



Technical Specification 6.9.1.7 (Salem)  
Technical Specification 6.9.1.6 (Hope Creek)

LR-N20-0024

April 27, 2020

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington DC 20555-001

Salem Generating Station, Units 1 and 2  
Renewed Facility Operating License Nos. DPR-70 and DPR-75  
NRC Docket Nos. 50-272 and 50-311

Hope Creek Generating Station  
Renewed Facility Operating License No. NPF-57 NRC Docket No. 50-354

Subject: 2019 Annual Radiological Environmental Operating Report (AREOR)

As required with Section 6.9.1.7 of Appendix A to Renewed Facility Operating License Nos. DPR-70 (Unit 1) and DPR-75 (Unit 2) for Salem Generating Stations (SGS), and Section 6.9.1.6 of Appendix A to Renewed Facility Operating License NPF-57 for Hope Creek Generating Station (HCGS), PSEG Nuclear hereby transmits one (1) copy of the combined 2019 Annual Radiological Environmental Operating Report (Enclosure 1). This report summarizes the results of the Radiological Environmental Surveillance Program for 2019 in the vicinity of the Salem and Hope Creek Generating Stations. The result of this program for 2019 was specifically compared to the result of the pre-operational program.

There are no regulatory commitments contained in this letter.

If you have any questions or comments on this transmittal, please contact Mr. Rick Heathwaite at (856) 339-2076.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Sharbaugh", written over a horizontal line.

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Plant Manager  
Salem Generating Stations

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Steven R. Poorman  
Plant Manager  
Hope Creek Generating Station

Enclosure 1: 2019 Annual Radiological Environmental Operating Report for Salem and Hope Creek Generating Stations

cc: NRC Regional Administrator, Region I  
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NRC Project Manager, Salem  
NRC Project Manager, Hope Creek  
NRC Senior Resident Inspector, Salem  
NRC Senior Resident Inspector, Hope Creek  
NJ Department of Environmental Protection, Bureau of Nuclear Engineering  
PSEG Nuclear, Corporate Commitment Tracking Coordinator - w/o enclosure  
PSEG Nuclear, Salem Commitment Tracking Coordinator - w/o enclosure  
PSEG Nuclear, Hope Creek Commitment Tracking Coordinator - w/o enclosure



**PSEG Nuclear**

# Salem and Hope Creek Generating Stations

## 2019 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

JANUARY 1 THROUGH DECEMBER 31, 2019


RADIOLOGICAL  
ENVIRONMENTAL  
MONITORING  
PROGRAM


Report Prepared by:  Date 04/01/2020  
Rick Heathwaite (REMP/REC Program Manager)


<u>SGS AREOR- 68</u>		<u>HCGS AREOR- 42</u>	
Unit 1	Unit 2	Unit 1	
DOCKET No. 50-272	DOCKET No. 50-311	DOCKET No. 50-354	
OPERATING LICENSE No. DPR-070	OPERATING LICENSE No. DPR-075	OPERATING LICENSE No. NPF-057	


## Station Reviews and Approvals

### Salem

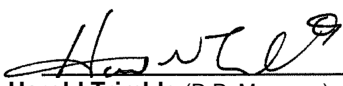
 Date 4/20/20  
Shane Howe (R.P. Manager)


 Date 04/16/20  
William Gropp (Chem. Manager)


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Richard DeSanctis (Sr. Dir. Operations)


 Date 4-18-20  
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**LIST OF ACRONYMS OR TERMS (in alphabetical order)**

%	Percent
A	Acceptable
<i>a posteriori</i>	An “after the fact” limit representing the capability of a measurement system
<i>a priori</i>	A “before the fact” limit representing the capability of a measurement system
AIO	Air Iodine sample
Analyte	The substance being identified and measured in a chemical analysis
APT	Air Particulate sample
AREOR	Annual Radiological Environmental Operating Report
BNE	Bureau of Nuclear Engineering: A New Jersey state agency regulating, as applicable, the nuclear industry within the Department of Environmental Protection.
Bq	Becquerel: The SI unit of activity referring to the number of radioactive atoms. 1 Bq = 1 decay per second
C	Control
CAP	Corrective Action Program
CARR	Corrective/Preventive Action Request and Report (GEL CAP)
CVCS	Chemical Volume Control System
Ci	Curie: A non-SI unit of activity referring to the number of radioactive atoms. 1 Ci = $3.7 \times 10^{10}$ decays per second
DOE	Department of Energy
DPM	Disintegrations per minute
DQO	Data Quality Objective
ECH	Crab sample
ERA	Environmental Resource Associates
ESF	Fish sample
ESS	Sediment sample
EZA	Eckert & Ziegler Analytics, Inc.
FPL	Broad Leafy Vegetation sample
FPV	Vegetables sample
GAM	Game sample
GEL	General Engineering Laboratories; Duplicate sample analysis vendor
Gr-A	Gross alpha
Gr-B	Gross beta
H-3	Tritium
HCGS	Hope Creek Generating Station
IDM	Immersion Dose Monitor sample (direct radiation measurement made with field TLD)
ISFSI	Independent Spent Fuel Storage Installation
Kg	Kilogram
keV	Kilo-electron volts: A non-SI unit of energy equal to approximately $1.6 \times 10^{-16}$ joules
L	Liter
LIMS	Laboratory Information Management System
LLD	Lower Limit of Detection: The predefined limit for the concentration at which the analyte will no longer be reliably detected with certainty (i.e method must be able to detect the analyte with certainty to a value at or below the LLD).
LTS	Laboratory Testing Services
m <sup>3</sup>	Cubic meter

**LIST OF ACRONYMS OR TERMS (in alphabetical order)**

MAPEP	Mixed Analyte Performance Evaluation Program
MDC	Minimum Detectable Concentration: The minimum concentration that is practically achievable with certainty by an analytical method (not a predefined limit or goal).
mL	Milliliter
MLK	Milk sample
mR	MilliRoentgen: a unit of radiation, used to measure the exposure of somebody or something to X-rays and gamma rays, defined in terms of the ionization effect on air.
mrem	Millirem: a unit for measuring amounts of radiation, equal to the effect that one roentgen of X-rays or gamma-rays would produce in a human being.
MW <sub>e</sub>	Megawatt Electric
MW <sub>th</sub>	Megawatt Thermal
N	Not Acceptable
NCR	Nonconformance Report (TBE CAP)
NELAC	National Environmental Laboratory Conference
NRC / USNRC	U.S. Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
pCi	Picocuries (one-trillionth of a Curie)
PD	Passive Dosimeter
PE	Performance Evaluation
PSEG	Public Service Enterprise Group
PT	Performance Testing
PWR	Potable (drinking) Water sample - Raw
PWT	Potable (drinking) Water sample - Treated
QA	Quality Assurance
REMP	Radiological Environmental Monitoring Program
RGPP	Radiological Groundwater Protection Program
SA	Salem
SAR	Safety Analysis Report
SCFM	Standard Cubic Feet per Minute
SGS	Salem Generating Station
SOL	Soil sample
SOP	Standard Operating Procedures
Std Quarter	Standard Quarter = 92 days
SWA	Surface Water sample
TBE	Teledyne Brown Engineering; Primary sample analysis vendor
TEDA	Triethylene-diamine
TLD	Thermoluminescent Dosimeter: A TLD measures ionizing radiation exposure by measuring the intensity of visible light emitted from a crystal when it is heated. The intensity of light emitted from the crystal is dependent upon the radiation exposure.
TS	Technical Specifications
uCi	Microcuries (one-millionth of a Curie)
USEPA	United States Environmental Protection Agency
VGT	Fodder Crop sample
W	Warning
WWA	Ground (well) Water sample

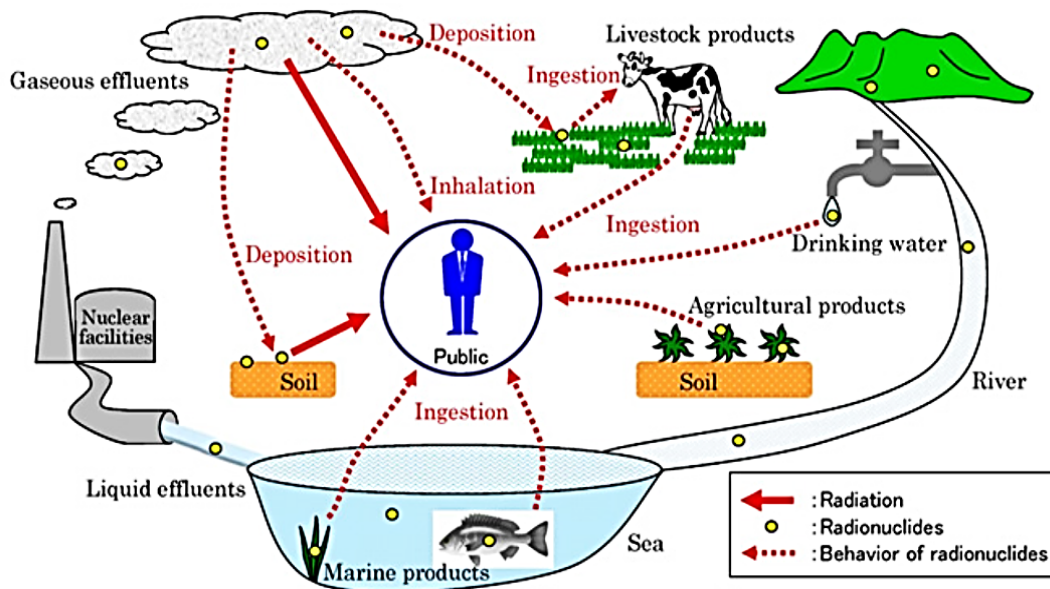
## I. EXECUTIVE SUMMARY

PSEG Nuclear, LLC (PSEG) operates three nuclear reactors collectively referred to as the Site, which consists of Salem Generating Stations (SGS) Unit 1 and Unit 2, and the Hope Creek Generating Station (HCGS). The Site implements a Radiological Environmental Monitoring Program (REMP) in accordance with the Site Offsite Dose Calculation Manuals (ODCMs).

In 2019 there was no instance of radioactivity from plant effluents observed in the environment that exceeded any Reporting Levels identified in SGS ODCM Table 3.12-2 or HCGS ODCM Table 3.12.1-2. Furthermore, the data obtained during the Reporting Period were comparable to the results obtained during the pre-operational phase of the program, and are lower than the applicable limits. As expected, the operational REMP data from 2019 is consistent with historical data collected before, and throughout, commercial operation. Therefore, it can be concluded that the operation of the Site has had no significant radiological impact on the health and safety of the public or on the environment.

## II. INTRODUCTION

The REMP monitors and evaluates the environment surrounding the Site to ensure that there are no adverse impacts on the health and safety of the public or on the environment. The results of the REMP are published annually in this report, the Annual Radiological Environmental Operating Report (AREOR). This AREOR provides a summary and interpretation of the data collected from January 1 through December 31, 2019 (the Reporting Period). No cultural or historic resources officially identified and confirmed by regulatory agencies are known to exist at PSEG.



The REMP is based on NRC guidance as reflected in the Site ODCMs and establishes sample media, sampling locations, sampling frequency and analytical sensitivity requirements. It also identifies indicator and control locations established for comparison purposes to distinguish plant related radioactivity from naturally occurring or other radioactivity from man-made sources. The environmental monitoring program also verifies the projected and anticipated radionuclide concentrations in the environment and evaluates exposures associated with releases of radionuclides from the Site as described by the ODCM.

This program satisfies the requirements of Section IV.B.2 of Appendix I to 10 CFR 50 and

provides surveillance of all appropriate critical exposure pathways to man. The REMP also complies with the following Technical Specifications and ODCM requirements:

Unit	Technical Specifications	ODCM
SGS U1	6.8.4.h Radiological Environmental Monitoring Program	3/4.12.1 Monitoring Program 6.9.1.7 Annual Radiological Environmental Operating Report
SGS U2	6.8.4.h Radiological Environmental Monitoring Program	3/4.12.1 Monitoring Program 6.9.1.7 Annual Radiological Environmental Operating Report
HCGS	6.8.4.h Radiological Environmental Monitoring Program	3/4.12.1 Monitoring Program 6.9.1.6 Annual Radiological Environmental Operating Report

To demonstrate compliance with the requirements, samples of air particulates, air iodine, milk, surface water, ground (well) water, potable (drinking) water, vegetables, fodder crops, fish, crabs, oysters, game, and sediment were collected and analyzed. External radiation dose measurements were also made in the vicinity of the Site using passive dosimeters. These environmental media were analyzed for one or more of the following: gamma emitting isotopes, tritium (H-3), iodine-131 (I-131), gross alpha, gross beta, direct and immersion dose. Measurements made in the vicinity of the Site were compared to background or control measurements and the preoperational REMP study performed before SGS Unit 1 became operational. The results of these analyses were used to assess the impact on the health and safety of the public or on the environment of Site operations, thereby demonstrating compliance with the applicable Technical Specifications, ODCMs, and Federal regulations.

For the Reporting Period, there were a total of 1,690 analyses performed on 1,327 environmental samples. The radioactive materials noted in this Report are in general either naturally occurring in the environment such as K-40 or Be-7, or a result of other non-plant related human activities, such as historical atmospheric nuclear weapons testing or medical wastes from offsite. The majority of the remaining samples did not contain plant related radionuclides above detection limits.

The detection capabilities for environmental samples, required by the Site ODCMs, were achieved for the Reporting Period. Any exceptions to the program are noted in the Report and the associated PSEG Nuclear corrective action identifier was included in parenthesis.

### III. THE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

The Site is located in Lower Alloway's Creek Township, Salem County, New Jersey. SGS consists of two operating pressurized water nuclear power reactors. SGS Unit 1 has an approximate net electrical rating of 1,180 megawatts electric (MW<sub>e</sub>) and SGS Unit 2 has an approximate net electrical rating of 1,178 MW<sub>e</sub>. The licensed core thermal power rating for both Units is 3,459 megawatts thermal (MW<sub>th</sub>). HCGS consists of an operating boiling water nuclear power reactor, which has an approximate net electrical rating of 1,212 MW<sub>e</sub>. The licensed core thermal power rating is 3,902 MW<sub>th</sub>.

The Site is located on a man-made peninsula on the east bank of the Delaware River called Artificial Island. The peninsula was created by the deposition of hydraulic fill from dredging

operations. The surrounding environment is characterized mainly by the Delaware River Estuary, extensive tidal marshlands, and low-lying meadowlands. These land types make up a vast majority of the land area within five miles of the Site, with most of the remaining land used for agriculture.

Since 1968, a Radiological Environmental Monitoring Program (REMP) has been conducted at the Site. Starting in December 1972, a more extensive radiological monitoring program was initiated in preparation for the operation of SGS Unit 1. The operational REMP was initiated in December 1976 when SGS Unit 1 achieved criticality.

An overview of the 2019 REMP is provided in Table B-1. Radioanalytical data from samples collected under this program were compared with results from the preoperational phase and historical operational results. This report presents the results from January 1 through December 31, 2019 (the Reporting Period) for the Site REMP.

### **A. Objectives of the Operational REMP:**

The objectives of the Operational REMP as described in the Site ODCMs are:

1. To determine whether any significant increases occur within the concentrations of radionuclides for critical pathways of exposure in the vicinity of Artificial Island.
2. To determine if the operation of the Site has resulted in any increase to the inventory of long lived radionuclides in the environment.
3. To detect any change in ambient gamma radiation levels.
4. To verify that Site operations do not have detrimental effects on the health and safety of the public or on the environment.

### **B. Implementation of the Objectives:**

The following describes the actions taken by PSEG to meet the REMP objectives listed above:

1. Samples of various media were selected for monitoring due to the potential radiological dose impact to humans. The selection of samples was based on:
  - a. Established critical pathways for the transfer of plant related radionuclides through the environment to man, and
  - b. Experience gained during the preoperational phase. Sampling locations were determined based on site meteorology, Delaware River Estuary hydrology, local demography, and land uses.
2. Sampling locations are divided into two classes: indicator and control. Indicator locations are those which have the potential to be influenced by Site operations. Control samples are collected at locations which are believed to be unaffected by Site operations, usually at 15 to 30 kilometers (9.3 to 18.6 miles) away from the Site. Fluctuations in the levels of radionuclides and direct radiation at indicator locations are evaluated with respect to analogous fluctuations at control locations. Indicator and control location data are also evaluated relative to preoperational data.
3. Appendix A describes the coding system which identifies sample type and location and describes and summarizes the analytical results in accordance with Section 6.9.1.7 of the SGS ODCM and Section 6.9.1.6 of the HCGS ODCM. Table A-1 summarizes average, minimum and maximum activities of the indicator locations, control locations

and the location with the highest mean using values above the Minimum Detectable Concentration (MDC).

4. Appendix B Table B-1 lists the types of samples collected, sample frequency, and analysis types. Table B-2 lists location codes, locations, and latitude and longitude coordinate.
5. The sampling locations are also indicated on Maps B-1 for on-site sampling locations out to 1 mile; B-2 for off-site sampling locations 1 to 10 miles; and B-3 for off-site sampling locations greater than 10 miles.

#### IV. PROGRAM DESCRIPTION

##### A. Data Interpretation

Results of analyses are grouped according to sample type and presented in Appendix C data tables. All results above the Lower Limit of Detection (LLD) are at a confidence level of  $\pm 2$  sigma. This represents the range of values into which 95% of repeated analyses of the same sample should fall. As defined in NRC NUREG-1301 and NUREG-1302, LLD is the smallest concentration of radioactive material in a sample that will yield a net count (above system background) that will be detected with 95% probability, with only 5% probability of falsely concluding that a blank observation represents a "real signal." The equation for determining LLD is:

$$LLD = \frac{4.66 \bullet S_b}{E \bullet V \bullet 2.22 \bullet Y \bullet \exp(-\lambda \Delta t)}$$

4.66 is the statistical factor from NUREG 1301 and 1302,

$S_b$  is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate, as counts per minute,

E is the counting efficiency, as counts per disintegration,

V is the sample size in units of mass or volume,

2.22 is the number of disintegrations per minute per picocurie,

Y is the fractional radiochemical yield, when applicable,

$\lambda$  is the radioactive decay constant for the particular radionuclide (sec<sup>-1</sup>), and

$\Delta t$  for environmental samples is the elapsed time between sample collection, or end of the sample collection period, and time of counting (sec).

The LLD is an *a priori* number, which represents the capability of the measurement system (including instrumentation, procedure and sample type) and not an after the fact criteria for the presence of activity. All analyses are designed to achieve the required detection limits for environmental sample analysis as described in the Site ODCMs.

The Minimum Detectable Concentration (MDC) is defined as above with the exception that the measurement is an *a posteriori* (after the fact) estimate of the presence of activity. The MDC should be lower than the required LLD.

The grouped data were averaged and standard deviations calculated. The  $\pm 2$  sigma

deviations of the averaged data represent sample and not analytical variability. Averages are calculated using positive values. Results are considered positive if the activity exceeds the MDC and exceeds 3 sigma uncertainty. Additionally, for gamma analysis, the peak must be identified in the gamma spectrum.

## B. Program Anomalies and Exceptions.

For the purpose of this report, a **Program Exception** is considered when a sample is missed; meaning that no scientifically valid data can be obtained (i.e. a forgotten or lost sample). Conversely, **Sample Anomalies** are instances where a partial sample was obtained, and despite potentially not meeting all the data objectives it still represents scientifically valid data (failed sample pump, defective TLD element, etc.). During the reporting period, anomalies and exceptions to REMP sampling requirements involved Air Sample weekly run times and Direct Radiation Monitoring dosimeters. In all but one air sampling instances, sufficient sample was collected during the week to meet the required LLD. One dosimeter was damaged and could not be read, and two dosimeters were identified as being placed on inner fences (closer to the site) than is described in the ODCM.

### Air Sampling Locations

- **Sample Anomaly (Notification 20803621):** During the weekly air sampler collection on 04/01/2019 it was discovered that the air sampler at location 15S2 was not running. Upon inspecting the air sampler it was determined the GFCI had tripped. The GFCI was reset and the pump for 15S2 began running normal. The air sampler was verified to be running without issue the following week on 04/08/2019.

The total time the sampler was in operation was 122.8 hours. The total outage duration was 45.0 hours. A total of 11,000 Cubic feet were determined to have been collected in that amount of time, which will meet the LLD requirement for the sample.

In this instance, adequate sample volume was achieved and the LLD for I-131 was met. A sample that misses the LLD requirement still represents a valid scientific observation, which is why it is not considered a missed sample. It simply has not met the Data Quality Objectives (DQO) set forth in the REMP.

- **Sample Anomaly (Notification 20830535):** During the weekly air sampler collection on 07/29/2019 it was discovered that air sampler at location 01F1 had an apparent power failure based on the hour meter and flow through the totalizer. The air sampler was verified to be running without issue.

The total time the sampler was in operation was 165.5 hours. The total outage duration was 4.2 hours. A total of 15,420 Cubic feet were determined to have been collected in that amount of time, which met the LLD requirement for the sample. A sample that misses the LLD requirement still represents a valid scientific observation, which is why it is not considered a missed sample. It simply has not met the DQO set forth in the REMP.

- **Sample Anomaly (Notification 20837715):** There was a power outage due to a Ground Fault Circuit Interrupter (GFCI) trip that caused a 22.1 hour period of non-sampling at air sampling location 05S2 the week of 10/21/2019 through 10/25/2019. The GFCI was reset and sampler began running as expected.

The total flow was 13,300 cubic feet over 142.5 hours. In this instance, adequate sample volume was achieved and the LLD for I-131 was met. A sample that misses

the LLD requirement still represents a valid scientific observation, which is why it is not considered a missed sample. It simply has not met the DQO set forth in the REMP.

#### Direct Radiation Measurement Locations

- **Program Exception (Notification 20844771):** On 1/22/2020 upon arrival at location TLD location 03F3, the LTS REMP Technician discovered the TLD for the 4<sup>th</sup> quarter of 2019 at this location was missing.

The Technician searched the surrounding area for it, but could not locate it. This one is located at a school about 15 feet in the air. The Technician installed the new TLD with a new bag and new hardware. This was the only one that was missing. During weekly rounds the Technician continued to observe the TLD at this location for vandalism. If this happens again he will be moving the TLD higher up.

Deviations are permitted from the required sampling schedule if specimens are unobtainable due to circumstances such as hazardous conditions, seasonal unavailability and malfunction of automatic sampling equipment. If specimens are unobtainable due to sampling equipment malfunction, effort shall be made to complete corrective action prior to the end of the next sampling period.

#### **C. Program Changes**

**Program Changes** are instances where a change to the REMP was assumed due to a permanent change in ability to obtain sample at that location. There were no REMP program changes in 2019.

#### **D. Quality Assurance Program**

Below are summaries of the 2019 QA program for radiochemistry vendors used by PSEG to implement the REMP. QA program details can be obtained in the 2019 QA report provided by each vendor below.

##### Teledyne Brown Engineering

The results reported by TBE are consistent with the Quality Assurance Program as described in the TBE Quality Assurance Manual and the TBE Procedure Manual.

##### GEL Laboratories

The results reported by GEL Laboratories, LLC (GEL) are consistent with the Quality System described in GEL's Quality Assurance Manual and the requirements of ISO17025:2005.

#### **E. Inter-laboratory Comparison Program**

Inter-laboratory Comparison Programs are independent checks on the precision and accuracy of laboratory analyses. These checks are performed as part of the REMP and are part of the quality assurance program.



TBE analyzed Performance Evaluation (PE) samples of air particulate, air iodine, milk, soil, vegetation and water matrices, as appropriate for 172 analyses (Appendix D, Tables D-1 through D-3).

GEL analyzed PE samples of air particulate, air iodine, milk, soil, vegetation and water matrices, as appropriate for 425 analyses (Appendix D, Tables D-4 through D-7).

The PE samples, supplied by Eckert & Ziegler Analytics, Inc. (EZA), Environmental Resource Associates (ERA), and the Department of Energy's (DOE) Mixed Analyte Performance Evaluation Program (MAPEP), were evaluated against the following acceptance criteria:

### 1. EZA Evaluation Criteria

EZA's evaluation report provides a ratio of reported results and EZA's known value. Since flag acceptance criteria values are not assigned by EZA, TBE evaluated the reported ratios based on internal QC requirements, which are based on the DOE MAPEP criteria.

### 2. ERA Evaluation Criteria

ERA's evaluation report provides an acceptance range for control and warning limits with associated flag values. ERA's acceptance limits are established in accordance with the United States Environmental Protection Agency (USEPA), National Environmental Laboratory Conference (NELAC) performance testing (PT) program requirements, or ERA's standard operating procedure (SOP) for the Generation of Performance Acceptance Limits, as applicable. The acceptance limits are either determined by a regression equation specific to each analyte or a fixed percentage limit promulgated under the appropriate regulatory document.

### 3. DOE Evaluation Criteria

MAPEP's evaluation report provides an acceptance range with associated flag values. The MAPEP defines three levels of performance: Acceptable (flag = "A"), Acceptable with Warning (flag = "W"), and Not Acceptable (flag = "N"). Performance is considered acceptable when a mean result for the specified analyte is  $\pm 20\%$  of the reference value. Performance is "acceptable with warning" when a mean result falls in the range from  $\pm 20\%$  to  $\pm 30\%$  of the reference value (i.e.,  $20\% < \text{bias} < 30\%$ ). If the mean result is greater than 30%, the results are deemed not acceptable.

## **Teledyne Brown Engineering**

### **ANALYTICAL SERVICES QUALITY CONTROL SYNOPSIS**

#### **A. Interlaboratory Cross-Check Program**

During this reporting period, 25 nuclides associated with six media types (Air Filter, Charcoal [Air Iodine], Milk, Soil, Vegetation and Water) were analyzed. Samples were obtained from Analytics, MAPEP and ERA. Media types representative of client analyses performed during this reporting period were selected.

#### **1. Analytics Environmental Cross Check Program**

Thirteen nuclides in milk, air particulate, air iodine (charcoal), soil, and water samples were evaluated. All of the environmental analyses performed were evaluated as within the acceptable/acceptable with warning range except for one Cr-51 in soil sample.

NCR 19-27 was initiated to address the failure and Corrective Actions were issued. All raw data and associated QC data were reviewed and fell within acceptance limits. No client data was affected by the failure.

## 2. DOE's MAPEP Quality Assessment Program

Sixteen nuclides in water, air particulate, soil, and vegetation samples were evaluated. All of the environmental analyses performed were evaluated as within the acceptable/acceptable with warning criteria except for the following: one Sr-90 in soil sample, one Sr-90 in vegetation sample (statistical failure for false positive), Ni-63 in soil sample, and two Am-241 in water samples.

NCRs 19-12, 19-13, 19-14, 19-25 and 19-26 were initiated to address the failures and Corrective Actions were issued. All raw data and associated QC data were reviewed and fell within acceptance limits. No client data was affected by the failures.

## 3. ERA Environmental Cross Check Program

Twelve nuclides were evaluated in water samples. All analyses performed were within the acceptable criteria except for the following: Cs-134, Sr-89, Sr-90 and Gross Alpha in water samples (one each).

NCRs 19-10, 19-11, 19-23 and 19-24 were initiated to address the failures and Corrective Actions were issued. All raw data and associated QC data were reviewed and fell within acceptance limits. No client data was affected by the failures.

## B. Intralaboratory Cross-Check Program

During this reporting period, 37 nuclides in various matrices, including air particulate, charcoal, vegetation, fish, milk, soil/solid, and water were analyzed by means of the laboratory's internal process control program. A compilation of interlaboratory comparison data for this reporting period is summarized in Attachment B. (Note: Only gamma nuclides that are typically seen in samples are included in the attachment – a complete list is available upon request).

The TBE-ES laboratory's internal process control program evaluated 6755 analyses during this period.

### 1. Blanks

During this reporting period, 1587/1588 environmental blanks analyzed were less than the MDC. One QC blank was positive, but the sample results were greater than 10 times the level of activity in the blank. A case narrative was included with the sample results.

## 2. Spikes

During this reporting period, all 1573 environmental spikes and matrix spikes analyzed were within the acceptance criteria.

## 3. Duplicates

All of the 3594 duplicate sets analyzed were within acceptance criteria.

## C. Non-Conformance Reports (NCRs)

In 2019, 28 NCRs were initiated and completed. (See Attachment C).

## D. Observation Reports

Two observation reports were initiated for this reporting period and have been completed at this time.

## E. Instrumentation

TBE uses the statistical principle method of evaluation for instrument quality control check data based on the mean, 2-sigma and 3-sigma set point model or uses pre-set tolerance limits. Each detector is checked prior to use for that day and the resulting data points are automatically compared to statistical baselines to determine the instrument's acceptability for counting.

Control charts showing this data are available during audits or upon request.

### Gamma Spectroscopy:

Gamma detectors are routinely monitored for energy, full width at half maximum, efficiency, and background. TBE gamma detectors operated without incident during this reporting period. Occasional second runs (as allowed by our QA program) were necessary to verify acceptable operation.

Some amplifier fine gain adjustments and liquid nitrogen addition to the dewars were also necessary when data trends indicate an energy drift on the detector.

### Liquid Scintillation Counters (LSC):

LSC instruments, used in tritium, C-14, Ni-63 and other low-energy beta emitters, are monitored for background and efficiency. The reliability of these instruments is exceptional with zero instances of background or efficiency values outside of control limits.

### Alpha/Beta Gas Flow Proportional (GFP) Counters:

GFP detectors, used for gross alpha/beta, Sr-89/90, I-131 (low Level), and other nuclides, are monitored for background and efficiency. TBE GFP detectors operated without incident during this reporting period. Occasionally, second runs (primarily for alpha due to the sensitivity of source placement) were necessary to verify acceptable operation or because of low P-10 pressure. After gas change-out and purging, control check values return to control norms.

### Alpha Spectroscopy:

Alpha detectors are routinely monitored for energy, full width at half maximum, efficiency, and background. TBE alpha detectors operated without incident during this reporting period. Occasional second runs (as allowed by our QA program) were necessary to verify acceptable operation.

### **GEL**

During 2019, forty-five (45) radioisotopes associated with seven (7) matrix types were analyzed under GEL's Performance Evaluation program in participation with ERA, MAPEP, and Eckert & Ziegler Analytics. Matrix types were representative of client analyses performed during 2019. Of the four hundred twenty-five (425) total results, 97.2% (413 of 425) were found to be acceptable within the PT providers three sigma or other statistical criteria. The list below contains the type of matrix evaluated by GEL.

- Air Filter
- Cartridge
- Water
- Milk
- Soil
- Liquid
- Vegetation

### Analytics Evaluation

#### 1. Eckert & Ziegler Analytics

Eckert & Ziegler Analytics provided samples for eighty-nine (89) individual environmental analyses. The accuracy of each result reported to Eckert & Ziegler Analytics, Inc. is measured by the ratio of GEL's result to the known value. All results fell within GEL's acceptance criteria (100% within acceptance).

#### 2. ERA Evaluation

The ERA MRad program provided samples (MRAD-30 and MRAD-31) for one hundred sixty-six (166) individual environmental analyses. Of the 166 analyses, 96% (160 out of 166) fell within the PT provider's acceptance criteria.

The ERA program provided samples (RAD-116, RAD-117, RAD-118, and 9116) for forty-two (42) individual environmental analyses. Of the 42 analyses, 90% (38 out of 42) fell within the PT provider's acceptance criteria.

#### 3. DOE Evaluation

MAPEP Series 40 and 41 were analyzed by the laboratory. Of the one hundred twenty-eight (128) analyses, 98% (126 out of 128) fell within the PT provider's acceptance criteria.

### GEL Corrective Action Request and Report (CARR)

There are two categories of corrective action at GEL. One is corrective action implemented at the analytical and data review level in accordance with the analytical SOP. The other is formal corrective action documented by the Quality Systems Team in accordance with GL-QS-E-002. A formal corrective action is initiated when a nonconformance reoccurs or is so significant that permanent elimination or prevention of the problem is required. Formal corrective action investigations include root cause analysis.

GEL includes quality requirements in most analytical standard operating procedures to ensure that data are reported only if the quality control criteria are met or the quality control measures that did not meet the acceptance criteria are documented. A formal corrective action is implemented according to GL-QS-E-002 for Conducting Corrective/Preventive Action and Identifying Opportunities for Improvement. Recording and documentation is performed following guidelines stated in GL-QS-E-012 for Client NCR Database Operation.

Any employee at GEL can identify and report a nonconformance and request that corrective action be taken. Any GEL employee can participate on a corrective action team as requested by the QS team or Group Leaders. The steps for conducting corrective action are detailed in GL-QS-E-002. In the event that correctness or validity of the laboratory's test results in doubt, the laboratory will take corrective action. If investigations show that the results have been impacted, affected clients will be informed of the issue in writing within five (5) calendar days of the discovery.

- CARR190225-1192 documents the unacceptable result of Strontium-89 of ERA Study 116
- CARR190530-1211 documents the unacceptable results of Uranium-238, Uranium-238, Uranium-Mass and Plutonium-238 in vegetation and Uranium-238 in soil of ERA MRAD-30
- CARR 190603-1212 documents the unacceptable result of Iron-55 in soil of MAPEP-40, CARR 190826-1250 documents the unacceptable result of Strontium-89 and Gross Alpha of RAD-118
- CARR 191212-1262 documents the unacceptable result of Lead-212 of MRAD-31
- CARR 191213-1265 documents the unacceptable result of Radium-226 of MAPEP-41

### Summary of Results: Split Sample Comparison Program

In order to meet the requirement of ODCM 3/4.12.3, INTERLABORATORY COMPARISON PROGRAM, several duplicate environmental samples each year are sent to a second independent laboratory to compare results. The laboratory chosen for these Quality Control Analyses is General Engineering Laboratories (GEL).

Duplicate samples were obtained for some samples of weekly air iodine and particulates, quarterly air particulate, sediment, broad leaf vegetation, milk, and surface water. These samples were analyzed by GEL as comparison and quality assurance of TBE results. The GEL duplicate analysis results are shown in Table C-19.

Agreement between TBE and GEL is based on criteria for accepting measurements in NRC Inspection Procedure 84525.

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## 1. Air Iodine

I-131 was not detected (less than MDC) by both TBE and GEL for all 52 air samples.

## 2. Air Particulates

Gross beta was detected by GEL and TBE in all 52 of the duplicate weekly APT samples. GEL detects significantly higher gross beta results. The variance between the lab results is due to different calibration energy sources used by each lab.

Air Particulate								
TBE					GEL			TBE / GEL Relative Difference (%)
CRS #	Collection Date	Nuclide	Activity	1 Sigma Error	CRS #	Nuclide	Activity	RD (%)
L80687	1/2/2019	Gross β	1.24E-02	1.38E-03	468033	Gross β	2.75E-02	114%
L80758	1/8/2019	Gross β	1.24E-02	1.63E-03	468611	Gross β	2.99E-02	124%
L80905	1/14/2019	Gross β	9.95E-03	1.54E-03	469075	Gross β	2.57E-02	133%
L80991	1/21/2019	Gross β	1.08E-02	1.37E-03	469539	Gross β	2.18E-02	101%
L81060	1/28/2019	Gross β	9.38E-03	1.35E-03	470736	Gross β	3.06E-02	159%
L81143	2/5/2019	Gross β	1.95E-02	1.51E-03	470132	Gross β	2.33E-02	27%
L81238	2/13/2019	Gross β	1.10E-02	1.25E-03	471383	Gross β	2.29E-02	105%
L81329	2/21/2019	Gross β	1.23E-02	1.53E-03	472016	Gross β	2.63E-02	109%
L81406	2/27/2019	Gross β	2.09E-02	1.92E-03	472593	Gross β	2.68E-02	37%
L81494	3/5/2019	Gross β	1.20E-02	1.71E-03	472975	Gross β	2.57E-02	109%
L81562	3/11/2019	Gross β	1.13E-02	1.62E-03	473481	Gross β	3.06E-02	138%
L81663	3/18/2019	Gross β	1.54E-02	1.58E-03	474029	Gross β	3.63E-02	121%
L81721	3/25/2019	Gross β	1.12E-02	1.38E-03	474652	Gross β	1.70E-02	62%
L81838	4/1/2019	Gross β	1.15E-02	1.52E-03	475231	Gross β	1.83E-02	68%
L81931	4/8/2019	Gross β	1.02E-02	1.36E-03	475802	Gross β	1.82E-02	85%
L82067	4/15/2019	Gross β	5.27E-03	1.23E-03	476670	Gross β	1.61E-02	152%
L82170	4/23/2019	Gross β	7.11E-03	1.12E-03	477506	Gross β	1.84E-02	133%
L82260	4/29/2019	Gross β	8.95E-03	1.60E-03	477871	Gross β	1.82E-02	102%
L82347	5/6/2019	Gross β	6.89E-03	1.40E-03	478568	Gross β	1.73E-02	129%
L82453	5/13/2019	Gross β	8.94E-03	1.38E-03	479246	Gross β	1.61E-02	86%
L82522	5/20/2019	Gross β	1.44E-02	1.61E-03	479872	Gross β	2.19E-02	62%
L82625	5/28/2019	Gross β	7.89E-03	1.15E-03	480482	Gross β	2.03E-02	132%
L82757	6/3/2019	Gross β	1.06E-02	1.65E-03	481052	Gross β	1.64E-02	64%
L82830	6/10/2019	Gross β	1.33E-02	1.53E-03	481641	Gross β	2.26E-02	78%
L82921	6/17/2019	Gross β	9.88E-03	1.42E-03	482363	Gross β	2.24E-02	116%
L82999	6/24/2019	Gross β	7.60E-03	1.19E-03	483027	Gross β	1.64E-02	110%
L83117	7/1/2019	Gross β	9.32E-03	1.34E-03	483999	Gross β	2.68E-02	145%
L83249	7/8/2019	Gross β	8.97E-03	1.43E-03	484411	Gross β	2.19E-02	126%
L83325	7/15/2019	Gross β	6.71E-03	1.22E-03	484902	Gross β	2.51E-02	173%
L83417	7/22/2019	Gross β	1.21E-02	1.44E-03	485547	Gross β	3.00E-02	128%

Air Particulate (Cont.)								
TBE					GEL			TBE / GEL Relative Difference (%)
L83517	7/29/2019	Gross $\beta$	1.12E-02	1.64E-03	486160	Gross $\beta$	2.36E-02	107%
L83625	8/5/2019	Gross $\beta$	1.76E-02	1.66E-03	486847	Gross $\beta$	3.82E-02	111%
L83718	8/12/2019	Gross $\beta$	1.56E-02	1.64E-03	487589	Gross $\beta$	3.28E-02	107%
L83829	8/19/2019	Gross $\beta$	1.73E-02	1.64E-03	488436	Gross $\beta$	3.46E-02	100%
L83948	8/26/2019	Gross $\beta$	1.36E-02	1.63E-03	488954	Gross $\beta$	2.70E-02	99%
L84052	9/3/2019	Gross $\beta$	1.46E-02	1.46E-03	489583	Gross $\beta$	2.53E-02	80%
L84145	9/9/2019	Gross $\beta$	1.42E-02	1.70E-03	489955	Gross $\beta$	3.26E-02	118%
L84236	9/16/2019	Gross $\beta$	1.52E-02	1.61E-03	490477	Gross $\beta$	2.89E-02	93%
L84349	9/24/2019	Gross $\beta$	1.40E-02	1.38E-03	491301	Gross $\beta$	3.22E-02	118%
L84416	9/30/2019	Gross $\beta$	1.64E-02	1.83E-03	491733	Gross $\beta$	3.44E-02	106%
L84583	10/7/2019	Gross $\beta$	1.04E-02	1.42E-03	492608	Gross $\beta$	2.19E-02	107%
L84711	10/14/2019	Gross $\beta$	1.92E-02	1.79E-03	493098	Gross $\beta$	3.15E-02	73%
L84793	10/21/2019	Gross $\beta$	1.16E-02	1.51E-03	493833	Gross $\beta$	2.72E-02	121%
L84899	10/28/2019	Gross $\beta$	1.18E-02	1.65E-03	494817	Gross $\beta$	2.73E-02	119%
L84973	11/4/2019	Gross $\beta$	8.38E-03	1.37E-03	495537	Gross $\beta$	1.54E-02	89%
L85061	11/12/2019	Gross $\beta$	1.59E-02	1.49E-03	496233	Gross $\beta$	3.24E-02	102%
L85153	11/18/2019	Gross $\beta$	1.32E-02	1.78E-03	497041	Gross $\beta$	2.94E-02	114%
L85234	11/25/2019	Gross $\beta$	1.49E-02	1.60E-03	497683	Gross $\beta$	6.76E-02	192%
L85301	12/2/2019	Gross $\beta$	1.06E-02	1.40E-03	498013	Gross $\beta$	2.01E-02	93%
L85419	12/9/2019	Gross $\beta$	1.24E-02	1.42E-03	498724	Gross $\beta$	1.93E-02	65%
L85526	12/17/2019	Gross $\beta$	1.03E-02	1.25E-03	499411	Gross $\beta$	2.29E-02	114%
L85566	12/23/2019	Gross $\beta$	1.50E-02	1.79E-03	499815	Gross $\beta$	3.80E-02	130%
L85609	12/30/2019	Gross $\beta$	1.82E-02	1.68E-03	500038	Gross $\beta$	4.37E-02	124%

All four duplicate quarterly composite samples analyzed had positive results for Be-7.

AIR PARTICULATE COMPOSITES												
TBE						GEL			TBE / GEL Comparison			
LIMS #	Collection Date	Nuclide	Decay Corrected Activity	1 Sigma Error	Resolution	LIMS #	Nuclide	Decay Corrected Activity	Ratio	Acceptance Criteria	Agreement	
L82287	Q1 2019	Be-7	6.26E-02	7.25E-03	9	477005	Be-7	8.06E-02	1.29	0.60	1.66	YES
L83237	Q2 2019	Be-7	6.72E-02	1.01E-02	7	484868	Be-7	6.88E-02	1.02	0.50	2.00	YES
L84497	Q3 2019	Be-7	7.94E-02	8.95E-03	9	492922	Be-7	8.06E-02	1.02	0.60	1.66	YES
L85720	Q4 2019	Be-7	6.14E-02	6.35E-03	10	501553	Be-7	5.69E-02	0.93	0.60	1.66	YES

### 3. Surface Water

Naturally occurring K-40 was detected by GEL and TBE in 3 out of 4 duplicate samples analyzed. All 3 detections were in agreement.

SURFACE WATER												
TBE						GEL			TBE / GEL Comparison			
LIMS #	Collection Date	Nuclide	Decay Corrected Activity	1 Sigma Error	Resolution	LIMS #	Nuclide	Decay Corrected Activity	Ratio	Acceptance Criteria	Agreement	
L81736	3/19/19	K-40	4.46E+01	2.97E+01	2	474646	K-40	3.84E+01	0.86	0.40	2.25	YES
L82969	6/17/19	K-40	< MDC	N/A	N/A	482701	K-40	< MDC	N/A	N/A	N/A	N/A
L84341	9/17/19	K-40	8.70E+01	1.69E+01	5	491298	K-40	1.43E+02	1.07	0.50	2.00	YES
L85567	12/17/19	K-40	6.88E+01	1.31E+01	5	498816	K-40	8.24E+01	0.94	0.40	2.25	YES

## 4. Milk

Naturally occurring K-40 was detected in all 12 duplicate samples and are all in agreement with the exception of the sample collected on 11/4/2019. The results of the GEL analysis were slightly outside the NRC acceptance criteria. Notification 20844922 was initiated for this non-agreement.

Environmental samples such as milk, ground water, surface water, etc., are submitted to subcontracting laboratory Teledyne Brown Engineering (TBE) for radiological analysis based on a preset PSEG schedule. Such samples are taken, and analyses performed, to meet the requirements of the Radiological Environmental Monitoring Program (REMP) as set forth in the Salem and Hope Creek offsite dose calculation manuals.

## Sample Data:

A milk sample and duplicate (or split) milk sample were taken from ODCM site 14F4 between 11/03/2019 16:00 and 11/04/2019 06:00.

TBE results for K-40: 1.27E+03 pCi/L +/- 1.99E+02 pCi/L (official reported value)

GEL results for K-40: 2.22E+03 pCi/L +/- 8.05E+01 pCi/L (quality control value)

Even considering measurement uncertainty, the results of the two vendors do not overlap. In addition, the two results do not agree by the comparison method set forth in EN-AA-170-1000, Attachment 8.

This condition only occurred in one sample comparison on one date. All TBE K-40 results trended well with other 14F1 milk samples taken in 2019 and analyzed by TBE. All other 2019 results reported by GEL for K-40 for 14F1 trended well with both TBE and GEL 2019 results and agreed with TBE results.

## Vendor Follow-up:

GEL was contacted to ensure analyses parameters were correct (sample volume, counting geometry, etc). GEL confirmed that the analysis parameters were valid. The next scheduled milk PT sample agreed between both vendors.

MILK												
TBE						GEL			TBE / GEL Comparison			
LIMS #	Collection Date	Nuclide	Decay Corrected Activity	1 Sigma Error	Resolution	LIMS #	Nuclide	Decay Corrected Activity	Ratio	Acceptance Criteria		Agreement
L80807	1/8/2019	K-40	1.33E+03	7.70E+01	17	468715	K-40	1.63E+03	1.23	0.75	1.33	YES
L81180	2/5/2019	K-40	1.43E+03	9.10E+01	16	470902	K-40	1.34E+03	0.94	0.60	1.66	YES
L81521	3/5/2019	K-40	1.38E+03	9.75E+01	14	473110	K-40	1.32E+03	0.96	0.60	1.66	YES
L81975	4/8/2019	K-40	1.30E+03	9.75E+01	13	476333	K-40	1.47E+03	1.13	0.60	1.66	YES
L82385	5/6/2019	K-40	1.36E+03	7.35E+01	19	478722	K-40	1.37E+03	1.01	0.75	1.33	YES
L82750	6/3/2019	K-40	1.31E+03	9.05E+01	14	481057	K-40	1.19E+03	0.91	0.60	1.66	YES
L83250	7/8/2019	K-40	1.35E+03	5.35E+01	25	484415	K-40	1.77E+03	1.31	0.75	1.33	YES
L83649	8/5/2019	K-40	1.31E+03	8.70E+01	15	487113	K-40	1.24E+03	0.95	0.60	1.66	YES
L84083	9/3/2019	K-40	1.16E+03	8.40E+01	14	489509	K-40	1.27E+03	1.09	0.60	1.66	YES
L84600	10/6/2019	K-40	1.40E+03	8.95E+01	16	492625	K-40	1.21E+03	0.86	0.60	1.66	YES
L84974	11/4/2019	K-40	1.27E+03	9.95E+01	13	495539	K-40	2.22E+03	1.75	0.60	1.66	NO
L85314	12/2/2019	K-40	1.28E+03	9.10E+01	14	498221	K-40	1.47E+03	1.15	0.60	1.66	YES



### 5. Broad Leaf Vegetation

Naturally occurring K-40 was detected by GEL and TBE in all 19 duplicate samples analyzed. All results are in agreement.

VEGETATION												
TBE						GEL			TBE / GEL Comparison			
LIMS #	Collection Date	Nuclide	Decay Corrected Activity	1 Sigma Error	Resolution	LIMS #	Nuclide	Decay Corrected Activity	Ratio	Acceptance Criteria		Agreement
L82492	5/16/19	K-40	2.52E+03	2.22E+02	11	479513	K-40	2.58E+03	1.02	0.60	1.66	YES
L82492	5/16/19	K-40	1.87E+03	2.03E+02	9	479513	K-40	1.42E+03	0.76	0.60	1.66	YES
L82492	5/16/19	K-40	1.57E+03	1.56E+02	10	479513	K-40	2.18E+03	1.39	0.60	1.66	YES
L83364	7/16/19	K-40	4.39E+03	3.47E+02	13	485240	K-40	5.39E+03	1.23	0.60	1.66	YES
L83364	7/16/19	K-40	7.16E+03	4.24E+02	17	485240	K-40	7.49E+03	1.05	0.75	1.33	YES
L83455	7/24/19	K-40	1.24E+03	2.18E+02	6	485865	K-40	1.52E+03	1.23	0.50	2.00	YES
L83455	7/24/19	K-40	1.41E+03	1.75E+02	8	485865	K-40	1.84E+03	1.30	0.60	1.66	YES
L83455	7/24/19	K-40	2.17E+03	2.33E+02	9	485865	K-40	2.51E+03	1.16	0.60	1.66	YES
L83455	7/24/19	K-40	2.41E+03	2.85E+02	8	485865	K-40	2.03E+03	0.84	0.60	1.66	YES
L83455	7/24/19	K-40	1.46E+03	2.14E+02	7	485865	K-40	1.57E+03	1.08	0.50	2.00	YES
L83455	7/24/19	K-40	1.95E+03	1.77E+02	11	485865	K-40	2.64E+03	1.35	0.60	1.66	YES
L83455	7/24/19	K-40	1.45E+03	2.51E+02	6	485865	K-40	2.25E+03	1.55	0.50	2.00	YES
L83455	7/24/19	K-40	3.48E+03	2.84E+02	12	485865	K-40	2.36E+03	0.68	0.60	1.66	YES
L83455	7/24/19	K-40	1.36E+03	2.03E+02	7	485865	K-40	1.60E+03	1.18	0.50	2.00	YES
L83455	7/24/19	K-40	1.68E+03	2.02E+02	8	485871	K-40	1.87E+03	1.11	0.60	1.66	YES
L83455	7/24/19	K-40	2.00E+03	2.56E+02	8	485871	K-40	2.49E+03	1.25	0.50	2.00	YES
L83455	7/24/19	K-40	2.21E+03	2.56E+02	9	485871	K-40	2.16E+03	0.98	0.60	1.66	YES
L83455	7/24/19	K-40	3.04E+03	2.49E+02	12	485871	K-40	2.54E+03	0.84	0.60	1.66	YES
L83455	7/24/19	K-40	2.75E+03	2.23E+02	12	485871	K-40	1.83E+03	0.67	0.60	1.66	YES

### 6. Sediment

Naturally occurring K-40 was detected in 2 duplicate samples by both GEL and TBE. Results are in agreement.

SEDIMENT												
TBE						GEL			TBE / GEL Comparison			
LIMS #	Collection Date	Nuclide	Decay Corrected Activity	1 Sigma Error	Resolution	LIMS #	Nuclide	Decay Corrected Activity	Ratio	Acceptance Criteria		Agreement
L82672	5/22/19	K-40	2.17E+03	3.63E+02	6	480643	K-40	2.94E+03	1.35	0.50	2.00	YES
L83153	7/2/19	K-40	7.41E+03	6.75E+02	11	483986	K-40	9.16E+03	1.24	0.60	1.66	YES

### 7. Fish

Naturally occurring K-40 was detected in the sample by both GEL and TBE. Results are in agreement.

FISH												
TBE						GEL			TBE / GEL Comparison			
LIMS #	Collection Date	Nuclide	Decay Corrected Activity	1 Sigma Error	Resolution	LIMS #	Nuclide	Decay Corrected Activity	Ratio	Acceptance Criteria		Agreement
L82479	5/3/2019	K-40	3.41E+03	5.15E+02	7	479429	K-40	2.71E+03	0.79	0.50	2.00	YES

## V. RESULTS AND DISCUSSION

The analytical results of the 2019 REMP samples were divided into categories based on exposure pathways: atmospheric, direct radiation, terrestrial, and aquatic. The ingestion pathway was evaluated under the terrestrial and aquatic categories. The analytical results for the Reporting Period are summarized in Appendix A, Radiological Environmental Monitoring Program Summary. The data for individual samples are presented in Appendix C data tables. The data are compared to the preoperational REMP data (1973-1976) and to historical data since Site operation commenced. The samples collected and analysis results indicate that the Site REMP was conducted in compliance with the Site Technical Specifications and ODCMs.

Effluent monitoring for the Site has historically included samples and analyses not specifically required by the Site ODCMs in addition to those required. Management Audit Samples are samples that are taken to augment the radiological effluent monitoring program, but do not fulfill any regulatory requirement. These analyses are referenced throughout the Report as Management Audit Samples. PSEG Nuclear continues to collect these samples. In addition to summarizing the required samples as part of the REMP, Table A-1, "Radiological Environmental Monitoring Program Summary", of this report includes Management Audit Samples referenced in Table E-1 of each station's ODCM. Additionally, Appendix C of this report includes a series of tables with analytical analysis results for all samples collected as the broader scope of the REMP. These tables also contain results for Management Audit Samples, including those not specified in ODCM Table E-1.

The following is a list and quantity of the Management audit samples collected in 2019:

Management Audit Sample Type	Number of Samples
Vegetables	20
Well Water	12
Potable Water (raw / treated)	12 / 12
Fodder Crops	3
Soil	9
Game	3

### A. Atmospheric

APT (Air Particulate) samples were collected on glass fiber filters with low-volume air samplers sampling at approximately 1.5 SCFM. Air sample volumes were measured with calibrated dry-gas meters.

AIO samples (Air Iodine) were collected from the air by adsorption on triethylene-diamine (TEDA) impregnated charcoal cartridges connected in series after the APT filters.

#### 1. Air Particulates

APT samples were collected weekly at seven indicator locations (05S1, 07S2, 15S2, 05D1, 16E1, 01F1, and 02F6), one duplicate location (05S2) and one control location (14G1). Each weekly sample collected was analyzed for gross beta by TBE. Quarterly composites of the weekly samples from each location were analyzed for specific gamma emitters. The duplicate air location sample was shipped to GEL for

analysis (Tables C-1, C-2 and C-20).

#### Gamma Spectroscopy

Gamma spectroscopy was performed on each of the 32 quarterly composite samples. Naturally occurring Be-7 was detected and no other gamma emitters were detected in any of the samples.

Naturally occurring Be-7, attributed to cosmic ray activity in the atmosphere, was detected in all 28 indicator location composites at concentrations ranging from  $37\text{E-03 pCi/m}^3$  to  $79\text{E-03 pCi/m}^3$  with an average concentration of  $59\text{E-03 pCi/m}^3$ , and in the four control location composites ranging in concentration from  $40\text{E-03 pCi/m}^3$  to  $61\text{E-03 pCi/m}^3$  with an average concentration of  $53\text{E-03 pCi/m}^3$ . The maximum preoperational level detected was  $330\text{E-03 pCi/m}^3$  with an average concentration of  $109\text{E-03 pCi/m}^3$  (Table C-1 and Reference [1] RMC-TR-77-03).

#### Gross Beta

Gross beta activity was detected in all 364 of the indicator location samples at concentrations ranging from  $4\text{E-03 pCi/m}^3$  to  $36\text{E-03 pCi/m}^3$  with an average concentration of  $12\text{E-03 pCi/m}^3$ , and in 52 of 52 of the control location samples at concentrations ranging from  $4\text{E-03 pCi/m}^3$  to  $22\text{E-03 pCi/m}^3$  with an average of  $12\text{E-03 pCi/m}^3$ . Gross beta activity was less than ten times the yearly mean of control samples. Therefore, per the ODCM gamma isotopic analysis was not required to be performed on the individual samples. The maximum preoperational level detected was  $920\text{E-03 pCi/m}^3$  with an average concentration of  $74\text{E-03 pCi/m}^3$  (Table C-2 and Reference [1] RMC-TR-77-03). See Figures 1 and 1a (Appendix C).

#### 2. Air Iodine

AIO were collected weekly at seven indicator locations (05S1, 07S2, 15S2, 05D1, 16E1, 01F1, and 02F6), one duplicate location (05S2) and one control location (14G1). The duplicate air location sample was shipped to GEL for analysis. Each sample was analyzed by TBE for I-131, and all 416 samples were less than the MDC for both indicator and control samples during the Reporting Period. The maximum preoperational level detected was  $42\text{E-03 pCi/m}^3$  (Table C-3 and Reference [1] RMC-TR-77-03).

### **B. Direct Radiation**

Ambient radiation levels in the environment were monitored at locations on the Site and in the surrounding areas with pairs of passive dosimeters (PD) supplied and analyzed by Stamford Dosimetry/Environmental Dosimetry Co. Packets containing the PDs were placed in the owner-controlled area, around the Site at various distances, and in each land based meteorological sector. Six were placed in control locations and the balance of measurement locations were placed at areas of interest such as population centers, nearby residences, and schools.

A total of 58 Immersion Dose Monitor (IDM) locations were established to monitor for direct radiation during 2019, including:

- 21 on-site locations:  
01S1, 01S2, 02S2a, 02S4, 03S1, 04S1, 05S1, 06S2, 07S1, 08S1, 09S1, 10S1, 11S1, 12S1, 13S1, 14S1, 15S1, 15S2, 16S1, 16S2, and 16S3
- 32 off-site locations within the 10 mile zone:

04D2, 05D1, 10D1, 14D1, 15D1, 02E1, 03E1, 11E2, 12E1, 13E1, 16E1, 01F1, 02F2, 02F5, 02F6, 03F2, 03F3, 04F2, 05F1, 06F1, 07F2, 08F1, 09F1, 10F2, 11F1, 12F1, 13F2, 13F3, 13F4, 14F2, 15F3, and 16F2

- 6 control locations beyond 10 miles:  
01G3, 03G1, 10G1, 14G1, 16G1, and 03H1.

### Direct Radiation Annual Summary (mrem/year)

	2015		2016		2017		2018		2019	
	Gross	Net	Gross	Net	Gross	Net	Gross	Net	Gross	Net
<b>On-Site (ex. Spec Int)</b> (Inside the SB)	50.5	(ND)	48.5	(ND)	50.7	5.7	52.8	(ND)	49.3	(ND)
<b>Special Interest</b> (Inside the SB and influenced by ISFSI pad)	124.8	73.7	114.4	63.3	108.9	57.8	114.0	53.6	130.0	81.3
<b>Site Boundary (SB)</b>  % of 10 CFR 20 Limit 100 mrem/year at SB (net)	50.9	5.9 5.9%	47.4	(ND) 0%	45.5	(ND) 0%	49.9	(ND) 0%	48.0	(ND) 0%
<b>Intermediate Ring</b> (> SB, ≤ 5 mi)	54.7	(ND)	51.7	(ND)	51.5	(ND)	52.8	(ND)	52.8	(ND)
<b>Outer Ring</b> (> 5 mi., ≤ 10 mi.)	55.5	(ND)	52.0	(ND)	53.3	5.8	54.6	(ND)	54.4	(ND)
<b>Control Locations</b> (> 10mi)	55.4	(ND)	52.2	(ND)	54.3	(ND)	54.5	(ND)	54.0	(ND)

**Gross** = Normalized TLD reading before baseline subtract.      **Net** = Normalized TLD reading after baseline subtract.  
**(ND)** = Non Detect after baseline subtract.

The PDs at each location are changed and analyzed quarterly.

Two PDs (Panasonic type UD-814) are placed at each location. The laboratory utilizes a Panasonic based system using UD-814 dosimeters that are constructed of three rectangular, lead-shielded (protects against low-energy gamma radiation) teflon wafers, impregnated with 25% calcium sulfate phosphor (CaSO<sub>4</sub>:Dy) to monitor gamma radiation. Additionally, each PD has one lithium borate (LiBO:Mn) element to monitor beta radiation (which is not used).

In 2019 PSEG implemented American National Standards Institute (ANSI) N13.37-2014 Environmental Dosimetry - Criteria for System Design and Implementation for comparing each PD location dose result to its historical background dose. Per the standard a well-functioning dosimetry system should be able to detect a 5 mrem difference in the quarterly data and a 10 mrem difference in the yearly data above background.

The two site boundary locations 01S1 and 16S2 showed measurable dose rates above background. The net dose radiation levels as measured by these site boundary locations ranged from 16.4 to 24.7 mrem/Standard Quarter and an annual dose of 91.5 mrem for Locations 01S1, and 71.9 mrem for Location 16S2.

Dose to the nearest resident due to direct radiation from ISFSI was calculated to be 0.007 mrem/yr, which is a very small fraction (0.03%) of the 25 mrem/yr limit per 40 CFR 190 and 10 CFR 72.104. Both regulations limit the dose to a real member of the public to 25 mrem in a year to the total body. The calculation was performed using the formula provided in ANSI/HPS N13.37-2014 as follows:

$$D_2 = OF * \left( (D_1 * R_1^2) / R_2^2 \right)$$

Where:

- $D_1$  = Dose that was measured from TLD Location 01S1
- $D_2$  = Dose that will be extrapolated to Nearest Resident
- $R_1$  = Distance from the source to the location where  $D_1$  was obtained.  
(Distance from ISFSI to TLD at 01S1)
- $R_2$  = Distance from ISFSI to the location that dose will be extrapolated  
(Nearest Resident)
- OF = Occupancy Factor (1 = full time)

Location	$R_1$ (ft)	$D_1$ Annual Net Dose (mrem)	$R_2$ (ft)	OF	$D_2$ Annual Net Dose (mrem)
Nearest Resident	171	91.5	19,536	1.0	7.01 E-03

### C. Terrestrial

Terrestrial REMP sampling includes the collection of milk, well water, potable water, vegetables, and fodder crop samples.

Milk samples (MLK) were taken semi-monthly when cows were on pasture and monthly when cows were not grazing on open pasture, from three indicator locations (13E3, 14F4, 02G3) and one control location (03G1). Animals were considered on pasture from April to November of each year. Samples were collected in new polyethylene containers, sodium bisulfite was added as a sample preservative, and then samples were frozen and transported in ice chests to TBE.

Well water samples (WWA) were collected monthly from one location (03E1). Separate raw water (PWR) and treated potable water (PWT) composite samples were collected monthly from one location (02F3). Each monthly composite was made up of weekly samples. All samples were collected in new polyethylene containers and shipped to TBE for analysis.

Locally grown vegetables (FPV) were collected at the time of harvest at six locations (02F9, 03F8, 15F4, 01G1, 02G2, and 03H5); fodder crops (VGT) were sampled at three locations (13E3, 14F4, and 02G3); and broad leaf vegetation (FPL) was sampled at five locations (01S1, 07S2, 15S2, 16S1, and 10D1). The vegetables and fodder samples are

additional samples (Management Audit) taken to enhance the radiological monitoring program. There is no dairy farm within three miles of the Site, and there is only one dairy farm within five miles (13E3). Therefore, broadleaf vegetation is grown, maintained and harvested monthly during the growing season. All samples were weighed, packaged and shipped to TBE for analysis.

## 1. MILK

Milk samples were collected from two farms in New Jersey (02G3 and 03G1) and two farms in Delaware (13E3 and 14F4). Each sample was analyzed for I-131 and gamma emitters.

### I-131

I-131 was not detected above MDC in any of the 60 samples analyzed. The maximum preoperational level detected was 65 pCi/L, which occurred following a period of atmospheric nuclear weapons tests (Table C-5 and Reference [1] RMC-TR-77-03).

### Gamma Spectroscopy

No plant related gamma emitters were detected above the MDC in any of the indicator or control location milk samples.

Naturally occurring K-40 was detected in all 60 milk samples with concentrations for the 40 indicator location samples ranging from 1,152 pCi/L to 1,643 pCi/L with an average concentration of 1,368 pCi/L, and the 20 control location sample concentrations ranging from 1,148 pCi/L to 1,429 pCi/L, with an average concentration of 1,280 pCi/L. The maximum preoperational level detected was 2,000 pCi/L with an average concentration of 1,437 pCi/L (Table C-5 and Reference [1] RMC-TR-77-03).

## 2. WELL WATER (GROUND WATER)

Although offsite wells in the vicinity of the Site are not directly affected by plant operations, well water samples were collected monthly from one farm (03E1). Samples from this well are considered Management Audit samples.

### Gross Alpha

Gross alpha activity was not detected above the MDC in any of the 12 well water samples. The maximum preoperational level detected was 9.6 pCi/L (Table C-6 and Reference [1] RMC-TR-77-03).

### Gross Beta

Gross beta activity was detected in 2 of the 12 well water samples. Concentrations ranged from 2.9 pCi/L to 4.5 pCi/L with an average concentration of 3.7 pCi/L. The preoperational results ranged from <2.1 pCi/L to 38 pCi/L, with an average value of 9 pCi/L (Table C-6 and Reference [1] RMC-TR-77-03).

### Tritium

Tritium activity was not detected above the MDC in any of the 12 well water samples. The maximum preoperational level detected was 380 pCi/L (Table C-6 and Reference [1] RMC-TR-77-03).

#### I-131

I-131 activity was not detected in any of the 12 well water samples. No preoperational data were available for comparison, since I-131 was not analyzed as a specific radionuclide prior to 1989. However, I-131 analytical results to date have been below the MDC (Table C-7 and Reference [1] RMC-TR-77-03).

#### Gamma Spectroscopy

No plant related gamma emitters were detected above the MDC in any of the indicator or control location well water samples. Naturally occurring K-40 was not detected in any of the well water samples. The maximum preoperational levels detected were 30 pCi/L (Table C-7 and Reference [1] RMC-TR-77-03).

### 3. POTABLE WATER (DRINKING WATER)

Both raw and treated potable water samples were collected and composited at the local water treatment facility. Each sample consisted of weekly aliquots composited into a monthly sample. The raw water source for this plant is a combination of surface water from Laurel Lake and groundwater from its adjacent wells. These are Management Audit samples as no liquid effluents discharged from the Site directly affect this pathway.

#### Gross Alpha

No Gross alpha activity was detected above the MDC in any of the raw or treated water samples. The maximum preoperational level detected was 2.7 pCi/L (Table C-8 and Reference [1] RMC-TR-77-03).

#### Gross Beta

Gross beta activity was detected in all of the raw and treated water samples. The concentrations for the raw samples ranged from 3.2 pCi/L to 9.8 pCi/L, with an average concentration of 6.7 pCi/L. Concentrations for the treated water ranged from 2.8 pCi/L to 11.0 pCi/L, with an average concentration of 6.8 pCi/L. The maximum preoperational level detected was 9.0 pCi/L with an average concentration of 4.2 pCi/L (Table C-8 and Reference [1] RMC-TR-77-03).

#### Tritium

Tritium activity was not detected above the MDC in any of the 12 raw or 12 treated water samples. The maximum preoperational level detected was 350 pCi/L with an average of 179 pCi/L (Table C-8 and Reference [1] RMC-TR-77-03).

#### I-131

I-131 activity was not detected above the MDC in any of the 12 raw or 12 treated water samples. No preoperational data were available for comparison, since I-131 was not analyzed as a specific radionuclide prior to 1989. However, I-131 analytical results to date have been below the MDC (Table C-9 and Reference [1] RMC-TR-77-03).

#### Gamma Spectroscopy

No plant related gamma emitters were detected above the MDC in any of the 24 potable water samples. Naturally occurring K-40 was detected in 1 of the 12 raw samples at 97 pCi/L and 1 of the 12 treated water samples at 123 pCi/L. No preoperational data were available for comparison. Naturally occurring Ra-226 was not detected in any raw or treated water samples. The maximum preoperational level detected for Ra-226 was 1.4 pCi/L (Table C-9 and Reference [1] RMC-TR-77-03).

#### 4. BROADLEAF VEGETATION

Broadleaf vegetation was grown by PSEG personnel at four onsite locations and one offsite location in Delaware at 3.9 miles SSW for purposes of REMP sampling. These broadleaf vegetation samples were collected since there were no dairy farms operating within the five km (three mile) radius of the Site. The closest dairy farm (13E3) was located in Odessa, DE at 5.0 miles to the West.

All samples were analyzed for gamma emitters and included kale, cabbage, and collards. These samples were obtained from five indicator locations (21 samples) and one control locations (1 samples). The results for these samples are discussed below.

##### Gamma Spectroscopy

No plant related gamma emitters were detected above the MDC in any of the indicator or control location broadleaf vegetation samples.

Naturally occurring Be-7, attributed to cosmic ray activity in the atmosphere, was detected above the MDC in 2 of the 20 indicator location samples with concentrations ranging from 208.3 pCi/kg (wet) to 523.3 pCi/kg (wet), with an average concentration of 366 pCi/kg (wet). Be-7 was not detected in the control location sample. No preoperational Be-7 data was available for comparison (Table C-10).

Naturally occurring K-40 was detected in all 20 indicator samples, with concentrations ranging from 4,206 pCi/kg (wet) to 8,939 pCi/kg (wet) with an average concentration of 6,363 pCi/kg (wet), and in the control location sample at 1,680 pCi/kg (wet). The maximum preoperational level detected was 4,800 pCi/kg (wet) with an average concentration of 2,140 pCi/kg (wet) (Table C-10 and Reference [1] RMC-TR-77-03).

#### 5. VEGETABLES

There are no farm products that are irrigated with water in which plant effluents have been discharged. The Delaware River at the location of the Site is brackish and therefore is not used for irrigation.

A variety of food products were sampled on and around the Site; however, the variety was dependent on the farmer's preference. These vegetables were collected as Management Audit samples.

All samples were analyzed for gamma emitters and included asparagus, sweet corn, peppers, tomatoes, and peaches. These samples were obtained from seven indicator locations (20 samples). The results for these samples are discussed below.

##### Gamma Spectroscopy

No plant related gamma emitters were detected above the MDC in any of the indicator or control location vegetable samples.

Naturally occurring Be-7, attributed to cosmic ray activity in the atmosphere, was not detected above the MDC in any of the vegetables samples.

Naturally occurring K-40 was detected in all 20 indicator samples, with concentrations ranging from 1,224 pCi/kg (wet) to 3,481 pCi/kg (wet) with an average concentration of 1,946 pCi/kg (wet). The maximum preoperational level detected was 4,800 pCi/kg (wet) with an average concentration of 2,140 pCi/kg (wet) (Table C-10 and Reference [1] RMC-TR-77-03).



## 6. FODDER CROPS

Although not required by the Site ODCMs, three samples of silage normally used as cattle feed were collected from three indicator locations. It was determined that these products could be an element in the food-chain pathway. These fodder crops were collected as Management Audit samples and analyzed for gamma emitters. All three locations from which samples were collected are milk sampling locations.

### Gamma Spectroscopy

No plant related gamma emitters were detected above the MDC in any of the indicator or control location fodder crop samples. Naturally occurring Be-7, attributed to cosmic ray activity in the atmosphere, was detected in two of the three indicator samples with an average concentration of 232.1 pCi/kg (wet). The maximum preoperational level detected for fodder was 4,700 pCi/kg (wet) with an average concentration of 2,000 pCi/kg (wet) (Table C-11 and Reference [1] RMC-TR-77-03).

Naturally occurring K-40 was detected in all three indicator samples at concentrations ranging from 2,624 pCi/kg (wet) to 8,375 pCi/kg (wet) with an average concentration of 5,080 pCi/kg (wet). Preoperational results averaged 7,000 pCi/kg (wet) (Table C-11 and Reference [1] RMC-TR-77-03).

## 7. SOIL

Soil is sampled every three years and analyzed for gamma emitters. Nine locations were sampled in 2019. These Management Audit samples were collected in areas that have been relatively undisturbed since the last collection in order to determine any change in the radionuclide inventory of the area (Table C-12).

### Gamma Spectroscopy

Naturally occurring K-40 was detected in all nine indicator samples at concentrations ranging from 4,610 to 14,410 pCi/kg (dry) with an average concentration of 9,376 pCi/kg (dry). The maximum preoperational level detected was 24,000 pCi/kg (dry) with an average of 10,000 pCi/kg (dry) (Table C-12).

Cs-137 was detected in three of the nine indicator samples at concentrations ranging from 82 to 231 pCi/kg (dry) with an average concentration of 155 pCi/kg (dry). The maximum preoperational level detected was 2,800 pCi/kg (dry) with an average of 800 pCi/kg (dry). See Figure 2 for graphical presentation (Table C-12).

Historically, Cs-137 has been observed in REMP soil samples and attributed to the above mentioned weapons testing. The values observed in these samples are consistent with prior results, and are below the NRC's predicted values of Cs-137 for the New Jersey area soils as a result of fallout from atmospheric weapons testing. Furthermore, the analyzed samples were at concentrations many orders of magnitude above the theoretical impact by plant operation given the Cs-137 concentrations in plant effluents back through 2005.

Additionally, soil is not a formal component of the REMP, nor is it required to be collected as part of the REMP in accordance with the ODCM; it is collected as a REMP Management Audit sample. As such, the ODCM specifies no reportability or LLD thresholds for soil samples. PSEG REMP Implementation procedure, Attachment 1 (Analytical Results Investigation Levels) provides an investigation threshold of 1,000 pCi/kg for Cs-137 in soil and sediment, which is based on the expected concentrations for our region from sources other than plant operation as

recognized by the NRC in DOCKET NO.50-219, RFTA NO. 99-040.

This evaluation validated suppositions and will appropriately characterize positive sample results obtained in future sampling evolutions as related to atmospheric testing, provided that:

- Soil concentrations are less than 1,000 pCi/kg
- Annual gaseous Cs-137 effluents are reviewed and do not show a significant increase
- Cs-134 is not detected (Cs-134 is plant related and has a much shorter half-life than Cs-137)
- D/Q values continue to be routinely evaluated and are updated as necessary

For the above reasons, it can be concluded that the samples are primarily the result of atmospheric testing, with negligible contribution from site operations at PSEG Nuclear's three reactors.

Although it has been concluded the Cs-137 in the soil is due to fallout from atmospheric weapons testing, there is essentially no radiological impact to the environment or a member of the public with respect to the annual dose. To demonstrate this, a skin dose calculation was performed for a theoretical person who stood on the soil at location 05F1 for 1,000 hours per year (arbitrary number). This calculation concluded the dose to a member of the public beyond the site boundary would be a mere 2.70E-1 mrem/yr (1.8% of the annual skin dose limit of 15 mrem/yr), which conforms to 10 CFR 50 Appendix I. Since this activity has been determined to be non-site related, a better comparison is the calculated skin dose against background radiation levels (or approximately 0.1% of the 300 mrem/yr background dose).

Naturally occurring Ra-226 was detected in three of the nine indicator samples at concentrations ranging from 2,090 to 4,079 pCi/kg (dry) with an average concentration of 2,901 pCi/kg (dry). The maximum preoperational level detected was 1,500 pCi/kg (dry) with an average of 870 pCi/kg (dry) (Table C-12).

Naturally occurring Th-232 was detected in all of the nine indicator samples at concentrations ranging from 387 to 1,007 pCi/kg (dry) with an average concentration of 678 pCi/kg (dry). The maximum preoperational level detected was 1,400 pCi/kg (dry) with an average of 740 pCi/kg (dry) (Table C-12).

The analysis of data and review of industry reports indicates that the non-naturally occurring activity found in the soil samples associated with the 2019 triennial REMP soil collection could not be just from Salem and Hope Creek effluents, and likely are from atmospheric weapons testing.

## 8. GAME

Although not required by the Site ODCMs, three muskrat samples were collected from three indicator locations. The game samples were collected as Management Audit samples and analyzed for gamma emitters.

### Gamma Spectroscopy

No plant related gamma emitters were detected above the MDC in any of the indicator game samples. Naturally occurring K-40 was detected in all samples at concentrations ranging from 3,004 to 3,061 pCi/kg (wet) with an average concentration of 3,038 pCi/kg (wet). No preoperational data was available for comparison (Table C-13 and Reference [1] RMC-TR-77-03).

#### **D. Aquatic**

This sample set includes edible fish, shoreline and riverbed sediment, surface water, and crabs.

Surface water samples were collected offshore in new polyethylene containers that were rinsed twice with the sample medium prior to collection. The surface water samples were transported to TBE for analysis.

Edible fish were collected using gill nets while crabs were caught in commercial traps. These samples were processed by separating the flesh from the bone and shell. The flesh was placed in sealed containers and frozen before being transported in ice chests to TBE for analysis.

Sediment samples were taken with a bottom grab sampler and frozen in sealed polyethylene containers before being transported in ice chests to TBE. For the river bottom sediment, a marine GPS was used to locate the correct site and the sampling boat was maneuvered over the area until the correct amount of sample was obtained (grabbed) with the sediment dredge.

Location 06S2 shoreline sediment sample (an onsite location) was sampled as follows: A square area, measuring one meter on each side was staked out and then divided into a grid of nine smaller boxes, three per side. A one inch deep scoop from the center of each of the small grids was taken. All the aliquots were combined and the total sample transported in the ice chest to TBE.

##### **1. SURFACE WATER**

Surface water samples were collected twice a month at four indicator locations and one control location in the Delaware River Estuary. The two samples for the month were combined to create a single monthly composite sample that was then analyzed. One location (11A1) is at the outfall area (which is the area potentially impacted by effluents discharged from the Site into the Delaware River), one location is downstream from the outfall area (07E1), and one location is directly west of the outfall area at the mouth of the Appoquinimink River (12C1). Samples were collected upstream in the Delaware River (01F2) and at the mouth of the Chesapeake and Delaware Canal (16F1) the latter being sampled when the flow was from the Canal into the river.

Location 12C1, located directly west of the Site, at the mouth of the Appoquinimink River, serves as the control. 12C1 was chosen as the control location because the physical characteristics of this location more closely resemble those of the outfall area than do those at the farther upstream location (01F2). As discussed in the preoperational summary report, due to its tidal nature, there were flow rate and salinity variations in the Delaware River Estuary. These variations accounted for the differences in K-40 concentrations.

##### **Tritium**

Tritium activity was detected in 1 of the 49 indicator and none of the 12 control location samples. The occurrences were from a sample collected at location 11A1. The detected concentration was 211 pCi/L. The maximum preoperational

level detected was 600 pCi/L, with an average concentration of 210 pCi/L (Table C-14 and Reference [1] RMC-TR-77-03). See Figure 3 for graphical presentation.

**(Notification 20825900)**

Gamma Spectroscopy

No plant related gamma emitters were detected above the MDC in any of the indicator or control surface water samples.

Naturally occurring K-40 was detected in 12 of the 49 indicator location samples at concentrations ranging from 42 pCi/L to 123 pCi/L, with an average of 85 pCi/L. K-40 was detected in 4 of the 12 control location samples at an average concentration of 74 pCi/L. The maximum preoperational level detected for K-40 was 200 pCi/L with an average concentration of 48 pCi/L (Table C-15 and Reference [1] RMC-TR-77-03).

I-131

I-131 was not detected above the MDC in any of the 49 indicator samples or in any of the control location samples (Table C-15).

2. FISH

Edible species of fish were collected semi-annually at two indicator locations and one control location and analyzed for gamma emitters in edible flesh. Sample species collected in 2017 were perch, striped bass and catfish.

Gamma Spectroscopy

No plant related gamma emitters were detected above the MDC in any of the indicator or control location fish samples. Naturally occurring K-40 was detected in all 9 indicator location samples at concentrations ranging from 2,744 pCi/kg (wet) to 4,625 pCi/kg (wet) with an average concentration of 3,618 pCi/kg (wet). All 5 control location samples had concentrations ranging from 2,817 pCi/kg (wet) to 5,205 pCi/kg (wet), with an average of 3,938 pCi/kg (wet). The maximum preoperational detection was 13,000 pCi/kg (wet) with an average concentration of 2,900 pCi/kg (wet) (Table C-16 and Reference [1] RMC-TR-77-03).

3. BLUE CRAB

Blue crab samples were collected twice during the season at one indicator and one control location. The edible portions were analyzed for gamma emitters.

Gamma Spectroscopy

No plant related gamma emitters were detected above the MDC in any of the indicator or control location blue crab samples. Naturally occurring K-40 was detected in both indicator location samples at concentrations of 2,685 pCi/kg (wet) and 3,970 pCi/kg (wet) with an average concentration of 3,327 pCi/kg (wet). Both control location samples had concentrations of 2,527 pCi/kg (wet) and 2,576 pCi/kg (wet), with an average concentration of 2,552 pCi/kg (wet). The maximum preoperational level for K-40 detected was 12,000 pCi/kg (wet) with an average concentration of 2,835 pCi/kg (wet). All other gamma emitters were less than the MDC (Table C-17 and Reference [1] RMC-TR-77-03).

#### 4. SEDIMENT

Sediment samples were collected semi-annually from six indicator locations and one control location. Location 06S2 was the only shoreline sediment sample location that was directly subjected to tidal fluctuations. The remaining locations were located offshore.

##### Gamma Spectroscopy

Naturally occurring K-40 was detected in all 12 indicator location samples at concentrations ranging from 2,169 pCi/kg (dry) to 19,520 pCi/kg (dry), with an average concentration of 8,596 pCi/kg (dry). Both control locations samples had concentrations of 11,910 pCi/kg (dry) and 15,280 pCi/kg (dry) with an average concentration of 13,595 pCi/kg (dry). The maximum preoperational level detected was 21,000 pCi/kg (dry) with an average concentration of 15,000 pCi/kg (dry) (Table C-18 and Reference [1] RMC-TR-77-03).

Cs-137 was not detected in any of the indicator or control samples. The maximum preoperational level detected was 400 pCi/kg (dry) with an average concentration of 150 pCi/kg (dry) (Table C-18 and Reference [1] RMC-TR-77-03).

Naturally occurring Ra-226 was detected in 4 of the 12 indicator location samples at concentrations ranging from 1,751 pCi/kg (dry) to 3,602 pCi/kg (dry) with an average concentration of 2,497 pCi/kg (dry) and was not detected above the MDC in the control location samples. The maximum preoperational level detected was 1,200 pCi/kg (dry) with an average concentration of 760 pCi/kg (dry) (Table C-18 and Reference [1] RMC-TR-77-03).

Naturally occurring Th-232 was detected in 9 of the 12 indicator location samples at concentrations ranging from 416 pCi/kg (dry) to 947 pCi/kg (dry) with an average concentration of 714 pCi/kg (dry), and in both of the control location samples at concentrations of 962 pCi/kg (dry) and 1,068 pCi/kg (dry) with an average concentration of 1,015 pCi/kg (dry). The maximum preoperational level detected was 1,300 pCi/kg (dry) with an average concentration of 840 pCi/kg (dry). All other gamma emitters were less than the MDC (Table C-18 and Reference [1] RMC-TR-77-03).

#### E. Land Use Census

A land use census was conducted during the reporting period in each of the 16 meteorological sectors to identify, within a distance of 8 km (5 miles), the location of the nearest milk animal, the nearest meat animal, the nearest residence and the nearest garden of greater than 50 m<sup>2</sup> (500 ft<sup>2</sup>) producing broad leaf vegetation. In accordance with the Site ODCMs, the survey was performed using a visual survey, Post Office inquiries, Yellow Pages, and Google Earth mapping software.

No cultural or historic resource officially identified and confirmed by regulatory agencies is known to exist at PSEG.

A comparison of the identified locations from the 2019 table with the 2018 table shows that there was no change to the nearest resident or vegetable garden larger than 50 m<sup>2</sup> (500 ft<sup>2</sup>) with broadleaf vegetation. Dose evaluations do not need to be updated and no changes to the Site ODCMs are required. The 2019 Land Use Survey results are summarized below:

<b>Meteorological Sector</b>	<b>Milk Animal</b> <i>within 8 km (5 miles)</i> <b>km (miles)</b>	<b>Residence</b> <i>within 8 km (5 miles)</i> <b>km (miles)</b>	<b>Vegetable Garden &gt; 500SF</b> <i>within 8 km (5 miles)</i> <b>km (miles)</b>	<b>Meat Animal</b> <i>within 8 km (5 miles)</i> <b>km (miles)</b>
N	None	None	None	None
<b>NNE</b>	None	<b>8.0 (5.0)</b>	None	None
<b>NE</b>	None	<b>6.2 (3.9)</b>	None	<b>6.8 (4.2)</b>
<b>ENE</b>	None	<b>6.2 (3.9)</b>	None	None
E	None	None	None	None
ESE	None	None	None	None
SE	None	None	None	None
SSE	None	None	None	None
S	None	None	None	None
<b>SSW</b>	None	<b>6.2 (3.9)</b>	None	None
<b>SW</b>	None	<b>6.9 (4.3)</b>	None	None
<b>WSW</b>	None	<b>7.1 (4.4)</b>	None	None
<b>W</b>	<b>8.0 (5.0)</b>	<b>6.5 (4.0)</b>	None	None
<b>WNW</b>	None	<b>5.5 (3.4)</b>	None	None
<b>NW</b>	None	<b>5.9 (3.7)</b>	None	None
<b>NNW</b>	None	<b>6.8 (4.2)</b>	None	None

#### **VI. ANNOTATIONS TO PREVIOUS AREOR**

NONE

#### **VII. HOPE CREEK TECHNICAL SPECIFICATION LIMIT FOR PRIMARY WATER IODINE CONCENTRATION**

The HCGS primary coolant results for Dose Equivalent Iodine-131, Total Gamma, and Total Beta were reviewed. The specific activity of the primary coolant did not exceed 0.2 micro curies per gram Dose Equivalent I-131 (DEI).

The Total Gamma and the Total Beta activity (microcuries per gram) did not exceed the 100/E-Bar limit. Therefore, HCGS did not exceed the Technical Specifications limit specified in section 3.4.5.

## **VIII. CONCLUSIONS**

The Radiological Environmental Monitoring Program for the Site was conducted during 2019 in accordance with the Site ODCMs. The required sample analysis LLD values were achieved (See Appendix A and Appendix C) and the REMP objectives were met. The data collected demonstrates that the Site was operated in compliance with the Site ODCMs' REMP requirements.

The concentration of radioactive material in the environment that could be attributable to Site operations was only a small fraction of the total radioactivity when compared to the concentration of naturally occurring and non-plant related man-made radioactivity in the environment.

Since these results were comparable to the results obtained during the preoperational phase of the program, which ran from 1973 to 1976, and with historical results collected since commercial operation, it can be concluded that the operation of the Site had no significant radiological impact on the health and safety of the public or on the environment.

## **IX. REFERENCES**

- [1] Radiation Management Corporation. "Artificial Island Radiological Environmental Monitoring Program - Reoperation Summary - 1973 through 1976". RMC-TR-77-03, 1978.
- [2] Public Service Enterprise Group. "Offsite Dose Calculation Manual" - Salem Generating Station. Revisions 27 and 28.
- [3] Public Service Enterprise Group. "Offsite Dose Calculation Manual" - Hope Creek Generating Station. Revisions 27 and 28.
- [4] U.S. Nuclear Regulatory Commission: NUREG-1301, "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors", published April 1991.
- [5] U.S. Nuclear Regulatory Commission: NUREG-1302, "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors", published April 1991.
- [6] U.S. Atomic Energy Commission, Docket NOS. 50-272/50-311, "Salem Nuclear Generating Station Units 1 and 2, Environmental Report, Operating License Stage".

APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING

PROGRAM SUMMARY



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## SAMPLE DESIGNATION

Samples locations are generally identified by a three part code. 1) The first two letters are the program identification code. Because of the proximity of the SGS and HCGS, a common environmental surveillance program is conducted. The identification code, "SA", has been applied to SGS and HCGS. 1) The next three letters identify the media sampled.

AIO = Air Iodine	IDM = Immersion Dose (TLD)
APT = Air Particulate	MLK = Milk
ECH = Hard Shell Blue Crab	PWR = Potable Water (Raw)
ESF = Edible Fish	PWT = Potable Water (Treated)
ESS = Sediment	SOL = Soil
FPL = Green Leaf Vegetables	SWA = Surface Water
FPV = Vegetables (Various)	VGT = Fodder Crops (Various)
GAM = Game (Muskrat)	WWA= Well Water

3) The last three or four alphanumeric designator is a general location code based on direction and distance from a standard reference point (SSRLL) The reference point is located at the midpoint between the center of the SGS Unit 1 and Unit 2 containments. Of these, the first one or two represent each of the sixteen angular sectors of 22.5 degrees centered about the reactor site. Sector one is divided evenly by the north axis and other sectors are numbered in a clockwise direction as follows:

The first numerical digits are the directional sector designator

01 = N	05 = E	09 = S	13 = W
02 = NNE	06 = ESE	10 = SSW	14 = WNW
03 = NE	07 = SE	11 = SW	15 = NW
04 = ENE	08 = SSE	12 = WSW	16= NNW

The next alpha character represents the radial distance from the reference point:

S = On-site location	E = 4-5 miles off-site
A = 0-1 miles off-site	F = 5-10 miles off-site
B = 1-2 miles off-site	G = 10-20 miles off-site
C = 2-3 miles off-site	H = >20 miles off-site
D = 3-4 miles off-site	

The last number is the location numerical designation within each sector and zone; e.g. 1,2,3,...etc.

For example, the location designation SA-WWA-03E1 would indicate a sample in the SGS and HCGS program (SA) consisting of well water (WWA) which was collected in sector number 03, centered at 45 degrees (north east) with respect to the midpoint between SGS Units 1 and 2 Containments at a radial distance of 4 to 5 miles offsite, (therefore, radial distance E). The number 1 indicates that this is sampling location number 1 in that particular sector.

### **SAMPLING LOCATIONS**

All sampling locations and specific information about the individual locations are given in Appendix B, Table B-2. Additionally Maps B-1, B-2, and B-3 of Appendix B show the locations of sampling locations with respect to the Site. Not all locations in Table B-2 are required sample locations. Some of the locations identified in Table B-2 are used for management audit samples.

# TABLE A-1

## Radiological Environmental Monitoring Program Summary

SALEM GENERATING STATION  
HOPE CREEK GENERATING STATION  
SALEM COUNTY, NEW JERSEY

DOCKET NO. 50-272/-311  
DOCKET NO. 50-354

REPORTING PERIOD: January 1, 2019 - December 31, 2019

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND <i>TOTAL NUMBER</i> OF ANALYSIS PERFORMED	LOWER LIMIT OF DETECTION (LLD*)	ALL INDICATOR LOCATIONS	LOCATION WITH HIGHEST MEAN		CONTROL LOCATION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
			MEAN (f) ** ( <i>RANGE</i> )	NAME DISTANCE AND DIRECTION	MEAN (f) ** ( <i>RANGE</i> )	MEAN (f) ** ( <i>RANGE</i> )	
I. AIRBORNE							
AIR PARTICULATE (E-3 pCi/m³)	Gr-B <u>416</u>	10	12 (364/364) (5/25)	SA-APT-14G1 (C) 11.8 MILES WNW	13 (52/52) (7/23)	13 (52/52) (7/23)	0
	GAMMA Be-7 <u>32</u>	N/A	66.1 (28/28) (50.0/87.3)	SA-APT-15S2 0.59 MILES NW	70.7 (4/4) (54.8/87.3)	66.7 (4/4) (46.3/92.4)	0
	K-40	N/A	<MDC	N/A	N/A	<MDC	0
	Cs-134	50	<MDC	N/A	N/A	<MDC	0
	Cs-137	60	<MDC	N/A	N/A	<MDC	0
AIR IODINE (E-3 pCi/m³)	GAMMA I-131 <u>416</u>	70	<MDC	N/A	N/A	<MDC	0
II. DIRECT							
DIRECT RADIATION (mR/standard quarter)	TLD-QUARTERLY <u>236</u>	N/A	15.2 (212/212) (11.2/38.2)	SA-IDM-1S1 0.57 MILES N	36.4 (4/4) (33.3/38.2)	14.9 (24/24) (13.4/16.6)	0
III. TERRESTRIAL							
MILK (pCi/L)	I-131 (LOW LVL) <u>60</u>	1	<MDC	N/A	N/A	<MDC	0
	GAMMA K-40 <u>60</u>	N/A	1368 (40/40) (1152/1643)	SA-MLK-13E3 5.0 MILES W	1372 (20/20) (1152/1633)	1280 (20/20) (1148/1429)	0
	Cs-134	15	<MDC	N/A	N/A	<MDC	0
	Cs-137	18	<MDC	N/A	N/A	<MDC	0
	BaLa-140	15	<MDC	N/A	N/A	<MDC	0
	Ra-226	N/A	<MDC	N/A	N/A	<MDC	0
WELL WATER (pCi/L)	Gr-A <u>12</u>	3	<MDC	N/A	N/A	N/A	0
	Gr-B <u>12</u>	4	3.7 (2/12) (2.9/4.5)	SA-WWA-3E 4.2 MILES NE	3.7 (2/12) (2.9/4.5)	N/A	0
	H-3 <u>12</u>	200	<MDC	N/A	N/A	N/A	0

# TABLE A-1

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			MEAN (f) ** ( <i>RANGE</i> )	NAME DISTANCE AND DIRECTION	MEAN (f) ** ( <i>RANGE</i> )	MEAN (f) ** ( <i>RANGE</i> )	
WELL WATER (cont.) (pCi/L)	I-131 (LOW LVL) <u>12</u>	1	<MDC	N/A	N/A	N/A	0
	GAMMA <u>12</u>						
	K-40	N/A	<MDC	N/A	N/A	N/A	0
	Mn-54	15	<MDC	N/A	N/A	N/A	0
	Co-58	15	<MDC	N/A	N/A	N/A	0
	Fe-59	30	<MDC	N/A	N/A	N/A	0
	Co-60	15	<MDC	N/A	N/A	N/A	0
	Zn-65	30	<MDC	N/A	N/A	N/A	0
	ZrNb-95	15	<MDC	N/A	N/A	N/A	0
	Cs-134	15	<MDC	N/A	N/A	N/A	0
	Cs-137	18	<MDC	N/A	N/A	N/A	0
	BaLa-140	15	<MDC	N/A	N/A	N/A	0
	Ra-226	N/A	<MDC	N/A	N/A	N/A	0
POTABLE WATER (RAW) (pCi/L)	Gr-A <u>12</u>	3	<MDC	N/A	N/A	N/A	0
	Gr-B <u>12</u>	4	7 (12/12) (3.2/9.8)	SA-PWR-2F3 8.0 MILES NNE	7 (12/12) (3.2/9.8)	N/A	0
	H-3 <u>12</u>	200	<MDC	N/A	N/A	N/A	0
	I-131 (LOW LVL) <u>12</u>	1	<MDC	N/A	N/A	N/A	0
	GAMMA <u>12</u>						
	K-40	N/A	97 (1/12)	SA-PWR-2F3 8.0 MILES NNE	97 (1/12)	N/A	0
	Mn-54	15	<MDC	N/A	N/A	N/A	0
	Co-58	15	<MDC	N/A	N/A	N/A	0

# TABLE A-1

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			MEAN (f) ** (RANGE)	NAME DISTANCE AND DIRECTION	MEAN (f) ** (RANGE)	MEAN (f) ** (RANGE)	
POTABLE WATER (RAW) (cont.) (pCi/L)	Fe-59	30	<MDC	N/A	N/A	N/A	0
	Co-60	15	<MDC	N/A	N/A	N/A	0
	Zn-65	30	<MDC	N/A	N/A	N/A	0
	ZrNb-95	15	<MDC	N/A	N/A	N/A	0
	Cs-134	15	<MDC	N/A	N/A	N/A	0
	Cs-137	18	<MDC	N/A	N/A	N/A	0
	BaLa-140	15	<MDC	N/A	N/A	N/A	0
	Ra-226	N/A	<MDC	N/A	N/A	N/A	0
POTABLE WATER (TREATED) (pCi/L)	<b>Gr-A</b> <u>12</u>	3	<MDC	N/A	N/A	N/A	0
	<b>Gr-B</b> <u>12</u>	4	6.8 (11/12) (2.8/11)	SA-PWT-2F3 8.0 MILES NNE	6.8 (11/12) (2.8/11)	N/A	0
	<b>H-3</b> <u>12</u>	200	<MDC	N/A	N/A	N/A	0
	<b>I-131 (LOW LVL)</b> <u>12</u>	1	<MDC	N/A	N/A	N/A	0
	<b>GAMMA</b> <u>12</u> K-40	N/A	123 (1/12)	SA-PWT-2F3 8.0 MILES NNE	123 (1/12)	N/A	0
	Mn-54	15	<MDC	N/A	N/A	N/A	0
	Co-58	15	<MDC	N/A	N/A	N/A	0
	Fe-59	30	<MDC	N/A	N/A	N/A	0
	Co-60	15	<MDC	N/A	N/A	N/A	0
	Zn-65	30	<MDC	N/A	N/A	N/A	0
	ZrNb-95	15	<MDC	N/A	N/A	N/A	0
	Cs-134	15	<MDC	N/A	N/A	N/A	0

# TABLE A-1

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			MEAN (f) ** ( <i>RANGE</i> )	NAME DISTANCE AND DIRECTION	MEAN (f) ** ( <i>RANGE</i> )	MEAN (f) ** ( <i>RANGE</i> )	
POTABLE WATER (cont.) (pCi/L)	Cs-137	18	<MDC	N/A	N/A	N/A	0
	BaLa-140	15	<MDC	N/A	N/A	N/A	0
	Ra-226	N/A	<MDC	N/A	N/A	N/A	0
BROAD-LEAF FPL (pCi/kg wet)	<b>GAMMA</b> <u>21</u> Be-7	N/A	366 (2/20) (208.3/523.3)	SA-FPL-10D1 3.9 MILES SSW	366 (2/3) (208.3/523.3)	<MDC	0
	K-40	N/A	6363 (20/20) (4206/8939)	SA-FPL-10D1 3.9 MILES SSW	6964 (3/3) (5777/8939)	1680 (1/1)	0
	I-131	60	<MDC	N/A	N/A	<MDC	0
	Cs-134	60	<MDC	N/A	N/A	<MDC	0
	Cs-137	80	<MDC	N/A	N/A	<MDC	0
	Ra-226	N/A	635 (1/20)	SA-FPL-10D1 3.9 MILES SSW	635 (1/3)	<MDC	0
	Th-232	N/A	<MDC	N/A	N/A	<MDC	0
VEGETABLES, FPV (pCi/kg wet)	<b>GAMMA</b> <u>20</u> Be-7	N/A	<MDC	N/A	N/A	N/A	0
	K-40	N/A	1946 (20/20) (1224/3481)	SA-FPV-15F4 7.0 MILES NW	2749 (1/1)	N/A	0
	I-131	60	<MDC	N/A	N/A	N/A	0
	Cs-134	60	<MDC	N/A	N/A	N/A	0
	Cs-137	80	<MDC	N/A	N/A	N/A	0
	Ra-226	N/A	<MDC	N/A	N/A	N/A	0
	Th-232	N/A	<MDC	N/A	N/A	N/A	0
FODDER CROPS (pCi/kg wet)	<b>GAMMA</b> <u>3</u> Be-7	N/A	232.1 (2/3) (168.8/295.4)	SA-VGT-14F4 7.6 MILES WNW	295.4 (1/1)	N/A	0

# TABLE A-1

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DOCKET NO. 50-354  
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			MEAN (f) ** (RANGE)	NAME DISTANCE AND DIRECTION	MEAN (f) ** (RANGE)	MEAN (f) ** (RANGE)	
FODDER CROPS (cont.) (pCi/kg wet)	K-40	N/A	5079.7 (3/3) (2624/8375)	SA-VGT-13E3 5.0 MILES W	8375 (1/1)	N	0
	I-131	60	<MDC	N/A	N/A	N /	0
	Cs-134	60	<MDC	N/A	N/A	N /	0
	Cs-137	80	<MDC	N/A	N/A	N /	0
	Ra-226	N/A	<MDC	N/A	N/A	N /	0
	Th-232	N/A	<MDC	N/A	N/A	N /	0
SOIL (pCi/kg dry)	<b>GAMMA</b> <u>9</u> Be-7	N/A	<MDC	N/A	N/A	N /	0
	K-40	N/A	9376 (9/9) (4610/14410)	SA-SOL-13E3 5.0 MILES W	14410 (1/1)	N	0
	Cs-134	150	<MDC	N/A	N/A	N /	0
	Cs-137	180	155 (4/9) (82/231)	SA-SOL-5F1 6.5 MILES E	231 (1/1)	N	0
	Ra-226	N/A	2901 (3/9) (2090/4079)	SA-SOL-13E3 5.0 MILES W	4079 (1/1)	N	0
	Th-232	N/A	678 (8/9) (387/1007)	SA-SOL-14F4 8.04 MILES WNW	1007 (1/1)	N /	0
GAME (pCi/kg wet)	<b>GAMMA</b> <u>3</u> Be-7	N/A	<MDC	N/A	N/A	N /	0
	K-40	N/A	3038 (3/3) (3004/3061)	SA-GAM-5C1 3.14 MILES ENE	3061 (1/1)	N	0
	I-131	60	<MDC	N/A	N/A	N /	0
	Cs-134	60	<MDC	N/A	N/A	N /	0
	Cs-137	80	<MDC	N/A	N/A	N /	0
SURFACE WATER (pCi/L)	<b>H-3</b> <u>61</u>	200	211 (1/49)	SA-SWA-11A1 0.20 MILES SW	211 (1/12)	< M	0



# TABLE A-1

## Radiological Environmental Monitoring Program Summary

SALEM GENERATING STATION  
HOPE CREEK GENERATING STATION  
SALEM COUNTY, NEW JERSEY

DOCKET NO. 50-272/-311  
DOCKET NO. 50-354

REPORTING PERIOD: January 1, 2019 - December 31, 2019

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND <u>TOTAL NUMBER</u> OF ANALYSIS PERFORMED	LOWER LIMIT OF DETECTION (LLD*)	ALL INDICATOR LOCATIONS	LOCATION WITH HIGHEST MEAN		CONTROL LOCATION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
			MEAN (f) ** (RANGE)	NAME DISTANCE AND DIRECTION	MEAN (f) ** (RANGE)	MEAN (f) ** (RANGE)	
SURFACE WATER (cont.) (pCi/L)	<b>I-131 (LOW LVL)</b> <u>61</u>	1	<MDC	N/A	N/A	<MDC	0
	<b>GAMMA</b> <u>61</u>						
	K-40	N/A	85 (12/49) (42/123)	SA-SWA-7E1 4.5 MILES SE	94 (6/12) (74/123)	74 (4/12) (52/104)	0
	Mn-54	15	<MDC	N/A	N/A	<MDC	0
	Co-58	15	<MDC	N/A	N/A	<MDC	0
	Fe-59	30	<MDC	N/A	N/A	<MDC	0
	Co-60	15	<MDC	N/A	N/A	<MDC	0
	Zn-65	30	<MDC	N/A	N/A	<MDC	0
	ZrNb-95	15	<MDC	N/A	N/A	<MDC	0
	Cs-134	15	<MDC	N/A	N/A	<MDC	0
	Cs-137	18	<MDC	N/A	N/A	<MDC	0
	BaLa-140	15	<MDC	N/A	N/A	<MDC	0
FISH (pCi/kg wet)	<b>GAMMA</b> <u>14</u>						
	K-40	N/A	3618 (9/9) (2744/4625)	SA-ESF-12C1 (C) 2.5 MILES WSW	3938 (5/5) (2817/5205)	3938 (5/5) (2817/5205)	0
	Mn-54	130	<MDC	N/A	N/A	<MDC	0
	Co-58	130	<MDC	N/A	N/A	<MDC	0
	Fe-59	260	<MDC	N/A	N/A	<MDC	0
	Co-60	130	<MDC	N/A	N/A	<MDC	0
	Zn-65	260	<MDC	N/A	N/A	<MDC	0
	Cs-134	130	<MDC	N/A	N/A	<MDC	0
	Cs-137	150	<MDC	N/A	N/A	<MDC	0
	Ra-226	N/A	<MDC	N/A	N/A	<MDC	0

# TABLE A-1

## Radiological Environmental Monitoring Program Summary

SALEM GENERATING STATION  
HOPE CREEK GENERATING STATION  
SALEM COUNTY, NEW JERSEY

DOCKET NO. 50-272/-311  
DOCKET NO. 50-354

REPORTING PERIOD: January 1, 2019 - December 31, 2019

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND <u>TOTAL NUMBER</u> OF ANALYSIS PERFORMED	LOWER LIMIT OF DETECTION (LLD*)	ALL INDICATOR LOCATIONS	LOCATION WITH HIGHEST MEAN		CONTROL LOCATION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
			MEAN (f) ** (RANGE)	NAME DISTANCE AND DIRECTION	MEAN (f) ** (RANGE)	MEAN (f) ** (RANGE)	
BLUE CRABS (pCi/kg wet)	<b>GAMMA</b> <u>4</u> K-40	N/A	3327.5 (2/2) (2685/3970)	SA-ECH-11A1 0.20 MILES SW	3327.5 (2/2) (2685/3970)	2551.5 (2/2) (2527/2576)	0
	Mn-54	130	<MDC	N/A	N/A	<MDC	0
	Co-58	130	<MDC	N/A	N/A	<MDC	0
	Fe-59	260	<MDC	N/A	N/A	<MDC	0
	Co-60	130	<MDC	N/A	N/A	<MDC	0
	Zn-65	260	<MDC	N/A	N/A	<MDC	0
	Cs-134	130	<MDC	N/A	N/A	<MDC	0
	Cs-137	150	<MDC	N/A	N/A	<MDC	0
	Ra-226	N/A	<MDC	N/A	N/A	<MDC	0
SEDIMENT (pCi/kg dry)	<b>GAMMA</b> <u>14</u> Be-7	N/A	<MDC	N/A	N/A	<MDC	0
	K-40	N/A	8596 (12/12) (2169/19520)	SA-ESS-16F1 6.9 MILES NNW	15425 (2/2) (11330/19520)	13595 (2/2) (11910/15280)	0
	Cs-134	150	<MDC	N/A	N/A	<MDC	0
	Cs-137	180	<MDC	N/A	N/A	<MDC	0
	Ra-226	N/A	2497 (4/12) (1751/3602)	SA-ESS-16A1 0.24 MILES NNW	3107 (2/2) (2611/3602)	<MDC	0
	Th-232	N/A	714 (9/12) (416/947)	SA-ESS-12C1 C 2.5 MILES WSW	1015 (2/2) (962/1068)	1015 (2/2) (962/1068)	0

\* The LLD listed is the Lower Limit of Detection, which was requested by PSEG to be achieved.

\*\* Mean was calculated using values above the MDC only. f = the fraction of measurements above the MDC.

(C) Control Location

N/A Not Applicable

APPENDIX B

SAMPLE DESIGNATION

AND

LOCATIONS

Intentionally left blank

**TABLE B-1**

**SALEM AND HOPE CREEK GENERATING STATIONS'**

**RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM**

(Program Overview)

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS	SAMPLING AND COLLECTION FREQUENCY	TYPE/FREQUENCY OF ANALYSIS
<u>1. DIRECT RADIATION</u>			
a. Dosimeters (IDM)	<p>Fifty-eight routine monitoring locations with two or more dosimeters placed as follows:</p> <p>An inner ring of locations, one in each land based meteorological sector in the general area of the SITE BOUNDARY.</p> <p>An outer ring of locations, one in each land based meteorological sector in the 5 to 11 km (3.1 - 6.8 miles) range from the site ; and</p> <p>The balance of the locations placed in areas of special interest such as population centers, nearby residences, and schools and in six areas beyond 10 miles to serve as control locations.</p>	Quarterly	Gamma dose / quarterly

**TABLE B-1 (cont'd)**

**SALEM AND HOPE CREEK GENERATING STATIONS'**  
**RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM**

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS	SAMPLING AND COLLECTION FREQUENCY	TYPE/FREQUENCY OF ANALYSIS
<u>2. ATMOSPHERIC</u>			
a. Air Particulate (APT)	3 samples from close to the Site Boundary: 05S1, 07S2, 15S2. One duplicate sample from close to the site boundary: 05S2. 3 Samples in different land based sectors: 01F1, 02F6, 05D1.	Continuous sampler operation with sample collection weekly or more frequently if required by dust loading	Gross Beta / weekly Gamma isotopic analysis / quarterly composite*
b. Air Iodine (AIO)	One sample from the vicinity of a community having a highest annual average ground level D/Q: 16E1. One sample from a control location; for example 15 - 30 km distant (9.3 - 18.6 miles) and in the least prevalent wind direction: 14G1.	Continuous sampler operation with sample collection weekly or more frequently if required by dust loading	Iodine-131 / weekly
<u>3. TERRESTRIAL</u>			
a. Milk (MLK)	Samples from milking animals in 3 locations within 5 km distance (3.1 miles) having the highest dose potential. If there are none, then 1 sample from milking animals in each of 3 areas between 5 - 8 km distant (3.1 - 5.0 miles) where doses are calculated to be greater than 1 mrem per yr: 13E3, 14F4, 02G3 <sup>(1)</sup> . 1 Sample from milking animals at a control location 15 - 30 km distant (9.3 - 18.6 miles): 03G1.	Semi-monthly (when animals are on pasture)  Monthly (when animals are not on pasture)	Gamma scan / semi-monthly Iodine-131 / semi-monthly  Gamma scan / monthly Iodine-131 / monthly

**TABLE B-1 (cont'd)**

**SALEM AND HOPE CREEK GENERATING STATIONS'  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM**

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS	SAMPLING AND COLLECTION FREQUENCY	TYPE/FREQUENCY OF ANALYSIS
b. Well Water (Ground) (WWA)	Although wells in the vicinity of SGS/HCGS are not directly affected by plant operations so sampling is not required by SGS/HCGS ODCM, samples of 03E1 farm's well are collected as <u>management audit samples</u> .	Monthly	Gamma scan / monthly Gross alpha / monthly Gross beta / monthly Tritium / monthly
c. Potable Water (Drinking Water) (PWR, PWT)	Although no potable water samples are required as liquid effluents discharged from SGS/HCGS do not directly affect this pathway and it is not required by SGS/HCGS ODCM, one raw and one treated water sample from a public water supply (City of Salem Water and Sewer Department) are collected: 02F3 as <u>management audit samples</u> .	Monthly (composited weekly)	Gross alpha / monthly Gross beta / monthly Tritium / monthly Gamma scan / monthly Iodine-131 / monthly
d. Vegetables (FPL, FPV)	Although the Delaware River at the location of SGS/HCGS is a brackish water source and is not used for irrigation of food products and so sampling is not required by SGS/HCGS ODCM, samples of vegetables are collected as <u>management audit samples</u> from various locations during harvest. In addition, broad leaf vegetation is collected from various offsite locations as well as being planted & collected onsite (01S1, 07S2, 15S2, 16S1). This is in lieu of having a milk farm within 5 km (3.1 miles) of the Site <sup>(1)</sup> .	Monthly (during growing season)	Gamma scan / on collection

**TABLE B-1 (cont'd)**

**SALEM AND HOPE CREEK GENERATING STATIONS'  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM**

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS	SAMPLING AND COLLECTION FREQUENCY	TYPE/FREQUENCY OF ANALYSIS
e. Fodder Crops (VGT)	Although not required by SGS/HCGS ODCM, samples of crops normally used as cattle feed (silage) were collected from milk farms as <u>management audit samples</u> : 14F4, 03G1, 2G3, 13E3.	Annually (at harvest)	Gamma scan / on collection
f. Soil (SOL)	Although not required by SGS/HCGS ODCM, samples of soil are collected as <u>management audit samples</u> .	Every 3 years (2013-2016-2019)	Gamma scan / on collection
<b>4. <u>AQUATIC ENVIRONMENT</u></b>			
a. Surface Water (SWA)	One sample upstream: 01F2. One sample downstream: 07E1. One sample outfall: 11A1. One sample cross-stream (mouth of Appoquinimink River): 12C1 <sup>(2)</sup> . And an additional location in the Chesapeake & Delaware Canal: 16F1.	Semi-Monthly	Gamma scan / monthly Tritium / monthly**
b. Edible Fish (ESF)	One sample of each commercially and recreationally important species in vicinity of plant discharge area: 11A1. One sample of same species in area not influenced by plant discharge: 12C1 <sup>(2)</sup> , and an additional location downstream: 7E1.	Semi-Annually	Gamma scan (flesh) / on collection



**TABLE B-1 (cont'd)**

**SALEM AND HOPE CREEK GENERATING STATIONS'  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM**

<b>EXPOSURE PATHWAY AND/OR SAMPLE</b>	<b>NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS</b>	<b>SAMPLING AND COLLECTION FREQUENCY</b>	<b>TYPE/FREQUENCY OF ANALYSIS</b>
c. Blue Crabs (ECH)	One sample of each commercially and recreationally important species in vicinity of plant discharge area 11A1.	Semi-Annually	Gamma scan (flesh) /on collection
	One sample of same species in area not influenced by plant discharge 12C1 <sup>(2)</sup> .	Semi-Annually	Gamma scan / on collection
d. Sediment (ESS)	<p>One sample from downstream area: 07E1.</p> <p>One sample from cross-stream area and control location: 12C1<sup>(2)</sup>.</p> <p>One sample from outfall area: 11A1.</p> <p>One sample from upstream, the C &amp; D Canal: 16F1.</p> <p>One sample from shoreline area: 06S2.</p> <p>One sample from Cooling Tower Blowdown discharge: 15A1.</p> <p>One sample south storm drain discharge line: 16A1.</p>		

## TABLE B-1 (cont'd)

### SALEM AND HOPE CREEK GENERATING STATIONS' RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

#### TABLE B-1 NOTATIONS:

- \* Except for Passive Dosimeters, the quarterly analysis is performed on a composite of individual samples collected during the quarter.
- \*\* ODCM requires a minimum of semi-monthly sample collection with monthly composites for gamma isotopic analysis, and quarterly composites for tritium analysis. However, it was decided to analyze surface waters on a monthly basis for tritium as a program enhancement.
- (1) While these milk locations are not within the 5 km range, they are the closest farms in the Site vicinity.  
  
Since broad leaf vegetation is acceptable in lieu of milk collections, gardens were planted and harvested at four locations on Site (01S1, 07S2, 15S2, and 16S1) and one in Delaware (10D1).
- (2) Location 12C1 was made the operational control (1975) for aquatic samples since the physical characteristics of this location more closely resemble those of the outfall area than do those at the upstream location originally chosen. This is due to the distance from Liston Point, which is the boundary between the Delaware River and Delaware Bay. As discussed extensively in the SGS/HCGS Pre-operational reports, the sampling locations further upstream show significantly lower background levels due to tidal flow.
- (3) Oysters were added as a management audit sample in 2015. As such they are not required by the program, nor are they listed in the ODCM. The oysters from the indicator location (7C1) are impacted by bacteria and are considered too small to be sold to the public. In 2018 the oyster management audit program was terminated because the hope creek oyster bed suffered a high mortality rate due to low salinity water from excessive rain (as reported by Rutgers University), and to date the study concluded there is no impact from the station.

**TABLE B-2**  
**SAMPLING LOCATIONS**

Specific information about the individual sampling locations are given in Table B-1. Maps B-1, B-2, and B-3 show the locations of sampling locations with respect to the Site. A Portable Global Positioning System (GPS) was used to provide the coordinates of sampling locations.

All sample types are not required to be collected at all possible sites every year.

LOCATION CODE	STATION LOCATION	LATITUDINAL DEG. MIN.	LONGITUDINAL DEG. MIN.	MEDIA SAMPLED
01S1	0.55 mi. N side of road near ISFSI pad.	39 – 28.260	75 – 32.222	IDM, FPL
01S2	0.62 mi. N (382 of TLD 1S1).	39 – 28.260	75 – 32.222	IDM, FPL
02S4	0.60 mi. NNE; in the equipment laydown area	39 – 28.110	75 – 31.992	IDM
03S1	0.58 mi. NE; behind refrigeration building	39 – 28.140	75 – 31.678	IDM
04S1	0.60 mi. ENE; site access road near intersection to TB-02	39 – 28.023	75 – 31.544	IDM
05S1	0.86 mi. E; site access road	39 – 27.668	75 – 31.187	IDM, AIO, APT
05S2	0.86 mi. E; site access road, duplicate sample	39 – 27.668	75 – 31.187	AIO, APT
06S2	0.23mi. ESE; area around helicopter pad	39 – 27.719	75 – 31.912	IDM, ESS
07S1	0.14 mi. SE; station personnel gate	39 – 27.701	75 – 32.05	IDM
07S2	0.12 mi. SE; station personnel gate	39 – 27.720	75 – 32.15	AIO, APT, FPL, SOL
08S1	0.12 mi. SSE; fuel oil storage	39 – 27.676	75 – 32.055	IDM
09S1	0.12 mi. S; fuel oil storage	39 – 27.636	75 – 32.091	IDM
10S1	0.14 mi. SSW; circulating water building	39 – 27.700	75 – 32.160	IDM
11S1	0.09 mi. SW; circulating water building	39 – 27.719	75 – 32.225	IDM
12S1	0.09 mi. WSW; outside security fence	39 – 27.756	75 – 32.236	IDM
13S1	0.09 mi. W; outside security fence	39 – 27.801	75 – 32.267	IDM
14S1	0.10 mi. NNW; outside security fence	39 – 27.893	75 – 32.280	IDM
15S1	0.57 mi. NW; near river and HCGS barge slip	39 – 28.161	75 – 32.525	IDM
15S2	0.59 mi. NW; near river and HCGS barge slip	39 – 28.12	75 – 32.32	IDM, AIO, APT, FPL
16S1	0.57 mi. NNW; on road near fuel oil storage tank	39 – 28.215	75 – 32.432	IDM, FPL
16S2	0.60 mi. NNW; near security firing range	39 – 28.16	75 – 32.17	IDM
16S3	1.0 mi. NNW; consolidated spoils facility	39 – 28.350	75 – 32.550	IDM
11A1	0.20 mi. SW; SGS outfall area	39 – 27.59	75 – 32.25	ESS, SWA, ECH, ESF
11A1A	0.15 mi. SE; Located in the plant barge slip area	39 – 27.41	75 – 32.02	Alternate SWA

**TABLE B-2 (cont'd)**  
**SAMPLING LOCATIONS**

All sample types are not required to be collected at all possible sites every year.

LOCATION CODE	STATION LOCATION	LATITUDINAL DEG. MIN.	LONGITUDINAL DEG. MIN.	MEDIA SAMPLED
15A1	0.65 mi. NW; HCGS outfall area	39.2767	75 – 32.19	ESS
16A1	0.24 mi. NNW; South Storm Drain outfall	39.2824	75 – 32.58	ESS
12C1	2.5 mi. WSW; West bank of Delaware River	39 – 27.22	75 – 34.08	ESS, SWA, ECH, ESF
12C1A	3.7 mi. WSW; Tip of Augustine Beach Boat Ramp	39 – 30.17	75 – 34.48	Alternate SWA
04D2	3.7 mi. ENE; Alloway Creek Neck Road	39 – 29.292	75 – 28.175	IDM
05D1	3.5 mi. E; local farm along SGS/HCGS access road.	39 – 28.396	75 – 28.334	IDM, AIO, APT
10D1	3.9 mi. SSW; Taylor's Bridge Spur, DE	39 – 24.613	75 – 33.733	IDM, FPL, SOL
14D1	3.4 mi. WNW; Bay View, DE	39 – 29.26	75 – 35.521	IDM
15D1	3.8 mi. NW; Route 9, Augustine Beach, DE	39 – 30.125	75 – 35.28	IDM
02E1	4.4 mi. NNE; local farm, NJ	39 – 31.380	75 – 30.428	IDM
03E1	4.2 mi. NE; local farm, NJ	39 – 30.098	75 – 28.646	IDM, WWA, GAM
07E1	4.5 mi. SE; River Bank 1 mi. W of Mad Horse Creek	39 – 25.08	75 – 28.64	ESS, SWA, ESF
7E1A	8.9 mi. SE; Located at the end of Bayside Road, NJ	39 – 22.57	75 – 24.24	Alternate SWA
11E2	5.0 mi. SW; Route 9, DE	39 – 24.328	75 – 35.546	IDM
12E1	4.4 mi. WSW; Thomas Landing, DE	39 – 26.862	75 – 36.968	IDM
13E1	4.2 mi. W; Diehl House Lab, DE	39 – 27.989	75 – 36.735	IDM
13E3	5.0 mi. W; local farm, DE	39 – 27.17	75 – 37.30	MLK, VGT, SOL, GAM
16E1	4.1 mi. NNW; Port Penn, DE	39 – 30.762	75 – 34.580	IDM, AIO, APT, SOL
01F1	5.8 mi. N; Fort Elfsborg, NJ	39 – 32.693	75 – 31.124	IDM, AIO, APT
01F2	7.1 mi. N; midpoint of Delaware River	39 – 33.08	75 – 32.54	SWA
02F2	8.5 mi. NNE; Salem Substation, Salem NJ	39 – 34.522	75 – 28.120	IDM
02F3	8.0 mi. NNE; City of Salem, NJ Water and Sewage Dep	39 – 33.40	75 – 27.18	PWR, PWT
02F5	7.4 mi. NNE; Salem High School, Salem, NJ	39 – 33.448	75 – 28.514	IDM
02F6	7.3 mi. NNE; PSE&G Training Center, Salem NJ	39 – 33.713	75 – 28.819	IDM, AIO, APT
02F9	7.5 mi. NNE; Local Farm, Tilbury Rd, Salem, NJ	39 – 33.55	75 – 29.30	FPV, SOL

**TABLE B-2 (cont'd)**  
**SAMPLING LOCATIONS**

All sample types are not required to be collected at all possible sites every year.

LOCATION CODE	STATION LOCATION	LATITUDINAL DEG. MIN.	LONGITUDINAL DEG. MIN.	MEDIA SAMPLED
03F2	5.1 mi. NE; Hancocks Bridge, NJ Munc Bldg	39 – 30.410	75 – 27.578	IDM
03F3	8.6 mi. NE; Quinton Township Elem. School NJ	39 – 32.616	75 – 24.735	IDM
03F8	9.3 mi. NE; Circle M Orchard, NJ	39 – 33.987	75 – 25.468	FPV
04F2	6.0 mi. ENE; Mays Lane, Harmersville, NJ	39 – 29.953	75 – 26.076	IDM
05F1	6.5 mi. E; Canton, NJ	39 – 28.360	75 – 25.031	IDM,SOL
06F1	6.4 mi. ESE; Stow Neck Road, NJ	39 – 26.396	75 – 25.148	IDM
07F2	9.1 mi. SE; Bayside, NJ	39 – 22.971	75 – 24.261	IDM
08F1	9.7 mi. SE; Woodland Beach, DE	39 – 19.933	75 – 28.463	IDM
09F1	5.3 mi. S; off Route #9, DE	39 – 23.042	75 – 32.95	IDM
10F2	5.8 mi. SSW; Route #9, DE	39 – 23.034	75 – 34.152	IDM
11F1	6.2 mi. SW; Taylor's Bridge, DE	39 – 24.766	75 – 37.632	IDM
12F1	9.4 mi. WSW; Townsend Elementary School, DE	39 – 23.778	75 – 41.311	IDM
13F2	6.5 mi. W; Odessa, DE	39 – 27.297	75 – 39.372	IDM
13F3	9.3 mi. W; Redding Middle School, Middletown, DE	39 – 27.215	75 – 42.543	IDM
13F4	9.8 mi. W; Middletown, DE	39 – 26.857	75 – 43.111	IDM
14F2	6.7 mi. WNW; Route 13 and Boyds Corner Rd, DE	39 – 29.979	75 – 39.042	IDM
14F4	8.0 mi. WNW; local farm, DE	39 – 30.44	75 – 40.52	MLK, VGT, SOL, FPV
15F3	5.4 mi. NW, Port Penn Rd. at Pole Bridge Rd., DE	39 – 30.987	75 – 36.586	IDM
15F4	7.0 mi. NW; local farm; Port Penn Road; DE	39 – 31.21	75 – 38.31	FPV
16F1	6.9 mi. NNW; C&D Canal, DE	39 – 33.55	75 – 34.25	ESS, SWA
16F1A	6.8 mi. NNW; Located at the C&D Canal Tip, DE	39 – 33.34	75 – 33.56	Alternate SWA

**TABLE B-2 (cont'd)**  
**SAMPLING LOCATIONS**

All sample types are not required to be collected at all possible sites every year.

LOCATION CODE	STATION LOCATION	LATITUDINAL DEG. MIN.	LONGITUDINAL DEG. MIN.	MEDIA SAMPLED
16F2	8.1 mi. NNW; Delaware City Public School, DE	39 – 34.314	75 – 35.429	IDM
01G1	10.9 mi. NNE; Route 49, South Broadway, NJ	39 – 37.113	75 – 30.178	FPV, FPL
01G3	19 mi. N; N. Church Street Wilmington, DE	39 – 44.287	75 – 32.512	IDM
02G2	13.5 mi. NNE; Local Farm; Pointers Auburn Road (Route 540), Salem, NJ	39 – 38.19	75 – 26.10	FPV
02G3	11.8 mi. NNE; Local Milk Farm, NJ	39 – 36.21	75 – 24.53	MLK, VGT, SOL
03G1	17 mi. NE; local farm, NJ	39 – 35.913	75 – 16.804	IDM, MLK, VGT, SOL
10G1	12 mi. SSW; Smyrna, DE	39 – 18.223	75 – 36.095	IDM
14G1	11.8 mi. WNW; Route 286, Bethel Church Road, DE	39 – 31.290	75 – 46.495	AIO,APT,IDM
16G1	15 mi. NNW; Wilmington Airport, DE	39 – 40.637	75 – 35.570	IDM
03H1	32 mi. NE; National Park, NJ	39 – 51.599	75 – 11.96	IDM
03H5	25 mi. NE; Farm Market, Route 77, NJ	39 – 41.040	75 – 12.380	FPV, FPL
07C1*	2 mi SE; Hope Creek Bed, near mouth of Hope Creek	39 – 26.611	75 – 30.328	EOY
07H1*	19 mi SE; Bennies Oyster Bed, near Nantuxent Cove	39 – 15.500	75 – 17.500	EOY

**TABLE B-2 NOTATIONS:**

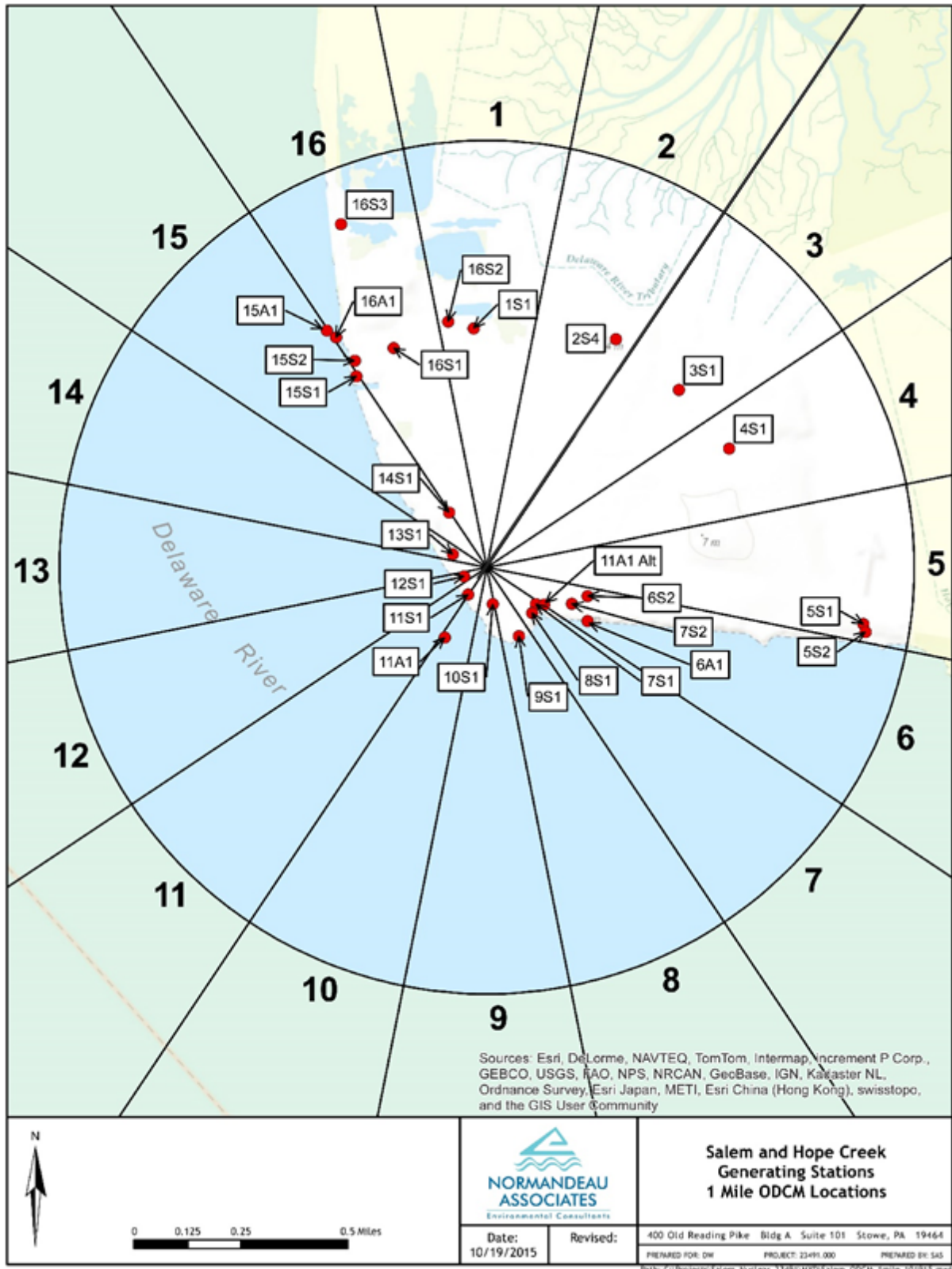
All locations are referenced to the midpoint of the two SGS Units' Containments. The coordinates of this location are: Latitude N 39° - 27' - 46.5" and Longitude W 75° - 32' - 10.6".

Vegetable samples are not always collected in consecutive years from the same farmer due to crop rotation.

\* Oysters were added as a management audit sample in 2015. As such they are not required by the program, nor are they listed in the ODCM. The oysters from the indicator location (7C1) are impacted by bacteria and are considered too small to be sold to the public. In 2018 the oyster management audit program was terminated because the hope creek oyster bed suffered a high mortality rate due to low salinity water from excessive rain (as reported by Rutgers University), and to date the study concluded there is no impact from the station.

## MAP B-1

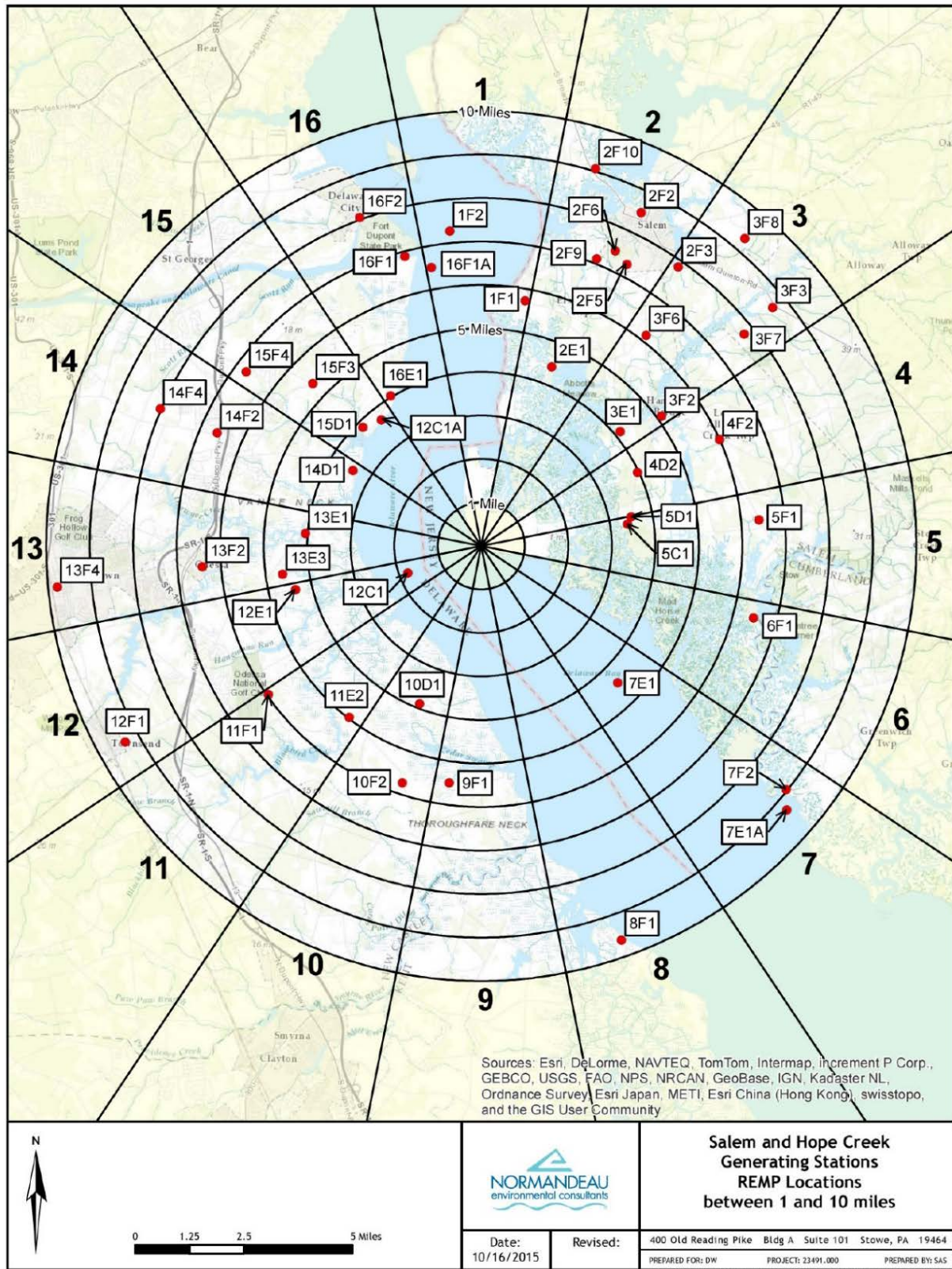
### SALEM AND HOPE CREEK GENERATING STATIONS' RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ON-SITE SAMPLING LOCATIONS TO 1 MILE





## MAP B-2

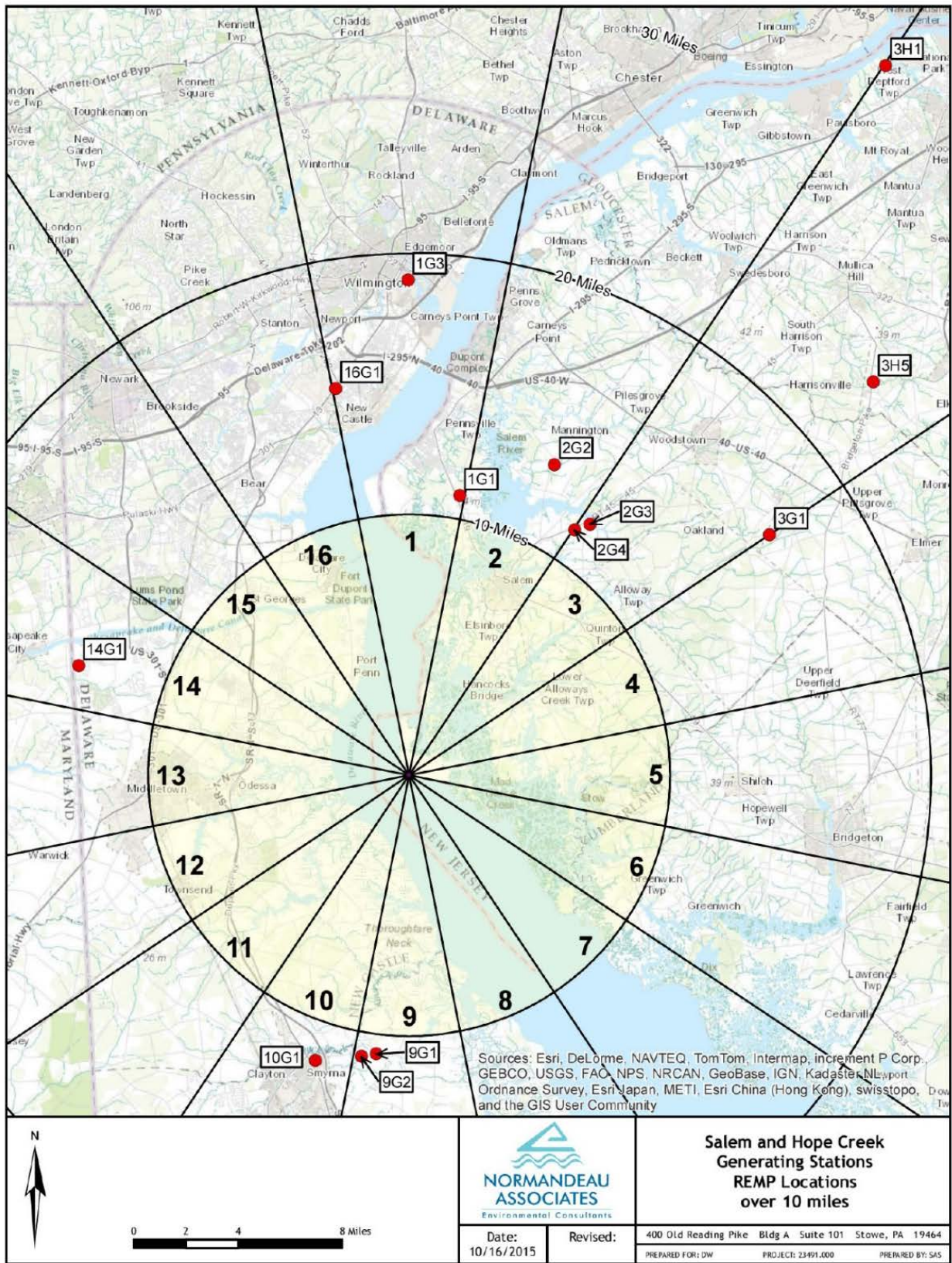
### SALEM AND HOPE CREEK GENERATING STATIONS' RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM OFF-SITE SAMPLING LOCATIONS 1 TO 10 MILES





## MAP B-3

### SALEM AND HOPE CREEK GENERATING STATIONS' RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM OFF-SITE SAMPLING LOCATIONS GREATER THAN 10 MILES



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## APPENDIX C

### DATA TABLES AND FIGURES

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**Table C-1 CONCENTRATIONS OF GAMMA EMMITTERS IN QUARTERLY COMPOSITES  
OF AIR PARTICULATES, 2019**  
Results in Units of E-03 pCi/m<sup>3</sup> ± 2σ

STATION ID	COLLECTION PERIOD			<-----GAMMA EMITTERS----->			
	START		STOP	Be-7	K-40	Cs-134	Cs-137
SA-APT-14G1 (C)	01/02/19	-	04/01/19	63 ± 15	< 30	< 2	< 2
	04/01/19	-	07/01/19	65 ± 14	< 22	< 1	< 2
	07/01/19	-	09/30/19	92 ± 15	< 32	< 2	< 1
	09/30/19	-	12/30/19	46 ± 12	< 24	< 1	< 1
	AVERAGE*			67 ± 38	-	-	-
SA-APT-5S1	01/02/19	-	04/01/19	63 ± 14	< 31	< 2	< 2
	04/01/19	-	07/01/19	67 ± 20	< 15	< 2	< 2
	07/01/19	-	09/30/19	79 ± 18	< 30	< 2	< 1
	09/30/19	-	12/30/19	61 ± 13	< 19	< 2	< 1
	AVERAGE*			68 ± 16	-	-	-
SA-APT-7S2	01/02/19	-	04/01/19	59 ± 17	< 29	< 1	< 2
	04/01/19	-	07/01/19	64 ± 16	< 28	< 2	< 1
	07/01/19	-	09/30/19	52 ± 14	< 19	< 1	< 1
	09/30/19	-	12/30/19	63 ± 13	< 28	< 2	< 1
	AVERAGE*			60 ± 10	-	-	-
SA-APT-15S2	01/02/19	-	04/01/19	87 ± 21	< 19	< 2	< 1
	04/01/19	-	07/01/19	73 ± 19	< 26	< 1	< 2
	07/01/19	-	09/30/19	68 ± 14	< 32	< 2	< 2
	09/30/19	-	12/30/19	55 ± 15	< 44	< 2	< 2
	AVERAGE*			71 ± 27	-	-	-
SA-APT-5D1	01/02/19	-	04/01/19	75 ± 18	< 31	< 2	< 2
	04/01/19	-	07/01/19	70 ± 16	< 24	< 2	< 1
	07/01/19	-	09/30/19	60 ± 13	< 34	< 2	< 2
	09/30/19	-	12/30/19	56 ± 12	< 22	< 1	< 1
	AVERAGE*			65 ± 18	-	-	-
SA-APT-16E1	01/02/19	-	04/01/19	74 ± 16	< 13	< 2	< 1
	04/01/19	-	07/01/19	74 ± 19	< 13	< 2	< 2
	07/01/19	-	09/30/19	71 ± 18	< 31	< 2	< 2
	09/30/19	-	12/30/19	50 ± 15	< 37	< 1	< 2
	AVERAGE*			67 ± 23	-	-	-
SA-APT-1F1	01/02/19	-	04/01/19	58 ± 14	< 25	< 1	< 1
	04/01/19	-	07/01/19	66 ± 14	< 33	< 2	< 1
	07/01/19	-	09/30/19	85 ± 14	< 30	< 2	< 2
	09/30/19	-	12/30/19	57 ± 11	< 23	< 2	< 1
	AVERAGE*			67 ± 26	-	-	-
SA-APT-2F6	01/02/19	-	04/01/19	76 ± 21	< 19	< 2	< 1
	04/01/19	-	07/01/19	69 ± 14	< 28	< 2	< 1
	07/01/19	-	09/30/19	63 ± 14	< 29	< 1	< 1
	09/30/19	-	12/30/19	55 ± 14	< 34	< 1	< 2
	AVERAGE*			66 ± 18	-	-	-
ALL INDICATOR AVERAGE *				66 ± 19	-	-	-

(C) CONTROL LOCATION.

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES. IF THERE IS ONLY 1 POSITIVE VALUE, THE AVERAGE AND THE ERROR ARE DISPLAYED.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

Table C-2

## CONCENTRATIONS OF GROSS BETA EMITTERS IN AIR PARTICULATES, 2019

Results in Units of E-03 pCi/m<sup>3</sup> ± 2σ

COLLECTION PERIOD			CONTROL	INDICATORS						
START	STOP		14G1	05S1	07S2	15S2	05D1	16E1	01F1	02F6
01/02/19	- 01/08/19		12 ± 3	12 ± 3	13 ± 3	9 ± 3	12 ± 3	11 ± 3	8 ± 3	12 ± 3
01/08/19	- 01/14/19		9 ± 3	10 ± 3	9 ± 3	8 ± 3	11 ± 3	6 ± 3	10 ± 3	8 ± 3
01/14/19	- 01/21/19		10 ± 3	11 ± 3	13 ± 3	14 ± 3	11 ± 3	12 ± 3	10 ± 3	13 ± 3
01/21/19	- 01/28/19		11 ± 3	9 ± 3	13 ± 3	11 ± 3	11 ± 3	12 ± 3	11 ± 3	11 ± 3
01/28/19	- 02/05/19		11 ± 3	20 ± 3	18 ± 3	21 ± 3	19 ± 3	16 ± 3	16 ± 3	19 ± 3
02/05/19	- 02/13/19		14 ± 3	11 ± 2	11 ± 3	14 ± 3	12 ± 3	10 ± 2	10 ± 2	13 ± 3
02/13/19	- 02/21/19		13 ± 3	12 ± 3	15 ± 3	13 ± 3	15 ± 3	16 ± 3	12 ± 3	14 ± 3
02/21/19	- 02/27/19		20 ± 4	21 ± 4	21 ± 4	18 ± 4	24 ± 4	19 ± 4	18 ± 4	19 ± 4
02/27/19	- 03/05/19		11 ± 3	12 ± 3	15 ± 4	13 ± 4	11 ± 4	11 ± 4	12 ± 4	13 ± 4
03/05/19	- 03/11/19		12 ± 3	11 ± 3	10 ± 3	13 ± 3	13 ± 3	10 ± 3	12 ± 3	11 ± 3
03/11/19	- 03/18/19		20 ± 3	15 ± 3	19 ± 3	21 ± 3	22 ± 4	17 ± 3	19 ± 3	19 ± 3
03/18/19	- 03/25/19		11 ± 3	11 ± 3	12 ± 3	11 ± 3	9 ± 3	11 ± 3	10 ± 3	10 ± 3
03/25/19	- 04/01/19		10 ± 3	12 ± 3	9 ± 3	13 ± 4	12 ± 3	11 ± 3	11 ± 3	12 ± 3
04/01/19	- 04/08/19		10 ± 3	10 ± 3	11 ± 3	10 ± 3	11 ± 3	11 ± 3	9 ± 3	12 ± 3
04/08/19	- 04/15/19		8 ± 3	5 ± 2	7 ± 3	8 ± 3	8 ± 3	6 ± 2	5 ± 3	9 ± 3
04/15/19	- 04/23/19		9 ± 2	7 ± 2	7 ± 2	8 ± 2	8 ± 2	10 ± 2	8 ± 2	10 ± 2
04/23/19	- 04/29/19		9 ± 3	9 ± 3	9 ± 3	7 ± 3	11 ± 3	11 ± 3	9 ± 3	10 ± 3
04/29/19	- 05/06/19		7 ± 3	7 ± 3	7 ± 3	5 ± 3	6 ± 3	8 ± 3	7 ± 3	6 ± 3
05/06/19	- 05/13/19		11 ± 3	9 ± 3	10 ± 3	9 ± 3	9 ± 3	7 ± 3	7 ± 3	6 ± 3
05/13/19	- 05/20/19		12 ± 3	14 ± 3	12 ± 3	12 ± 3	13 ± 3	12 ± 3	12 ± 3	15 ± 3
05/20/19	- 05/28/19		10 ± 2	8 ± 2	8 ± 2	7 ± 2	7 ± 2	7 ± 2	8 ± 2	7 ± 2
05/28/19	- 06/03/19		16 ± 4	11 ± 3	11 ± 3	12 ± 3	10 ± 3	11 ± 3	10 ± 3	11 ± 3
06/03/19	- 06/10/19		11 ± 3	13 ± 3	11 ± 3	13 ± 3	12 ± 3	13 ± 3	15 ± 3	9 ± 3
06/10/19	- 06/17/19		11 ± 3	10 ± 3	9 ± 3	9 ± 3	11 ± 3	9 ± 3	13 ± 3	11 ± 3
06/17/19	- 06/24/19		9 ± 3	8 ± 2	7 ± 2	7 ± 2	10 ± 3	8 ± 2	9 ± 3	6 ± 2
06/24/19	- 07/01/19		9 ± 3	9 ± 3	9 ± 3	10 ± 3	10 ± 3	10 ± 3	8 ± 3	8 ± 3
07/01/19	- 07/08/19		10 ± 3	9 ± 3	9 ± 3	10 ± 3	9 ± 3	11 ± 3	12 ± 3	9 ± 3
07/08/19	- 07/15/19		9 ± 3	7 ± 2	8 ± 3	9 ± 3	7 ± 2	7 ± 2	7 ± 2	6 ± 2
07/15/19	- 07/22/19		12 ± 3	12 ± 3	13 ± 3	10 ± 3	11 ± 3	8 ± 3	12 ± 3	13 ± 3
07/22/19	- 07/29/19		10 ± 3	11 ± 3	11 ± 3	12 ± 3	8 ± 3	8 ± 3	9 ± 3	10 ± 3
07/29/19	- 08/05/19		22 ± 3	18 ± 3	16 ± 3	20 ± 4	16 ± 3	15 ± 3	16 ± 3	17 ± 3
08/05/19	- 08/12/19		20 ± 3	16 ± 3	18 ± 3	18 ± 3	17 ± 3	16 ± 3	15 ± 3	19 ± 3
08/12/19	- 08/19/19		19 ± 3	17 ± 3	18 ± 3	16 ± 3	18 ± 3	18 ± 3	19 ± 3	21 ± 3
08/19/19	- 08/26/19		12 ± 3	14 ± 3	10 ± 3	11 ± 3	14 ± 3	12 ± 3	13 ± 3	12 ± 3
08/26/19	- 09/03/19		15 ± 3	15 ± 3	13 ± 3	12 ± 3	17 ± 3	15 ± 3	11 ± 3	15 ± 3
09/03/19	- 09/09/19		15 ± 3	14 ± 3	16 ± 3	17 ± 4	15 ± 3	13 ± 3	12 ± 3	14 ± 3
09/09/19	- 09/16/19		17 ± 3	15 ± 3	13 ± 3	16 ± 3	17 ± 3	16 ± 3	12 ± 3	15 ± 3
09/16/19	- 09/24/19		16 ± 3	14 ± 3	16 ± 3	15 ± 3	14 ± 3	12 ± 3	15 ± 3	17 ± 3
09/24/19	- 09/30/19		16 ± 4	16 ± 4	15 ± 4	17 ± 4	14 ± 4	14 ± 3	16 ± 4	16 ± 4
09/30/19	- 10/07/19		15 ± 3	10 ± 3	12 ± 3	13 ± 3	14 ± 3	13 ± 3	13 ± 3	16 ± 4
10/07/19	- 10/14/19		16 ± 3	19 ± 4	16 ± 3	14 ± 3	19 ± 3	12 ± 3	14 ± 3	17 ± 3
10/14/19	- 10/21/19		15 ± 3	12 ± 3	12 ± 3	15 ± 3	15 ± 3	12 ± 3	11 ± 3	14 ± 3
10/21/19	- 10/28/19		14 ± 3	12 ± 3	10 ± 3	10 ± 3	13 ± 3	10 ± 3	11 ± 3	11 ± 3
10/28/19	- 11/04/19		10 ± 3	8 ± 3	11 ± 3	8 ± 3	8 ± 3	8 ± 3	9 ± 3	11 ± 3
11/04/19	- 11/12/19		16 ± 3	16 ± 3	14 ± 3	17 ± 3	16 ± 3	16 ± 3	15 ± 3	14 ± 3
11/12/19	- 11/18/19		12 ± 3	13 ± 4	18 ± 4	15 ± 4	13 ± 3	16 ± 4	11 ± 3	12 ± 3
11/18/19	- 11/25/19		19 ± 3	15 ± 3	15 ± 3	11 ± 3	16 ± 3	16 ± 3	15 ± 3	16 ± 3
11/25/19	- 12/02/19		10 ± 3	11 ± 3	9 ± 3	9 ± 3	8 ± 3	8 ± 3	9 ± 3	6 ± 3
12/02/19	- 12/09/19		13 ± 3	12 ± 3	12 ± 3	11 ± 3	14 ± 3	11 ± 3	9 ± 3	11 ± 3
12/09/19	- 12/17/19		11 ± 3	10 ± 2	11 ± 3	11 ± 3	11 ± 2	9 ± 3	9 ± 2	9 ± 3
12/17/19	- 12/23/19		20 ± 4	15 ± 4	18 ± 4	18 ± 4	14 ± 4	18 ± 4	17 ± 4	16 ± 4
12/23/19	- 12/30/19		23 ± 4	18 ± 3	23 ± 4	24 ± 4	20 ± 4	25 ± 4	21 ± 4	22 ± 3
AVERAGE*			13 ± 8	12 ± 7	13 ± 8	13 ± 8	13 ± 8	12 ± 8	12 ± 7	13 ± 8
			ALL INDICATOR AVERAGE*							12 ± 8

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING ONLY THE POSITIVE VALUES. IF THERE IS ONLY 1 POSITIVE VALUE, THE AVERAGE AND THE ERROR ARE DISPLAYED.

TABLE C-3

## CONCENTRATIONS OF IODINE-131 IN FILTERED AIR, 2019

Results in Units of E-03 pCi/m <sup>3</sup> ± 2σ										
COLLECTION PERIOD		CONTROL	INDICATORS							
START	STOP	14G1	05S1	07S2	15S2	05D1	16E1	01F1	02F6	
01/02/19	- 01/08/19	< 43	< 20	< 17	< 41	< 20	< 43	< 20	< 20	
01/08/19	- 01/14/19	< 32	< 20	< 34	< 33	< 20	< 34	< 19	< 21	
01/14/19	- 01/21/19	< 30	< 33	< 30	< 29	< 35	< 29	< 13	< 33	
01/21/19	- 01/28/19	< 28	< 18	< 28	< 11	< 18	< 28	< 19	< 19	
01/28/19	- 02/05/19	< 26	< 13	< 25	< 13	< 13	< 25	< 13	< 13	
02/05/19	- 02/13/19	< 14	< 14	< 13	< 5	< 14	< 14	< 14	< 14	
02/13/19	- 02/21/19	< 13	< 22	< 11	< 12	< 8	< 12	< 20	< 21	
02/21/19	- 02/27/19	< 40	< 20	< 41	< 16	< 21	< 40	< 21	< 20	
02/27/19	- 03/05/19	< 21	< 15	< 8	< 21	< 16	< 22	< 16	< 16	
03/05/19	- 03/11/19	< 24	< 21	< 25	< 24	< 22	< 23	< 21	< 21	
03/11/19	- 03/18/19	< 26	< 19	< 27	< 26	< 20	< 10	< 20	< 19	
03/18/19	- 03/25/19	< 24	< 28	< 23	< 23	< 28	< 23	< 15	< 28	
03/25/19	- 04/01/19	< 18	< 26	< 17	< 24	< 26	< 18	< 27	< 26	
04/01/19	- 04/08/19	< 12	< 9	< 5	< 12	< 11	< 12	< 11	< 11	
04/08/19	- 04/15/19	< 21	< 16	< 21	< 11	< 17	< 20	< 17	< 17	
04/15/19	- 04/23/19	< 18	< 11	< 18	< 18	< 11	< 19	< 11	< 9	
04/23/19	- 04/29/19	< 28	< 23	< 29	< 29	< 11	< 27	< 19	< 24	
04/29/19	- 05/06/19	< 12	< 14	< 12	< 12	< 6	< 12	< 14	< 14	
05/06/19	- 05/13/19	< 19	< 22	< 19	< 16	< 21	< 19	< 22	< 22	
05/13/19	- 05/20/19	< 16	< 26	< 16	< 16	< 11	< 26	< 26	< 26	
05/20/19	- 05/28/19	< 14	< 19	< 11	< 13	< 19	< 14	< 19	< 20	
05/28/19	- 06/03/19	< 35	< 19	< 14	< 34	< 20	< 36	< 19	< 19	
06/03/19	- 06/10/19	< 5	< 8	< 12	< 12	< 7	< 12	< 8	< 7	
06/10/19	- 06/17/19	< 18	< 25	< 17	< 16	< 24	< 18	< 10	< 24	
06/17/19	- 06/24/19	< 12	< 23	< 12	< 11	< 23	< 12	< 24	< 23	
06/24/19	- 07/01/19	< 32	< 18	< 32	< 13	< 18	< 16	< 19	< 19	
07/01/19	- 07/08/19	< 36	< 16	< 33	< 35	< 16	< 34	< 16	< 17	
07/08/19	- 07/15/19	< 12	< 22	< 23	< 24	< 22	< 23	< 22	< 22	
07/15/19	- 07/22/19	< 29	< 12	< 30	< 30	< 11	< 30	< 12	< 11	
07/22/19	- 07/29/19	< 13	< 31	< 16	< 17	< 30	< 16	< 30	< 30	
07/29/19	- 08/05/19	< 13	< 17	< 16	< 18	< 16	< 17	< 16	< 16	
08/05/19	- 08/12/19	< 22	< 25	< 22	< 22	< 24	< 23	< 24	< 25	
08/12/19	- 08/19/19	< 22	< 18	< 9	< 23	< 18	< 23	< 17	< 16	
08/19/19	- 08/26/19	< 8	< 14	< 8	< 7	< 13	< 6	< 13	< 13	
08/26/19	- 09/03/19	< 9	< 25	< 11	< 11	< 24	< 12	< 24	< 10	
09/03/19	- 09/09/19	< 12	< 18	< 13	< 13	< 17	< 13	< 17	< 17	
09/09/19	- 09/16/19	< 15	< 19	< 15	< 16	< 19	< 16	< 19	< 8	
09/16/19	- 09/24/19	< 20	< 16	< 20	< 20	< 15	< 21	< 15	< 15	
09/24/19	- 09/30/19	< 23	< 19	< 23	< 23	< 19	< 23	< 6	< 19	
09/30/19	- 10/07/19	< 13	< 17	< 5	< 15	< 16	< 17	< 17	< 17	
10/07/19	- 10/14/19	< 26	< 18	< 27	< 26	< 14	< 26	< 17	< 17	
10/14/19	- 10/21/19	< 11	< 6	< 11	< 11	< 6	< 12	< 5	< 6	
10/21/19	- 10/28/19	< 8	< 30	< 19	< 19	< 31	< 18	< 29	< 29	
10/28/19	- 11/04/19	< 23	< 22	< 23	< 23	< 22	< 24	< 11	< 23	
11/04/19	- 11/12/19	< 5	< 7	< 12	< 12	< 7	< 12	< 7	< 7	
11/12/19	- 11/18/19	< 23	< 22	< 23	< 23	< 22	< 24	< 18	< 22	
11/18/19	- 11/25/19	< 24	< 25	< 24	< 11	< 25	< 24	< 25	< 25	
11/25/19	- 12/02/19	< 19	< 14	< 18	< 18	< 14	< 18	< 14	< 15	
12/02/19	- 12/09/19	< 13	< 13	< 14	< 14	< 12	< 14	< 13	< 13	
12/09/19	- 12/17/19	< 7	< 10	< 7	< 7	< 10	< 7	< 10	< 11	
12/17/19	- 12/23/19	< 9	< 11	< 9	< 9	< 12	< 9	< 11	< 12	
12/23/19	- 12/30/19	< 25	< 16	< 26	< 28	< 14	< 15	< 16	< 14	
AVERAGE*		-	-	-	-	-	-	-	-	-

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING ONLY THE POSITIVE VALUES. IF THERE IS ONLY 1 POSITIVE VALUE, THE AVERAGE AND THE ERROR ARE DISPLAYED.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD

Table C-4

**DIRECT AND IMMERSION RADIATION MEASUREMENTS, 2019  
(REMP DOSIMETRY RESULTS\*)**

STATION ID	ANNUAL NET DOSE (mrem)	GROSS ANNUAL DOSE (mrem)	QUARTERLY NET DOSE AND GROSS DOSE (mrem/StandardQuarter)							
			JAN - MAR		APR - JUN		JUL - SEP		OCT - DEC	
			Net	Gross	Net	Gross	Net	Gross	Net	Gross
SA-IDM-01G3 (C)	ND	60.7	ND	14.6	ND	15.2	ND	15.2	ND	15.7
SA-IDM-03G1 (C)	ND	60.2	ND	15.0	ND	15.2	ND	16.2	ND	13.8
SA-IDM-10G1 (C)	ND	64.0	ND	15.3	ND	15.8	ND	16.6	ND	16.3
SA-IDM-14G1 (C)	ND	60.5	ND	14.8	ND	15.6	ND	16.3	ND	13.8
SA-IDM-16G1 (C)	ND	55.9	ND	13.9	ND	13.9	ND	14.2	ND	13.9
SA-IDM-03H1 (C)	ND	57.0	ND	13.4	ND	13.6	ND	13.9	ND	16.1
SA-IDM-01S1 **	<b>91.5</b>	145.8	<b>19.7</b>	33.3	<b>24.7</b>	38.2	<b>24.6</b>	38.2	<b>22.5</b>	36.1
SA-IDM-01S2	ND	54.0	ND	13.3	ND	13.6	ND	13.7	ND	13.4
SA-IDM-02S2	ND	57.6	ND	13.9	ND	14.6	ND	14.2	ND	14.9
SA-IDM-02S4	ND	55.8	ND	13.4	ND	13.9	ND	14.1	ND	14.4
SA-IDM-03S1	ND	51.1	ND	11.8	ND	12.9	ND	13.2	ND	13.2
SA-IDM-04S1	ND	52.1	ND	12.8	ND	12.7	ND	13.4	ND	13.2
SA-IDM-05S1	ND	50.2	ND	12.3	ND	12.0	ND	12.8	ND	13.1
SA-IDM-06S2	ND	66.6	ND	16.8	ND	16.0	ND	17.0	ND	16.8
SA-IDM-07S1	ND	51.4	ND	12.8	ND	13.1	ND	12.2	ND	13.3
SA-IDM-08S1	ND	46.1	ND	11.2	ND	11.3	ND	11.8	ND	11.8
SA-IDM-09S1	ND	46.7	ND	11.3	ND	11.8	ND	11.7	ND	11.9
SA-IDM-10S1	ND	50.2	ND	12.3	ND	12.5	ND	12.6	ND	12.8
SA-IDM-11S1	ND	49.4	ND	11.8	ND	12.5	ND	12.6	ND	12.5
SA-IDM-12S1	ND	62.6	ND	15.4	ND	16.6	ND	15.3	ND	15.3
SA-IDM-13S1	ND	67.0	ND	16.1	ND	18.0	ND	16.8	ND	16.1
SA-IDM-14S1	ND	67.7	ND	17.1	ND	18.3	ND	16.5	ND	15.8
SA-IDM-15S1	ND	49.3	ND	12.3	ND	12.2	ND	12.5	ND	12.3
SA-IDM-15S2	ND	56.4	ND	14.1	ND	14.0	ND	13.9	ND	14.4
SA-IDM-16S1	ND	59.4	ND	14.7	ND	15.3	ND	14.7	ND	14.7
SA-IDM-16S2 **	<b>71.9</b>	126.2	<b>16.4</b>	30.0	<b>19.3</b>	32.9	<b>17.9</b>	31.4	<b>18.3</b>	31.9
SA-IDM-16S3	ND	53.3	ND	13.7	ND	13.9	ND	12.6	ND	13.1
SA-IDM-04D2	ND	62.0	ND	15.0	ND	15.9	ND	15.3	ND	15.8
SA-IDM-05D1	ND	58.3	ND	13.8	ND	14.9	ND	14.8	ND	14.8
SA-IDM-10D1	ND	62.4	ND	14.9	ND	16.1	ND	16.0	ND	15.4
SA-IDM-14D1	ND	56.3	ND	13.6	ND	14.6	ND	13.8	ND	14.3
SA-IDM-15D1	ND	59.9	ND	14.4	ND	15.0	ND	15.5	ND	15.0
SA-IDM-02E1	ND	57.0	ND	14.1	ND	14.1	ND	14.3	ND	14.5
SA-IDM-03E1	ND	49.2	ND	11.6	ND	12.3	ND	12.7	ND	12.6
SA-IDM-11E2	ND	64.3	ND	15.5	ND	16.1	ND	16.8	ND	15.9
SA-IDM-12E1	ND	64.5	ND	15.7	ND	15.9	ND	16.8	ND	16.1
SA-IDM-13E1	ND	51.3	ND	12.7	ND	12.7	ND	13.3	ND	12.6
SA-IDM-16E1	ND	59.2	ND	14.5	ND	14.8	ND	15.4	ND	14.5
SA-IDM-01F1	ND	76.5	ND	18.4	ND	19.1	ND	19.7	ND	19.3
SA-IDM-02F2	ND	55.8	ND	13.9	ND	13.4	ND	14.3	ND	14.2
SA-IDM-02F5	ND	60.5	ND	14.7	ND	14.9	ND	15.6	ND	15.3
SA-IDM-02F6	ND	56.6	ND	13.9	ND	14.3	ND	14.2	ND	14.2
SA-IDM-03F2	ND	53.5	ND	13.0	ND	13.6	ND	13.5	ND	13.4
SA-IDM-03F3	ND	52.4	ND	13.2	ND	13.2	ND	13.4	ND	12.6
SA-IDM-04F2	ND	52.6	ND	12.8	ND	12.9	ND	13.3	ND	13.6
SA-IDM-05F1	ND	52.8	ND	13.2	ND	13.7	ND	14.3	ND	11.6
SA-IDM-06F1	ND	48.7	ND	11.5	ND	11.6	ND	11.8	ND	13.8
SA-IDM-07F2	<b>5.9</b>	55.0	ND	13.2	ND	13.9	<b>5.9</b>	14.7	ND	13.2
SA-IDM-08F1	ND	61.2	ND	15.7	ND	15.6	ND	13.7	ND	16.2
SA-IDM-09F1	ND	64.9	ND	15.2	ND	16.7	ND	17.5	ND	15.5
SA-IDM-10F2	ND	64.4	ND	14.9	ND	15.9	ND	17.2	ND	16.4
SA-IDM-11F1	ND	64.4	ND	15.4	ND	16.6	ND	16.7	ND	15.7
SA-IDM-12F1	ND	61.9	ND	14.8	ND	15.8	ND	16.3	ND	15.0
SA-IDM-13F2	ND	61.8	ND	14.2	ND	15.4	ND	15.8	ND	16.4
SA-IDM-13F3	ND	63.1	ND	15.1	ND	15.7	ND	16.2	ND	16.1
SA-IDM-13F4	ND	65.4	ND	15.1	ND	18.2	ND	15.6	ND	16.5
SA-IDM-14F2	ND	66.9	ND	16.0	ND	16.3	ND	17.4	ND	17.2
SA-IDM-15F3	ND	64.6	ND	15.6	ND	16.8	ND	17.5	ND	14.7
SA-IDM-16F2	ND	57.2	ND	13.5	ND	13.9	ND	14.7	ND	15.1

ND NOT DETECTABLE ABOVE BACKGROUND

(C) CONTROL LOCATION

\* QUARTERLY ELEMENT TLD RESULTS BY VENDOR LABORATORY.

\*\* SAMPLE RESULTS ARE AFFECTED BY THE INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)



Table C-5

## CONCENTRATIONS OF IODINE-131 AND GAMMA EMITTERS IN MILK, 2019

Results in Units of pCi/L  $\pm 2\sigma$ 

STATION ID	COLLECTION PERIOD START STOP	I-133 LL	Gamma Emitters				
			K-40	Cs-134	Cs-137	BaLa-140	Ra-226
SA-MLK-2G3 (C)	01/07/19 - 01/08/19	< 0.6	1,317 $\pm$ 196	< 10	< 7	< 13	< 193
	02/04/19 - 02/05/19	< 0.3	1,346 $\pm$ 148	< 11	< 9	< 13	< 237
	03/04/19 - 03/05/19	< 0.6	1,181 $\pm$ 169	< 6	< 7	< 10	< 171
	04/07/19 - 04/08/19	< 0.9	1,332 $\pm$ 185	< 8	< 7	< 10	< 190
	04/22/19 - 04/23/19	< 0.5	1,240 $\pm$ 231	< 7	< 8	< 5	< 189
	05/05/19 - 05/06/19	< 0.5	1,429 $\pm$ 181	< 7	< 8	< 11	< 181
	05/19/19 - 05/20/19	< 0.5	1,158 $\pm$ 137	< 6	< 6	< 7	< 135
	06/02/19 - 06/03/19	< 0.8	1,339 $\pm$ 201	< 8	< 8	< 8	< 168
	06/16/19 - 06/17/19	< 0.6	1,287 $\pm$ 181	< 9	< 8	< 9	< 204
	07/07/19 - 07/08/19	< 0.8	1,148 $\pm$ 120	< 6	< 6	< 8	< 118
	07/21/19 - 07/22/19	< 0.6	1,194 $\pm$ 192	< 11	< 8	< 11	< 233
	08/04/19 - 08/05/19	< 0.8	1,288 $\pm$ 190	< 10	< 7	< 12	< 236
	08/18/19 - 08/19/19	< 0.9	1,277 $\pm$ 136	< 8	< 8	< 13	< 180
	09/02/19 - 09/03/19	< 1.0	1,384 $\pm$ 154	< 7	< 6	< 8	< 158
	09/15/19 - 09/16/19	< 0.9	1,364 $\pm$ 157	< 7	< 9	< 12	< 195
	10/06/19 - 10/07/19	< 0.6	1,293 $\pm$ 172	< 9	< 7	< 10	< 185
	10/20/19 - 10/21/19	< 0.7	1,326 $\pm$ 199	< 9	< 8	< 13	< 184
	11/03/19 - 11/04/19	< 0.9	1,209 $\pm$ 192	< 7	< 8	< 9	< 156
	11/17/19 - 11/18/19	< 1.0	1,236 $\pm$ 204	< 8	< 9	< 9	< 205
	12/01/19 - 12/02/19	< 0.9	1,250 $\pm$ 174	< 7	< 8	< 10	< 168
	AVERAGE*	-	1,280 $\pm$ 154	-	-	-	-

STATION ID	COLLECTION PERIOD START STOP	I-133 LL	Gamma Emitters				
			K-40	Cs-134	Cs-137	BaLa-140	Ra-226
SA-MLK-13E3	01/07/19 - 01/08/19	< 0.9	1,326 $\pm$ 162	< 11	< 10	< 9	< 270
	02/04/19 - 02/05/19	< 0.3	1,555 $\pm$ 198	< 8	< 9	< 12	< 181
	03/04/19 - 03/05/19	< 0.7	1,152 $\pm$ 155	< 8	< 7	< 12	< 144
	04/07/19 - 04/08/19	< 0.7	1,356 $\pm$ 168	< 7	< 8	< 12	< 167
	04/22/19 - 04/23/19	< 0.6	1,633 $\pm$ 205	< 9	< 7	< 11	< 232
	05/05/19 - 05/06/19	< 0.4	1,256 $\pm$ 164	< 7	< 7	< 10	< 150
	05/19/19 - 05/20/19	< 0.5	1,317 $\pm$ 181	< 8	< 7	< 8	< 148
	06/02/19 - 06/03/19	< 0.6	1,352 $\pm$ 168	< 10	< 8	< 11	< 188
	06/16/19 - 06/17/19	< 0.5	1,493 $\pm$ 194	< 7	< 7	< 7	< 184
	07/07/19 - 07/08/19	< 0.7	1,402 $\pm$ 108	< 4	< 4	< 5	< 89
	07/21/19 - 07/22/19	< 0.7	1,477 $\pm$ 191	< 7	< 6	< 11	< 189
	08/04/19 - 08/05/19	< 0.5	1,421 $\pm$ 204	< 10	< 8	< 15	< 214
	08/18/19 - 08/19/19	< 0.7	1,254 $\pm$ 190	< 8	< 8	< 6	< 204
	09/02/19 - 09/03/19	< 0.6	1,280 $\pm$ 170	< 9	< 6	< 9	< 184
	09/15/19 - 09/16/19	< 0.9	1,384 $\pm$ 160	< 8	< 7	< 10	< 158
	10/06/19 - 10/07/19	< 0.7	1,387 $\pm$ 177	< 8	< 8	< 9	< 155
	10/20/19 - 10/21/19	< 0.7	1,214 $\pm$ 163	< 8	< 7	< 14	< 154
	11/03/19 - 11/04/19	< 0.8	1,539 $\pm$ 160	< 7	< 7	< 9	< 157
	11/17/19 - 11/18/19	< 0.8	1,369 $\pm$ 195	< 9	< 10	< 8	< 214
	12/01/19 - 12/02/19	< 0.9	1,273 $\pm$ 183	< 8	< 9	< 8	< 193
	AVERAGE*	-	1,372 $\pm$ 244	-	-	-	-

Table C-5

## CONCENTRATIONS OF IODINE-131 AND GAMMA EMITTERS IN MILK, 2019

Results in Units of pCi/L  $\pm 2\sigma$ 

STATION ID	COLLECTION PERIOD		I-133 LL	Gamma Emitters				
	START	STOP		K-40	Cs-134	Cs-137	BaLa-140	Ra-226
SA-MLK-14F4	01/07/19	- 01/08/19	< 0.6	1,331 $\pm$ 154	< 8	< 7	< 10	< 176
	02/04/19	- 02/05/19	< 0.4	1,430 $\pm$ 182	< 8	< 7	< 9	< 136
	03/04/19	- 03/05/19	< 0.6	1,382 $\pm$ 195	< 10	< 8	< 10	< 200
	04/07/19	- 04/08/19	< 0.7	1,303 $\pm$ 195	< 7	< 8	< 8	< 172
	04/22/19	- 04/23/19	< 0.6	1,643 $\pm$ 211	< 8	< 8	< 11	< 212
	05/05/19	- 05/06/19	< 0.4	1,364 $\pm$ 147	< 7	< 7	< 7	< 159
	05/19/19	- 05/20/19	< 0.6	1,179 $\pm$ 183	< 8	< 7	< 8	< 139
	06/02/19	- 06/03/19	< 0.7	1,311 $\pm$ 181	< 8	< 7	< 13	< 179
	06/16/19	- 06/17/19	< 0.6	1,518 $\pm$ 151	< 7	< 7	< 7	< 152
	07/07/19	- 07/08/19	< 0.9	1,348 $\pm$ 107	< 5	< 5	< 5	< 109
	07/21/19	- 07/22/19	< 0.8	1,436 $\pm$ 156	< 8	< 6	< 13	< 176
	08/04/19	- 08/05/19	< 0.7	1,308 $\pm$ 174	< 8	< 7	< 12	< 183
	08/18/19	- 08/19/19	< 0.7	1,398 $\pm$ 208	< 9	< 10	< 13	< 222
	09/02/19	- 09/03/19	< 0.8	1,158 $\pm$ 168	< 10	< 9	< 14	< 217
	09/15/19	- 09/16/19	< 0.9	1,487 $\pm$ 185	< 8	< 8	< 9	< 189
	10/06/19	- 10/07/19	< 0.8	1,400 $\pm$ 179	< 7	< 6	< 6	< 148
	10/20/19	- 10/21/19	< 0.8	1,400 $\pm$ 179	< 7	< 8	< 13	< 204
	11/03/19	- 11/04/19	< 0.9	1,268 $\pm$ 199	< 9	< 10	< 13	< 204
	11/17/19	- 11/18/19	< 0.9	1,342 $\pm$ 185	< 7	< 8	< 8	< 191
	12/01/19	- 12/02/19	< 0.8	1,280 $\pm$ 182	< 9	< 7	< 11	< 156
AVERAGE*			-	1,364 $\pm$ 222	-	-	-	-
			I-133 LL	K-40	Cs-134	Cs-137	BaLa-140	Ra-226
ALL INDICATOR AVERAGE*			-	1,368 $\pm$ 231	-	-	-	-

(C) CONTROL LOCATION.

- \* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES. IF THERE IS ONLY 1 POSITIVE VALUE, THE AVERAGE AND THE ERROR ARE DISPLAYED.
- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

Table C-6

**CONCENTRATIONS OF GROSS ALPHA AND BETA EMITTERS AND TRITIUM IN WELL  
WATER\*\*, 2019**

Results in Units of pCi/L  $\pm 2\sigma$

STATION ID	COLLECTION DATE	Gross Alpha	Gross Beta	H-3
SA-WWA-3E1	01/21/19	< 2.9	< 2.4	< 189
	02/21/19	< 1.7	< 2.3	< 191
	03/25/19	< 1.1	< 2.3	< 191
	04/23/19	< 1.8	< 2.2	< 196
	05/20/19	< 2.3	< 2.4	< 196
	06/24/19	< 1.9	< 2.2	< 185
	07/22/19	< 2.5	< 2.4	< 192
	08/26/19	< 2.6	< 2.5	< 189
	09/24/19	< 0.8	< 2.5	< 182
	10/21/19	< 1.2	<b>4.5</b> $\pm$ 1.7	< 190
	11/18/19	< 2.7	< 2.4	< 196
	12/17/19	< 1.6	<b>2.9</b> $\pm$ 1.6	< 192
<b>AVERAGE*</b>		-	<b>3.7</b> $\pm$ 2.3	-

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES. IF THERE IS ONLY 1 POSITIVE VALUE THE AVERAGE AND THE ERROR ARE DISPLAYED.

\*\* MANAGEMENT AUDIT SAMPLE: NOT REQUIRED BY ODCM.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

TABLE C-7

## CONCENTRATIONS OF IODINE-131 AND GAMMA EMITTERS IN WELL WATER\*\*, 2019

		Results in Units of pCi/L $\pm 2\sigma$											
		< ----- GAMMA EMITTERS ----- >											
STATION ID	COLLECTION DATE	I-131 LL	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	ZrNb-95	Cs-134	Cs-137	BaLa- 140	Ra-226
SA-WWA-3E1	01/21/19	< 0.7	< 66	< 6	< 5	< 10	< 8	< 14	< 7	< 7	< 7	< 7	< 187
	02/21/19	< 0.7	< 57	< 4	< 5	< 10	< 6	< 13	< 5	< 6	< 5	< 6	< 131
	03/25/19	< 0.7	< 99	< 5	< 9	< 13	< 6	< 18	< 9	< 6	< 8	< 9	< 187
	04/23/19	< 0.8	< 65	< 4	< 4	< 8	< 4	< 8	< 4	< 4	< 4	< 5	< 114
	05/20/19	< 0.8	< 43	< 4	< 5	< 9	< 4	< 8	< 4	< 5	< 5	< 4	< 110
	06/24/19	< 0.7	< 131	< 6	< 6	< 14	< 7	< 13	< 7	< 7	< 7	< 9	< 169
	07/22/19	< 0.8	< 106	< 5	< 5	< 11	< 6	< 12	< 5	< 6	< 6	< 6	< 138
	08/26/19	< 0.5	< 106	< 6	< 5	< 13	< 6	< 9	< 6	< 6	< 5	< 8	< 145
	09/24/19	< 0.9	< 80	< 6	< 6	< 12	< 9	< 10	< 7	< 7	< 7	< 7	< 182
	10/21/19	< 0.7	< 89	< 4	< 4	< 8	< 4	< 11	< 5	< 4	< 5	< 5	< 113
	11/18/19	< 0.7	< 126	< 6	< 6	< 9	< 7	< 12	< 7	< 6	< 7	< 7	< 154
	12/17/19	< 0.8	< 121	< 7	< 7	< 5	< 7	< 14	< 6	< 7	< 7	< 9	< 166
AVERAGE*		-	-	-	-	-	-	-	-	-	-	-	-

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES. IF THERE IS ONLY 1 POSITIVE VALUE THE AVERAGE AND THE ERROR ARE DISPLAYED.

\*\* MANAGEMENT AUDIT SAMPLE: NOT REQUIRED BY ODCM.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

TABLE C-8

**CONCENTRATIONS OF GROSS ALPHA AND GROSS BETA EMITTERS AND TRITIUM IN RAW AND TREATED POTABLE WATER\*\*, 2019**

Results in Units of pCi/L  $\pm 2\sigma$

STATION ID	COLLECTION PERIOD			Gross Alpha	Gross Beta	H-3
	START		STOP			
SA-PWR-2F3	12/26/18	-	01/28/19	< 2.0	8.9 $\pm$ 2.2	< 198
	01/28/19	-	02/27/19	< 1.3	5.4 $\pm$ 1.9	< 181
	02/27/19	-	03/25/19	< 2.1	6.3 $\pm$ 2.1	< 188
	03/25/19	-	04/29/19	< 1.8	5.2 $\pm$ 1.9	< 189
	04/29/19	-	05/28/19	< 1.1	8.1 $\pm$ 2.4	< 194
	05/28/19	-	06/24/19	< 1.6	8.9 $\pm$ 2.3	< 182
	06/24/19	-	07/29/19	< 1.8	7.2 $\pm$ 2.1	< 191
	07/29/19	-	08/26/19	< 1.4	5.7 $\pm$ 1.4	< 198
	08/26/19	-	09/24/19	< 0.9	3.2 $\pm$ 2.0	< 183
	09/24/19	-	10/28/19	< 1.2	9.3 $\pm$ 2.1	< 189
	10/28/19	-	11/25/19	< 2.6	9.8 $\pm$ 2.2	< 186
	11/25/19	-	12/30/19	< 1.4	6.0 $\pm$ 1.3	< 180
	AVERAGE*			-	7.0 $\pm$ 4.1	-
SA-PWT-2F3	12/26/18	-	01/28/19	< 2.1	6.1 $\pm$ 2.0	< 198
	01/28/19	-	02/27/19	< 1.3	4.5 $\pm$ 1.9	< 182
	02/27/19	-	03/25/19	< 1.3	< 2.0	< 191
	03/25/19	-	04/29/19	< 1.8	5.2 $\pm$ 1.9	< 193
	04/29/19	-	05/28/19	< 1.1	7.7 $\pm$ 2.4	< 194
	05/28/19	-	06/24/19	< 1.6	11 $\pm$ 2.5	< 181
	06/24/19	-	07/29/19	< 1.8	6.7 $\pm$ 2.0	< 188
	07/29/19	-	08/26/19	< 2.9	8.9 $\pm$ 2.3	< 195
	08/26/19	-	09/24/19	< 0.9	4.1 $\pm$ 2.0	< 185
	09/24/19	-	10/28/19	< 3.0	9.0 $\pm$ 2.1	< 190
	10/28/19	-	11/25/19	< 2.5	8.4 $\pm$ 2.1	< 186
	11/25/19	-	12/30/19	< 2.9	2.8 $\pm$ 1.6	< 184
	AVERAGE*			-	6.8 $\pm$ 5.0	-

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES. IF THERE IS ONLY 1 POSITIVE VALUE THE AVERAGE AND THE ERROR ARE DISPLAYED.

\*\* MANAGEMENT AUDIT SAMPLE: NOT REQUIRED BY ODCM.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

**Table C-9 CONCENTRATIONS OF IODINE-131 AND GAMMA EMITTERS IN RAW AND TREATED POTABLE WATER\*\*,**

Results in Units of pCi/L $\pm 2\sigma$														
COLLECTION PERIOD			< ----- GAMMA EMITTERS ----- >											
STATION ID	START	STOP	I-131 LL	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	ZrNb-95	Cs-134	Cs-137	BaLa-140	Ra-226
SA-PWR-2F3	12/26/18 - 01/28/19		< 0.7	< 126	< 6	< 5	< 10	< 8	< 13	< 7	< 7	< 7	< 11	< 166
	01/28/19 - 02/27/19		< 0.5	< 89	< 5	< 7	< 11	< 6	< 8	< 7	< 6	< 4	< 8	< 159
	02/27/19 - 03/25/19		< 0.6	< 112	< 7	< 6	< 14	< 7	< 18	< 7	< 7	< 6	< 8	< 179
	03/25/19 - 04/29/19		< 0.6	< 65	< 5	< 6	< 10	< 5	< 12	< 6	< 7	< 6	< 6	< 162
	04/29/19 - 05/28/19		< 0.5	<b>97</b> $\pm$ 58	< 4	< 4	< 5	< 4	< 11	< 5	< 4	< 4	< 6	< 126
	05/28/19 - 06/24/19		< 0.7	< 123	< 7	< 7	< 12	< 6	< 15	< 7	< 7	< 6	< 8	< 174
	06/24/19 - 07/29/19		< 0.8	< 68	< 7	< 7	< 15	< 7	< 18	< 8	< 9	< 6	< 9	< 223
	07/29/19 - 08/26/19		< 0.7	< 85	< 6	< 5	< 12	< 7	< 14	< 6	< 6	< 5	< 8	< 192
	08/26/19 - 09/24/19		< 0.6	< 97	< 4	< 6	< 12	< 7	< 10	< 6	< 6	< 7	< 10	< 163
	09/24/19 - 10/28/19		< 0.9	< 118	< 5	< 6	< 13	< 9	< 11	< 7	< 5	< 6	< 9	< 162
	10/28/19 - 11/25/19		< 0.7	< 89	< 4	< 5	< 10	< 4	< 8	< 5	< 4	< 5	< 6	< 106
	11/25/19 - 12/30/19		< 0.5	< 56	< 3	< 3	< 7	< 3	< 7	< 3	< 4	< 4	< 5	< 85
	<b>AVERAGE*</b>		-	<b>97</b> $\pm$ 58	-	-	-	-	-	-	-	-	-	-
SA-PWT-2F3	12/26/18 - 01/28/19		< 0.9	< 61	< 5	< 6	< 8	< 7	< 12	< 8	< 6	< 6	< 9	< 153
	01/28/19 - 02/27/19		< 0.6	< 115	< 6	< 7	< 9	< 6	< 12	< 6	< 8	< 7	< 7	< 162
	02/27/19 - 03/25/19		< 0.7	< 88	< 7	< 6	< 15	< 8	< 15	< 7	< 6	< 6	< 8	< 153
	03/25/19 - 04/29/19		< 0.6	< 53	< 5	< 5	< 10	< 6	< 10	< 5	< 5	< 5	< 6	< 149
	04/29/19 - 05/28/19		< 0.9	< 98	< 5	< 5	< 11	< 7	< 8	< 6	< 6	< 4	< 3	< 140
	05/28/19 - 06/24/19		< 0.8	<b>123</b> $\pm$ 55	< 7	< 5	< 11	< 6	< 11	< 6	< 6	< 6	< 6	< 192
	06/24/19 - 07/29/19		< 0.6	< 106	< 8	< 8	< 16	< 9	< 14	< 7	< 8	< 8	< 11	< 187
	07/29/19 - 08/26/19		< 0.6	< 127	< 5	< 6	< 13	< 5	< 10	< 6	< 6	< 5	< 9	< 153
	08/26/19 - 09/24/19		< 0.6	< 115	< 6	< 5	< 11	< 6	< 12	< 6	< 6	< 6	< 9	< 150
	09/24/19 - 10/28/19		< 0.8	< 96	< 5	< 5	< 14	< 7	< 12	< 6	< 7	< 7	< 9	< 152
	10/28/19 - 11/25/19		< 0.8	< 97	< 4	< 5	< 8	< 6	< 11	< 6	< 6	< 7	< 7	< 166
	11/25/19 - 12/30/19		< 0.7	< 72	< 3	< 3	< 7	< 4	< 6	< 4	< 4	< 4	< 5	< 92
	<b>AVERAGE*</b>		-	<b>123</b> $\pm$ 55	-	-	-	-	-	-	-	-	-	-

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES.  
IF THERE IS ONLY 1 POSITIVE VALUE THE AVERAGE AND THE ERROR ARE DISPLAYED.

\*\* MANAGEMENT AUDIT SAMPLE: NOT REQUIRED BY ODCM.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

Table C-10a

## CONCENTRATIONS OF GAMMA EMITTERS IN BROADLEAF VEGETATION (FPL), 2019

Results in Units of pCi/kg (wet) $\pm 2\sigma$									
STATION ID	COLLECTION DATE	SAMPLE TYPE	Be-7	K-40	I-131	Cs-134	Cs-137	Ra-226	Th-232
SA-FPL-3H5 (C)	07/24/19	Cabbage	< 166	<b>1,680</b> $\pm$ 403	< 28	< 18	< 20	< 496	< 74
SA-FPL-1S1	07/16/19	Cabbage	< 281	<b>7,086</b> $\pm$ 710	< 55	< 37	< 35	< 690	< 113
SA-FPL-1S1	07/16/19	Collards	< 306	<b>7,966</b> $\pm$ 856	< 50	< 37	< 30	< 599	< 134
SA-FPL-1S1	08/28/19	Cabbage	< 212	<b>5,549</b> $\pm$ 656	< 41	< 32	< 27	< 672	< 120
SA-FPL-1S1	08/28/19	Collards	< 263	<b>4,674</b> $\pm$ 740	< 53	< 39	< 31	< 778	< 129
SA-FPL-1S1	08/28/19	Kale	< 285	<b>4,206</b> $\pm$ 648	< 57	< 39	< 38	< 786	< 143
SA-FPL-7S2	07/16/19	Collards	< 303	<b>7,160</b> $\pm$ 848	< 56	< 37	< 32	< 715	< 155
SA-FPL-7S2	07/16/19	Kale	< 267	<b>4,494</b> $\pm$ 741	< 52	< 37	< 37	< 825	< 130
SA-FPL-7S2	08/28/19	Collards	< 330	<b>6,440</b> $\pm$ 801	< 57	< 38	< 35	< 804	< 131
SA-FPL-7S2	08/28/19	Cabbage	< 131	<b>7,952</b> $\pm$ 355	< 29	< 16	< 15	< 365	< 60
SA-FPL-7S2	08/28/19	Kale	< 153	<b>7,652</b> $\pm$ 371	< 31	< 18	< 18	< 327	< 69
SA-FPL-15S2	07/16/19	Cabbage	< 294	<b>4,392</b> $\pm$ 693	< 40	< 35	< 35	< 652	< 108
SA-FPL-15S2	07/16/19	Kale	< 357	<b>6,246</b> $\pm$ 747	< 54	< 37	< 35	< 797	< 144
SA-FPL-15S2	08/28/19	Cabbage	< 239	<b>4,702</b> $\pm$ 587	< 34	< 25	< 21	< 466	< 88
SA-FPL-15S2	08/28/19	Kale	< 319	<b>7,137</b> $\pm$ 879	< 53	< 34	< 33	< 783	< 125
SA-FPL-16S1	08/28/19	Cabbage	< 320	<b>7,118</b> $\pm$ 697	< 55	< 31	< 30	< 663	< 120
SA-FPL-16S1	08/28/19	Kale	< 270	<b>6,194</b> $\pm$ 621	< 55	< 36	< 32	< 542	< 137
SA-FPL-16S1	08/28/19	Collards	< 302	<b>7,393</b> $\pm$ 781	< 51	< 37	< 30	< 765	< 114
SA-FPL-10D1	08/28/19	Collards	< 315	<b>5,777</b> $\pm$ 614	< 48	< 28	< 29	< 631	< 122
SA-FPL-10D1	08/28/19	Cabbage	<b>208</b> $\pm$ 125	<b>8,939</b> $\pm$ 411	< 33	< 20	< 18	<b>635</b> $\pm$ 393	< 75
SA-FPL-10D1	08/28/19	Kale	<b>523</b> $\pm$ 219	<b>6,176</b> $\pm$ 724	< 50	< 31	< 28	< 544	< 118
ALL INDICATOR AVERAGE*			<b>366</b> $\pm$ 445	<b>6,140</b> $\pm$ 3,358	-	-	-	<b>635</b> $\pm$ 393	-

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES.  
IF THERE IS ONLY 1 POSITIVE VALUE THE AVERAGE AND THE ERROR ARE DISPLAYED.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

Table C-10b

## CONCENTRATIONS OF GAMMA EMITTERS IN VEGETABLES (FPV)\*\*, 2019

Results in Units of pCi/kg (wet)  $\pm 2\sigma$ 

STATION ID	COLLECTION DATE	SAMPLE TYPE	< ----- GAMMA EMITTERS ----- >						
			Be-7	K-40	I-131	Cs-134	Cs-137	Ra-226	Th-232
SA-FPV-2F9**	05/16/19	Asparagus	< 128	<b>1,482</b> $\pm$ 337	< 18	< 23	< 22	< 497	< 65
SA-FPV-2F9**	07/24/19	Corn	< 258	<b>3,481</b> $\pm$ 567	< 43	< 29	< 33	< 775	< 125
SA-FPV-2F9**	07/24/19	Pepper	< 218	<b>1,486</b> $\pm$ 412	< 43	< 22	< 29	< 703	< 79
SA-FPV-2F9**	07/24/19	Tomato	< 211	<b>1,454</b> $\pm$ 501	< 41	< 28	< 23	< 614	< 94
SA-FPV-15F4**	07/24/19	Corn	< 188	<b>2,749</b> $\pm$ 446	< 34	< 26	< 24	< 603	< 91
SA-FPV-1G1**	05/16/19	Asparagus	< 214	<b>2,519</b> $\pm$ 444	< 24	< 29	< 25	< 609	< 84
SA-FPV-1G1**	07/24/19	Peach	< 210	<b>2,413</b> $\pm$ 570	< 35	< 29	< 26	< 645	< 107
SA-FPV-1G1**	07/24/19	Corn	< 198	<b>2,168</b> $\pm$ 466	< 30	< 23	< 25	< 612	< 114
SA-FPV-1G1**	07/24/19	Pepper	< 268	<b>1,235</b> $\pm$ 436	< 49	< 29	< 26	< 724	< 120
SA-FPV-1G1**	07/24/19	Tomato	< 128	<b>1,406</b> $\pm$ 349	< 22	< 18	< 17	< 406	< 78
SA-FPV-2G2**	05/16/19	Asparagus	< 150	<b>1,224</b> $\pm$ 342	< 23	< 20	< 20	< 478	< 78
SA-FPV-2G2**	05/16/19	Tomato	< 166	<b>1,871</b> $\pm$ 405	< 20	< 23	< 23	< 443	< 77
SA-FPV-2G2**	07/24/19	Corn	< 121	<b>1,945</b> $\pm$ 354	< 21	< 13	< 19	< 351	< 55
SA-FPV-2G2**	07/24/19	Pepper	< 196	<b>1,458</b> $\pm$ 428	< 34	< 28	< 24	< 531	< 87
SA-FPV-9G1**	07/24/19	Tomato	< 189	<b>1,364</b> $\pm$ 405	< 30	< 28	< 23	< 426	< 88
SA-FPV-3H5**	05/16/19	Asparagus	< 131	<b>1,568</b> $\pm$ 312	< 14	< 19	< 14	< 388	< 66
SA-FPV-3H5**	07/24/19	Peach	< 211	<b>2,212</b> $\pm$ 511	< 42	< 21	< 22	< 646	< 103
SA-FPV-3H5**	07/24/19	Tomato	< 203	<b>1,995</b> $\pm$ 511	< 30	< 34	< 24	< 552	< 86
SA-FPV-3H5**	07/24/19	Corn	< 236	<b>3,042</b> $\pm$ 498	< 38	< 25	< 25	< 703	< 98
SA-FPV-3H5**	07/24/19	Pepper	< 278	<b>1,844</b> $\pm$ 457	< 41	< 27	< 27	< 632	< 122
<b>AVERAGE*</b>			-	<b>1,946</b> $\pm$ 1,264	-	-	-	-	-

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES.  
IF THERE IS ONLY 1 POSITIVE VALUE THE AVERAGE AND THE ERROR ARE DISPLAYED.

\*\* MANAGEMENT AUDIT SAMPLE: NOT REQUIRED BY ODCM.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.



TABLE C-11

## CONCENTRATIONS OF GAMMA EMITTERS IN FODDER CROPS\*\*, 2019

Results in Units of pCi/kg (wet)  $\pm 2\sigma$ 

STATION ID	COLLECTION DATE	SAMPLE TYPE	< ----- GAMMA EMITTERS ----- >						
			Be-7	K-40	I-131	Cs-134	Cs-137	Ra-226	Th-232
SA-VGT-13E3**	11/04/19	Silage	< 107	<b>8,375</b> $\pm$ 448	< 22	< 15	< 12	< 256	< 54
SA-VGT-14F4**	11/04/19	Silage	<b>295</b> $\pm$ 84	<b>2,624</b> $\pm$ 251	< 17	< 11	< 11	< 224	< 49
SA-VGT-2G3**	11/04/19	Silage	<b>169</b> $\pm$ 82	<b>4,240</b> $\pm$ 282	< 17	< 11	< 10	< 200	< 33
AVERAGE*			<b>232</b> $\pm$ 179	<b>5,080</b> $\pm$ 5,932	-	-	-	-	-

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES.  
IF THERE IS ONLY 1 POSITIVE VALUE THE AVERAGE AND THE ERROR ARE DISPLAYED.

\*\* MANAGEMENT AUDIT SAMPLE: NOT REQUIRED BY ODCM.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

(C) CONTROL LOCATION.

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES, IF THERE IS ONLY 1 POSITIVE VALUE THE AVERAGE AND THE ERROR ARE DISPLAYED.

\*\* MANAGEMENT AUDIT SAMPLE: NOT REQUIRED BY ODCM.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

Table C-12

## CONCENTRATIONS OF GAMMA EMITTERS IN SOIL\*\*, 2019

Results in Units of pCi/kg (dry)  $\pm 2\sigma$ 

STATION ID	COLLECTION DATE	<----- GAMMA EMITTERS ----->					
		Be-7	K-40	Cs-134	Cs-137	Ra-226	Th-232
SA-SOL-10D1**	7/2/2019	< 642	<b>10,630</b> $\pm$ 1,619	< 66	<b>169</b> $\pm$ 58	< 1,562	<b>632</b> $\pm$ 200
SA-SOL-13E3**	7/2/2019	< 833	<b>14,410</b> $\pm$ 2,057	< 136	< 116	<b>4,079</b> $\pm$ 2,574	< 629
SA-SOL-16E1**	7/2/2019	< 558	<b>10,360</b> $\pm$ 1,354	< 85	< 83	< 1,443	<b>752</b> $\pm$ 182
SA-SOL-2F9**	7/2/2019	< 477	<b>4,610</b> $\pm$ 1,219	< 61	<b>82</b> $\pm$ 47	<b>2,090</b> $\pm$ 1,351	<b>387</b> $\pm$ 153
SA-SOL-5F1**	7/2/2019	< 820	<b>7,784</b> $\pm$ 1,366	< 111	<b>231</b> $\pm$ 52	< 2,119	<b>823</b> $\pm$ 249
SA-SOL-14F4**	7/2/2019	< 597	<b>13,580</b> $\pm$ 1,846	< 89	< 89	<b>2,533</b> $\pm$ 1,283	<b>1007</b> $\pm$ 165
SA-SOL-2G3**	7/2/2019	< 602	<b>9,401</b> $\pm$ 1,391	< 96	< 98	< 2,024	<b>661</b> $\pm$ 181
SA-SOL-3G1**	7/2/2019	< 506	<b>6,196</b> $\pm$ 1,358	< 73	<b>140</b> $\pm$ 51	< 1,316	<b>704</b> $\pm$ 143
SA-SOL-6S2**	7/2/2019	< 508	<b>7,414</b> $\pm$ 1,346	< 77	< 75	< 1,115	<b>459</b> $\pm$ 137
AVERAGE*		-	<b>9,376</b> $\pm$ 6,510	-	<b>155</b> $\pm$ 124	<b>2,901</b> $\pm$ 2,088	<b>678</b> $\pm$ 393

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES, IF THERE IS ONLY 1 POSITIVE VALUE THE AVERAGE AND THE ERROR ARE DISPLAYED.

\*\* MANAGEMENT AUDIT SAMPLE: NOT REQUIRED BY ODCM.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

Table C-13

## CONCENTRATIONS OF GAMMA EMITTERS IN GAME\*\*, 2019

Results in Units of pCi/kg (wet)  $\pm 2\sigma$ 

STATION ID	COLLECTION DATE	SAMPLE TYPE	<-----GAMMA EMITTERS----->				
			Be-7	K-40	I-131	Cs-134	Cs-137
SA-GAM-3E1	03/07/19	Muskrat	< 30	3,004 $\pm$ 72	< 45	< 3	< 3
SA-GAM-13E3	03/05/19	Muskrat	< 30	3,049 $\pm$ 78	< 52	< 3	< 2
SA-GAM-5C1	02/22/19	Muskrat	< 55	3,061 $\pm$ 215	< 10	< 7	< 7
ALL INDICATOR AVERAGE*			-	3,038 $\pm$ 60	-	-	-

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES. IF THERE IS ONLY 1 POSITIVE VALUE, THE AVERAGE AND THE ERROR ARE DISPLAYED.

\*\* MANAGEMENT AUDIT SAMPLE: NOT REQUIRED BY ODCM.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

Table C-14

## CONCENTRATIONS OF TRITIUM IN SURFACE WATER, 2019

Results in Units of pCi/L  $\pm 2\sigma$ 

COLLECTION PERIOD			CONTROL	INDICATORS				
START		STOP	SA-SWA-12C1 (C)	SA-SWA-11A1	SA-SWA-07E1	SA-SWA-01F2	SA-SWA-16F1	
01/07/19	-	01/25/19	< 197	< 197	< 199	< 196	< 194	
02/04/19	-	02/19/19	< 192	< 193	< 192	< 193	< 193	
03/05/19	-	03/19/19	< 189	< 190	< 193	< 193	< 192	
04/04/19	-	04/17/19	< 199	<b>211</b> $\pm 129$	< 198	< 194	< 193	
05/08/19	-	05/22/19	< 185	< 179	< 185	< 182	< 181	
06/03/19	-	06/17/19	< 198	< 195	< 195	< 196	< 195	
07/09/19	-	07/24/19	< 188	< 186	< 187	< 188	< 188	
08/07/19	-	08/23/19	< 197	< 195	< 197	< 192	< 195	
09/02/19	-	09/17/19	< 184	< 183	< 182	< 183	< 182	
10/09/19	-	10/24/19	< 194	< 191	< 189	< 192	< 191	
10/10/19	-	10/10/19	(1)	(1)	< 184	(1)	(1)	
11/06/19	-	11/20/19	< 189	< 190	< 187	< 187	< 192	
12/04/19	-	12/17/19	< 192	< 192	< 193	< 191	< 192	
AVERAGE *			-	<b>211</b> $\pm 129$	-	-	-	

(C) CONTROL LOCATION.

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES.  
IF THERE IS ONLY 1 POSITIVE VALUE, THE AVERAGE AND THE ERROR ARE DISPLAYED.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

(1) EXTRA SAMPLING OPTIONAL DURING THIS COLLECTION DATE.

Table C-15

## CONCENTRATIONS OF IODINE-131 AND GAMMA EMITTERS IN SURFACE WATER, 2019

Results in Units of pCi/L $\pm 2\sigma$												
STATION ID	Collection Date	<-----GAMMA EMITTERS----->										
		I-131 LL	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	ZrNb-95	Cs-134	Cs-137	BaLa-140
SA-SWA-12C1 (C)	01/07/19	< 0.7	< 120	< 6	< 5	< 11	< 7	< 10	< 7	< 6	< 5	< 8
	02/04/19	< 0.9	< 56	< 4	< 4	< 9	< 6	< 8	< 5	< 6	< 4	< 6
	03/05/19	< 0.8	< 105	< 4	< 5	< 12	< 4	< 12	< 6	< 6	< 5	< 8
	04/04/19	< 0.8	< 35	< 3	< 4	< 8	< 4	< 7	< 4	< 3	< 4	< 7
	05/08/19	< 0.7	< 39	< 2	< 2	< 5	< 2	< 4	< 2	< 2	< 2	< 5
	06/03/19	< 0.6	< 158	< 3	< 7	< 13	< 5	< 10	< 6	< 6	< 4	< 7
	07/09/19	< 0.8	< 18	< 2	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 3
	08/07/19	< 0.8	83 $\pm$ 32	< 2	< 2	< 5	< 2	< 5	< 2	< 3	< 2	< 3
	09/02/19	< 0.5	104 $\pm$ 35	< 2	< 2	< 5	< 3	< 5	< 3	< 3	< 2	< 5
	10/09/19	< 0.8	< 40	< 5	< 5	< 10	< 4	< 8	< 5	< 5	< 4	< 8
	11/06/19	< 0.6	52 $\pm$ 27	< 2	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 4
	12/04/19	< 0.8	56 $\pm$ 27	< 2	< 2	< 4	< 2	< 3	< 2	< 2	< 2	< 4
	<b>AVERAGE*</b>	-	74 $\pm$ 49	-	-	-	-	-	-	-	-	-
SA-SWA-11A1	01/07/19	< 0.6	< 73	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 8
	02/04/19	< 0.6	< 36	< 6	< 4	< 9	< 7	< 9	< 5	< 6	< 5	< 9
	03/05/19	< 0.8	< 30	< 4	< 4	< 9	< 5	< 9	< 5	< 5	< 4	< 7
	04/04/19	< 0.6	< 43	< 4	< 4	< 8	< 5	< 8	< 4	< 4	< 4	< 6
	05/08/19	< 0.8	< 31	< 4	< 4	< 8	< 3	< 7	< 4	< 4	< 4	< 7
	06/03/19	< 0.7	< 140	< 5	< 6	< 17	< 7	< 14	< 7	< 5	< 8	< 13
	07/09/19	< 0.8	< 97	< 5	< 4	< 10	< 4	< 9	< 4	< 5	< 5	< 8
	08/07/19	< 0.6	< 114	< 5	< 5	< 11	< 6	< 12	< 5	< 5	< 6	< 8
	09/02/19	< 0.4	87 $\pm$ 34	< 2	< 2	< 5	< 2	< 4	< 2	< 2	< 2	< 4
	10/09/19	< 1.0	115 $\pm$ 62	< 4	< 5	< 10	< 3	< 10	< 5	< 5	< 5	< 8
	11/06/19	< 0.7	72 $\pm$ 32	< 2	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 3
	12/04/19	< 0.9	69 $\pm$ 26	< 2	< 2	< 4	< 2	< 3	< 2	< 2	< 1	< 4
	<b>AVERAGE*</b>	-	86 $\pm$ 42	-	-	-	-	-	-	-	-	-

Table C-15

## CONCENTRATIONS OF IODINE-131 AND GAMMA EMITTERS IN SURFACE WATER, 2019

Results in Units of pCi/L $\pm 2\sigma$												
STATION ID	Collection Date	<-----GAMMA EMITTERS----->										
		I-131 LL	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	ZrNb-95	Cs-134	Cs-137	BaLa-140
SA-SWA-7E1	01/07/19	< 0.7	< 45	< 3	< 6	< 10	< 6	< 10	< 5	< 5	< 4	< 9
	02/04/19	< 0.8	< 56	< 5	< 5	< 13	< 4	< 9	< 4	< 5	< 5	< 9
	03/05/19	< 0.9	<b>93</b> $\pm$ 56	< 4	< 5	< 10	< 5	< 8	< 6	< 5	< 5	< 11
	04/04/19	< 0.5	< 43	< 3	< 4	< 7	< 4	< 8	< 4	< 4	< 4	< 7
	05/08/19	< 0.8	< 32	< 3	< 3	< 8	< 3	< 7	< 3	< 3	< 3	< 8
	06/03/19	< 0.7	< 94	< 5	< 4	< 10	< 5	< 9	< 5	< 6	< 4	< 10
	07/09/19	< 0.8	<b>74</b> $\pm$ 32	< 2	< 2	< 5	< 2	< 4	< 2	< 3	< 2	< 4
	08/07/19	< 0.8	<b>89</b> $\pm$ 29	< 2	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 3
	09/02/19	< 0.7	<b>123</b> $\pm$ 39	< 2	< 2	< 5	< 2	< 5	< 3	< 2	< 3	< 4
	10/09/19	< 1.0	< 43	< 4	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 9
	10/10/19	< 0.9	< 58	< 6	< 5	< 10	< 5	< 12	< 6	< 6	< 5	< 8
	11/06/19	< 0.7	<b>100</b> $\pm$ 29	< 2	< 2	< 4	< 2	< 3	< 2	< 2	< 2	< 4
	12/04/19	< 0.8	<b>82</b> $\pm$ 29	< 2	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 4
	<b>AVERAGE*</b>	-	<b>94</b> $\pm$ 34	-	-	-	-	-	-	-	-	-
SA-SWA-1F2	01/07/19	< 0.7	< 127	< 6	< 6	< 13	< 5	< 14	< 7	< 6	< 6	< 8
	02/04/19	< 0.7	< 38	< 4	< 4	< 10	< 5	< 10	< 5	< 5	< 3	< 7
	03/05/19	< 0.7	< 48	< 5	< 5	< 7	< 7	< 9	< 6	< 5	< 6	< 9
	04/04/19	< 0.8	< 70	< 4	< 4	< 7	< 4	< 7	< 3	< 4	< 4	< 7
	05/08/19	< 0.7	< 27	< 2	< 2	< 4	< 2	< 3	< 2	< 2	< 2	< 4
	06/03/19	< 1.0	< 87	< 5	< 5	< 10	< 7	< 12	< 6	< 7	< 5	< 8
	07/09/19	< 0.8	< 103	< 4	< 6	< 12	< 5	< 11	< 5	< 5	< 5	< 9
	08/07/19	< 1.0	< 105	< 5	< 5	< 9	< 6	< 12	< 6	< 6	< 5	< 8
	09/02/19	< 0.9	<b>42</b> $\pm$ 27	< 2	< 2	< 5	< 2	< 5	< 2	< 2	< 2	< 4
	10/09/19	< 0.8	< 147	< 6	< 5	< 11	< 4	< 11	< 5	< 5	< 5	< 7
	11/06/19	< 0.5	< 20	< 2	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 4
	12/04/19	< 0.9	< 31	< 2	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 4
	<b>AVERAGE*</b>	-	<b>42</b> $\pm$ 27	-	-	-	-	-	-	-	-	-

Table C-15

## CONCENTRATIONS OF IODINE-131 AND GAMMA EMITTERS IN SURFACE WATER, 2019

Results in Units of pCi/L $\pm 2\sigma$												
STATION ID	Collection Date	<-----GAMMA EMITTERS----->										
		I-131 LL	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	ZrNb-95	Cs-134	Cs-137	BaLa-140
SA-SWA-16F1	01/07/19	< 0.9	< 49	< 4	< 5	< 14	< 6	< 12	< 6	< 5	< 5	< 9
	02/04/19	< 0.7	< 60	< 4	< 4	< 12	< 6	< 11	< 5	< 5	< 4	< 7
	03/05/19	< 0.9	< 45	< 5	< 5	< 10	< 3	< 11	< 4	< 5	< 4	< 7
	04/04/19	< 0.5	< 81	< 3	< 4	< 8	< 4	< 7	< 4	< 4	< 4	< 5
	05/08/19	< 0.6	< 13	< 2	< 2	< 3	< 1	< 3	< 2	< 2	< 2	< 4
	06/03/19	< 0.6	< 106	< 5	< 5	< 9	< 6	< 11	< 5	< 6	< 5	< 9
	07/09/19	< 0.9	< 38	< 4	< 4	< 7	< 4	< 9	< 4	< 5	< 5	< 10
	08/07/19	< 1.0	< 45	< 6	< 7	< 10	< 7	< 14	< 6	< 6	< 7	< 7
	09/02/19	< 0.7	79 $\pm$ 29	< 2	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 3
	10/09/19	< 0.8	< 52	< 5	< 5	< 11	< 5	< 10	< 5	< 5	< 5	< 7
	11/06/19	< 0.8	< 33	< 2	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 3
	12/04/19	< 0.8	< 17	< 2	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 5
	AVERAGE*	-	79 $\pm$ 29	-	-	-	-	-	-	-	-	-
ALL INDICATOR AVERAGE*		-	85 $\pm$ 43	-	-	-	-	-	-	-	-	-

## (C) CONTROL LOCATION.

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES. IF THERE IS ONLY 1 POSITIVE VALUE, THE AVERAGE AND THE ERROR ARE DISPLAYED.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

Table C-16

## CONCENTRATIONS OF GAMMA EMITTERS IN EDIBLE FISH, 2019

Results in Units of pCi/kg (wet)  $\pm 2\sigma$ 

<-----GAMMA EMITTERS----->										
STATION ID	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226
SA-ESF-12C1 (C)	05/02/19	2,817 $\pm$ 768	< 43	< 39	< 115	< 45	< 68	< 47	< 36	< 965
	05/02/19	4,242 $\pm$ 945	< 51	< 49	< 118	< 44	< 101	< 46	< 60	< 974
	09/23/19	3,960 $\pm$ 1,174	< 67	< 71	< 119	< 68	< 113	< 62	< 61	< 1,109
	09/23/19	3,468 $\pm$ 1,190	< 95	< 96	< 147	< 87	< 188	< 89	< 100	< 2,099
	09/23/19	5,205 $\pm$ 1,202	< 76	< 68	< 145	< 87	< 161	< 76	< 87	< 1,590
	AVERAGE*	3,938 $\pm$ 1,782	-	-	-	-	-	-	-	-
SA-ESF-11A1	05/02/19	3,510 $\pm$ 907	< 60	< 64	< 142	< 67	< 106	< 67	< 54	< 1,270
	05/02/19	3,408 $\pm$ 1,028	< 64	< 58	< 142	< 76	< 140	< 64	< 74	< 1,648
	09/24/19	4,625 $\pm$ 1,295	< 87	< 78	< 190	< 98	< 195	< 79	< 90	< 1,856
	09/24/19	4,473 $\pm$ 1,008	< 60	< 70	< 114	< 51	< 139	< 55	< 51	< 1,179
	09/24/19	2,744 $\pm$ 1,134	< 64	< 64	< 131	< 56	< 153	< 49	< 49	< 1,111
	AVERAGE*	3,752 $\pm$ 1,573	-	-	-	-	-	-	-	-
SA-ESF-7E1	05/02/19	3,273 $\pm$ 956	< 42	< 48	< 85	< 55	< 76	< 63	< 46	< 1,030
	05/02/19	2,811 $\pm$ 847	< 45	< 49	< 107	< 59	< 149	< 60	< 42	< 1,093
	09/25/19	4,057 $\pm$ 1,243	< 72	< 91	< 209	< 90	< 203	< 88	< 81	< 1,769
	09/25/19	3,663 $\pm$ 1,059	< 56	< 77	< 164	< 126	< 124	< 71	< 70	< 1,621
	AVERAGE*	3,451 $\pm$ 1,067	-	-	-	-	-	-	-	-
ALL INDICATOR AVERAGE*		3,618 $\pm$ 1,328	-	-	-	-	-	-	-	-

(C) CONTROL LOCATION.

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES. IF THERE IS ONLY 1 POSITIVE VALUE, THE AVERAGE AND THE ERROR ARE DISPLAYED.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.



Table C-17

## CONCENTRATIONS OF GAMMA EMITTERS IN CRABS, 2019

Results in Units of pCi/kg (wet)  $\pm 2\sigma$ 

<-----GAMMA EMITTERS----->										
STATION ID	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226
SA-ECH-12C1 (C)	06/26/19	2,527 $\pm$ 872	< 57	< 47	< 76	< 42	< 120	< 67	< 57	< 1,063
	08/26/19	2,576 $\pm$ 851	< 44	< 65	< 122	< 61	< 94	< 54	< 46	< 1,182
	AVERAGE*	2,552 $\pm$ 69	-	-	-	-	-	-	-	-
STATION ID	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226
SA-ECH-11A1	06/26/19	2,685 $\pm$ 971	< 45	< 53	< 143	< 56	< 151	< 50	< 52	< 1,289
	08/26/19	3,970 $\pm$ 1120	< 77	< 80	< 195	< 80	< 156	< 73	< 83	< 1,603
	AVERAGE*	3,328 $\pm$ 1,817	-	-	-	-	-	-	-	-

(C) CONTROL LOCATION.

\* THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES. IF THERE IS ONLY 1 POSITIVE VALUE, THE AVERAGE AND THE ERROR ARE DISPLAYED.

- INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

Table C-18

## CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT, 2019

Results in Units of pCi/kg (dry)  $\pm 2\sigma$ 

STATION ID	Collection Date	<-----GAMMA EMITTERS----->					
		Be-7	K-40	Cs-134	Cs-137	Ra-226	Th-232
SA-ESS-12C1 (C)	05/22/19	< 727	15,280 $\pm$ 1,718	< 79	< 82	< 1,484	1,068 $\pm$ 245
	12/04/19	< 619	11,910 $\pm$ 1,644	< 91	< 79	< 1,616	962 $\pm$ 175
	AVERAGE*	-	13,595 $\pm$ 4,766	-	-	-	1,050 $\pm$ 150
SA-ESS-6A1	05/24/19	< 869	8,585 $\pm$ 1,416	< 90	< 94	< 1,956	457 $\pm$ 195
	12/03/19	< 344	7,168 $\pm$ 1,026	< 59	< 44	< 1,040	416 $\pm$ 129
	AVERAGE*	-	7,877 $\pm$ 2,004	-	-	-	436 $\pm$ 59
SA-ESS-11A1	05/22/19	< 505	2,169 $\pm$ 725	< 52	< 43	< 1,110	< 249
	12/04/19	< 396	3,388 $\pm$ 708	< 60	< 41	< 930	< 254
	AVERAGE*	-	2,779 $\pm$ 1,724	-	-	-	-
SA-ESS-15A1	05/22/19	< 542	7,971 $\pm$ 1,222	< 64	< 57	< 1,130	711 $\pm$ 164
	12/04/19	< 373	4,985 $\pm$ 851	< 55	< 54	1,751 $\pm$ 970	674 $\pm$ 140
	AVERAGE*	-	6,478 $\pm$ 4,223	-	-	1,751 $\pm$ 970	692 $\pm$ 52
SA-ESS-16A1	05/22/19	< 784	4,284 $\pm$ 977	< 87	< 70	3,602 $\pm$ 1,520	920 $\pm$ 237
	12/04/19	< 515	5,407 $\pm$ 1,069	< 90	< 62	2,611 $\pm$ 1,155	947 $\pm$ 212
	AVERAGE*	-	4,846 $\pm$ 1,588	-	-	3,107 $\pm$ 1,401	934 $\pm$ 38
SA-ESS-7E1	05/22/19	< 923	14,990 $\pm$ 1,864	< 95	< 94	< 1,537	816 $\pm$ 236
	12/04/19	< 737	13,360 $\pm$ 1,528	< 102	< 86	< 1,461	790 $\pm$ 207
	AVERAGE*	-	14,175 $\pm$ 2,305	-	-	-	803 $\pm$ 37
SA-ESS-16F1	05/22/19	< 686	11,330 $\pm$ 1,208	< 89	< 71	2,023 $\pm$ 1,303	700 $\pm$ 189
	12/04/19	< 1105	19,520 $\pm$ 2,557	< 137	< 129	< 1,824	< 794
	AVERAGE*	-	15,425 $\pm$ 11,582	-	-	2,023 $\pm$ 1,303	700 $\pm$ 189
ALL INDICATOR AVERAGE*		-	8,596 $\pm$ 10,498	-	-	2,497 $\pm$ 1,639	714 $\pm$ 367

(C) CONTROL LOCATION.

THE AVERAGE AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE

\* POSITIVE VALUES. IF THERE IS ONLY 1 POSITIVE VALUE, THE AVERAGE AND THE ERROR ARE DISPLAYED.

INDICATES AVERAGE WAS NOT CALCULATED DUE TO NO POSITIVE VALUES FOR THE REPORTING PERIOD.

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Weekly Air Iodine Cartridge</b>									
SA-AIO-5S2(468033002) - Air Cartridge	2-Jan-19	Iodine-131	< MDC	4.28E-03 pCi/m <sup>3</sup>	1.22E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	6.13E-03	6.43E-03	U
SA-AIO-5S2(468611002) - Air Cartridge	8-Jan-19	Iodine-131	< MDC	1.74E-03 pCi/m <sup>3</sup>	9.96E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	4.91E-03	4.97E-03	U
SA-AIO-5S2(469075002) - Air Cartridge	14-Jan-19	Iodine-131	< MDC	1.09E-02 pCi/m <sup>3</sup>	2.25E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	1.00E-02	1.12E-02	U
SA-AIO-5S2(469539002) - Air Cartridge	21-Jan-19	Iodine-131	< MDC	3.01E-03 pCi/m <sup>3</sup>	1.76E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	9.58E-03	9.68E-03	U
SA-AIO-5S2(470132002) - Air Cartridge	28-Jan-19	Iodine-131	< MDC	-7.67E-04 pCi/m <sup>3</sup>	6.73E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	4.11E-03	4.12E-03	U
SA-AIO-5S2(470736002) - Air Cartridge	5-Feb-19	Iodine-131	< MDC	5.73E-04 pCi/m <sup>3</sup>	5.54E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	3.22E-03	3.23E-03	U
SA-AIO-5S2(471383002) - Air Cartridge	13-Feb-19	Iodine-131	< MDC	8.39E-03 pCi/m <sup>3</sup>	1.96E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	9.50E-03	1.03E-02	U
SA-AIO-5S2(472016002) - Air Cartridge	21-Feb-19	Iodine-131	< MDC	5.28E-03 pCi/m <sup>3</sup>	1.78E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	8.78E-03	9.10E-03	U
SA-AIO-5S2(472593002) - Air Cartridge	27-Feb-19	Iodine-131	< MDC	-2.89E-03 pCi/m <sup>3</sup>	1.09E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	8.57E-03	8.67E-03	U
SA-AIO-5S2(472975001) - Air Cartridge	5-Mar-19	Iodine-131	< MDC	8.09E-04 pCi/m <sup>3</sup>	1.08E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	5.94E-03	5.95E-03	U
SA-AIO-5S2(473481002) - Air Cartridge	11-Mar-19	Iodine-131	< MDC	4.72E-04 pCi/m <sup>3</sup>	7.06E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	4.11E-03	4.12E-03	U
SA-AIO-5S2(474029002) - Air Cartridge	18-Mar-19	Iodine-131	< MDC	-3.11E-04 pCi/m <sup>3</sup>	1.24E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	7.80E-03	7.80E-03	U
SA-AIO-5S2(474652002) - Air Cartridge	25-Mar-19	Iodine-131	< MDC	2.54E-03 pCi/m <sup>3</sup>	8.86E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	4.40E-03	4.55E-03	U
SA-AIO-5S2(475231002) - Air Cartridge	1-Apr-19	Iodine-131	< MDC	1.25E-03 pCi/m <sup>3</sup>	1.53E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	8.68E-03	8.70E-03	U
SA-AIO-5S2(475802002) - Air Cartridge	8-Apr-19	Iodine-131	< MDC	-8.50E-05 pCi/m <sup>3</sup>	1.05E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	6.16E-03	6.16E-03	U
SA-AIO-5S2(476670002) - Air Cartridge	15-Apr-19	Iodine-131	< MDC	5.66E-04 pCi/m <sup>3</sup>	5.93E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	3.35E-03	3.36E-03	U
SA-AIO-5S2(477506002) - Air Cartridge	23-Apr-19	Iodine-131	< MDC	-3.93E-03 pCi/m <sup>3</sup>	9.71E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	8.83E-03	9.01E-03	U
SA-AIO-5S2(477871002) - Air Cartridge	29-Apr-19	Iodine-131	< MDC	-3.21E-03 pCi/m <sup>3</sup>	9.55E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	6.46E-03	6.63E-03	U
SA-AIO-5S2(478568002) - Air Cartridge	6-May-19	Iodine-131	< MDC	1.04E-03 pCi/m <sup>3</sup>	6.96E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	3.92E-03	3.95E-03	U
SA-AIO-5S2(479246002) - Air Cartridge	13-May-19	Iodine-131	< MDC	1.37E-03 pCi/m <sup>3</sup>	1.06E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	5.99E-03	6.03E-03	U
SA-AIO-5S2(479872002) - Air Cartridge	20-May-19	Iodine-131	< MDC	1.07E-03 pCi/m <sup>3</sup>	1.32E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	7.26E-03	7.27E-03	U
SA-AIO-5S2(480482002) - Air Cartridge	28-May-19	Iodine-131	< MDC	1.61E-04 pCi/m <sup>3</sup>	7.48E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	4.26E-03	4.26E-03	U
SA-AIO-5S2(481052002) - Air Cartridge	3-Jun-19	Iodine-131	< MDC	1.06E-02 pCi/m <sup>3</sup>	2.47E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	1.20E-02	1.30E-02	U
SA-AIO-5S2(481641002) - Air Cartridge	10-Jun-19	Iodine-131	< MDC	-6.62E-03 pCi/m <sup>3</sup>	1.53E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	1.18E-02	1.22E-02	U
SA-AIO-5S2(482363002) - Air Cartridge	17-Jun-19	Iodine-131	< MDC	-1.72E-03 pCi/m <sup>3</sup>	1.65E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	1.04E-02	1.04E-02	U
SA-AIO-5S2(483027002) - Air Cartridge	24-Jun-19	Iodine-131	< MDC	-7.78E-04 pCi/m <sup>3</sup>	6.03E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	3.75E-03	3.77E-03	U
SA-AIO-5S2(483999002) - Air Cartridge	1-Jul-19	Iodine-131	< MDC	-5.21E-04 pCi/m <sup>3</sup>	1.21E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	7.19E-03	7.20E-03	U
SA-AIO-5S2(484411002) - Air Cartridge	8-Jul-19	Iodine-131	< MDC	2.80E-03 pCi/m <sup>3</sup>	8.73E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	4.68E-03	4.85E-03	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Weekly Air Iodine Cartridge (Cont.)</b>									
SA-AIO-5S2(484902002) - Air Cartridge	15-Jul-19	Iodine-131	< MDC	2.36E-03 pCi/m <sup>3</sup>	8.70E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	4.83E-03	4.95E-03	U
SA-AIO-5S2(485547002) - Air Cartridge	22-Jul-19	Iodine-131	< MDC	1.67E-03 pCi/m <sup>3</sup>	6.08E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	3.38E-03	3.46E-03	U
SA-AIO-5S2(486160002) - Air Cartridge	29-Jul-19	Iodine-131	< MDC	2.50E-03 pCi/m <sup>3</sup>	8.53E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	4.71E-03	4.85E-03	U
SA-AIO-5S2(486847002) - Air Cartridge	5-Aug-19	Iodine-131	< MDC	-5.25E-03 pCi/m <sup>3</sup>	6.21E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	6.33E-03	6.78E-03	U
SA-AIO-5S2(487589002) - Air Cartridge	12-Aug-19	Iodine-131	< MDC	4.83E-04 pCi/m <sup>3</sup>	6.30E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	3.56E-03	3.57E-03	U
SA-AIO-5S2(488436002) - Air Cartridge	19-Aug-19	Iodine-131	< MDC	-2.57E-03 pCi/m <sup>3</sup>	1.41E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	8.93E-03	9.01E-03	U
SA-AIO-5S2(488954002) - Air Cartridge	26-Aug-19	Iodine-131	< MDC	4.82E-03 pCi/m <sup>3</sup>	1.44E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	6.61E-03	6.97E-03	U
SA-AIO-5S2(489583002) - Air Cartridge	3-Sep-19	Iodine-131	< MDC	-2.26E-03 pCi/m <sup>3</sup>	1.55E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	9.57E-03	9.63E-03	U
SA-AIO-5S2(489955002) - Air Cartridge	9-Sep-19	Iodine-131	< MDC	4.45E-03 pCi/m <sup>3</sup>	1.85E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	1.01E-02	1.03E-02	U
SA-AIO-5S2(490477002) - Air Cartridge	16-Sep-19	Iodine-131	< MDC	9.72E-04 pCi/m <sup>3</sup>	5.49E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	2.31E-03	2.35E-03	U
SA-AIO-5S2(491301002) - Air Cartridge	24-Sep-19	Iodine-131	< MDC	-8.68E-04 pCi/m <sup>3</sup>	5.18E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	3.21E-03	3.24E-03	U
SA-AIO-5S2(491733002) - Air Cartridge	30-Sep-19	Iodine-131	< MDC	-8.63E-03 pCi/m <sup>3</sup>	1.06E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	9.00E-03	9.83E-03	U
SA-AIO-5S2(492608002) - Air Cartridge	7-Oct-19	Iodine-131	< MDC	1.90E-03 pCi/m <sup>3</sup>	9.75E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	5.43E-03	5.50E-03	U
SA-AIO-5S2(493098002) - Air Cartridge	14-Oct-19	Iodine-131	< MDC	2.27E-03 pCi/m <sup>3</sup>	2.11E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	1.18E-02	1.18E-02	U
SA-AIO-5S2(493883002) - Air Cartridge	21-Oct-19	Iodine-131	< MDC	1.10E-04 pCi/m <sup>3</sup>	5.10E-04 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	2.70E-04	2.74E-04	U
SA-AIO-5S2(494817002) - Air Cartridge	28-Oct-19	Iodine-131	< MDC	7.98E-03 pCi/m <sup>3</sup>	1.89E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	7.96E-03	8.76E-03	U
SA-AIO-5S2(495537002) - Air Cartridge	4-Nov-19	Iodine-131	< MDC	-1.11E-03 pCi/m <sup>3</sup>	1.47E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	8.98E-03	8.99E-03	U
SA-AIO-5S2(496233002) - Air Cartridge	12-Nov-19	Iodine-131	< MDC	2.04E-03 pCi/m <sup>3</sup>	5.61E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	3.03E-03	3.17E-03	U
SA-AIO-5S2(497041002) - Air Cartridge	18-Nov-19	Iodine-131	< MDC	9.49E-03 pCi/m <sup>3</sup>	1.70E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	8.07E-03	9.17E-03	U
SA-AIO-5S2(497683002) - Air Cartridge	25-Nov-19	Iodine-131	< MDC	1.61E-03 pCi/m <sup>3</sup>	1.66E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	9.13E-03	9.16E-03	U
SA-AIO-5S2(498013002) - Air Cartridge	2-Dec-19	Iodine-131	< MDC	3.29E-03 pCi/m <sup>3</sup>	8.85E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	4.65E-03	4.89E-03	U
SA-AIO-5S2(498724002) - Air Cartridge	9-Dec-19	Iodine-131	< MDC	1.71E-03 pCi/m <sup>3</sup>	1.60E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	8.91E-03	8.94E-03	U
SA-AIO-5S2(499411002) - Air Cartridge	17-Dec-19	Iodine-131	< MDC	2.94E-03 pCi/m <sup>3</sup>	9.31E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	5.12E-03	5.29E-03	U
SA-AIO-5S2(499815002) - Air Cartridge	23-Dec-19	Iodine-131	< MDC	-1.65E-03 pCi/m <sup>3</sup>	8.32E-03 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	5.19E-03	5.25E-03	U
SA-AIO-5S2(500038002) - Air Cartridge	30-Dec-19	Iodine-131	< MDC	4.74E-03 pCi/m <sup>3</sup>	1.07E-02 pCi/m <sup>3</sup>	7.00E-02 pCi/m <sup>3</sup>	4.80E-03	5.27E-03	U
<b>Weekly Air Particulate Filter</b>									
SA-APT-5S2(468033001) - Air Particulate	2-Jan-19	BETA	<b>2.75E-02 pCi/m<sup>3</sup></b>	2.75E-02 pCi/m <sup>3</sup>	2.29E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.67E-03	3.67E-03	
SA-APT-5S2(468611001) - Air Particulate	8-Jan-19	BETA	<b>2.99E-02 pCi/m<sup>3</sup></b>	2.99E-02 pCi/m <sup>3</sup>	2.47E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	4.13E-03	4.13E-03	
SA-APT-5S2(469075001) - Air Particulate	14-Jan-19	BETA	<b>2.57E-02 pCi/m<sup>3</sup></b>	2.57E-02 pCi/m <sup>3</sup>	2.37E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.75E-03	3.75E-03	

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Weekly Air Particulate Filter (Cont.)</b>									
SA-APT-5S2(469539001) - Air Particulate	21-Jan-19	BETA	<b>2.18E-02 pCi/m<sup>3</sup></b>	2.18E-02 pCi/m <sup>3</sup>	2.54E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.41E-03	3.42E-03	
SA-APT-5S2(470132001) - Air Particulate	28-Jan-19	BETA	<b>2.33E-02 pCi/m<sup>3</sup></b>	2.33E-02 pCi/m <sup>3</sup>	2.54E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.50E-03	3.51E-03	
SA-APT-5S2(470736001) - Air Particulate	5-Feb-19	BETA	<b>3.06E-02 pCi/m<sup>3</sup></b>	3.06E-02 pCi/m <sup>3</sup>	2.12E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.56E-03	3.57E-03	
SA-APT-5S2(471383001) - Air Particulate	13-Feb-19	BETA	<b>2.29E-02 pCi/m<sup>3</sup></b>	2.29E-02 pCi/m <sup>3</sup>	1.97E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.14E-03	3.15E-03	
SA-APT-5S2(472016001) - Air Particulate	21-Feb-19	BETA	<b>2.63E-02 pCi/m<sup>3</sup></b>	2.63E-02 pCi/m <sup>3</sup>	2.03E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.46E-03	3.46E-03	
SA-APT-5S2(472593001) - Air Particulate	27-Feb-19	BETA	<b>2.68E-02 pCi/m<sup>3</sup></b>	2.68E-02 pCi/m <sup>3</sup>	2.69E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.90E-03	3.90E-03	
SA-APT-5S2(472975002) - Air Particulate	5-Mar-19	BETA	<b>2.57E-02 pCi/m<sup>3</sup></b>	2.57E-02 pCi/m <sup>3</sup>	2.56E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.80E-03	3.80E-03	
SA-APT-5S2(473481001) - Air Particulate	11-Mar-19	BETA	<b>3.06E-02 pCi/m<sup>3</sup></b>	3.06E-02 pCi/m <sup>3</sup>	2.76E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	4.36E-03	4.37E-03	
SA-APT-5S2(474029001) - Air Particulate	18-Mar-19	BETA	<b>3.64E-02 pCi/m<sup>3</sup></b>	3.64E-02 pCi/m <sup>3</sup>	2.07E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	4.05E-03	4.06E-03	
SA-APT-5S2(474652001) - Air Particulate	25-Mar-19	BETA	<b>1.70E-02 pCi/m<sup>3</sup></b>	1.70E-02 pCi/m <sup>3</sup>	2.27E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.01E-03	3.02E-03	
SA-APT-5S2(475231001) - Air Particulate	1-Apr-19	BETA	<b>1.83E-02 pCi/m<sup>3</sup></b>	1.83E-02 pCi/m <sup>3</sup>	2.42E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.12E-03	3.13E-03	
SA-APT-5S2(475802001) - Air Particulate	8-Apr-19	BETA	<b>1.82E-02 pCi/m<sup>3</sup></b>	1.82E-02 pCi/m <sup>3</sup>	2.09E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.02E-03	3.02E-03	
SA-APT-5S2(476670001) - Air Particulate	15-Apr-19	BETA	<b>1.61E-02 pCi/m<sup>3</sup></b>	1.61E-02 pCi/m <sup>3</sup>	2.20E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.00E-03	3.00E-03	
SA-APT-5S2(477506001) - Air Particulate	23-Apr-19	BETA	<b>1.84E-02 pCi/m<sup>3</sup></b>	1.84E-02 pCi/m <sup>3</sup>	2.07E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	2.92E-03	2.92E-03	
SA-APT-5S2(477871001) - Air Particulate	29-Apr-19	BETA	<b>1.82E-02 pCi/m<sup>3</sup></b>	1.82E-02 pCi/m <sup>3</sup>	2.69E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.51E-03	3.51E-03	
SA-APT-5S2(478568001) - Air Particulate	6-May-19	BETA	<b>1.73E-02 pCi/m<sup>3</sup></b>	1.73E-02 pCi/m <sup>3</sup>	2.35E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.09E-03	3.09E-03	
SA-APT-5S2(479246001) - Air Particulate	13-May-19	BETA	<b>1.61E-02 pCi/m<sup>3</sup></b>	1.61E-02 pCi/m <sup>3</sup>	2.28E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	2.99E-03	2.99E-03	
SA-APT-5S2(479872001) - Air Particulate	20-May-19	BETA	<b>2.19E-02 pCi/m<sup>3</sup></b>	2.19E-02 pCi/m <sup>3</sup>	2.19E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.38E-03	3.39E-03	
SA-APT-5S2(480482001) - Air Particulate	28-May-19	BETA	<b>2.03E-02 pCi/m<sup>3</sup></b>	2.03E-02 pCi/m <sup>3</sup>	1.86E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	2.99E-03	2.99E-03	
SA-APT-5S2(481052001) - Air Particulate	3-Jun-19	BETA	<b>1.64E-02 pCi/m<sup>3</sup></b>	1.64E-02 pCi/m <sup>3</sup>	2.70E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.33E-03	3.34E-03	
SA-APT-5S2(481641001) - Air Particulate	10-Jun-19	BETA	<b>2.26E-02 pCi/m<sup>3</sup></b>	2.26E-02 pCi/m <sup>3</sup>	2.15E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.44E-03	3.44E-03	
SA-APT-5S2(482363001) - Air Particulate	17-Jun-19	BETA	<b>2.24E-02 pCi/m<sup>3</sup></b>	2.24E-02 pCi/m <sup>3</sup>	2.08E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.36E-03	3.36E-03	
SA-APT-5S2(483027001) - Air Particulate	24-Jun-19	BETA	<b>1.64E-02 pCi/m<sup>3</sup></b>	1.64E-02 pCi/m <sup>3</sup>	2.20E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.00E-03	3.01E-03	
SA-APT-5S2(483999001) - Air Particulate	1-Jul-19	BETA	<b>2.68E-02 pCi/m<sup>3</sup></b>	2.68E-02 pCi/m <sup>3</sup>	2.19E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.68E-03	3.68E-03	
SA-APT-5S2(484411001) - Air Particulate	8-Jul-19	BETA	<b>2.19E-02 pCi/m<sup>3</sup></b>	2.19E-02 pCi/m <sup>3</sup>	2.31E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.43E-03	3.43E-03	
SA-APT-5S2(484902001) - Air Particulate	15-Jul-19	BETA	<b>2.51E-02 pCi/m<sup>3</sup></b>	2.51E-02 pCi/m <sup>3</sup>	2.29E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.62E-03	3.62E-03	
SA-APT-5S2(485547001) - Air Particulate	22-Jul-19	BETA	<b>3.00E-02 pCi/m<sup>3</sup></b>	3.00E-02 pCi/m <sup>3</sup>	2.15E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.80E-03	3.81E-03	
SA-APT-5S2(486160001) - Air Particulate	29-Jul-19	BETA	<b>2.36E-02 pCi/m<sup>3</sup></b>	2.36E-02 pCi/m <sup>3</sup>	2.25E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.47E-03	3.47E-03	

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Weekly Air Particulate Filter (Cont.)</b>									
SA-APT-5S2(486847001) - Air Particulate	5-Aug-19	BETA	<b>3.82E-02 pCi/m<sup>3</sup></b>	3.82E-02 pCi/m <sup>3</sup>	2.33E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	4.30E-03	4.31E-03	
SA-APT-5S2(487589001) - Air Particulate	12-Aug-19	BETA	<b>3.28E-02 pCi/m<sup>3</sup></b>	3.28E-02 pCi/m <sup>3</sup>	2.32E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	4.05E-03	4.05E-03	
SA-APT-5S2(488436001) - Air Particulate	19-Aug-19	BETA	<b>3.46E-02 pCi/m<sup>3</sup></b>	3.46E-02 pCi/m <sup>3</sup>	2.20E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	4.10E-03	4.11E-03	
SA-APT-5S2(488954001) - Air Particulate	26-Aug-19	BETA	<b>2.70E-02 pCi/m<sup>3</sup></b>	2.70E-02 pCi/m <sup>3</sup>	2.16E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.64E-03	3.64E-03	
SA-APT-5S2(489583001) - Air Particulate	3-Sep-19	BETA	<b>2.53E-02 pCi/m<sup>3</sup></b>	2.53E-02 pCi/m <sup>3</sup>	1.92E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.30E-03	3.31E-03	
SA-APT-5S2(489955001) - Air Particulate	9-Sep-19	BETA	<b>3.26E-02 pCi/m<sup>3</sup></b>	3.26E-02 pCi/m <sup>3</sup>	2.62E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	4.42E-03	4.42E-03	
SA-APT-5S2(490477001) - Air Particulate	16-Sep-19	BETA	<b>2.89E-02 pCi/m<sup>3</sup></b>	2.89E-02 pCi/m <sup>3</sup>	2.23E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.82E-03	3.82E-03	
SA-APT-5S2(491301001) - Air Particulate	24-Sep-19	BETA	<b>3.22E-02 pCi/m<sup>3</sup></b>	3.22E-02 pCi/m <sup>3</sup>	2.06E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.72E-03	3.73E-03	
SA-APT-5S2(491733001) - Air Particulate	30-Sep-19	BETA	<b>3.44E-02 pCi/m<sup>3</sup></b>	3.44E-02 pCi/m <sup>3</sup>	2.75E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	4.55E-03	4.56E-03	
SA-APT-5S2(492608001) - Air Particulate	7-Oct-19	BETA	<b>2.19E-02 pCi/m<sup>3</sup></b>	2.19E-02 pCi/m <sup>3</sup>	2.32E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.39E-03	3.40E-03	
SA-APT-5S2(493098001) - Air Particulate	14-Oct-19	BETA	<b>3.15E-02 pCi/m<sup>3</sup></b>	3.15E-02 pCi/m <sup>3</sup>	2.27E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.95E-03	3.96E-03	
SA-APT-5S2(493883001) - Air Particulate	21-Oct-19	BETA	<b>2.72E-02 pCi/m<sup>3</sup></b>	2.72E-02 pCi/m <sup>3</sup>	2.15E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.63E-03	3.64E-03	
SA-APT-5S2(494817001) - Air Particulate	28-Oct-19	BETA	<b>2.73E-02 pCi/m<sup>3</sup></b>	2.73E-02 pCi/m <sup>3</sup>	2.38E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.85E-03	3.85E-03	
SA-APT-5S2(495537001) - Air Particulate	4-Nov-19	BETA	<b>1.54E-02 pCi/m<sup>3</sup></b>	1.54E-02 pCi/m <sup>3</sup>	2.07E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	2.77E-03	2.78E-03	
SA-APT-5S2(496233001) - Air Particulate	12-Nov-19	BETA	<b>3.24E-02 pCi/m<sup>3</sup></b>	3.24E-02 pCi/m <sup>3</sup>	1.79E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.52E-03	3.53E-03	
SA-APT-5S2(497041001) - Air Particulate	18-Nov-19	BETA	<b>2.94E-02 pCi/m<sup>3</sup></b>	2.94E-02 pCi/m <sup>3</sup>	2.55E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	4.09E-03	4.10E-03	
SA-APT-5S2(497683001) - Air Particulate	25-Nov-19	BETA	<b>3.04E-02 pCi/m<sup>3</sup></b>	3.04E-02 pCi/m <sup>3</sup>	2.37E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	4.00E-03	4.00E-03	
SA-APT-5S2(498013001) - Air Particulate	2-Dec-19	BETA	<b>2.01E-02 pCi/m<sup>3</sup></b>	2.01E-02 pCi/m <sup>3</sup>	2.05E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.12E-03	3.12E-03	
SA-APT-5S2(498724001) - Air Particulate	9-Dec-19	BETA	<b>1.93E-02 pCi/m<sup>3</sup></b>	1.93E-02 pCi/m <sup>3</sup>	2.56E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.41E-03	3.41E-03	
SA-APT-5S2(499411001) - Air Particulate	17-Dec-19	BETA	<b>2.29E-02 pCi/m<sup>3</sup></b>	2.29E-02 pCi/m <sup>3</sup>	2.04E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	3.21E-03	3.22E-03	
SA-APT-5S2(499815001) - Air Particulate	23-Dec-19	BETA	<b>3.80E-02 pCi/m<sup>3</sup></b>	3.80E-02 pCi/m <sup>3</sup>	3.03E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	4.96E-03	4.97E-03	
SA-APT-5S2(500038001) - Air Particulate	30-Dec-19	BETA	<b>4.37E-02 pCi/m<sup>3</sup></b>	4.37E-02 pCi/m <sup>3</sup>	2.26E-03 pCi/m <sup>3</sup>	1.00E-02 pCi/m <sup>3</sup>	4.54E-03	4.55E-03	
<b>Quarterly Air Particulate Filter</b>									
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Barium-140	< MDC	1.52E-03 pCi/m <sup>3</sup>	5.26E-03 pCi/m <sup>3</sup>		2.94E-03	3.03E-03	U
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Beryllium-7	<b>8.06E-02 pCi/m<sup>3</sup></b>	8.06E-02 pCi/m <sup>3</sup>	4.26E-03 pCi/m <sup>3</sup>		9.45E-03	1.18E-02	
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Cerium-141	< MDC	-2.10E-04 pCi/m <sup>3</sup>	5.93E-04 pCi/m <sup>3</sup>		3.97E-04	4.08E-04	U
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Cerium-144	< MDC	-2.96E-04 pCi/m <sup>3</sup>	1.52E-03 pCi/m <sup>3</sup>		1.02E-03	1.03E-03	U
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Cesium-134	< MDC	1.24E-04 pCi/m <sup>3</sup>	4.49E-04 pCi/m <sup>3</sup>	5.00E-02 pCi/m <sup>3</sup>	2.43E-04	2.49E-04	U
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Cesium-137	< MDC	-3.83E-05 pCi/m <sup>3</sup>	3.03E-04 pCi/m <sup>3</sup>	6.00E-02 pCi/m <sup>3</sup>	1.83E-04	1.83E-04	U
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Chromium-51	< MDC	-4.80E-04 pCi/m <sup>3</sup>	4.62E-03 pCi/m <sup>3</sup>		2.79E-03	2.80E-03	U



Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propogated Uncertainty)	Qualifier
<b>Quarterly Air Particulate Filter</b>									
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Cobalt-58	< MDC	-7.55E-05 pCi/m <sup>3</sup>	3.66E-04 pCi/m <sup>3</sup>		2.32E-04	2.34E-04	U
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Cobalt-60	< MDC	8.68E-05 pCi/m <sup>3</sup>	4.20E-04 pCi/m <sup>3</sup>		2.31E-04	2.35E-04	U
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Iodine-131	< MDC	-2.25E-03 pCi/m <sup>3</sup>	3.52E-03 pCi/m <sup>3</sup>		2.50E-03	2.71E-03	U
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Iron-59	< MDC	2.58E-05 pCi/m <sup>3</sup>	1.06E-03 pCi/m <sup>3</sup>		6.33E-04	6.33E-04	U
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Lanthanum-140	< MDC	1.02E-03 pCi/m <sup>3</sup>	2.61E-03 pCi/m <sup>3</sup>		1.27E-03	1.36E-03	U
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Manganese-54	< MDC	1.13E-04 pCi/m <sup>3</sup>	3.54E-04 pCi/m <sup>3</sup>		1.85E-04	1.92E-04	U
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Niobium-95	< MDC	-1.31E-04 pCi/m <sup>3</sup>	3.98E-04 pCi/m <sup>3</sup>		2.58E-04	2.65E-04	U
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Potassium-40	<b>4.34E-03 pCi/m<sup>3</sup></b>	4.34E-03 pCi/m <sup>3</sup>	4.34E-03 pCi/m <sup>3</sup>		5.24E-03	5.26E-03	
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Ruthenium-103	< MDC	-1.37E-05 pCi/m <sup>3</sup>	3.79E-04 pCi/m <sup>3</sup>		2.34E-04	2.34E-04	U
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Ruthenium-106	<b>3.03E-03 pCi/m<sup>3</sup></b>	3.03E-03 pCi/m <sup>3</sup>	3.03E-03 pCi/m <sup>3</sup>		5.42E-03	5.49E-03	
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Zinc-65	< MDC	-1.47E-04 pCi/m <sup>3</sup>	6.90E-04 pCi/m <sup>3</sup>		4.57E-04	4.62E-04	U
SA-APT-5S2(477005001) - Air Particulate	25-Mar-19	Zirconium-95	< MDC	-1.55E-04 pCi/m <sup>3</sup>	7.32E-04 pCi/m <sup>3</sup>		4.77E-04	4.82E-04	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Barium-140	< MDC	3.77E-04 pCi/m <sup>3</sup>	6.13E-03 pCi/m <sup>3</sup>		3.59E-03	3.59E-03	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Beryllium-7	<b>6.88E-02 pCi/m<sup>3</sup></b>	6.88E-02 pCi/m <sup>3</sup>	5.85E-03 pCi/m <sup>3</sup>		1.19E-02	1.35E-02	
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Cerium-141	< MDC	-4.21E-04 pCi/m <sup>3</sup>	8.21E-04 pCi/m <sup>3</sup>		5.24E-04	5.59E-04	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Cerium-144	< MDC	2.74E-04 pCi/m <sup>3</sup>	2.27E-03 pCi/m <sup>3</sup>		1.41E-03	1.42E-03	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Cesium-134	< MDC	1.15E-04 pCi/m <sup>3</sup>	5.90E-04 pCi/m <sup>3</sup>	5.00E-02 pCi/m <sup>3</sup>	3.24E-04	3.29E-04	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Cesium-137	< MDC	-2.03E-04 pCi/m <sup>3</sup>	4.51E-04 pCi/m <sup>3</sup>	6.00E-02 pCi/m <sup>3</sup>	3.11E-04	3.25E-04	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Chromium-51	< MDC	-4.46E-03 pCi/m <sup>3</sup>	5.16E-03 pCi/m <sup>3</sup>		3.80E-03	4.31E-03	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Cobalt-58	< MDC	-2.98E-04 pCi/m <sup>3</sup>	3.49E-04 pCi/m <sup>3</sup>		3.33E-04	3.61E-04	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Cobalt-60	< MDC	5.79E-05 pCi/m <sup>3</sup>	6.82E-04 pCi/m <sup>3</sup>		3.76E-04	3.77E-04	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Iodine-131	< MDC	-8.24E-04 pCi/m <sup>3</sup>	2.72E-03 pCi/m <sup>3</sup>		1.78E-03	1.82E-03	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Iron-59	< MDC	6.38E-04 pCi/m <sup>3</sup>	1.91E-03 pCi/m <sup>3</sup>		9.84E-04	1.03E-03	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Lanthanum-140	< MDC	5.06E-05 pCi/m <sup>3</sup>	2.05E-03 pCi/m <sup>3</sup>		1.17E-03	1.17E-03	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Manganese-54	< MDC	-7.29E-05 pCi/m <sup>3</sup>	6.07E-04 pCi/m <sup>3</sup>		3.88E-04	3.89E-04	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Niobium-95	< MDC	-2.21E-04 pCi/m <sup>3</sup>	6.05E-04 pCi/m <sup>3</sup>		4.26E-04	4.38E-04	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Potassium-40	< MDC	1.81E-03 pCi/m <sup>3</sup>	9.90E-03 pCi/m <sup>3</sup>		5.00E-03	5.07E-03	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Ruthenium-103	< MDC	3.01E-05 pCi/m <sup>3</sup>	5.59E-04 pCi/m <sup>3</sup>		3.26E-04	3.26E-04	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Ruthenium-106	< MDC	1.63E-03 pCi/m <sup>3</sup>	3.44E-03 pCi/m <sup>3</sup>		1.45E-03	1.63E-03	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Zinc-65	< MDC	-2.76E-04 pCi/m <sup>3</sup>	1.23E-03 pCi/m <sup>3</sup>		8.52E-04	8.61E-04	U
SA-APT-5S2(484868001) - Air Particulate	24-Jun-19	Zirconium-95	< MDC	2.44E-04 pCi/m <sup>3</sup>	1.14E-03 pCi/m <sup>3</sup>		6.17E-04	6.28E-04	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Barium-140	< MDC	-3.18E-04 pCi/m <sup>3</sup>	3.57E-03 pCi/m <sup>3</sup>		2.19E-03	2.20E-03	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Beryllium-7	<b>8.06E-02 pCi/m<sup>3</sup></b>	8.06E-02 pCi/m <sup>3</sup>	3.32E-03 pCi/m <sup>3</sup>		8.41E-03	1.10E-02	

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Quarterly Air Particulate Filter (Cont.)</b>									
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Cerium-141	< MDC	-7.79E-05 pCi/m <sup>3</sup>	4.94E-04 pCi/m <sup>3</sup>		3.01E-04	3.03E-04	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Cerium-144	< MDC	-1.34E-04 pCi/m <sup>3</sup>	1.17E-03 pCi/m <sup>3</sup>		7.08E-04	7.10E-04	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Cesium-134	< MDC	-5.09E-05 pCi/m <sup>3</sup>	3.11E-04 pCi/m <sup>3</sup>	5.00E-02 pCi/m <sup>3</sup>	1.91E-04	1.93E-04	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Cesium-137	< MDC	2.05E-04 pCi/m <sup>3</sup>	4.24E-04 pCi/m <sup>3</sup>	6.00E-02 pCi/m <sup>3</sup>	2.23E-04	2.42E-04	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Chromium-51	< MDC	1.98E-03 pCi/m <sup>3</sup>	4.45E-03 pCi/m <sup>3</sup>		2.35E-03	2.52E-03	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Cobalt-58	< MDC	9.23E-06 pCi/m <sup>3</sup>	3.31E-04 pCi/m <sup>3</sup>		1.89E-04	1.89E-04	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Cobalt-60	< MDC	-2.72E-04 pCi/m <sup>3</sup>	1.63E-04 pCi/m <sup>3</sup>		2.23E-04	2.56E-04	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Iodine-131	< MDC	-5.73E-04 pCi/m <sup>3</sup>	1.75E-03 pCi/m <sup>3</sup>		1.09E-03	1.12E-03	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Iron-59	< MDC	8.71E-05 pCi/m <sup>3</sup>	8.42E-04 pCi/m <sup>3</sup>		4.77E-04	4.79E-04	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Lanthanum-140	< MDC	-8.09E-04 pCi/m <sup>3</sup>	1.19E-03 pCi/m <sup>3</sup>		9.59E-04	1.03E-03	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Manganese-54	< MDC	8.30E-06 pCi/m <sup>3</sup>	3.63E-04 pCi/m <sup>3</sup>		2.09E-04	2.09E-04	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Niobium-95	< MDC	1.28E-04 pCi/m <sup>3</sup>	4.58E-04 pCi/m <sup>3</sup>		2.43E-04	2.50E-04	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Potassium-40	< MDC	3.54E-03 pCi/m <sup>3</sup>	7.05E-03 pCi/m <sup>3</sup>		4.00E-03	4.01E-03	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Ruthenium-103	< MDC	-2.48E-04 pCi/m <sup>3</sup>	3.33E-04 pCi/m <sup>3</sup>		2.46E-04	2.71E-04	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Ruthenium-106	< MDC	-1.85E-03 pCi/m <sup>3</sup>	2.71E-03 pCi/m <sup>3</sup>		1.99E-03	2.17E-03	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Zinc-65	< MDC	1.17E-04 pCi/m <sup>3</sup>	9.04E-04 pCi/m <sup>3</sup>		5.13E-04	5.16E-04	U
SA-APT-5S2(492922001) - Air Particulate	24-Sep-19	Zirconium-95	< MDC	3.02E-04 pCi/m <sup>3</sup>	9.27E-04 pCi/m <sup>3</sup>		5.18E-04	5.36E-04	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Barium-140	< MDC	-1.51E-03 pCi/m <sup>3</sup>	2.06E-03 pCi/m <sup>3</sup>		1.49E-03	1.65E-03	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Beryllium-7	5.69E-02 pCi/m <sup>3</sup>	5.69E-02 pCi/m <sup>3</sup>	2.64E-03 pCi/m <sup>3</sup>		5.97E-03	7.97E-03	
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Cerium-141	< MDC	-1.29E-04 pCi/m <sup>3</sup>	4.16E-04 pCi/m <sup>3</sup>		2.58E-04	2.65E-04	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Cerium-144	< MDC	2.64E-04 pCi/m <sup>3</sup>	1.10E-03 pCi/m <sup>3</sup>		6.19E-04	6.31E-04	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Cesium-134	< MDC	-3.04E-05 pCi/m <sup>3</sup>	2.28E-04 pCi/m <sup>3</sup>	5.00E-02 pCi/m <sup>3</sup>	1.46E-04	1.46E-04	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Cesium-137	< MDC	-5.89E-05 pCi/m <sup>3</sup>	3.64E-04 pCi/m <sup>3</sup>	6.00E-02 pCi/m <sup>3</sup>	2.19E-04	2.20E-04	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Chromium-51	< MDC	-6.21E-04 pCi/m <sup>3</sup>	3.01E-03 pCi/m <sup>3</sup>		1.97E-03	1.99E-03	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Cobalt-58	< MDC	9.19E-05 pCi/m <sup>3</sup>	2.85E-04 pCi/m <sup>3</sup>		1.62E-04	1.67E-04	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Cobalt-60	< MDC	1.10E-06 pCi/m <sup>3</sup>	2.99E-04 pCi/m <sup>3</sup>		1.75E-04	1.75E-04	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Iodine-131	< MDC	-1.77E-04 pCi/m <sup>3</sup>	1.17E-03 pCi/m <sup>3</sup>		7.70E-04	7.74E-04	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Iron-59	< MDC	-4.23E-05 pCi/m <sup>3</sup>	7.30E-04 pCi/m <sup>3</sup>		4.31E-04	4.31E-04	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Lanthanum-140	< MDC	-3.85E-04 pCi/m <sup>3</sup>	6.19E-04 pCi/m <sup>3</sup>		5.46E-04	5.74E-04	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Manganese-54	< MDC	2.83E-05 pCi/m <sup>3</sup>	2.58E-04 pCi/m <sup>3</sup>		1.50E-04	1.50E-04	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Niobium-95	2.89E-04 pCi/m <sup>3</sup>	2.89E-04 pCi/m <sup>3</sup>	2.89E-04 pCi/m <sup>3</sup>		2.82E-04	2.84E-04	
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Potassium-40	< MDC	-1.73E-03 pCi/m <sup>3</sup>	4.85E-03 pCi/m <sup>3</sup>		3.23E-03	3.32E-03	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Ruthenium-103	< MDC	-1.10E-04 pCi/m <sup>3</sup>	3.46E-04 pCi/m <sup>3</sup>		2.16E-04	2.22E-04	U



Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Quarterly Air Particulate Filter (Cont.)</b>									
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Ruthenium-106	< MDC	9.74E-04 pCi/m <sup>3</sup>	2.49E-03 pCi/m <sup>3</sup>		1.30E-03	1.38E-03	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Zinc-65	< MDC	4.13E-05 pCi/m <sup>3</sup>	5.47E-04 pCi/m <sup>3</sup>		3.05E-04	3.06E-04	U
SA-APT-5S2(501553001) - Air Particulate	30-Dec-19	Zirconium-95	< MDC	-4.66E-04 pCi/m <sup>3</sup>	4.99E-04 pCi/m <sup>3</sup>		3.93E-04	4.48E-04	U
<b>Fish</b>									
SA-ESF-11A1(479429001) - Fish	3-May-19	Barium-140	< MDC	2.67E+01 pCi/kg	2.20E+02 pCi/kg		1.30E+02	1.30E+02	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Beryllium-7	< MDC	5.44E+01 pCi/kg	2.80E+02 pCi/kg		1.61E+02	1.63E+02	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Cerium-141	< MDC	2.62E+01 pCi/kg	5.64E+01 pCi/kg		4.26E+01	4.27E+01	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Cerium-144	< MDC	5.73E+01 pCi/kg	1.64E+02 pCi/kg		9.38E+01	9.75E+01	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Cesium-134	< MDC	-5.49E-01 pCi/kg	3.26E+01 pCi/kg	1.30E+02 pCi/kg	2.19E+01	2.19E+01	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Cesium-137	< MDC	-3.99E-01 pCi/kg	2.29E+01 pCi/kg	1.50E+02 pCi/kg	1.34E+01	1.34E+01	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Chromium-51	< MDC	1.87E+02 pCi/kg	3.74E+02 pCi/kg		1.98E+02	2.15E+02	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Cobalt-58	< MDC	-5.44E+00 pCi/kg	2.54E+01 pCi/kg	1.30E+02 pCi/kg	1.63E+01	1.65E+01	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Cobalt-60	< MDC	1.23E+01 pCi/kg	3.93E+01 pCi/kg	1.30E+02 pCi/kg	2.05E+01	2.13E+01	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Iodine-131	< MDC	9.01E+01 pCi/kg	1.02E+02 pCi/kg		1.57E+02	1.57E+02	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Iron-59	< MDC	2.62E+01 pCi/kg	7.29E+01 pCi/kg	2.60E+02 pCi/kg	3.63E+01	3.83E+01	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Lanthanum-140	< MDC	-6.12E+00 pCi/kg	5.69E+01 pCi/kg		3.57E+01	3.58E+01	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Manganese-54	< MDC	-4.27E-01 pCi/kg	2.96E+01 pCi/kg	1.30E+02 pCi/kg	1.75E+01	1.75E+01	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Niobium-95	< MDC	9.50E+00 pCi/kg	3.16E+01 pCi/kg		1.64E+01	1.70E+01	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Potassium-40	2.71E+03 pCi/kg	2.71E+03 pCi/kg	2.51E+02 pCi/kg		6.31E+02	7.21E+02	
SA-ESF-11A1(479429001) - Fish	3-May-19	Ruthenium-103	< MDC	-7.81E+00 pCi/kg	3.21E+01 pCi/kg		2.13E+01	2.16E+01	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Ruthenium-106	< MDC	7.77E+01 pCi/kg	2.44E+02 pCi/kg		1.26E+02	1.31E+02	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Zinc-65	< MDC	2.64E+01 pCi/kg	7.64E+01 pCi/kg	2.60E+02 pCi/kg	3.95E+01	4.13E+01	U
SA-ESF-11A1(479429001) - Fish	3-May-19	Zirconium-95	< MDC	-2.92E+01 pCi/kg	4.93E+01 pCi/kg		3.52E+01	3.77E+01	U
<b>Crab</b>									
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Barium-140	< MDC	1.27E+02 pCi/kg	1.45E+02 pCi/kg		7.99E+01	9.89E+01	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Beryllium-7	< MDC	-6.86E+01 pCi/kg	1.59E+02 pCi/kg		1.01E+02	1.06E+02	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Cerium-141	< MDC	2.42E+00 pCi/kg	2.65E+01 pCi/kg		1.78E+01	1.78E+01	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Cerium-144	< MDC	3.72E+01 pCi/kg	9.25E+01 pCi/kg		5.58E+01	5.83E+01	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Cesium-134	< MDC	4.42E+00 pCi/kg	2.06E+01 pCi/kg	1.30E+02 pCi/kg	1.25E+01	1.27E+01	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Cesium-137	< MDC	5.60E+00 pCi/kg	1.73E+01 pCi/kg	1.50E+02 pCi/kg	1.35E+01	1.35E+01	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Chromium-51	< MDC	-1.29E+02 pCi/kg	1.78E+02 pCi/kg		1.12E+02	1.27E+02	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Cobalt-58	< MDC	-8.50E+00 pCi/kg	1.80E+01 pCi/kg	1.30E+02 pCi/kg	1.22E+01	1.28E+01	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propogated Uncertainty)	Qualifier
<b>Crab (Cont.)</b>									
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Cobalt-60	< MDC	-2.07E+00 pCi/kg	2.13E+01 pCi/kg	1.30E+02 pCi/kg	1.32E+01	1.32E+01	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Iodine-131	< MDC	-2.14E+01 pCi/kg	5.15E+01 pCi/kg		3.19E+01	3.34E+01	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Iron-59	< MDC	6.83E+00 pCi/kg	4.54E+01 pCi/kg	2.60E+02 pCi/kg	2.65E+01	2.67E+01	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Lanthanum-140	< MDC	-2.44E+01 pCi/kg	4.16E+01 pCi/kg		3.44E+01	3.62E+01	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Manganese-54	< MDC	-3.35E+00 pCi/kg	1.91E+01 pCi/kg	1.30E+02 pCi/kg	1.14E+01	1.15E+01	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Niobium-95	< MDC	-1.21E+00 pCi/kg	2.13E+01 pCi/kg		1.35E+01	1.35E+01	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Potassium-40	1.61E+03 pCi/kg	1.61E+03 pCi/kg	2.00E+02 pCi/kg		4.21E+02	4.63E+02	
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Ruthenium-103	< MDC	2.65E+00 pCi/kg	2.10E+01 pCi/kg		1.26E+01	1.26E+01	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Ruthenium-106	< MDC	-1.26E+01 pCi/kg	1.69E+02 pCi/kg		1.05E+02	1.06E+02	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Zinc-65	< MDC	1.49E+01 pCi/kg	4.31E+01 pCi/kg	2.60E+02 pCi/kg	1.58E+01	1.58E+01	U
SA-ECH-11A1(484156001) - Crab	27-Jun-19	Zirconium-95	< MDC	1.77E+01 pCi/kg	3.50E+01 pCi/kg		2.02E+01	2.18E+01	U
<b>Sediment</b>									
SA-ESS-11A1(480643001) - Sediment	22-May-19	Barium-140	< MDC	-1.88E+01 pCi/kg	1.32E+02 pCi/kg		7.34E+01	7.39E+01	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Beryllium-7	< MDC	1.20E+02 pCi/kg	1.78E+02 pCi/kg		8.49E+01	1.01E+02	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Cerium-141	< MDC	-1.51E+01 pCi/kg	2.99E+01 pCi/kg		1.98E+01	2.10E+01	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Cerium-144	< MDC	-1.78E+01 pCi/kg	9.10E+01 pCi/kg		4.79E+01	4.86E+01	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Cesium-134	< MDC	1.31E+01 pCi/kg	2.30E+01 pCi/kg	1.50E+02 pCi/kg	2.22E+01	2.30E+01	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Cesium-137	< MDC	-4.13E+00 pCi/kg	2.46E+01 pCi/kg	1.80E+02 pCi/kg	1.47E+01	1.48E+01	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Chromium-51	< MDC	-1.04E+01 pCi/kg	1.97E+02 pCi/kg		1.12E+02	1.12E+02	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Cobalt-58	< MDC	-2.34E-01 pCi/kg	2.06E+01 pCi/kg		1.18E+01	1.18E+01	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Cobalt-60	< MDC	4.59E+00 pCi/kg	2.07E+01 pCi/kg		1.12E+01	1.14E+01	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Iodine-131	< MDC	1.93E+01 pCi/kg	6.37E+01 pCi/kg	1.00E+02 pCi/kg	3.46E+01	3.57E+01	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Iron-59	< MDC	5.13E+00 pCi/kg	4.41E+01 pCi/kg		2.38E+01	2.40E+01	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Manganese-54	< MDC	6.42E+00 pCi/kg	1.84E+01 pCi/kg		1.08E+01	1.12E+01	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Niobium-95	< MDC	-1.09E+01 pCi/kg	2.00E+01 pCi/kg		1.42E+01	1.51E+01	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Potassium-40	2.94E+03 pCi/kg	2.94E+03 pCi/kg	1.80E+02 pCi/kg		3.74E+02	4.71E+02	
SA-ESS-11A1(480643001) - Sediment	22-May-19	Radium-226	2.14E+02 pCi/kg	2.14E+02 pCi/kg	3.16E+01 pCi/kg		6.03E+01	6.28E+01	
SA-ESS-11A1(480643001) - Sediment	22-May-19	Ruthenium-103	< MDC	8.51E-01 pCi/kg	1.99E+01 pCi/kg		1.06E+01	1.06E+01	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Ruthenium-106	< MDC	-2.44E+01 pCi/kg	1.50E+02 pCi/kg		8.56E+01	8.63E+01	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Zinc-65	< MDC	-1.35E+00 pCi/kg	3.94E+01 pCi/kg		2.38E+01	2.38E+01	U
SA-ESS-11A1(480643001) - Sediment	22-May-19	Zirconium-95	< MDC	1.96E+01 pCi/kg	3.87E+01 pCi/kg		1.97E+01	2.16E+01	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Broad Leaf Vegetation</b>									
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Barium-140	< MDC	7.39E+01 pCi/kg	9.83E+01 pCi/kg		1.26E+02	1.30E+02	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Beryllium-7	< MDC	2.01E+01 pCi/kg	1.79E+02 pCi/kg		1.07E+02	1.08E+02	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Cerium-141	< MDC	2.87E+00 pCi/kg	2.78E+01 pCi/kg		1.60E+01	1.61E+01	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Cerium-144	< MDC	3.34E+01 pCi/kg	1.06E+02 pCi/kg		5.94E+01	6.14E+01	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Cesium-134	< MDC	-1.66E+00 pCi/kg	1.85E+01 pCi/kg	6.00E+01 pCi/kg	1.09E+01	1.09E+01	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Cesium-137	< MDC	-1.57E+00 pCi/kg	1.88E+01 pCi/kg	8.00E+01 pCi/kg	1.18E+01	1.18E+01	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Chromium-51	< MDC	4.78E+01 pCi/kg	1.60E+02 pCi/kg		9.15E+01	9.40E+01	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Cobalt-58	< MDC	-9.06E-01 pCi/kg	1.79E+01 pCi/kg		1.05E+01	1.05E+01	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Cobalt-60	< MDC	1.07E+01 pCi/kg	2.43E+01 pCi/kg		1.29E+01	1.38E+01	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Iodine-131	< MDC	-1.44E+00 pCi/kg	2.81E+01 pCi/kg	6.00E+01 pCi/kg	1.70E+01	1.70E+01	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Iron-59	< MDC	3.43E+00 pCi/kg	4.51E+01 pCi/kg		2.61E+01	2.62E+01	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Lanthanum-140	< MDC	-1.36E+00 pCi/kg	2.78E+01 pCi/kg		1.71E+01	1.71E+01	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Manganese-54	< MDC	1.63E+01 pCi/kg	2.23E+01 pCi/kg		1.12E+01	1.35E+01	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Niobium-95	< MDC	-1.63E+00 pCi/kg	2.11E+01 pCi/kg		1.42E+01	1.42E+01	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Potassium-40	5.39E+03 pCi/kg	5.39E+03 pCi/kg	1.30E+02 pCi/kg		5.26E+02	6.93E+02	
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Ruthenium-103	< MDC	-1.41E+00 pCi/kg	1.73E+01 pCi/kg		1.07E+01	1.07E+01	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Ruthenium-106	< MDC	-2.61E+01 pCi/kg	1.59E+02 pCi/kg		1.01E+02	1.02E+02	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Zinc-65	< MDC	-2.09E+01 pCi/kg	4.32E+01 pCi/kg		2.81E+01	2.96E+01	U
SA-FPL-15S2(485240001) - Cabbage	16-Jul-19	Zirconium-95	< MDC	4.48E+00 pCi/kg	3.56E+01 pCi/kg		2.01E+01	2.02E+01	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Barium-140	< MDC	1.23E+01 pCi/kg	6.81E+01 pCi/kg		3.82E+01	3.86E+01	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Beryllium-7	< MDC	2.65E+01 pCi/kg	1.10E+02 pCi/kg		6.06E+01	6.18E+01	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Cerium-141	< MDC	1.19E+00 pCi/kg	2.07E+01 pCi/kg		1.64E+01	1.64E+01	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Cerium-144	< MDC	2.02E+01 pCi/kg	8.21E+01 pCi/kg		4.82E+01	4.91E+01	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Cesium-134	< MDC	5.42E+00 pCi/kg	1.44E+01 pCi/kg	6.00E+01 pCi/kg	8.17E+00	8.54E+00	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Cesium-137	< MDC	3.47E-01 pCi/kg	1.26E+01 pCi/kg	8.00E+01 pCi/kg	8.27E+00	8.28E+00	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Chromium-51	1.03E+02 pCi/kg	1.03E+02 pCi/kg	1.03E+02 pCi/kg		1.06E+02	1.07E+02	
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Cobalt-58	< MDC	-4.03E+00 pCi/kg	1.43E+01 pCi/kg		9.26E+00	9.45E+00	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Cobalt-60	< MDC	-1.95E+00 pCi/kg	1.37E+01 pCi/kg		8.34E+00	8.38E+00	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Iodine-131	< MDC	-3.52E+00 pCi/kg	2.30E+01 pCi/kg	6.00E+01 pCi/kg	1.36E+01	1.37E+01	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Iron-59	< MDC	2.42E+01 pCi/kg	3.60E+01 pCi/kg		1.72E+01	2.05E+01	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Lanthanum-140	< MDC	-2.94E+00 pCi/kg	2.04E+01 pCi/kg		1.28E+01	1.28E+01	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Manganese-54	< MDC	8.28E-01 pCi/kg	1.21E+01 pCi/kg		7.11E+00	7.12E+00	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Niobium-95	< MDC	-9.73E+00 pCi/kg	1.32E+01 pCi/kg		9.16E+00	1.02E+01	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Broad Leaf Vegetation (Cont.)</b>									
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Potassium-40	1.87E+03 pCi/kg	1.87E+03 pCi/kg	1.48E+02 pCi/kg		3.33E+02	3.82E+02	
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Ruthenium-103	< MDC	2.11E+00 pCi/kg	1.27E+01 pCi/kg		7.09E+00	7.16E+00	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Ruthenium-106	< MDC	-1.65E+00 pCi/kg	1.22E+02 pCi/kg		7.26E+01	7.26E+01	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Zinc-65	< MDC	-7.02E+00 pCi/kg	3.40E+01 pCi/kg		2.52E+01	2.54E+01	U
SA-FPL-3H5(485871001) - Cabbage	24-Jul-19	Zirconium-95	< MDC	-1.62E+01 pCi/kg	2.22E+01 pCi/kg		1.65E+01	1.81E+01	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Barium-140	8.16E+01 pCi/kg	8.16E+01 pCi/kg	8.16E+01 pCi/kg		8.32E+01	9.19E+01	
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Beryllium-7	< MDC	7.61E+01 pCi/kg	1.20E+02 pCi/kg		1.36E+02	1.36E+02	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Cerium-141	< MDC	9.38E+00 pCi/kg	2.22E+01 pCi/kg		1.78E+01	1.78E+01	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Cerium-144	< MDC	-1.66E+01 pCi/kg	7.85E+01 pCi/kg		4.92E+01	4.98E+01	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Cesium-134	< MDC	5.96E+00 pCi/kg	1.84E+01 pCi/kg	6.00E+01 pCi/kg	9.98E+00	1.04E+01	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Cesium-137	1.45E+01 pCi/kg	1.45E+01 pCi/kg	1.45E+01 pCi/kg	8.00E+01 pCi/kg	1.93E+01	1.94E+01	
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Chromium-51	< MDC	2.85E+01 pCi/kg	1.37E+02 pCi/kg		7.77E+01	7.88E+01	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Cobalt-58	< MDC	1.71E-01 pCi/kg	1.70E+01 pCi/kg		9.82E+00	9.82E+00	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Cobalt-60	< MDC	5.56E+00 pCi/kg	1.81E+01 pCi/kg		1.07E+01	1.10E+01	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Iodine-131	< MDC	-4.86E+00 pCi/kg	2.76E+01 pCi/kg	6.00E+01 pCi/kg	1.66E+01	1.67E+01	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Iron-59	< MDC	8.24E+00 pCi/kg	4.17E+01 pCi/kg		2.38E+01	2.41E+01	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Lanthanum-140	< MDC	1.03E+01 pCi/kg	2.66E+01 pCi/kg		1.40E+01	1.48E+01	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Manganese-54	< MDC	-5.09E+00 pCi/kg	1.54E+01 pCi/kg		9.48E+00	9.76E+00	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Niobium-95	< MDC	5.27E+00 pCi/kg	1.65E+01 pCi/kg		8.97E+00	9.29E+00	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Potassium-40	7.49E+03 pCi/kg	7.49E+03 pCi/kg	1.45E+02 pCi/kg		5.73E+02	9.01E+02	
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Ruthenium-103	< MDC	3.36E+00 pCi/kg	1.64E+01 pCi/kg		9.51E+00	9.63E+00	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Ruthenium-106	< MDC	5.67E+01 pCi/kg	1.35E+02 pCi/kg		7.55E+01	7.99E+01	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Zinc-65	< MDC	8.82E+00 pCi/kg	3.89E+01 pCi/kg		2.20E+01	2.24E+01	U
SA-FPL-7S2(485240002) - Collards	16-Jul-19	Zirconium-95	< MDC	1.79E+01 pCi/kg	3.36E+01 pCi/kg		1.76E+01	1.95E+01	U
<b>Vegetables</b>									
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Barium-140	< MDC	3.98E+00 pCi/kg	5.52E+01 pCi/kg		3.36E+01	3.36E+01	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Beryllium-7	< MDC	-1.91E+01 pCi/kg	9.65E+01 pCi/kg		5.96E+01	6.03E+01	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Cerium-141	< MDC	5.76E+00 pCi/kg	1.79E+01 pCi/kg		1.65E+01	1.65E+01	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Cerium-144	< MDC	8.68E+00 pCi/kg	6.34E+01 pCi/kg		3.79E+01	3.81E+01	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Cesium-134	< MDC	1.10E+01 pCi/kg	1.54E+01 pCi/kg	6.00E+01 pCi/kg	1.40E+01	1.49E+01	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Cesium-137	< MDC	1.43E-01 pCi/kg	9.51E+00 pCi/kg	8.00E+01 pCi/kg	6.36E+00	6.36E+00	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Chromium-51	< MDC	5.42E+01 pCi/kg	1.15E+02 pCi/kg		6.08E+01	6.56E+01	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Vegetables (Cont.)</b>									
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Cobalt-58	< MDC	-4.02E+00 pCi/kg	9.29E+00 pCi/kg	6.00E+01 pCi/kg	6.66E+00	6.91E+00	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Cobalt-60	< MDC	2.92E+00 pCi/kg	1.25E+01 pCi/kg		6.89E+00	7.02E+00	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Iodine-131	< MDC	8.80E-01 pCi/kg	2.05E+01 pCi/kg		1.18E+01	1.18E+01	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Iron-59	< MDC	-8.57E+00 pCi/kg	2.11E+01 pCi/kg		1.42E+01	1.47E+01	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Lanthanum-140	< MDC	-1.12E+01 pCi/kg	1.22E+01 pCi/kg		1.16E+01	1.27E+01	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Manganese-54	< MDC	-6.96E-01 pCi/kg	1.14E+01 pCi/kg		7.11E+00	7.12E+00	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Niobium-95	< MDC	1.25E+00 pCi/kg	1.28E+01 pCi/kg		7.54E+00	7.56E+00	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Potassium-40	6.69E+02 pCi/kg	6.69E+02 pCi/kg	6.69E+02 pCi/kg		2.89E+02	8.92E+02	
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Ruthenium-103	< MDC	-1.52E+00 pCi/kg	1.12E+01 pCi/kg		6.84E+00	6.87E+00	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Ruthenium-106	< MDC	-4.32E+01 pCi/kg	6.41E+01 pCi/kg		4.90E+01	5.29E+01	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Zinc-65	< MDC	1.00E+00 pCi/kg	3.33E+01 pCi/kg		1.92E+01	1.92E+01	U
SA-FPV-15F4(485871005) - Corn	24-Jul-19	Zirconium-95	< MDC	2.43E+00 pCi/kg	1.90E+01 pCi/kg		1.10E+01	1.10E+01	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Barium-140	< MDC	-7.62E+00 pCi/kg	4.53E+01 pCi/kg	6.00E+01 pCi/kg	2.79E+01	2.81E+01	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Beryllium-7	< MDC	7.70E+01 pCi/kg	8.49E+01 pCi/kg		9.39E+01	9.42E+01	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Cerium-141	< MDC	-9.25E+00 pCi/kg	1.36E+01 pCi/kg		1.04E+01	1.13E+01	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Cerium-144	< MDC	-1.36E+01 pCi/kg	5.19E+01 pCi/kg		3.30E+01	3.36E+01	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Cesium-134	< MDC	3.22E+00 pCi/kg	1.18E+01 pCi/kg		6.35E+00	6.53E+00	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Cesium-137	< MDC	-3.81E+00 pCi/kg	1.01E+01 pCi/kg		6.71E+00	6.93E+00	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Chromium-51	< MDC	2.95E+00 pCi/kg	9.51E+01 pCi/kg		5.39E+01	5.39E+01	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Cobalt-58	< MDC	-3.63E+00 pCi/kg	9.09E+00 pCi/kg		6.31E+00	6.53E+00	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Cobalt-60	< MDC	2.98E+00 pCi/kg	1.48E+01 pCi/kg		7.99E+00	8.11E+00	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Iodine-131	< MDC	-1.11E+01 pCi/kg	1.18E+01 pCi/kg		8.42E+00	9.83E+00	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Iron-59	< MDC	3.49E+00 pCi/kg	3.01E+01 pCi/kg		1.79E+01	1.79E+01	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Lanthanum-140	< MDC	3.38E-01 pCi/kg	1.68E+01 pCi/kg		9.81E+00	9.81E+00	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Manganese-54	< MDC	3.08E+00 pCi/kg	1.22E+01 pCi/kg	6.00E+01 pCi/kg	7.25E+00	7.39E+00	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Niobium-95	< MDC	5.21E-01 pCi/kg	1.14E+01 pCi/kg		6.71E+00	6.72E+00	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Potassium-40	2.58E+03 pCi/kg	2.58E+03 pCi/kg	1.56E+02 pCi/kg		3.23E+02	4.14E+02	
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Ruthenium-103	< MDC	-2.01E+00 pCi/kg	9.77E+00 pCi/kg		6.02E+00	6.09E+00	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Ruthenium-106	< MDC	-4.63E+00 pCi/kg	1.03E+02 pCi/kg		6.89E+01	6.89E+01	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Zinc-65	< MDC	2.16E+00 pCi/kg	2.97E+01 pCi/kg		1.78E+01	1.79E+01	U
SA-FPV-1G1(479513001) - Asparagus	16-May-19	Zirconium-95	< MDC	-1.56E+00 pCi/kg	1.73E+01 pCi/kg		1.07E+01	1.07E+01	U



Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Vegetables (Cont.)</b>									
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Barium-140	< MDC	-6.26E+00 pCi/kg	5.52E+01 pCi/kg		3.47E+01	3.49E+01	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Beryllium-7	< MDC	-2.31E+01 pCi/kg	8.88E+01 pCi/kg		5.74E+01	5.83E+01	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Cerium-141	1.53E+01 pCi/kg	1.53E+01 pCi/kg	1.53E+01 pCi/kg		1.67E+01	1.68E+01	
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Cerium-144	< MDC	3.24E+01 pCi/kg	5.80E+01 pCi/kg		5.76E+01	5.76E+01	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Cesium-134	< MDC	-4.78E+00 pCi/kg	1.20E+01 pCi/kg	6.00E+01 pCi/kg	7.87E+00	8.17E+00	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Cesium-137	< MDC	-3.09E+00 pCi/kg	1.14E+01 pCi/kg	8.00E+01 pCi/kg	7.07E+00	7.21E+00	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Chromium-51	< MDC	-4.02E+01 pCi/kg	1.05E+02 pCi/kg		6.58E+01	6.84E+01	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Cobalt-58	< MDC	-4.70E+00 pCi/kg	1.14E+01 pCi/kg		7.41E+00	7.72E+00	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Cobalt-60	< MDC	-9.02E+00 pCi/kg	1.42E+01 pCi/kg		1.35E+01	1.41E+01	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Iodine-131	< MDC	5.22E+00 pCi/kg	2.02E+01 pCi/kg	6.00E+01 pCi/kg	1.14E+01	1.16E+01	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Iron-59	< MDC	9.86E+00 pCi/kg	3.07E+01 pCi/kg		1.66E+01	1.72E+01	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Lanthanum-140	< MDC	3.66E-01 pCi/kg	1.60E+01 pCi/kg		9.28E+00	9.28E+00	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Manganese-54	< MDC	-4.87E-01 pCi/kg	1.22E+01 pCi/kg		7.23E+00	7.23E+00	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Niobium-95	< MDC	-9.87E+00 pCi/kg	9.98E+00 pCi/kg		9.09E+00	1.02E+01	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Potassium-40	2.51E+03 pCi/kg	2.51E+03 pCi/kg	1.38E+02 pCi/kg		3.46E+02	4.31E+02	
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Ruthenium-103	< MDC	-2.81E+00 pCi/kg	1.06E+01 pCi/kg		6.91E+00	7.03E+00	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Ruthenium-106	< MDC	-2.57E+01 pCi/kg	9.64E+01 pCi/kg		6.42E+01	6.53E+01	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Zinc-65	< MDC	-4.71E+00 pCi/kg	3.02E+01 pCi/kg		1.90E+01	1.91E+01	U
SA-FPV-1G1(485865003) - Corn	24-Jul-19	Zirconium-95	< MDC	3.19E-01 pCi/kg	2.02E+01 pCi/kg		1.17E+01	1.17E+01	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Barium-140	< MDC	-4.42E+00 pCi/kg	3.59E+01 pCi/kg		2.22E+01	2.23E+01	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Beryllium-7	< MDC	8.64E+00 pCi/kg	7.17E+01 pCi/kg		4.08E+01	4.10E+01	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Cerium-141	< MDC	-3.25E+00 pCi/kg	1.29E+01 pCi/kg		8.62E+00	8.74E+00	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Cerium-144	< MDC	-5.03E+00 pCi/kg	4.88E+01 pCi/kg		3.03E+01	3.04E+01	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Cesium-134	< MDC	4.38E+00 pCi/kg	1.09E+01 pCi/kg	6.00E+01 pCi/kg	5.74E+00	6.08E+00	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Cesium-137	< MDC	6.92E+00 pCi/kg	1.15E+01 pCi/kg	8.00E+01 pCi/kg	5.77E+00	6.58E+00	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Chromium-51	< MDC	-3.18E+01 pCi/kg	6.54E+01 pCi/kg		4.18E+01	4.42E+01	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Cobalt-58	< MDC	2.06E+00 pCi/kg	1.01E+01 pCi/kg		5.73E+00	5.81E+00	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Cobalt-60	< MDC	2.19E+00 pCi/kg	1.12E+01 pCi/kg		6.03E+00	6.11E+00	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Iodine-131	< MDC	-2.14E+00 pCi/kg	1.43E+01 pCi/kg	6.00E+01 pCi/kg	8.57E+00	8.62E+00	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Iron-59	< MDC	-1.79E+00 pCi/kg	2.24E+01 pCi/kg		1.33E+01	1.33E+01	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Lanthanum-140	< MDC	-1.76E+00 pCi/kg	9.24E+00 pCi/kg		6.35E+00	6.40E+00	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Manganese-54	< MDC	5.46E-01 pCi/kg	8.45E+00 pCi/kg		5.03E+00	5.04E+00	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Niobium-95	< MDC	3.02E+00 pCi/kg	1.02E+01 pCi/kg		5.61E+00	5.78E+00	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Vegetables (Cont.)</b>									
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Potassium-40	<b>2.03E+03 pCi/kg</b>	2.03E+03 pCi/kg	8.61E+01 pCi/kg		2.74E+02	3.39E+02	
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Ruthenium-103	< MDC	-2.07E+00 pCi/kg	8.70E+00 pCi/kg		6.15E+00	6.22E+00	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Ruthenium-106	< MDC	-3.50E+00 pCi/kg	6.71E+01 pCi/kg		4.09E+01	4.09E+01	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Zinc-65	< MDC	3.69E+00 pCi/kg	2.58E+01 pCi/kg		1.44E+01	1.45E+01	U
SA-FPV-1G1(485865004) - Peach	24-Jul-19	Zirconium-95	< MDC	5.13E+00 pCi/kg	1.77E+01 pCi/kg		9.68E+00	9.96E+00	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Barium-140	< MDC	1.61E+01 pCi/kg	5.26E+01 pCi/kg		2.81E+01	2.91E+01	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Beryllium-7	< MDC	-5.28E+01 pCi/kg	7.48E+01 pCi/kg		5.41E+01	5.93E+01	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Cerium-141	< MDC	2.66E+00 pCi/kg	1.72E+01 pCi/kg		1.01E+01	1.02E+01	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Cerium-144	< MDC	-8.17E+00 pCi/kg	6.44E+01 pCi/kg		3.96E+01	3.97E+01	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Cesium-134	< MDC	4.51E+00 pCi/kg	1.49E+01 pCi/kg	6.00E+01 pCi/kg	8.26E+00	8.51E+00	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Cesium-137	< MDC	8.50E+00 pCi/kg	1.58E+01 pCi/kg	8.00E+01 pCi/kg	8.20E+00	9.08E+00	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Chromium-51	< MDC	-5.45E+00 pCi/kg	9.73E+01 pCi/kg		5.66E+01	5.67E+01	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Cobalt-58	< MDC	-1.86E+00 pCi/kg	1.21E+01 pCi/kg		8.27E+00	8.32E+00	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Cobalt-60	< MDC	-1.38E+00 pCi/kg	1.20E+01 pCi/kg		7.59E+00	7.62E+00	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Iodine-131	< MDC	2.22E+00 pCi/kg	1.71E+01 pCi/kg	6.00E+01 pCi/kg	9.58E+00	9.64E+00	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Iron-59	< MDC	-2.61E+00 pCi/kg	2.40E+01 pCi/kg		1.48E+01	1.48E+01	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Lanthanum-140	< MDC	-5.06E+00 pCi/kg	1.66E+01 pCi/kg		1.21E+01	1.23E+01	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Manganese-54	< MDC	-1.37E+00 pCi/kg	1.04E+01 pCi/kg		6.28E+00	6.32E+00	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Niobium-95	< MDC	1.36E-01 pCi/kg	1.21E+01 pCi/kg		7.52E+00	7.52E+00	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Potassium-40	<b>1.52E+03 pCi/kg</b>	1.52E+03 pCi/kg	1.58E+02 pCi/kg		3.14E+02	3.45E+02	
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Ruthenium-103	< MDC	5.06E+00 pCi/kg	1.32E+01 pCi/kg		7.05E+00	7.42E+00	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Ruthenium-106	< MDC	-3.49E+01 pCi/kg	9.93E+01 pCi/kg		6.66E+01	6.85E+01	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Zinc-65	< MDC	1.37E+01 pCi/kg	3.40E+01 pCi/kg		1.74E+01	1.85E+01	U
SA-FPV-1G1(485865001) - Peppers	24-Jul-19	Zirconium-95	< MDC	-8.78E+00 pCi/kg	1.81E+01 pCi/kg		1.32E+01	1.38E+01	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Barium-140	< MDC	-1.32E+01 pCi/kg	3.43E+01 pCi/kg		2.57E+01	2.64E+01	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Beryllium-7	< MDC	2.26E+01 pCi/kg	6.93E+01 pCi/kg		3.77E+01	3.91E+01	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Cerium-141	< MDC	-8.22E+00 pCi/kg	1.06E+01 pCi/kg		7.80E+00	8.66E+00	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Cerium-144	< MDC	-6.27E+00 pCi/kg	4.28E+01 pCi/kg		2.69E+01	2.71E+01	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Cesium-134	< MDC	1.46E+00 pCi/kg	8.48E+00 pCi/kg	6.00E+01 pCi/kg	4.85E+00	4.89E+00	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Cesium-137	< MDC	-9.45E-01 pCi/kg	7.70E+00 pCi/kg	8.00E+01 pCi/kg	4.81E+00	4.83E+00	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Chromium-51	< MDC	2.35E+01 pCi/kg	6.91E+01 pCi/kg		3.73E+01	3.88E+01	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Cobalt-58	< MDC	-4.30E-01 pCi/kg	7.40E+00 pCi/kg		4.61E+00	4.61E+00	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Vegetables (Cont.)</b>									
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Cobalt-60	< MDC	-1.53E+00 pCi/kg	9.16E+00 pCi/kg	6.00E+01 pCi/kg	5.73E+00	5.77E+00	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Iodine-131	< MDC	3.46E+00 pCi/kg	1.54E+01 pCi/kg		8.57E+00	8.72E+00	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Iron-59	< MDC	-2.52E+00 pCi/kg	1.86E+01 pCi/kg		1.13E+01	1.13E+01	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Lanthanum-140	< MDC	2.41E+00 pCi/kg	1.13E+01 pCi/kg		5.83E+00	5.93E+00	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Manganese-54	< MDC	-1.32E+00 pCi/kg	6.53E+00 pCi/kg		4.30E+00	4.35E+00	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Niobium-95	< MDC	2.45E-01 pCi/kg	7.12E+00 pCi/kg		4.27E+00	4.27E+00	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Potassium-40	<b>1.84E+03 pCi/kg</b>	1.84E+03 pCi/kg	1.05E+02 pCi/kg		2.57E+02	3.12E+02	
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Ruthenium-103	< MDC	-7.10E-01 pCi/kg	7.11E+00 pCi/kg		4.32E+00	4.33E+00	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Ruthenium-106	< MDC	-2.50E+01 pCi/kg	5.65E+01 pCi/kg		3.87E+01	4.04E+01	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Zinc-65	< MDC	6.14E+00 pCi/kg	1.82E+01 pCi/kg		1.02E+01	1.06E+01	U
SA-FPV-1G1(485865002) - Tomato	24-Jul-19	Zirconium-95	< MDC	-4.43E+00 pCi/kg	1.44E+01 pCi/kg		9.56E+00	9.77E+00	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Barium-140	< MDC	1.46E+01 pCi/kg	4.71E+01 pCi/kg	6.00E+01 pCi/kg	2.59E+01	2.68E+01	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Beryllium-7	< MDC	2.58E+01 pCi/kg	8.22E+01 pCi/kg		4.54E+01	4.69E+01	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Cerium-141	< MDC	3.38E+00 pCi/kg	1.33E+01 pCi/kg		8.51E+00	8.65E+00	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Cerium-144	< MDC	7.39E+00 pCi/kg	4.75E+01 pCi/kg		2.84E+01	2.86E+01	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Cesium-134	< MDC	-5.46E-01 pCi/kg	8.21E+00 pCi/kg		5.16E+00	5.17E+00	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Cesium-137	<b>4.81E+00 pCi/kg</b>	4.81E+00 pCi/kg	4.81E+00 pCi/kg		7.79E+00	7.90E+00	
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Chromium-51	< MDC	-1.63E+01 pCi/kg	7.05E+01 pCi/kg		4.27E+01	4.33E+01	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Cobalt-58	<b>7.60E+00 pCi/kg</b>	7.60E+00 pCi/kg	7.60E+00 pCi/kg		6.90E+00	6.95E+00	
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Cobalt-60	< MDC	-5.64E+00 pCi/kg	9.37E+00 pCi/kg		6.79E+00	7.27E+00	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Iodine-131	< MDC	-2.53E+00 pCi/kg	1.28E+01 pCi/kg		8.79E+00	8.87E+00	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Iron-59	< MDC	-5.97E+00 pCi/kg	2.28E+01 pCi/kg		1.43E+01	1.45E+01	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Lanthanum-140	< MDC	-4.74E+00 pCi/kg	1.26E+01 pCi/kg	6.00E+01 pCi/kg	9.03E+00	9.28E+00	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Manganese-54	< MDC	-4.26E+00 pCi/kg	9.01E+00 pCi/kg		7.27E+00	7.53E+00	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Niobium-95	< MDC	-2.61E+00 pCi/kg	8.41E+00 pCi/kg		5.65E+00	5.78E+00	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Potassium-40	<b>2.36E+03 pCi/kg</b>	2.36E+03 pCi/kg	8.26E+01 pCi/kg		2.71E+02	3.38E+02	
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Ruthenium-103	< MDC	1.52E+00 pCi/kg	9.55E+00 pCi/kg		5.47E+00	5.51E+00	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Ruthenium-106	< MDC	-2.16E+01 pCi/kg	8.04E+01 pCi/kg		5.18E+01	5.28E+01	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Zinc-65	< MDC	1.00E+00 pCi/kg	2.24E+01 pCi/kg		1.29E+01	1.29E+01	U
SA-FPV-2F9(485865008) - Corn	24-Jul-19	Zirconium-95	< MDC	9.98E-01 pCi/kg	1.69E+01 pCi/kg		1.02E+01	1.02E+01	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Barium-140	< MDC	9.05E+00 pCi/kg	4.01E+01 pCi/kg		2.30E+01	2.34E+01	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Beryllium-7	< MDC	2.10E+01 pCi/kg	6.59E+01 pCi/kg		3.67E+01	3.80E+01	U



Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Vegetables (Cont.)</b>									
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Cerium-141	< MDC	-2.55E+00 pCi/kg	1.12E+01 pCi/kg		6.58E+00	6.68E+00	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Cerium-144	< MDC	-1.29E+01 pCi/kg	4.00E+01 pCi/kg		2.38E+01	2.45E+01	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Cesium-134	< MDC	2.39E+00 pCi/kg	9.58E+00 pCi/kg	6.00E+01 pCi/kg	5.19E+00	5.31E+00	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Cesium-137	< MDC	1.59E+00 pCi/kg	8.17E+00 pCi/kg	8.00E+01 pCi/kg	4.74E+00	4.80E+00	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Chromium-51	< MDC	1.28E+01 pCi/kg	5.47E+01 pCi/kg		3.18E+01	3.24E+01	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Cobalt-58	< MDC	-3.62E+00 pCi/kg	6.34E+00 pCi/kg		4.31E+00	4.62E+00	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Cobalt-60	< MDC	2.33E+00 pCi/kg	8.56E+00 pCi/kg		4.57E+00	4.69E+00	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Iodine-131	< MDC	-1.70E+00 pCi/kg	1.20E+01 pCi/kg	6.00E+01 pCi/kg	7.30E+00	7.34E+00	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Iron-59	< MDC	1.03E+01 pCi/kg	2.05E+01 pCi/kg		1.04E+01	1.14E+01	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Lanthanum-140	< MDC	6.44E-01 pCi/kg	9.29E+00 pCi/kg		5.37E+00	5.38E+00	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Manganese-54	< MDC	2.66E+00 pCi/kg	9.57E+00 pCi/kg		5.20E+00	5.34E+00	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Niobium-95	< MDC	-5.08E+00 pCi/kg	6.01E+00 pCi/kg		4.91E+00	5.43E+00	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Potassium-40	2.25E+03 pCi/kg	2.25E+03 pCi/kg	7.29E+01 pCi/kg		2.35E+02	3.04E+02	
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Ruthenium-103	< MDC	-3.57E+00 pCi/kg	6.53E+00 pCi/kg		5.14E+00	5.40E+00	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Ruthenium-106	< MDC	-5.82E+00 pCi/kg	6.45E+01 pCi/kg		4.04E+01	4.04E+01	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Zinc-65	< MDC	1.22E+01 pCi/kg	2.24E+01 pCi/kg		1.14E+01	1.27E+01	U
SA-FPV-2F9(485865007) - Tomato	24-Jul-19	Zirconium-95	< MDC	-9.32E+00 pCi/kg	9.52E+00 pCi/kg		8.04E+00	9.11E+00	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Barium-140	< MDC	-3.20E+00 pCi/kg	5.46E+01 pCi/kg		3.38E+01	3.38E+01	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Beryllium-7	< MDC	-2.39E+00 pCi/kg	1.03E+02 pCi/kg		6.28E+01	6.28E+01	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Cerium-141	< MDC	-1.83E+01 pCi/kg	1.91E+01 pCi/kg		1.30E+01	1.55E+01	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Cerium-144	< MDC	1.05E+01 pCi/kg	6.82E+01 pCi/kg		4.19E+01	4.22E+01	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Cesium-134	< MDC	-3.51E+00 pCi/kg	1.52E+01 pCi/kg	6.00E+01 pCi/kg	9.27E+00	9.41E+00	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Cesium-137	< MDC	3.12E+00 pCi/kg	1.40E+01 pCi/kg	8.00E+01 pCi/kg	8.17E+00	8.30E+00	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Chromium-51	< MDC	6.74E+00 pCi/kg	1.20E+02 pCi/kg		7.00E+01	7.01E+01	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Cobalt-58	< MDC	9.71E+00 pCi/kg	1.59E+01 pCi/kg		8.68E+00	9.76E+00	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Cobalt-60	< MDC	5.86E-01 pCi/kg	1.22E+01 pCi/kg		7.21E+00	7.22E+00	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Iodine-131	< MDC	-1.17E+00 pCi/kg	2.31E+01 pCi/kg	6.00E+01 pCi/kg	1.39E+01	1.39E+01	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Iron-59	< MDC	9.96E+00 pCi/kg	3.09E+01 pCi/kg		2.08E+01	2.13E+01	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Lanthanum-140	< MDC	-5.83E+00 pCi/kg	1.08E+01 pCi/kg		9.18E+00	9.56E+00	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Manganese-54	< MDC	9.53E+00 pCi/kg	1.59E+01 pCi/kg		8.04E+00	9.16E+00	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Niobium-95	< MDC	-2.52E+00 pCi/kg	1.29E+01 pCi/kg		7.80E+00	7.89E+00	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Potassium-40	2.64E+03 pCi/kg	2.64E+03 pCi/kg	1.11E+02 pCi/kg		3.32E+02	4.19E+02	
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Ruthenium-103	< MDC	3.97E+00 pCi/kg	1.48E+01 pCi/kg		8.49E+00	8.68E+00	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Vegetables (Cont.)</b>									
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Ruthenium-106	< MDC	-5.01E+01 pCi/kg	9.95E+01 pCi/kg		6.93E+01	7.31E+01	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Zinc-65	< MDC	2.44E+00 pCi/kg	2.84E+01 pCi/kg		1.64E+01	1.65E+01	U
SA-FPV-2G2(485865006) - Corn	24-Jul-19	Zirconium-95	< MDC	4.19E+00 pCi/kg	2.66E+01 pCi/kg		1.49E+01	1.50E+01	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Barium-140	< MDC	2.67E+01 pCi/kg	5.36E+01 pCi/kg		2.80E+01	3.05E+01	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Beryllium-7	< MDC	3.44E+01 pCi/kg	9.69E+01 pCi/kg		5.32E+01	5.55E+01	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Cerium-141	< MDC	-6.30E+00 pCi/kg	1.35E+01 pCi/kg		9.01E+00	9.46E+00	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Cerium-144	< MDC	7.00E+00 pCi/kg	6.19E+01 pCi/kg		3.73E+01	3.74E+01	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Cesium-134	< MDC	1.59E+00 pCi/kg	1.30E+01 pCi/kg	6.00E+01 pCi/kg	7.28E+00	7.31E+00	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Cesium-137	< MDC	-8.84E+00 pCi/kg	8.97E+00 pCi/kg	8.00E+01 pCi/kg	7.16E+00	8.23E+00	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Chromium-51	< MDC	1.56E+01 pCi/kg	9.46E+01 pCi/kg		5.34E+01	5.38E+01	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Cobalt-58	< MDC	2.06E+00 pCi/kg	1.12E+01 pCi/kg		6.17E+00	6.24E+00	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Cobalt-60	< MDC	-6.25E+00 pCi/kg	1.19E+01 pCi/kg		8.55E+00	9.02E+00	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Iodine-131	< MDC	3.16E+00 pCi/kg	1.80E+01 pCi/kg	6.00E+01 pCi/kg	1.02E+01	1.03E+01	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Iron-59	< MDC	2.98E+00 pCi/kg	2.52E+01 pCi/kg		1.44E+01	1.45E+01	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Lanthanum-140	< MDC	5.48E+00 pCi/kg	1.73E+01 pCi/kg		8.69E+00	9.05E+00	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Manganese-54	< MDC	4.75E-01 pCi/kg	1.06E+01 pCi/kg		6.09E+00	6.09E+00	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Niobium-95	< MDC	5.41E+00 pCi/kg	1.26E+01 pCi/kg		7.14E+00	7.56E+00	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Potassium-40	1.57E+03 pCi/kg	1.57E+03 pCi/kg	4.25E+01 pCi/kg		2.52E+02	2.91E+02	
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Ruthenium-103	< MDC	1.26E-01 pCi/kg	1.12E+01 pCi/kg		6.67E+00	6.67E+00	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Ruthenium-106	< MDC	8.46E+01 pCi/kg	8.94E+01 pCi/kg		1.00E+02	1.01E+02	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Zinc-65	< MDC	-2.87E+00 pCi/kg	2.42E+01 pCi/kg		1.49E+01	1.50E+01	U
SA-FPV-2G2(485865005) - Peppers	24-Jul-19	Zirconium-95	< MDC	5.64E+00 pCi/kg	1.89E+01 pCi/kg		9.95E+00	1.03E+01	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Barium-140	< MDC	7.15E+00 pCi/kg	4.37E+01 pCi/kg		2.54E+01	2.56E+01	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Beryllium-7	< MDC	9.61E+00 pCi/kg	6.66E+01 pCi/kg		3.84E+01	3.87E+01	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Cerium-141	< MDC	3.24E+00 pCi/kg	9.12E+00 pCi/kg		1.16E+01	1.16E+01	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Cerium-144	< MDC	-2.06E+00 pCi/kg	3.66E+01 pCi/kg		2.28E+01	2.28E+01	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Cesium-134	< MDC	1.81E+00 pCi/kg	1.18E+01 pCi/kg	6.00E+01 pCi/kg	6.60E+00	6.65E+00	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Cesium-137	< MDC	-5.27E-01 pCi/kg	9.22E+00 pCi/kg	8.00E+01 pCi/kg	5.79E+00	5.79E+00	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Chromium-51	< MDC	-2.48E+01 pCi/kg	5.84E+01 pCi/kg		3.75E+01	3.92E+01	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Cobalt-58	< MDC	-7.05E-01 pCi/kg	8.10E+00 pCi/kg		4.86E+00	4.87E+00	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Cobalt-60	< MDC	1.42E+00 pCi/kg	1.16E+01 pCi/kg		6.68E+00	6.72E+00	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Iodine-131	< MDC	1.44E+00 pCi/kg	1.19E+01 pCi/kg	6.00E+01 pCi/kg	6.83E+00	6.86E+00	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Vegetables (Cont.)</b>									
SA-FPV-2G2(479513002) - Tomato	16-May-19	Iron-59	< MDC	-6.58E+00 pCi/kg	1.99E+01 pCi/kg		1.32E+01	1.36E+01	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Lanthanum-140	< MDC	2.06E+00 pCi/kg	1.44E+01 pCi/kg		7.76E+00	7.81E+00	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Manganese-54	< MDC	-2.06E+00 pCi/kg	8.78E+00 pCi/kg		5.50E+00	5.58E+00	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Niobium-95	< MDC	1.16E+00 pCi/kg	1.06E+01 pCi/kg		5.96E+00	5.99E+00	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Potassium-40	<b>1.42E+03 pCi/kg</b>	1.42E+03 pCi/kg	9.93E+01 pCi/kg		2.39E+02	2.71E+02	
SA-FPV-2G2(479513002) - Tomato	16-May-19	Ruthenium-103	< MDC	-2.63E+00 pCi/kg	8.43E+00 pCi/kg		5.49E+00	5.63E+00	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Ruthenium-106	< MDC	9.31E+00 pCi/kg	9.45E+01 pCi/kg		5.65E+01	5.67E+01	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Zinc-65	< MDC	-2.00E+00 pCi/kg	2.34E+01 pCi/kg		1.44E+01	1.44E+01	U
SA-FPV-2G2(479513002) - Tomato	16-May-19	Zirconium-95	< MDC	-3.16E+00 pCi/kg	1.87E+01 pCi/kg		1.13E+01	1.14E+01	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Barium-140	< MDC	6.35E+00 pCi/kg	6.96E+01 pCi/kg		4.13E+01	4.14E+01	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Beryllium-7	<b>1.05E+02 pCi/kg</b>	1.05E+02 pCi/kg	7.52E+01 pCi/kg		7.91E+01	7.96E+01	
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Cerium-141	< MDC	-7.07E+00 pCi/kg	1.52E+01 pCi/kg		1.03E+01	1.08E+01	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Cerium-144	< MDC	-1.54E+01 pCi/kg	5.84E+01 pCi/kg		3.81E+01	3.87E+01	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Cesium-134	< MDC	-1.05E-01 pCi/kg	1.76E+01 pCi/kg	6.00E+01 pCi/kg	1.02E+01	1.02E+01	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Cesium-137	< MDC	5.86E+00 pCi/kg	1.68E+01 pCi/kg	8.00E+01 pCi/kg	9.40E+00	9.78E+00	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Chromium-51	< MDC	6.79E+01 pCi/kg	1.20E+02 pCi/kg		6.31E+01	7.03E+01	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Cobalt-58	< MDC	1.02E+00 pCi/kg	1.25E+01 pCi/kg		7.07E+00	7.09E+00	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Cobalt-60	< MDC	1.75E+00 pCi/kg	1.60E+01 pCi/kg		9.23E+00	9.26E+00	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Iodine-131	< MDC	-1.07E+01 pCi/kg	1.59E+01 pCi/kg	6.00E+01 pCi/kg	1.09E+01	1.19E+01	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Iron-59	< MDC	-5.95E+00 pCi/kg	2.76E+01 pCi/kg		1.77E+01	1.79E+01	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Lanthanum-140	< MDC	-2.07E+00 pCi/kg	1.64E+01 pCi/kg		1.09E+01	1.09E+01	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Manganese-54	< MDC	1.37E-01 pCi/kg	1.53E+01 pCi/kg		8.87E+00	8.87E+00	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Niobium-95	< MDC	-5.21E+00 pCi/kg	1.13E+01 pCi/kg		7.52E+00	7.89E+00	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Potassium-40	<b>2.18E+03 pCi/kg</b>	2.18E+03 pCi/kg	1.13E+02 pCi/kg		3.41E+02	3.87E+02	
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Ruthenium-103	< MDC	1.00E+00 pCi/kg	1.26E+01 pCi/kg		7.44E+00	7.46E+00	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Ruthenium-106	< MDC	2.42E+01 pCi/kg	1.42E+02 pCi/kg		8.33E+01	8.41E+01	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Zinc-65	< MDC	1.06E+00 pCi/kg	3.01E+01 pCi/kg		1.77E+01	1.77E+01	U
SA-FPV-3H5(479513003) - Asparagus	16-May-19	Zirconium-95	< MDC	-6.92E+00 pCi/kg	2.48E+01 pCi/kg		1.58E+01	1.61E+01	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Barium-140	< MDC	7.10E+00 pCi/kg	4.54E+01 pCi/kg		2.56E+01	2.58E+01	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Beryllium-7	< MDC	5.32E+00 pCi/kg	8.57E+01 pCi/kg		4.95E+01	4.95E+01	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Cerium-141	< MDC	3.78E+00 pCi/kg	1.49E+01 pCi/kg		9.32E+00	9.48E+00	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Cerium-144	< MDC	-8.73E+00 pCi/kg	4.92E+01 pCi/kg		3.08E+01	3.10E+01	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propogated Uncertainty)	Qualifier
<b>Vegetables (Cont.)</b>									
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Cesium-134	< MDC	4.91E-02 pCi/kg	1.12E+01 pCi/kg	6.00E+01 pCi/kg	6.76E+00	6.76E+00	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Cesium-137	< MDC	1.32E+00 pCi/kg	1.07E+01 pCi/kg	8.00E+01 pCi/kg	6.15E+00	6.18E+00	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Chromium-51	< MDC	2.65E+01 pCi/kg	9.53E+01 pCi/kg		5.19E+01	5.33E+01	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Cobalt-58	< MDC	4.41E+00 pCi/kg	1.15E+01 pCi/kg		6.19E+00	6.51E+00	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Cobalt-60	< MDC	-2.79E+00 pCi/kg	9.56E+00 pCi/kg		6.31E+00	6.44E+00	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Iodine-131	< MDC	-9.11E-01 pCi/kg	1.62E+01 pCi/kg	6.00E+01 pCi/kg	9.45E+00	9.46E+00	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Iron-59	< MDC	-1.91E+00 pCi/kg	2.24E+01 pCi/kg		1.33E+01	1.33E+01	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Lanthanum-140	< MDC	3.34E+00 pCi/kg	1.43E+01 pCi/kg		7.26E+00	7.42E+00	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Manganese-54	< MDC	3.38E+00 pCi/kg	9.95E+00 pCi/kg		5.37E+00	5.59E+00	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Niobium-95	< MDC	1.25E-01 pCi/kg	1.25E+01 pCi/kg		8.19E+00	8.19E+00	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Potassium-40	2.54E+03 pCi/kg	2.54E+03 pCi/kg	1.02E+02 pCi/kg		2.95E+02	3.95E+02	
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Ruthenium-103	< MDC	-1.75E+00 pCi/kg	9.33E+00 pCi/kg		5.73E+00	5.79E+00	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Ruthenium-106	< MDC	-2.03E+01 pCi/kg	8.94E+01 pCi/kg		5.63E+01	5.71E+01	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Zinc-65	< MDC	1.15E+01 pCi/kg	2.52E+01 pCi/kg		3.52E+01	3.52E+01	U
SA-FPV-3H5(485871004) - Corn	24-Jul-19	Zirconium-95	< MDC	-7.11E+00 pCi/kg	1.68E+01 pCi/kg		1.15E+01	1.19E+01	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Barium-140	< MDC	1.52E+01 pCi/kg	4.71E+01 pCi/kg		2.64E+01	2.73E+01	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Beryllium-7	6.27E+01 pCi/kg	6.27E+01 pCi/kg	6.27E+01 pCi/kg		1.09E+02	1.09E+02	
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Cerium-141	< MDC	-8.24E+00 pCi/kg	1.27E+01 pCi/kg		8.50E+00	9.30E+00	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Cerium-144	< MDC	1.97E+00 pCi/kg	5.01E+01 pCi/kg		2.86E+01	2.86E+01	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Cesium-134	< MDC	1.75E+00 pCi/kg	8.61E+00 pCi/kg	6.00E+01 pCi/kg	4.94E+00	5.01E+00	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Cesium-137	< MDC	1.39E+00 pCi/kg	7.74E+00 pCi/kg	8.00E+01 pCi/kg	4.46E+00	4.51E+00	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Chromium-51	< MDC	-4.09E+00 pCi/kg	8.20E+01 pCi/kg		4.89E+01	4.89E+01	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Cobalt-58	< MDC	2.14E-01 pCi/kg	7.47E+00 pCi/kg		4.57E+00	4.57E+00	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Cobalt-60	< MDC	-6.57E-01 pCi/kg	8.76E+00 pCi/kg		5.34E+00	5.35E+00	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Iodine-131	< MDC	1.10E+00 pCi/kg	1.54E+01 pCi/kg	6.00E+01 pCi/kg	9.03E+00	9.04E+00	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Iron-59	< MDC	-7.59E+00 pCi/kg	2.07E+01 pCi/kg		1.33E+01	1.37E+01	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Lanthanum-140	< MDC	-7.36E+00 pCi/kg	5.59E+00 pCi/kg		6.77E+00	7.57E+00	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Manganese-54	< MDC	6.58E-01 pCi/kg	8.88E+00 pCi/kg		5.65E+00	5.66E+00	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Niobium-95	< MDC	3.33E+00 pCi/kg	9.98E+00 pCi/kg		5.59E+00	5.80E+00	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Potassium-40	2.16E+03 pCi/kg	2.16E+03 pCi/kg	7.05E+01 pCi/kg		2.43E+02	3.27E+02	
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Ruthenium-103	< MDC	-2.02E+00 pCi/kg	7.43E+00 pCi/kg		4.79E+00	4.88E+00	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Ruthenium-106	< MDC	-1.78E+01 pCi/kg	5.98E+01 pCi/kg		3.98E+01	4.07E+01	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Zinc-65	< MDC	-4.28E+00 pCi/kg	2.09E+01 pCi/kg		1.29E+01	1.31E+01	U
SA-FPV-3H5(485871003) - Peach	24-Jul-19	Zirconium-95	< MDC	-5.54E-04 pCi/kg	1.26E+01 pCi/kg		7.76E+00	7.76E+00	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Vegetables (Cont.)</b>									
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Barium-140	< MDC	1.38E+01 pCi/kg	3.92E+01 pCi/kg		2.12E+01	2.21E+01	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Beryllium-7	< MDC	-7.36E+00 pCi/kg	5.23E+01 pCi/kg		3.19E+01	3.21E+01	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Cerium-141	< MDC	1.04E+00 pCi/kg	1.01E+01 pCi/kg		6.75E+00	6.77E+00	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Cerium-144	< MDC	-1.59E-01 pCi/kg	3.90E+01 pCi/kg		2.38E+01	2.38E+01	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Cesium-134	< MDC	1.45E+00 pCi/kg	9.11E+00 pCi/kg	6.00E+01 pCi/kg	5.28E+00	5.33E+00	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Cesium-137	< MDC	2.78E-01 pCi/kg	7.26E+00 pCi/kg	8.00E+01 pCi/kg	4.31E+00	4.31E+00	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Chromium-51	< MDC	1.80E+01 pCi/kg	5.76E+01 pCi/kg		3.09E+01	3.20E+01	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Cobalt-58	< MDC	8.83E-01 pCi/kg	7.49E+00 pCi/kg		4.38E+00	4.40E+00	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Cobalt-60	< MDC	-1.85E+00 pCi/kg	8.83E+00 pCi/kg		5.58E+00	5.64E+00	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Iodine-131	< MDC	-9.61E+00 pCi/kg	1.05E+01 pCi/kg	6.00E+01 pCi/kg	7.36E+00	8.57E+00	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Iron-59	< MDC	1.28E+00 pCi/kg	1.56E+01 pCi/kg		8.75E+00	8.77E+00	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Lanthanum-140	< MDC	-3.27E+00 pCi/kg	1.11E+01 pCi/kg		7.65E+00	7.79E+00	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Manganese-54	< MDC	3.64E+00 pCi/kg	7.79E+00 pCi/kg		4.03E+00	4.37E+00	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Niobium-95	< MDC	1.33E+00 pCi/kg	7.91E+00 pCi/kg		4.56E+00	4.60E+00	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Potassium-40	2.49E+03 pCi/kg	2.49E+03 pCi/kg	6.43E+01 pCi/kg		2.49E+02	3.49E+02	
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Ruthenium-103	< MDC	1.68E+00 pCi/kg	7.15E+00 pCi/kg		3.97E+00	4.04E+00	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Ruthenium-106	< MDC	1.68E+01 pCi/kg	6.57E+01 pCi/kg		3.65E+01	3.73E+01	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Zinc-65	< MDC	2.89E+00 pCi/kg	1.76E+01 pCi/kg		9.70E+00	9.79E+00	U
SA-FPV-3H5(485871002) - Tomato	24-Jul-19	Zirconium-95	< MDC	-2.16E-01 pCi/kg	1.23E+01 pCi/kg		7.48E+00	7.48E+00	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Barium-140	< MDC	-3.48E+00 pCi/kg	2.84E+01 pCi/kg		1.74E+01	1.74E+01	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Beryllium-7	< MDC	5.00E+00 pCi/kg	5.36E+01 pCi/kg		3.08E+01	3.09E+01	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Cerium-141	< MDC	-1.29E+00 pCi/kg	8.91E+00 pCi/kg		5.52E+00	5.55E+00	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Cerium-144	< MDC	1.11E+00 pCi/kg	3.21E+01 pCi/kg		1.92E+01	1.92E+01	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Cesium-134	< MDC	3.18E+00 pCi/kg	7.09E+00 pCi/kg	6.00E+01 pCi/kg	4.02E+00	4.27E+00	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Cesium-137	< MDC	7.78E-02 pCi/kg	6.44E+00 pCi/kg	8.00E+01 pCi/kg	3.86E+00	3.86E+00	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Chromium-51	< MDC	1.28E+01 pCi/kg	5.80E+01 pCi/kg		3.19E+01	3.25E+01	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Cobalt-58	< MDC	1.96E+00 pCi/kg	6.36E+00 pCi/kg		3.50E+00	3.61E+00	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Cobalt-60	< MDC	-4.97E-01 pCi/kg	6.05E+00 pCi/kg		4.25E+00	4.26E+00	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Iodine-131	< MDC	-2.70E+00 pCi/kg	1.02E+01 pCi/kg	6.00E+01 pCi/kg	6.19E+00	6.31E+00	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Iron-59	< MDC	6.64E+00 pCi/kg	1.77E+01 pCi/kg		9.31E+00	9.81E+00	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Lanthanum-140	< MDC	-5.13E-01 pCi/kg	9.76E+00 pCi/kg		6.01E+00	6.02E+00	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Manganese-54	< MDC	1.61E-01 pCi/kg	5.56E+00 pCi/kg		3.37E+00	3.37E+00	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Niobium-95	< MDC	2.47E-01 pCi/kg	7.18E+00 pCi/kg		4.45E+00	4.45E+00	U



Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propogated Uncertainty)	Qualifier
<b>Vegetables (Cont.)</b>									
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Potassium-40	<b>1.60E+03 pCi/kg</b>	1.60E+03 pCi/kg	7.39E+01 pCi/kg		1.97E+02	2.54E+02	
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Ruthenium-103	< MDC	1.58E+00 pCi/kg	6.43E+00 pCi/kg		3.57E+00	3.64E+00	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Ruthenium-106	< MDC	1.75E+01 pCi/kg	5.17E+01 pCi/kg		2.79E+01	2.90E+01	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Zinc-65	< MDC	3.12E+00 pCi/kg	1.63E+01 pCi/kg		8.96E+00	9.08E+00	U
SA-FPV-9G1(485865009) - Tomato	24-Jul-19	Zirconium-95	< MDC	-5.48E-01 pCi/kg	1.24E+01 pCi/kg		7.63E+00	7.63E+00	U
<b>Game</b>									
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Barium-140	< MDC	1.33E+01 pCi/kg	4.05E+01 pCi/kg		2.30E+01	2.38E+01	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Beryllium-7	< MDC	-1.86E+00 pCi/kg	6.20E+01 pCi/kg		3.78E+01	3.78E+01	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Cerium-141	< MDC	-2.60E+00 pCi/kg	1.07E+01 pCi/kg		6.32E+00	6.43E+00	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Cerium-144	< MDC	-3.91E-01 pCi/kg	4.34E+01 pCi/kg		2.48E+01	2.48E+01	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Cesium-134	< MDC	8.68E-01 pCi/kg	8.12E+00 pCi/kg	1.30E+02 pCi/kg	4.60E+00	4.62E+00	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Cesium-137	< MDC	3.14E+00 pCi/kg	8.12E+00 pCi/kg	1.50E+02 pCi/kg	5.03E+00	5.23E+00	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Chromium-51	< MDC	1.19E+01 pCi/kg	6.99E+01 pCi/kg		4.04E+01	4.08E+01	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Cobalt-58	< MDC	-1.23E+00 pCi/kg	6.55E+00 pCi/kg	1.30E+02 pCi/kg	4.00E+00	4.04E+00	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Cobalt-60	<b>1.04E+01 pCi/kg</b>	1.04E+01 pCi/kg	1.04E+01 pCi/kg	1.30E+02 pCi/kg	8.03E+00	9.66E+00	
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Iodine-131	< MDC	-2.09E+00 pCi/kg	1.39E+01 pCi/kg		8.50E+00	8.56E+00	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Iron-59	< MDC	-5.99E+00 pCi/kg	1.52E+01 pCi/kg	2.60E+02 pCi/kg	1.17E+01	1.20E+01	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Lanthanum-140	< MDC	3.15E+00 pCi/kg	1.28E+01 pCi/kg		6.96E+00	7.11E+00	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Manganese-54	< MDC	4.07E+00 pCi/kg	9.19E+00 pCi/kg	1.30E+02 pCi/kg	4.89E+00	5.24E+00	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Niobium-95	< MDC	1.42E+00 pCi/kg	8.73E+00 pCi/kg		4.90E+00	4.94E+00	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Potassium-40	<b>2.73E+03 pCi/kg</b>	2.73E+03 pCi/kg	7.23E+01 pCi/kg		2.47E+02	3.60E+02	
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Ruthenium-103	< MDC	-3.08E+00 pCi/kg	6.97E+00 pCi/kg		4.62E+00	4.83E+00	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Ruthenium-106	< MDC	1.22E+01 pCi/kg	6.72E+01 pCi/kg		3.96E+01	4.00E+01	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Zinc-65	< MDC	-5.30E+00 pCi/kg	1.76E+01 pCi/kg	2.60E+02 pCi/kg	1.30E+01	1.32E+01	U
SA-GAM-5C1(472313001) - Muskrat	22-Feb-19	Zirconium-95	< MDC	-4.62E+00 pCi/kg	1.34E+01 pCi/kg		8.33E+00	8.60E+00	U
<b>Milk</b>									
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Barium-140	< MDC	-2.68E+00 pCi/L	6.84E+00 pCi/L	1.50E+01 pCi/L	4.15E+00	4.33E+00	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Beryllium-7	< MDC	-1.23E-01 pCi/L	1.30E+01 pCi/L		7.54E+00	7.55E+00	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Cerium-141	< MDC	-2.91E+00 pCi/L	2.78E+00 pCi/L		2.41E+00	2.75E+00	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Cerium-144	< MDC	-7.59E+00 pCi/L	1.06E+01 pCi/L		8.93E+00	9.59E+00	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Cesium-134	< MDC	-3.89E-01 pCi/L	1.56E+00 pCi/L	1.50E+01 pCi/L	9.60E-01	9.76E-01	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Cesium-137	< MDC	2.45E-01 pCi/L	1.59E+00 pCi/L	1.80E+01 pCi/L	9.24E-01	9.31E-01	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Milk (Cont.)</b>									
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Chromium-51	< MDC	1.15E+00 pCi/L	1.43E+01 pCi/L		8.51E+00	8.52E+00	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Cobalt-58	< MDC	-3.46E-01 pCi/L	1.42E+00 pCi/L		8.74E-01	8.88E-01	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Cobalt-60	< MDC	8.52E-01 pCi/L	1.74E+00 pCi/L		1.00E+00	1.08E+00	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Iodine-131	< MDC	3.88E-02 pCi/L	5.25E-01 pCi/L	1.00E+00 pCi/L	3.04E-01	3.05E-01	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Iodine-131	< MDC	1.24E+00 pCi/L	2.65E+00 pCi/L		1.47E+00	1.58E+00	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Iron-59	< MDC	-4.50E-01 pCi/L	3.41E+00 pCi/L		2.11E+00	2.12E+00	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Lanthanum-140	< MDC	1.27E+00 pCi/L	2.22E+00 pCi/L	1.50E+01 pCi/L	1.17E+00	1.30E+00	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Manganese-54	< MDC	-4.34E-01 pCi/L	1.37E+00 pCi/L		9.64E-01	9.84E-01	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Niobium-95	< MDC	5.95E-01 pCi/L	1.47E+00 pCi/L		2.61E+00	2.61E+00	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Potassium-40	1.63E+03 pCi/L	1.63E+03 pCi/L	1.43E+01 pCi/L		5.90E+01	1.65E+02	
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Ruthenium-103	< MDC	-1.12E+00 pCi/L	1.49E+00 pCi/L		9.25E-01	1.06E+00	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Ruthenium-106	< MDC	7.01E+00 pCi/L	1.38E+01 pCi/L		7.75E+00	8.40E+00	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Zinc-65	< MDC	-1.48E+00 pCi/L	3.73E+00 pCi/L		2.38E+00	2.48E+00	U
SA-MLK-14F4(468715001) - Milk	8-Jan-19	Zirconium-95	< MDC	-6.69E-01 pCi/L	2.71E+00 pCi/L		1.66E+00	1.69E+00	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Barium-140	< MDC	-2.20E-01 pCi/L	9.98E+00 pCi/L	1.50E+01 pCi/L	5.98E+00	5.98E+00	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Beryllium-7	< MDC	-8.07E-02 pCi/L	1.55E+01 pCi/L		9.20E+00	9.20E+00	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Cerium-141	< MDC	2.77E-01 pCi/L	3.69E+00 pCi/L		2.11E+00	2.11E+00	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Cerium-144	< MDC	-3.64E+00 pCi/L	1.37E+01 pCi/L		1.01E+01	1.02E+01	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Cesium-134	< MDC	3.77E-01 pCi/L	2.10E+00 pCi/L	1.50E+01 pCi/L	1.25E+00	1.26E+00	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Cesium-137	< MDC	3.65E-01 pCi/L	2.16E+00 pCi/L	1.80E+01 pCi/L	1.28E+00	1.29E+00	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Chromium-51	< MDC	-6.76E+00 pCi/L	1.75E+01 pCi/L		1.06E+01	1.10E+01	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Cobalt-58	< MDC	1.02E-01 pCi/L	1.74E+00 pCi/L		1.05E+00	1.05E+00	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Cobalt-60	< MDC	1.37E+00 pCi/L	2.44E+00 pCi/L		1.31E+00	1.45E+00	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Iodine-131	< MDC	2.50E-02 pCi/L	7.78E-01 pCi/L	1.00E+00 pCi/L	4.62E-01	4.62E-01	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Iodine-131	< MDC	1.04E+00 pCi/L	3.56E+00 pCi/L		2.05E+00	2.10E+00	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Iron-59	< MDC	-1.99E-01 pCi/L	4.72E+00 pCi/L		2.73E+00	2.74E+00	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Lanthanum-140	< MDC	-8.48E-01 pCi/L	2.58E+00 pCi/L	1.50E+01 pCi/L	1.63E+00	1.67E+00	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Manganese-54	< MDC	4.29E-02 pCi/L	1.86E+00 pCi/L		1.13E+00	1.13E+00	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Niobium-95	< MDC	3.95E-01 pCi/L	2.13E+00 pCi/L		1.27E+00	1.28E+00	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Potassium-40	1.34E+03 pCi/L	1.34E+03 pCi/L	1.91E+01 pCi/L		6.79E+01	1.47E+02	
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Ruthenium-103	< MDC	-6.52E-01 pCi/L	2.03E+00 pCi/L		1.24E+00	1.28E+00	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Ruthenium-106	< MDC	8.74E+00 pCi/L	1.72E+01 pCi/L		9.77E+00	1.06E+01	U
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Zinc-65	< MDC	-1.25E+00 pCi/L	4.49E+00 pCi/L		2.67E+00	2.73E+00	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Milk (Cont.)</b>									
SA-MLK-14F4(470902001) - Milk	5-Feb-19	Zirconium-95	< MDC	1.77E+00 pCi/L	3.64E+00 pCi/L		2.08E+00	2.23E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Barium-140	< MDC	-6.57E+00 pCi/L	9.57E+00 pCi/L	1.50E+01 pCi/L	6.22E+00	6.91E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Beryllium-7	< MDC	1.25E+01 pCi/L	1.59E+01 pCi/L		8.87E+00	1.06E+01	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Cerium-141	< MDC	4.49E-01 pCi/L	2.75E+00 pCi/L		1.85E+00	1.86E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Cerium-144	< MDC	-1.43E+00 pCi/L	9.69E+00 pCi/L		6.09E+00	6.13E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Cesium-134	< MDC	5.93E-01 pCi/L	2.20E+00 pCi/L	1.50E+01 pCi/L	1.25E+00	1.28E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Cesium-137	< MDC	6.26E-01 pCi/L	1.97E+00 pCi/L	1.80E+01 pCi/L	1.17E+00	1.20E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Chromium-51	< MDC	-4.70E+00 pCi/L	1.57E+01 pCi/L		9.43E+00	9.67E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Cobalt-58	< MDC	4.34E-01 pCi/L	2.03E+00 pCi/L		1.15E+00	1.17E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Cobalt-60	< MDC	-3.77E-01 pCi/L	2.12E+00 pCi/L		1.31E+00	1.32E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Iodine-131	< MDC	1.55E-01 pCi/L	5.33E-01 pCi/L	1.00E+00 pCi/L	3.08E-01	3.16E-01	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Iodine-131	< MDC	-1.78E+00 pCi/L	3.79E+00 pCi/L		2.33E+00	2.47E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Iron-59	< MDC	-2.00E+00 pCi/L	4.26E+00 pCi/L		2.67E+00	2.82E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Lanthanum-140	< MDC	1.04E+00 pCi/L	3.11E+00 pCi/L	1.50E+01 pCi/L	1.77E+00	1.84E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Manganese-54	< MDC	1.13E-02 pCi/L	1.77E+00 pCi/L		1.03E+00	1.03E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Niobium-95	< MDC	6.21E-01 pCi/L	2.07E+00 pCi/L		1.17E+00	1.20E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Potassium-40	1.32E+03 pCi/L	1.32E+03 pCi/L	1.67E+01 pCi/L		6.30E+01	1.29E+02	
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Ruthenium-103	< MDC	-8.51E-01 pCi/L	1.82E+00 pCi/L		1.14E+00	1.21E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Ruthenium-106	< MDC	7.17E+00 pCi/L	1.62E+01 pCi/L		9.47E+00	1.00E+01	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Zinc-65	< MDC	1.53E+00 pCi/L	4.56E+00 pCi/L		2.61E+00	2.70E+00	U
SA-MLK-14F4(473110001) - Milk	5-Mar-19	Zirconium-95	< MDC	1.28E+00 pCi/L	3.56E+00 pCi/L		1.99E+00	2.07E+00	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Barium-140	< MDC	9.04E-01 pCi/L	6.90E+00 pCi/L	1.50E+01 pCi/L	3.99E+00	4.02E+00	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Beryllium-7	< MDC	-3.39E+00 pCi/L	1.12E+01 pCi/L		6.70E+00	6.87E+00	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Cerium-141	< MDC	-9.65E-01 pCi/L	2.43E+00 pCi/L		2.35E+00	2.39E+00	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Cerium-144	< MDC	2.97E+00 pCi/L	8.83E+00 pCi/L		5.24E+00	5.41E+00	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Cesium-134	< MDC	-4.72E-01 pCi/L	1.39E+00 pCi/L	1.50E+01 pCi/L	8.67E-01	8.93E-01	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Cesium-137	< MDC	7.08E-01 pCi/L	1.44E+00 pCi/L	1.80E+01 pCi/L	8.15E-01	8.77E-01	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Chromium-51	< MDC	4.01E+00 pCi/L	1.31E+01 pCi/L		7.30E+00	7.53E+00	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Cobalt-58	< MDC	-5.27E-01 pCi/L	1.29E+00 pCi/L		8.13E-01	8.48E-01	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Cobalt-60	< MDC	1.36E-01 pCi/L	1.54E+00 pCi/L		8.82E-01	8.84E-01	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Iodine-131	< MDC	2.28E-03 pCi/L	4.59E-01 pCi/L	1.00E+00 pCi/L	3.05E-01	3.05E-01	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Iodine-131	< MDC	1.12E+00 pCi/L	2.92E+00 pCi/L		1.80E+00	1.87E+00	U



Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Milk (Cont.)</b>									
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Iron-59	< MDC	-3.80E-01 pCi/L	3.34E+00 pCi/L	1.50E+01 pCi/L	2.08E+00	2.09E+00	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Lanthanum-140	< MDC	7.13E-01 pCi/L	2.22E+00 pCi/L		1.23E+00	1.27E+00	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Manganese-54	< MDC	-1.54E-01 pCi/L	1.32E+00 pCi/L		8.08E-01	8.11E-01	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Niobium-95	< MDC	5.87E-01 pCi/L	1.40E+00 pCi/L		1.11E+00	1.11E+00	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Potassium-40	<b>1.47E+03 pCi/L</b>	1.47E+03 pCi/L	1.34E+01 pCi/L		5.19E+01	1.41E+02	
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Ruthenium-103	< MDC	-8.69E-01 pCi/L	1.26E+00 pCi/L		7.83E-01	8.78E-01	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Ruthenium-106	< MDC	5.31E-01 pCi/L	1.21E+01 pCi/L		7.10E+00	7.11E+00	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Zinc-65	< MDC	7.84E-01 pCi/L	3.30E+00 pCi/L		1.98E+00	2.01E+00	U
SA-MLK-14F4(476333001) - Milk	8-Apr-19	Zirconium-95	< MDC	-4.28E-01 pCi/L	2.36E+00 pCi/L		1.44E+00	1.46E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Barium-140	< MDC	-2.50E-01 pCi/L	9.66E+00 pCi/L	1.50E+01 pCi/L	5.88E+00	5.88E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Beryllium-7	< MDC	8.35E+00 pCi/L	1.56E+01 pCi/L	1.50E+01 pCi/L	8.96E+00	9.75E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Cerium-141	< MDC	6.68E-01 pCi/L	2.63E+00 pCi/L		1.76E+00	1.78E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Cerium-144	< MDC	2.12E-01 pCi/L	9.86E+00 pCi/L		6.14E+00	6.14E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Cesium-134	< MDC	2.39E-01 pCi/L	1.87E+00 pCi/L		1.07E+00	1.08E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Cesium-137	< MDC	3.57E-01 pCi/L	1.86E+00 pCi/L		1.12E+00	1.13E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Chromium-51	< MDC	6.75E+00 pCi/L	1.65E+01 pCi/L		9.42E+00	9.92E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Cobalt-58	< MDC	-3.49E-01 pCi/L	1.89E+00 pCi/L		1.12E+00	1.13E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Cobalt-60	< MDC	2.42E-01 pCi/L	1.90E+00 pCi/L		1.12E+00	1.13E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Iodine-131	< MDC	-2.57E-01 pCi/L	5.63E-01 pCi/L		3.47E-01	3.66E-01	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Iodine-131	< MDC	1.79E+00 pCi/L	3.70E+00 pCi/L	1.00E+00 pCi/L	2.11E+00	2.26E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Iron-59	< MDC	6.17E-01 pCi/L	4.47E+00 pCi/L	1.50E+01 pCi/L	2.61E+00	2.63E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Lanthanum-140	< MDC	1.38E+00 pCi/L	3.33E+00 pCi/L		1.88E+00	1.98E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Manganese-54	< MDC	-3.20E-01 pCi/L	1.75E+00 pCi/L		1.04E+00	1.05E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Niobium-95	< MDC	1.55E+00 pCi/L	2.02E+00 pCi/L		1.08E+00	1.29E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Potassium-40	<b>1.37E+03 pCi/L</b>	1.37E+03 pCi/L	1.61E+01 pCi/L		5.89E+01	1.31E+02	
SA-MLK-14F4(478722001) - Milk	6-May-19	Ruthenium-103	< MDC	-1.72E-01 pCi/L	1.87E+00 pCi/L		1.14E+00	1.14E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Ruthenium-106	< MDC	8.68E+00 pCi/L	1.64E+01 pCi/L		9.50E+00	1.03E+01	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Zinc-65	< MDC	-2.26E-01 pCi/L	4.51E+00 pCi/L		2.70E+00	2.70E+00	U
SA-MLK-14F4(478722001) - Milk	6-May-19	Zirconium-95	< MDC	-2.73E-01 pCi/L	3.33E+00 pCi/L		1.94E+00	1.95E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Barium-140	< MDC	1.62E+00 pCi/L	8.22E+00 pCi/L	1.50E+01 pCi/L	4.77E+00	4.82E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Beryllium-7	< MDC	1.90E+00 pCi/L	1.30E+01 pCi/L	3.08E+00	7.53E+00	7.58E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Cerium-141	< MDC	2.89E-01 pCi/L	2.76E+00 pCi/L		3.08E+00	3.08E+00	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Milk (Cont.)</b>									
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Cerium-144	< MDC	-9.85E-02 pCi/L	1.02E+01 pCi/L		6.25E+00	6.25E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Cesium-134	< MDC	4.13E-01 pCi/L	1.82E+00 pCi/L	1.50E+01 pCi/L	1.07E+00	1.09E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Cesium-137	< MDC	7.12E-01 pCi/L	1.82E+00 pCi/L	1.80E+01 pCi/L	1.05E+00	1.10E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Chromium-51	< MDC	3.26E-02 pCi/L	1.45E+01 pCi/L		9.26E+00	9.26E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Cobalt-58	< MDC	1.42E-01 pCi/L	1.70E+00 pCi/L		1.02E+00	1.02E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Cobalt-60	< MDC	3.95E-01 pCi/L	2.04E+00 pCi/L		1.16E+00	1.18E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Iodine-131	< MDC	6.35E-02 pCi/L	7.41E-01 pCi/L	1.00E+00 pCi/L	4.38E-01	4.39E-01	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Iodine-131	< MDC	-1.10E-01 pCi/L	2.78E+00 pCi/L		1.80E+00	1.80E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Iron-59	< MDC	-4.54E-01 pCi/L	4.01E+00 pCi/L		2.36E+00	2.37E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Lanthanum-140	< MDC	-9.34E-01 pCi/L	2.56E+00 pCi/L	1.50E+01 pCi/L	1.64E+00	1.69E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Manganese-54	< MDC	4.12E-01 pCi/L	1.72E+00 pCi/L		1.02E+00	1.04E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Niobium-95	< MDC	9.73E-01 pCi/L	1.63E+00 pCi/L		1.18E+00	1.18E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Potassium-40	1.19E+03 pCi/L	1.19E+03 pCi/L	1.77E+01 pCi/L		5.85E+01	1.29E+02	
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Ruthenium-103	< MDC	-3.50E-01 pCi/L	1.65E+00 pCi/L		1.11E+00	1.12E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Ruthenium-106	< MDC	3.29E+00 pCi/L	1.34E+01 pCi/L		7.77E+00	7.91E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Zinc-65	< MDC	-4.32E-01 pCi/L	4.18E+00 pCi/L		2.45E+00	2.46E+00	U
SA-MLK-14F4(481057001) - Milk	3-Jun-19	Zirconium-95	< MDC	7.82E-01 pCi/L	2.82E+00 pCi/L		1.83E+00	1.86E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Barium-140	< MDC	-5.83E+00 pCi/L	7.34E+00 pCi/L	1.50E+01 pCi/L	4.88E+00	5.56E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Beryllium-7	< MDC	2.11E+00 pCi/L	1.57E+01 pCi/L		9.45E+00	9.50E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Cerium-141	< MDC	3.73E-01 pCi/L	2.99E+00 pCi/L		2.03E+00	2.03E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Cerium-144	< MDC	2.27E+00 pCi/L	1.24E+01 pCi/L		7.66E+00	7.73E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Cesium-134	< MDC	-1.26E-01 pCi/L	2.20E+00 pCi/L	1.50E+01 pCi/L	1.30E+00	1.30E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Cesium-137	< MDC	6.98E-01 pCi/L	2.04E+00 pCi/L	1.80E+01 pCi/L	1.15E+00	1.19E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Chromium-51	< MDC	-4.53E-01 pCi/L	1.69E+01 pCi/L		1.00E+01	1.00E+01	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Cobalt-58	< MDC	7.56E-01 pCi/L	2.00E+00 pCi/L		1.13E+00	1.18E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Cobalt-60	< MDC	-4.22E-01 pCi/L	2.14E+00 pCi/L		1.35E+00	1.36E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Iodine-131	< MDC	1.80E-01 pCi/L	4.58E-01 pCi/L	1.00E+00 pCi/L	2.55E-01	2.68E-01	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Iodine-131	< MDC	-1.04E+00 pCi/L	2.42E+00 pCi/L		1.50E+00	1.57E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Iron-59	< MDC	8.68E-01 pCi/L	4.73E+00 pCi/L		2.79E+00	2.82E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Lanthanum-140	< MDC	1.04E+00 pCi/L	2.59E+00 pCi/L	1.50E+01 pCi/L	1.59E+00	1.66E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Manganese-54	< MDC	-3.34E-01 pCi/L	1.83E+00 pCi/L		1.25E+00	1.26E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Niobium-95	< MDC	6.54E-01 pCi/L	2.13E+00 pCi/L		1.62E+00	1.65E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Potassium-40	1.77E+03 pCi/L	1.77E+03 pCi/L	2.04E+01 pCi/L		7.05E+01	1.99E+02	

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Milk (Cont.)</b>									
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Ruthenium-103	< MDC	1.23E-01 pCi/L	1.84E+00 pCi/L		1.25E+00	1.25E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Ruthenium-106	< MDC	5.77E-01 pCi/L	1.68E+01 pCi/L		9.66E+00	9.66E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Zinc-65	< MDC	-5.51E-01 pCi/L	5.10E+00 pCi/L		3.11E+00	3.12E+00	U
SA-MLK-14F4(484415001) - Milk	8-Jul-19	Zirconium-95	< MDC	-9.16E-01 pCi/L	3.29E+00 pCi/L		1.98E+00	2.02E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Barium-140	< MDC	1.19E+00 pCi/L	8.07E+00 pCi/L	1.50E+01 pCi/L	4.78E+00	4.82E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Beryllium-7	< MDC	-2.01E+00 pCi/L	1.36E+01 pCi/L		8.26E+00	8.31E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Cerium-141	< MDC	-3.84E+00 pCi/L	3.01E+00 pCi/L		2.66E+00	3.19E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Cerium-144	< MDC	-1.88E+00 pCi/L	1.07E+01 pCi/L		6.64E+00	6.70E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Cesium-134	< MDC	4.36E-01 pCi/L	1.74E+00 pCi/L	1.50E+01 pCi/L	9.76E-01	9.96E-01	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Cesium-137	< MDC	3.55E-02 pCi/L	1.74E+00 pCi/L	1.80E+01 pCi/L	1.07E+00	1.07E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Chromium-51	< MDC	4.18E-01 pCi/L	1.61E+01 pCi/L		9.38E+00	9.38E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Cobalt-58	< MDC	-3.68E-01 pCi/L	1.65E+00 pCi/L		9.77E-01	9.92E-01	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Cobalt-60	< MDC	-8.03E-01 pCi/L	1.77E+00 pCi/L		1.14E+00	1.20E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Iodine-131	< MDC	3.17E-01 pCi/L	5.47E-01 pCi/L	1.00E+00 pCi/L	3.01E-01	3.33E-01	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Iodine-131	< MDC	3.72E-01 pCi/L	3.23E+00 pCi/L		1.88E+00	1.88E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Iron-59	< MDC	-4.55E-02 pCi/L	3.91E+00 pCi/L		2.32E+00	2.32E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Lanthanum-140	< MDC	-4.68E-01 pCi/L	2.47E+00 pCi/L	1.50E+01 pCi/L	1.57E+00	1.59E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Manganese-54	< MDC	-1.04E+00 pCi/L	1.64E+00 pCi/L		1.98E+00	2.04E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Niobium-95	< MDC	3.72E-01 pCi/L	1.76E+00 pCi/L		9.90E-01	1.01E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Potassium-40	1.24E+03 pCi/L	1.24E+03 pCi/L	1.43E+01 pCi/L		5.64E+01	1.39E+02	
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Ruthenium-103	< MDC	2.38E-01 pCi/L	1.72E+00 pCi/L		1.14E+00	1.14E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Ruthenium-106	< MDC	-1.26E+00 pCi/L	1.45E+01 pCi/L		8.90E+00	8.92E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Zinc-65	< MDC	2.14E-01 pCi/L	4.27E+00 pCi/L		2.52E+00	2.52E+00	U
SA-MLK-14F4(487113001) - Milk	5-Aug-19	Zirconium-95	< MDC	1.14E+00 pCi/L	2.99E+00 pCi/L		1.65E+00	1.73E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Barium-140	< MDC	1.36E-01 pCi/L	9.32E+00 pCi/L	1.50E+01 pCi/L	5.63E+00	5.63E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Beryllium-7	< MDC	4.92E+00 pCi/L	1.55E+01 pCi/L		9.03E+00	9.31E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Cerium-141	< MDC	-2.19E+00 pCi/L	3.67E+00 pCi/L		3.36E+00	3.50E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Cerium-144	< MDC	-1.38E+00 pCi/L	1.25E+01 pCi/L		7.22E+00	7.25E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Cesium-134	< MDC	-3.19E-01 pCi/L	1.92E+00 pCi/L	1.50E+01 pCi/L	1.36E+00	1.37E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Cesium-137	< MDC	1.63E+00 pCi/L	1.91E+00 pCi/L	1.80E+01 pCi/L	1.17E+00	1.39E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Chromium-51	< MDC	-2.56E+00 pCi/L	1.82E+01 pCi/L		1.09E+01	1.09E+01	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Cobalt-58	< MDC	-5.93E-01 pCi/L	1.69E+00 pCi/L		1.09E+00	1.12E+00	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Milk (Cont.)</b>									
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Cobalt-60	< MDC	9.59E-01 pCi/L	2.01E+00 pCi/L		1.10E+00	1.19E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Iodine-131	<b>6.48E-01 pCi/L</b>	6.48E-01 pCi/L	6.48E-01 pCi/L	1.00E+00 pCi/L	5.93E-01	5.94E-01	
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Iodine-131	< MDC	-8.72E-01 pCi/L	3.98E+00 pCi/L		2.40E+00	2.43E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Iron-59	< MDC	-1.43E+00 pCi/L	4.10E+00 pCi/L		2.49E+00	2.58E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Lanthanum-140	< MDC	-5.49E-01 pCi/L	3.13E+00 pCi/L	1.50E+01 pCi/L	1.93E+00	1.94E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Manganese-54	< MDC	-4.49E-01 pCi/L	1.64E+00 pCi/L		1.05E+00	1.07E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Niobium-95	< MDC	1.34E-01 pCi/L	1.83E+00 pCi/L		1.12E+00	1.12E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Potassium-40	<b>1.27E+03 pCi/L</b>	1.27E+03 pCi/L	1.41E+01 pCi/L		5.85E+01	1.42E+02	
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Ruthenium-103	< MDC	-5.59E-02 pCi/L	1.86E+00 pCi/L		1.12E+00	1.12E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Ruthenium-106	<b>1.48E+01 pCi/L</b>	1.48E+01 pCi/L	1.48E+01 pCi/L		1.59E+01	1.60E+01	
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Zinc-65	< MDC	-2.20E-01 pCi/L	4.27E+00 pCi/L		2.86E+00	2.86E+00	U
SA-MLK-14F4(489509001) - Milk	3-Sep-19	Zirconium-95	< MDC	-4.27E-01 pCi/L	3.28E+00 pCi/L		2.05E+00	2.06E+00	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Barium-140	< MDC	3.89E-01 pCi/L	8.24E+00 pCi/L	1.50E+01 pCi/L	4.98E+00	4.98E+00	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Beryllium-7	< MDC	2.30E+00 pCi/L	1.32E+01 pCi/L		7.82E+00	7.89E+00	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Cerium-141	< MDC	-1.55E+00 pCi/L	2.62E+00 pCi/L		1.65E+00	1.80E+00	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Cerium-144	< MDC	-8.62E-01 pCi/L	9.44E+00 pCi/L		5.76E+00	5.77E+00	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Cesium-134	< MDC	1.78E-01 pCi/L	1.73E+00 pCi/L	1.50E+01 pCi/L	9.98E-01	1.00E+00	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Cesium-137	< MDC	1.86E-01 pCi/L	1.63E+00 pCi/L	1.80E+01 pCi/L	9.97E-01	1.00E+00	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Chromium-51	< MDC	-1.73E+00 pCi/L	1.43E+01 pCi/L		8.39E+00	8.43E+00	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Cobalt-58	< MDC	1.95E-01 pCi/L	1.56E+00 pCi/L		9.00E-01	9.04E-01	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Cobalt-60	< MDC	-6.53E-01 pCi/L	1.85E+00 pCi/L		1.82E+00	1.85E+00	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Iodine-131	< MDC	-1.15E-02 pCi/L	6.60E-01 pCi/L	1.00E+00 pCi/L	3.82E-01	3.82E-01	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Iodine-131	< MDC	-5.68E-01 pCi/L	2.81E+00 pCi/L		1.68E+00	1.70E+00	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Iron-59	< MDC	-7.96E-01 pCi/L	3.59E+00 pCi/L		2.21E+00	2.24E+00	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Lanthanum-140	< MDC	-7.48E-01 pCi/L	2.22E+00 pCi/L	1.50E+01 pCi/L	1.38E+00	1.43E+00	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Manganese-54	< MDC	4.34E-02 pCi/L	1.51E+00 pCi/L		8.83E-01	8.84E-01	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Niobium-95	< MDC	2.56E-01 pCi/L	1.62E+00 pCi/L		9.25E-01	9.33E-01	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Potassium-40	<b>1.21E+03 pCi/L</b>	1.21E+03 pCi/L	1.29E+01 pCi/L		4.89E+01	1.18E+02	
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Ruthenium-103	< MDC	-6.26E-02 pCi/L	1.63E+00 pCi/L		9.85E-01	9.85E-01	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Ruthenium-106	< MDC	6.61E+00 pCi/L	1.44E+01 pCi/L		8.49E+00	9.02E+00	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Zinc-65	< MDC	-2.17E-01 pCi/L	3.65E+00 pCi/L		2.21E+00	2.21E+00	U
SA-MLK-14F4(492625001) - Milk	7-Oct-19	Zirconium-95	< MDC	-4.74E-01 pCi/L	2.82E+00 pCi/L		1.67E+00	1.68E+00	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Milk (Cont.)</b>									
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Barium-140	< MDC	-1.32E+00 pCi/L	9.03E+00 pCi/L	1.50E+01 pCi/L	5.52E+00	5.55E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Beryllium-7	< MDC	1.96E+00 pCi/L	1.65E+01 pCi/L		9.74E+00	9.78E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Cerium-141	< MDC	-1.30E+00 pCi/L	3.25E+00 pCi/L		2.04E+00	2.13E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Cerium-144	< MDC	-6.38E+00 pCi/L	1.28E+01 pCi/L		8.04E+00	8.57E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Cesium-134	< MDC	-1.06E-01 pCi/L	2.42E+00 pCi/L	1.50E+01 pCi/L	1.41E+00	1.41E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Cesium-137	< MDC	5.20E-01 pCi/L	2.26E+00 pCi/L	1.80E+01 pCi/L	1.35E+00	1.37E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Chromium-51	< MDC	-5.90E-01 pCi/L	1.70E+01 pCi/L		1.04E+01	1.04E+01	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Cobalt-58	< MDC	-7.15E-01 pCi/L	1.99E+00 pCi/L		1.20E+00	1.24E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Cobalt-60	< MDC	4.12E-02 pCi/L	2.51E+00 pCi/L		1.52E+00	1.52E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Iodine-131	< MDC	1.08E-01 pCi/L	7.29E-01 pCi/L	1.00E+00 pCi/L	4.26E-01	4.29E-01	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Iodine-131	< MDC	2.58E-01 pCi/L	3.06E+00 pCi/L		1.78E+00	1.79E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Iron-59	< MDC	2.01E-01 pCi/L	5.56E+00 pCi/L		3.41E+00	3.41E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Lanthanum-140	< MDC	-5.08E-01 pCi/L	2.68E+00 pCi/L	1.50E+01 pCi/L	1.61E+00	1.63E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Manganese-54	< MDC	-1.32E+00 pCi/L	2.08E+00 pCi/L		1.29E+00	1.42E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Niobium-95	< MDC	-8.79E-01 pCi/L	2.21E+00 pCi/L		2.25E+00	2.28E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Potassium-40	2.22E+03 pCi/L	2.22E+03 pCi/L	1.99E+01 pCi/L		8.05E+01	2.50E+02	
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Ruthenium-103	< MDC	-6.27E-01 pCi/L	1.97E+00 pCi/L		1.21E+00	1.25E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Ruthenium-106	< MDC	7.99E+00 pCi/L	1.84E+01 pCi/L		1.07E+01	1.14E+01	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Zinc-65	< MDC	2.25E+00 pCi/L	5.84E+00 pCi/L		3.77E+00	3.91E+00	U
SA-MLK-14F4(495539001) - Milk	4-Nov-19	Zirconium-95	< MDC	8.37E-01 pCi/L	3.78E+00 pCi/L		2.13E+00	2.16E+00	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Barium-140	< MDC	5.85E-01 pCi/L	9.90E+00 pCi/L	1.50E+01 pCi/L	5.93E+00	5.93E+00	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Beryllium-7	< MDC	-7.05E-01 pCi/L	1.71E+01 pCi/L		1.03E+01	1.03E+01	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Cerium-141	< MDC	5.49E-01 pCi/L	3.45E+00 pCi/L		2.10E+00	2.11E+00	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Cerium-144	< MDC	6.35E+00 pCi/L	1.30E+01 pCi/L		7.71E+00	8.25E+00	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Cesium-134	< MDC	-8.54E-01 pCi/L	2.21E+00 pCi/L	1.50E+01 pCi/L	1.33E+00	1.39E+00	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Cesium-137	< MDC	3.59E-01 pCi/L	1.98E+00 pCi/L	1.80E+01 pCi/L	1.19E+00	1.20E+00	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Chromium-51	< MDC	2.65E-01 pCi/L	1.80E+01 pCi/L		1.04E+01	1.04E+01	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Cobalt-58	< MDC	3.79E-01 pCi/L	2.11E+00 pCi/L		1.20E+00	1.21E+00	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Cobalt-60	< MDC	-4.45E-01 pCi/L	2.42E+00 pCi/L		1.50E+00	1.51E+00	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Iodine-131	< MDC	-3.08E-03 pCi/L	5.39E-01 pCi/L	1.00E+00 pCi/L	3.10E-01	3.10E-01	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Iodine-131	< MDC	-5.64E-01 pCi/L	3.77E+00 pCi/L		2.24E+00	2.25E+00	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Iron-59	< MDC	4.23E-02 pCi/L	5.46E+00 pCi/L		3.24E+00	3.24E+00	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Lanthanum-140	< MDC	-4.62E-01 pCi/L	3.71E+00 pCi/L	1.50E+01 pCi/L	2.20E+00	2.21E+00	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Manganese-54	< MDC	-3.75E-01 pCi/L	1.97E+00 pCi/L		1.17E+00	1.18E+00	U



Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Milk (Cont.)</b>									
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Niobium-95	< MDC	-7.15E-01 pCi/L	1.88E+00 pCi/L		1.13E+00	1.18E+00	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Potassium-40	<b>1.47E+03 pCi/L</b>	1.47E+03 pCi/L	2.16E+01 pCi/L		6.75E+01	1.71E+02	
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Ruthenium-103	< MDC	-1.28E+00 pCi/L	2.05E+00 pCi/L		1.47E+00	1.59E+00	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Ruthenium-106	< MDC	8.72E+00 pCi/L	1.77E+01 pCi/L		1.02E+01	1.10E+01	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Zinc-65	< MDC	-3.59E+00 pCi/L	5.23E+00 pCi/L		3.70E+00	4.05E+00	U
SA-MLK-14F4(498221001) - Milk	2-Dec-19	Zirconium-95	< MDC	-1.26E-01 pCi/L	3.37E+00 pCi/L		1.95E+00	1.95E+00	U
<b>Surface Water</b>									
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Barium-140	< MDC	7.11E-01 pCi/L	1.07E+01 pCi/L	1.50E+01 pCi/L	6.24E+00	6.25E+00	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Beryllium-7	< MDC	2.53E+00 pCi/L	1.29E+01 pCi/L		7.38E+00	7.47E+00	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	BETA	<b>3.55E+01 pCi/L</b>	3.55E+01 pCi/L	1.60E+01 pCi/L	4.00E+00 pCi/L	1.05E+01	1.22E+01	
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Cerium-141	< MDC	-3.83E+00 pCi/L	2.88E+00 pCi/L		1.90E+00	2.59E+00	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Cerium-144	< MDC	-5.74E+00 pCi/L	9.50E+00 pCi/L		6.00E+00	6.56E+00	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Cesium-134	< MDC	-8.37E-02 pCi/L	1.40E+00 pCi/L	1.50E+01 pCi/L	8.46E-01	8.47E-01	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Cesium-137	< MDC	-2.68E-01 pCi/L	1.26E+00 pCi/L	1.80E+01 pCi/L	7.66E-01	7.76E-01	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Chromium-51	< MDC	9.31E-01 pCi/L	1.67E+01 pCi/L		9.48E+00	9.49E+00	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Cobalt-58	< MDC	2.07E-01 pCi/L	1.44E+00 pCi/L	1.50E+01 pCi/L	8.43E-01	8.49E-01	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Cobalt-60	< MDC	1.32E+00 pCi/L	1.62E+00 pCi/L	1.50E+01 pCi/L	8.72E-01	1.06E+00	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Iodine-131	< MDC	-3.35E+00 pCi/L	4.96E+00 pCi/L	1.00E+01 pCi/L	4.61E+00	4.86E+00	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Iron-59	< MDC	2.01E-01 pCi/L	2.81E+00 pCi/L	3.00E+01 pCi/L	1.69E+00	1.70E+00	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Lanthanum-140	< MDC	-5.80E-01 pCi/L	3.23E+00 pCi/L	1.50E+01 pCi/L	1.95E+00	1.96E+00	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Manganese-54	< MDC	4.47E-01 pCi/L	1.38E+00 pCi/L	1.50E+01 pCi/L	7.92E-01	8.18E-01	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Niobium-95	< MDC	7.81E-02 pCi/L	1.59E+00 pCi/L	1.50E+01 pCi/L	9.46E-01	9.47E-01	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Potassium-40	<b>3.84E+01 pCi/L</b>	3.84E+01 pCi/L	1.28E+01 pCi/L		2.51E+01	2.54E+01	
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Ruthenium-103	< MDC	-7.22E-02 pCi/L	1.65E+00 pCi/L		1.08E+00	1.08E+00	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Ruthenium-106	< MDC	4.02E+00 pCi/L	1.27E+01 pCi/L		7.22E+00	7.45E+00	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Tritium	< MDC	1.83E+02 pCi/L	2.20E+02 pCi/L	1.00E+03 pCi/L	1.40E+02	1.44E+02	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Zinc-65	< MDC	-1.56E+00 pCi/L	2.45E+00 pCi/L	3.00E+01 pCi/L	1.66E+00	1.81E+00	U
SA-SWA-11A1(474646001) - Surface Water	19-Mar-19	Zirconium-95	< MDC	6.67E-01 pCi/L	2.54E+00 pCi/L	1.50E+01 pCi/L	1.47E+00	1.50E+00	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Barium-140	< MDC	-5.32E-01 pCi/L	7.08E+00 pCi/L	1.50E+01 pCi/L	4.23E+00	4.24E+00	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Beryllium-7	< MDC	-3.77E+00 pCi/L	1.13E+01 pCi/L		6.92E+00	7.13E+00	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	BETA	<b>3.39E+01 pCi/L</b>	3.39E+01 pCi/L	6.88E+00 pCi/L	4.00E+00 pCi/L	5.19E+00	7.58E+00	
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Cerium-141	< MDC	-4.83E+00 pCi/L	2.46E+00 pCi/L		2.56E+00	3.39E+00	U

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Surface Water (Cont.)</b>									
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Cerium-144	< MDC	4.57E+00 pCi/L	1.01E+01 pCi/L		5.96E+00	6.32E+00	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Cesium-134	< MDC	9.71E-01 pCi/L	1.71E+00 pCi/L	1.50E+01 pCi/L	9.56E-01	1.05E+00	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Cesium-137	< MDC	8.46E-01 pCi/L	1.60E+00 pCi/L	1.80E+01 pCi/L	8.97E-01	9.77E-01	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Chromium-51	< MDC	-2.60E+00 pCi/L	1.32E+01 pCi/L		7.72E+00	7.81E+00	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Cobalt-58	< MDC	1.60E-01 pCi/L	1.33E+00 pCi/L	1.50E+01 pCi/L	8.87E-01	8.90E-01	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Cobalt-60	< MDC	3.76E-01 pCi/L	1.62E+00 pCi/L	1.50E+01 pCi/L	9.09E-01	9.26E-01	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Iodine-131	< MDC	-4.32E-01 pCi/L	2.54E+00 pCi/L	1.00E+01 pCi/L	1.50E+00	1.51E+00	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Iron-59	< MDC	-6.17E-01 pCi/L	2.94E+00 pCi/L	3.00E+01 pCi/L	1.76E+00	1.78E+00	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Lanthanum-140	< MDC	-6.59E-01 pCi/L	2.33E+00 pCi/L	1.50E+01 pCi/L	1.47E+00	1.51E+00	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Manganese-54	< MDC	-7.23E-01 pCi/L	1.32E+00 pCi/L	1.50E+01 pCi/L	9.94E-01	1.05E+00	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Niobium-95	< MDC	-5.72E-01 pCi/L	1.36E+00 pCi/L	1.50E+01 pCi/L	8.78E-01	9.17E-01	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Potassium-40	<b>1.12E+01 pCi/L</b>	1.12E+01 pCi/L	1.12E+01 pCi/L		2.36E+01	2.38E+01	
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Ruthenium-103	< MDC	5.33E-01 pCi/L	1.51E+00 pCi/L		9.48E-01	9.79E-01	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Ruthenium-106	< MDC	-1.25E+01 pCi/L	1.29E+01 pCi/L		2.19E+01	2.27E+01	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Tritium	< MDC	9.44E+01 pCi/L	4.44E+02 pCi/L	1.00E+03 pCi/L	2.77E+02	2.77E+02	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Zinc-65	< MDC	4.53E-01 pCi/L	3.20E+00 pCi/L	3.00E+01 pCi/L	1.82E+00	1.83E+00	U
SA-SWA-11A1(482701001) - Surface Water	17-Jun-19	Zirconium-95	< MDC	-4.95E-01 pCi/L	2.44E+00 pCi/L	1.50E+01 pCi/L	1.53E+00	1.54E+00	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Barium-140	< MDC	-1.17E+00 pCi/L	1.10E+01 pCi/L	1.50E+01 pCi/L	6.71E+00	6.73E+00	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Beryllium-7	< MDC	4.54E+00 pCi/L	1.39E+01 pCi/L		8.04E+00	8.30E+00	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	BETA	<b>8.10E+01 pCi/L</b>	8.10E+01 pCi/L	4.07E+01 pCi/L	4.00E+00 pCi/L	2.68E+01	2.99E+01	
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Cerium-141	< MDC	-3.13E-01 pCi/L	3.02E+00 pCi/L		1.86E+00	1.87E+00	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Cerium-144	< MDC	-9.23E-01 pCi/L	9.75E+00 pCi/L		5.98E+00	6.00E+00	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Cesium-134	< MDC	4.08E-01 pCi/L	1.56E+00 pCi/L	1.50E+01 pCi/L	9.83E-01	1.00E+00	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Cesium-137	< MDC	3.99E-02 pCi/L	1.53E+00 pCi/L	1.80E+01 pCi/L	9.35E-01	9.35E-01	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Chromium-51	< MDC	4.72E+00 pCi/L	1.68E+01 pCi/L		9.56E+00	9.81E+00	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Cobalt-58	< MDC	3.41E-01 pCi/L	1.65E+00 pCi/L	1.50E+01 pCi/L	9.38E-01	9.51E-01	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Cobalt-60	< MDC	3.74E-01 pCi/L	1.73E+00 pCi/L	1.50E+01 pCi/L	1.01E+00	1.03E+00	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Iodine-131	< MDC	-2.90E+00 pCi/L	4.61E+00 pCi/L	1.00E+01 pCi/L	2.84E+00	3.14E+00	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Iron-59	< MDC	-1.58E-01 pCi/L	3.71E+00 pCi/L	3.00E+01 pCi/L	2.22E+00	2.22E+00	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Lanthanum-140	< MDC	-1.25E+00 pCi/L	3.90E+00 pCi/L	1.50E+01 pCi/L	2.38E+00	2.45E+00	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Manganese-54	< MDC	-1.08E-01 pCi/L	1.50E+00 pCi/L	1.50E+01 pCi/L	8.77E-01	8.78E-01	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Niobium-95	< MDC	1.11E-01 pCi/L	1.69E+00 pCi/L	1.50E+01 pCi/L	9.66E-01	9.67E-01	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Potassium-40	<b>1.43E+02 pCi/L</b>	1.43E+02 pCi/L	1.56E+01 pCi/L		2.83E+01	3.21E+01	

Table C-19

## Concentrations of Duplicate Samples as Analyzed by GEL

Sample Name	Date Collected	Nuclide	Reported Activity	Analysis Result	MDC	LLD	2 Sigma Uncert	2 Sigma (Total Propagated Uncertainty)	Qualifier
<b>Surface Water (Cont.)</b>									
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Ruthenium-103	< MDC	2.74E-02 pCi/L	1.80E+00 pCi/L		1.20E+00	1.20E+00	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Ruthenium-106	< MDC	8.24E-01 pCi/L	1.33E+01 pCi/L		8.06E+00	8.07E+00	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Tritium	< MDC	1.02E+02 pCi/L	2.39E+02 pCi/L	1.00E+03 pCi/L	1.46E+02	1.47E+02	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Zinc-65	< MDC	7.01E-01 pCi/L	3.37E+00 pCi/L	3.00E+01 pCi/L	2.21E+00	2.23E+00	U
SA-SWA-11A1(491298001) - Surface Water	17-Sep-19	Zirconium-95	< MDC	9.20E-01 pCi/L	2.87E+00 pCi/L	1.50E+01 pCi/L	1.60E+00	1.66E+00	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Barium-140	< MDC	1.88E+00 pCi/L	8.01E+00 pCi/L	1.50E+01 pCi/L	4.60E+00	4.68E+00	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Beryllium-7	< MDC	1.24E+00 pCi/L	1.16E+01 pCi/L		6.72E+00	6.74E+00	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	BETA	<b>5.02E+01 pCi/L</b>	5.02E+01 pCi/L	2.68E+01 pCi/L	4.00E+00 pCi/L	1.81E+01	2.00E+01	
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Cerium-141	< MDC	6.67E-02 pCi/L	2.44E+00 pCi/L		1.61E+00	1.62E+00	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Cerium-144	< MDC	7.65E+00 pCi/L	8.65E+00 pCi/L		5.05E+00	6.15E+00	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Cesium-134	< MDC	1.02E-02 pCi/L	1.28E+00 pCi/L	1.50E+01 pCi/L	7.69E-01	7.69E-01	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Cesium-137	< MDC	5.33E-03 pCi/L	1.13E+00 pCi/L	1.80E+01 pCi/L	6.69E-01	6.69E-01	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Chromium-51	< MDC	4.69E-01 pCi/L	1.31E+01 pCi/L		7.47E+00	7.47E+00	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Cobalt-58	< MDC	-7.43E-01 pCi/L	1.13E+00 pCi/L	1.50E+01 pCi/L	7.24E-01	8.01E-01	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Cobalt-60	< MDC	1.18E-01 pCi/L	1.09E+00 pCi/L	1.50E+01 pCi/L	6.18E-01	6.20E-01	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Iodine-131	< MDC	-7.04E-01 pCi/L	3.63E+00 pCi/L	1.00E+01 pCi/L	2.35E+00	2.37E+00	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Iron-59	< MDC	-6.90E-01 pCi/L	2.49E+00 pCi/L	3.00E+01 pCi/L	1.58E+00	1.61E+00	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Lanthanum-140	< MDC	1.25E+00 pCi/L	2.93E+00 pCi/L	1.50E+01 pCi/L	1.61E+00	1.71E+00	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Manganese-54	< MDC	2.40E-01 pCi/L	1.12E+00 pCi/L	1.50E+01 pCi/L	6.55E-01	6.65E-01	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Niobium-95	< MDC	-3.78E-01 pCi/L	1.24E+00 pCi/L	1.50E+01 pCi/L	1.15E+00	1.17E+00	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Potassium-40	<b>8.24E+01 pCi/L</b>	8.24E+01 pCi/L	1.09E+01 pCi/L		2.41E+01	2.52E+01	
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Ruthenium-103	< MDC	-1.66E+00 pCi/L	1.30E+00 pCi/L		1.95E+00	2.09E+00	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Ruthenium-106	< MDC	2.93E+00 pCi/L	1.06E+01 pCi/L		6.11E+00	6.25E+00	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Tritium	< MDC	-2.04E+01 pCi/L	4.30E+02 pCi/L	1.00E+03 pCi/L	2.54E+02	2.54E+02	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Zinc-65	< MDC	-2.34E+00 pCi/L	2.30E+00 pCi/L	3.00E+01 pCi/L	2.87E+00	3.06E+00	U
SA-SWA-11A1(499816001) - Surface Water	17-Dec-19	Zirconium-95	< MDC	2.34E-01 pCi/L	2.20E+00 pCi/L	1.50E+01 pCi/L	1.30E+00	1.30E+00	U

## Notes:

LLDs are a-priori values.

MDCs are calculated a-posteriori values.

Gamma spectroscopy analysis results are calculated from a measurement using only one gamma energy line.

## Qualifiers:

U = Target isotope was analyzed for but not detected above the MDC and LLD.

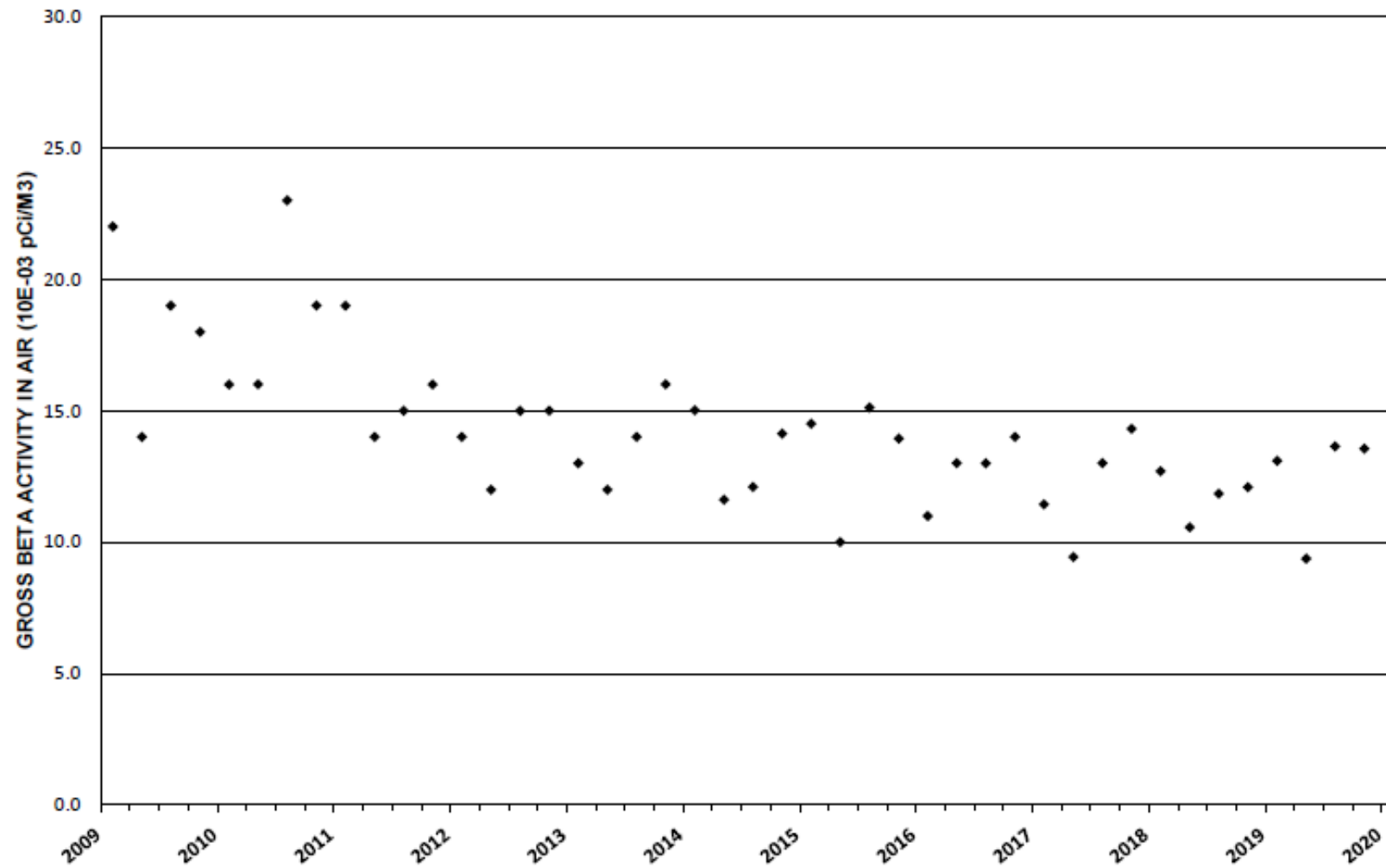
UI = Uncertain identification for gamma spectroscopy.

X = Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.

M = Reported result is less than the LLD and greater than the MDC.



**FIGURE 1**  
**GROSS BETA ACTIVITY IN AIR PARTICULATES -**  
**QUARTERLY AVERAGE FOR ALL LOCATIONS**  
**2009 THROUGH 2019<sup>1</sup>**

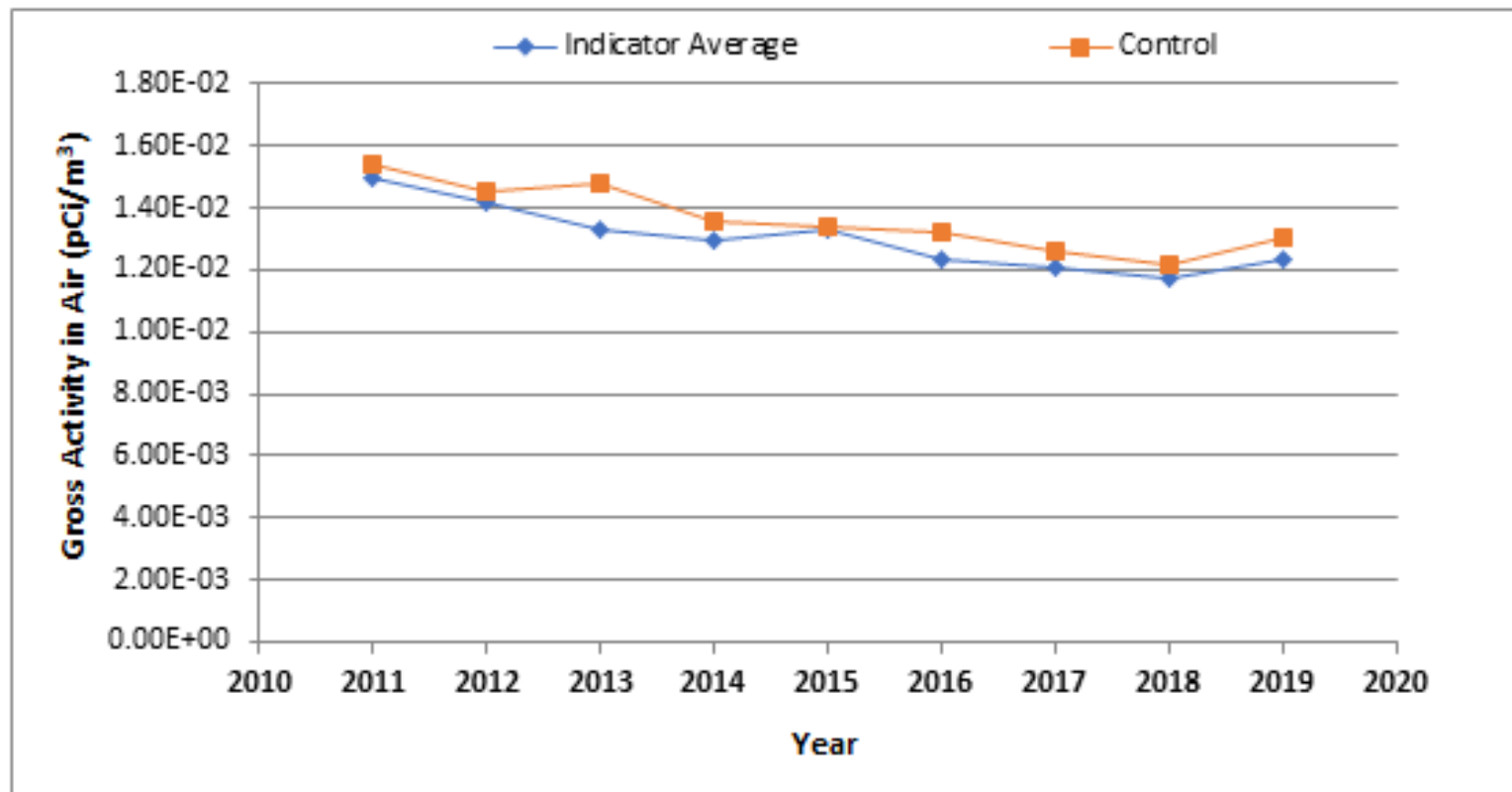


1 - 2013 data included temporary sampling locations

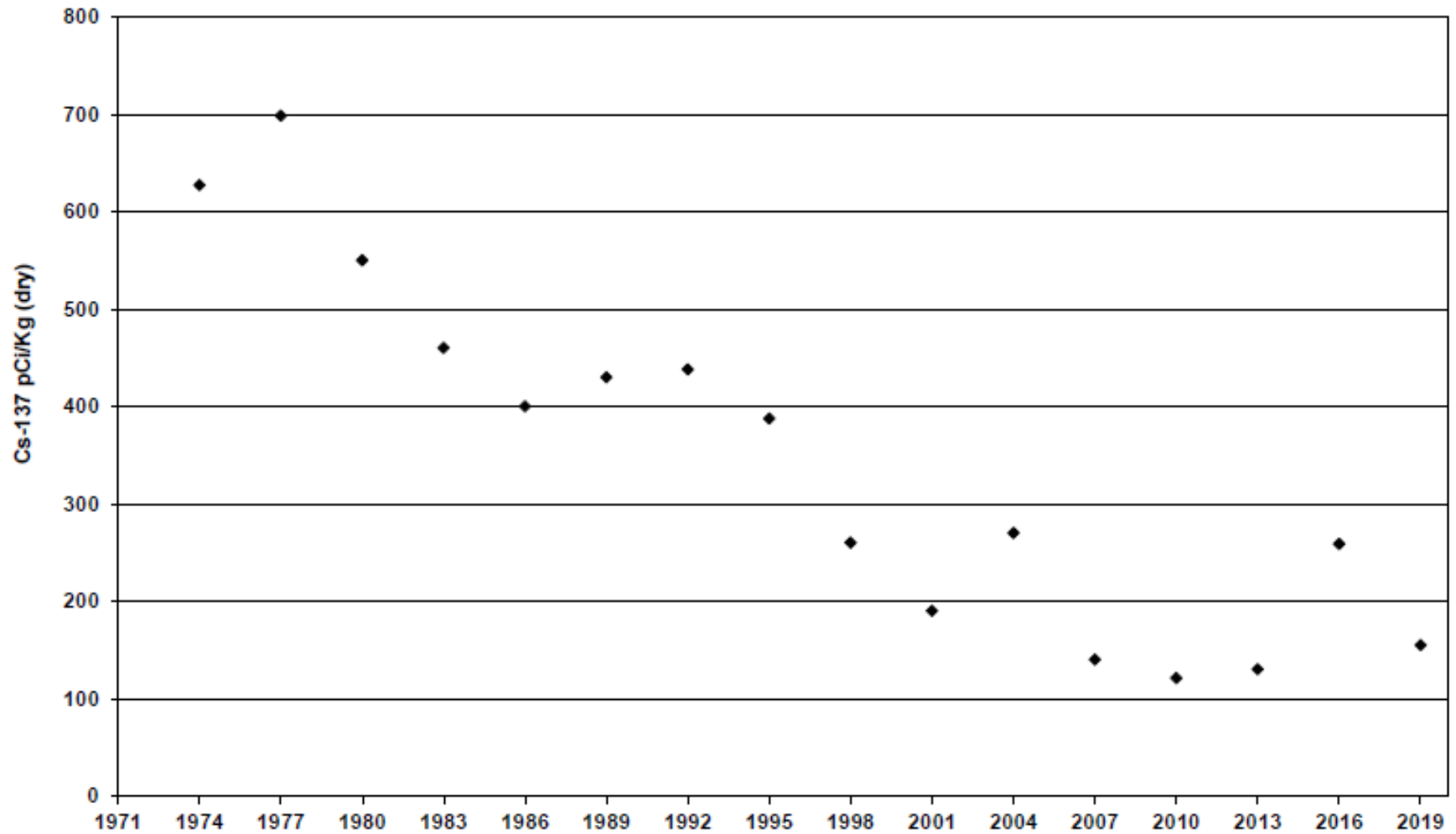
FIGURE 1a

## Air Particulate: Analysis of Gross Beta Activity

(Average mean for all Indicator Locations vs. Control)

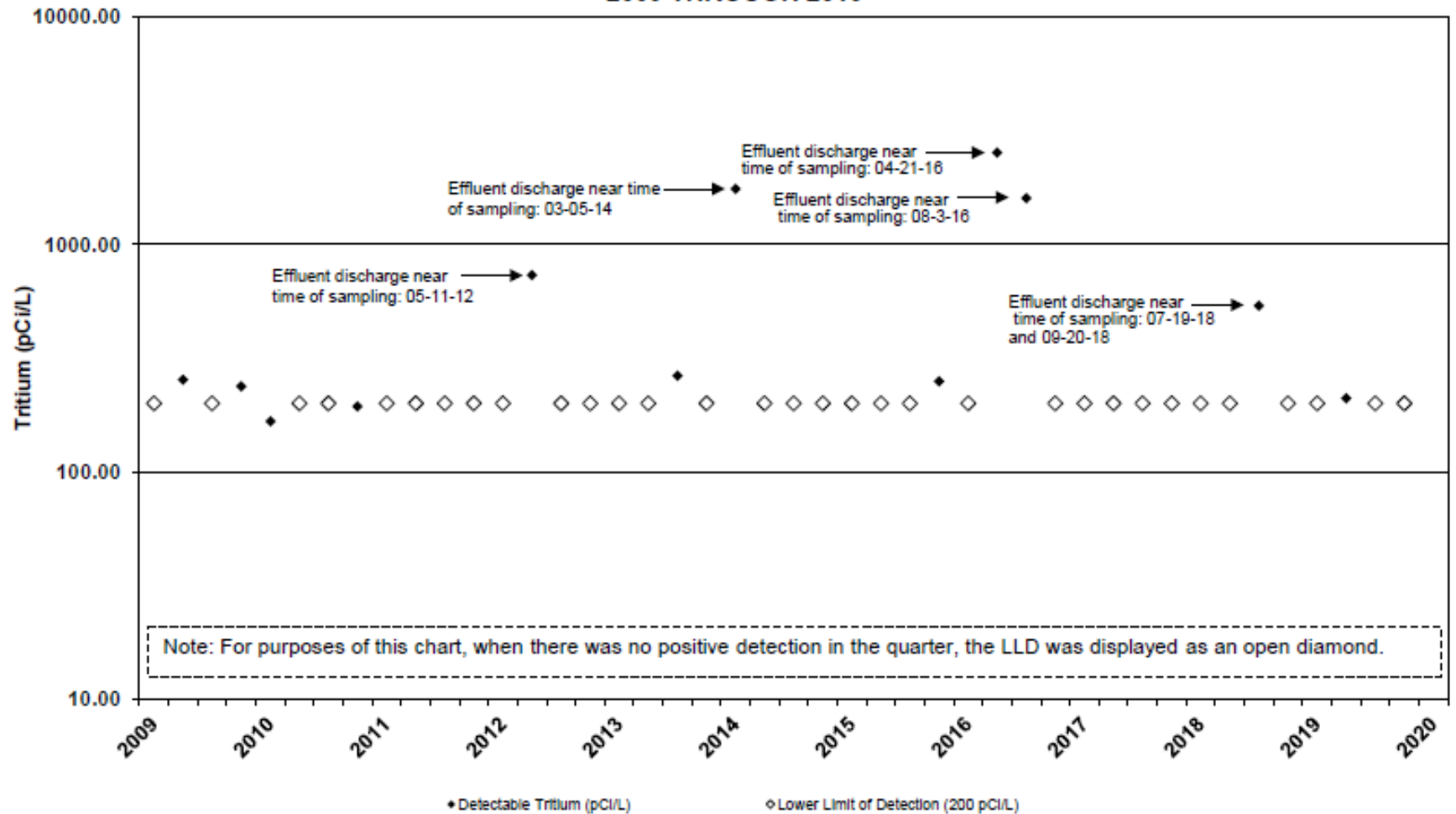


**FIGURE 2**  
**CESIUM-137 ACTIVITY IN SOIL 1974 THROUGH 2019**  
**(TRIENNIAL)**



Soil is sampled every three years. Last samples were taken in 2019. Annual values are an average of the results from the ten soil sites.

**FIGURE 3  
TRITIUM ACTIVITY IN SURFACE WATER - QUARTERLY AVERAGE  
2009 THROUGH 2019**



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APPENDIX D

SUMMARY OF INTER-LABORATORY  
COMPARISON PROGRAM

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**Table D-1**  
**Analytics Environmental Radioactivity Cross Check Program**  
**Teledyne Brown Engineering Environmental Services**

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value	Known Value <sup>(a)</sup>	Ratio of TBE to Analytics Result	Evaluation <sup>(b)</sup>
March 2019	E12468A	Milk	Sr-89	pCi/L	87.1	96	0.91	A
			Sr-90	pCi/L	12.6	12.6	1.00	A
	E12469A	Milk	Ce-141	pCi/L	113	117	0.97	A
			Co-58	pCi/L	153	143	1.07	A
			Co-60	pCi/L	289	299	0.97	A
			Cr-51	pCi/L	233	293	0.80	A
			Cs-134	pCi/L	147	160	0.92	A
			Cs-137	pCi/L	193	196	0.98	A
			Fe-59	pCi/L	153	159	0.96	A
			I-131	pCi/L	91.5	89.5	1.02	A
			Mn-54	pCi/L	149	143	1.04	A
			Zn-65	pCi/L	209	220	0.95	A
	E12470	Charcoal	I-131	pCi	77.5	75.2	1.03	A
	E12471	AP	Ce-141	pCi	60.7	70.2	0.87	A
			Co-58	pCi	87.9	85.8	1.02	A
			Co-60	pCi	175	179	0.98	A
			Cr-51	pCi	165	176	0.94	A
			Cs-134	pCi	91.2	95.9	0.95	A
			Cs-137	pCi	120	118	1.02	A
			Fe-59	pCi	108	95.3	1.13	A
			Mn-54	pCi	94.2	85.7	1.10	A
			Zn-65	pCi	102	132	0.77	W
	E12472	Water	Fe-55	pCi/L	2230	1920	1.16	A
	E12473	Soil	Ce-141	pCi/g	0.189	0.183	1.03	A
			Co-58	pCi/g	0.209	0.224	0.93	A
			Co-60	pCi/g	0.481	0.466	1.03	A
			Cr-51	pCi/g	0.522	0.457	1.14	A
			Cs-134	pCi/g	0.218	0.250	0.87	A
			Cs-137	pCi/g	0.370	0.381	0.97	A
			Fe-59	pCi/g	0.263	0.248	1.06	A
			Mn-54	pCi/g	0.248	0.223	1.11	A
			Zn-65	pCi/g	0.371	0.344	1.08	A
	E12474	AP	Sr-89	pCi	88.3	95.2	0.93	A
			Sr-90	pCi	11.7	12.5	0.94	A
August 2019	E12562	Soil	Sr-90	pCi/g	4.710	6.710	0.70	W

(a) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) Analytics evaluation based on TBE internal QC limits:

A = Acceptable - reported result falls within ratio limits of 0.80-1.20

W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30

N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30



**Table D-1**  
**Analytics Environmental Radioactivity Cross Check Program**  
**Teledyne Brown Engineering Environmental Services**

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value	Known Value <sup>(a)</sup>	Ratio of TBE to Analytics Result	Evaluation <sup>(b)</sup>
September 2019	E12475	Milk	Sr-89	pCi/L	70.0	93.9	0.75	W
			Sr-90	pCi/L	12.0	12.9	0.93	A
	E12476	Milk	Ce-141	pCi/L	150	167	0.90	A
			Co-58	pCi/L	170	175	0.97	A
			Co-60	pCi/L	211	211	1.00	A
			Cr-51	pCi/L	323	331	0.98	A
			Cs-134	pCi/L	180	207	0.87	A
			Cs-137	pCi/L	147	151	0.97	A
			Fe-59	pCi/L	156	148	1.05	A
			I-131	pCi/L	81.1	92.1	0.88	A
			Mn-54	pCi/L	160	154	1.04	A
			Zn-65	pCi/L	303	293	1.03	A
	E12477	Charcoal	I-131	pCi	95.9	95.1	1.01	A
	E12478	AP	Ce-141	pCi	129	138	0.93	A
			Co-58	pCi	128	145	0.88	A
			Co-60	pCi	181	174	1.04	A
			Cr-51	pCi	292	274	1.07	A
			Cs-134	pCi	166	171	0.97	A
			Cs-137	pCi	115	125	0.92	A
			Fe-59	pCi	119	123	0.97	A
			Mn-54	pCi	129	128	1.01	A
			Zn-65	pCi	230	242	0.95	A
	E12479	Water	Fe-55	pCi/L	1810	1850	0.98	A
	E12480	Soil	Ce-141	pCi/g	0.305	0.276	1.10	A
			Co-58	pCi/g	0.270	0.289	0.93	A
			Co-60	pCi/g	0.358	0.348	1.03	A
			Cr-51	pCi/g	0.765	0.547	1.40	N <sup>(1)</sup>
			Cs-134	pCi/g	0.327	0.343	0.95	A
			Cs-137	pCi/g	0.308	0.321	0.96	A
			Fe-59	pCi/g	0.257	0.245	1.05	A
			Mn-54	pCi/g	0.274	0.255	1.07	A
			Zn-65	pCi/g	0.536	0.485	1.11	A
	E12481	AP	Sr-89	pCi	95.9	91.9	1.04	A
			Sr-90	pCi	12.3	12.6	0.97	A
	E12563	Soil	Sr-90	pCi/g	0.392	0.360	1.09	A

(a) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) Analytics evaluation based on TBE internal QC limits:

A = Acceptable - reported result falls within ratio limits of 0.80-1.20

W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30

N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

**Table D-2**  
**DOE's Mixed Analyte Performance Evaluation Program (MAPEP)**  
**Teledyne Brown Engineering Environmental Services**

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value	Known Value <sup>(a)</sup>	Acceptable Range	Evaluation <sup>(b)</sup>
February 2019	19-GrF40	AP	Gross	Bq/sample	0.184	0.528	0.158 - 0.898	A
			Gross Beta	Bq/sample	0.785	0.948	0.474 - 1.422	A
	19-MaS40	Soil	Ni-63	Bq/kg	420	519.0	363 - 675	A
			Sr-90	Bq/kg			(1)	NR <sup>(3)</sup>
	19-MaW40	Water	Am-241	Bq/L	0.764	0.582	0.407 - 0.757	N <sup>(4)</sup>
			Ni-63	Bq/L	4.72	5.8	4.1 - 7.5	A
			Pu-238	Bq/L	0.443	0.451	0.316 - 0.586	A
			Pu-239/240	Bq/L	-0.00161	0.0045	(2)	A
	19-RdF40	AP	U-234/233	Bq/sample	0.1138	0.106	0.074 - 0.138	A
			U-238	Bq/sample	0.107	0.110	0.077 - 0.143	A
	19-RdV40	Vegetation	Cs-134	Bq/sample	2.14	2.44	1.71 - 3.17	A
			Cs-137	Bq/sample	2.22	2.30	1.61 - 2.99	A
			Co-57	Bq/sample	2.16	2.07	1.45 - 2.69	A
			Co-60	Bq/sample	0.02382		(1)	A
			Mn-54	Bq/sample	-0.03607		(1)	A
			Sr-90	Bq/sample	-0.1060		(1)	N <sup>(5)</sup>
			Zn-65	Bq/sample	1.35	1.71	1.20 - 2.22	W
August 2019	19-GrF41	AP	Gross	Bq/sample	0.192	0.528	0.158 - 0.898	W
			Gross Beta	Bq/sample	0.722	0.937	0.469 - 1.406	A
	19-MaS41	Soil	Ni-63	Bq/kg	436	629	440 - 818	N <sup>(6)</sup>
			Sr-90	Bq/kg	444	572	400 - 744	W
	19-MaW41	Water	Am-241	Bq/L				NR <sup>(7)</sup>
			Ni-63	Bq/L	7.28	9.7	6.8 - 12.6	W
			Pu-238	Bq/L	0.0207	0.0063	(2)	A
			Pu-239/240	Bq/L	0.741	0.727	0.509 - 0.945	A
	19-RdF41	AP	U-234/233	Bq/sample	0.0966	0.093	0.065 - 0.121	A
			U-238	Bq/sample	0.0852	0.096	0.067-0.125	A
	19-RdV41	Vegetation	Cs-134	Bq/sample	0.0197		(1)	A
			Cs-137	Bq/sample	3.21	3.28	2.30 - 4.26	A
			Co-57	Bq/sample	4.62	4.57	3.20 - 5.94	A
			Co-60	Bq/sample	4.88	5.30	3.71 - 6.89	A
			Mn-54	Bq/sample	4.54	4.49	3.14 - 5.84	A
			Sr-90	Bq/sample	0.889	1.00	0.70 - 1.30	A
			Zn-65	Bq/sample	2.78	2.85	2.00 - 3.71	A

(a) The MAPEP known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) DOE/MAPEP evaluation based on TBE internal QC limits:

A = Acceptable - reported result falls within ratio limits of 0.80-1.20

W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30

N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

(1) False positive test

(2) Sensitivity evaluation

(3) See **NCR 19-12**

(4) See **NCR 19-13**

(5) See **NCR 19-14**

(6) See **NCR 19-25**

(7) See **NCR 19-26**

**Table D-3**  
**ERA Environmental Radioactivity Cross Check Program**  
**Teledyne Brown Engineering Environmental Services**

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value	Known Value <sup>(a)</sup>	Acceptable Range	Evaluation <sup>(b)</sup>
April 2019	Rad-117	Water	Ba-133	pCi/L	26.3	24.1	18.6 - 27.8	A
			Cs-134	pCi/L	15.2	12.1	8.39 - 14.4	N <sup>(1)</sup>
			Cs-137	pCi/L	33.6	33.1	28.8 - 39.4	A
			Co-60	pCi/L	11.9	11.5	8.67 - 15.5	A
			Zn-65	pCi/L	87.1	89.2	80.3 - 107	A
			GR-A	pCi/L	19	19.3	9.56 - 26.5	A
			GR-B	pCi/L	20.2	29.9	19.1 - 37.7	A
			U-Nat	pCi/L	55.5	55.9	45.6 - 61.5	A
			H-3	pCi/L	21500	21400	18700 - 23500	A
			Sr-89	pCi/L	44.9	33.3	24.5 - 40.1	N <sup>(2)</sup>
			Sr-90	pCi/L	24.5	26.3	19.0 - 30.7	A
			I-131	pCi/L	28.9	28.4	23.6 - 33.3	A
October 2019	Rad-119	Water	Ba-133	pCi/L	42.7	43.8	35.7 - 48.8	A
			Cs-134	pCi/L	53.5	55.9	45.2 - 61.5	A
			Cs-137	pCi/L	77.7	78.7	70.8 - 89.2	A
			Co-60	pCi/L	51.5	53.4	48.1 - 61.3	A
			Zn-65	pCi/L	36.6	34.0	28.5 - 43.1	A
			GR-A	pCi/L	40.5	27.6	14.0 - 36.3	N <sup>(3)</sup>
			GR-B	pCi/L	36.3	39.8	26.4 - 47.3	A
			U-Nat	pCi/L	27.66	28.0	22.6 - 31.1	A
			H-3	pCi/L	22800	23400	20500 - 25700	A
			Sr-89	pCi/L	47.1	45.5	35.4 - 52.7	A
			Sr-90	pCi/L	32.5	26.5	19.2 - 30.9	N <sup>(4)</sup>
			I-131	pCi/L	26.0	23.9	19.8 - 28.4	A
December 2019	QR 120419D	Water	Sr-90	pCi/L	20.1	18.6	13.2 - 22.1	A

(a) The ERA known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) ERA evaluation based on TBE internal QC limits:

A = Acceptable - reported result falls within ratio limits of 0.80-1.20

W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30

N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

(1) See **NCR 19-10**

(2) See **NCR 19-11**

(3) See **NCR 19-23**

(4) See **NCR 19-24**

**TABLE D-4  
2019 ECKERT & ZIEGLER ANALYTICS PERFORMANCE  
EVALUATION RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
EZA	2nd/2019	07/29/19	E12360	Cartridge	pCi	Iodine-131	8.40E+01	8.17E+01	1.03	Acceptable
EZA	2nd/2019	07/29/19	E12361	Milk	pCi/L	Strontium-89	1.01E+02	8.29E+01	1.22	Acceptable
EZA	2nd/2019	07/29/19	E12361	Milk	pCi/L	Strontium-90	1.21E+01	1.35E+01	0.90	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Cerium-141	1.39E+02	1.33E+02	1.04	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Cobalt-58	1.17E+02	1.12E+02	1.05	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Cobalt-60	2.05E+02	1.98E+02	1.04	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Chromium-51	3.41E+02	3.37E+02	1.01	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Cesium-134	1.30E+02	1.40E+02	0.93	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Cesium-137	1.78E+02	1.68E+02	1.06	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Iron-59	1.66E+02	1.41E+02	1.18	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Iodine-131	8.51E+01	8.14E+01	1.05	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Manganese-54	2.09E+02	1.90E+02	1.10	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Zinc-65	2.82E+02	2.47E+02	1.14	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Cerium-141	1.50E+02	1.45E+02	1.03	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Cobalt-58	1.22E+02	1.22E+02	1.00	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Cobalt-60	2.22E+02	2.16E+02	1.03	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Chromium-51	3.56E+02	3.68E+02	0.97	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Cesium-134	1.37E+02	1.53E+02	0.89	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Cesium-137	1.90E+02	1.84E+02	1.03	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Iron-59	1.73E+02	1.54E+02	1.12	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Iodine-131	8.92E+01	8.91E+01	1.00	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Manganese-54	2.27E+02	2.70E+00	1.10	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Zinc-65	3.01E+02	2.70E+02	1.11	Acceptable
EZA	1st/2019	05/10/19	E12364	Cartridge	pCi	Iodine-131	7.80E+01	7.54E+01	1.03	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Cerium-141	1.23E+02	1.17E+02	1.05	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Cobalt-58	1.51E+02	1.43E+02	1.05	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Cobalt-60	3.12E+02	2.99E+02	1.04	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Chromium-51	3.04E+02	2.93E+02	1.04	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Cesium-134	1.53E+02	1.60E+02	0.96	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Cesium-137	2.04E+02	1.96E+02	1.04	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Manganese-54	1.55E+02	1.43E+02	1.08	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Iron-59	1.78E+02	1.59E+02	1.12	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Zinc-65	2.42E+02	2.20E+02	1.1	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Cerium-141	1.20E+02	1.13E+02	1.06	Acceptable

**TABLE D-4**  
**2019 ECKERT & ZIEGLER ANALYTICS PERFORMANCE**  
**EVALUATION RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Cesium-134	1.43E+02	1.55E+02	0.92	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Cesium-137	2.09E+02	1.91E+02	1.10	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Chromium-51	3.55E+02	2.84E+02	1.25	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Cobalt-58	1.43E+02	1.39E+02	1.03	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Cobalt-60	3.18E+02	2.90E+02	1.10	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Iodine-131	8.89E+01	9.65E+01	1.03	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Iron-59	1.76E+02	1.54E+02	1.14	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Manganese-54	1.55E+02	1.39E+02	1.12	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Zinc-65	2.44E+02	2.14E+02	1.14	Acceptable
EZA	3rd/2019	11/08/19	E12368	Cartridge	pCi	Iodine-131	9.93E+01	9.33E+01	1.06	Acceptable
EZA	3rd/2019	11/08/19	E12369	Milk	pCi/L	Strontium-89	8.71E+01	9.39E+01	0.93	Acceptable
EZA	3rd/2019	11/08/19	E12369	Milk	pCi/L	Strontium-90	7.02E+00	1.29E+01	0.54	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Cerium-141	1.69E+02	1.67E+02	1.01	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Cobalt-58	1.74E+02	1.75E+02	0.99	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Cobalt-60	2.08E+02	2.11E+02	0.99	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Chromium-51	3.64E+02	3.31E+02	1.1	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Cesium-134	1.93E+02	2.07E+02	0.93	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Cesium-137	1.49E+02	1.51E+02	0.99	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Iron-59	1.66E+02	1.48E+02	1.12	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Iodine-131	9.28E+01	9.21E+01	1.01	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Manganese-54	1.69E+02	1.54E+02	1.09	Acceptable
EZA	3rd/2019	11/08/19	E12371	Milk	pCi/L	Zinc-65	3.21E+02	2.93E+02	1.1	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Cerium-141	1.41E+02	1.27E+02	1.11	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Cobalt-58	1.36E+02	1.33E+02	1.03	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Cobalt-60	1.68E+02	1.60E+02	1.036	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Chromium-51	2.45E+02	2.51E+02	0.98	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Cesium-134	1.50E+02	1.57E+02	0.96	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Cesium-137	1.22E+02	1.14E+02	1.07	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Iron-59	1.27E+02	1.12E+02	1.13	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Iodine-131	9.34E+01	8.94E+01	1.04	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Manganese-54	1.34E+02	1.17E+02	1.15	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Zinc-65	2.57E+02	2.22E+02	1.16	Acceptable
EZA	4th/2019	02/05/20	E12372	Cartridge	pCi	Iodine-131	9.07E+01	8.88E+01	1.02	Acceptable
EZA	4th/2019	02/05/20	E12373	Milk	pCi/L	Strontium-89	6.60E+01	8.06E+01	0.82	Acceptable

**TABLE D-4  
2019 ECKERT & ZIEGLER ANALYTICS PERFORMANCE  
EVALUATION RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
EZA	4th/2019	02/05/20	E12373	Milk	pCi/L	Strontium-90	1.11E+01	1.10E+01	1.00	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Cerium-141	7.95E+01	8.30E+01	0.96	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Cobalt-58	8.93E+01	8.99E+01	0.99	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Cobalt-60	1.17E+02	1.15E+02	1.02	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Chromium-51	2.67E+02	2.41E+02	1.11	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Cesium-134	9.79E+01	1.13E+02	0.87	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Cesium-137	1.01E+02	1.02E+02	0.99	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Iron-59	1.01E+02	8.71E+01	1.16	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Iodine-131	9.34E+01	9.45E+01	0.99	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Manganese-54	1.34E+02	1.30E+02	1.03	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Zinc-65	1.17E+02	1.59E+02	1.08	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Cerium-141	8.92E+01	8.41E+01	1.06	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Cobalt-58	9.54E+01	9.11E+01	1.05	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Cobalt-60	1.22E+02	1.17E+02	1.05	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Chromium-51	2.64E+02	2.44E+02	1.08	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Cesium-134	1.06E+02	1.14E+02	0.93	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Cesium-137	1.09E+02	1.03E+02	1.06	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Iron-59	9.32E+01	8.82E+01	1.06	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Iodine-131	1.04E+02	9.45E+01	1.10	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Manganese-54	1.44E+02	1.31E+02	1.10	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Zinc-65	1.91E+02	1.61E+02	1.19	Acceptable
EZA	2nd/2019	07/29/19	E12360	Cartridge	pCi	Iodine-131	8.40E+01	8.17E+01	1.03	Acceptable
EZA	2nd/2019	07/29/19	E12361	Milk	pCi/L	Strontium-89	1.01E+02	8.29E+01	1.22	Acceptable
EZA	2nd/2019	07/29/19	E12361	Milk	pCi/L	Strontium-90	1.21E+01	1.35E+01	0.90	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Cerium-141	1.39E+02	1.33E+02	1.04	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Cobalt-58	1.17E+02	1.12E+02	1.05	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Cobalt-60	2.05E+02	1.98E+02	1.04	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Chromium-51	3.41E+02	3.37E+02	1.01	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Cesium-134	1.30E+02	1.40E+02	0.93	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Cesium-137	1.78E+02	1.68E+02	1.06	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Iron-59	1.66E+02	1.41E+02	1.18	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Iodine-131	8.51E+01	8.14E+01	1.05	Acceptable
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Manganese-54	2.09E+02	1.90E+02	1.10	Acceptable

**TABLE D-4  
2019 ECKERT & ZIEGLER ANALYTICS PERFORMANCE  
EVALUATION RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
EZA	2nd/2019	07/29/19	E12362	Milk	pCi/L	Zinc-65	2.82E+02	2.47E+02	1.14	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Cerium-141	1.50E+02	1.45E+02	1.03	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Cobalt-58	1.22E+02	1.22E+02	1.00	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Cobalt-60	2.22E+02	2.16E+02	1.03	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Chromium-51	3.56E+02	3.68E+02	0.97	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Cesium-134	1.37E+02	1.53E+02	0.89	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Cesium-137	1.90E+02	1.84E+02	1.03	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Iron-59	1.73E+02	1.54E+02	1.12	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Iodine-131	8.92E+01	8.91E+01	1.00	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Manganese-54	2.27E+02	2.70E+00	1.10	Acceptable
EZA	2nd/2019	07/29/19	E12363	Water	pCi/L	Zinc-65	3.01E+02	2.70E+02	1.11	Acceptable
EZA	1st/2019	05/10/19	E12364	Cartridge	pCi	Iodine-131	7.80E+01	7.54E+01	1.03	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Cerium-141	1.23E+02	1.17E+02	1.05	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Cobalt-58	1.51E+02	1.43E+02	1.05	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Cobalt-60	3.12E+02	2.99E+02	1.04	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Chromium-51	3.04E+02	2.93E+02	1.04	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Cesium-134	1.53E+02	1.60E+02	0.96	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Cesium-137	2.04E+02	1.96E+02	1.04	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Manganese-54	1.55E+02	1.43E+02	1.08	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Iron-59	1.78E+02	1.59E+02	1.12	Acceptable
EZA	1st/2019	05/10/19	E12366A	Milk	pCi/L	Zinc-65	2.42E+02	2.20E+02	1.1	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Cerium-141	1.20E+02	1.13E+02	1.06	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Cesium-134	1.43E+02	1.55E+02	0.92	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Cesium-137	2.09E+02	1.91E+02	1.10	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Chromium-51	3.55E+02	2.84E+02	1.25	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Cobalt-58	1.43E+02	1.39E+02	1.03	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Cobalt-60	3.18E+02	2.90E+02	1.10	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Iodine-131	8.89E+01	9.65E+01	1.03	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Iron-59	1.76E+02	1.54E+02	1.14	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Manganese-54	1.55E+02	1.39E+02	1.12	Acceptable
EZA	1st/2019	05/10/19	E12367	Water	pCi/L	Zinc-65	2.44E+02	2.14E+02	1.14	Acceptable
EZA	3rd/2019	11/08/19	E12368	Cartridge	pCi	Iodine-131	9.93E+01	9.33E+01	1.06	Acceptable
EZA	3rd/2019	11/08/19	E12369	Milk	pCi/L	Strontium-89	8.71E+01	9.39E+01	0.93	Acceptable

**TABLE D-4**  
**2019 ECKERT & ZIEGLER ANALYTICS PERFORMANCE**  
**EVALUATION RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
EZA	3rd/2019	11/08/19	E12369	Milk	pCi/L	Strontium-90	7.02E+00	1.29E+01	0.54	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Cerium-141	1.69E+02	1.67E+02	1.01	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Cobalt-58	1.74E+02	1.75E+02	0.99	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Cobalt-60	2.08E+02	2.11E+02	0.99	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Chromium-51	3.64E+02	3.31E+02	1.1	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Cesium-134	1.93E+02	2.07E+02	0.93	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Cesium-137	1.49E+02	1.51E+02	0.99	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Iron-59	1.66E+02	1.48E+02	1.12	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Iodine-131	9.28E+01	9.21E+01	1.01	Acceptable
EZA	3rd/2019	11/08/19	E12370	Milk	pCi/L	Manganese-54	1.69E+02	1.54E+02	1.09	Acceptable
EZA	3rd/2019	11/08/19	E12371	Milk	pCi/L	Zinc-65	3.21E+02	2.93E+02	1.1	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Cerium-141	1.41E+02	1.27E+02	1.11	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Cobalt-58	1.36E+02	1.33E+02	1.03	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Cobalt-60	1.68E+02	1.60E+02	1.036	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Chromium-51	2.45E+02	2.51E+02	0.98	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Cesium-134	1.50E+02	1.57E+02	0.96	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Cesium-137	1.22E+02	1.14E+02	1.07	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Iron-59	1.27E+02	1.12E+02	1.13	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Iodine-131	9.34E+01	8.94E+01	1.04	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Manganese-54	1.34E+02	1.17E+02	1.15	Acceptable
EZA	3rd/2019	11/08/19	E12371	Water	pCi/L	Zinc-65	2.57E+02	2.22E+02	1.16	Acceptable
EZA	4th/2019	02/05/20	E12372	Cartridge	pCi	Iodine-131	9.07E+01	8.88E+01	1.02	Acceptable
EZA	4th/2019	02/05/20	E12373	Milk	pCi/L	Strontium-89	6.60E+01	8.06E+01	0.82	Acceptable
EZA	4th/2019	02/05/20	E12373	Milk	pCi/L	Strontium-90	1.11E+01	1.10E+01	1.00	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Cerium-141	7.95E+01	8.30E+01	0.96	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Cobalt-58	8.93E+01	8.99E+01	0.99	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Cobalt-60	1.17E+02	1.15E+02	1.02	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Chromium-51	2.67E+02	2.41E+02	1.11	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Cesium-134	9.79E+01	1.13E+02	0.87	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Cesium-137	1.01E+02	1.02E+02	0.99	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Iron-59	1.01E+02	8.71E+01	1.16	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Iodine-131	9.34E+01	9.45E+01	0.99	Acceptable
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Manganese-54	1.34E+02	1.30E+02	1.03	Acceptable



**TABLE D-4**  
**2019 ECKERT & ZIEGLER ANALYTICS PERFORMANCE**  
**EVALUATION RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
EZA	4th/2019	02/05/20	E12374	Milk	pCi/L	Zinc-65	1.17E+02	1.59E+02	1.08	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Cerium-141	8.92E+01	8.41E+01	1.06	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Cobalt-58	9.54E+01	9.11E+01	1.05	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Cobalt-60	1.22E+02	1.17E+02	1.05	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Chromium-51	2.64E+02	2.44E+02	1.08	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Cesium-134	1.06E+02	1.14E+02	0.93	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Cesium-137	1.09E+02	1.03E+02	1.06	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Iron-59	9.32E+01	8.82E+01	1.06	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Iodine-131	1.04E+02	9.45E+01	1.10	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Manganese-54	1.44E+02	1.31E+02	1.10	Acceptable
EZA	4th/2019	02/05/20	E12375	Water	pCi/L	Zinc-65	1.91E+02	1.61E+02	1.19	Acceptable

**TABLE D-5**  
**2019 DEPARTMENT OF ENERGY MIXED ANALYTE PERFORMANCE EVALUATION**  
**PROGRAM (MAPEP) RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
MAPEP	2nd/2019	05/31/19	MAPEP-19-GrF40	Filter	Bq/sample	Gross alpha	0.540	0.528	0.158-0.898	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-GrF41	Filter	Bq/sample	Gross beta	0.928	0.948	0.474-1.422	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-GrW40	Water	Bq/L	Gross alpha	0.819	0.840	0.25-1.43	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-GrW40	Water	Bq/L	Gross beta	2.390	2.330	1.17-3.50	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Americium-241	52.8	49.9	34.9-64.9	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Cesium-134	2.25		False Pos Test	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Cesium-137	1290.00	1164.0	815-1513	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Cobalt-57	0.133		False Pos Test	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Cobalt-60	853	855	599-1112	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Iron-55	486	344	241-447	Not Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Manganese-54	1130	1027	719-1335	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Nickel-63	524.00	519	363-675	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Plutonium-238	75.2	71.0	49.7-92.3	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Plutonium-239/240	67.3	59.8	41.9-77.7	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Potassium-40	596	585	410-761	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Strontium-90	3.44		False Pos Test	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Technetium-99	381	408	286-530	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Uranium 234	54.7	56.0	39-73	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Uranium-238	204	205	144-267	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaS40	Soil	Bq/Kg	Zinc-65	751	668	468-868	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Americium-241	0.549	0.582	0.407-0.757	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Cesium-134	5.32	5.99	4.19-7.79	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Cesium-137	0.0		False Pos Test	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Cobalt-57	9.840	10	7.0-13.0	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Cobalt-60	6.7	6.7	4.7-8.7	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Hydrogen-3	389.00	421	295-547	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Iron-55	0.0173		False Pos Test	Acceptable

**TABLE D-5**  
**2019 DEPARTMENT OF ENERGY MIXED ANALYTE PERFORMANCE EVALUATION**  
**PROGRAM (MAPEP) RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Manganese-54	8.80	8.4	5.9-10.9	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Nickel-63	4.62	5.8	4.1-7.5	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Plutonium-238	0.419	0.451	0.316-0.586	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Plutonium-239/240	0.0158	0.0045	Sens. Eval.	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Potassium-40	-0.156		False Pos Test	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Radium-226	0.593	0.672	0.470-0.874	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Strontium-90	5.86	6.350	4.45-8.26	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Technetium-99	3.66	3.3	2.34-4.34	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Uranium-234	0.81	0.8	0.56-1.04	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Uranium-238	0.802	0.81	0.57-1.05	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-MaW40	Water	Bq/L	Zinc-65	-0.0318		False Pos Test	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	ug/sample	Uranium-235	0.0566	0.0640	0.0448-0.0832	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	ug/sample	Uranium-238	7.76	8.8	6.2-11.4	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	ug/sample	Uranium-Total	7.72	8.9	6.2-11.6	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	Bq/sample	Americium-241	0.0284	0.0294	0.0206-0.0382	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	Bq/sample	Cesium-134	0.251	0.216	0.151-0.281	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	Bq/sample	Cesium-137	0.313	0.290	0.203-0.377	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	Bq/sample	Cobalt-57	0.424	0.411	0.288-0.534	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	Bq/sample	Cobalt-60	0.373	0.34	0.238-0.442	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	Bq/sample	Manganese-54	0.576	0.547	0.383-0.711	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	Bq/sample	Plutonium-238	0.0551	0.0526	0.0368-0.0684	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	Bq/sample	Plutonium-239/240	0.0377	0.038	0.0265-0.0493	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	Bq/sample	Strontium-90	0.616	0.662	0.463-0.861	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	Bq/sample	Uranium-234	0.108	0.106	0.074-0.138	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	Bq/sample	Uranium-238	0.118	0.110	0.077-0.143	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdF40	Filter	Bq/sample	Zinc-65	0.0143		False Pos Test	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdV40	Vegetation	Bq/sample	Americium-241	0.000092		False Pos Test	Acceptable

**TABLE D-5**  
**2019 DEPARTMENT OF ENERGY MIXED ANALYTE PERFORMANCE EVALUATION**  
**PROGRAM (MAPEP) RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdV40	Vegetation	Bq/sample	Cesium-134	2.25	2.44	1.71-3.17	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdV40	Vegetation	Bq/sample	Cesium-137	2.37	2.30	1.61-2.99	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdV40	Vegetation	Bq/sample	Cobalt-57	2.04	2.07	1.45-2.69	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdV40	Vegetation	Bq/sample	Cobalt-60	-0.0061		False Pos Test	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdV40	Vegetation	Bq/sample	Manganese-54	0.00255		False Pos Test	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdV40	Vegetation	Bq/sample	Plutonium-238	0.0247	0.0339	0.0237-0.0441	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdV40	Vegetation	Bq/sample	Plutonium-239/240	0.0425	0.0460	0.0322-0.0598	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdV40	Vegetation	Bq/sample	Strontium-90	0.00951		False Pos Test	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdV40	Vegetation	Bq/sample	Uranium-234	0.20	0.217	0.152-0.282	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdV40	Vegetation	Bq/sample	Uranium-238	0.216	0.225	0.158-0.293	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-RdV40	Vegetation	Bq/sample	Zinc-65	1.85	1.71	1.20-2.22	Acceptable
MAPEP	2nd/2019	05/31/19	MAPEP-19-XaW40	Water	Bq/L	Iodine-129	0.64	0.62	0.431-0.801	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Americium-241	86.1	74.7	52.3-97.1	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Cesium-134	896	1020	714-1326	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Cesium-137	865	789	552-1026	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Cobalt-57	0.227		False Pos Test	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Cobalt-60	761	760	532-988	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Iron-55	-48.0		False Pos Test	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Manganese-54	816	745	522-969	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Nickel-63	552	629	440-818	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Plutonium-238	55.3	52.1	36.5-67.7	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Plutonium-239/240	59.9	61.4	43.0-79.8	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Potassium-40	604	555	389-722	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Strontium-90	609	572	400-744	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Technetium-99	514	593	415-771	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	U-234/233	125	116	81-151	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Uranium-238	122	117	82-152	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaS41	Soil	Bq/Kg	Zinc-65	-0.650		False Pos Test	Acceptable

**TABLE D-5**  
**2019 DEPARTMENT OF ENERGY MIXED ANALYTE PERFORMANCE EVALUATION**  
**PROGRAM (MAPEP) RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Americium-241	0.511	0.522	0.365-0.679	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Cesium-134	0.0266		False Pos Test	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Cesium-137	19.70	18.4	12.9-23.9	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Cobalt-57	16.2	15.6	10.9-20.3	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Cobalt-60	9.01	8.8	6.2-11.4	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Hydrogen-3	166	175	123-228	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Iron-55	13.80	15.7	11.0-20.4	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Manganese-54	22.6	20.6	14.4-26.8	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Nickel-63	9.26	9.7	6.8-12.6	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Plutonium-238	0.0164	0.0063	Sens. Evaluation	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Plutonium-239/240	0.701	0.727	0.509-0.945	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Potassium-40	-0.121		False Pos Test	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Radium-226	0.481	0.307	0.215-0.399	Not Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Strontium-90	9.34	10.60	7.4-13.8	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Technetium-99	0.119		False Pos Test	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Uranium-234/233	1.09	1.07	0.75-1.39	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Uranium-238	1.12	1.05	0.74-1.37	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-MaW41	Water	Bq/L	Zinc-65	23.1	20.3	5.27-9.79	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	ug/sample	Uranium-235	0.0565	0.0565	0.0396-0.0735	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	ug/sample	Uranium-238	7.8	7.7	5.4-10.0	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	ug/sample	Uranium-Total	7.9	7.8	5.5-10.1	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	Bq/sample	Americium-241	0.00106		False Pos Test	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	Bq/sample	Cesium-134	0.00080		False Pos Test	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	Bq/sample	Cesium-137	1.63	1.58	1.11-2.05	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	Bq/sample	Cobalt-57	1.23	1.16	0.81-1.51	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	Bq/sample	Cobalt-60	0.783	0.815	0.571-1.060	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	Bq/sample	Manganese-54	1.35	1.37	0.96-1.78	Acceptable

**TABLE D-5**  
**2019 DEPARTMENT OF ENERGY MIXED ANALYTE PERFORMANCE EVALUATION**  
**PROGRAM (MAPEP) RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	Bq/sample	Plutonium-238	0.0755	0.0761	0.0533-0.0989	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	Bq/sample	Plutonium-239/240	0.0485	0.0468	0.0328-0.0608	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	Bq/sample	Strontium-90	0.442	0.498	0.349-0.647	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	Bq/sample	Uranium-234/233	0.0965	0.093	0.065-0.121	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	Bq/sample	Uranium-238	0.0935	0.096	0.067-0.125	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdF41	Filter	Bq/sample	Zinc-65	1.09	1.06	0.74-1.38	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdV41	Vegetation	Bq/sample	Americium-241	0.0958	0.090	0.063-0.117	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdV41	Vegetation	Bq/sample	Cesium-134	0.0190		False Pos Test	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdV41	Vegetation	Bq/sample	Cesium-137	3.34	3.28	2.30-4.26	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdV41	Vegetation	Bq/sample	Cobalt-57	4.50	4.57	3.20-5.94	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdV41	Vegetation	Bq/sample	Cobalt-60	5.34	5.30	3.71-6.89	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdV41	Vegetation	Bq/sample	Manganese-54	4.57	4.49	3.14-5.84	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdV41	Vegetation	Bq/sample	Plutonium-238	0.0882	0.081	0.057-0.105	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdV41	Vegetation	Bq/sample	Plutonium-239/240	0.00127		False Pos Test	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdV41	Vegetation	Bq/sample	Strontium-90	0.847	1.00	0.70-1.30	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdV41	Vegetation	Bq/sample	Uranium-234/233	0.0656	0.0647	0.0453-0.0841	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdV41	Vegetation	Bq/sample	Uranium-238	0.0660	0.0670	0.0469-0.871	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-RdV41	Vegetation	Bq/sample	Zinc-65	2.89	2.85	2.00-3.71	Acceptable
MAPEP	4th/2019	12/13/19	MAPEP-19-XaW41	Alk. Water	Bq/L	Iodine-129	1.69	1.78	1.25-2.31	Acceptable

**TABLE D-6**  
**2019 ERA PROGRAM (MRAD) PERFORMANCE EVALUATION RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range	Evaluation
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Actinium-228	3060	3280	2160 - 4130	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Americium-241	346	474	256 - 671	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Bismuth-212	3200	3400	973 - 5070	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Bismuth-214	1160	1370	658 - 2040	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Cesium-134	6590	9280	6350 - 11100	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Cesium-137	831	1030	779 - 1300	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Cobalt-60	4830	5880	4630 - 7260	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Lead-212	3360	3380	2360 - 4270	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Lead-214	1500	1450	609 - 2280	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Manganese-54	<25.4	<1000	<1000	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Plutonium-238	955	1220	608 - 1850	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Plutonium-239	579	829	452 - 1190	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Potassium-40	25800	24300	16700 - 29000	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Strontium-90	1220	1350	420 - 2100	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Thorium-234	1050	1470	555 - 2520	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Uranium-234	1170	1050	492 - 1380	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Uranium-234	925	1050	492 - 1380	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Uranium-234	925	1050	492 - 1380	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Uranium-238	437	1030	565 - 1380	Not Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Uranium-238	928	1030	565 - 1380	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Uranium-238	880	1030	565 - 1380	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Uranium-Total	2090	2030	1130 - 2620	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Uranium-Total	1910	2030	1130 - 2620	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	µg/kg	Uranium-Total (mass)	1360	2420	1090 - 3270	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	µg/kg	Uranium-Total (mass)	2780	2420	1090 - 3270	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	µg/kg	Uranium-Total (mass)	2630	2420	1090 - 3270	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Soil	pCi/kg	Zinc-65	1300	1460	1170 - 1990	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	pCi/kg	Americium-241	2090	1680	1040 - 2370	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	pCi/kg	Cesium-134	1590	1640	1090 - 2180	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	pCi/kg	Cesium-137	1510	1410	1080 - 1900	Acceptable

**TABLE D-6**  
**2019 ERA PROGRAM (MRAD) PERFORMANCE EVALUATION RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range	Evaluation
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	pCi/kg	Cobalt-60	1200	1000	785 - 1310	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	pCi/kg	Curium-244	87.1	87.3	49.2 - 109	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	pCi/kg	Manganese-54	<35.9	<300	<300	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	pCi/kg	Plutonium-238	110	76	52.6 - 98.0	Not Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	pCi/kg	Plutonium-239	1150	941	650 - 1190	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	pCi/kg	Potassium-40	41500	34500	25900 - 43700	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	pCi/kg	Strontium-90	4670	3530	1990 - 4600	Not Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	pCi/kg	Uranium-234	1210	961	675 - 1230	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	pCi/kg	Uranium-238	1230	953	673 - 1190	Not Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	pCi/kg	Uranium-Total	2540	1940	1240 - 2620	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	µg/kg	Uranium-Total (mass)	3720	2830	2170 - 3500	Not Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Vegetation	pCi/kg	Zinc-65	715	527	393 - 781	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Americium-241	18.7	18.7	13.3 - 24.9	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Cesium-134	639	721	468 - 884	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Cesium-137	627	634	521 - 832	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Cobalt-60	103	93.8	79.7 - 119	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Iron-55	613	718	262 - 1150	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Manganese-54	<3.29	<50.0	<50.0	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Plutonium-238	31.1	33.8	25.5 - 41.5	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Plutonium-239	62	67	50.1 - 80.8	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Strontium-90	169	181	114 - 246	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Uranium-234	17.1	18.2	13.5 - 21.3	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Uranium-234	16.4	18.2	13.5 - 21.3	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Uranium-238	16.9	18.1	13.7 - 21.6	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Uranium-238	16	18.1	13.7 - 21.6	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Uranium-Total	33.1	37.1	27.1 - 44.0	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Uranium-Total	34.7	37.1	27.1 - 44.0	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	µg/Filter	Uranium-Total (mass)	50.9	54.1	43.4 - 63.4	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	µg/Filter	Uranium-Total (mass)	48	54.1	43.4 - 63.4	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Zinc-65	1520	1380	1130 - 2110	Acceptable



**TABLE D-6**  
**2019 ERA PROGRAM (MRAD) PERFORMANCE EVALUATION RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range	Evaluation
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Gross Alpha	43	50.3	26.3 - 82.9	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Filter	pCi/Filter	Gross Beta	75.7	78.6	47.7 - 119	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Americium-241	180	168	115 - 215	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Cesium-134	116	123	92.9 - 135	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Cesium-137	126	125	107 - 142	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Cobalt-60	1200	1100	949 - 1260	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Iron-55	1310	1320	776 - 1920	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Manganese-54	<5.6	<100	<100	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Plutonium-238	41.2	42.8	25.7 - 55.5	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Plutonium-239	117	123	76.1 - 152	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Strontium-90	365	315	227 - 389	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Uranium-234	56.3	55.2	42.0 - 63.1	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Uranium-234	56	55.2	42.0 - 63.1	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Uranium-234	53.7	55.2	42.0 - 63.1	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Uranium-234	56	55.2	42.0 - 63.1	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Uranium-238	55.3	54.7	42.4 - 64.4	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Uranium-238	51.8	54.7	42.4 - 64.4	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Uranium-238	51	54.7	42.4 - 64.4	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Uranium-Total	107.3	112	87.4 - 128	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Uranium-Total	113	112	87.4 - 128	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	µg/L	Uranium-Total (mass)	166	163	132 - 185	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	µg/L	Uranium-Total (mass)	153	163	132 - 185	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Zinc-65	1990	1780	1580 - 2250	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Gross Alpha	79.8	68.5	25.0 - 94.5	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Gross Beta	140	151	75.5 - 208	Acceptable
ERA	2nd/2019	05/21/19	MRAD-30	Water	pCi/L	Tritium	22200	23700	17900 - 28800	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Actinium-228	3730	3170	2090 - 3990	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Americium-241	1740	1920	1040 - 2720	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Bismuth-212	4130	3280	939 - 4890	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Bismuth-214	1370	1330	638 - 1980	Acceptable

**TABLE D-6**  
**2019 ERA PROGRAM (MRAD) PERFORMANCE EVALUATION RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range	Evaluation
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Cesium-134	7600	7650	5230 - 9140	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Cesium-137	1350	1230	930 - 1560	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Cobalt-60	3840	3710	2920 - 4580	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Lead-212	4300	3350	2340 - 4240	Not Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Lead-214	1740	1450	609 - 2280	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Manganese-54	<26.5	<1000	<1000	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Plutonium-238	680	546	272 - 830	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Plutonium-239	1010	1090	594 - 1570	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Potassium-40	26200	24700	17000 - 29500	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Strontium-90	1660	1910	594 - 2980	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Thorium-234	1580	1360	513 - 2330	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Uranium-234	1140	1030	483 - 1350	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Uranium-234	1290	1030	483 - 1350	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Uranium-238	1080	974	534 - 1310	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Uranium-238	1070	974	534 - 1310	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Uranium-Total	2290	1930	1070 - 2500	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	pCi/kg	Uranium-Total	2409	1930	1070 - 2500	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	µg/kg	Uranium-Total (mass)	3250	2410	1090 - 3250	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	µg/kg	Uranium-Total (mass)	3200	2410	1090 - 3250	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Soil	µg/kg	Zinc-65	3100	2690	2150 - 3670	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Americium-241	2070	2050	1270 - 2900	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Cesium-134	1910	2210	1470 - 2940	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Cesium-137	2500	2480	1910-3340	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Cobalt-60	604	607	476 - 793	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Curium-244	2760	3010	1700 - 3740	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Manganese-54	<35.4	<300	<300	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Plutonium-238	2120	1920	1330 - 2480	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Plutonium-239	2860	2600	1800 - 3290	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Potassium-40	41600	39300	29500 - 49800	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Strontium-90	4010	3940	2220 - 5130	Acceptable

**TABLE D-6**  
**2019 ERA PROGRAM (MRAD) PERFORMANCE EVALUATION RESULTS (GEL)**

PT Provider	Quarter / Year	Report Received Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range	Evaluation
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Uranium-234	3510	3320	2330 - 4230	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Uranium-238	3620	3290	2320 - 4110	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Uranium-Total	7360	6670	4260 - 8990	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Uranium-Total (mass)	10900	9730	7470 - 12100	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Vegetation	pCi/kg	Zinc-65	1860	1620	1210 - 2400	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Filter	pCi/Filter	Americium-241	34.5	32	22.8 - 42.7	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Filter	pCi/Filter	Cesium-134	55.6	59	38.3 - 72.3	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Filter	pCi/Filter	Cesium-137	443	437	359 - 573	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Filter	pCi/Filter	Cobalt-60	63.7	58.4	49.6 - 74.2	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Iron-55	1410	1460	858 - 2120	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Manganese-54	<7.24	<100	<100	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Plutonium-238	41.2	47.8	28.7 - 61.9	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Plutonium-239	36.9	46.8	29.0 - 57.7	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Strontium-90	508	481	346 - 595	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Uranium-234	135	139	106 - 159	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Uranium-234	138	139	106 - 159	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Uranium-238	141	137	106 - 161	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Uranium-238	118	137	106 - 161	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Uranium-Total	285	282	220 - 321	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Uranium-Total	261.3	282	220 - 321	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	µg/L	Uranium-Total (mass)	424	411	333 - 466	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	µg/L	Uranium-Total (mass)	353	411	333 - 466	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Zinc-65	1490	1370	1220 - 1730	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Gross Alpha	147	124	45.3 - 171	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Gross Beta	72.9	68	34.0 - 93.6	Acceptable
ERA	4th/2019	11/19/19	MRAD-31	Water	pCi/L	Tritium	20900	22300	16800 - 27100	Acceptable