead-214	EPA 901.1 Modified	7.43E-01	2.53E-01	2.56E-01	4.47E-01		pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Promethium-145	EPA 901.1 Modified	2.25E-01	3.00E-01	3.00E-01	4.71E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Radium-226	EPA 901.1 Modified	1.08E+00	3.08E-01	3.13E-01	3.50E-01		pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Antimony-125	EPA 901.1 Modified	4.44E-02	2.46E-01	2.46E-01	4.35E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Thorium-234	EPA 901.1 Modified	2.95E+00	2.02E+00	2.03E+00	3.07E+00	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Thallium-208	EPA 901.1 Modified	7.84E-02	3.25E-01	3.25E-01	5.73E-01	U	pCi/g
18-06123-06	TRG	B1-06201AFSWC-027CV	06/07/18 13:30	6/28/2018	6/28/2018	18-06123	Uranium-235	EPA 901.1 Modified	-6.67E-01	1.74E+00	1.74E+00	8.37E-01	U	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (1-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample;MBL=Blank;DUP=Duplicate;TRG=Normal Sample;DO=Duplicate Original;U=Non-detect

Eberline Analytical
Final Report of Analysis

Report To:

Patricia Giza
Zion Solutions
101 Shiloh Blvd
Zion, IL 60099

Work Order Details:

SDG: **18-06123**
Purchase Order: 677118
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Qualifier	Report Units
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Actinium-228	EPA 901.1 Modified	7.61E-01	7.10E-01	7.11E-01	1.29E+00	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Silver-108m	EPA 901.1 Modified	9.83E-02	1.91E-01	1.91E-01	2.22E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Americium-241	EPA 901.1 Modified	-2.00E-02	2.07E-01	2.07E-01	3.00E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Barium-133	EPA 901.1 Modified	4.55E-01	2.77E-01	2.78E-01	3.54E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Bismuth-214	EPA 901.1 Modified	6.48E-01	4.69E-01	4.70E-01	8.01E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Cobalt-60	EPA 901.1 Modified	5.00E-02	1.58E-01	1.58E-01	2.87E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Cesium-134	EPA 901.1 Modified	7.29E-02	1.19E-01	1.19E-01	3.17E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Cesium-137	EPA 901.1 Modified	5.59E-02	2.21E-01	2.21E-01	3.21E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Europium-152	EPA 901.1 Modified	-1.61E-01	4.84E-01	4.84E-01	4.20E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Europium-154	EPA 901.1 Modified	-5.41E-02	1.90E-01	1.90E-01	2.15E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Europium-155	EPA 901.1 Modified	1.73E-01	2.62E-01	2.62E-01	3.93E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Holmium-166m	EPA 901.1 Modified	-1.07E-01	3.30E-01	3.30E-01	1.81E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Iodine-129	EPA 901.1 Modified	-1.03E-01	8.75E-02	8.76E-02	1.17E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Potassium-40	EPA 901.1 Modified	5.40E+00	3.15E+00	3.16E+00	4.70E+00		pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Manganese-54	EPA 901.1 Modified	1.15E-01	1.62E-01	1.62E-01	2.98E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Niobium-94	EPA 901.1 Modified	1.43E-01	1.65E-01	1.65E-01	2.88E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Lead-210	EPA 901.1 Modified	1.68E+00	1.61E+00	1.61E+00	2.54E+00	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Lead-212	EPA 901.1 Modified	3.64E-01	3.24E-01	3.24E-01	5.31E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Lead-214	EPA 901.1 Modified	9.66E-01	4.95E-01	4.97E-01	7.20E-01		pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Promethium-145	EPA 901.1 Modified	-8.71E-02	1.49E-01	1.49E-01	2.07E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Radium-226	EPA 901.1 Modified	6.48E-01	4.69E-01	4.70E-01	8.01E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Antimony-125	EPA 901.1 Modified	-1.04E-01	5.29E-01	5.29E-01	7.18E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Thorium-234	EPA 901.1 Modified	2.22E+00	1.99E+00	2.00E+00	3.12E+00	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Thallium-208	EPA 901.1 Modified	5.20E-01	5.53E-01	5.54E-01	9.04E-01	U	pCi/g
18-06123-07	TRG	B1-06201A-FSWC-024CV	06/07/18 14:05	6/28/2018	6/28/2018	18-06123	Uranium-235	EPA 901.1 Modified	-3.29E-01	1.78E+00	1.78E+00	9.06E-01	U	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (1-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample;MBL=Blank;DUP=Duplicate;TRG=Normal Sample;DO=Duplicate Original;U=Non-detect

ZIONSOLUTIONS LLC
An EnergySolutions Company

18-06123

ZS-WM-131
Revision 0
Information Use

Attachment 1 – Chain-of-Custody Form

REC'D JUN 28 2018

	Sample ID	Sample Log	Matrix	Sample Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Sample Time	Analysis Type	Preservative	Remarks
4	B1-06202A-FSFC-016CV	N/A	Concrete	Concrete	57.94	cm^3	Puck	1	6/18/2018	1410	5 ROC –H_3	None	136.46g 0.0-0.5"
5	B1-06202A-FSWC-035CV	N/A	Concrete	Concrete	57.94	cm^3	Puck	1	6/18/2018	1230	5 ROC –H_3	None	141.92g 0.0-0.5"
6	B1-06201AFSWC-027CV	N/A	Concrete	Concrete	57.94	cm^3	Puck	1	6/07/2018	1330	5 ROC –H_3	None	113.80g 0.0-0.5"
7	B1-06201A-FSWC-024CV	N/A	Concrete	Concrete	57.94	cm^3	Puck	1	6/07/2018	1405	5 ROC –H_3	None	127.63g 0.0-0.5"

Laboratory:	Date Submitted To Lab:	Ship Container No.:	Cooler Temperature:	Airbill Number:
Eberline Labs		**N/A**	**N/A**	FEDEX EXPRESS 8115 9539 6980

Relinquished by:	Date	Time:	Received by:	Date: (mm/dd/yyyy):	Time:
Jack Mucia	06/27/2018	1310	Richard F. Rickert	06/27/2018	13:10
Richard F. Rickert	06/27/2018	1630 ~~1310~~	Fed Ex Express	06/27/2018	1630
Fed Ex	06/28/18	08:30	E Towery Eberline Analytical	06/28/2018	0830

Comments

ANALYSIS 5 ROC HTD-H_3

PRIORITY 7 day turnaround

PO# 677118