



William G. Hettel
Columbia Generating Station
P.O. Box 968, MD PE23
Richland, WA 99352-0968
Ph. 509.377.8311 | F. 509.377.4674
wghettel@energy-northwest.com

May 11, 2017
GO2-17-091

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Subject: **COLUMBIA GENERATING STATION, DOCKET NO. 50-397
INDEPENDENT SPENT FUEL STORAGE INSTALLATION, DOCKET NO. 72-35
2016 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT**

References: 1. Columbia Generating Station Technical Specification 5.6.1
2. Independent Spent Fuel Storage Installation Technical Specification 5.4.c
3. EFSEC Resolution No. 332, February 21, 2012

Dear Sir or Madam:

In accordance with the requirements of References 1-3, the subject report is submitted as an enclosure to this letter. This letter contains no regulatory commitments. If you have questions regarding this information, please contact DL Mee at (509) 377-2360.

Executed on this 9th day of MAY, 2017.

Respectfully,

A handwritten signature in blue ink, appearing to read "W. G. Hettel", with a long horizontal flourish extending to the right.

WG Hettel
Vice President, Operations

Enclosure – as stated

cc: NRC Region IV Administrator
NRC NRR Project Manager
NRC Sr. Resident Inspector (988C)
CD Sonoda – BPA/1399
WA Horin (Winston & Strawn)
J. Laspina – ESFEC

Director, SFPO-NRC NMSS
M. Priddy (WDOH)
L. Albin (WDOH)
P. Miller (WDFW)
J. Ayres (WDOE)



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COLUMBIA GENERATING STATION

2016 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT FOR THE COLUMBIA GENERATING STATION





COLUMBIA GENERATING STATION

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

2016 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

For Calendar Year 2016

Preparation Date: April 2017

Submitted Date: May 2017

Authored By :

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

David Mee, ENW Environmental Services

Reviewed By:

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

Elisa Nguyen, ENW Environmental Services

Approved By:

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

Brad Barfuss, ENW Environmental Services Supervisor

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1.0 EXECUTIVE SUMMARY	1-1
2.0 DEFINITIONS	2-1
3.0 INTRODUCTION	3-1
3.1 Site Description	3-1
3.2 Program Background	3-1
3.3 Program Objectives	3-2
4.0 PROGRAM DESCRIPTION	4-1
4.1 Sample Locations	4-1
4.2 Independent Spent Fuel Storage Installation (ISFSI)	4-1
4.3 Land Use Census	4-2
4.4 Sampling Methods	4-2
4.4.1 Direct Radiation	4-2
4.4.2 Airborne - Particulate/Iodine	4-3
4.4.3 Water	4-3
4.4.4 Soil	4-4
4.4.5 Sediment	4-4
4.4.6 Fish	4-5
4.4.7 Milk	4-5
4.4.8 Garden Produce	4-5
4.5 Split Sample Program	4-6
4.6 Sample Analyses	4-5
4.6.1 Analysis of TLDs	4-6
4.6.2 Gross Beta Activity on Air Particulate Filters	4-6
4.6.3 Measurement of Gamma Emitting Radionuclides	4-7
4.6.4 Gross Alpha and Gross Beta Activity in Water	4-7
4.6.5 Tritium in Water	4-7
4.6.6 Low Level Radioiodine in Milk and Water	4-8

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
4.6.7 Carbon-14	4-8
4.6.8 Strontium-89/90, Iron-55, and Nickel-63	4-8
4.7 Data Analysis Methods	4-8
4.8 Changes to the Sampling Program in 2016	4-9
5.0 RESULTS AND DISCUSSION	5-1
5.1 Direct Radiation	5-1
5.2 Airborne Particulate/Iodine	5-3
5.3 Water	5-5
5.3.1 Surface Water	5-5
5.3.2 Ground Water	5-6
5.4 Soil	5-7
5.5 River Sediment	5-7
5.6 Fish	5-7
5.7 Milk	5-8
5.8 Garden Produce	5-8
5.9 Special Interest Stations	5-8
5.9.1 Evaporation Pond (Station 101B)	5-8
5.9.2 Sanitary Waste Treatment Facility (Station 102B)	5-9
5.9.3 Cooling System Sediment Disposal Area (Station 119)	5-9
5.9.4 Spray Pond Drain Field (Station 120)	5-11
5.9.5 Independent Spent Fuel Storage Installation	5-11
5.9.6 Miscellaneous Environmental Sample Results	5-12
5.10 2016 Sample Deviations	5-13

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
6.0 QUALITY ASSURANCE AND QUALITY CONTROL	6-1
6.1 Quality Control for the Energy Northwest Environmental TLD Program	6-1
6.2 Quality Control for the Environmental Sample Program	6-1
6.2.1 Sample Collection Quality Control	6-2
6.2.2 Laboratory Instruments Quality Control	6-2
6.2.3 Sample Batch Quality Control	6-2
6.3 Laboratory Intercomparison Program Participation and Results	6-3
6.4 Laboratory Quality Control Program Problems and Improvements	6-3
7.0 REFERENCES	7-1
8.0 ERRATA	8-1

APPENDIX A. Data Tables A and B

LIST OF TABLES

<u>TABLE</u>		<u>PAGE</u>
4-1	Radiological Environmental Monitoring Program Sampling Plan	4-10
4-2	REMP Sample Stations and Requirements	4-12
4-3	2016 Five Mile Land Use Census Results	4-16
4-4	Comparison of Laboratory Nominal Lower Limits of Detection With Offsite Dose Calculation Manual Requirements	4-17
5-1a	REMP Sample Deviations for 2016	5-13
5-1b	CGS REMP Air Sample Percent in Service Time for 2016	5-14
5-2	Radiological Environmental Monitoring Program Summary	5-15
5-3	Quarterly TLD Data Summary with Comparison to the Preoperational and Operational Periods	5-25
6-1	2016 Environmental Spiked Dosimeter Results	6-4
6-2	ENW REMP Program Cross Check Performance Results	6-5

LIST OF FIGURES

<u>FIGURE</u>	<u>PAGE</u>
4-1 Select REMP Sampling Locations Within 0.8 Miles of CGS	4-18
4-2 Select REMP Sampling Locations Between 0.8 and 2.8 Miles	4-19
4-3 Select REMP Sampling Locations Beyond 2.8 Miles	4-20
4-4 ISFSI TLD Station Layout	4-21
5-1 "S" Stations Quarterly TLDs 1984-2015 Hi/Low/Mean and 2016 Mean by Sector	5-1
5-2 Near Plant Stations Quarterly TLDs 1984-2015 Hi/Low/Mean and 2016 Mean by Sector	5-2
5-3 Remote Stations Quarterly TLDs 1984-2015 Hi/Low/Mean and 2016 Mean by Sector	5-2
5-4 1985-2015 Weekly Hi/Low/Mean and 2016 Weekly Mean Gross Beta in Air-Near Plant Stations	5-3
5-5 1985-2015 Weekly Hi/Low/Mean and 2016 Weekly Mean Gross Beta in Air-Remote Stations	5-4
5-6 Gross Beta in River/Drinking (Stations 26 & 29) and Plant Discharge Water (Station 27) for 2016	5-5
5-7 Tritium in River/Drinking (Stations 26 & 29) and Plant Discharge Water (Station 27) for 2016	5-6
5-8 Cooling System Sediment Activity Levels for Disposals Made in 2016	5-10
5-9 ISFSI TLD Trend at CGS	5-11

1.0 EXECUTIVE SUMMARY

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The primary purpose of the Energy Northwest Radiological Environmental Monitoring Program (REMP) is to evaluate the radiological impact that Columbia Generating Station (CGS) operation may have on the environment. Sampling is performed as specified in the Offsite Dose Calculation Manual (ODCM) and agreements made with the State of Washington Energy Facility Site Evaluation Council (EFSEC). Additional sampling is also performed to meet Nuclear Energy Institute (NEI) guidelines or as an Energy Northwest initiative. The program serves to validate CGS effluent measurements and exposure pathway models and to provide a documented, historical record of CGS impact on the environment. This report serves to document and communicate the program results and findings for calendar year 2016.

A variety of environmental samples are routinely collected and analyzed by the REMP. The types of samples collected include air, water, soil, sediment, milk, fish, and garden produce. Additionally, the program continuously monitors direct radiation at numerous locations surrounding CGS. Analysis results are trended and compared to results from control locations, results obtained in previous operational and pre-operational periods, and regulatory limits.

The results contained in this report show that all identified radiological impact to the environment attributable to CGS operation was limited to areas within the CGS controlled area. All routine sample results were consistent with the results obtained from control locations, results from the preoperational period, and historical results collected since CGS began commercial operation. All activity identified within the controlled area is attributed to rain-washout (recapture) of gaseous activity exiting the plant vent system via an approved and monitored effluent pathway. All radioactive material identified outside the CGS controlled area was of natural origin or known to be present in the environment around CGS in the quantities identified. No radioactive material related to CGS operation was identified beyond the CGS controlled area. The results are consistent with and verify CGS effluent measurements and modeling of the exposure pathways. Below is a summary of the 2016 results by exposure pathway:

Direct Radiation - No impact was identified at locations beyond the CGS controlled area. Within the controlled area, the only impact identified was at locations known to be influenced by the Independent Spent Fuel Storage Installation (ISFSI) or radiation from the turbine building during operation.

Airborne - No impact due to CGS operation was identified. No radioiodines or other radionuclides related to CGS operation were identified in any of the environmental air samples.

Ingestion - No impact due to CGS operation identified in any of the milk, fish, or food product sample results. Carbon 14 concentrations in local fruit samples were at levels expected due solely to natural background contributions.

Waterborne - No impact was identified at surface/drinking water locations outside the CGS controlled area. Low level tritium activity was identified in evaporation pond, storm drain, and rain water samples collected at locations within the CGS controlled area; recapture of CGS effluent tritium was the source of this activity. All storm drain water originating from the CGS protected area was directed to lined evaporation ponds and did not have a pathway to groundwater. Radionuclides related to CGS operation were identified at low levels in evaporation pond and cooling tower sediment. The source of this activity is attributed to recapture

and concentration of CGS effluent activity. Tritium activity identified in groundwater samples was at levels historically observed and consistent with levels known to exist in Hanford groundwater. No evidence that CGS operation contributed to groundwater tritium levels was identified. Radionuclide activity identified in river sediment is consistent with activity levels known to exist in Hanford area sediment and soils.

2.0 DEFINITIONS

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a priori: refers to a “before the fact” limit that represent the capabilities of a measurement system and not a limit for a particular measurement.

a posteriori: refers to an “after the fact” limit determined for a particular measurement and not a limit for a measurement system.

Airborne Activity Sampling: Continuous sampling of air through the collection of particulates and radionuclides on filter media. Periodic soil samples are collected for gamma isotopic analysis to provide information on deposition to the soil from airborne releases.

Alpha Particle (α): A charged particle emitted from the nucleus of an atom having a mass and charge equal in magnitude of a helium nucleus.

Becquerel (Bq): One disintegration per second. One picocurie (pCi) equals 0.037 becquerel.

Beta Particle (β): Charged particle emitted from the nucleus of an atom with a mass and charge equal in magnitude to that of an electron.

Blank Sample: A sample of the same media as the field sample being analyzed but without any radionuclide(s) being measured. It enables correction for the inherent sample background.

CGS: Columbia Generating Station, formerly referred to as WNP-2.

CGS Controlled Area: The area within a 1.2 mile radius of the CGS reactor building and a narrow corridor extending from CGS east to the Columbia River.

CGS Protected Area: The area within the security fence surrounding CGS. Access to this area requires a security badge or escort.

Composite Sample: A series of single collected portions (aliquots) analyzed as one sample. The aliquots making up the sample are collected at time intervals that are very short compared to the composite period.

Control Station: A sampling station in a location not likely to be affected by plant effluents due to its distance and/or direction from the Columbia Generating Station.

Counting Error: An estimate of the two-sigma uncertainty associated with the sample results based on respective count times.

$$+ / - 2\sqrt{(SampleCPM/CountTime + BkgCPM/CountTime)}$$

Curie (Ci): A measure of radioactivity; equal to 3.7×10^{10} disintegrations per second, or 2.22×10^{12} disintegrations per minute.

Direct Radiation Monitoring: The measurement of radiation dose at various distances from the plant is assessed using thermoluminescent dosimeters and pressurized ionization chambers.

DOE: U.S. Department of Energy.

DOH: Washington State Department of Health.

EFSEC: Energy Facility Site Evaluation Council.

HEDP: Hanford External Dosimetry Program. Supplier of environmental TLDs for the CGS REMP

FFTF: Fast Flux Test Facility. This facility is referred to as the DOE 400 area throughout this report.

Flow Proportional Sampling: Sample collection volume or frequency determined as a function of the flow rate of the water being sampled.

Grab Sample: A single discrete sample drawn at one point in time.

IDC: Energy Northwest Industrial Development Complex, formerly referred to as the WNP-1 and WNP-4 sites.

Indicator Station: A sampling location that is likely to be affected by plant effluents due to its proximity and/or direction from the Columbia Generating Station.

Ingestion Pathway Monitoring: The ingestion pathway includes milk, fish, and garden produce. Also sampled (under special circumstances) are other media such as vegetation and animal products such as eggs and meat when additional information about particular radionuclides is needed.

ISFSI: Independent Spent Fuel Storage Installation.

Lower Limit of Detection (LLD): 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 a 5% probability of a false conclusion that a blank observation represents “real” signal.

Mean: The average, i.e., the sum of results divided by the number of results.

Microcurie: 3.7×10^4 disintegrations per second, or 2.22×10^6 disintegrations per minute.

Milliroentgen (mR): 1/1000 Roentgen; a unit of exposure to X or gamma radiation.

MDA: Minimum Detectable Activity.

MDC: Minimum Detectable Concentration.

NEI: Nuclear Energy Institute

NIST: National Institute of Standards and Technology.

NPDES: National Pollutant Discharge Elimination System.

NRC: U.S. Nuclear Regulatory Commission.

ODCM: Offsite Dose Calculation Manual. Licensing document that contains the NRC mandated effluent and offsite radiological monitoring requirements.

Picocurie (pCi): 1×10^{-12} Curie or one millionth of a microcurie. 1 picocurie equal 0.037 becquerel or 2.22 disintegrations per minute

Protected Area: The fenced area immediately surrounding CGS. Access to the protected area requires a security badge or escort.

Radioiodine: Radioisotopes of iodine. For commercial nuclear reactors, iodine-131 to iodine-135 are the principle radioiodines of concern. Due to its longer half-life, iodine-131 is the most probable radioiodine identifiable in the environment.

REMP: Radiological Environmental Monitoring Program.

Range: The difference between the smallest and largest results.

Restricted Area: Any area where access is controlled for the purpose of protecting individuals from exposure to radiation or radioactive materials.

Roentgen: Unit of exposure to ionizing radiation in air.

Site Certification Agreement (SCA): The initial Columbia Generating Station licensing agreement with the State of Washington. The REMP sampling commitments in the SCA have been modified by EFSEC agreements.

Spiked Sample: A sample that has had a known quantity of radionuclide(s) added for the purposes of assessing analytical performance.

Standard Deviation: A measure of the scatter of a set of observations (or samples) around their mean value. Indicated by " σ ".

Standard Error of the Mean: An estimate of the uncertainty associated with the mean of observation (or sample) averages. Also known as the standard deviation.

$$SE = \sqrt{\frac{S^2}{n}}$$

where S^2 , the variance is

$$S^2 = \frac{1}{(n-1)} \sum^n (X_i - \bar{X})^2$$

SWTF: Sanitary Waste Treatment Facility. The sanitary waste processing facility for the Columbia Generating Station and other ENW facility near the CGS site.

TEDA: triethylene diamine. A compound used in charcoal cartridge filters to collect radioiodine.

Thermoluminescent Dosimeter (TLD): A device used to measure the amount of exposure to radiation. A crystal phosphor that stores energy proportional to the amount of exposure; the exposure level is determined by heating the crystal and reading the amount of emitted light.

3.0 INTRODUCTION

3.0 INTRODUCTION

3.1 Site Description

The Columbia Generating Station (CGS) is a 1230 MWe commercial nuclear power plant that achieved initial criticality on January 19, 1984. The plant is located in a sparsely populated shrub-steppe region within the Department of Energy (DOE) Hanford Site in southeastern Washington. The plant is approximately three miles west of the Columbia River and is surrounded on all sides by uninhabited desert land. The nearest large population centers are Richland, Pasco and Kennewick, which are 12 miles south, 18 miles southeast, and 21 miles southeast, respectively. The nearest privately owned lands are located approximately four miles east-northeast of the plant, across the Columbia River. The site has a bimodal wind pattern with winds primarily from the northwest and south.⁽¹⁾ The primary region of focus for REMP sampling is the farming region east of the plant.

Naturally occurring radionuclides exist in detectable quantities throughout the world and are seen in many of the samples collected for the REMP. Some examples of naturally occurring radionuclides that are frequently seen in samples are potassium-40, beryllium-7, actinium-228 (present as a decay product of radium-228), and radium-226. Additionally, some relatively long lived anthropogenic radioisotopes, such as strontium-90 and cesium-137, are also seen in some REMP samples; these radionuclides exist in measurable quantities throughout the world as a result of fallout from atmospheric nuclear weapons testing.^(2, 3)

Due to the location of CGS on the Hanford Site, there are other sources of reactor produced radionuclides in close proximity to the plant. CGS is unique in the U.S. commercial nuclear power industry in this respect. Hanford related radionuclides, most notably tritium, are identified in some CGS REMP samples. Though the presence of these radionuclides in the vicinity of CGS are not necessarily reflective of CGS activity, changes in the levels of these radionuclides are monitored to assess any contribution that CGS may be making to the established background. The DOE has an active environmental monitoring program for the Hanford Site that overlaps the CGS REMP.

3.2 Program Background

The CGS REMP is designed to conform to the Nuclear Regulatory Commission (NRC) Regulatory Guide 4.1,⁽⁴⁾ NUREG 1302,⁽⁵⁾ and the 1979 NRC Branch Technical Position.⁽⁶⁾ In addition, the REMP also meets the requirements of 10 CFR 72.44(d)(2)⁽²⁰⁾ for coverage of the ISFSI.

The quality assurance aspects of the sampling program and the thermoluminescent dosimetry are conducted in accordance with Regulatory Guides 4.15⁽⁷⁾ and 4.13.⁽⁸⁾ The REMP also adheres to the requirements of the State of Washington Energy Facility Site Evaluation Council (EFSEC),⁽⁹⁾ CGS Technical Specifications,⁽¹⁰⁾ and the CGS Offsite Dose Calculation Manual (ODCM).⁽¹¹⁾ These requirements cover the environmental sampling and sample analysis aspects of the program, and also the reporting and quality assurance requirements.

The preoperational phase of the program, which lasted from March 1978 until initial criticality in January 1984, provided a baseline of background environmental data. Variability in the background levels of radioactivity over time is due to differences in geologic composition, meteorological conditions, decay of nuclear testing fallout material in the environment, and seasonal changes. Variability in results may also have been introduced by changing analytical contractors and the use of different correction factors over the years.

In addition to evaluating environmental concentrations against regulatory limits, the REMP also compares some results to standards set by the State of Washington.^(12,13) Results may also be evaluated by comparing them to similar measurements made during the preoperational and previous operational periods and to the detection capabilities associated with the current methods of analysis.

All CGS REMP samples were collected by Energy Northwest Environmental Services personnel in 2016. Thermoluminescent dosimeters (TLDs) were analyzed by the Hanford External Dosimetry Program (HEDP) operated by Mission Support Alliance (MSA). Carbon 14 analysis was performed by the Washington State Department of Health Laboratory in Shoreline, WA. All other REMP sample analyses were performed by the Energy Northwest Environmental Services Laboratory located in Richland, WA.

3.3 Program Objectives

The REMP provides an independent mechanism for determining the levels of radioactivity in the plant environs in order to empirically quantify and qualify any radiological effect plant operation may be making on the environment. The program serves to ensure that any accumulation of radionuclides in the environment resulting from station operation will be identified promptly and before they become significant or exceed established limits.

While in-plant monitoring programs are used to ensure that 10 CFR 20⁽¹⁴⁾ and 10 CFR 50⁽¹⁵⁾ criteria for releases of radioactive effluents are met, the REMP further verifies that the measured concentrations of radioactive material and levels of radiation observed in the environment are not higher than expected based on CGS effluent measurements and modeling of the exposure pathways.

4.0 PROGRAM DESCRIPTION

4.0 PROGRAM DESCRIPTION

The ODCM contains the CGS licensing based sampling requirements for the REMP. Additional sampling requirements are specified in Resolutions or Council Orders issued by the State of Washington Energy Facility Site Evaluation Council (EFSEC). Some sampling is also performed as a CGS initiative in response to site specific or industry wide concerns. The sampling plan presented in Table 4-1 gives an overview of the REMP sampling routine, a summary of the sample locations, the specified collection frequency, and the types of analyses to be performed. The methods of sampling and sampling frequencies utilized in the program are mostly dictated by regulatory requirements. Factors such as nuclide half-lives and the major exposure pathways for the radionuclides potentially released from the plant have been taken into account in determining the sampling methodology.

4.1 Sample Locations

One hundred and fourteen sampling locations (referred to as 'stations') were included in the monitoring program during 2016. More than one sample type may be collected at a sample station. One hundred and five indicator and three control stations were located within a 10-mile radius of CGS. Six additional stations were located beyond the ten mile radius of the plant, two were indicator locations and four were control locations. Sample stations are listed in Tables 4-1 and 4-2. Most station locations are shown in Figures 4-1 to 4-4.

The locations of most sample stations have been selected on the basis of an exposure pathway analysis. The exposure pathway analysis was based on factors such as weather patterns, anticipated emissions, likely receptors, and land use in the surrounding areas. Samples collected from stations located in areas that potentially could be influenced by CGS operation are used as indicators. Samples collected from locations that are not likely to be influenced by CGS operation serve as controls. Results from indicator stations are compared to the results from control stations and results obtained during the previous operational and preoperational years of the program in order to assess the impact CGS operation may be having on the environment.

4.2 Independent Spent Fuel Storage Installation (ISFSI)

The Independent Spent Fuel Storage Installation (ISFSI) is a fenced, secured area constructed to provide a storage location for spent nuclear fuel. The spent fuel is stored in HI-STORM dry storage casks which are placed on concrete pads inside the facility. The pads are 30-feet wide by 147-feet long and each pad can hold up to 18 casks. The ISFSI is located approximately 500 meters north-northwest of the reactor building. Radiological exposure rates inside the ISFSI security fence line are elevated and access to the area requires radiological dosimetry and security notification. In addition to the TLD monitoring program, quarterly radiological surveys of the ISFSI are conducted by the CGS Radiation Protection Department.

Direct radiation monitoring of the ISFSI is performed using TLDs placed at 10 locations on the second of three security fences that surround the facility. The TLDs are exchanged quarterly. Two additional TLD locations, Station 121 located approximately 200 meters north of the turbine building, and Station 122 located approximately 100 meters north of the ISFSI, were established prior to ISFSI operation to specifically monitor ISFSI direct radiation. In the first quarter 2016, the REMP added two additional TLDs near the ISFSI in order to further aid in monitoring ISFSI direct radiation. These locations are Station 155, located WNW of the ISFSI, and Station 156, located to the NW of the ISFSI. Figure 4-1 shows the ISFSI location in relation to CGS and the position of these additional TLD locations.

Figure 4-4 shows the location of the TLD stations located around the ISFSI fence line. This arrangement of TLDs in conjunction with the radiological surveys conducted by the CGS Radiation Protection Department serves as the radiological monitoring program for the ISFSI.

In 2016, a third spent fuel storage pad was added to the CGS ISFSI. As part of the new pad construction, the east and west ISFSI fence lines were extended, a new south fence was installed, and the old south fence was removed. These changes required the relocation of three south fence line TLD stations starting at the beginning of the third quarter. The south fence line TLD locations; Stations 136A, 137A, and 138A, were moved to the new south fence and re-designated as Stations 136B, 137B, and 138B. Two additional TLD locations (Stations 130 and 131) are planned to be established east and west of the new pad in 2017. Figure 4-4 shows the updated ISFSI facility, the location of the new pad and south fence, and the locations of all ISFSI fence line TLD Stations.

4.3 Land Use Census

A land use census covering the areas within a five mile radius of CGS is performed annually. The objective of the land use census is to identify the locations of the nearest milk animal, residence, and garden greater than 500 ft² producing broadleaf vegetation. This information is used to determine whether any site located during the census has a calculated dose or dose commitment greater than the sites currently monitored for the same exposure pathway. If a new location with a higher dose commitment was found, routine sampling of that dose pathway would be initiated at that new site. The results of the 2016 five miles land use census are presented in Table 4-3.

4.4 Sampling Methods

Environmental samples are collected by Energy Northwest personnel in accordance with the program plan outlined in Table 4-1. Methods of sample collection and TLD handling are specified in REMP specific procedures. A general overview of the sampling methods used in the REMP is given below. Generic descriptions of the REMP sample analysis methods are given in section 4.6.

4.4.1 Direct Radiation

Direct radiation dose levels are monitored with Harshaw Model 8807 thermoluminescent dosimeters (TLDs). The TLDs are placed in the field between three and five feet above the ground. TLDs are wrapped in aluminum foil and sealed in plastic bags to prevent damage. TLDs are exchanged on a quarterly basis.

The locations of the TLD stations are listed in Table 4-2 and are shown in Figures 4-1 through 4-4. Station 9A near Sunnyside, WA serves as the environmental TLD control location. Station 119C serves as the control for Station 119B (the cooling system sediment disposal basin). The remaining TLDs deployed in the field serve as indicator TLDs.

The TLDs are arranged in a series of rings that encircle CGS. The innermost ring of TLD stations, referred to as the “S” stations, are located inside the CGS site boundary at distances that range from 0.3-0.8 miles from the reactor building centerline. The second ring of TLDs, referred to as the “near plant” stations, are located at distances ranging from 0.9 to 2.1 miles from the reactor building. The outer ring of TLDs are located at distances that range from a little under three miles to around ten miles. A MicroRem dose rate meter is available as a backup device and to take real time readings as needed.

4.4.2 Airborne - Particulate/Iodine

Weekly air particulate and radioiodine (iodine -131) samples are obtained through the use of low volume (1.5 cfm), constant flow-rate sampling units located at 12 locations. The samples collected at Station 9A (Figure 4-3) serve as controls, the samples collected at all other locations (Figures 4-1, 4-2, and 4-3) are indicators. Air particulate samples are collected using 47mm diameter glass fiber filters, air iodine samples are collected using Radeco CP-100 TEDA impregnated charcoal cartridges. The air particulate filter and charcoal cartridge are placed in tandem, particulate filter first, in a holder that attaches to the air inlet of the sampler unit. The sampler units are placed in ventilated metal weatherproof housing mounted on elevated platforms at each air sample location. The filter media are changed weekly. Four additional air sample monitor locations are available to monitor work at the DOE 618-11 burial site if needed.

4.4.3 Water

Water sampling is performed to meet ODCM and State of Washington EFSEC requirements, to comply with NEI guidelines, or as a CGS initiative. REMP water sampling can be categorized as follows:

- Intake-River/Drinking Water; two locations (Stations 26 and 29)
- Deep Groundwater; three locations (Stations 52, 31 and 32)
- Shallow Groundwater; nine locations (MW-3, 5, 6 and MW-9 through MW-14)
- Plant Discharge Water; one location (Station 27)
- Storm Drain Water; one location (Station 101B)
- Sanitary Wastewater; one location (Station 102B)

The sample at Station 26 is obtained using a composite sampler that draws water from the plant intake water system (TMU). The source of this water is the Columbia River. The station serves as a control location, as it is upstream of the plant discharge location, and also as a drinking water location as drinking water for CGS comes from this source. Station 29 is a composite sampler located at the City of Richland Water Treatment Plant located 11 miles downstream of the plant discharge. Station 29 is an indicator station for both river and drinking water.

The ODCM requirement for a downstream water sample is conservatively met by Station 27, a composite sampler that collects water from the cooling tower discharge line just prior to final discharge into the Columbia River. This sample reflects the radioactivity present in the plant discharge prior to any river dilution, rather than the concentrations that would be found after dilution in the mixing zone. Composite samples from Stations 26, 27, and 29 are collected monthly and analyzed for gamma emitting radionuclides, gross beta, and tritium.

Three drinking water wells on Energy Northwest property are used to provide deep groundwater samples. These wells are greater than 400 feet deep and provide samples from the confined aquifer under CGS. Station 52 is a deep well located 0.1 mile north of the CGS reactor building. Station 31 and 32 are deep wells at the IDC (ENW Industrial Development Complex) located 1.2 miles down gradient from CGS. Water from Station 52 can be used as a backup source for drinking water and fire protection. The IDC wells supply water for drinking and fire protection at the IDC site. All of these wells are considered indicator locations. Quarterly grab samples are collected from each well and analyzed for gamma emitting radionuclides and tritium.

The composite sampler at Station 101B collects samples of wastewater discharged to two evaporation ponds located on the CGS site. The water collected is storm drain, air wash, and non-radioactive system wastewater originating from within the CGS protected area. Samples are collected monthly on a flow proportional basis and analyzed for gross beta, gamma emitting radionuclides, and tritium. Sampling and analysis requirements for Station 101B are given in EFSEC Resolution 332⁽⁹⁾ and EFSEC Council Order 874.⁽²³⁾ Process wastewater originating outside of the CGS protected area is typically discharged to three additional evaporation ponds; the water discharged to these ponds is not sampled by the Station 101B composite sampler. Annual grab samples are collected from these three evaporation ponds and analyzed for gamma emitting radionuclides and tritium as specified by EFSEC Council Order 874.⁽²³⁾

The Sanitary Waste Treatment Facility (SWTF) receives sanitary waste water from CGS, the IDC (ENW Industrial Development Complex), and the Kootenai Building. Discharge standards and monitoring requirements for the SWTF are established in EFSEC Resolution No. 300.⁽¹⁶⁾ The Station 102B composite sampler collects a representative sample of water flowing into the head works at the SWTF. Monthly samples are collected and analyzed for gross alpha, gross beta, tritium, and gamma emitting radionuclides. Transfer of sanitary waste water from the DOE 400 area to the SWTF was terminated in December 2013.

Routine quarterly grab samples are taken as part of the REMP from nine shallow ground water monitoring wells surrounding CGS. The monitoring well locations are shown in Figure 4-1. The shallow groundwater wells are all less than 100 feet deep and allow samples to be obtained from the unconfined aquifer under CGS. None of the wells are used for drinking water. Sampling from these locations is performed to meet NEI 07-07 guidelines⁽¹⁷⁾ and requirements in the CGS NPDES permit.

4.4.4 Soil

Annual soil samples are a requirement of EFSEC Resolution No. 332.⁽⁹⁾ For 2016, two soil samples were collected from locations near CGS, two samples from farmland in Franklin County east of CGS, and one sample from a control location near Sunnyside, WA. Each sample was collected from an area of approximately one square foot to a depth of approximately one inch. Approximately one to two kilograms of soil is collected from each location. Soil samples are analyzed for gamma activity on a dry weight basis.

4.4.5 Sediment

River sediment samples are collected semiannually as required by the ODCM and EFSEC Resolution No. 332.⁽⁹⁾ The upstream sediment sample location (Station 33) is approximately two miles upriver from the plant discharge. The downstream sample (Station 34) is collected approximately one mile downstream from the plant discharge. Each sample consists of approximately two kilograms of shallow surface sediment scooped from areas known to be underwater during high water periods and where the potential for sediment accumulation is likely. Sediment samples are dried in an oven and then analyzed for gamma emitting radionuclides on a dry weight basis.

Cooling system sediment samples are collected and analyzed whenever cooling system sediment is added to the disposal cells (Station 119B, Figure 4-1). Disposal of cooling system sediment is made in accordance with EFSEC Resolution No. 299.⁽¹⁸⁾ Pre-disposal samples are collected and analyzed prior to transfer to ensure the material will be within the limits specified in the EFSEC resolution. Following transfer, the material is allowed to dry and a post-disposal sample is collected and analyzed.

Sediment samples from the two evaporation ponds that receive wastewater originating from within the CGS protected area (ponds 3 and 4) are collected annually and analyzed for gamma emitting radionuclides. This sampling and analysis is performed to meet EFSEC Council Order 874⁽²³⁾ requirements. Sediment samples from the other three evaporation ponds may be collected as a CGS initiative as conditions allow.

4.4.6 Fish

Annual fish sampling is usually performed in the fall. Fish samples collected from the Columbia River (Station 30) serve as indicator samples, whereas fish collected on the Snake River (Station 38) serve as control samples. Only edible portions of the fish are used to prepare the samples for analysis. Fish samples are analyzed for gamma emitting radionuclides on a wet weight basis. Three species of fish are collected; an anadromous species (salmon or steelhead), and two other resident species generally considered edible or potentially edible (typically carp, bass, perch, walleye, sucker, or whitefish). The same species are collected at each location. Anadromous species are obtained from local fish hatcheries through arrangements made with the State of Washington Department of Fish and Wildlife. Resident species have been collected using traditional hook and line fishing for the past four years.

4.4.7 Milk

Milk samples are collected monthly during the fall and winter months (October through March). During the spring and summer months when cows are more likely to be grazing or on fresh feed, milk samples are collected twice per month. Raw milk samples are collected within a few hours of milking and the samples are normally prepared and analyzed within four days. Milk samples are collected from both indicator and control locations. Station 36 in Franklin County serves as the primary indicator location and is the only known dairy within a ten mile radius of CGS. Control milk samples were collected from a dairy in the lower Yakima Valley near Prosser, WA.

Changes made to the CGS ODCM in 2016 resulted in a number of changes affecting milk collection. Collection of control milk samples was changed to a once per month requirement at all times of the year and CGS REMP ceased collection of a second monthly control milk sample in July 2016. The option to collect the second monthly indicator milk sample from a location where the milking animal was known to have been on pasture, if available, was added to the ODCM. In July, CGS REMP identified a location 7.1 miles East of CGS with goats and obtained a goat milk sample from this location. Additional milk samples were not obtained from this location, however, as it was determined the owner did not routinely milk the goats and could not provide assurances that the milk was obtained from animals that had been on pasture.

4.4.8 Garden Produce

Samples of local garden produce are collected during the growing season when the produce is readily available. Three types of garden produce are typically collected; root crops, fruits, and leafy vegetables. Control samples (Station 9C) are usually obtained from the lower Yakima Valley. Indicator samples are collected from areas downstream of the CGS discharge where crops are irrigated with Columbia River water or from locations that potentially could be impacted by CGS gaseous emissions. The Riverview area of Pasco is the principle collection location for fruit and root crops. Collection of leafy vegetables is primarily made from gardens and farms located east of CGS. Vegetation samples may also be collected from locations closer to CGS; however none were collected in 2016. Garden and vegetable samples are typically puréed in a food processor and then analyzed for gamma emitting radionuclides on a wet weight basis. Only edible portions are used for analysis.

4.5 Split Sample Program

In addition to the sample analyses performed by the Energy Northwest Environmental Services laboratory, a number of the samples collected are split and independently analyzed by the Washington State Department of Health (WaDOH). CGS REMP personnel typically collects these samples, ship a representative portion to the WaDOH laboratory, then separately analyzes another portion of the sample. For media such as air particulates or TLDs where sample splitting is not feasible, the WaDOH co-locates a TLD or air sampler at the sample location. The following split samples are typically provided: Monthly surface water samples from three locations, annual ground water samples from three locations, weekly air iodine and particulate filters from two locations, bi-annual vegetable samples from one location, monthly indicator milk samples from one location, quarterly control milk samples from one location, annual resident fish from one location, annual soil samples from three locations, annual sediment samples from two locations.

4.6 Sample Analyses

General descriptions of the procedures used to analyze REMP samples are provided in the following sections. All REMP TLDs in 2016 were processed at the Hanford External Dosimetry Program (HEDP) laboratory located near Richland, WA. The HEDP is operated by Mission Support Alliance (MSA). Carbon-14 analysis of apples was performed by the Washington State Department of Health (WaDOH) in 2016. All additional REMP samples were collected and analyzed by Energy Northwest Environmental Services. Samples are normally collected and analyzed within a short time period to ensure required detection sensitivities are met and to provide timely results. Sample count times are conservatively calculated to ensure required *a priori* LLDs are achieved. Table 4-4 lists the ODCM required LLDs and the nominal target LLD used in the Energy Northwest REMP program.

4.6.1 Analysis of TLDs

REMP TLDs are analyzed on a Harshaw Model 8800 hot gas reader. The reader is calibrated immediately prior to processing the environmental TLDs. The reader is calibrated with TLDs that have been given a known exposure from a cesium-137 source. Each group of environmental TLDs is processed with blank (freshly annealed) TLDs and spiked TLDs that have been given a known exposure. Exposure received by the field TLDs during transport is monitored with a set of 'trip' control dosimeters that accompany the field dosimeters to and from the field locations and while in storage. Another set of TLDs, the building controls, are used to determine the exposure of the TLDs at the storage location. The TLD exposure during transport to and from the field was determined from the difference between the building control results and the trip control results.

4.6.2 Gross Beta Activity on Air Particulate Filters

Air particulate filters are counted directly in a gas flow proportional counter after a delay of several days to allow for the decay of radon and its progeny. Samples were counted using a Protean WPC-9550 instrument which allows automated sample counting and simultaneous alpha/beta determination. If gross beta activity is identified significantly above the mean of the control, gamma isotopic analysis is performed on the individual samples.

4.6.3 Measurement of Gamma Emitting Radionuclides

Gamma isotopic analysis allows identification and quantification of gamma-emitting radionuclides that may be attributable to CGS effluents. Shielded, high purity germanium (HPGe) detectors are used to assay environmental samples for gamma emitting radionuclides. All samples are counted in standardized, calibrated geometries.

- **Liquids** – Measured aliquots of the liquid samples are poured into appropriately sized Marinelli beakers or plastic container. Sample results are corrected for decay during the collection period if applicable. Results are reported in pCi/liter.
- **Solids** – Soil, sludge, and sediment samples are dried and ground as needed. Foodstuff, biota (fish), and vegetation, are chopped finely or pureed and then analyzed wet (no drying is done). For foodstuff (including fish), only the edible portion of the sample is used. Sample aliquots are placed in tared containers and weighed. Results are reported in pCi/kg.
- **Charcoal Cartridges** – Typically four charcoal cartridges are counted simultaneously using a cartridge holding jig that positions the cartridges in a standardized geometry to the side of the detector. Detector calibration files are maintained for both face count and side count positions. If radioiodines are identified in the assay of a group, each charcoal cartridge in the group is assayed separately. Results are corrected for decay during the sample collection period. Results are reported in pCi/m³.
- **Air Particulate Filters** – At the end of each quarter, air particulate filters are composited on a station by station basis. The filters are stacked in a Petri dish and analyzed by gamma spectroscopy. Results are reported in pCi/m³ and represent the total quarterly gamma activity collected at each station. Results are decay corrected to the midpoint of the sample collection period. If a radionuclide related to CGS operation is positively identified, the filters are separated and counted individually.

4.6.4 Gross Alpha and Gross Beta Activity in Water

A measured aliquot of each sample is evaporated to a small volume then quantitatively transferred to a ribbed, stainless steel planchet. Final evaporation is normally done under a heat lamp. Residue mass is determined by weighing the planchet before and after mounting the sample. The planchet is counted for gross alpha and beta activity using a Protean WPC-9550 automatic gas flow proportional counter which allows automated sample counting and simultaneous alpha/beta determination. Results are corrected for sample self-absorption using the sample residue mass values. Results are reported in pCi/liter.

4.6.5 Tritium in Water

The sample is distilled, then 8.0mL of the distillate is mixed with 12.0mL of scintillation cocktail. The sample mixture is analyzed on a Packard Tri-Carb 2900TR automatic liquid scintillation counter. Results are reported in pCi/liter.

4.6.6 Low Level Radioiodine in Milk and Water

Four liters of sample are first equilibrated with stable iodide carrier. Anion exchange resin is then added and mixed for a period sufficient to allow any iodine present in the sample to be captured by the resin. The resin is then isolated from the liquid sample and transferred to a small counting container. The radioiodine content is determined by gamma spectroscopy analysis. Results are reported in pCi/liter.

4.6.7 Carbon-14

Carbon-14 levels in the environment around CGS are evaluated by comparison of carbon-14 content in apples obtained from local orchards to apples obtained from control locations. Apple samples are dried in a food dehydrator; both wet and dry sample mass measurements are taken. The analysis method used involves sample oxidation, capture of the resulting carbon dioxide, then liquid scintillation counting. Final results are calculated on a wet weight basis. Sample analysis is performed by an outside laboratory.

4.6.8 Strontium-89/90, Iron-55, and Nickel-63

These "hard to detect" analytes are not routinely analyzed as part of the CGS REMP. When needed, these analyses are performed under contract by Teledyne- Brown Environmental Services Laboratory located in Knoxville, TN using the vendor's standard analysis procedures.

4.7 Data Analysis Methods

Counting results for low level samples are often within the counting error of the background determination; consequently results for these samples can be positive or negative values. Though most REMP analytical results are below the detection limit, an actual calculated value has been reported. In some cases the reported value is zero or a negative number. Reporting results in this manner is the preferred practice for low level environmental analyses as it gives an indication of positive or negative biases that may be present and prevents loss of individual results inherent in the use of "less than" (<) values. Also reported in most cases are the *a posteriori* MDA values. A nuclide is flagged as positively identified if its calculated value is greater than the MDA. A listing of the Energy Northwest nominal target LLDs (*a priori*) for each sample type is provided in Table 4-4; the ODCM required LLDs are also included for a comparison.

Data is trended following analysis for many of the sample types analyzed. For analyses such as gross beta on air particulate filters where results are normally above the detection limit, indicator results are plotted with the control results for better comparison. Analysis results that are normally below detection limits are plotted against historical data to monitor if trends may be evident.

Thermoluminescent dosimeter (TLD) data is presented in both units of mR/day and mR/standard quarter. TLD results in mR/day are calculated by taking the total exposure (in mR) determined for each TLD, correcting for storage background and any transit (or trip) exposure received during distribution and retrieval, then dividing by the number of days the TLD was in the field. The mR/standard quarter values are calculated by multiplying the mR/day value by 91.25 days (365/4). All TLD results are reported in units of exposure (Roentgen) and not in units of dose (Rem).

4.8 Changes to the Sampling Program in 2016

The following is a synopsis of changes made to the sampling program in 2016.

ODCM amendment 54, issue date 04/07/2016, made changes to ODCM section 5.0 and Table 6.3.1-1 which effected a number of REMP sampling requirements. Changes made included updating the list of ODCM stations and sample types, adding control vegetable collection requirements, revising sector and distance specifications for some sample locations, and modification of indicator milk collection requirements and control milk collection frequency.

Three ISFSI TLD stations were re-located at the start of the third quarter. Stations 136A, 137A, and 138A were located on the south ISFSI fence line which was removed in July 2016 after a new south fence line was established as part of the ISFSI pad 3 construction. The stations were relocated to the new south fence line and designated as stations 136B, 137B and 138B. See figure 4.4 for details.

Two new TLD locations were established near the ISFSI in the first quarter 2016. Station 155 was established approximately 0.07 miles WNW of the ISFSI and Station 156 was established approximately 0.06 miles NW of the ISFSI. These stations were established at CGS initiative to aid in determination of dose impact from the ISFSI.

TLD station 120 was removed from service in the first quarter 2016. This station was established to monitor outfall 03 near the CGS Standby Service Water Ponds. Requirement for direct radiation monitoring at this location was removed with the eliminated of outfall 003 from the CGS NPDES permit in 2014.

Broad leaf vegetation was obtained from a small backyard garden located 5.1 miles E of CGS in 2016. This location, though outside the 5 mile radius of CGS, was determined to have a higher projected dose commitment than the one garden location identified within the 5 mile radius. The location was designated as Station 104.

**TABLE 4-1
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SAMPLING PLAN**

SAMPLE TYPE^(a)	SAMPLE STATION^(b) NUMBER	SAMPLE METHOD AND COLLECTION FREQUENCY^(c)	TYPE AND FREQUENCY OF ANALYSIS
AIRBORNE			
Particulates and Radioiodine ^(d) (6/12)	1, 4-8, <u>9A</u> , 21, 23, 40, 48, and 57	Continuous sampling; weekly collection.	Weekly air filters gross beta and iodine cartridge gamma isotopic. Quarterly air filter composite gamma isotopic.
DIRECT RADIATION			
TLD ^(e) (34/80)	1-8, <u>9A</u> , 10-25, 40-47, 49-51, 53-56, 58, 65, 71-90, 119B, <u>119C</u> , 121-129, 136-138, 150, 151, 155, 156.	Continuous monitoring, quarterly collection.	Radiation exposure monitoring processed on a quarterly frequency.
WATERBORNE			
River/Drinking Water ^(h) (3/3)	<u>26</u> , 27 and 29	Composite aliquots ^(f) ; monthly collection.	Monthly gamma isotopic, gross beta, and tritium. Iodine-131 ⁽ⁱ⁾ as required.
Storm Drain Water ^(s) (0/1)	101B	Composite aliquots ^(f) ; monthly collection.	Monthly gamma isotopic, tritium, and gross beta.
Sanitary Waste Treatment Facility Water ^(r) (0/1)	102B	Composite aliquots ^(f) ; monthly collection.	Monthly gamma isotopic, gross beta, gross alpha, and tritium.
Ground Water ^(k) (2/3)	31, 32, and 52	Grab sample performed quarterly.	Quarterly gamma isotopic and tritium.
Ground Water Monitoring ^(e) (0/9)	MW-3, 5, 6, 9-14	Grab sample performed quarterly.	Quarterly gamma isotopic and tritium.
Evaporation Pond Water ^(q) (0/3)	EVP-1A, 1B, 2	Grab sample performed annually	Annual gamma isotopic and tritium.
SOIL AND SEDIMENT			
Soil ^(l) (0/5)	1, 5, <u>9A</u> , 21, 37	Grab sample performed annually.	Annual gamma isotopic. Strontium-90 ^(f) as required.
River Sediment ^(l) (1/2)	<u>33</u> and 34	Grab sample performed semiannually.	Semiannual gamma isotopic.
Cooling System Sediment Disposal Area ^(l) (0/2)	119B, <u>119C</u>	Grab sample of dried sediment within 30 days of disposal date.	Gamma Isotopic. After disposal.
Evaporation Pond Sediment ^(q) (0/2)	EVP-3, 4	Grab sample performed annually	Annual gamma isotopic
INGESTION			
Milk ^(m) (2/2)	<u>9B</u> , 36	Grab sample collected semimonthly during grazing season, monthly at other times.	Gamma isotopic, Iodine-131 each sample. Strontium-90. ⁽ⁿ⁾ as required
Fish ^(o) (2/2)	30, <u>38</u>	Grab samples collected annually.	Gamma isotopic each sample.
Garden Produce ^(p) (3/4)	<u>9C</u> , 37, 48G, 104	Grab samples collected monthly or at time of harvest.	Gamma isotopic each sample.

TABLE 4-1 FOOTNOTES:

- (a) The fraction in parentheses for each sample type indicates the ratio of ODCM-required sample locations to the total number of sample locations currently being monitored in the surveillance program. Additional sampling is performed to meet EFSEC requirements or as an ENW initiative.
- (b) The underlined sample location designates a control station.
- (c) Sample collection is performed at a frequency specified in the ODCM and EFSEC resolutions. Some sampling referenced in Table 4-1 is performed at CGS initiative. Sample deviations are permitted if samples are unobtainable due to hazardous conditions, seasonal availability, malfunction of automatic sampling equipment, or other legitimate reasons.
- (d) The ODCM specifies six air sample locations and EFSEC Resolution 332 specifies nine. Two of the air sample stations are maintained at CGS initiative and are not requirements of either the ODCM or EFSEC Resolution 332.
- (e) Shallow ground water sampling is performed to meet NEI 07-07 guidelines and NPDES requirements.
- (f) Soil samples are collected from five locations to satisfy EFSEC Resolution 332 requirements. Two samples are collected from locations near CGS, two from locations in Franklin County, and one collected from a control location. Sample locations listed in Table 4-1 are the locations sampled in 2016. EFSEC 332 requires strontium-90 analysis be performed if gamma analysis results are greater than a specified threshold.
- (g) TLD Stations 71-86 are not included among the 34 TLD stations required by the ODCM. Alternate designations for these stations are 1S-16S. EFSEC Resolution 332 requires 25 or more TLD stations to be located within a 10-mile radius of CGS.
- (h) The term "river/drinking water" is used as Columbia River water is also used as a source of drinking water. Station 26 samples CGS makeup water drawn from the Columbia River. This sample is both a control upstream water sample and a drinking water sample. Station 29 is a downstream drinking water sample location. Station 27 samples plant discharge water immediately before discharge to the Columbia River. EFSEC Resolution 332 requires samples from at least one downstream drinking water location and samples from the plant intake and discharge water systems.
- (i) Composite samples are collected on a flow proportional or timed interval basis using automatic sampling equipment. When timed interval sampling is used, the interval period is short (e.g. hourly) relative to the compositing period (e.g. monthly).
- (j) When the dose calculated via ODCM methodology for consumption of water exceeds 1 mrem per year, low level iodine-131 analyses are performed on the drinking water samples.
- (k) Sampling from these locations fulfills ODCM table 6.3.1-1 3b requirements. EFSEC Resolution 332 requires sampling from at least one deep well used for fire protection and/or as a backup drinking water source.
- (l) Downstream sampling fulfills ODCM table 6.3.1-1 3d requirements. EFSEC Resolution 332 requires annual sediment samples upstream and downstream of the plant discharge.
- (m) ODCM table 6.3.1-1 4a milk collection requirements were updated in 2016 to take into account site characteristics and the proximity of milking animals to CGS. Milk samples are collected from the nearest dairy potentially impacted by CGS operation and also from a control location at the frequency specified in the ODCM. EFSEC Resolution 332 specifies sampling from at least one milk location within the 10-mile radius of CGS and also from a control location.
- (n) ODCM table 6.3.1-1 (k) requires that if cesium-134 or cesium-137 is measured in an individual milk sample in excess of 30 pCi/liter, then a strontium-90 analysis will also be performed.
- (o) Station 30 is the Columbia River and station 38 is the Snake River. If an impact is indicated, sampling will be conducted semiannually per ODCM table 6.3.1-1 (i). There are no species fished commercially in the Hanford Reach of the Columbia River. The most recreationally important species in the area are anadromous, which ascend rivers from the ocean for breeding. Anadromous fish species are normally obtained from hatcheries; Snake River samples are obtained from the Lyons Ferry Fish Hatchery, and Columbia River samples are obtained at the Ringold Fish Hatchery.
- (p) Garden produce is obtained from farms or gardens that use Columbia River water for irrigation. One sample of a root crop, leafy vegetable, and a fruit is typically collected each sample period, when available. EFSEC Resolution 332 further specifies fruit and vegetable sampling from locations potentially impacted by CGS gaseous emissions.
- (q) Annual sediment sampling from Evaporation Ponds 3 and 4 and annual water sampling from Evaporation Ponds 1A, 1B, and 2 are specified in EFSEC Council Order 874.
- (r) Sample requirements for the Sanitary Waste Treatment Facility are specified in EFSEC Resolution 300.
- (s) Monthly Station 101B sampling is specified in EFSEC Resolution 332 and EFSEC Council Order 874.
- (t) Disposal, sampling, and monitoring of cooling system sediment is specified in EFSEC Resolution 299.

TABLE 4-2
REMP SAMPLE STATIONS AND REQUIREMENTS

SECTOR ^(a)	STATION NUMBER ^(b)	DISTANCE MILES ^(c)	ODCM ^(d)	STATE ^(e)	OTHER ^(f)
N (1)	52	0.07	DGW	DGW	
	71(1S)	0.28			TLD
	47	0.70		TLD	
	57	0.70	AP/AI		
	18	1.16	TLD	TLD	
	53	7.54	TLD		
NNE (2)	72(2S)	0.32			TLD
	2	1.45	TLD	TLD	
	54	6.08	TLD		
	EVP-1A	0.31		Dis W	
NE (3)	73(3S)	0.54			TLD
	19	1.74	TLD	TLD	
	48	4.59	AP/AI	AP/AI	
	48G ^(k)	4.63	GP		
	46	4.99	TLD		
	MW-9	0.22		SGW	SGW
	EVP-1B	0.25		Dis W	
	EVP-2	0.35		Dis W	
	EVP-3	0.43		SE	
ENE (4)	74(4S)	0.38			TLD
	21	1.45		TLD, SO	AP/AI
	20	1.93	TLD	TLD	
	11	3.16		TLD	
	33	3.44		SE	
	45	4.45	TLD		
	44	5.90	TLD		
	101B	0.22		Dis W	
	MW-11	0.10		SGW	SGW
	EVP-4	0.60		SE	
E (5)	75(5S)	0.37			TLD
	22	2.08	TLD		
	10	3.16	TLD	TLD	
	26	3.19	SW, DW	SW	
	27	3.19	SW	Dis W	
	30 ^(g)	3.5	FI	FI	
	43	5.63	TLD		
	104 ^(k)	5.08			GP
	151 (Site 4)	0.83			TLD
	MW-12	0.12		SGW	SGW

TABLE 4-2
REMP SAMPLE STATIONS AND REQUIREMENTS

SECTOR ^(a)	STATION NUMBER ^(b)	DISTANCE MILES ^(c)	ODCM ^(d)	STATE ^(e)	OTHER ^(f)
ESE (6)	76(6S)	0.42			TLD
	31	1.06	DGW		
	32	1.27			DGW
	51	2.14	TLD		
	34	3.32	SE	SE	
	23	3.03		TLD, AP/AI, SO	
	8	4.39	TLD, AP/AI	TLD, AP/AI	
	42	5.85	TLD		
	36	7.33	MI	MI	
	5	7.72	TLD		AP/AI
	38 ^(g)	26	FI	FI	
	150 (Site 1)	0.90			TLD
	SE (7)	77(7S)	0.57		
24		1.87	TLD	TLD	
3		2.06		TLD	
41		5.79	TLD		
40		6.51	TLD, AP/AI	AP/AI	
MW-14		0.58		SGW	SGW
SSE (8)	119C	0.28		TLD	
	102B	0.50		SFW	
	78(8S)	0.81			TLD
	25	1.50	TLD	TLD	
	55	6.05	TLD		
	4	9.57	TLD, AP/AI	TLD, AP/AI	
	29	11.57	DW	DW	
	37 ^(h)	16	GP	GP,SO	
	MW-6	0.33		SGW	SGW
	MW-13	0.52		SGW	SGW
S (9)	119B	0.31		TLD, SE	
	79(9S)	0.76			TLD
	1	1.25	TLD	TLD, AP/AI, SO	
	6	7.72	TLD	TLD, AP/AI	
	65	8.87			TLD
SSW (10)	80(10S)	0.83			TLD
	50	1.26	TLD	TLD	
	56	6.65	TLD		
	MW-3	0.31		SGW	SGW

**TABLE 4-2
REMP SAMPLE STATIONS AND REQUIREMENTS**

SECTOR^(a)	STATION NUMBER^(b)	DISTANCE MILES^(c)	ODCM^(d)	STATE^(e)	OTHER^(f)
SW (11)	81(11S)	0.74			TLD
	90 ^(j)	0.62			TLD, AI/AP
	MW-5	0.43		SGW	SGW
	13	1.26	TLD	TLD	
	9B	23.2	MI	MI	
WSW (12)	82(12S)	0.57			TLD
	14	1.26	TLD	TLD	
	9A	28.35	TLD, AP/AI	TLD, AP/AI, SO	
	9C ^(j)	32	GP	GP	
	89 ^(j)	0.23			TLD, AI/AP
	58	0.44			TLD
W (13)	83(13S)	0.52			TLD
	15	1.24	TLD	TLD	
WNW (14)	84(14S)	0.55			TLD
	16	1.21	TLD	TLD	
	7	2.83	TLD	TLD, AP/AI, SO	
	88 ^(j)	0.17			TLD, AI/AP
	MW-10	0.07		SGW	SGW
NW (15)	85 (15S)	0.43			TLD
	49	1.19	TLD	TLD	
	87 ^(j)	0.20			TLD, AI/AP
	155	0.30			TLD
NNW (16)	121	0.12			TLD
	122	0.31			TLD
	123	0.29			TLD
	124 ^(m)	0.28		TLD	TLD
	125	0.28			TLD
	126	0.28			TLD
	127	0.26			TLD
	128 ^(m)	0.25		TLD	TLD
	129 ^(m)	0.17		TLD	TLD
	136A,B	0.29			TLD
	137A,B ^(m)	0.24		TLD	TLD
	138A,B	0.17			TLD
	86 (16S)	0.31			TLD
	17	1.19	TLD	TLD	
	12	6.74		TLD	
	156	0.33			TLD

TABLE 4-2 SAMPLE TYPE KEY

AP/AI - Air Particulate/Air Iodine	DW - Drinking Water
Dis W - Discharge Water	FI - Fish
GP - Garden/Orchard Produce	DGW - Deep Ground Water
MI - Milk	SE - Sediment
SFW - Sanitation Facility Water	SO - Soil
SW - Surface Water	TLD - Thermoluminescent Dosimeter
VE – Vegetation	SGW – Shallow Ground Water

TABLE 4-2 FOOTNOTES:

- (a) The area in the vicinity of CGS is separated into 16 sectors for reporting purposes. The 16 sectors cover 360 degrees in equal 22.5 degree sections, beginning with sector 1 (N) at 348.75 to 11.25 degrees and continuing clockwise through sector 16 (NNW).
- (b) Alternate designations for some sample stations are given in parentheses; i.e., TLD Stations 71-86 are also referred to as 1S-16S.
- (c) Distance and sector indications are relative to the center of the CGS reactor building and were determined using GPS coordinate readings. Distance and sector indication for the Evaporation Ponds is to the center of each pond.
- (d) ODCM - Offsite Dose Calculation Manual Table 6.3.1-1 requirement.
- (e) STATE - State of Washington EFSEC requirement. Station 102B is an EFSEC Resolution 300 requirement. Stations 119B and 119C are EFSEC Resolution 299 requirements. Sampling at Evaporation Ponds 1A, 1B, 2, 3, and 4 is specified in EFSEC Council Order 874. All other State required samples are specified in EFSEC Resolution 332.
- (f) OTHER –Special study stations. TLD Stations 121 through 129 and 136 through 138 satisfy ISFSI monitoring requirements 10CFR72.44(d)(2). Sampling at MW locations is performed to meet NEI 07-07 guidelines and NPDES requirements.
- (g) Station 30 is the Columbia River at the vicinity of the plant discharge. Actual distance of fish collection locations from plant are variable, distance listed is approximation. Station 38 is the Snake River. Control resident fish are typically collected at variable locations in area below Ice Harbor Dam, distance listed is approximation. Control anadromous fish are typically collected at Lyons Ferry Fish Hatchery.
- (h) Fruit and Vegetable indicator samples are typically collected from farms and gardens in the Riverview area of Pasco. Distance listed here is general distance of Riverview area to CGS. Station 37 designation is also used for any samples collected in Franklin County that could potentially be affected by CGS liquid or gaseous effluents.
- (i) Station 9C is the designation given for control fruits and vegetables. Distance listed is general distance to the Sunnyside-Grandview area where the majority of the control fruits and vegetables are obtained.
- (j) Stations 87-90 were installed at CGS initiative to monitor remediation work at the DOE 618-11 burial ground. No remediation work was performed at the burial ground in 2016. Quarterly TLDs were deployed at all 4 locations in 2016. No air samples were collected from any of these locations in 2016.
- (k) Station 48G is listed in ODCM table 5-1 as an alternate (garden produce) location for atmospheric deposition. This location consists of a small garden near the Ringold Fish Hatchery. Station 104, though outside the 5 mile radius of CGS, is the garden location with the highest projected dose commitment. CGS obtained broad leaf vegetable samples from both stations 48G and 104 in 2016.
- (l) MW-3, 5, 6, 9-14 are all listed as State required shallow groundwater monitoring stations. Actual EFSEC 332 requirement is to obtain 2 shallow ground water samples quarterly from any of these locations.
- (m) Stations 124, 128, 129 and 137 are ISFSI TLD stations listed as State requirements. Actual EFSEC 332 requirement is to have 4 or more TLDs located on the ISFSI security fence. Any 4 of the 10 TLD stations CGS has established on the ISFSI fence line can satisfy this requirement.

TABLE 4-3
2016 FIVE MILE LAND USE CENSUS RESULTS

SECTOR ^(a)	NEAREST RESIDENT ^(b)	GARDEN ^(d) (>500 ft ²)	DAIRY ANIMALS	LIVESTOCK ^(b,c)
NE	4.50	4.63	none	none
ENE	3.88	none	none	4.95
E	4.64	5.08	none	4.64
ESE	4.26	none	none	4.49
SE	none	none	none	none

FOOTNOTES

- (a) Within a five-mile radius of the plant, only the five sectors listed above contain activities related to land use census requirements. The other eleven sectors lay fully within the federally owned Hanford Site. Only those sectors containing potential land use census activities are presented here.
- (b) Estimated distances in miles from CGS Reactor Building based on GPS readings. Actual locations are same as identified in previous years, distance values may differ from those reported in past due to updated GPS data.
- (c) 32 beef cattle were identified in a pasture in the ENE sector. The western edge of the pasture is just within the 5 mile radius of CGS. Additional feed appears to be provided at this location. Eight cattle and 10-20 chickens were observed at a residence in the E sector, there is no pasture at this location and the cattle are fed hay. A single horse was observed in the ESE sector, there is little pasture at this location and the animal appears to be fed mostly hay.
- (d) The garden in the NE sector is located approximately 200 yards from the Station 48 air sampler and is irrigated using water from a local spring. The garden in the E sector, though technically outside the 5 mile radius of CGS, was included as dose projections indicated higher deposition potential at this location than at any other garden identified. CGS REMP obtained broad leaf vegetable samples from both garden locations in 2016. In addition to the 2 gardens, commercial agriculture is extensively practiced in some parts of the sectors listed in Table 4-3. Agricultural activities observed were primarily apple and soft fruit orchards, corn, alfalfa, and grape vineyards.

TABLE 4-4
COMPARISON OF LABORATORY NOMINAL LOWER LIMITS OF DETECTION WITH
OFFSITE DOSE CALCULATION MANUAL REQUIREMENTS

MEDIA (UNITS)	ANALYSIS	ENERGY	ODCM REQUIRED
		NORTHWEST LLDs ^(a)	LLDs
Air (pCi/m ³)	Gross Beta	0.002	0.01
	Cs-134	0.001	0.05
	Cs-137	0.001	0.06
	I-131	0.03	0.07
Water: (pCi/liter)	Gross Beta	2.4	4
	Tritium	00	2000 ^(b)
	Sr-90	1	---
	Ni-63	5	---
	Fe-55	200	---
	I-131 ^(c)	1	---
	Mn-54	7	15
	Fe-59	10	30
	Co-58	7	15
	Co-60	7	15
	Zn-65	10	30
	Zr-Nb-95	7	15
	Cs-134	7	15
	Cs-137	7	18
Ba-La-140	10	15	
Soil/Sediment: (pCi/kg dry)	Mn-54	20	---
	Co-60	20	---
	Zn-65	30	---
	Cs-134	20	150
	Cs-137	20	180
	Sr-90	10	---
Fish: (pCi/kg wet)	Mn-54	25	130
	Fe-59	100	260
	Co-58	35	130
	Co-60	25	130
	Zn-65	50	260
	Cs-134	30	130
Milk: (pCi/liter)	I-31 ^(c)	0.5	1
	Cs-134	8	15
	Cs-137	8	18
	Ba-La-140	10	15
	Sr-90	1	---
Garden Produce: (pCi/kg wet)	Cs-134	20	60
	Cs-137	20	80
	I-131	20	60

^(a) These are the nominal target LLDs (a priori) for analyses performed in the Energy Northwest Environmental Services Laboratory and are based on conservative assumptions. These calculations included corrections for decay during the collection period and delay prior to analysis using factors that are normally encountered for the different media types. Actual LLDs (a posteriori) may be higher or lower for specific samples.

^(b) If no drinking water pathway exists, a value of 3,000 pCi/liter may be used.

^(c) This ENW Iodine-131 LLD achieved by anion resin separation and does not represent a direct analysis of the sample media.

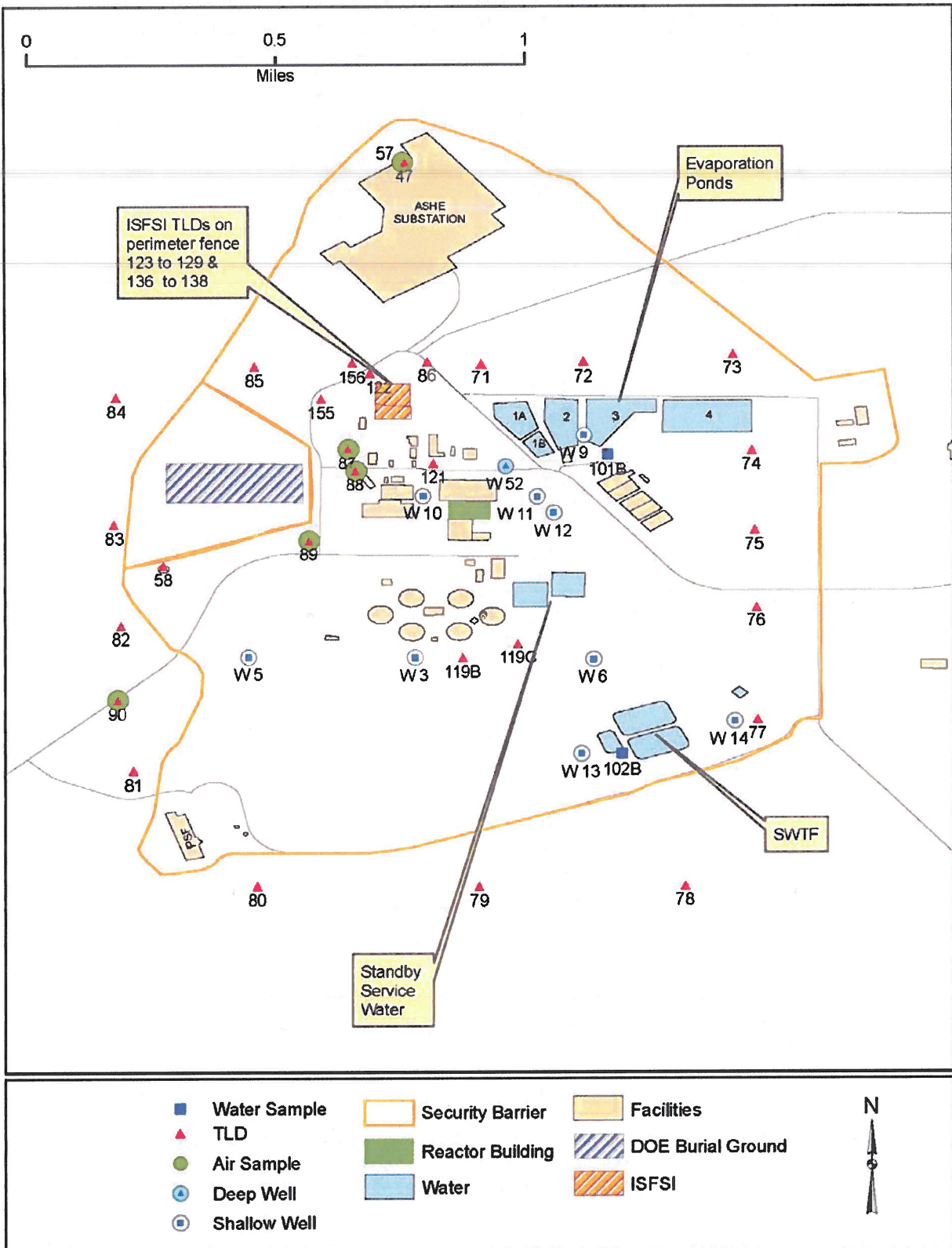


FIGURE 4-1 SELECT REMP SAMPLING LOCATIONS WITHIN 0.8 MILES OF CGS

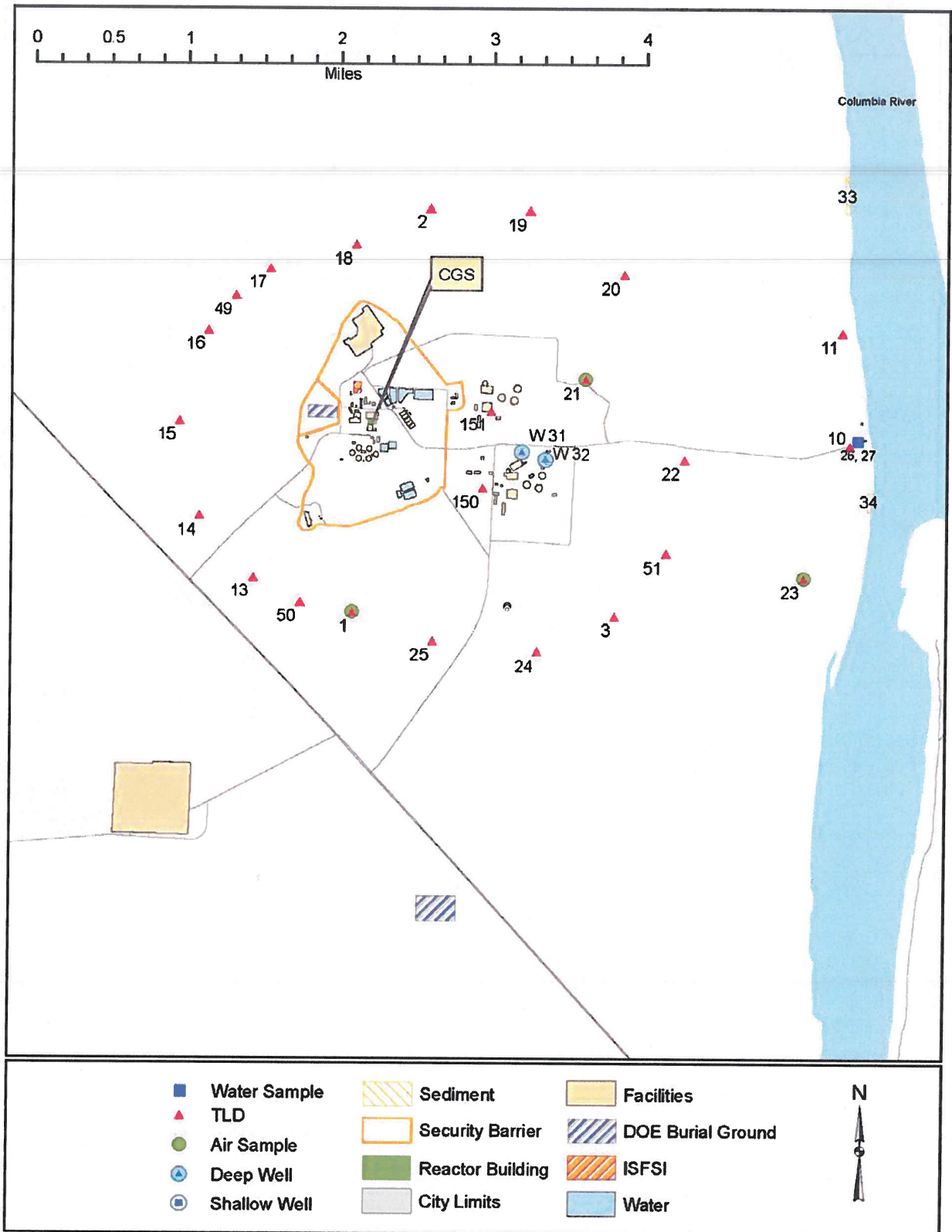


FIGURE 4-2 SELECT REMP SAMPLING LOCATIONS BETWEEN 0.8 AND 2.8 MILES

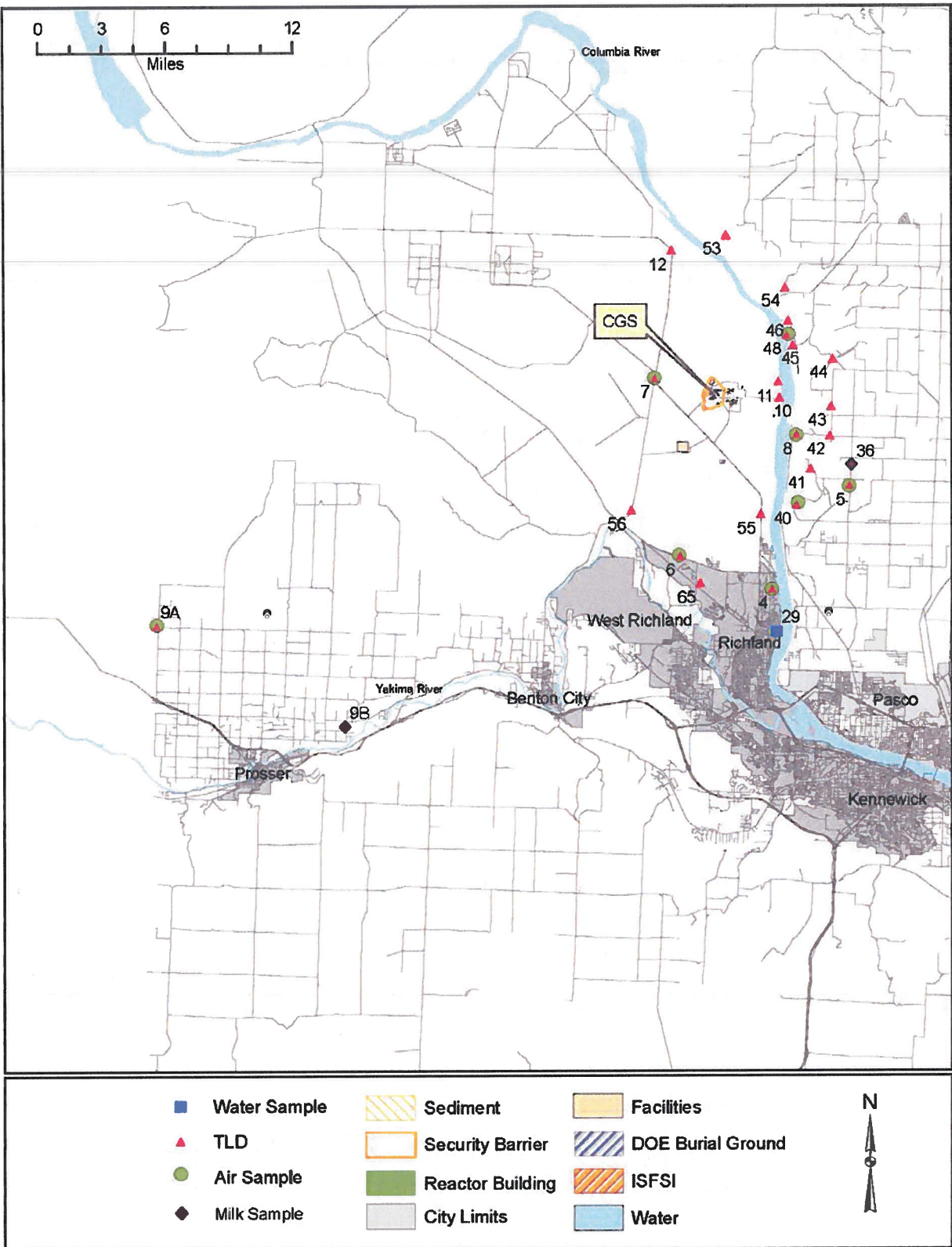


FIGURE 4-3 SELECT REMP SAMPLING LOCATIONS BEYOND 2.8 MILES

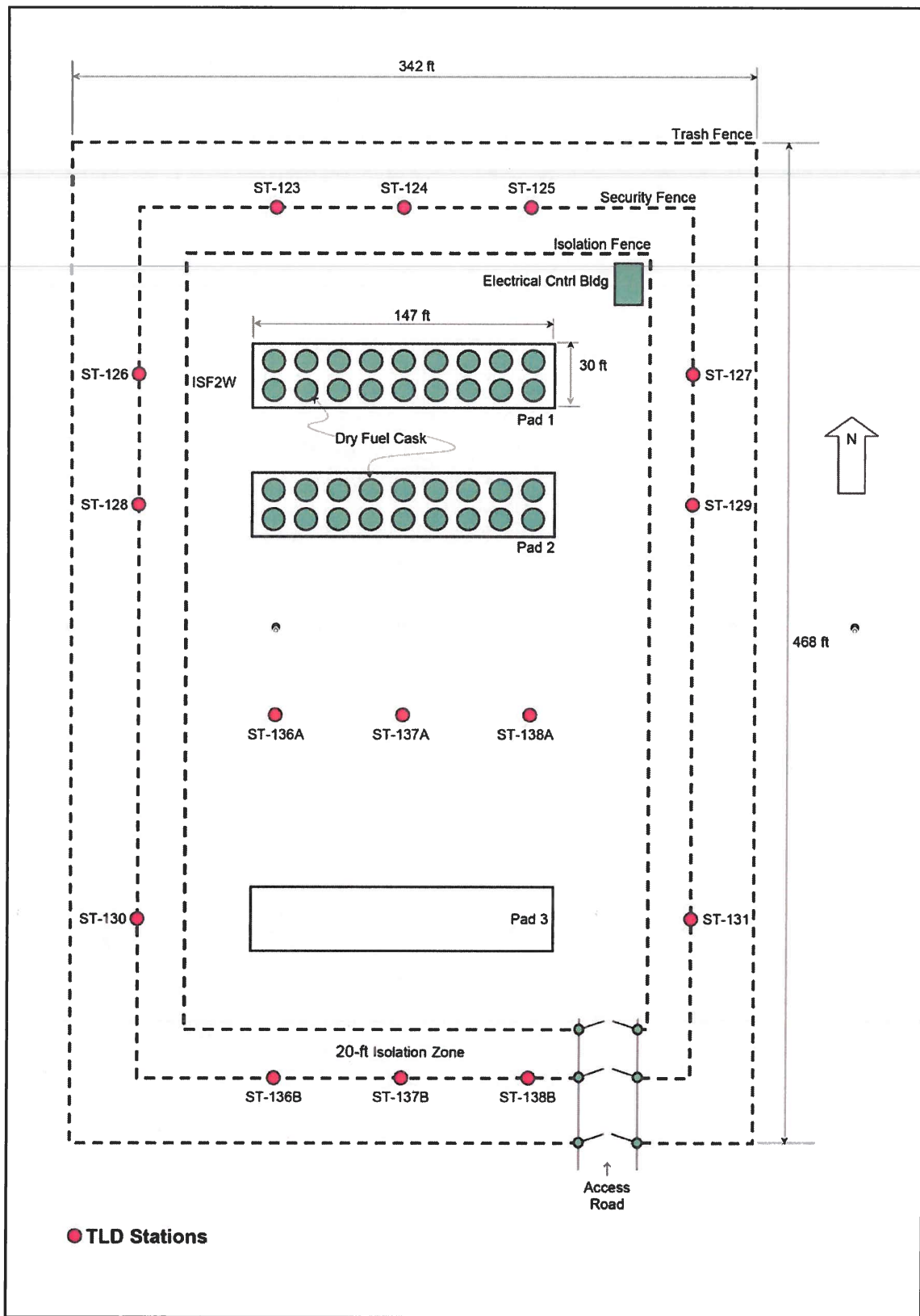


FIGURE 4-4 ISFSI TLD STATION LAYOUT

5.0 RESULTS AND DISCUSSION

5.0 RESULTS AND DISCUSSION

The Columbia Generating Station environmental TLDs were collected by Energy Northwest Environmental Services personnel and analyzed by the Hanford External Dosimetry Program (HEDP) operated by Mission Support Alliance (MSA). All other CGS REMP samples were collected and analyzed by the Energy Northwest Environmental Services Laboratory located in Richland, WA with the exception of carbon 14 analysis which was performed by the Washington State Department of Health Laboratory in Shoreline, WA. Table 5-2 provides a summary of the ODCM required REMP sample and CGS groundwater monitoring analysis results in the format specified by the NRC.^(5,6) Results for naturally occurring radionuclides that are not related to CGS operations have not been included in the summary table. The lower limit of detection (LLD) values listed in Table 5-2 are the ODCM required detection limits and are not the method detection limits listed in Table 4-4. Analytical results for all REMP samples are presented in Appendix A of this volume.

5.1 Direct Radiation

Direct radiation is monitored at 80 TLD locations surrounding CGS. TLDs are exchanged on a quarterly frequency at all locations. The 16 locations designated as "S" stations are located between 0.3 and 0.8 miles from the CGS reactor building and all are inside the property boundary, see Figure 4-1 for station locations. Figure 5-1 shows the 2016 "S" station mean quarterly TLD results separated into 16 geographical sectors around the plant. Figure 5-1 also shows the pre-operational mean and the high, low, and mean results in each sector for the 1984 - 2015 operational period for comparison. The 2016 "S" station TLD results were lower than the pre-operational mean in 12 of the 16 sectors and lower than the operational mean in 14 of the 16 sectors. TLD results from the N, NNE, and NNW sectors are slightly higher than the other "S" station locations as a result of being physically closer to the ISFSI and the CGS turbine building. TLD results for the NE sector (Station 73) have been higher than the operational period average since the 4th quarter 2013. The increase is attributed to an increased in natural background resulting from the large amount of excavation dirt piled near the TLD station.

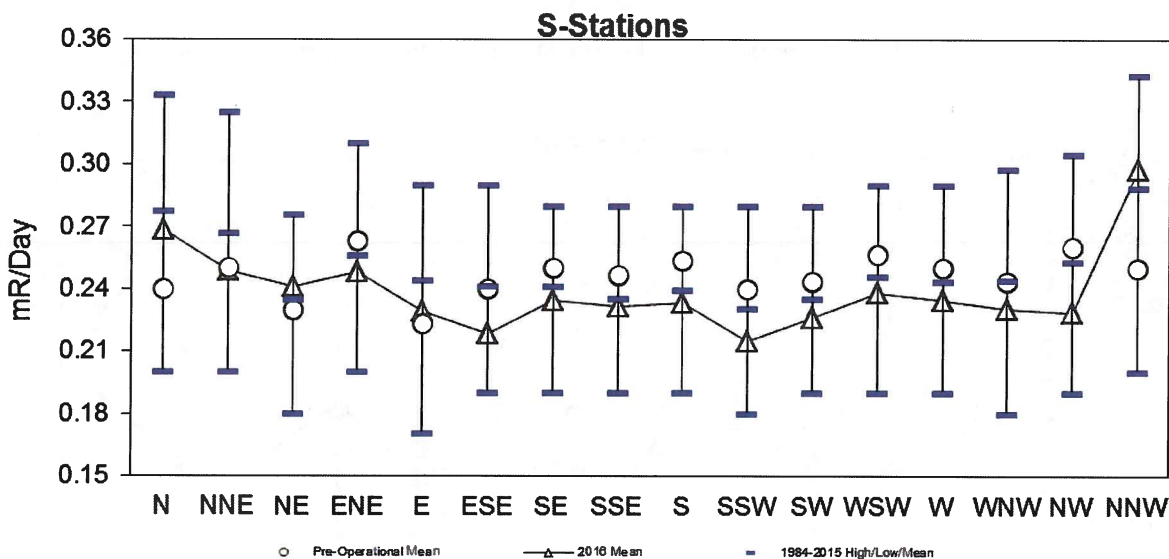


Figure 5-1 "S" Stations Quarterly TLDs 1984-2015 Hi/Low/Mean and 2016 Mean by Sector

Excluding the NNW sector, the average deviation relative to the operational period was -4.65%; in 2015 the average deviation was +0.80%. The NNW sector is the closest “S” station to the ISFSI and the higher result here is attributed to the stations close proximity to this facility.

The 19 locations designated as near plant stations are located at distances between 0.9 and 2.1 miles from the CGS reactor building, see Figure 4-2 for station locations. Figure 5-2 shows the exposure rates for the near plant TLD locations separated into sixteen geographical sectors around the plant. Figure 5-2 also shows the pre-operational mean and the high, low, and mean results in each sector for the 1984-2015 operational period for comparison. The 2016 near plant TLD results were lower than the pre-operational mean in 14 of the 16 sectors and less than the operational mean in 15 of the 16 sectors. The average deviation relative to the operational period was -4.3%, in 2015 the average deviation was +0.2%.

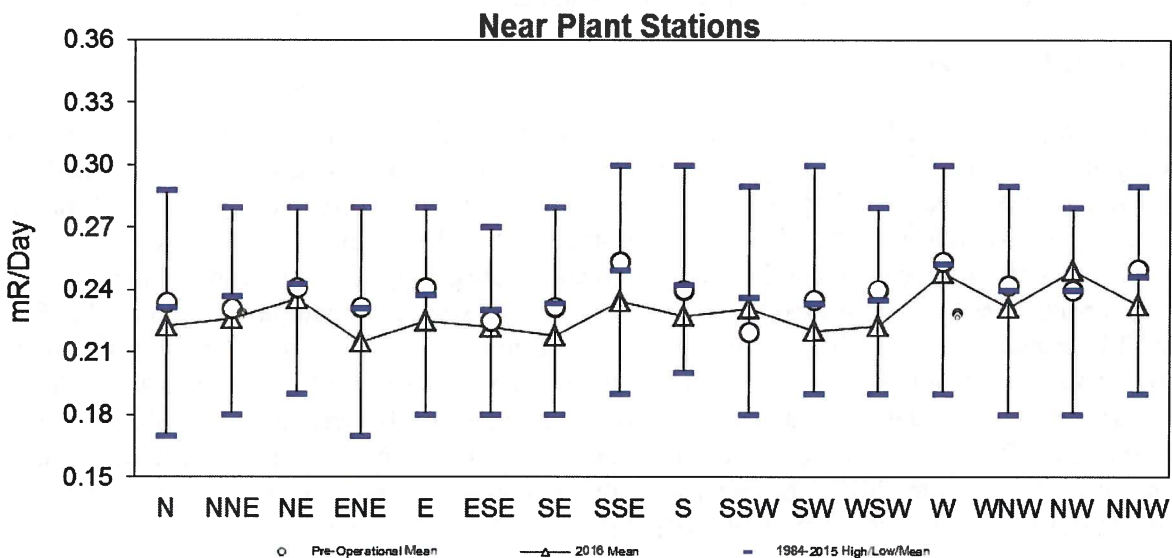


Figure 5-2 Near Plant Stations Quarterly TLDs 1984-2015 Hi/Low/Mean and 2016 Mean by Sector

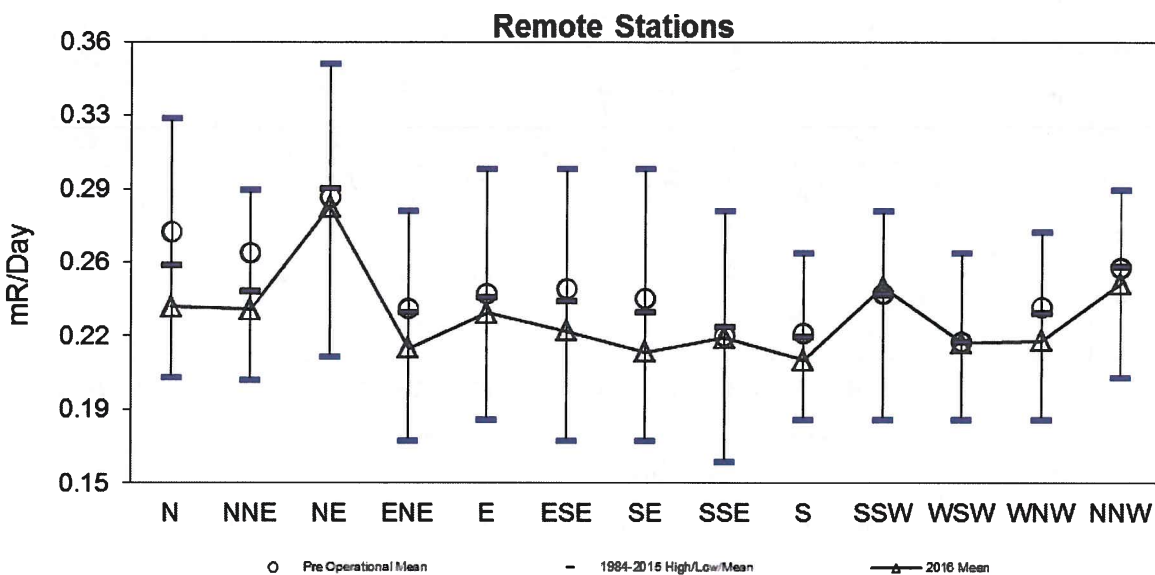


Figure 5-3 Remote Stations Quarterly TLDs 1984-2015 Hi/Low/Mean and 2016 Mean By Sector

The 22 TLD locations designated as remote locations are located between 2.83 and 28.35 miles from the CGS reactor building; see Figure 4-3 for station locations. Figure 5-3 shows the exposure rates for the remote TLD locations separated into geographical sectors around the plant. Figure 5-3 also shows the pre-operational mean and the high, low, and mean results by sector for the 1984-2015 operational period for comparison. The 2016 remote TLD results were lower than the pre-operational mean and also the operational mean in 12 of the 13 sectors. Station 46 in the Wahluke Reserve (NE sector) remained the remote location with the highest exposure rate. This has been the case since the pre-operational measurement phase and is attributed to differences in the underlying rock and soil composition in this area. The 2016 average deviation relative to the operational period was -4.5%; the average deviation in 2015 was -0.6%.

Offsite direct radiation monitoring results for 2016 were slightly lower than previous years. Fourth quarter results for some locations were noted to have been biased low relative to the long term trend. The 2016 results indicate no observable dose contributions due to plant operations at locations outside the CGS controlled area. Dose contributions inside the CGS controlled area (but outside the protected area) are limited to those locations known to be influenced by the Independent Spent Fuel Storage Installation (ISFSI) and/or radiation from the turbine building during operation. Environmental radiation exposure rates for 2016, the pre-operational period, and the long term operational period are summarized in Table 5-3. See also Appendix A, Tables A-1.1 and B-1.1 for the 2016 quarterly TLD results. TLD results for special interest locations are discussed in further detail in Section 5.9.

5.2 Airborne Particulate/Iodine

Air samples are collected weekly from 11 sample stations located around CGS. Additionally, an air sample station located 28 miles WSW of CGS is used as a control for comparison. Air particulate filters are analyzed for gross beta and iodine cartridges for radioiodines on a weekly basis. Air filters are also composited and analyzed for gamma emitting radionuclides quarterly.

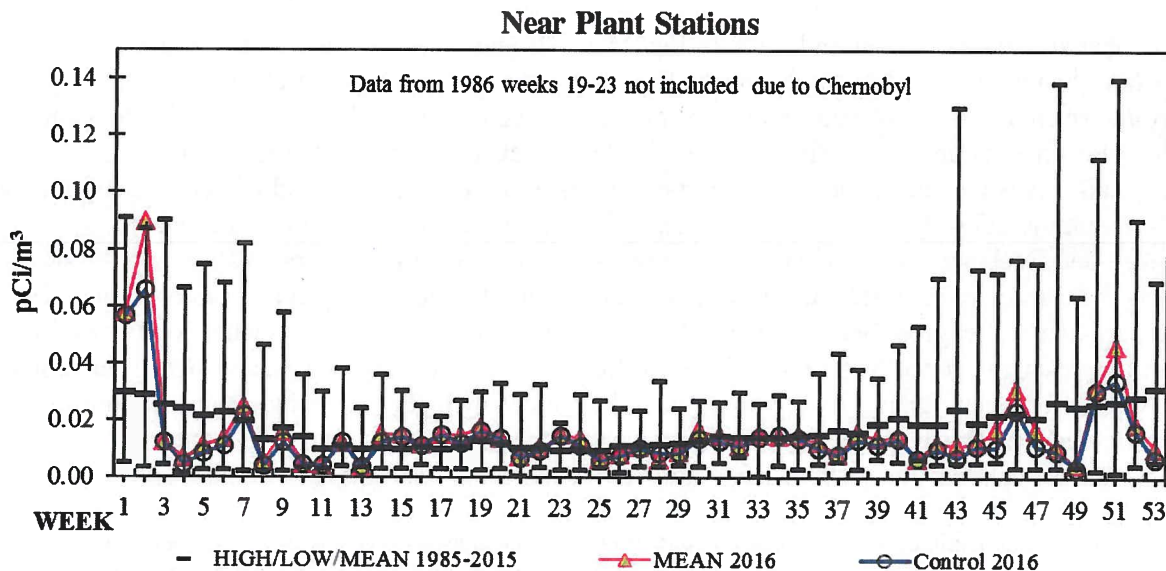


Figure 5-4 1985-2015 Weekly Hi/Low/Mean and 2016 Weekly Mean Gross Beta in Air - Near Plant Stations

The 2016 mean weekly particulate filter gross beta results for the five stations located within three miles of CGS are plotted in Figure 5-4 (See also Appendix A, Tables A-2.1, A-2.2). Results for these near plant stations are similar to results from the remote locations and follow the trend of the control location.

Figure 5-5 is a plot of the 2016 mean weekly particulate-filter gross beta results for the 6 sample stations located between 3 and 9.6 miles from CGS (See also Appendix A, Tables A-2.1, A-2.2). Results for these remote stations are similar to results from the near plant stations and follow the trend of the control location. No correlation between air gross beta activity and proximity to CGS was observed.

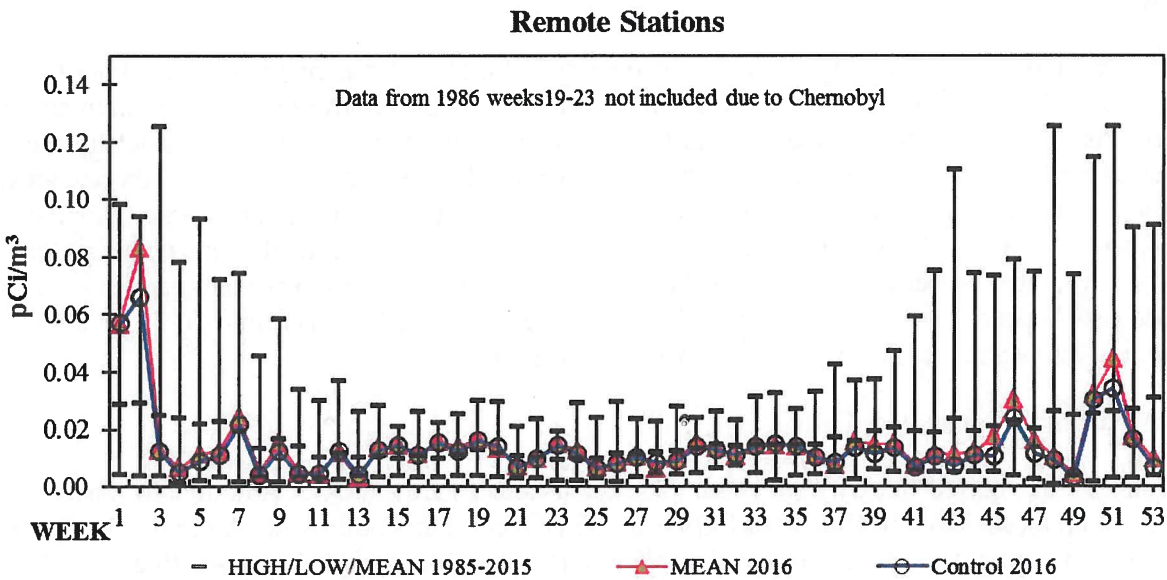


Figure 5-5 1985-2015 Weekly Hi/Low/Mean and 2016 Weekly Mean Gross Beta in Air - Remote Stations

For both near and remote air station locations, higher results and greater variability in air gross beta activity have historically been observed during fall and winter months due to weather induced background fluctuations. Gross beta levels typically increase during periods of inversion due to natural decay products being trapped near the earth surface. Gross beta results plotted over a period of several years typically show a cyclical pattern with higher results observed in the fall and winter compared to the spring and summer. Gross beta results were observed above the average trend range in January, November, and December. The increases observed during these periods occurred at all sample locations including the control and are attributed to weather phenomena and not the result of CGS operation. The highest particulate filter gross beta results for the year occurred during week 2; weather conditions for this week were characterized by periods of fog and freezing rain, moderate winds, and significant cloud cover. Results for weeks 2 and 51 were observed to be noticeably higher at the indicator locations than at the control location. This is attributed to difference in weather conditions during these weeks at the control location (Yakima Valley) versus condition at the indicator locations (Columbia Basin).

Quarterly gamma isotopic analysis of the air particulate filters identified the presence of beryllium-7 in all the control and indicator composite samples (See Appendix A, Tables A-3.1, A-3.2). Beryllium-7 is a naturally occurring radionuclide formed in the upper atmosphere by interaction with cosmic radiation and is not a radionuclide associated with CGS operation. Naturally occurring potassium-40 was also identified in some of the indicator samples.

The 2016 weekly iodine cartridge isotopic results showed no indication of radioiodines in any of the samples. Results for iodine-131 were in all cases below the lower limit of detection (See Appendix A, Tables A-4.1, A-4.2). The 2016 air particulate and iodine sample results show no evidence of measurable environmental radiological air quality impact that can be attributed to CGS plant operation.

5.3 Water

5.3.1 Surface Water

Composite water samples are collected from five surface water locations monthly and analyzed for tritium, gross beta, and gamma emitting radionuclides. A plot of the 2016 gross beta results for the plant intake, plant discharge, and river/drinking water stations are shown in Figure 5-6.

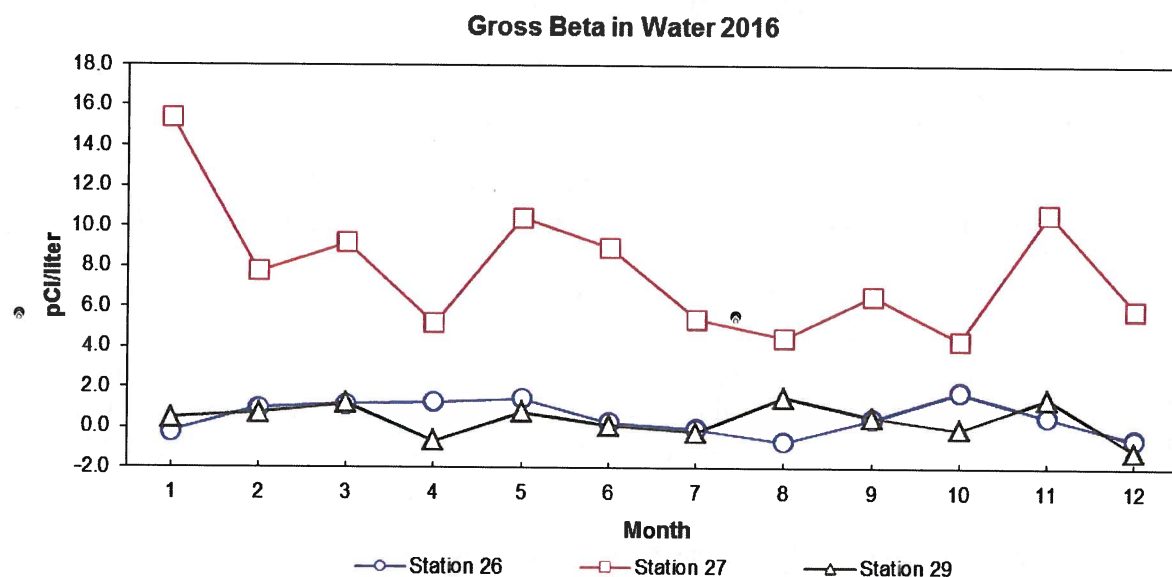


Figure 5-6 Gross Beta in River/Drinking (Stations 26 & 29) and Plant Discharge Water (Station 27) for 2016

All drinking and river water (Stations 26 and 29) gross beta results were below the analysis detection limits (See Appendix A, Tables A-5.1, A-5.2). Gross beta levels in the plant discharge water (Station 27) were above the detection limits in all twelve samples. Positive results for this location are expected due to concentration of natural radioactivity in the water by evaporative loss and the scrubbing action of the cooling towers which incorporates atmospheric particulate material into the discharge water. Historically, higher gross beta results at Station 27 can be correlated to the level of calcium concentration in the CGS circulating water. The Station 27 sample results are representative of the radioactivity present in plant discharge water before any mixing with river water occurs.

Monthly tritium results for all plant intake, plant discharge, and river/drinking water samples were below the analysis method *a priori* LLD. Tritium results for the three sample locations are plotted in Figure 5-7; quarterly averages for the locations are listed in Appendix A, Tables A-6.1, A-6.2.

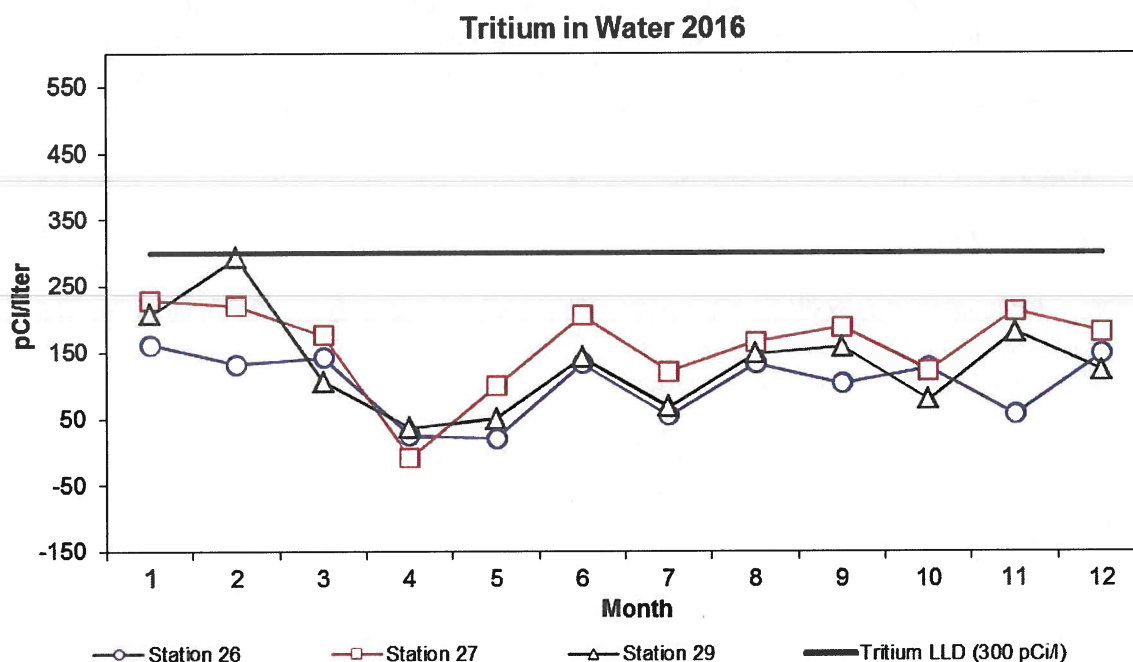


Figure 5-7 Tritium in River/Drinking (Stations 26 & 29) and Plant Discharge Water (Station 27) for 2016

Gamma spectroscopy results for all plant intake, plant discharge, and river/drinking water samples identified only naturally occurring radionuclides; no gamma-emitting radionuclides related to CGS operation were positively identified in these samples (See Appendix A, Tables A-7.1, A-7.2, A-13.1, A-13.2).

Analysis results for the plant intake, plant discharge, and river/drinking water samples showed no measurable impact to the environment due to CGS plant operations in 2016. Composite water samples are also taken from a sanitary waste and storm drain location. Analysis results for these samples are discussed in further detail in Section 5.9.

5.3.2 Ground Water

Samples from 3 deep wells were collected quarterly to meet ODCM and EFSEC Resolution No. 332⁽⁹⁾ requirements. Quarterly samples were also collected from nine shallow groundwater monitoring wells located near CGS as part of the CGS groundwater monitoring program. All well samples were analyzed for tritium and gamma emitting radionuclides. Well locations sampled are shown in Figures 4-1 and 4-2.

Analytical results for the three deep water wells were consistent with results seen in previous years. Tritium results were below detection limits and no gamma emitting radionuclides related to CGS operation were identified in any samples (See Appendix A, Tables A-6.1, A-6.2, A-14.1, and A-14.2).

The CGS groundwater monitoring program is conducted to meet the Nuclear Energy Institute (NEI) Groundwater Protection Initiative (NEI 07-07)⁽¹⁷⁾ guidelines and to support NPDES requirements. Water samples from the unconfined aquifer are collected quarterly from nine shallow monitoring wells located around the CGS site. None of these monitoring wells are used as a source of drinking water. CGS is unique in the commercial nuclear power industry in that it is located in an area where the unconfined aquifer under the site is known to be contaminated with tritium as a result of past

DOE activities on the Hanford Site.⁽¹⁹⁾ The CGS groundwater program is intended to assess any contribution CGS may be making to the known groundwater contamination issue.

Tritium results for the nine shallow monitoring wells ranged from < LLD to 14,600 pCi/liter (See Appendix A, Table B-11.1). Tritium results from each well were consistent during the year and within the trend range observed in previous years. The highest tritium concentrations were measured at MW-5 which is hydraulically up-gradient of CGS. The tritium identified in the shallow monitoring well samples is the result of past DOE activities on the Hanford site and is not attributable to CGS operation. Historically, the only identified impact that CGS operation has had on ground water tritium concentrations was through the discharge of storm drain water. With the establishment of lined evaporation ponds in 2014, this pathway was effectively eliminated. All storm drain water from the CGS site was directed to the lined evaporation ponds in 2016.

Gamma Spectroscopy results of the quarterly shallow monitoring well samples identified only natural occurring radionuclides (See Appendix A, Tables B-10.1, and B-10.2). The 2016 groundwater sample results show no evidence that CGS made a measurable radiological impact on groundwater.

5.4 Soil

Gamma spectroscopy analysis was performed on soil samples from five different locations in 2016 (See Appendix A, Tables A-8.1, A-8.2). Two samples were collected from locations near CGS, two samples were collected for locations east of CGS in Franklin County, and one sample was collected from a control location. Naturally occurring radionuclides were identified in all samples. Cesium-137 was identified at one indicator location near CGS and one indicator location in Franklin County. The level of cesium-137 identified was within the range historically observed in local soil and within the range considered normal background in Hanford area soils.^(21,22) The cesium-137 activity identified was below the level that would require strontium-90 analysis to be performed.⁽⁹⁾ The soil sample results indicate no measurable impact from CGS plant operation.

5.5 River Sediment

Gamma spectroscopy results of river sediment identified naturally occurring radionuclides and cesium-137 (See Appendix A, Tables A-9.1, 9.2). Relative to the circulating water discharge point, cesium-137 was detected in both the downstream samples (Station 34) and one of the upstream samples (Station 33). The downstream cesium-137 activity levels were slightly higher than the upstream levels. All cesium-137 results were within the range identified in previous years and within the range known to be present in Hanford area sediment and soil.⁽²¹⁾ Cesium-137 was not identified in any samples of plant cooling water discharged to the Columbia River. CGS has not made a radioactive discharge to the Columbia River since 1998. The sediment sample results indicate no measurable impact from CGS plant operation.

5.6 Fish

The gamma spectroscopy results of fish samples collected at both the indicator location (Columbia River) and the control location (Snake River) identified only the presence of naturally occurring radionuclides (See Appendix A, Tables A-10.1, 10.2). The same three species; bass, walleye, and steelhead, were collected at both the indicator and control locations. No measureable impact attributable to CGS operation was identified in the 2016 fish sample results.

5.7 Milk

No radioiodine activity was identified in any of the milk samples collected in 2016 (See Appendix A, Tables A-11.1, A-11.2). Gamma spectroscopy results of milk radionuclides other than radioiodine did not identify the presence of any radionuclides of interest (See Appendix A, Tables A-12.1, A-12.2). Naturally occurring potassium-40 was identified in all milk samples. Changes made in 2016 to milk sampling are discussed in sections 4.4.7 and 4.8. The 2016 milk analysis results indicate no measurable impact due to CGS plant operation.

5.8 Garden Produce

Gamma analysis was performed on twenty nine samples of fruits, vegetables, and root crops in 2016 (See Appendix A, Tables A-15.1, A-15.2, A-16.1, A-16.2, A-17.1, A-17.2). No radionuclides related to CGS operation were identified in any of the samples. Naturally occurring potassium-40 was identified in all samples.

5.9 Special Interest Stations

Sampling and analysis is performed at the locations covered in this section to comply with EFSEC requirements or as a CGS initiative. Sanitary Waste Treatment Facility (SWTF) and storm drain water sampling were incorporated into the routine sampling schedule in 1992. In 1995, the cooling tower sediment disposal area was added. TLDs were placed at the spray pond drain field (Station 120) in June 1995. TLD monitoring in the vicinity of the planned Independent Spent Fuel Storage Installation (ISFSI) was first performed in 1998 to collect background data and TLD monitoring was established on the ISFSI fence line after construction was completed in 2002. Additional TLD and air monitoring locations were established in 2008/2009 to monitor remediation work at the DOE 618-11 burial ground west of CGS. Discussion of the results from each of these locations is given in the following sections.

5.9.1 Evaporation Pond (Station 101B)

The Station 101B composite sampler samples storm drain, air wash, and non-radioactive system wastewater originating from within the CGS protected area. Water from these sources has been directed to two lined evaporation ponds since November 2014. Wastewater originating outside the CGS protected area is typically directed to three other lined evaporation ponds that are not sampled by the Station 101B sampler. Figure 4-1 shows the location of the five evaporation ponds; Station 101B samples water flowing into ponds 3 and 4. Sampling and analysis at this location is specified in EFSEC Resolutions.^(9,23) Historically, the water directed to the evaporation ponds was discharged to an unlined storm drain pond. Remediation of the historic storm drain pond was completed in 2016.

Monthly composite water samples were analyzed for gamma emitting radionuclides, tritium, and gross beta. Gamma spectroscopy results did not identify the presence of any gamma emitting radionuclides of interest (See Appendix A, Tables B-2.1, B-2.2). Gross beta was identified slightly above background in June and October (See Appendix A, Tables B-3.1, B-3.2). Tritium was detected in all twelve monthly samples (See Appendix A, Tables B-4.1, B-4.2). The samples with higher tritium levels were all from colder, wetter months which is consistent with results seen in previous years. The source of the tritium in storm drain water is attributed to recapture of tritium from CGS gaseous effluents which is more likely to occur during cooler, rainier periods. The total amount of tritium calculated to have been recaptured in CGS storm drain water in 2016 was slightly lower than the amount determined for 2014 and 2015.

Water grab samples were taken from all five ponds in May and analyzed for tritium, gross beta, and gamma emitting radionuclides. Gamma analysis did not identify any radionuclides related to CGS operation. Tritium and gross beta was identified slightly above detection limits in ponds 3 and 4; no tritium or gross beta was positively identified in ponds 1A, 1B, or 2 (See Appendix A, Tables B-12.1, B-14.1, B-15.1).

Sediment samples collected in July and September from evaporation ponds 1B, 3, and 4 were analyzed for gamma emitting radionuclides. Samples were collected when the ponds were dry or nearly dry allowing sediment to be collected from multiple locations. Only naturally occurring radionuclides were identified in pond 1B sediment. Low level cobalt-60 was identified in both ponds 3 and 4; cesium-137 was identified in pond 4 (See Appendix A, Table B-13.1). Concentrations and radionuclides identified were similar to those identified in 2015. Recapture of CGS gaseous effluents in storm drain water has historically been identified as the source of the low level cobalt-60 activity in storm drain pond sediment and soil. The identification of low level cobalt-60 in evaporation pond sediment was expected. The level of Cs-137 identified in pond 4 is within the range known to exist in Hanford area soils.

5.9.2 Sanitary Waste Treatment Facility (Station 102B)

The Sanitary Waste Treatment Facility (SWTF) is located approximately 0.5 miles south-southeast of CGS. The facility processes sanitary waste water from CGS, the ENW Industrial Development Complex (formerly referred to as WNP-1 and WNP-4), and the Kootenai Building. The Station 102B composite sampler collects wastewater as it enters the SWTF head works. Discharge standards and monitoring requirements for the SWTF are established in EFSEC Resolution No. 300.⁽¹⁶⁾ No SWTF water was discharged to ground in 2016.

Low level gross beta was identified in all twelve Station 102B samples. The levels identified were consistent with levels identified in previous years. Gross alpha was not positively identified in any of the Station 102B samples (See Appendix A, Tables B-5.1, B-5.2, B-6.1, B-6.2).

Gamma spectroscopy results of the monthly Station 102B samples identified only naturally occurring radionuclides (See Appendix A, Tables B-7.1, B-7.2).

No tritium activity was identified in any of the Station 102B samples in 2016 (See Appendix A, Tables B-8.1, B-8.2). Tritium activity has not been identified in the Station 102B samples since processing of DOE 400 area waste water was terminated in 2013.

5.9.3 Cooling System Sediment Disposal Area (Station 119)

EFSEC Resolution No. 299⁽¹⁸⁾ authorizes the onsite disposal of sediments from plant cooling systems containing low levels of radionuclides. The disposal area for these sediments is located just south of the CGS cooling towers. EFSEC Resolution No. 299⁽¹⁸⁾ requires direct radiation monitoring using quarterly TLDs in the vicinity of the disposal cells and the collection and analysis of a dry composite sediment sample from the disposal cell within thirty days following each cleaning in order to confirm that the disposal criteria outlined in the resolution have not been exceeded.

The source of the radioactivity identified in cooling tower sediment is attributed to incorporation of radionuclides present in the general environment (cesium-137) or recapture of radionuclides in CGS gaseous effluents (cobalt-60). As air is pulled through the cooling towers, atmospheric particles are

incorporated into the cooling water. Algae and other biological organisms present in the cooling tower environment actively assimilate the radionuclides resulting in concentrated and measurable levels of the radionuclides in these biological materials. The material removed during cleaning and referred to as sediment is composed in large part of algae and other biological organisms that exist in the cooling tower environment.

Cleaning of the CGS cooling towers was performed in April and October 2016. Both cleanings were limited to the upper tower decks; the tower basins were not cleaned. Disposal of the material removed during the tower cleanings resulted in an estimated 11 cubic meters of dry sediment being added to the disposal cells. Material removed during the October cleaning was placed in an older pit that has not been utilized since 2007.

2016 Cooling System Sediment Disposal Data				
	Disposal Date	Apr-16	Oct-16	
	Pit ID:	2007 Pit	2006 Pit	
	Mass, kg	3,446	5,351	
	Density, g/cc	0.82	0.77	
Nuclide	Limit (pCi/kg)	Analytical Result (pCi/kg)	Analytical Result (pCi/kg)	Total Curies
Co-60	5.00E+03	8.00E+01	< 49.3E+01	5.39E-07
Mn-54	3.00E+04	< 3.60E+01	< 4.47E+01	3.63E-07
Zn-65	5.00E+04	< 5.00E+01	< 8.09E+01	6.05E-07
Cs-134	1.00E+04	< 2.30E+01	< 4.12E+01	3.00E-07
Cs-137	2.00E+04	2.30E+02	1.72E+02	1.71E-06
				3.52E-06

Figure 5-8 Cooling System Sediment Activity Levels For Disposals Made In 2016

A summary of the estimated mass and radionuclide content of all transfers to the disposal cell area in 2016 is presented in Figure 5-8. For those isotopes listed in the table that were not positively identified, the MDA value obtained from the sample analysis was used in the table calculations. As such, the total activity reported is a conservative estimate.

As shown in Figure 5-8, all material transferred to the disposal cell area in 2016 was well below the disposal concentration limits specified in EFSEC Resolution No. 299.⁽¹⁸⁾ The cobalt-60 levels identified were slightly lower than levels typically observed in cooling tower sediment. Cesium-137 levels were within the range typically observed in cooling tower sediment and in Hanford area soils.

Measurements of direct radiation at the disposal pit area were taken using TLDs. Two locations were used, an indicator location by the collection area (Station 119B) and a control location approximately 200 yards to the east (Station 119C). The negligible difference between the indicator and the control TLDs indicate that there was no measureable dose contribution above background due to material in the disposal cells (See Tables 5.3 and Appendix A, Tables B-1.1).

5.9.4 Spray Pond Drain Field (Station 120)

The requirement for direct radiation monitoring at the Spray Pond Drain Field was removed from the CGS NPDES permit in 2014. No direct radiation monitoring was performed at Station 120 in 2016.

5.9.5 Independent Spent Fuel Storage Installation

The Independent Spent Fuel Storage Installation (ISFSI) is a fenced, secured area north northwest of CGS. Ten TLD stations are located on the second of three security fences that surround the ISFSI. Four other TLD locations; Stations 121, 122, 155, and 156, are located near the ISFSI to provide additional monitoring of ISFSI direct radiation. The ISFSI was expanded in 2016 and a new pad installed; refer to section 4.2 for further details and to Figure 4-4 for a map showing ISFSI TLD locations.

No new spent fuel casks were added to the ISFSI in 2016. As shown in Figure 5-9, exposure rates at the ISFSI fence line show mostly a downward trend since the second quarter 2014 when spent fuel was last added to the ISFSI. The TLD stations with the highest dose rates were located on the south fence; these stations are closest in proximity to the spent fuel casks moved to the ISFSI in 2014. These south fence TLDs, Stations 136A, 137A, and 138A, were relocated to a new fence further from the spent fuel casks at the start of the third quarter and re-designated as Stations 136B, 137B, and 138B. As shown in Figure 5-9, dose rates at the new locations are significantly lower.

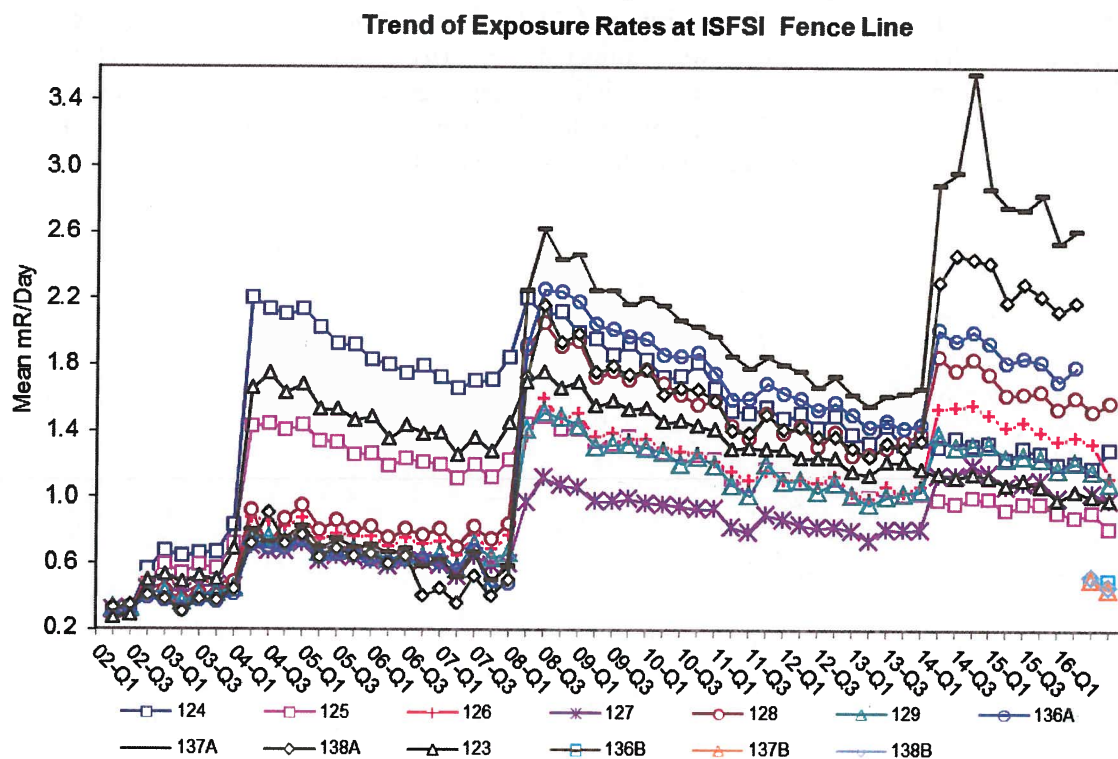


Figure 5-9 ISFSI TLD Trend at CGS

Station 122 TLD results show a flat trend line with no observable increase. This location is effectively shielded from the newer fuel casks on the south pad by the older casks on the north pad. Stations 155 and 156 were added in the first quarter 2016. Direct radiation results at these locations were slightly above expected background level. Station 121 results showed a flat trend line in 2016; this location is influenced mostly by turbine building radiation levels and not by the ISFSI (See Table 5-3 and Appendix A, Tables B-1.1, B-1.2).

5.9.6 Miscellaneous Environmental Sample Results

Apple samples from both control and indicator locations were collected in the summer and fall of 2016 and analyzed for carbon-14 content. Analyses were performed by the Washington State Department of Health Laboratory located in Shoreline WA. Results were similar for both indicator and control samples. The concentration of carbon-14 identified was within the range expected due solely to carbon-14 background contributions. The results do not indicate any discernable effect attributable to CGS operation (See Appendix B, Table B-17.1).

Rain water samples collected from three locations on the CGS site in October 2016 were analyzed for tritium content as a CGS initiative. All results were above the LLD and similar to the level observed in storm drain water (Station 101B) for that period (See Appendix A, Table B-16.1 and Table B-4.1).

Four air sample locations (Stations 87-90) and 5 TLD stations (Stations 58, 87-90) were established in 2008/2009 in order to monitor air quality and direct radiation during remediation work at the DOE 618-11 burial ground located just west of CGS (See Figure 4-1). No remediation work took place at the 618-11 burial ground in 2016 and no air samples were collected from these locations. Quarterly TLDs were exchanged at all five locations in 2016; the direct radiation results were consistent with the historical trend. Three of the locations (Stations 87-89) show results slightly higher than background due to their close proximity to the turbine building (See Appendix A, Table B-1.1).

5.10 2016 Sample Deviations

A summary of REMP sample deviations encountered in 2016 is listed below in Table 5-1a. All known deviations from the sampling schedule (i.e. sample was not obtained) or analyses where the ODCM specified lower limit of detection was not achieved are included. For ODCM or EFSEC specified locations where composite or continuous samples are collected, any known period greater than 24 hours during which samples were not collected have been included. All locations listed in Table 5-1a are required by either the ODCM or EFSEC resolutions. Inclusion of ODCM related sample deviations in Table 5-1a serves to meet the required compensatory measure listed in ODCM RFO 6.3.1 A.1. Table 5-1b lists information regarding air sample station sampling requirements.

TABLE 5-1a REMP Sample Deviations for 2016				
SAMPLE MEDIA	DATE	LOCATION	CR ID	PROBLEM / ACTIONS TAKEN
Air Sampler	4/4/16 to 4/21/16	Station 23	347539	Station without power for 18 days due to modifications being made at sub- station supplying power to this location. Alternate source of power not available. Notified EFSEC personnel of situation. Verified station operational after power restored.
Air Sampler	7/25/16 to 7/26/16	Station 40	352765	Station found off with blown fuse during weekly filter change out. Timer indication was station had been off for 30 hours. Fuse replaced, station returned to service. Sufficient sample volume obtained to meet LLD.
Air Sampler	10/21/16 to 10/25/16	Station 9A	356893	Station found with pump running but not pumping air. Air volume from mechanical totalizer was roughly half the normal air volume. Pump replaced and station returned to service. Investigation revealed pump vanes had failed. Station estimated to have been out of service for ~ 80 hours.
Water	7/13/16 to 7/14/16	Station 26	352221	TMU-SR-1 found without power. Investigation found GFCI circuit supplying power to the sampler had tripped. Power was restored and sampler verified operable. Estimate sampler was out of service for 30 hours.
Water	11/6/16 to 11/9/16	Station 27	357625	Circ water blowdown sampler CBD-SR-1 was out of service for 70 hours due to planned power outage. Power was restored and sampler verified operable.
Water	12/18/16 to 12/19/16	Station 101B	359209	Composite sampler 101B found not sampling and sampling program not initialized during routine check. Program re-initialized and station returned to service. Sampler believed to have lost memory during power outage the previous day. Estimate sampler was out of service for 24 hours.

Table 5-1b below shows the percent in service time for the 12 air sample locations. The table shows overall availability for all ODCM required locations was 98.9% or greater. Both Stations 21 and 23 were out of service for two week periods due to loss of electrical power.

TABLE 5-1b			
CGS REMP Air Sample Percent in Service Time for 2016			
Station ID	ODCM Required	EFSEC Required	Percent Time in Service
1		x	99.9%
4	x	x	99.9%
5			98.8%
6		x	99.9%
7		x	99.7%
8	x	x	99.9%
9	x	x	98.9%
21			95.1%
23		x	95.3%
40	x	x	99.5%
48	x	x	99.9%
57	x		99.8%

TABLE 5-2							
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY							
COLUMBIA GENERATING STATION Benton County, Washington				DOCKET NO. 50-397 Calendar Year 2016			
Medium: Environmental Direct Radiation (TLD)				mR/std. Units: quarter			
Analysis Type	Total Analyses Performed	Lower Limit of Detection (LLD)	Indicator Locations Mean (f) ^a Range	Location With Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Measurements
				Location Information	Mean (f) ^a Range		
TLD Quarterly	228	---	21.0 (224 / 224) (15.6-28.4)	86 NNW 0.3 miles	27.2 (4/4) (26.4-28.4)	19.8 (4/4) (19.6-20.2)	0
a. (f) is the number of positive measurements / total measurements at specified location.							
Reference Appendix A, Tables A-1.1, A-1.2							

TABLE 5-2 (cont.)							
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY							
COLUMBIA GENERATING STATION Benton County, Washington				DOCKET NO. 50-397 Calendar Year 2016			
Medium: ISFSI Direct Radiation (TLD)				mR/std. Units: quarter			
Analysis Type	Total Analyses Performed	Lower Limit of Detection (LLD)	Indicator Locations Mean (f) ^a Range	Location With Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Measurements
				Location Information	Mean (f) ^a Range		
TLD Quarterly	39	---	111.0 (39 / 39) (41.2-238.4)	137A NNW 0.24 miles	235.1 (2 / 2) (231.8-238.4)	--- (0 / 0)	0
a. (f) is the number of positive measurements / total measurements at specified location.							
Reference Appendix A, Tables B-1.1, B-1.2							
ISFSI TLDs are Stations 123 to 129, 136A to 138A, and 136B to 138B. One ISFSI TLD (Station 127) lost or misplaced in 2nd quarter.							
Station 137A was relocated at the start of the 3rd quarter; only two measurements were performed for this location.							

TABLE 5-2 (cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

**COLUMBIA GENERATING STATION
Benton County, Washington**

**DOCKET NO. 50-397
Calendar Year 2016**

Medium: Air Particulate/Air Radioiodine

Units: pCi/m³

Analysis Type	Total Analyses Performed	Lower Limit of Detection (LLD) ^b	Indicator Locations Mean (f) ^a Range	Location With Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Measurements
				Location Information	Mean (f) ^a Range		
Gross Beta	632	0.01	0.0155 (579/579) (0.0020-0.0921)	23 ESE 3.03 miles	0.0159 (51/51) (0.0030 - 0.0895)	0.0136(53/53) (0.0033 - 0.0658)	0
I-131	632	0.07	--- (0 / 579)	---	---	--- (0 / 53)	0
Cs-134	48	0.05	--- (0 / 44)	---	---	--- (0 / 4)	0
Cs-137	48	0.06	--- (0 / 44)	---	---	--- (0 / 4)	0

a. (f) is the number of positive measurements / total measurements at specified location.

b. These are the ODCM specified LLDs, actual method LLDs will be lower. See Table 4-4.

Reference Appendix A, Tables A-2.1, A-2.2, Tables A-3.1, A-3.2, and Tables A- 4.1, A-4.2.

TABLE 5-2 (cont.)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY
COLUMBIA GENERATING STATION **DOCKET NO. 50-397**
Benton County, Washington **Calendar Year 2016**

Medium: Water-River/Drinking				Units: pCi/L			
Analysis Type	Total Analyses Performed	Lower Limit of Detection (LLD) ^c	Indicator Locations Mean (f) ^a Range	Location With Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Measurements
				Location Information	Mean (f) ^a Range		
Gross Beta	24	4.0	--- (0/24) ^(b)	---	---	--- (0 / 12)	0
H-3	8	2000	--- (0 / 8) ^(b)	---	---	--- (0 / 4)	0
Mn-54	24	15	--- (0 / 24) ^(b)	---	---	--- (0 / 12)	0
Fe-59	24	30	--- (0 / 24) ^(b)	---	---	--- (0 / 12)	0
Co-58	24	15	--- (0 / 24) ^(b)	---	---	--- (0 / 12)	0
Co-60	24	15	--- (0 / 24) ^(b)	---	---	--- (0 / 12)	0
Zn-65	24	30	--- (0 / 24) ^(b)	---	---	--- (0 / 12)	0
Zr/Nb-95	24	15	--- (0 / 24) ^(b)	---	---	--- (0 / 12)	0
Cs-134	24	15	--- (0 / 24) ^(b)	---	---	--- (0 / 12)	0
Cs-137	24	18	--- (0 / 24) ^(b)	---	---	--- (0 / 12)	0
Ba/La-140	24	15	--- (0 / 24) ^(b)	---	---	--- (0 / 12)	0

a. (f) is the number of positive measurements / total measurements at specified location.

b. This includes the control sample for this group; the control (Station 26) is also a drinking water sample.

c. These are the ODCM specified LLDs, actual method LLDs will be lower. See Table 4-4.

Reference Appendix A, Tables A-5.1,A-5.2, Tables A-6.1, A-6.2, and Tables A-7.1, A-7.2

TABLE 5-2 (cont.)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY
COLUMBIA GENERATING STATION **DOCKET NO. 50-397**
Benton County, Washington **Calendar Year 2016**

Medium: Water-Discharge

Units: pCi/L

Analysis Type	Total Analyses Performed	Lower Limit of Detection (LLD) ^b	Indicator Locations Mean (f) ^a Range	Location With Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Measurements
				Location Information	Mean (f) ^a Range		
Gross Beta	12	4.0	7.87 (12/12) (4.35-15.4)	27 E 3.2 miles	7.87 (12/12) (4.35-15.4)	---(0 / 0)	0
H-3	4	2000	--- (0 / 4)	---	---	--- (0 / 0)	0
Mn-54	12	15	--- (0 / 12)	---	---	--- (0 / 0)	0
Fe-59	12	30	--- (0 / 12)	---	---	--- (0 / 0)	0
Co-58	12	15	--- (0 / 12)	---	---	--- (0 / 0)	0
Co-60	12	15	--- (0 / 12)	---	---	--- (0 / 0)	0
Zn-65	12	30	--- (0 / 12)	---	---	--- (0 / 0)	0
Zr/Nb-95	12	15	--- (0 / 12)	---	---	--- (0 / 0)	0
Cs-134	12	15	--- (0 / 12)	---	---	--- (0 / 0)	0
Cs-137	12	18	--- (0 / 12)	---	---	--- (0 / 0)	0
Ba/La-140	12	15	--- (0 / 12)	---	---	--- (0 / 0)	0

a. (f) is the number of positive measurements / total measurements at specified location.

b. These are the ODCM specified LLDs, actual method LLDs will be lower. See Table 4-4.

Reference Appendix A, Tables A-5.1, A-5.2, Tables A-6.1, A-6.2, and Tables A-13.1, A-13.2

TABLE 5-2 (cont.)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY
COLUMBIA GENERATING STATION **DOCKET NO. 50-397**
Benton County, Washington **Calendar Year 2016**

Medium: Water- Deep Ground				Units: pCi/L			
Analysis Type	Total Analyses Performed	Lower Limit of Detection (LLD) ^b	Indicator Locations Mean (f) ^a Range	Location With Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Measurements
				Location Information	Mean (f) ^a Range		
H-3	12	2000	--- (0 / 12)	---	---	--- (0 / 0)	0
Mn-54	12	15	--- (0 / 12)	---	---	--- (0 / 0)	0
Fe-59	12	30	--- (0 / 12)	---	---	--- (0 / 0)	0
Co-58	12	15	--- (0 / 12)	---	---	--- (0 / 0)	0
Co-60	12	15	--- (0 / 12)	---	---	--- (0 / 0)	0
Zn-65	12	30	--- (0 / 12)	---	---	--- (0 / 0)	0
Zr/Nb-95	12	15	--- (0 / 12)	---	---	--- (0 / 0)	0
Cs-134	12	15	--- (0 / 12)	---	---	--- (0 / 0)	0
Cs-137	12	18	--- (0 / 12)	---	---	--- (0 / 0)	0
Ba/La-140	12	15	--- (0 / 12)	---	---	--- (0 / 0)	0

a. (f) is the number of positive measurements / total measurements at specified location.

b. These are the ODCM specified LLDs, actual method LLDs will be lower. See Table 4-4.

Reference Appendix A, Tables A-6.1, A-6.2, and Tables A-14.1, A-14.2

<p align="center">TABLE 5-2 (cont.) RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY COLUMBIA GENERATING STATION Benton County, Washington DOCKET NO. 50-397 Calendar Year 2016</p>							
Medium: Water- Shallow Ground				Units: pCi/L			
Analysis Type	Total Analyses Performed	Lower Limit of Detection (LLD) ^b	Indicator Locations Mean (f) ^a Range	Location With Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Measurements
				Location Information	Mean (f) ^a Range		
H-3	36	2000	3971 (27 / 36) (115-14,600)	MW-5 SW 0.43 miles	14,400 (4 / 4) (14,200-14,600)	--- (0 / 0)	0
Mn-54	36	15	--- (0 / 36)	---	---	--- (0 / 0)	0
Fe-59	36	30	--- (0 / 36)	---	---	--- (0 / 0)	0
Co-58	36	15	--- (0 / 36)	---	---	--- (0 / 0)	0
Co-60	36	15	--- (0 / 36)	---	---	--- (0 / 0)	0
Zn-65	36	30	--- (0 / 36)	---	---	--- (0 / 0)	0
Zr/Nb-95	36	15	--- (0 / 36)	---	---	--- (0 / 0)	0
Cs-134	36	15	--- (0 / 36)	---	---	--- (0 / 0)	0
Cs-137	36	18	--- (0 / 36)	---	---	--- (0 / 0)	0
Ba/La-140	36	15	--- (0 / 36)	---	---	--- (0 / 0)	0

a. (f) is the number of positive measurements / total measurements at specified location.

b. These are the ODCM specified LLDs, actual method LLDs will be lower. See Table 4-4.

Reference Appendix A, Tables B-10.1, B-10.2, and B-11.1.

TABLE 5-2 (cont.)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY
COLUMBIA GENERATING STATION **DOCKET NO. 50-397**
Benton County, Washington **Calendar Year 2016**

Medium: River Sediment

Units: pCi/kg

Analysis Type	Total Analyses Performed	Lower Limit of Detection (LLD) ^b	Indicator Locations Mean (f) ^a Range	Location With Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Measurements
				Location Information	Mean (f) ^a Range		
Cs-134	4	150	--- (0 / 2)	---	---	--- (0 / 2)	0
Cs-137	4	180	162 (2 / 2) (130-194)	34 ESE 3.32 Miles	162 (2 / 2) (130-194)	63 (1 / 2) (17.0-109)	0
Co-60	4	---	--- (0 / 2)	---	---	--- (0 / 2)	0

a. (f) is the number of positive measurements / total measurements at specified location.

b. These are the ODCM specified LLDs, actual method LLDs will be lower. See Table 4-4.

Reference Appendix A, Tables A-9.1, A-9.2.

TABLE 5-2 (cont.) RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY COLUMBIA GENERATING STATION DOCKET NO. 50-397 Benton County, Washington Calendar Year 2016							
Medium: Roots				Units: pCi/kg			
Analysis Type	Total Analyses Performed	Lower Limit of Detection (LLD) ^b	Indicator Locations Mean (f) ^a Range	Location With Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Measurements
				Location Information	Mean (f) ^a Range		
I-131	5	60	--- (0 / 4)	---	---	--- (0/1)	0
Cs-134	5	60	--- (0 / 4)	---	---	--- (0/1)	0
Cs-137	5	80	--- (0 / 4)	---	---	--- (0/1)	0
a. (f) is the number of positive measurements / total measurements at specified location.							
b. These are the ODCM specified LLDs, actual method LLDs will be lower. See Table 4-4.							
Reference Appendix A, Tables A-15.1, A-15.2.							

TABLE 5-2 (cont.) RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY COLUMBIA GENERATING STATION DOCKET NO. 50-397 Benton County, Washington Calendar Year 2016							
Medium: Fruits				Units: pCi/kg			
Analysis Type	Total Analyses Performed	Lower Limit of Detection (LLD) ^b	Indicator Locations Mean (f) ^a Range	Location With Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Measurements
				Location Information	Mean (f) ^a Range		
I-131	6	60	--- (0 / 5)	---	---	--- (0 / 1)	0
Cs-134	6	60	--- (0 / 5)	---	---	--- (0 / 1)	0
Cs-137	6	80	--- (0 / 5)	---	---	--- (0 / 1)	0
a. (f) is the number of positive measurements / total measurements at specified location.							
b. These are the ODCM specified LLDs, actual method LLDs will be lower. See Table 4-4.							
Reference Appendix A, Table A-16.1, A-16.2.							

TABLE 5-2 (cont.) RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY COLUMBIA GENERATING STATION Benton County, Washington								DOCKET NO. 50-397 Calendar Year 2016	
Medium: Vegetables and Vegetation						Units: pCi/kg			
Analysis Type	Total Analyses Performed	Lower Limit of Detection (LLD) ^b	Indicator Locations Mean (f) ^a Range	Location With Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Measurements		
				Location Information	Mean (f) ^a Range				
I-131	18	60	--- (0 / 17)	---	---	--- (0 / 1)	0		
Cs-134	18	60	--- (0 / 17)	---	---	--- (0 / 1)	0		
Cs-137	18	80	--- (0 / 17)	---	---	--- (0 / 1)	0		
a. (f) is the number of positive measurements / total measurements at specified location.									
b. These are the ODCM specified LLDs, actual method LLDs will be lower. See Table 4-4.									
Reference Appendix A, Table A-17.1, A-17.2.									

TABLE 5-2 (cont.) RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY COLUMBIA GENERATING STATION Benton County, Washington								DOCKET NO. 50-397 Calendar Year 2016	
Medium: Fish						Units: pCi/kg			
Analysis Type	Total Analyses Performed	Lower Limit of Detection (LLD) ^b	Indicator Locations Mean (f) ^a Range	Location With Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Measurements		
				Location Information	Mean (f) ^a Range				
Mn-54	6	130	--- (0 / 3)	---	---	--- (0 / 3)	0		
Fe-59	6	260	--- (0 / 3)	---	---	--- (0 / 3)	0		
Co-58	6	130	--- (0 / 3)	---	---	--- (0 / 3)	0		
Co-60	6	130	--- (0 / 3)	---	---	--- (0 / 3)	0		
Zn-65	6	260	--- (0 / 3)	---	---	--- (0 / 3)	0		
Cs-134	6	130	--- (0 / 3)	---	---	--- (0 / 3)	0		
Cs-137	6	150	--- (0 / 3)	---	---	--- (0 / 3)	0		
a. (f) is the number of positive measurements / total measurements at specified location.									
b. These are the ODCM specified LLDs, actual method LLDs will be lower. See Table 4-4.									
Reference Appendix A, Table A-10.1, A-10.2.									

TABLE 5-2 (cont.)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY
COLUMBIA GENERATING STATION **DOCKET NO. 50-397**
Benton County, Washington **Calendar Year 2016**

Medium: Milk

Units: pCi/L

Analysis Type	Total Analyses Performed	Lower Limit of Detection (LLD) ^b	Indicator Locations Mean (f) ^a Range	Location With Highest Annual Mean		Control Locations Mean (f) ^a Range	Number of Nonroutine Measurements
				Location Information	Mean (f) ^a Range		
I-131	33	1.0	--- (0 / 18)	---	---	--- (0 / 15)	0
Cs-134	33	15	--- (0 / 18)	---	---	--- (0 / 15)	0
Cs-137	33	18	--- (0 / 18)	---	---	--- (0 / 15)	0
Ba/La-140	33	15	--- (0 / 18)	---	---	--- (0 / 15)	0

a. (f) is the number of positive measurements / total measurements at specified location.

b. These are the ODCM specified LLDs, actual method LLDs will be lower. See Table 4-4. ®

Reference Appendix A, Tables A-11.1, A-11.2, Tables A-12.1, A-12.2.

TABLE 5-3
QUARTERLY TLD DATA SUMMARY WITH COMPARISON TO
PREOPERATIONAL AND OPERATIONAL PERIODS
 Results in mR/Standard Quarter

Station	Pre-Operational				Operational to 2015				2016 Operational			
	Min	Max	Std Dev	Mean	Min	Max	Std Dev	Mean	Min	Max	Std Dev	Mean
1	19.16	23.73	2.07	21.90	18.25	27.38	1.59	22.12	18.77	22.45	1.54	20.77
2	17.34	22.81	2.09	21.10	16.43	25.55	1.51	21.64	19.22	21.57	1.08	20.62
3	18.25	21.90	1.46	20.42	16.43	24.64	1.63	20.84	17.67	20.55	1.28	19.41
4	15.51	23.73	2.65	19.96	14.60	22.81	1.60	19.54	18.48	20.00	0.70	18.98
5	18.25	22.81	1.74	20.76	16.43	23.73	1.58	20.01	18.34	19.65	0.72	18.99
6	18.25	21.90	1.50	20.19	16.43	23.73	1.51	20.11	17.91	19.26	0.61	18.80
7	19.16	22.81	1.69	21.33	16.43	24.64	1.65	21.09	17.41	21.12	1.67	19.87
8	21.90	25.55	1.50	23.84	15.51	27.38	1.87	23.28	19.66	23.82	1.75	21.93
9	15.51	21.90	2.00	19.85	16.43	23.73	1.62	19.83	19.61	20.15	0.26	19.78
10	19.16	22.81	1.38	20.99	16.43	24.64	1.59	20.96	20.07	22.14	0.94	21.11
11	19.16	22.81	1.38	21.44	16.43	24.64	1.41	21.54	20.44	21.29	0.37	20.86
12	20.99	24.64	1.60	23.04	18.25	26.46	1.65	23.11	21.72	22.98	0.63	22.36
13	19.16	22.81	1.54	21.44	17.34	27.38	1.71	21.30	19.52	21.03	0.70	20.12
14	19.16	24.64	2.07	21.90	17.34	25.55	1.45	21.46	19.25	21.34	0.92	20.31
15	20.99	25.55	1.37	23.15	17.34	27.38	1.64	23.02	20.55	25.01	1.91	22.63
16	20.08	23.73	1.52	22.13	16.43	26.46	1.73	21.92	20.29	21.76	0.63	21.12
17	19.16	23.73	1.62	22.81	17.34	26.46	1.54	22.50	19.96	22.13	0.92	21.25
18	20.08	23.73	1.27	22.13	16.43	25.55	1.60	22.03	20.55	21.22	0.30	20.98
19	20.08	23.73	1.24	22.01	17.34	25.55	1.52	22.18	19.65	23.03	1.42	21.50
20	19.16	23.73	1.76	21.44	17.34	25.55	1.58	21.84	15.62	21.42	2.62	19.49
21	19.16	21.90	1.25	20.68	15.51	23.73	1.40	20.30	19.35	20.72	0.64	19.77
22	19.16	23.73	1.58	22.01	16.43	25.55	1.46	21.66	19.54	21.10	0.71	20.54
23	20.08	23.73	1.49	21.60	17.34	25.55	1.58	21.18	18.10	21.59	1.52	20.29
24	20.99	23.73	1.09	21.90	17.34	50.50	3.05	22.04	19.05	22.23	1.35	20.42
25	20.99	24.64	1.46	23.15	17.34	27.38	1.84	22.75	20.72	22.17	0.63	21.40
40	17.34	21.90	1.70	19.94	15.51	24.64	1.70	19.94	16.81	18.06	0.55	17.58
41	20.08	25.55	2.00	23.73	17.34	27.38	1.96	22.35	20.59	22.10	0.64	21.21
42	20.08	23.73	1.61	22.36	17.34	26.46	1.86	21.90	18.06	20.73	1.28	19.97
43	20.99	24.64	1.49	23.12	16.43	27.38	2.03	22.54	19.79	22.18	1.11	21.06
44	19.16	22.81	1.34	21.12	15.51	24.64	1.90	20.68	17.26	19.01	0.79	18.25
45	19.16	22.81	1.37	21.25	16.43	25.55	1.74	21.10	18.31	20.03	0.83	19.55
46	22.81	28.29	2.10	26.10	19.16	31.94	2.05	26.50	23.86	28.03	1.73	25.71
47	17.34	20.99	1.73	19.85	15.51	26.28	1.65	20.19	18.91	20.52	0.78	19.71
49	21.90	21.90	-	21.90	16.43	25.55	1.51	21.87	19.68	27.57	3.48	22.78
50	20.08	20.08	-	20.08	16.43	26.46	1.70	21.57	20.35	22.03	0.78	21.07
51	19.16	21.90	1.18	20.53	16.43	24.64	1.57	21.03	19.41	21.09	0.71	20.29
53	24.64	24.64	-	24.64	18.25	29.57	2.05	23.16	20.56	21.88	0.63	21.34
54	23.73	23.73	-	23.73	18.18	26.46	1.91	22.06	20.47	21.93	0.60	21.23
55	20.99	20.99	-	20.99	16.43	25.55	1.45	21.45	20.41	21.62	0.55	21.02
56	21.90	21.90	-	21.90	16.43	25.55	1.68	21.92	20.60	24.29	1.61	22.22
58	-	-	-	-	18.07	21.86	1.02	19.63	19.06	23.04	2.10	21.11
65	-	-	-	-	17.73	22.72	1.15	19.91	18.82	19.68	0.46	19.27

TABLE 5-3 (Cont.)
QUARTERLY TLD DATA SUMMARY WITH COMPARISON TO
PREOPERATIONAL AND OPERATIONAL PERIODS
 Results in mR/Standard Quarter

Station	Pre-Operational				Operational to 2015				2016 Operational			
	Min	Max	Std Dev	Mean	Min	Max	Std Dev	Mean	Min	Max	Std Dev	Mean
71(1S)	20.08	22.81	1.58	21.90	18.25	30.39	2.37	25.29	21.71	26.14	2.07	24.48
72(2S)	21.90	23.73	0.91	22.81	18.25	29.65	1.91	24.35	18.40	25.01	2.96	22.71
73(3S)	20.08	21.90	0.91	20.99	16.43	25.15	1.61	21.41	21.39	22.83	0.69	22.02
74(4S)	23.73	24.64	0.53	24.03	18.25	28.29	1.80	23.38	21.91	23.34	0.67	22.67
75(5S)	19.16	21.90	1.39	20.38	15.51	26.46	1.78	22.28	19.27	22.14	1.20	20.91
76(6S)	20.99	22.81	0.91	21.90	17.34	26.46	1.69	21.99	17.90	22.25	2.07	19.92
77(7S)	21.90	23.73	0.91	22.81	17.34	25.55	1.53	22.01	21.09	21.61	0.25	21.40
78(8S)	21.90	23.73	1.05	22.51	17.34	25.55	1.51	21.47	19.93	22.59	1.11	21.14
79(9S)	22.81	23.73	0.53	23.12	17.34	25.55	1.58	21.84	20.22	22.27	0.96	21.29
80(10S)	20.99	22.81	0.91	21.90	16.43	25.55	1.67	21.01	17.84	20.73	1.36	19.61
81(11S)	20.08	23.73	1.90	22.20	17.34	25.55	1.48	21.45	19.20	21.56	1.01	20.62
82(12S)	21.90	24.64	1.39	23.42	17.34	26.46	1.50	22.43	20.67	22.83	1.18	21.74
83(13S)	21.90	23.73	0.91	22.81	17.34	26.46	1.81	22.20	19.68	23.63	1.65	21.41
84(14S)	20.99	22.81	1.05	22.20	16.43	27.17	1.73	22.27	19.50	23.34	1.64	20.99
85(15S)	21.90	24.64	1.58	23.73	17.34	27.83	1.80	23.10	16.58	23.55	3.01	20.83
86(16S)	21.90	23.73	0.91	22.81	18.25	31.28	2.58	26.36	26.31	28.42	0.90	27.16
87	-	-	-	-	19.34	34.34	3.98	28.63	28.37	29.90	0.73	28.95
88	-	-	-	-	17.05	31.67	3.51	25.29	23.10	31.11	3.69	25.83
89	-	-	-	-	19.25	29.38	2.41	25.99	24.50	27.42	1.25	25.89
90	-	-	-	-	17.53	21.02	0.77	19.07	16.79	19.51	1.19	18.43
119B	-	-	-	-	19.24	25.64	1.40	22.07	20.34	23.63	1.36	21.99
119Ctrl	-	-	-	-	19.53	26.55	1.33	21.87	21.14	22.08	0.40	21.70
121 (ISFSI)	-	-	-	-	19.52	130.27	22.43	74.61	66.31	70.67	2.07	69.41
122 (ISFSI)	-	-	-	-	19.62	42.49	6.93	31.81	31.74	35.74	1.71	34.06
123 (ISFSI)	-	-	-	-	24.99	160.33	34.22	114.12	89.80	94.88	2.27	91.78
124 (ISFSI)	-	-	-	-	26.89	201.05	44.10	139.73	107.85	117.85	4.43	111.40
125 (ISFSI)	-	-	-	-	26.46	135.52	26.41	100.00	74.64	83.42	4.06	80.45
126 (ISFSI)	-	-	-	-	26.00	145.68	33.12	92.54	102.56	125.05	10.32	117.86
127 (ISFSI)	-	-	-	-	28.97	109.16	21.32	71.42	90.00	94.32	2.22	91.86
128 (ISFSI)	-	-	-	-	25.64	187.25	46.97	109.22	139.29	146.89	3.46	142.57
129 (ISFSI)	-	-	-	-	30.16	138.08	32.01	85.99	99.59	111.05	4.77	106.10
136A (ISFSI)	-	-	-	-	28.99	205.64	60.56	113.88	155.65	163.34	5.43	159.49
137A (ISFSI)	-	-	-	-	29.47	324.49	82.15	135.62	231.78	238.43	4.70	235.10
138A (ISFSI)	-	-	-	-	28.28	224.87	62.42	110.65	194.03	199.15	3.62	196.59
136B (ISFSI)	-	-	-	-	-	-	-	-	45.28	45.92	0.45	45.60
137B (ISFSI)	-	-	-	-	-	-	-	-	41.20	46.50	3.75	43.85
138B (ISFSI)	-	-	-	-	-	-	-	-	42.43	47.68	3.71	45.05
Site 1	-	-	-	-	11.92	20.19	1.25	18.30	16.87	19.31	1.20	18.01
Site 4	-	-	-	-	17.02	20.24	0.99	18.70	15.70	19.13	1.60	18.08
155	-	-	-	-	-	-	-	-	23.02	26.88	1.58	25.01
156	-	-	-	-	-	-	-	-	26.78	28.83	0.98	27.89

TABLE 5-3 NOTES: The preoperational mean is from 1982-1983 data. Station 65 was added in 1997. Stations 119B and 119Ctrl were added in 1995. Stations 121 and 122 were added in 1998 for the ISFSI. Stations 123-129 and 136A-138A were added in the 2nd quarter of 2002. Stations Site 1 and Site 4 were added in 2006. Stations 58 and 87 to 90 were added in 2008 to monitor remediation work at DOE 618-11 burial site. Stations 136A-138A were relocated in the 3rd quarter 2016 and designated as stations 136B-138B. Stations 155 and 156 were added in the 1st quarter 2016.

6.0 QUALITY ASSURANCE AND QUALITY CONTROL

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6.0 QUALITY ASSURANCE AND QUALITY CONTROL

The REMP is designed to meet the quality assurance (QA) and quality control (QC) criteria of the NRC Regulatory Guide 4.15⁽⁷⁾ and 10 CFR 50 Appendix B⁽¹⁵⁾. The laboratories performing sample analysis, Energy Northwest Environmental Services and Hanford External Dosimetry Program (HEDP), maintain quality control programs to ensure that analytical results are accurate, precise, and defensible. The following sections summarize the quality assurance and quality control aspects of the TLD, sample collection, and sample analysis components of the REMP.

6.1 Quality Control for the Energy Northwest Environmental TLD Program

The Quality Control program for the environmental TLD program covers the preparation, transportation, deployment, collection, storage, processing, and evaluation of the environmental TLDs and is designed to meet the requirements of NRC Regulatory Guides 4.13⁽⁸⁾ and 4.15.⁽⁷⁾

From the time the TLDs are annealed to the time they are placed in the field, they are stored and transported with control TLDs. Two sets of control TLDs are used, the building controls and the transportation (trip) controls. The building controls monitor the exposure that the TLDs receive while being transported to and from the TLD vendor and while in storage awaiting deployment and analysis. The trip controls accompany the field TLDs when transported to and from the vendor and also during deployment and collection in the field. The building controls and trip controls are stored in a low background lead shield while the field TLDs are deployed. If the trip control results are greater than the building control results, the difference between the two is subtracted from the field dosimeters to account for exposure during transit.

Reader QC dosimeters serve as checks that the dosimeter reader calibration is satisfactory and that the TLDs were processed correctly. These TLDs are annealed and then given a known exposure (typically 100 mR) to a cesium-137 source. The number of QC dosimeters used during each processing is generally 10% of the number of field dosimeters. Evaluation of the 2016 reader QC dosimeter results indicated satisfactory agreement for all periods. The quarterly average reader QC results are presented in Table 6-1.

TLDs designated as spikes are prepared by the Energy Northwest Radiation Protection Department by exposing the TLDs to a calibrated source to produce a known exposure. The spiked dosimeters are submitted and processed with the field dosimeters to further verify the accuracy and precision of the environmental TLD results. Quarterly spikes receive a target exposure of 22 mR. Evaluation of the 2016 spiked dosimeter results indicated satisfactory agreement for all periods. Spiked TLD results are presented in Table 6-1.

6.2 Quality Control for the Environmental Sample Program

Quality control for the environmental sample program encompasses both the sample collection and sample analysis processes. Results are reviewed for correctness, reasonableness, and data entry errors. Sample results that are suspect are normally investigated. A crosscheck program utilizing blind samples supplied by an outside vendor is maintained for all sample media routinely analyzed.

6.2.1 Sample Collection Quality Control

Duplicate samples are collected and submitted for analysis when practical. The duplicate samples are used to assess the repeatability of the sample collection process and the precision of the analytical method.

6.2.2 Laboratory Instruments Quality Control

Analytical Balances - Analytical balances used in the laboratory for sample preparations are calibrated every six months. Performance checks are performed prior to use and span the range of intended use. Performance check results are documented on the sample preparation forms and kept with the analytical results.

Analytical Instruments – Analytical instruments used for determining radioactive emissions in samples are calibrated for efficiency annually using standard reference material traceable to the National Institute of Standards and Technology (NIST). Below is a summary of the routine QC practices for the different analytical instruments.

- **Gas-flow Proportional Counter:** Background and performance checks are performed daily when in use. Control charts are maintained with two and three-sigma limits specified; the checks must fall within the two-sigma warning limits prior to use. Mid-batch QC and end of batch performance checks are typically performed.
- **Gamma Spectrometers:** Performance checked daily for efficiency, energy per channel relationship, peak resolution, and background when in use. The checks are performed and plotted for both a low and high energy peak. Efficiency checks are held within two-sigma control limits. Long duration background checks are performed quarterly. A low level batch QC check is typically analyzed with each set of samples.
- **Liquid Scintillation Counter:** Background and performance checks are performed daily when in use. A performance check standard of the same matrix as the samples is analyzed and results trended. A control chart with acceptance limits specified is maintained. A low level batch QC check is typically analyzed with each set of samples.

6.2.3 Sample Batch Quality Control

Sample batch analysis is normally performed with sample blanks and known-addition samples (or spiked samples) included. The type of known addition sample used is dictated by the sample media being analyzed, the primary analytes of interest, and the method being used. The following is a summary of sample batch QC activities.

Iodine-131 Cartridges - At least one known-addition sample is analyzed with each batch. A charcoal cartridge of the same type used for sample collection but spiked with barium-133 is used. The 356 keV peak of barium-133 serves as a proxy for the 364 keV peak of iodine-131. Samples from the control location serve as blanks.

Gross Beta Filters - At least one unused blank air particulate filter and at least one known-addition air particulate filter is analyzed with each batch.

Aqueous Samples – In most cases, samples collected from the control locations are analyzed as blanks. A known-addition sample is typically analyzed with each batch of samples.

Gross Alpha/Beta in Water - Blank samples were prepared from reagent grade water and analyzed with each batch of samples. One known addition sample and one replicate sample is normally analyzed with each batch.

Tritium in Water – A blank and a low level known addition sample is typically analyzed with each batch. A replicate sample is prepared and analyzed inside of each batch in most cases.

6.3 Laboratory Intercomparison Program Participation and Results

Participation in cross check intercomparison studies is mandatory for laboratories performing analyses of CGS REMP samples. Intercomparison studies provide a consistent and effective means to evaluate the accuracy and precision of analyses performed by a laboratory. Study results should fall within specified control limits. Results that fall outside the control limits are investigated and corrective action taken.

The Energy Northwest Environmental Services Laboratory participated in three proficiency testing studies involving radioactive measurements provided by Environmental Resource Associates (ERA) during 2016. The Laboratory's intercomparison program was further supplemented by additional cross check media provided by ERA. The Laboratory's intercomparison program results for 2016 are shown in Table 6-2. With two exceptions, all 2016 Laboratory intercomparison program results were within acceptable limits. Participation in the ERA studies serves to meet the intercomparison program requirements specified in the ODCM.

In addition to the studies noted above, the CGS REMP maintains a split sample program with the State of Washington Department of Health. Split samples are sent to a State of Washington Lab on a scheduled frequency where they are independently analyzed. This program provides an additional check on the accuracy and precision of the results reported in this document.

6.4 Laboratory Quality Control Program Problems and Improvements

The reported water planchet gross alpha and beta results for the spring 2016 cross check study (MRAD 24) were below the acceptance criteria. Investigation found the activity on the study planchets was not as uniformly distributed as on the planchets used for calibration. This would result in higher sample self-attenuation and lower analytical results. As part of the investigation, the activity on the study planchets was re-suspended with demineralized water then dried in a manner to ensure a more uniform distribution. Reanalysis of the study planchets yielded results near the target value (gross alpha results were 110 pCi/l, gross beta results 60 pCi/l). As part of the corrective action, the procedure on preparing the water planchets was revised to include a note directing the performer to ensure sample material is evenly distributed, and if not, recommending the sample be re-suspended and re-dried. The water planchet gross alpha and beta results for the fall 2016 study were acceptable and near the target value.

TABLE 6-1
2016 ENVIRONMENTAL SPIKED DOSIMETER RESULTS

PERIOD	SPIKE ID	KNOWN EXPOSURE (mR)	REPORTED EXPOSURE (mR)	BIAS (%)
1st Quarter	ENW Spike	22	21.2	-3.6%
	ENW Spike	22	21.8	-0.9%
	ENW Spike	22	21.2	-3.6%
	HEDP Avg. Reader	100	97.7	-2.3%
2nd Quarter	ENW Spike	22	21.8	-0.9%
	ENW Spike	22	21.8	-0.9%
	ENW Spike	22	22.4	+1.8%
	HEDP Avg. Reader	100	98.0	-2.0%
3rd Quarter	ENW Spike	22	22.3	+1.4%
	ENW Spike	22	22.5	+2.3%
	ENW Spike	22	21.9	-0.5%
	HEDP Avg. Reader	100	100.5	+0.5%
4th Quarter	ENW Spike	22 [®]	21.8	-0.9%
	ENW Spike	22	22.7	+3.2%
	ENW Spike	22	22.1	+0.5%
	HEDP Avg. Reader	100	97.9	-2.1%

TABLE 6-2
ENW REMP PROGRAM CROSS CHECK PERFORMANCE RESULTS

ERA MRAD-24 Results Spring 2016					
Standard/Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation
Air Filter Radionuclides					
Americium-241	pCi/Filter	51	45.9	28.3 - 62.1	Acceptable
Cesium-134	pCi/Filter	253	304	193 - 377	Acceptable
Cesium-137	pCi/Filter	1250	1150	864 - 1510	Acceptable
Cobalt-60	pCi/Filter	611	623	482 - 778	Acceptable
Zinc-65	pCi/Filter	420	356	255 - 492	Acceptable
Air Filter Gross Alpha/Beta					
Gross Alpha	pCi/Filter	75	70.1	23.5 - 109	Acceptable
Gross Beta	pCi/Filter	46	54.4	34.4 - 79.3	Acceptable
Water Radionuclides					
Americium-241	pCi/L	< 150	121	81.5 - 162	Acceptable
Cesium-134	pCi/L	754	842	618 - 968	Acceptable
Cesium-137	pCi/L	1160	1100	934 - 1320	Acceptable
Cobalt-60	pCi/L	1030	1050	912 - 1230	Acceptable
Zinc-65	pCi/L	1120	1010	842 - 1270	Acceptable
Water Gross Alpha/Beta					
Gross Alpha	pCi/L	41	117	41.5 - 181	Not Acceptable*
Gross Beta	pCi/L	43	75.5	43.2 - 112	Not Acceptable*
Water Tritium					
Tritium	pCi/L	8830	8650	5800 - 12300	Acceptable
Soil Radionuclides					
Actinium-228	pCi/kg	1230	1240	795 - 1720	Acceptable
Americium-241	pCi/kg	1350	1360	796 - 1770	Acceptable
Bismuth-212	pCi/kg	1020	1240	330 - 1820	Acceptable
Bismuth-214	pCi/kg	3380	3530	2130 - 5080	Acceptable
Cesium-134	pCi/kg	3170	3450	2260 - 4140	Acceptable
Cesium-137	pCi/kg	4460	4310	3300 - 5550	Acceptable
Cobalt-60	pCi/kg	5450	5490	3710 - 7560	Acceptable
Lead-212	pCi/kg	1200	1240	812 - 1730	Acceptable
Lead-214	pCi/kg	3660	3710	2170 - 5530	Acceptable
Potassium-40	pCi/kg	10200	10600	7740 - 14200	Acceptable
Zinc-65	pCi/kg	2610	2450	1950 - 3260	Acceptable

*See section 6.4 for discussion. Following correction to preparation method, gross alpha results were 110 pCi/L, gross beta results 60 pCi/L.

TABLE 6-2 (Cont.)
ENW REMP PROGRAM CROSS CHECK PERFORMANCE RESULTS

ERA MRAD-25 Results Fall 2016					
Standard/Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation
Air Filter Radionuclides					
Americium-241	pCi/Filter	39	42.3	26.1 - 57.2	Acceptable
Cesium-134	pCi/Filter	514	614	391 - 762	Acceptable
Cesium-137	pCi/Filter	1264	1170	879 - 1540	Acceptable
Cobalt-60	pCi/Filter	896	900	696 - 1120	Acceptable
Zinc-65	pCi/Filter	1366	1150	824 - 1590	Acceptable
Air Filter Gross Alpha/Beta					
Gross Alpha	pCi/Filter	85.6	71.2	23.9 - 111	Acceptable
Gross Beta	pCi/Filter	65.3	60.3	38.1 - 87.9	Acceptable
Water Radionuclides					
Americium-241	pCi/L	< 100	56.2	37.9 - 75.4	Acceptable
Cesium-134	pCi/L	1145	1260	925 - 1450	Acceptable
Cesium-137	pCi/L	1033	987	838 - 1180	Acceptable
Cobalt-60	pCi/L	1975	1960	1700 - 2290	Acceptable
Zinc-65	pCi/L	789	724	604 - 913	Acceptable
Water Gross Alpha/Beta					
Gross Alpha	pCi/L	158	165	58.6 - 256	Acceptable
Gross Beta	pCi/L	110	130	74.4 - 193	Acceptable
Water Tritium					
Tritium	pCi/L	9683	10100	6770 - 14400	Acceptable
Soil Radionuclides					
Actinium-228	pCi/kg	1165	1170	750 - 1620	Acceptable
Americium-241	pCi/kg	1040	878	514 - 1140	Acceptable
Bismuth-212	pCi/kg	920	1280	341 - 1880	Acceptable
Bismuth-214	pCi/kg	1245	1230	741 - 1770	Acceptable
Cesium-134	pCi/kg	5028	5470	3580 - 6570	Acceptable
Cesium-137	pCi/kg	6758	6700	5130 - 8620	Acceptable
Cobalt-60	pCi/kg	7949	8020	5420 - 11000	Acceptable
Lead-212	pCi/kg	1258	1200	786 - 1670	Acceptable
Lead-214	pCi/kg	1304	1280	747 - 1910	Acceptable
Potassium-40	pCi/kg	10380	10600	7740 - 14200	Acceptable
Zinc-65	pCi/kg	3256	2920	2330 - 3880	Acceptable

TABLE 6-2 (Cont)
ENW REMP PROGRAM CROSS CHECK PERFORMANCE RESULTS

2016 ERA Crosscheck Result Iodine-131 Charcoal Cartridge						
Sample ID	Analysis	Units	Result	Ref Value	Acceptance Limits	Performance Evaluation
05311605A	Iodine-131	pCi/Filter	522	434	334 – 573	Acceptable
12301502	Iodine-131	pCi/Filter	283	233	179 - 307	Acceptable

2016 ERA RAD Results Iodine-131 in Milk						
Sample ID	Analysis	Units	Result	Ref Value	Acceptance Limits	Performance Evaluation
RAD-106	Iodine-131	pCi/L	24.0	24.9	20.7 – 29.5	Acceptable

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7.0 REFERENCES

7.0 REFERENCES

1. Energy Northwest, "Columbia Generating Station Final Safety Analysis Report," Section 2.3.1.1.
2. Nuclear Regulatory Commission Fact Sheet "Fact Sheet on Radiation Monitoring at Nuclear Power Plants and the "Tooth Fairy" Issue", NRC Library, www.nrc.gov/reading-rm/doc-collections/fact-sheets/.
3. The National Council on Radiation Protection and Measurements, 2006, "Cesium-137 in the Environment: Radioecology and Approaches to Assessment and Management", Report 154, NCRP, Bethesda, MD.
4. U.S. Nuclear Regulatory Commission, "Programs For Monitoring Radioactivity in the Environs of Nuclear Power Plants," Regulatory Guide 4.1, Revision 1, April 1975.
5. U.S. Nuclear Regulatory Commission, "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors", NUREG-1302, 1991.
6. U.S. Nuclear Regulatory Commission, "An Acceptable Radiological Environmental Monitoring Program," Assessment Branch Technical Position Revision 1, November 1979.
7. U.S. Nuclear Regulatory Commission, "Quality Assurance For Radiological Environmental Monitoring Program (Normal Operations), Effluent Streams and the Environment," Regulatory Guide 4.15, Revision 1, February 1979.
8. U.S. Nuclear Regulatory Commission, "Performance, Testing and Procedural Specifications For Thermoluminescence Dosimetry-Environmental Applications," Regulatory Guide 4.13, Revision 1, July 1977.
9. State of Washington, Energy Facility Site Evaluation Council, Resolution No. 332, approved February 21, 2012.
10. Energy Northwest Nuclear Columbia Generating Station, Operating License NPF-21, "Technical Specifications" Sections 5.5.1 and 5.6.1
11. Columbia Generating Station Offsite Dose Calculation Manual (ODCM).
12. Washington Administrative Code 173-200-040, "Water Quality Standards for Ground Water of the State of Washington - Criteria."
13. Washington Administrative Code 173-201A, "Water Quality Standards for Surface Waters of the State of Washington."
14. Code of Federal Regulations, Title 10 Part 20, "Standards for Protection against Radiation."

15. Code of Federal Regulations, Title 10 Part 50, "Domestic Licensing of Production and Utilization Facilities."
16. State of Washington, Energy Facility Site Evaluation Council, Resolution No. 300, approved September 10, 2001.
17. Nuclear Energy Institute, "Industry Ground Water Protection Initiative – Final Guidance Document", NEI 07-07, Nuclear Energy Institute, 1776 I Street N. W., Suite 400, Washington D.C.
18. State of Washington, Energy Facility Site Evaluation Council, Resolution No. 299, approved August 13, 2001.
19. PNNL, 2007, "Summary of Hydrogeology and Evaluation of Existing Groundwater Monitoring Wells for Outfalls 002 and 003 at the Columbia generating Station", PNWD-3845, Pacific Northwest National Laboratory, Richland, WA.
20. Code of Federal Regulations, Title 10 Part 72, "Licensing requirements for the independent storage of spent nuclear fuel, high-level radioactive waste, and reactor-related greater than class C waste", Subpart C, 72.44, "License conditions".
21. DOE, 2016, "Hanford Site Environmental Report for Calendar Year 2015", DOE/RL-2016-33 Rev 0, US Dept. of Energy, Richland, WA
22. US DOE, 1995, "Hanford Site Background: Evaluation of Existing Soil Radionuclide Data", DOE/RL-95-55, US Dept. of Energy, Richland, WA.
23. State of Washington, Energy Facility Site Evaluation Council, Council Order No. 874, approved January 21, 2015

8.0 ERRATA

8.0 ERRATA

Errors or omissions identified in previous year's reports are identified below.

In the 2013 through 2015 AREOR, Table 4-2 incorrectly listed Station 32 as an ODCM required deep ground water sample location. Sampling from this location is performed as a CGS initiative and is not an ODCM requirement. The Station should have been listed in the 'Other' column of Table 4-2 as a deep ground water sample location.

In the 2014 and 2015 AREOR, actions taken to prevent reoccurrence were not presented for the fish sampling deviations noted in Table 5-1a. The following summarizes actions taken in 2014 and 2015 to obtain the required fish samples.

2014- ENW REMP personnel made at least 6 attempts to collect the indicator fish samples by line fishing from shore without success between August and November. The anadromous fish were obtained from local fish hatcheries. One control fish was obtained as a fisherman donation. In November, arrangements were made with a commercial fishing guide to collect the fish samples. The guide obtained 3 fish samples but was not able to obtain the same 3 species from both the indicator and control locations. ENW remained in consultation with the National Marine Fisheries Service (NMFS) in a continued effort to obtain permission to use electroshock fishing techniques.

2015- ENW contracted with a local fishing guide to provide guide services. REMP personnel made 2 trips with the guide in September and October to the indicator location and obtained the 2 required resident fish samples. The anadromous fish were obtained from local fish hatcheries. REMP personnel made 1 trip with the guide in October to the control location but only one of the required species was obtained. REMP personnel made an additional attempt at the control location in October but were not successful. A fisherman donation from the control location was obtained in December but was not the same species as collected at the indicator location. ENW remained in consultation with the National Marine Fisheries Service (NMFS) in a continued effort to obtain permission to use electroshock fishing techniques.



APPENDIX A

2016 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT COLUMBIA GENERATING STATION

DATA TABLES A and B

Covers Sample Collection Period Starting January 2016 Through December 2016

**RADIOLOGICAL
ENVIRONMENTAL
MONITORING PROGRAM**

Prepared by:

**Energy Northwest - Environmental Services Staff
Richland, WA**

APPENDIX A - TABLE OF CONTENTS
TABLE A: ROUTINE RESULTS

A-1.1	2016 Quarterly TLD Results
A-1.2	2016 Quarterly TLD Results - Summary
A-2.1	Gross Beta on Air Particulate Filters
A-2.2	Gross Beta on Air Particulate Filters - Summary
A-3.1	Gamma Spectrometry Results of Air Particulate Filters
A-3.2	Gamma Spectrometry Results of Air Particulate Filters - Summary
A-4.1	Gamma Spectrometry Results of Iodine-131 on Charcoal Filters
A-4.2	Gamma Spectrometry Results of Iodine-131 on Charcoal Filters - Summary
A-5.1	Gross Beta in Water
A-5.2	Gross Beta in Water - Summary
A-6.1	Tritium in Water
A-6.2	Tritium in Water - Summary
A-7.1	Gamma Spectrometry Results of River/Drinking Water
A-7.2	Gamma Spectrometry Results of River/Drinking Water - Summary
A-8.1	Gamma Spectrometry Results of Soil
A-8.2	Gamma Spectrometry Results of Soil - Summary
A-9.1	Gamma Spectrometry Results of Sediment
A-9.2	Gamma Spectrometry Results of Sediment - Summary
A-10.1	Gamma Spectrometry Results of Fish
A-10.2	Gamma Spectrometry Results of Fish - Summary
A-11.1	Iodine-131 in Milk
A-11.2	Iodine-131 in Milk - Summary
A-12.1	Gamma Spectrometry Results of Milk
A-12.2	Gamma Spectrometry Results of Milk - Summary
A-13.1	Gamma Spectrometry Results of Plant Discharge Water
A-13.2	Gamma Spectrometry Results of Plant Discharge Water - Summary
A-14.1	Gamma Spectrometry Results of Deep Ground Water
A-14.2	Gamma Spectrometry Results of Deep Ground Water - Summary
A-15.1	Gamma Spectrometry Results of Root Crops
A-15.2	Gamma Spectrometry Results of Root Crops - Summary
A-16.1	Gamma Spectrometry Results of Fruits

APPENDIX A - TABLE OF CONTENTS

TABLE A: ROUTINE RESULTS -Cont.

- A-16.2 Gamma Spectrometry Results of Fruits - Summary
- A-17.1 Gamma Spectrometry Results of Vegetables
- A-17.2 Gamma Spectrometry Results of Vegetables – Summary

TABLE B: SPECIAL INTEREST SAMPLE RESULTS

- B-1.1 2016 Quarterly Special Interest TLD Results
- B-1.2 2016 Quarterly Special Interest TLD Results - Summary
- B-2.1 Gamma Spectrometry Results of Storm Drain Water
- B-2.2 Gamma Spectrometry Results of Storm Drain Water - Summary
- B-3.1 Gross Beta in Storm Drain Water
- B-3.2 Gross Beta in Storm Drain Water - Summary
- B-4.1 Tritium in Storm Drain Water
- B-4.2 Tritium in Storm Drain Water - Summary
- B-5.1 Gross Alpha in Sanitary Waste Treatment Water
- B-5.2 Gross Alpha in Sanitary Waste Treatment Water - Summary
- B-6.1 Gross Beta in Sanitary Waste Treatment Water
- B-6.2 Gross Beta in Sanitary Waste Treatment Water - Summary
- B-7.1 Gamma Spectrometry Results of Sanitary Waste Treatment Water
- B-7.2 Gamma Spectrometry Results of Sanitary Waste Treatment Water - Summary
- B-8.1 Tritium in Sanitary Waste Treatment Water
- B-8.2 Tritium in Sanitary Waste Treatment Water – Summary
- B-10.1 Gamma Spectrometry Results of Groundwater Monitoring Well Samples
- B-10.2 Gamma Spectrometry Results of Groundwater Monitoring Well Samples - Summary
- B-11.1 Tritium in Groundwater Monitoring Well Samples
- B-12.1 Gamma Spectrometry Results of Evaporation Pond Water
- B-13.1 Gamma Spectrometry Results of Evaporation Pond Sediment
- B-14.1 Gross Beta in Evaporation Pond Water
- B-15.1 Tritium in Evaporation Pond Water
- B-16.1 Tritium in Rainwater
- B-17.1 Carbon 14 in Apples

FORWARD

Since mid-1984, the results of the REMP analyses have been presented as net results calculated from total counts minus the observed background counts of the detection method. Counting results for low level samples are often within the counting error of the background determination; consequently results can range from negative to positive values in these samples. Though most of the analytical results presented in this Appendix are below the detection limit, listing the actual calculated value, even when it is negative or below the detection limit, prevents positive biases and loss of individual results inherent in the use of "less than" (<) values. It is recommended practice to report radiological environmental data in this manner.

Most results listed in this Appendix are accompanied by a plus or minus (\pm) error value. In most cases the error value represents the two sigma counting uncertainty determined for that particular analysis. These error values are in the same units as the listed activity values. The two sigma error value represents the range that a recount of the same sample would be expected to fall within 95% of the time, based on the statistics encountered in the original count.

Also included in most cases are the analysis specific, minimum detectable activity (MDA) values. Though similar in concept to the LLD, these values are based on the statistics encountered in the specific sample count itself and not a blank determination. As such, they are a *a posteriori* (after the fact) determination where the LLD is a *a priori* (before the fact) determination. These values were included as they represent the level of activity that would have needed to be present in the sample for a positive identification to be made.

TABLE A-1.1
2016 QUARTERLY TLD RESULTS

Results in milli-Roentgen (mR) per Standard Quarter

Station ID	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Quarterly Sum
1	20.6	21.3	22.5	18.8	83.1
2	20.3	21.6	21.4	19.2	82.5
3	19.3	20.6	20.1	17.7	77.6
4	18.5	18.6	18.8	20.0	75.9
5	18.4	19.6	19.6	18.3	76.0
6	17.9	19.1	19.0	19.3	75.2
7	20.6	20.4	21.1	17.4	79.5
8	21.7	22.6	23.8	19.7	87.7
9	20.2	19.6	19.6	19.7	79.1
10	20.1	22.1	20.6	21.6	84.5
11	20.7	21.3	20.4	21.0	83.4
12	21.9	21.7	22.8	23.0	89.4
13	19.5	21.0	20.3	19.6	80.5
14	19.9	21.3	20.7	19.3	81.2
15	20.6	23.2	21.8	25.0	90.5
16	20.3	21.4	21.0	21.8	84.5
17	20.0	22.1	21.6	21.3	85.0
18	20.6	21.2	21.0	21.1	83.9
19	19.7	22.0	21.3	23.0	86.0
20	20.5	21.4	20.4	15.6	78.0
21	19.4	19.4	19.6	20.7	79.1
22	19.5	21.1	20.5	21.0	82.1
23	20.6	21.6	20.9	18.1	81.2
24	19.9	22.2	19.0	20.5	81.7
25	20.7	22.2	21.6	21.1	85.6
40	17.6	17.8	18.1	16.8	70.3
41	20.6	21.1	21.1	22.1	84.8
42	20.5	20.7	20.6	18.1	79.9
43	19.8	20.5	22.2	21.8	84.3
44	18.0	18.7	19.0	17.3	73.0
45	18.3	19.9	20.0	19.9	78.2
46	23.9	28.0	25.6	25.4	102.9
47	19.2	18.9	20.2	20.5	78.8
49	19.7	23.0	20.9	27.6	91.1
50	20.4	22.0	20.5	21.4	84.3
51	19.4	21.1	20.1	20.6	81.2
53	20.6	21.1	21.9	21.8	85.3
54	20.5	21.2	21.3	21.9	84.9
55	20.7	20.4	21.3	21.6	84.1
56	20.6	21.4	22.6	24.3	88.9
65	18.82	18.91	19.65	19.68	77.1
71	24.10	25.98	26.14	21.71	97.9
72	23.22	24.21	25.01	18.40	90.8

TABLE A-1.1
2016 QUARTERLY TLD RESULTS

Results in milli-Roentgen (mR) per Standard Quarter

Station ID	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Quarterly Sum
73	21.51	22.35	22.83	21.39	88.1
74	21.91	23.12	23.34	22.32	90.7
75	21.01	21.23	22.14	19.27	83.6
76	21.05	18.48	22.25	17.90	79.7
77	21.61	21.30	21.61	21.09	85.6
78	20.76	19.93	21.28	22.59	84.6
79	20.22	21.92	20.77	22.27	85.2
80	19.25	20.73	20.61	17.84	78.4
81	19.20	20.67	21.03	21.56	82.5
82	20.67	22.83	22.69	20.75	86.9
83	19.68	20.92	21.40	23.63	85.6
84	20.54	20.59	23.34	19.50	84.0
85	21.12	22.08	23.55	16.58	83.3
86	26.82	27.10	28.42	26.31	108.6

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TABLE A-1.2
2016 QUARTERLY TLD RESULTS- SUMMARY

Results in milli-Roentgen (mR) per Standard Quarter

Location	Average Activity	Activity Low	Activity High	Number of Samples
Quarterly Indicator TLDs	21.0	15.6	28.4	224
Quarterly Control TLDs	19.8	19.6	20.2	4

TABLE A-2.1
GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi per Cubic Meter

Collection Period	Station 01		Station 04		Station 05	
	Result	Error	Result	Error	Result	Error
12/29/15 - 01/05/16	5.55E-02	± 1.42E-03	5.70E-02	± 1.50E-03	5.41E-02	± 1.46E-03
01/05/16 - 01/12/16	9.09E-02	± 1.84E-03	9.09E-02	± 1.93E-03	7.68E-02	± 1.75E-03
01/12/16 - 01/19/16	1.22E-02	± 6.63E-04	1.43E-02	± 7.54E-04	1.11E-02	± 6.66E-04
01/19/16 - 01/26/16	7.94E-03	± 5.59E-04	6.85E-03	± 5.53E-04	6.38E-03	± 5.35E-04
01/26/16 - 02/02/16	1.20E-02	± 6.67E-04	1.03E-02	± 6.42E-04	1.70E-02	± 1.36E-03
02/02/16 - 02/09/16	1.41E-02	± 7.14E-04	1.21E-02	± 6.92E-04	1.20E-02	± 6.81E-04
02/09/16 - 02/16/16	2.74E-02	± 9.82E-04	2.49E-02	± 9.66E-04	2.32E-02	± 9.24E-04
02/16/16 - 02/23/16	5.63E-03	± 4.82E-04	5.74E-03	± 5.08E-04	4.70E-03	± 4.62E-04
02/23/16 - 03/01/16	1.57E-02	± 7.57E-04	1.58E-02	± 8.03E-04	1.42E-02	± 7.40E-04
03/01/16 - 03/08/16	4.35E-03	± 4.44E-04	5.89E-03	± 5.25E-04	5.47E-03	± 4.97E-04
03/08/16 - 03/15/16	4.03E-03	± 4.33E-04	4.35E-03	± 4.48E-04	4.32E-03	± 4.61E-04
03/15/16 - 03/22/16	1.16E-02	± 6.84E-04	1.10E-02	± 6.56E-04	1.22E-02	± 7.03E-04
03/22/16 - 03/29/16	3.85E-03	± 4.35E-04	2.03E-03	± 3.50E-04	3.94E-03	± 4.39E-04
03/29/16 - 04/05/16	1.32E-02	± 7.14E-04	1.35E-02	± 7.15E-04	1.35E-02	± 7.13E-04
04/05/16 - 04/12/16	1.49E-02	± 7.57E-04	1.52E-02	± 7.56E-04	1.48E-02	± 7.51E-04
04/12/16 - 04/19/16	1.21E-02	± 6.93E-04	1.11E-02	± 6.55E-04	1.02E-02	± 6.28E-04
04/19/16 - 04/26/16	1.82E-02	± 8.74E-04	1.70E-02	± 8.15E-04	1.60E-02	± 7.92E-04
04/26/16 - 05/03/16	1.42E-02	± 7.30E-04	1.27E-02	± 6.99E-04	1.27E-02	± 6.99E-04
05/03/16 - 05/10/16	1.75E-02	± 8.08E-04	1.84E-02	± 8.34E-04	1.52E-02	± 7.60E-04
05/10/16 - 05/17/16	1.39E-02	± 7.44E-04	1.33E-02	± 7.33E-04	1.32E-02	± 7.34E-04
05/17/16 - 05/24/16	7.32E-03	± 5.48E-04	7.43E-03	± 5.56E-04	6.87E-03	± 5.33E-04
05/24/16 - 05/31/16	1.13E-02	± 6.54E-04	1.01E-02	± 6.38E-04	1.07E-02	± 6.54E-04
05/31/16 - 06/07/16	1.50E-02	± 7.58E-04	1.60E-02	± 8.04E-04	1.54E-02	± 7.89E-04
06/07/16 - 06/14/16	1.47E-02	± 7.51E-04	1.32E-02	± 7.25E-04	1.22E-02	± 6.57E-04
06/14/16 - 06/21/16	6.54E-03	± 5.33E-04	6.51E-03	± 5.41E-04	6.88E-03	± 5.18E-04
06/21/16 - 06/28/16	8.00E-03	± 5.72E-04	8.46E-03	± 5.92E-04	8.49E-03	± 5.60E-04
06/28/16 - 07/05/16	1.01E-02	± 6.42E-04	1.13E-02	± 6.97E-04	1.00E-02	± 6.10E-04
07/05/16 - 07/12/16	5.89E-03	± 5.03E-04	7.08E-03	± 5.61E-04	7.74E-03	± 5.42E-04
07/12/16 - 07/19/16	1.03E-02	± 6.45E-04	9.34E-03	± 6.09E-04	9.71E-03	± 6.02E-04
07/19/16 - 07/26/16	1.77E-02	± 8.33E-04	1.49E-02	± 7.31E-04	1.37E-02	± 7.02E-04
07/26/16 - 08/02/16	1.60E-02	± 7.96E-04	1.39E-02	± 7.20E-04	1.42E-02	± 7.14E-04
08/02/16 - 08/09/16	1.08E-02	± 6.43E-04	1.18E-02	± 6.63E-04	1.01E-02	± 6.34E-04
08/09/16 - 08/16/16	1.58E-02	± 7.69E-04	1.41E-02	± 7.24E-04	1.48E-02	± 7.68E-04
08/16/16 - 08/23/16	1.50E-02	± 7.54E-04	1.53E-02	± 7.62E-04	1.43E-02	± 7.30E-04
08/23/16 - 08/30/16	1.46E-02	± 7.44E-04	1.36E-02	± 7.22E-04	1.50E-02	± 7.40E-04
08/30/16 - 09/06/16	1.11E-02	± 6.70E-04	1.25E-02	± 6.92E-04	1.03E-02	± 6.18E-04
09/06/16 - 09/13/16	8.29E-03	± 5.87E-04	7.16E-03	± 5.39E-04	9.55E-03	± 6.01E-04
09/13/16 - 09/20/16	1.55E-02	± 7.69E-04	1.65E-02	± 7.61E-04	1.56E-02	± 7.37E-04
09/20/16 - 09/27/16	1.45E-02	± 7.44E-04	1.48E-02	± 7.38E-04	1.48E-02	± 7.36E-04
09/27/16 - 10/04/16	1.30E-02	± 7.22E-04	1.50E-02	± 7.48E-04	1.53E-02	± 7.39E-04
10/04/16 - 10/11/16	7.31E-03	± 5.38E-04	7.81E-03	± 5.51E-04	7.56E-03	± 5.47E-04
10/11/16 - 10/18/16	1.14E-02	± 6.63E-04	1.18E-02	± 6.64E-04	1.18E-02	± 6.77E-04
10/18/16 - 10/25/16	1.05E-02	± 6.53E-04	1.14E-02	± 6.65E-04	1.14E-02	± 6.58E-04
10/25/16 - 11/01/16	1.31E-02	± 7.25E-04	1.21E-02	± 6.88E-04	1.16E-02	± 6.77E-04
11/01/16 - 11/08/16	1.56E-02	± 7.82E-04	1.80E-02	± 8.23E-04	1.66E-02	± 8.00E-04
11/08/16 - 11/15/16	3.10E-02	± 1.09E-03	3.29E-02	± 1.09E-03	2.98E-02	± 1.06E-03
11/15/16 - 11/22/16	1.70E-02	± 8.10E-04	1.72E-02	± 7.85E-04	1.53E-02	± 7.57E-04
11/22/16 - 11/29/16	9.84E-03	± 6.22E-04	1.01E-02	± 6.23E-04	1.02E-02	± 6.31E-04
11/29/16 - 12/06/16	4.97E-03	± 4.80E-04	5.94E-03	± 5.00E-04	3.87E-03	± 4.37E-04
12/06/16 - 12/13/16	2.93E-02	± 1.02E-03	3.21E-02	± 1.06E-03	2.96E-02	± 1.04E-03
12/13/16 - 12/20/16	4.55E-02	± 1.29E-03	4.48E-02	± 1.26E-03	3.99E-02	± 1.20E-03
12/20/16 - 12/27/16	1.81E-02	± 8.28E-04	2.00E-02	± 8.46E-04	1.68E-02	± 7.92E-04
12/27/16 - 1/3/2017	1.07E-02	± 6.44E-04	9.18E-03	± 6.01E-04	9.07E-03	± 5.95E-04

NVS = Valid sample not obtained due to sampler failure.
Average MDA for analyses in Table A-2.1 was 8.78 E-04.

TABLE A-2.1
GROSS BETA ON AIR PARTICULATE FILTERS
 Results in pCi per Cubic Meter

Collection Period	Station 06		Station 07		Station 08	
	Result	Error	Result	Error	Result	Error
12/29/15 - 01/05/16	5.34E-02	± 1.40E-03	5.57E-02	± 1.45E-03	5.78E-02	± 1.46E-03
01/05/16 - 01/12/16	9.11E-02	± 1.87E-03	9.21E-02	± 1.92E-03	8.06E-02	± 1.74E-03
01/12/16 - 01/19/16	1.27E-02	± 6.90E-04	1.16E-02	± 6.68E-04	1.22E-02	± 6.69E-04
01/19/16 - 01/26/16	6.54E-03	± 5.19E-04	6.24E-03	± 5.22E-04	6.86E-03	± 5.29E-04
01/26/16 - 02/02/16	1.10E-02	± 6.39E-04	1.14E-02	± 6.63E-04	9.47E-03	± 6.07E-04
02/02/16 - 02/09/16	1.15E-02	± 6.51E-04	1.29E-02	± 6.99E-04	1.14E-02	± 6.58E-04
02/09/16 - 02/16/16	2.53E-02	± 9.54E-04	2.54E-02	± 9.71E-04	2.33E-02	± 9.19E-04
02/16/16 - 02/23/16	4.52E-03	± 4.42E-04	4.49E-03	± 4.62E-04	4.62E-03	± 4.53E-04
02/23/16 - 03/01/16	1.48E-02	± 7.44E-04	1.44E-02	± 7.48E-04	1.50E-02	± 7.54E-04
03/01/16 - 03/08/16	5.60E-03	± 4.86E-04	4.41E-03	± 4.56E-04	4.84E-03	± 4.72E-04
03/08/16 - 03/15/16	5.62E-03	± 4.89E-04	4.39E-03	± 4.61E-04	4.68E-03	± 4.69E-04
03/15/16 - 03/22/16	1.30E-02	± 7.08E-04	1.23E-02	± 7.25E-04	1.14E-02	± 6.80E-04
03/22/16 - 03/29/16	3.62E-03	± 4.21E-04	4.20E-03	± 4.36E-04	3.60E-03	± 4.27E-04
03/29/16 - 04/05/16	1.32E-02	± 7.15E-04	1.43E-02	± 7.25E-04	1.34E-02	± 7.18E-04
04/05/16 - 04/12/16	1.49E-02	± 7.49E-04	1.46E-02	± 7.53E-04	1.46E-02	± 7.49E-04
04/12/16 - 04/19/16	1.10E-02	± 6.54E-04	1.13E-02	± 6.61E-04	1.23E-02	± 6.84E-04
04/19/16 - 04/26/16	1.68E-02	± 8.01E-04	1.54E-02	± 7.90E-04	1.50E-02	± 7.70E-04
04/26/16 - 05/03/16	1.38E-02	± 7.14E-04	1.59E-02	± 7.91E-04	1.39E-02	± 7.44E-04
05/03/16 - 05/10/16	1.62E-02	± 7.94E-04	1.61E-02	± 7.98E-04	1.68E-02	± 8.19E-04
05/10/16 - 05/17/16	1.32E-02	± 7.29E-04	1.42E-02	± 7.98E-04	1.40E-02	± 7.52E-04
05/17/16 - 05/24/16	6.75E-03	± 5.38E-04	6.83E-03	± 5.56E-04	7.41E-03	± 5.45E-04
05/24/16 - 05/31/16	8.60E-03	± 5.79E-04	1.01E-02	± 6.13E-04	9.57E-03	± 6.01E-04
05/31/16 - 06/07/16	1.39E-02	± 7.30E-04	1.60E-02	± 7.73E-04	1.55E-02	± 7.63E-04
06/07/16 - 06/14/16	1.34E-02	± 7.13E-04	1.31E-02	± 2.01E-03	1.26E-02	± 6.83E-04
06/14/16 - 06/21/16	5.64E-03	± 5.08E-04	6.03E-03	± 5.05E-04	8.31E-03	± 5.82E-04
06/21/16 - 06/28/16	7.82E-03	± 5.64E-04	8.07E-03	± 5.78E-04	7.51E-03	± 5.50E-04
06/28/16 - 07/05/16	1.05E-02	± 6.60E-04	1.20E-02	± 6.99E-04	1.08E-02	± 6.58E-04
07/05/16 - 07/12/16	6.68E-03	± 5.39E-04	6.51E-03	± 5.25E-04	5.72E-03	± 4.87E-04
07/12/16 - 07/19/16	9.04E-03	± 6.23E-04	9.15E-03	± 6.13E-04	9.84E-03	± 6.22E-04
07/19/16 - 07/26/16	1.63E-02	± 7.72E-04	1.56E-02	± 8.08E-04	1.54E-02	± 7.58E-04
07/26/16 - 08/02/16	1.47E-02	± 7.61E-04	1.43E-02	± 7.29E-04	1.19E-02	± 6.85E-04
08/02/16 - 08/09/16	1.12E-02	± 6.67E-04	1.12E-02	± 6.57E-04	1.08E-02	± 6.51E-04
08/09/16 - 08/16/16	1.39E-02	± 7.34E-04	1.29E-02	± 6.92E-04	1.36E-02	± 7.25E-04
08/16/16 - 08/23/16	1.58E-02	± 7.73E-04	1.44E-02	± 7.31E-04	1.48E-02	± 7.53E-04
08/23/16 - 08/30/16	1.39E-02	± 7.40E-04	1.49E-02	± 7.49E-04	1.51E-02	± 7.68E-04
08/30/16 - 09/06/16	1.02E-02	± 6.46E-04	1.22E-02	± 6.88E-04	1.12E-02	± 6.81E-04
09/06/16 - 09/13/16	6.51E-03	± 5.36E-04	7.80E-03	± 5.67E-04	6.85E-03	± 5.46E-04
09/13/16 - 09/20/16	1.45E-02	± 7.47E-04	1.59E-02	± 7.63E-04	1.46E-02	± 7.43E-04
09/20/16 - 09/27/16	1.43E-02	± 7.51E-04	1.42E-02	± 7.29E-04	1.43E-02	± 7.49E-04
09/27/16 - 10/04/16	1.58E-02	± 7.91E-04	1.47E-02	± 7.46E-04	1.33E-02	± 7.34E-04
10/04/16 - 10/11/16	7.24E-03	± 5.54E-04	7.39E-03	± 5.36E-04	6.99E-03	± 5.45E-04
10/11/16 - 10/18/16	1.16E-02	± 6.85E-04	1.17E-02	± 6.61E-04	1.10E-02	± 6.76E-04
10/18/16 - 10/25/16	1.10E-02	± 6.65E-04	1.27E-02	± 6.91E-04	1.14E-02	± 6.85E-04
10/25/16 - 11/01/16	1.38E-02	± 7.42E-04	1.21E-02	± 6.88E-04	1.18E-02	± 6.91E-04
11/01/16 - 11/08/16	1.64E-02	± 8.01E-04	1.72E-02	± 8.06E-04	1.82E-02	± 8.41E-04
11/08/16 - 11/15/16	2.82E-02	± 1.04E-03	3.09E-02	± 1.06E-03	3.03E-02	± 1.07E-03
11/15/16 - 11/22/16	1.51E-02	± 7.76E-04	1.60E-02	± 7.48E-04	1.59E-02	± 7.76E-04
11/22/16 - 11/29/16	9.06E-03	± 5.83E-04	1.22E-02	± 6.75E-04	1.22E-02	± 6.88E-04
11/29/16 - 12/06/16	4.99E-03	± 4.60E-04	4.49E-03	± 4.52E-04	4.79E-03	± 4.75E-04
12/06/16 - 12/13/16	3.30E-02	± 1.09E-03	3.08E-02	± 1.05E-03	3.30E-02	± 1.12E-03
12/13/16 - 12/20/16	4.53E-02	± 1.29E-03	4.53E-02	± 1.28E-03	4.31E-02	± 1.27E-03
12/20/16 - 12/27/16	1.67E-02	± 7.91E-04	1.71E-02	± 7.93E-04	1.61E-02	± 7.83E-04
12/27/16 - 1/3/2017	9.57E-03	± 6.30E-04	9.22E-03	± 6.00E-04	9.79E-03	± 6.28E-04

NVS = Valid sample not obtained due to sampler failure.
 Average MDA for analyses in Table A-2.1 was 8.78 E-04.

TABLE A-2.1
GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi per Cubic Meter

Collection Period	Station 09		Station 21		Station 23	
	Result	Error	Result	Error	Result	Error
12/29/15 - 01/05/16	5.68E-02	± 1.46E-03	5.85E-02	± 1.49E-03	5.88E-02	± 1.52E-03
01/05/16 - 01/12/16	6.58E-02	± 1.56E-03	8.75E-02	± 1.84E-03	8.95E-02	± 1.90E-03
01/12/16 - 01/19/16	1.24E-02	± 6.82E-04	1.31E-02	± 7.12E-04	1.26E-02	± 6.98E-04
01/19/16 - 01/26/16	4.88E-03	± 4.64E-04	6.87E-03	± 5.39E-04	6.09E-03	± 5.19E-04
01/26/16 - 02/02/16	8.76E-03	± 5.73E-04	1.13E-02	± 6.61E-04	1.21E-02	± 6.91E-04
02/02/16 - 02/09/16	1.10E-02	± 6.40E-04	1.31E-02	± 7.03E-04	1.32E-02	± 7.16E-04
02/09/16 - 02/16/16	2.18E-02	± 8.89E-04	2.44E-02	± 9.51E-04	2.41E-02	± 9.51E-04
02/16/16 - 02/23/16	4.23E-03	± 4.37E-04	5.67E-03	± 4.88E-04	6.64E-03	± 5.39E-04
02/23/16 - 03/01/16	1.23E-02	± 6.78E-04	1.71E-02	± 7.62E-04	1.66E-02	± 8.13E-04
03/01/16 - 03/08/16	4.60E-03	± 4.48E-04	4.78E-03	± 4.57E-04	5.59E-03	± 5.19E-04
03/08/16 - 03/15/16	4.45E-03	± 4.45E-04	4.20E-03	± 4.42E-04	5.33E-03	± 4.96E-04
03/15/16 - 03/22/16	1.25E-02	± 6.87E-04	1.30E-02	± 7.02E-04	1.20E-02	± 7.03E-04
03/22/16 - 03/29/16	3.97E-03	± 4.17E-04	3.72E-03	± 4.15E-04	3.02E-03	± 4.06E-04
03/29/16 - 04/05/16	1.26E-02	± 6.79E-04	1.49E-02	± 7.41E-04	1.75E-02	± 8.93E-04
04/05/16 - 04/12/16	1.43E-02	± 7.19E-04	1.46E-02	± 1.06E-03	NVS	± NVS
04/12/16 - 04/19/16	1.11E-02	± 6.34E-04	1.25E-02	± 7.81E-04	NVS	± NVS
04/19/16 - 04/26/16	1.51E-02	± 7.45E-04	1.89E-02	± 8.63E-04	7.05E-03	± 7.23E-04
04/26/16 - 05/03/16	1.22E-02	± 6.67E-04	1.55E-02	± 7.64E-04	1.47E-02	± 7.57E-04
05/03/16 - 05/10/16	1.62E-02	± 7.70E-04	1.78E-02	± 8.11E-04	1.72E-02	± 8.24E-04
05/10/16 - 05/17/16	1.39E-02	± 7.17E-04	1.45E-02	± 7.37E-04	1.42E-02	± 7.71E-04
05/17/16 - 05/24/16	6.92E-03	± 5.21E-04	6.80E-03	± 5.17E-04	8.12E-03	± 5.93E-04
05/24/16 - 05/31/16	9.55E-03	± 5.94E-04	9.92E-03	± 6.05E-04	9.46E-03	± 6.27E-04
05/31/16 - 06/07/16	1.46E-02	± 7.28E-04	NVS	± NVS	1.42E-02	± 7.64E-04
06/07/16 - 06/14/16	1.13E-02	± 6.43E-04	NVS	± NVS	1.29E-02	± 6.83E-04
06/14/16 - 06/21/16	6.10E-03	± 5.05E-04	6.46E-03	± 5.24E-04	7.24E-03	± 5.38E-04
06/21/16 - 06/28/16	7.91E-03	± 5.48E-04	8.87E-03	± 5.72E-04	7.72E-03	± 5.44E-04
06/28/16 - 07/05/16	1.04E-02	± 6.24E-04	1.02E-02	± 6.22E-04	1.00E-02	± 6.31E-04
07/05/16 - 07/12/16	8.41E-03	± 5.69E-04	7.20E-03	± 5.24E-04	7.37E-03	± 5.42E-04
07/12/16 - 07/19/16	8.70E-03	± 5.82E-04	8.65E-03	± 5.77E-04	8.92E-03	± 5.95E-04
07/19/16 - 07/26/16	1.39E-02	± 7.11E-04	1.69E-02	± 7.65E-04	1.68E-02	± 7.91E-04
07/26/16 - 08/02/16	1.29E-02	± 6.98E-04	1.40E-02	± 7.18E-04	1.50E-02	± 7.51E-04
08/02/16 - 08/09/16	1.10E-02	± 6.40E-04	1.04E-02	± 6.20E-04	1.14E-02	± 6.54E-04
08/09/16 - 08/16/16	1.41E-02	± 7.18E-04	1.56E-02	± 7.45E-04	1.59E-02	± 7.62E-04
08/16/16 - 08/23/16	1.50E-02	± 7.40E-04	1.42E-02	± 7.10E-04	1.55E-02	± 7.61E-04
08/23/16 - 08/30/16	1.39E-02	± 7.26E-04	1.47E-02	± 7.24E-04	1.61E-02	± 7.75E-04
08/30/16 - 09/06/16	1.02E-02	± 6.41E-04	1.26E-02	± 6.82E-04	1.27E-02	± 6.88E-04
09/06/16 - 09/13/16	8.32E-03	± 5.90E-04	9.86E-03	± 6.05E-04	8.16E-03	± 5.68E-04
09/13/16 - 09/20/16	1.36E-02	± 7.04E-04	1.73E-02	± 7.99E-04	1.63E-02	± 7.64E-04
09/20/16 - 09/27/16	1.16E-02	± 6.64E-04	1.30E-02	± 7.14E-04	1.41E-02	± 7.31E-04
09/27/16 - 10/04/16	1.37E-02	± 7.14E-04	1.54E-02	± 7.73E-04	1.47E-02	± 7.40E-04
10/04/16 - 10/11/16	6.89E-03	± 5.27E-04	6.87E-03	± 5.30E-04	6.89E-03	± 5.19E-04
10/11/16 - 10/18/16	1.05E-02	± 6.36E-04	1.31E-02	± 7.00E-04	1.29E-02	± 6.82E-04
10/18/16 - 10/25/16	7.17E-03	± 8.54E-04	1.26E-02	± 6.91E-04	1.07E-02	± 6.36E-04
10/25/16 - 11/01/16	1.12E-02	± 6.75E-04	1.15E-02	± 6.71E-04	1.26E-02	± 7.00E-04
11/01/16 - 11/08/16	1.06E-02	± 6.72E-04	1.78E-02	± 8.04E-04	1.84E-02	± 8.22E-04
11/08/16 - 11/15/16	2.39E-02	± 9.60E-04	3.15E-02	± 1.06E-03	3.26E-02	± 1.09E-03
11/15/16 - 11/22/16	1.13E-02	± 6.76E-04	1.71E-02	± 7.83E-04	1.60E-02	± 7.59E-04
11/22/16 - 11/29/16	9.36E-03	± 6.05E-04	1.16E-02	± 6.49E-04	9.57E-03	± 5.92E-04
11/29/16 - 12/06/16	3.32E-03	± 4.14E-04	4.46E-03	± 4.52E-04	4.42E-03	± 4.43E-04
12/06/16 - 12/13/16	3.05E-02	± 1.07E-03	3.34E-02	± 1.08E-03	3.23E-02	± 1.07E-03
12/13/16 - 12/20/16	3.40E-02	± 1.10E-03	4.57E-02	± 1.27E-03	4.58E-02	± 1.27E-03
12/20/16 - 12/27/16	1.65E-02	± 7.72E-04	1.85E-02	± 8.14E-04	1.94E-02	± 8.32E-04
12/27/16 - 1/3/2017	6.91E-03	± 5.38E-04	1.07E-02	± 6.40E-04	1.05E-02	± 6.36E-04

NVS = Valid sample not obtained due to sampler failure.
Average MDA for analyses in Table A-2.1 was 8.78 E-04.

TABLE A-2.1
GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi per Cubic Meter

Collection Period	Station 40		Station 48		Station 57	
	Result	Error	Result	Error	Result	Error
12/29/15 - 01/05/16	5.83E-02	± 1.53E-03	5.97E-02	± 1.47E-03	5.84E-02	± 1.46E-03
01/05/16 - 01/12/16	7.65E-02	± 1.74E-03	8.21E-02	± 1.74E-03	8.74E-02	± 1.80E-03
01/12/16 - 01/19/16	1.25E-02	± 7.03E-04	1.27E-02	± 6.81E-04	1.24E-02	± 6.68E-04
01/19/16 - 01/26/16	6.33E-03	± 5.34E-04	6.66E-03	± 5.25E-04	6.59E-03	± 5.17E-04
01/26/16 - 02/02/16	9.58E-03	± 6.37E-04	1.08E-02	± 6.28E-04	1.02E-02	± 6.15E-04
02/02/16 - 02/09/16	1.25E-02	± 7.06E-04	1.43E-02	± 7.12E-04	1.51E-02	± 7.34E-04
02/09/16 - 02/16/16	2.45E-02	± 9.76E-04	2.44E-02	± 9.34E-04	2.46E-02	± 9.24E-04
02/16/16 - 02/23/16	4.76E-03	± 4.78E-04	5.60E-03	± 4.91E-04	5.60E-03	± 4.74E-04
02/23/16 - 03/01/16	1.61E-02	± 8.02E-04	1.49E-02	± 7.46E-04	1.53E-02	± 7.43E-04
03/01/16 - 03/08/16	4.26E-03	± 4.45E-04	4.80E-03	± 4.69E-04	4.63E-03	± 4.48E-04
03/08/16 - 03/15/16	4.94E-03	± 4.78E-04	4.65E-03	± 4.62E-04	3.53E-03	± 4.11E-04
03/15/16 - 03/22/16	1.14E-02	± 6.77E-04	1.15E-02	± 6.78E-04	1.23E-02	± 6.89E-04
03/22/16 - 03/29/16	2.94E-03	± 3.96E-04	3.55E-03	± 4.25E-04	3.58E-03	± 4.16E-04
03/29/16 - 04/05/16	1.41E-02	± 7.34E-04	1.38E-02	± 7.24E-04	1.61E-02	± 7.75E-04
04/05/16 - 04/12/16	1.40E-02	± 7.34E-04	1.42E-02	± 7.37E-04	1.60E-02	± 7.78E-04
04/12/16 - 04/19/16	1.14E-02	± 6.61E-04	1.24E-02	± 7.02E-04	1.13E-02	± 6.61E-04
04/19/16 - 04/26/16	1.50E-02	± 7.69E-04	1.52E-02	± 7.84E-04	1.63E-02	± 7.92E-04
04/26/16 - 05/03/16	1.48E-02	± 7.61E-04	1.50E-02	± 7.74E-04	1.37E-02	± 7.19E-04
05/03/16 - 05/10/16	1.67E-02	± 8.16E-04	1.58E-02	± 7.98E-04	1.80E-02	± 8.27E-04
05/10/16 - 05/17/16	1.21E-02	± 7.08E-04	1.38E-02	± 7.46E-04	1.26E-02	± 7.17E-04
05/17/16 - 05/24/16	6.08E-03	± 5.14E-04	7.10E-03	± 5.61E-04	7.28E-03	± 5.59E-04
05/24/16 - 05/31/16	1.06E-02	± 6.47E-04	9.51E-03	± 5.98E-04	1.09E-02	± 6.67E-04
05/31/16 - 06/07/16	1.46E-02	± 7.79E-04	1.32E-02	± 7.09E-04	1.44E-02	± 7.75E-04
06/07/16 - 06/14/16	1.37E-02	± 7.05E-04	1.16E-02	± 6.53E-04	1.45E-02	± 7.23E-04
06/14/16 - 06/21/16	5.75E-03	± 4.91E-04	5.97E-03	± 5.11E-04	6.41E-03	± 5.13E-04
06/21/16 - 06/28/16	8.48E-03	± 5.68E-04	9.04E-03	± 5.95E-04	8.94E-03	± 5.77E-04
06/28/16 - 07/05/16	1.08E-02	± 6.46E-04	1.04E-02	± 6.58E-04	1.19E-02	± 6.78E-04
07/05/16 - 07/12/16	6.05E-03	± 4.89E-04	5.33E-03	± 4.85E-04	5.66E-03	± 4.92E-04
07/12/16 - 07/19/16	1.09E-02	± 6.44E-04	8.88E-03	± 6.04E-04	8.70E-03	± 5.97E-04
07/19/16 - 07/26/16	1.59E-02	± 8.55E-04	1.48E-02	± 7.59E-04	1.61E-02	± 7.27E-04
07/26/16 - 08/02/16	1.27E-02	± 6.92E-04	1.40E-02	± 7.43E-04	1.34E-02	± 7.11E-04
08/02/16 - 08/09/16	9.57E-03	± 6.16E-04	9.69E-03	± 6.27E-04	1.22E-02	± 6.78E-04
08/09/16 - 08/16/16	1.46E-02	± 7.46E-04	1.55E-02	± 7.67E-04	1.60E-02	± 7.61E-04
08/16/16 - 08/23/16	1.36E-02	± 7.26E-04	1.28E-02	± 7.01E-04	1.39E-02	± 7.14E-04
08/23/16 - 08/30/16	1.27E-02	± 7.15E-04	1.45E-02	± 7.57E-04	1.45E-02	± 7.36E-04
08/30/16 - 09/06/16	1.03E-02	± 6.50E-04	1.11E-02	± 6.64E-04	1.34E-02	± 7.11E-04
09/06/16 - 09/13/16	6.57E-03	± 5.39E-04	8.53E-03	± 5.90E-04	7.79E-03	± 5.54E-04
09/13/16 - 09/20/16	1.75E-02	± 8.24E-04	1.55E-02	± 7.63E-04	1.50E-02	± 7.38E-04
09/20/16 - 09/27/16	1.49E-02	± 7.72E-04	1.44E-02	± 7.46E-04	1.26E-02	± 6.94E-04
09/27/16 - 10/04/16	1.43E-02	± 7.64E-04	1.50E-02	± 7.74E-04	1.52E-02	± 7.57E-04
10/04/16 - 10/11/16	8.08E-03	± 5.71E-04	8.02E-03	± 5.65E-04	6.66E-03	± 5.14E-04
10/11/16 - 10/18/16	1.17E-02	± 6.81E-04	1.14E-02	± 6.59E-04	1.14E-02	± 6.50E-04
10/18/16 - 10/25/16	1.04E-02	± 6.43E-04	1.23E-02	± 6.82E-04	1.10E-02	± 6.49E-04
10/25/16 - 11/01/16	1.24E-02	± 7.12E-04	1.14E-02	± 6.73E-04	1.27E-02	± 7.02E-04
11/01/16 - 11/08/16	1.73E-02	± 8.22E-04	1.83E-02	± 8.26E-04	1.81E-02	± 8.16E-04
11/08/16 - 11/15/16	3.01E-02	± 1.08E-03	3.05E-02	± 1.06E-03	3.07E-02	± 1.06E-03
11/15/16 - 11/22/16	1.65E-02	± 7.91E-04	1.78E-02	± 8.03E-04	1.83E-02	± 8.02E-04
11/22/16 - 11/29/16	1.08E-02	± 6.52E-04	1.09E-02	± 6.38E-04	1.07E-02	± 6.31E-04
11/29/16 - 12/06/16	4.03E-03	± 4.50E-04	4.45E-03	± 4.47E-04	5.10E-03	± 4.74E-04
12/06/16 - 12/13/16	3.42E-02	± 1.12E-03	3.14E-02	± 1.05E-03	3.30E-02	± 1.08E-03
12/13/16 - 12/20/16	4.34E-02	± 1.25E-03	5.01E-02	± 1.34E-03	4.95E-02	± 1.33E-03
12/20/16 - 12/27/16	1.57E-02	± 7.69E-04	1.87E-02	± 8.09E-04	2.14E-02	± 8.82E-04
12/27/16 - 1/3/2017	8.64E-03	± 5.89E-04	1.20E-02	± 6.67E-04	1.13E-02	± 6.56E-04

NVS = Valid sample not obtained due to sampler failure.
Average MDA for analyses in Table A-2.1 was 8.78 E-04.

TABLE A-2.2
GROSS BETA ON AIR PARTICULATE FILTERS - SUMMARY
 Results in pCi per cubic meter

LOCATION	Average Activity	Activity Low	Activity High	Number of Samples	Number of Positive IDs
Gross Beta Indicators	1.55E-02	2.03E-03	9.21E-02	579	579
Gross Beta Controls	1.36E-02	3.32E-03	6.58E-02	53	53

TABLE A-3.1
GAMMA SPECTROMETRY RESULTS OF AIR PARTICULATE FILTERS
 Results in pCi/cubic meter, results decay corrected for decay during sample collection period

Location and Quarter					Location and Quarter				
Station 1 1st Q 2016					Station 1 2nd Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	5.43E-02 ±	1.09E-02	8.71E-03	BE-7	+	1.34E-01 ±	1.81E-02	6.26E-03
K-40		1.76E-03 ±	6.16E-03	9.72E-03	K-40		2.26E-03 ±	1.05E-02	9.79E-03
MN-54		1.56E-04 ±	3.91E-04	5.61E-04	MN-54		2.35E-04 ±	8.93E-04	9.16E-04
FE-59		-1.22E-03 ±	5.13E-03	6.86E-03	FE-59		0.00E+00 ±	7.02E-04	7.18E-03
CO-60		2.85E-04 ±	3.06E-04	4.54E-04	CO-60		0.00E+00 ±	3.00E-04	1.21E-03
ZN-65		3.83E-04 ±	1.17E-03	1.60E-03	ZN-65		0.00E+00 ±	2.65E-04	1.85E-03
ZRNB-95		-1.62E-04 ±	1.36E-03	2.00E-03	ZRNB-95		5.60E-04 ±	1.28E-03	1.22E-03
CS-134		1.38E-04 ±	2.58E-04	4.46E-04	CS-134		-1.07E-04 ±	7.04E-04	7.60E-04
CS-137		7.40E-05 ±	3.51E-04	5.27E-04	CS-137		-6.40E-05 ±	7.65E-04	8.30E-04
BALA140		8.02E-03 ±	1.29E-02	3.26E-02	BALA140		0.00E+00 ±	4.58E-03	2.42E-02
RU-106		8.20E-04 ±	2.25E-03	4.11E-03	RU-106		1.92E-04 ±	5.31E-03	5.79E-03

Location and Quarter					Location and Quarter				
Station 1 3rd Q 2016					Station 1 4th Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.40E-01 ±	2.03E-02	1.14E-02	BE-7	+	8.89E-02 ±	1.37E-02	3.74E-03
K-40		1.01E-03 ±	1.25E-02	1.38E-02	K-40		3.86E-03 ±	7.34E-03	8.10E-03
MN-54		0.00E+00 ±	1.43E-04	1.27E-03	MN-54		1.17E-04 ±	7.15E-04	8.68E-04
FE-59		2.64E-03 ±	4.38E-03	4.77E-03	FE-59		1.44E-03 ±	3.93E-03	4.47E-03
CO-60		0.00E+00 ±	1.22E-04	1.38E-03	CO-60		0.00E+00 ±	1.60E-04	1.12E-03
ZN-65		-2.00E-04 ±	2.32E-03	2.64E-03	ZN-65		1.05E-03 ±	1.43E-03	1.56E-03
ZRNB-95		0.00E+00 ±	3.93E-04	3.96E-03	ZRNB-95		1.21E-03 ±	1.77E-03	2.03E-03
CS-134		2.92E-04 ±	5.23E-04	6.35E-04	CS-134		1.65E-04 ±	5.45E-04	6.66E-04
CS-137		0.00E+00 ±	2.09E-04	1.10E-03	CS-137		3.75E-04 ±	5.94E-04	7.02E-04
BALA140		3.52E-03 ±	2.23E-02	2.55E-02	BALA140		-3.10E-04 ±	2.11E-02	2.48E-02
RU-106		3.47E-03 ±	4.91E-03	5.80E-03	RU-106		-1.25E-03 ±	7.62E-03	9.21E-03

Location and Quarter					Location and Quarter				
Station 4 1st Q 2016					Station 4 2nd Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	7.46E-02 ±	1.67E-02	9.84E-03	BE-7	+	1.38E-01 ±	1.76E-02	3.87E-03
K-40	+	9.78E-03 ±	8.99E-03	7.06E-03	K-40		1.59E-03 ±	1.05E-02	1.17E-02
MN-54		4.41E-04 ±	7.13E-04	6.81E-04	MN-54		1.18E-04 ±	6.36E-04	7.91E-04
FE-59		0.00E+00 ±	8.88E-04	6.42E-03	FE-59		1.12E-03 ±	3.96E-03	4.58E-03
CO-60		8.16E-05 ±	7.58E-04	7.15E-04	CO-60		-1.54E-04 ±	1.08E-03	1.22E-03
ZN-65		-2.81E-04 ±	2.01E-03	1.96E-03	ZN-65		-1.33E-04 ±	1.89E-03	2.22E-03
ZRNB-95		0.00E+00 ±	3.19E-04	2.51E-03	ZRNB-95		5.87E-04 ±	1.74E-03	2.11E-03
CS-134		0.00E+00 ±	2.08E-04	7.84E-04	CS-134		-5.38E-05 ±	6.43E-04	7.97E-04
CS-137		1.31E-04 ±	5.12E-04	5.36E-04	CS-137		4.51E-04 ±	4.41E-04	4.91E-04
BALA140		-5.87E-04 ±	3.99E-02	3.73E-02	BALA140		7.89E-03 ±	1.98E-02	2.17E-02
RU-106		0.00E+00 ±	8.04E-04	6.99E-03	RU-106		7.73E-04 ±	6.23E-03	7.79E-03

Location and Quarter					Location and Quarter				
Station 4 3rd Q 2016					Station 4 4th Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.39E-01 ±	1.99E-02	2.03E-02	BE-7	+	9.36E-02 ±	1.39E-02	5.44E-03
K-40		6.17E-03 ±	1.07E-02	2.10E-02	K-40		4.22E-03 ±	3.19E-03	6.70E-03
MN-54		-1.24E-04 ±	7.54E-04	1.65E-03	MN-54		5.50E-04 ±	5.01E-04	7.38E-04
FE-59		3.60E-03 ±	2.28E-03	7.11E-03	FE-59		1.72E-03 ±	3.85E-03	5.77E-03
CO-60		0.00E+00 ±	3.78E-04	2.29E-03	CO-60		-2.73E-05 ±	9.44E-04	1.30E-03
ZN-65		-2.60E-04 ±	1.87E-03	4.06E-03	ZN-65		0.00E+00 ±	6.74E-04	2.83E-03
ZRNB-95		0.00E+00 ±	3.84E-04	6.53E-03	ZRNB-95		0.00E+00 ±	3.54E-04	3.11E-03
CS-134		-1.05E-04 ±	6.89E-04	1.41E-03	CS-134		-1.11E-04 ±	5.78E-04	8.30E-04
CS-137		-6.25E-05 ±	7.46E-04	1.58E-03	CS-137		2.28E-04 ±	4.66E-04	7.30E-04
BALA140		7.22E-03 ±	2.25E-02	5.13E-02	BALA140		0.00E+00 ±	3.60E-03	3.91E-02
RU-106		3.77E-04 ±	6.03E-03	1.33E-02	RU-106		1.72E-03 ±	4.16E-03	6.62E-03

RQ = Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE A-3.1
GAMMA SPECTROMETRY RESULTS OF AIR PARTICULATE FILTERS

Results in pCi/cubic meter, results decay corrected for decay during sample collection period

Location and Quarter					Location and Quarter				
Station 5 1st Q 2016					Station 5 2nd Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	6.15E-02 ±	1.24E-02	9.57E-03	BE-7	+	1.35E-01 ±	1.91E-02	9.10E-03
K-40		3.25E-03 ±	5.28E-03	6.84E-03	K-40		-2.87E-03 ±	1.43E-02	1.35E-02
MN-54		3.24E-04 ±	3.62E-04	4.70E-04	MN-54		-1.64E-04 ±	8.66E-04	8.96E-04
FE-59		0.00E+00 ±	1.35E-03	5.63E-03	FE-59		2.41E-03 ±	1.82E-03	4.52E-03
CO-60		1.68E-04 ±	4.99E-04	6.89E-04	CO-60		-8.98E-05 ±	1.04E-03	1.02E-03
ZN-65		4.76E-04 ±	1.56E-03	2.10E-03	ZN-65		-3.23E-04 ±	2.27E-03	2.21E-03
ZRNB-95		7.57E-04 ±	1.35E-03	1.87E-03	ZRNB-95		3.07E-04 ±	1.65E-03	1.69E-03
CS-134		-3.18E-04 ±	6.84E-04	9.45E-04	CS-134		6.97E-05 ±	6.84E-04	7.42E-04
CS-137		1.80E-04 ±	2.65E-04	3.74E-04	CS-137		-1.04E-04 ±	7.52E-04	8.11E-04
BALA140		1.36E-02 ±	1.21E-02	2.00E-02	BALA140		0.00E+00 ±	3.19E-03	2.92E-02
RU-106		7.55E-04 ±	4.55E-03	6.71E-03	RU-106		1.88E-03 ±	4.53E-03	4.62E-03

Location and Quarter					Location and Quarter				
Station 5 3rd Q 2016					Station 5 4th Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.26E-01 ±	1.82E-02	1.07E-02	BE-7	+	8.59E-02 ±	1.52E-02	9.62E-03
K-40		4.05E-03 ±	1.01E-02	1.10E-02	K-40		5.73E-03 ±	9.95E-03	1.06E-02
MN-54		-2.00E-04 ±	9.43E-04	1.11E-03	MN-54		-6.90E-05 ±	6.95E-04	8.52E-04
FE-59		1.80E-03 ±	4.03E-03	4.52E-03	FE-59		1.07E-03 ±	3.80E-03	4.39E-03
CO-60		3.19E-04 ±	6.37E-04	7.30E-04	CO-60		4.13E-05 ±	4.59E-04	9.27E-04
ZN-65		6.31E-05 ±	2.18E-03	2.50E-03	ZN-65		0.00E+00 ±	4.85E-04	3.01E-03
ZRNB-95		0.00E+00 ±	9.85E-04	2.76E-03	ZRNB-95		-8.49E-05 ±	1.56E-03	1.99E-03
CS-134		3.38E-05 ±	5.41E-04	6.81E-04	CS-134		0.00E+00 ±	9.77E-05	8.35E-04
CS-137		3.83E-04 ±	4.06E-04	4.61E-04	CS-137		0.00E+00 ±	1.09E-04	8.59E-04
BALA140		0.00E+00 ±	5.17E-03	3.24E-02	BALA140		1.53E-03 ±	2.10E-02	2.44E-02
RU-106		-1.28E-03 ±	6.62E-03	8.11E-03	RU-106		-1.40E-03 ±	6.96E-03	8.44E-03

Location and Quarter					Location and Quarter				
Station 6 1st Q 2016					Station 6 2nd Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	6.76E-02 ±	1.52E-02	8.13E-03	BE-7	+	1.32E-01 ±	1.96E-02	1.08E-02
K-40		2.29E-03 ±	1.23E-02	1.16E-02	K-40		-1.12E-03 ±	1.02E-02	9.70E-03
MN-54		0.00E+00 ±	2.84E-04	9.15E-04	MN-54		0.00E+00 ±	2.82E-04	9.08E-04
FE-59		0.00E+00 ±	8.43E-04	6.10E-03	FE-59		-2.91E-04 ±	3.76E-03	3.57E-03
CO-60		0.00E+00 ±	1.33E-04	1.18E-03	CO-60		0.00E+00 ±	1.21E-04	8.47E-04
ZN-65		0.00E+00 ±	2.66E-04	2.63E-03	ZN-65		7.21E-04 ±	1.44E-03	1.29E-03
ZRNB-95		7.57E-05 ±	2.27E-03	2.39E-03	ZRNB-95		0.00E+00 ±	8.45E-04	3.44E-03
CS-134		-8.73E-05 ±	6.30E-04	6.80E-04	CS-134		1.77E-05 ±	6.29E-04	6.87E-04
CS-137		1.65E-04 ±	4.93E-04	5.09E-04	CS-137		-8.46E-05 ±	8.31E-04	9.01E-04
BALA140		6.15E-03 ±	3.89E-02	3.55E-02	BALA140		0.00E+00 ±	3.25E-03	3.43E-02
RU-106		-1.14E-03 ±	7.53E-03	8.13E-03	RU-106		-1.71E-03 ±	6.95E-03	7.40E-03

Location and Quarter					Location and Quarter				
Station 6 3rd Q 2016					Station 6 4th Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.53E-01 ±	2.04E-02	8.48E-03	BE-7	+	9.74E-02 ±	1.55E-02	8.10E-03
K-40		-1.02E-03 ±	1.27E-02	1.40E-02	K-40		8.36E-04 ±	9.52E-03	1.08E-02
MN-54		4.21E-04 ±	5.32E-04	6.10E-04	MN-54		0.00E+00 ±	9.40E-05	1.09E-03
FE-59		-2.63E-04 ±	5.95E-03	6.78E-03	FE-59		0.00E+00 ±	6.93E-04	5.96E-03
CO-60		-1.24E-04 ±	8.88E-04	1.03E-03	CO-60		1.13E-04 ±	8.14E-04	9.47E-04
ZN-65		8.16E-04 ±	6.67E-04	1.00E-03	ZN-65		0.00E+00 ±	2.48E-04	2.78E-03
ZRNB-95		1.51E-03 ±	2.01E-03	2.28E-03	ZRNB-95		0.00E+00 ±	8.23E-04	2.41E-03
CS-134		3.62E-05 ±	7.07E-04	8.70E-04	CS-134		1.66E-04 ±	5.46E-04	6.67E-04
CS-137		2.80E-04 ±	6.31E-04	7.67E-04	CS-137		4.35E-04 ±	5.15E-04	5.94E-04
BALA140		0.00E+00 ±	9.51E-03	5.01E-02	BALA140		1.57E-03 ±	2.15E-02	2.50E-02
RU-106		3.92E-04 ±	6.27E-03	7.90E-03	RU-106		-7.16E-04 ±	7.03E-03	8.62E-03

RQ = Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE A-3.1
GAMMA SPECTROMETRY RESULTS OF AIR PARTICULATE FILTERS

Results in pCi/cubic meter, results decay corrected for decay during sample collection period

Location and Quarter Station 7 1st Q 2016					Location and Quarter Station 7 2nd Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	4.87E-02	± 1.12E-02	9.31E-03	BE-7	+	1.36E-01	± 2.07E-02	1.20E-02
K-40		6.24E-03	± 5.61E-03	8.52E-03	K-40		1.82E-03	± 1.36E-02	1.49E-02
MN-54		1.19E-04	± 2.99E-04	4.44E-04	MN-54		-2.27E-04	± 1.07E-03	1.26E-03
FE-59		0.00E+00	± 6.38E-04	2.35E-03	FE-59		0.00E+00	± 7.90E-04	9.17E-03
CO-60		9.64E-05	± 2.48E-04	4.75E-04	CO-60		0.00E+00	± 1.32E-04	1.10E-03
ZN-65		1.00E-04	± 1.17E-03	1.67E-03	ZN-65		8.60E-04	± 7.03E-04	1.06E-03
ZRNB-95		0.00E+00	± 3.20E-04	2.83E-03	ZRNB-95		7.96E-04	± 1.94E-03	2.33E-03
CS-134		-1.70E-04	± 5.34E-04	7.56E-04	CS-134		1.54E-04	± 6.29E-04	7.74E-04
CS-137		2.32E-04	± 2.65E-04	3.53E-04	CS-137		0.00E+00	± 9.18E-05	1.18E-03
BALA140		1.80E-02	± 1.36E-02	1.90E-02	BALA140		0.00E+00	± 4.09E-03	2.72E-02
RU-106		2.14E-03	± 2.45E-03	3.26E-03	RU-106		1.24E-03	± 6.74E-03	8.36E-03

Location and Quarter Station 7 3rd Q 2016					Location and Quarter Station 7 4th Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.34E-01	± 1.99E-02	1.97E-02	BE-7	+	7.96E-02	± 1.55E-02	1.31E-02
K-40		5.69E-03	± 1.29E-02	2.40E-02	K-40		5.04E-03	± 6.42E-03	8.00E-03
MN-54		3.37E-05	± 8.74E-04	1.84E-03	MN-54		-2.33E-05	± 5.77E-04	8.62E-04
FE-59		2.84E-03	± 6.17E-03	1.23E-02	FE-59		4.16E-04	± 3.19E-03	4.62E-03
CO-60		3.04E-05	± 6.10E-04	1.61E-03	CO-60		0.00E+00	± 3.54E-04	1.11E-03
ZN-65		0.00E+00	± 6.54E-04	4.67E-03	ZN-65		8.61E-04	± 6.51E-04	9.06E-04
ZRNB-95		0.00E+00	± 2.87E-04	5.96E-03	ZRNB-95		0.00E+00	± 2.64E-04	2.44E-03
CS-134		2.48E-04	± 5.94E-04	1.26E-03	CS-134		0.00E+00	± 1.84E-04	7.84E-04
CS-137		1.27E-04	± 4.96E-04	1.23E-03	CS-137		-2.27E-04	± 7.55E-04	1.04E-03
BALA140		-2.73E-03	± 2.69E-02	6.37E-02	BALA140		1.29E-02	± 1.06E-02	1.59E-02
RU-106		5.19E-03	± 4.16E-03	9.71E-03	RU-106		-1.77E-04	± 5.23E-03	7.85E-03

Location and Quarter Station 8 1st Q 2016					Location and Quarter Station 8 2nd Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	5.88E-02	± 1.49E-02	1.04E-02	BE-7	+	1.27E-01	± 1.80E-02	6.45E-03
K-40		3.10E-03	± 1.44E-02	1.36E-02	K-40		1.01E-03	± 1.24E-02	1.19E-02
MN-54		-1.10E-04	± 9.93E-04	1.04E-03	MN-54		4.09E-04	± 5.18E-04	4.56E-04
FE-59		1.43E-03	± 6.62E-03	6.19E-03	FE-59		3.28E-03	± 2.19E-03	3.38E-03
CO-60		0.00E+00	± 1.91E-04	9.74E-04	CO-60		0.00E+00	± 1.72E-04	1.20E-03
ZN-65		0.00E+00	± 3.82E-04	2.31E-03	ZN-65		-1.98E-04	± 2.30E-03	2.26E-03
ZRNB-95		6.91E-04	± 2.38E-03	2.42E-03	ZRNB-95		-6.87E-05	± 2.06E-03	2.17E-03
CS-134		-7.09E-05	± 5.72E-04	6.17E-04	CS-134		2.12E-04	± 5.88E-04	6.15E-04
CS-137		0.00E+00	± 1.19E-04	9.65E-04	CS-137		-1.27E-04	± 8.35E-04	9.00E-04
BALA140		2.28E-03	± 5.48E-02	5.10E-02	BALA140		3.46E-03	± 2.19E-02	1.99E-02
RU-106		0.00E+00	± 2.19E-03	8.25E-03	RU-106		-1.53E-03	± 7.59E-03	8.14E-03

Location and Quarter Station 8 3rd Q 2016					Location and Quarter Station 8 4th Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.53E-01	± 2.02E-02	8.22E-03	BE-7	+	9.35E-02	± 1.58E-02	8.21E-03
K-40		3.37E-04	± 1.24E-02	1.38E-02	K-40		5.82E-03	± 7.76E-03	8.22E-03
MN-54		1.27E-04	± 7.76E-04	9.42E-04	MN-54		1.76E-04	± 8.45E-04	1.00E-03
FE-59		8.44E-04	± 4.30E-03	5.05E-03	FE-59		2.62E-03	± 1.98E-03	2.76E-03
CO-60		0.00E+00	± 1.22E-04	1.65E-03	CO-60		0.00E+00	± 3.64E-04	1.29E-03
ZN-65		-1.34E-04	± 1.91E-03	2.24E-03	ZN-65		1.07E-03	± 1.46E-03	1.59E-03
ZRNB-95		6.02E-04	± 1.38E-03	1.71E-03	ZRNB-95		4.53E-04	± 1.73E-03	2.12E-03
CS-134		-5.36E-05	± 7.55E-04	9.21E-04	CS-134		0.00E+00	± 9.51E-05	9.20E-04
CS-137		-8.50E-05	± 8.35E-04	1.02E-03	CS-137		2.60E-04	± 3.78E-04	4.57E-04
BALA140		-3.94E-04	± 2.67E-02	3.14E-02	BALA140		-2.59E-03	± 2.55E-02	2.96E-02
RU-106		2.71E-03	± 6.48E-03	7.80E-03	RU-106		7.29E-04	± 5.88E-03	7.34E-03

RQ = Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE A-3.1
GAMMA SPECTROMETRY RESULTS OF AIR PARTICULATE FILTERS

Results in pCi/cubic meter, results decay corrected for decay during sample collection period

Location and Quarter		Station 9 1st Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	5.84E-02 ±	1.21E-02	1.00E-02
K-40		1.19E-03 ±	4.41E-03	8.12E-03
MN-54		-7.75E-05 ±	5.79E-04	8.27E-04
FE-59		0.00E+00 ±	6.09E-04	3.83E-03
CO-60		0.00E+00 ±	9.59E-05	8.96E-04
ZN-65		5.73E-04 ±	4.68E-04	7.03E-04
ZRNB-95		6.83E-04 ±	1.21E-03	1.68E-03
CS-134		7.48E-05 ±	4.12E-04	6.00E-04
CS-137		5.89E-05 ±	2.87E-04	4.43E-04
BALA140		0.00E+00 ±	4.92E-03	1.81E-02
RU-106		0.00E+00 ±	5.44E-04	5.48E-03

Location and Quarter		Station 9 2nd Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.23E-01 ±	1.75E-02	7.95E-03
K-40		3.28E-03 ±	7.34E-03	8.23E-03
MN-54		1.98E-04 ±	4.53E-04	5.63E-04
FE-59		-2.30E-04 ±	5.22E-03	5.94E-03
CO-60		-2.01E-04 ±	1.01E-03	1.14E-03
ZN-65		5.01E-04 ±	1.83E-03	2.09E-03
ZRNB-95		-3.04E-04 ±	2.28E-03	2.73E-03
CS-134		-1.17E-04 ±	6.08E-04	7.45E-04
CS-137		0.00E+00 ±	2.78E-04	8.07E-04
BALA140		0.00E+00 ±	3.59E-03	4.74E-02
RU-106		3.62E-04 ±	7.08E-03	8.72E-03

Location and Quarter		Station 9 3rd Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.29E-01 ±	1.89E-02	1.45E-02
K-40		8.55E-03 ±	8.35E-03	1.48E-02
MN-54		7.35E-05 ±	7.40E-04	1.41E-03
FE-59		6.26E-05 ±	4.00E-03	8.56E-03
CO-60		0.00E+00 ±	1.18E-04	2.12E-03
ZN-65		-6.47E-05 ±	1.30E-03	2.90E-03
ZRNB-95		1.41E-03 ±	1.49E-03	3.01E-03
CS-134		1.38E-04 ±	5.63E-04	1.05E-03
CS-137		2.46E-04 ±	5.01E-04	1.02E-03
BALA140		1.90E-03 ±	2.61E-02	5.28E-02
RU-106		9.32E-04 ±	5.26E-03	1.04E-02

Location and Quarter		Station 9 4th Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	8.73E-02 ±	1.75E-02	1.19E-02
K-40		-8.24E-04 ±	1.32E-02	1.43E-02
MN-54		6.99E-05 ±	7.05E-04	8.63E-04
FE-59		1.13E-03 ±	4.00E-03	4.63E-03
CO-60		-1.96E-04 ±	9.88E-04	1.11E-03
ZN-65		0.00E+00 ±	3.48E-04	3.31E-03
ZRNB-95		0.00E+00 ±	2.65E-04	3.06E-03
CS-134		-6.55E-05 ±	6.43E-04	7.88E-04
CS-137		2.73E-04 ±	4.84E-04	5.86E-04
BALA140		1.08E-02 ±	9.71E-03	1.60E-02
RU-106		-3.55E-04 ±	5.68E-03	7.15E-03

Location and Quarter		Station 21 1st Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	5.86E-02 ±	1.21E-02	9.48E-03
K-40		6.06E-03 ±	5.44E-03	8.26E-03
MN-54		-1.76E-04 ±	7.04E-04	9.78E-04
FE-59		9.31E-04 ±	1.08E-03	2.29E-03
CO-60		0.00E+00 ±	2.39E-04	9.12E-04
ZN-65		1.02E-03 ±	1.01E-03	1.22E-03
ZRNB-95		3.66E-04 ±	1.18E-03	1.72E-03
CS-134		-1.27E-04 ±	4.87E-04	6.95E-04
CS-137		1.50E-05 ±	3.45E-04	5.34E-04
BALA140		0.00E+00 ±	5.03E-03	1.85E-02
RU-106		1.11E-03 ±	2.81E-03	4.17E-03

Location and Quarter		Station 21 2nd Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.35E-01 ±	2.05E-02	9.62E-03
K-40		9.09E-03 ±	1.02E-02	1.05E-02
MN-54		7.10E-05 ±	5.40E-04	7.20E-04
FE-59		1.48E-04 ±	6.67E-03	7.62E-03
CO-60		7.37E-05 ±	1.05E-03	1.23E-03
ZN-65		1.28E-03 ±	9.08E-04	2.27E-03
ZRNB-95		0.00E+00 ±	4.73E-04	4.76E-03
CS-134		-1.29E-04 ±	8.48E-04	1.03E-03
CS-137		2.57E-04 ±	6.20E-04	7.72E-04
BALA140		1.15E-02 ±	1.03E-02	1.70E-02
RU-106		1.39E-03 ±	5.45E-03	6.98E-03

Location and Quarter		Station 21 3rd Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.26E-01 ±	1.76E-02	7.00E-03
K-40		3.19E-03 ±	2.85E-03	5.21E-03
MN-54		0.00E+00 ±	9.63E-05	9.83E-04
FE-59		8.00E-04 ±	4.07E-03	5.12E-03
CO-60		2.89E-05 ±	5.81E-04	7.85E-04
ZN-65		1.27E-04 ±	1.81E-03	2.14E-03
ZRNB-95		0.00E+00 ±	7.74E-04	3.04E-03
CS-134		-1.86E-04 ±	7.27E-04	8.28E-04
CS-137		4.63E-04 ±	4.20E-04	5.10E-04
BALA140		1.87E-03 ±	2.57E-02	3.18E-02
RU-106		7.33E-04 ±	5.91E-03	7.24E-03

Location and Quarter		Station 21 4th Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	9.08E-02 ±	1.73E-02	1.20E-02
K-40	+	6.04E-03 ±	3.82E-03	4.45E-03
MN-54		1.06E-04 ±	5.72E-04	7.11E-04
FE-59		-2.33E-04 ±	5.28E-03	6.01E-03
CO-60		1.37E-04 ±	5.71E-04	6.89E-04
ZN-65		3.61E-04 ±	1.74E-03	2.01E-03
ZRNB-95		4.31E-04 ±	1.64E-03	2.02E-03
CS-134		0.00E+00 ±	2.71E-04	8.75E-04
CS-137		4.00E-04 ±	5.79E-04	6.78E-04
BALA140		0.00E+00 ±	4.25E-03	3.76E-02
RU-106		0.00E+00 ±	1.70E-03	6.99E-03

RQ = Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE A-3.1
GAMMA SPECTROMETRY RESULTS OF AIR PARTICULATE FILTERS

Results in pCi/cubic meter, results decay corrected for decay during sample collection period

Location and Quarter Station 23 1st Q 2016					Location and Quarter Station 23 2nd Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	7.02E-02	± 1.54E-02	7.92E-03	BE-7	+	1.45E-01	± 2.08E-02	6.83E-03
K-40		3.59E-03	± 8.03E-03	7.11E-03	K-40		3.19E-03	± 1.38E-02	1.66E-02
MN-54		5.06E-04	± 8.60E-04	8.41E-04	MN-54		1.05E-04	± 1.10E-03	1.32E-03
FE-59		1.05E-03	± 6.87E-03	6.48E-03	FE-59		-1.15E-03	± 8.58E-03	9.40E-03
CO-60		0.00E+00	± 1.99E-04	1.25E-03	CO-60		-2.67E-04	± 1.35E-03	1.52E-03
ZN-65		-2.12E-04	± 2.46E-03	2.42E-03	ZN-65		1.33E-03	± 9.42E-04	2.00E-03
ZRNB-95		3.75E-04	± 2.02E-03	2.07E-03	ZRNB-95		8.67E-05	± 2.60E-03	3.21E-03
CS-134		3.15E-04	± 5.54E-04	5.59E-04	CS-134		6.24E-04	± 6.01E-04	6.70E-04
CS-137		-4.39E-05	± 8.57E-04	9.35E-04	CS-137		-1.60E-04	± 1.05E-03	1.28E-03
BALA140		1.08E-02	± 1.24E-02	1.67E-02	BALA140		0.00E+00	± 4.79E-03	5.04E-02
RU-106		1.62E-03	± 6.63E-03	7.04E-03	RU-106		1.68E-03	± 6.86E-03	8.57E-03

Location and Quarter Station 23 3rd Q 2016					Location and Quarter Station 23 4th Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.43E-01	± 2.01E-02	9.39E-03	BE-7	+	8.00E-02	± 1.67E-02	1.21E-02
K-40		3.60E-03	± 1.24E-02	1.34E-02	K-40		3.69E-03	± 7.01E-03	7.75E-03
MN-54		-1.07E-04	± 9.63E-04	1.14E-03	MN-54		4.51E-04	± 2.86E-04	5.76E-04
FE-59		1.27E-04	± 5.72E-03	6.53E-03	FE-59		2.42E-03	± 1.83E-03	2.55E-03
CO-60		1.78E-04	± 8.60E-04	9.91E-04	CO-60		2.71E-04	± 2.43E-04	4.00E-04
ZN-65		0.00E+00	± 2.61E-04	3.51E-03	ZN-65		2.38E-04	± 1.71E-03	1.99E-03
ZRNB-95		0.00E+00	± 7.95E-04	3.25E-03	ZRNB-95		1.30E-03	± 1.37E-03	1.52E-03
CS-134		1.21E-04	± 6.29E-04	7.70E-04	CS-134		0.00E+00	± 8.96E-05	7.04E-04
CS-137		1.65E-04	± 6.76E-04	8.32E-04	CS-137		0.00E+00	± 7.54E-05	9.72E-04
BALA140		0.00E+00	± 6.55E-03	4.10E-02	BALA140		8.09E-03	± 2.52E-02	2.81E-02
RU-106		0.00E+00	± 4.88E-03	9.06E-03	RU-106		1.37E-03	± 5.63E-03	6.92E-03

Location and Quarter Station 40 1st Q 2016					Location and Quarter Station 40 2nd Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	6.34E-02	± 1.23E-02	8.63E-03	BE-7	+	1.31E-01	± 2.03E-02	1.30E-02
K-40		5.95E-03	± 7.18E-03	1.04E-02	K-40		2.36E-03	± 1.27E-02	1.38E-02
MN-54		3.20E-04	± 4.45E-04	5.99E-04	MN-54		2.18E-04	± 6.49E-04	7.87E-04
FE-59		0.00E+00	± 9.25E-04	5.46E-03	FE-59		8.57E-04	± 5.63E-03	6.32E-03
CO-60		3.08E-04	± 2.52E-04	3.79E-04	CO-60		3.05E-05	± 6.13E-04	7.68E-04
ZN-65		6.14E-04	± 5.02E-04	7.55E-04	ZN-65		7.97E-04	± 6.51E-04	9.79E-04
ZRNB-95		0.00E+00	± 6.55E-04	2.43E-03	ZRNB-95		0.00E+00	± 3.92E-04	3.72E-03
CS-134		5.35E-05	± 4.38E-04	6.44E-04	CS-134		-8.89E-05	± 6.41E-04	7.90E-04
CS-137		-1.42E-04	± 4.85E-04	7.02E-04	CS-137		2.76E-04	± 4.01E-04	4.85E-04
BALA140		4.87E-03	± 2.55E-02	3.53E-02	BALA140		-2.56E-03	± 3.09E-02	3.39E-02
RU-106		-7.30E-04	± 4.40E-03	6.48E-03	RU-106		2.88E-03	± 5.69E-03	6.84E-03

Location and Quarter Station 40 3rd Q 2016					Location and Quarter Station 40 4th Q 2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.51E-01	± 2.15E-02	1.72E-02	BE-7	+	7.39E-02	± 1.50E-02	1.08E-02
K-40		3.62E-03	± 1.07E-02	1.85E-02	K-40		3.78E-03	± 3.08E-03	4.64E-03
MN-54		1.88E-04	± 9.03E-04	1.62E-03	MN-54		-1.19E-04	± 7.24E-04	8.79E-04
FE-59		0.00E+00	± 1.11E-03	1.22E-02	FE-59		0.00E+00	± 7.30E-04	7.46E-03
CO-60		1.54E-04	± 6.42E-04	1.38E-03	CO-60		8.56E-05	± 5.84E-04	7.18E-04
ZN-65		0.00E+00	± 3.83E-04	3.62E-03	ZN-65		7.53E-04	± 1.87E-03	2.09E-03
ZRNB-95		3.64E-04	± 2.22E-03	4.19E-03	ZRNB-95		-6.75E-05	± 2.02E-03	2.50E-03
CS-134		3.59E-05	± 7.02E-04	1.26E-03	CS-134		0.00E+00	± 9.43E-05	9.12E-04
CS-137		4.28E-05	± 6.84E-04	1.31E-03	CS-137		1.19E-04	± 6.45E-04	7.99E-04
BALA140		-2.81E-03	± 2.77E-02	5.57E-02	BALA140		6.69E-03	± 7.73E-03	1.64E-02
RU-106		5.85E-04	± 8.24E-03	1.45E-02	RU-106		-3.07E-03	± 8.87E-03	1.04E-02

RQ = Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE A-3.1
GAMMA SPECTROMETRY RESULTS OF AIR PARTICULATE FILTERS
 Results in pCi/cubic meter, results decay corrected for decay during sample collection period

Location and Quarter		Station 48 1st Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	7.17E-02 ±	1.40E-02	4.75E-03
K-40		5.46E-03 ±	1.05E-02	9.47E-03
MN-54		2.26E-04 ±	7.79E-04	7.92E-04
FE-59		1.69E-03 ±	1.69E-03	1.97E-03
CO-60		0.00E+00 ±	1.33E-04	9.60E-04
ZN-65		2.66E-04 ±	1.91E-03	1.86E-03
ZRNB-95		8.09E-04 ±	1.97E-03	1.95E-03
CS-134		0.00E+00 ±	3.56E-04	7.44E-04
CS-137		8.27E-05 ±	4.78E-04	5.08E-04
BALA140		6.22E-03 ±	3.94E-02	3.59E-02
RU-106		0.00E+00 ±	1.08E-03	9.96E-03

Location and Quarter		Station 48 2nd Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.35E-01 ±	1.96E-02	1.02E-02
K-40		3.61E-03 ±	1.06E-02	1.16E-02
MN-54		5.57E-04 ±	3.36E-04	9.19E-04
FE-59		2.27E-03 ±	4.32E-03	4.78E-03
CO-60		0.00E+00 ±	1.22E-04	1.21E-03
ZN-65		0.00E+00 ±	2.67E-04	2.22E-03
ZRNB-95		-4.40E-04 ±	2.72E-03	3.21E-03
CS-134		-5.35E-05 ±	6.40E-04	7.93E-04
CS-137		-2.13E-05 ±	5.89E-04	7.59E-04
BALA140		0.00E+00 ±	5.46E-03	3.41E-02
RU-106		0.00E+00 ±	1.09E-03	8.57E-03

Location and Quarter		Station 48 3rd Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.32E-01 ±	1.92E-02	1.46E-02
K-40		-4.51E-04 ±	1.02E-02	1.85E-02
MN-54		2.22E-04 ±	6.58E-04	1.31E-03
FE-59		4.28E-03 ±	1.68E-03	6.35E-03
CO-60		9.20E-05 ±	6.29E-04	1.38E-03
ZN-65		3.38E-04 ±	1.41E-03	3.03E-03
ZRNB-95		-6.10E-04 ±	2.88E-03	4.98E-03
CS-134		-1.79E-05 ±	6.39E-04	1.18E-03
CS-137		1.07E-04 ±	7.69E-04	1.41E-03
BALA140		4.99E-03 ±	7.06E-03	3.99E-02
RU-106		2.53E-03 ±	5.71E-03	1.09E-02

Location and Quarter		Station 48 4th Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	8.92E-02 ±	1.82E-02	1.30E-02
K-40		3.14E-03 ±	7.01E-03	7.86E-03
MN-54		0.00E+00 ±	1.30E-04	1.23E-03
FE-59		-1.23E-03 ±	6.61E-03	7.20E-03
CO-60		-2.75E-05 ±	5.53E-04	6.93E-04
ZN-65		3.03E-04 ±	1.26E-03	1.52E-03
ZRNB-95		0.00E+00 ±	2.61E-04	3.01E-03
CS-134		1.29E-04 ±	5.26E-04	6.48E-04
CS-137		-3.83E-05 ±	6.12E-04	7.71E-04
BALA140		-2.51E-03 ±	2.48E-02	2.87E-02
RU-106		1.74E-04 ±	4.82E-03	6.21E-03

Location and Quarter		Station 57 1st Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	5.95E-02 ±	1.12E-02	6.79E-03
K-40		3.07E-03 ±	4.76E-03	8.05E-03
MN-54		0.00E+00 ±	1.74E-04	7.45E-04
FE-59		7.64E-04 ±	2.68E-03	3.85E-03
CO-60		-1.19E-04 ±	7.30E-04	9.72E-04
ZN-65		0.00E+00 ±	1.90E-04	1.88E-03
ZRNB-95		0.00E+00 ±	7.48E-04	2.49E-03
CS-134		1.11E-04 ±	3.79E-04	5.49E-04
CS-137		1.31E-04 ±	2.29E-04	3.34E-04
BALA140		7.66E-03 ±	8.85E-03	1.88E-02
RU-106		0.00E+00 ±	1.87E-03	6.00E-03

Location and Quarter		Station 57 2nd Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.21E-01 ±	1.91E-02	1.14E-02
K-40		0.00E+00 ±	1.96E-02	1.72E-02
MN-54		0.00E+00 ±	1.00E-04	1.35E-03
FE-59		0.00E+00 ±	7.39E-04	7.56E-03
CO-60		1.52E-04 ±	6.33E-04	7.64E-04
ZN-65		-3.31E-04 ±	2.32E-03	2.62E-03
ZRNB-95		4.63E-04 ±	1.76E-03	2.17E-03
CS-134		1.06E-04 ±	5.75E-04	7.13E-04
CS-137		-4.22E-05 ±	6.76E-04	8.51E-04
BALA140		-4.65E-03 ±	3.24E-02	3.53E-02
RU-106		3.63E-03 ±	5.76E-03	6.81E-03

Location and Quarter		Station 57 3rd Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.34E-01 ±	2.02E-02	1.25E-02
K-40		9.75E-04 ±	1.21E-02	1.33E-02
MN-54		3.69E-04 ±	7.81E-04	9.10E-04
FE-59		1.59E-03 ±	4.34E-03	4.94E-03
CO-60		-5.89E-05 ±	8.38E-04	9.84E-04
ZN-65		3.25E-04 ±	1.36E-03	1.64E-03
ZRNB-95		1.15E-03 ±	1.45E-03	1.66E-03
CS-134		1.03E-04 ±	6.80E-04	8.29E-04
CS-137		-4.10E-05 ±	8.01E-04	9.86E-04
BALA140		-4.01E-04 ±	2.72E-02	3.20E-02
RU-106		-1.31E-03 ±	6.78E-03	8.31E-03

Location and Quarter		Station 57 4th Q 2016		
Nuclide	RQ	Activity	Error	MDA
BE-7	+	7.69E-02 ±	1.51E-02	9.73E-03
K-40	+	4.84E-03 ±	3.42E-03	4.46E-03
MN-54		2.29E-05 ±	6.85E-04	8.46E-04
FE-59		1.12E-03 ±	3.97E-03	4.59E-03
CO-60		2.74E-04 ±	2.45E-04	4.04E-04
ZN-65		-3.02E-04 ±	2.12E-03	2.39E-03
ZRNB-95		-1.96E-04 ±	1.97E-03	2.42E-03
CS-134		0.00E+00 ±	9.06E-05	8.26E-04
CS-137		-1.72E-04 ±	6.96E-04	8.47E-04
BALA140		4.44E-03 ±	6.28E-03	1.63E-02
RU-106		0.00E+00 ±	1.97E-03	7.72E-03

RQ = Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE A-3.2
GAMMA SPECTROMETRY RESULTS OF AIR PARTICULATE FILTERS - SUMMARY

Results in pCi/cubic meter, corrected for decay during collection period

Nuclide		Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
BE-7	Ind	1.05E-01	4.87E-02	1.53E-01	9.96E-03	44	44
BE-7	Cntl	9.94E-02	5.84E-02	1.29E-01	1.11E-02	4	4
K-40	Ind	3.31E-03	-2.87E-03	9.78E-03	1.11E-02	44	3
K-40	Cntl	3.05E-03	-8.24E-04	8.55E-03	1.14E-02	4	0
MN-54	Ind	1.20E-04	-2.27E-04	5.57E-04	9.41E-04	44	0
MN-54	Cntl	6.60E-05	-7.75E-05	1.98E-04	9.16E-04	4	0
FE-59	Ind	9.29E-04	-1.23E-03	4.28E-03	5.75E-03	44	0
FE-59	Cntl	2.41E-04	-2.30E-04	1.13E-03	5.74E-03	4	0
CO-60	Ind	4.66E-05	-2.67E-04	3.19E-04	1.02E-03	44	0
CO-60	Cntl	-9.93E-05	-2.01E-04	0.00E+00	1.32E-03	4	0
ZN-65	Ind	2.68E-04	-3.31E-04	1.33E-03	2.16E-03	44	0
ZN-65	Cntl	2.52E-04	-6.47E-05	5.73E-04	2.25E-03	4	0
ZRNB-95	Ind	2.56E-04	-6.10E-04	1.51E-03	2.74E-03	44	0
ZRNB-95	Cntl	4.48E-04	-3.04E-04	1.41E-03	2.62E-03	4	0
CS-134	Ind	3.16E-05	-3.18E-04	6.24E-04	7.98E-04	44	0
CS-134	Cntl	7.37E-06	-1.17E-04	1.38E-04	7.96E-04	4	0
CS-137	Ind	9.01E-05	-2.27E-04	4.63E-04	8.00E-04	44	0
CS-137	Cntl	1.44E-04	0.00E+00	2.73E-04	7.15E-04	4	0
BALA140	Ind	3.04E-03	-4.65E-03	1.80E-02	3.16E-02	44	0
BALA140	Cntl	3.19E-03	0.00E+00	1.08E-02	3.36E-02	4	0
RU-106	Ind	5.86E-04	-3.07E-03	5.19E-03	7.73E-03	44	0
RU-106	Cntl	2.35E-04	-3.55E-04	9.32E-04	7.95E-03	4	0

TABLE A-4.1
GAMMA SPECTROMETRY RESULTS OF IODINE-131 ON CHARCOAL FILTERS

Results in pCi/cubic meter, corrected for decay during collection period

Collection Period	Station 1				Station 9			
	RQ	Activity	Error	MDA	RQ	Activity	Error	MDA
12/29/2015 - 1/5/2016		2.14E-03 ±	1.05E-02	1.45E-02		3.81E-03 ±	1.06E-02	1.45E-02
1/5/2016 - 1/12/2016		-3.32E-03 ±	1.26E-02	1.74E-02		-2.01E-03 ±	1.16E-02	1.61E-02
1/12/2016 - 1/19/2016		4.03E-03 ±	1.10E-02	1.26E-02		5.60E-04 ±	1.08E-02	1.52E-02
1/19/2016 - 1/26/2016		7.18E-04 ±	8.52E-03	1.19E-02		-5.77E-03 ±	1.23E-02	1.67E-02
1/26/2016 - 2/2/2016		-3.01E-03 ±	9.44E-03	1.28E-02		1.80E-03 ±	8.68E-03	1.20E-02
2/2/2016 - 2/9/2016		6.30E-03 ±	9.83E-03	1.29E-02		-3.10E-03 ±	1.16E-02	1.60E-02
2/9/2016 - 2/16/2016		5.42E-04 ±	1.04E-02	1.47E-02		-3.06E-03 ±	9.59E-03	1.31E-02
2/16/2016 - 2/23/2016		-5.70E-03 ±	1.27E-02	1.73E-02		-8.74E-04 ±	9.77E-03	1.37E-02
2/23/2016 - 3/1/2016		0.00E+00 ±	1.55E-03	1.42E-02		-7.34E-04 ±	9.72E-03	1.36E-02
3/1/2016 - 3/8/2016		-4.37E-03 ±	1.15E-02	1.57E-02		-8.26E-04 ±	9.24E-03	1.29E-02
3/8/2016 - 3/15/2016		-1.10E-03 ±	7.62E-03	1.06E-02		3.36E-03 ±	8.42E-03	1.13E-02
3/15/2016 - 3/22/2016		-2.35E-03 ±	1.06E-02	1.46E-02		-5.20E-03 ±	1.16E-02	1.58E-02
3/22/2016 - 3/29/2016		4.82E-04 ±	1.07E-02	1.50E-02		-8.01E-04 ±	8.96E-03	1.25E-02
3/29/2016 - 4/5/2016		3.89E-03 ±	1.12E-02	1.64E-02		6.68E-03 ±	7.85E-03	9.12E-03
4/5/2016 - 4/12/2016		0.00E+00 ±	3.27E-03	1.83E-02		2.32E-03 ±	1.11E-02	1.48E-02
4/12/2016 - 4/19/2016		1.66E-03 ±	1.09E-02	1.52E-02		2.48E-03 ±	9.58E-03	1.32E-02
4/19/2016 - 4/26/2016		-1.24E-03 ±	1.20E-02	1.68E-02		-1.80E-03 ±	9.68E-03	1.34E-02
4/26/2016 - 5/3/2016		-3.73E-04 ±	8.80E-03	1.24E-02		2.71E-04 ±	9.04E-03	1.27E-02
5/3/2016 - 5/10/2016		-2.12E-03 ±	1.13E-02	1.56E-02		5.42E-04 ±	7.42E-03	1.04E-02
5/10/2016 - 5/17/2016		1.00E-02 ±	7.87E-03	1.04E-02		-2.67E-04 ±	8.89E-03	1.25E-02
5/17/2016 - 5/24/2016		-1.34E-03 ±	1.02E-02	1.42E-02		3.06E-03 ±	9.35E-03	1.27E-02
5/24/2016 - 5/31/2016		0.00E+00 ±	7.47E-03	1.76E-02		-1.15E-03 ±	9.85E-03	1.38E-02
5/31/2016 - 6/7/2016		-2.09E-03 ±	1.20E-02	1.67E-02		-3.61E-04 ±	8.51E-03	1.20E-02
6/7/2016 - 6/14/2016		-1.07E-03 ±	8.72E-03	1.21E-02		5.51E-03 ±	8.24E-03	1.06E-02
6/14/2016 - 6/21/2016		1.89E-04 ±	8.91E-03	1.26E-02		-2.72E-03 ±	1.07E-02	1.48E-02
6/21/2016 - 6/28/2016		-1.92E-03 ±	1.03E-02	1.43E-02		-5.60E-03 ±	1.19E-02	1.61E-02
6/28/2016 - 7/5/2016		1.58E-03 ±	1.31E-02	1.77E-02		7.30E-03 ±	7.94E-03	9.10E-03
7/5/2016 - 7/12/2016		-2.88E-04 ±	9.60E-03	1.35E-02		1.11E-03 ±	7.65E-03	1.06E-02
7/12/2016 - 7/19/2016		2.03E-03 ±	9.85E-03	1.36E-02		7.72E-03 ±	8.54E-03	1.06E-02
7/19/2016 - 7/26/2016		1.96E-04 ±	9.23E-03	1.30E-02		2.45E-03 ±	9.32E-03	1.28E-02
7/26/2016 - 8/2/2016		7.57E-03 ±	9.39E-03	1.19E-02		4.96E-03 ±	8.57E-03	1.12E-02
8/2/2016 - 8/9/2016		7.58E-03 ±	7.38E-03	8.68E-03		-4.76E-03 ±	1.12E-02	1.52E-02
8/9/2016 - 8/16/2016		-2.36E-03 ±	1.07E-02	1.47E-02		5.49E-03 ±	8.21E-03	1.05E-02
8/16/2016 - 8/23/2016		5.65E-04 ±	7.74E-03	1.08E-02		-4.48E-03 ±	1.05E-02	1.42E-02
8/23/2016 - 8/30/2016		4.47E-03 ±	8.20E-03	1.07E-02		1.87E-04 ±	8.79E-03	1.24E-02
8/30/2016 - 9/6/2016		-2.69E-03 ±	1.22E-02	1.69E-02		-6.35E-03 ±	1.35E-02	1.84E-02
9/6/2016 - 9/13/2016		9.35E-05 ±	8.22E-03	1.16E-02		-3.76E-04 ±	8.86E-03	1.25E-02
9/13/2016 - 9/20/2016		0.00E+00 ±	2.83E-03	1.81E-02		8.08E-03 ±	7.42E-03	8.62E-03
9/20/2016 - 9/27/2016		-4.91E-03 ±	1.22E-02	1.66E-02		0.00E+00 ±	6.41E-03	1.49E-02
9/27/2016 - 10/4/2016		4.15E-03 ±	9.02E-03	1.20E-02		5.46E-04 ±	7.47E-03	1.05E-02
10/4/2016 - 10/11/2016		-7.44E-04 ±	9.84E-03	1.38E-02		3.74E-03 ±	9.70E-03	1.47E-02
10/11/2016 - 10/18/2016		-3.30E-03 ±	1.16E-02	1.60E-02		-3.36E-03 ±	1.11E-02	1.52E-02
10/18/2016 - 10/25/2016		0.00E+00 ±	5.15E-03	2.02E-02		9.62E-04 ±	2.13E-02	3.00E-02
10/25/2016 - 11/1/2016		3.37E-03 ±	7.66E-03	1.01E-02		0.00E+00 ±	1.15E-03	1.68E-02
11/1/2016 - 11/8/2016		2.86E-04 ±	9.54E-03	1.35E-02		-1.08E-03 ±	1.18E-02	1.66E-02
11/8/2016 - 11/15/2016		5.36E-03 ±	9.26E-03	1.21E-02		4.60E-03 ±	1.13E-02	1.52E-02
11/15/2016 - 11/22/2016		-4.65E-03 ±	1.16E-02	1.57E-02		3.18E-03 ±	9.73E-03	1.32E-02
11/22/2016 - 11/29/2016		-2.84E-04 ±	9.46E-03	1.33E-02		-6.34E-03 ±	1.29E-02	1.75E-02
11/29/2016 - 12/6/2016		1.51E-03 ±	1.01E-02	1.40E-02		-6.52E-04 ±	1.03E-02	1.45E-02
12/6/2016 - 12/13/2016		-9.12E-05 ±	1.00E-02	1.42E-02		8.09E-03 ±	8.95E-03	1.27E-02
12/13/2016 - 12/20/2016		1.41E-03 ±	9.53E-03	1.32E-02		1.19E-03 ±	9.71E-03	1.89E-02
12/20/2016 - 12/27/2016		4.70E-03 ±	9.05E-03	1.19E-02		-3.84E-03 ±	1.09E-02	1.49E-02
12/27/2016 - 1/3/2017		-1.11E-03 ±	1.08E-02	1.51E-02		4.68E-04 ±	1.03E-02	1.46E-02

NVS = Valid sample not obtained due to sampler failure.

RQ= Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE A-4.1
GAMMA SPECTROMETRY RESULTS OF IODINE-131 ON CHARCOAL FILTERS

Results in pCi/cubic meter, corrected for decay during collection period

Collection Period	Station 4				Station 21			
	RQ	Activity	Error	MDA	RQ	Activity	Error	MDA
12/29/2015 - 1/5/2016		2.33E-03 ±	1.14E-02	1.58E-02		3.87E-03 ±	1.08E-02	1.47E-02
1/5/2016 - 1/12/2016		-3.67E-03 ±	1.39E-02	1.92E-02		-2.08E-03 ±	1.20E-02	1.66E-02
1/12/2016 - 1/19/2016		4.48E-03 ±	1.23E-02	1.40E-02		5.79E-04 ±	1.12E-02	1.57E-02
1/19/2016 - 1/26/2016		7.79E-04 ±	9.24E-03	1.29E-02		-5.95E-03 ±	1.27E-02	1.72E-02
1/26/2016 - 2/2/2016		-3.22E-03 ±	1.01E-02	1.38E-02		1.89E-03 ±	9.13E-03	1.26E-02
2/2/2016 - 2/9/2016		6.76E-03 ±	1.05E-02	1.38E-02		-3.21E-03 ±	1.20E-02	1.66E-02
2/9/2016 - 2/16/2016		5.72E-04 ±	1.10E-02	1.55E-02		-3.12E-03 ±	9.80E-03	1.33E-02
2/16/2016 - 2/23/2016		-6.10E-03 ±	1.36E-02	1.85E-02		-8.86E-04 ±	9.91E-03	1.39E-02
2/23/2016 - 3/1/2016		0.00E+00 ±	1.72E-03	1.58E-02		-6.92E-04 ±	9.15E-03	1.28E-02
3/1/2016 - 3/8/2016		-4.75E-03 ±	1.26E-02	1.71E-02		-8.36E-04 ±	9.35E-03	1.31E-02
3/8/2016 - 3/15/2016		-1.10E-03 ±	7.62E-03	1.06E-02		3.41E-03 ±	8.55E-03	1.15E-02
3/15/2016 - 3/22/2016		-2.28E-03 ±	1.03E-02	1.42E-02		-5.22E-03 ±	1.17E-02	1.58E-02
3/22/2016 - 3/29/2016		4.65E-04 ±	1.03E-02	1.45E-02		-8.27E-04 ±	9.24E-03	1.29E-02
3/29/2016 - 4/5/2016		3.83E-03 ±	1.10E-02	1.62E-02		6.82E-03 ±	8.01E-03	9.30E-03
4/5/2016 - 4/12/2016		0.00E+00 ±	3.22E-03	1.80E-02		4.55E-03 ±	2.18E-02	2.90E-02
4/12/2016 - 4/19/2016		1.60E-03 ±	1.06E-02	1.47E-02		3.34E-03 ±	1.29E-02	1.77E-02
4/19/2016 - 4/26/2016		-1.16E-03 ±	1.12E-02	1.57E-02		-1.96E-03 ±	1.05E-02	1.46E-02
4/26/2016 - 5/3/2016		-3.79E-04 ±	8.94E-03	1.26E-02		2.85E-04 ±	9.48E-03	1.34E-02
5/3/2016 - 5/10/2016		-2.16E-03 ±	1.14E-02	1.59E-02		5.51E-04 ±	7.54E-03	1.06E-02
5/10/2016 - 5/17/2016		1.02E-02 ±	8.01E-03	1.06E-02		-2.71E-04 ±	9.04E-03	1.27E-02
5/17/2016 - 5/24/2016		-1.36E-03 ±	1.04E-02	1.45E-02		3.06E-03 ±	9.35E-03	1.27E-02
5/24/2016 - 5/31/2016		0.00E+00 ±	7.73E-03	1.82E-02		-1.17E-03 ±	1.00E-02	1.40E-02
5/31/2016 - 6/7/2016		-2.20E-03 ±	1.26E-02	1.76E-02		NVS		
6/7/2016 - 6/14/2016		-1.10E-03 ±	8.90E-03	1.24E-02		NVS		
6/14/2016 - 6/21/2016		1.95E-04 ±	9.19E-03	1.30E-02		-2.80E-03 ±	1.10E-02	1.52E-02
6/21/2016 - 6/28/2016		-1.96E-03 ±	1.05E-02	1.45E-02		-5.60E-03 ±	1.19E-02	1.61E-02
6/28/2016 - 7/5/2016		1.67E-03 ±	1.39E-02	1.87E-02		7.31E-03 ±	7.95E-03	9.11E-03
7/5/2016 - 7/12/2016		-3.04E-04 ±	1.01E-02	1.43E-02		1.09E-03 ±	7.52E-03	1.04E-02
7/12/2016 - 7/19/2016		1.95E-03 ±	9.49E-03	1.31E-02		7.60E-03 ±	8.41E-03	1.04E-02
7/19/2016 - 7/26/2016		1.78E-04 ±	8.40E-03	1.19E-02		2.35E-03 ±	8.96E-03	1.23E-02
7/26/2016 - 8/2/2016		7.15E-03 ±	8.88E-03	1.13E-02		4.90E-03 ±	8.48E-03	1.11E-02
8/2/2016 - 8/9/2016		7.45E-03 ±	7.26E-03	8.54E-03		-4.76E-03 ±	1.12E-02	1.52E-02
8/9/2016 - 8/16/2016		-2.33E-03 ±	1.05E-02	1.45E-02		5.40E-03 ±	8.08E-03	1.04E-02
8/16/2016 - 8/23/2016		5.65E-04 ±	7.73E-03	1.08E-02		-4.34E-03 ±	1.02E-02	1.38E-02
8/23/2016 - 8/30/2016		4.46E-03 ±	8.18E-03	1.07E-02		1.78E-04 ±	8.36E-03	1.18E-02
8/30/2016 - 9/6/2016		-2.60E-03 ±	1.18E-02	1.63E-02		-6.04E-03 ±	1.29E-02	1.75E-02
9/6/2016 - 9/13/2016		9.06E-05 ±	7.97E-03	1.13E-02		-3.52E-04 ±	8.30E-03	1.17E-02
9/13/2016 - 9/20/2016		0.00E+00 ±	2.65E-03	1.69E-02		8.33E-03 ±	7.65E-03	8.89E-03
9/20/2016 - 9/27/2016		-4.74E-03 ±	1.18E-02	1.60E-02		0.00E+00 ±	6.66E-03	1.55E-02
9/27/2016 - 10/4/2016		3.93E-03 ±	8.54E-03	1.14E-02		5.73E-04 ±	7.85E-03	1.10E-02
10/4/2016 - 10/11/2016		-7.35E-04 ±	9.73E-03	1.36E-02		3.82E-03 ±	9.91E-03	1.50E-02
10/11/2016 - 10/18/2016		-3.18E-03 ±	1.12E-02	1.54E-02		-3.36E-03 ±	1.11E-02	1.52E-02
10/18/2016 - 10/25/2016		0.00E+00 ±	4.99E-03	1.95E-02		4.66E-04 ±	1.03E-02	1.45E-02
10/25/2016 - 11/1/2016		3.25E-03 ±	7.40E-03	9.75E-03		0.00E+00 ±	1.12E-03	1.64E-02
11/1/2016 - 11/8/2016		2.77E-04 ±	9.22E-03	1.30E-02		-9.88E-04 ±	1.08E-02	1.52E-02
11/8/2016 - 11/15/2016		5.10E-03 ±	8.81E-03	1.15E-02		4.28E-03 ±	1.05E-02	1.42E-02
11/15/2016 - 11/22/2016		-4.34E-03 ±	1.08E-02	1.47E-02		2.93E-03 ±	8.95E-03	1.21E-02
11/22/2016 - 11/29/2016		-2.79E-04 ±	9.28E-03	1.31E-02		-6.15E-03 ±	1.26E-02	1.70E-02
11/29/2016 - 12/6/2016		1.44E-03 ±	9.61E-03	1.34E-02		-6.42E-04 ±	1.02E-02	1.43E-02
12/6/2016 - 12/13/2016		-8.97E-05 ±	9.89E-03	1.40E-02		7.57E-03 ±	8.37E-03	1.18E-02
12/13/2016 - 12/20/2016		1.35E-03 ±	9.10E-03	1.26E-02		1.17E-03 ±	9.55E-03	1.86E-02
12/20/2016 - 12/27/2016		4.47E-03 ±	8.61E-03	1.13E-02		-3.86E-03 ±	1.10E-02	1.50E-02
12/27/2016 - 1/3/2017		-1.10E-03 ±	1.07E-02	1.50E-02		4.60E-04 ±	1.02E-02	1.43E-02

NVS = Valid sample not obtained due to sampler failure.

RQ= Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE A-4.1
GAMMA SPECTROMETRY RESULTS OF IODINE-131 ON CHARCOAL FILTERS

Results in pCi/cubic meter, corrected for decay during collection period

Collection Period	Station 5				Station 23			
	RQ	Activity	Error	MDA	RQ	Activity	Error	MDA
12/29/2015 - 1/5/2016		2.34E-03 ±	1.14E-02	1.59E-02		8.53E-03 ±	1.07E-02	1.38E-02
1/5/2016 - 1/12/2016		-3.61E-03 ±	1.37E-02	1.89E-02		2.18E-03 ±	1.06E-02	1.47E-02
1/12/2016 - 1/19/2016		4.41E-03 ±	1.21E-02	1.38E-02		5.80E-04 ±	1.12E-02	1.57E-02
1/19/2016 - 1/26/2016		7.81E-04 ±	9.26E-03	1.30E-02		-2.03E-03 ±	9.87E-03	1.36E-02
1/26/2016 - 2/2/2016		-8.09E-03 ±	2.54E-02	3.45E-02		-9.84E-05 ±	1.08E-02	1.53E-02
2/2/2016 - 2/9/2016		6.60E-03 ±	1.03E-02	1.35E-02		-2.75E-03 ±	1.24E-02	1.72E-02
2/9/2016 - 2/16/2016		5.64E-04 ±	1.09E-02	1.53E-02		7.53E-03 ±	8.90E-03	1.11E-02
2/16/2016 - 2/23/2016		-5.90E-03 ±	1.31E-02	1.79E-02		-3.35E-03 ±	1.14E-02	1.55E-02
2/23/2016 - 3/1/2016		0.00E+00 ±	1.63E-03	1.49E-02		2.11E-03 ±	1.03E-02	1.42E-02
3/1/2016 - 3/8/2016		-4.52E-03 ±	1.20E-02	1.63E-02		4.15E-04 ±	1.09E-02	1.54E-02
3/8/2016 - 3/15/2016		-1.16E-03 ±	8.03E-03	1.11E-02		7.82E-04 ±	9.27E-03	1.30E-02
3/15/2016 - 3/22/2016		-2.39E-03 ±	1.08E-02	1.49E-02		1.07E-03 ±	1.08E-02	1.51E-02
3/22/2016 - 3/29/2016		4.81E-04 ±	1.07E-02	1.50E-02		-5.37E-03 ±	1.33E-02	1.82E-02
3/29/2016 - 4/5/2016		3.81E-03 ±	1.09E-02	1.61E-02		-1.26E-03 ±	1.54E-02	2.08E-02
4/5/2016 - 4/12/2016		0.00E+00 ±	3.24E-03	1.81E-02		NVS		
4/12/2016 - 4/19/2016		1.58E-03 ±	1.04E-02	1.44E-02		NVS		
4/19/2016 - 4/26/2016		-1.15E-03 ±	1.11E-02	1.56E-02		2.92E-03 ±	1.41E-02	1.94E-02
4/26/2016 - 5/3/2016		-3.78E-04 ±	8.91E-03	1.25E-02		2.17E-03 ±	1.05E-02	1.46E-02
5/3/2016 - 5/10/2016		-2.14E-03 ±	1.13E-02	1.57E-02		4.23E-03 ±	1.16E-02	1.57E-02
5/10/2016 - 5/17/2016		1.02E-02 ±	8.01E-03	1.06E-02		0.00E+00 ±	4.17E-03	2.79E-02
5/17/2016 - 5/24/2016		-1.34E-03 ±	1.02E-02	1.42E-02		1.95E-03 ±	9.08E-03	1.24E-02
5/24/2016 - 5/31/2016		0.00E+00 ±	7.65E-03	1.81E-02		-6.37E-03 ±	1.30E-02	1.75E-02
5/31/2016 - 6/7/2016		-2.19E-03 ±	1.26E-02	1.75E-02		-4.01E-04 ±	9.46E-03	1.33E-02
6/7/2016 - 6/14/2016		-9.87E-04 ±	8.02E-03	1.12E-02		-2.71E-03 ±	1.23E-02	1.70E-02
6/14/2016 - 6/21/2016		1.75E-04 ±	8.24E-03	1.16E-02		-2.00E-03 ±	8.77E-03	1.20E-02
6/21/2016 - 6/28/2016		-1.77E-03 ±	9.48E-03	1.31E-02		-3.04E-03 ±	1.11E-02	1.53E-02
6/28/2016 - 7/5/2016		1.45E-03 ±	1.21E-02	1.63E-02		-1.87E-03 ±	1.35E-02	1.82E-02
7/5/2016 - 7/12/2016		-2.70E-04 ±	8.99E-03	1.27E-02		0.00E+00 ±	1.67E-03	1.46E-02
7/12/2016 - 7/19/2016		1.86E-03 ±	9.03E-03	1.25E-02		4.65E-03 ±	8.06E-03	1.04E-02
7/19/2016 - 7/26/2016		1.77E-04 ±	8.35E-03	1.18E-02		9.43E-03 ±	8.32E-03	9.81E-03
7/26/2016 - 8/2/2016		6.87E-03 ±	8.53E-03	1.08E-02		8.32E-04 ±	9.30E-03	1.30E-02
8/2/2016 - 8/9/2016		7.71E-03 ±	7.51E-03	8.83E-03		-8.25E-04 ±	9.22E-03	1.29E-02
8/9/2016 - 8/16/2016		-2.48E-03 ±	1.12E-02	1.54E-02		0.00E+00 ±	2.24E-03	1.46E-02
8/16/2016 - 8/23/2016		5.47E-04 ±	7.49E-03	1.05E-02		1.21E-03 ±	8.37E-03	1.16E-02
8/23/2016 - 8/30/2016		4.33E-03 ±	7.94E-03	1.04E-02		-4.97E-03 ±	1.17E-02	1.59E-02
8/30/2016 - 9/6/2016		-2.48E-03 ±	1.12E-02	1.55E-02		2.39E-03 ±	8.94E-03	1.22E-02
9/6/2016 - 9/13/2016		8.90E-05 ±	7.83E-03	1.11E-02		-2.37E-03 ±	9.85E-03	1.36E-02
9/13/2016 - 9/20/2016		0.00E+00 ±	2.60E-03	1.66E-02		-2.12E-03 ±	1.12E-02	1.56E-02
9/20/2016 - 9/27/2016		-4.67E-03 ±	1.16E-02	1.58E-02		-1.28E-03 ±	1.36E-02	1.91E-02
9/27/2016 - 10/4/2016		3.79E-03 ±	8.24E-03	1.09E-02		2.32E-03 ±	8.21E-03	1.11E-02
10/4/2016 - 10/11/2016		-7.39E-04 ±	9.77E-03	1.37E-02		5.51E-03 ±	7.24E-03	8.93E-03
10/11/2016 - 10/18/2016		-3.30E-03 ±	1.16E-02	1.60E-02		1.82E-03 ±	8.75E-03	1.21E-02
10/18/2016 - 10/25/2016		0.00E+00 ±	4.93E-03	1.93E-02		-1.26E-03 ±	1.08E-02	1.51E-02
10/25/2016 - 11/1/2016		3.29E-03 ±	7.48E-03	9.86E-03		-1.03E-03 ±	8.38E-03	1.17E-02
11/1/2016 - 11/8/2016		2.82E-04 ±	9.39E-03	1.32E-02		-2.75E-04 ±	9.17E-03	1.29E-02
11/8/2016 - 11/15/2016		5.27E-03 ±	9.10E-03	1.19E-02		0.00E+00 ±	2.40E-03	1.14E-02
11/15/2016 - 11/22/2016		-4.50E-03 ±	1.12E-02	1.53E-02		2.76E-04 ±	9.19E-03	1.45E-02
11/22/2016 - 11/29/2016		-2.83E-04 ±	9.43E-03	1.33E-02		4.69E-04 ±	1.04E-02	1.46E-02
11/29/2016 - 12/6/2016		1.51E-03 ±	1.01E-02	1.40E-02		-3.99E-03 ±	1.13E-02	1.55E-02
12/6/2016 - 12/13/2016		-9.29E-05 ±	1.02E-02	1.45E-02		-3.80E-03 ±	1.08E-02	1.47E-02
12/13/2016 - 12/20/2016		1.39E-03 ±	9.37E-03	1.30E-02		5.35E-03 ±	7.55E-03	9.52E-03
12/20/2016 - 12/27/2016		4.60E-03 ±	8.84E-03	1.17E-02		-1.82E-03 ±	1.08E-02	1.50E-02
12/27/2016 - 1/3/2017		-1.10E-03 ±	1.06E-02	1.49E-02		2.23E-03 ±	1.09E-02	1.51E-02

NVS = Valid sample not obtained due to sampler failure.

RQ= Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE A-4.1
GAMMA SPECTROMETRY RESULTS OF IODINE-131 ON CHARCOAL FILTERS

Results in pCi/cubic meter, corrected for decay during collection period

Collection Period	Station 6			Station 40				
	RQ	Activity	Error	MDA	RQ	Activity	Error	MDA
12/29/2015 - 1/5/2016		2.18E-03	± 1.07E-02	1.48E-02		8.72E-03	± 1.10E-02	1.41E-02
1/5/2016 - 1/12/2016		-3.42E-03	± 1.30E-02	1.79E-02		2.18E-03	± 1.06E-02	1.46E-02
1/12/2016 - 1/19/2016		4.18E-03	± 1.14E-02	1.31E-02		5.93E-04	± 1.14E-02	1.61E-02
1/19/2016 - 1/26/2016		7.28E-04	± 8.63E-03	1.21E-02		-2.07E-03	± 1.00E-02	1.39E-02
1/26/2016 - 2/2/2016		-3.01E-03	± 9.44E-03	1.29E-02		-1.03E-04	± 1.13E-02	1.60E-02
2/2/2016 - 2/9/2016		6.23E-03	± 9.72E-03	1.27E-02		-2.79E-03	± 1.27E-02	1.75E-02
2/9/2016 - 2/16/2016		5.51E-04	± 1.06E-02	1.49E-02		7.80E-03	± 9.21E-03	1.15E-02
2/16/2016 - 2/23/2016		-5.70E-03	± 1.27E-02	1.73E-02		-3.40E-03	± 1.15E-02	1.58E-02
2/23/2016 - 3/1/2016		0.00E+00	± 1.58E-03	1.45E-02		2.11E-03	± 1.02E-02	1.41E-02
3/1/2016 - 3/8/2016		-4.35E-03	± 1.15E-02	1.57E-02		3.81E-04	± 1.00E-02	1.42E-02
3/8/2016 - 3/15/2016		-1.10E-03	± 7.62E-03	1.06E-02		7.69E-04	± 9.12E-03	1.28E-02
3/15/2016 - 3/22/2016		-2.28E-03	± 1.03E-02	1.42E-02		1.04E-03	± 1.05E-02	1.48E-02
3/22/2016 - 3/29/2016		4.73E-04	± 1.05E-02	1.47E-02		-5.19E-03	± 1.29E-02	1.75E-02
3/29/2016 - 4/5/2016		3.90E-03	± 1.12E-02	1.65E-02		-1.05E-03	± 1.29E-02	1.74E-02
4/5/2016 - 4/12/2016		0.00E+00	± 3.22E-03	1.80E-02		-3.89E-03	± 1.38E-02	1.83E-02
4/12/2016 - 4/19/2016		1.60E-03	± 1.06E-02	1.47E-02		0.00E+00	± 2.79E-03	1.73E-02
4/19/2016 - 4/26/2016		-1.14E-03	± 1.10E-02	1.54E-02		1.94E-03	± 9.34E-03	1.29E-02
4/26/2016 - 5/3/2016		-3.67E-04	± 8.66E-03	1.22E-02		2.17E-03	± 1.06E-02	1.46E-02
5/3/2016 - 5/10/2016		-2.19E-03	± 1.16E-02	1.61E-02		4.23E-03	± 1.16E-02	1.57E-02
5/10/2016 - 5/17/2016		1.02E-02	± 8.01E-03	1.06E-02		0.00E+00	± 4.02E-03	2.69E-02
5/17/2016 - 5/24/2016	®	-1.39E-03	± 1.06E-02	1.47E-02		1.85E-03	± 8.61E-03	1.18E-02
5/24/2016 - 5/31/2016		0.00E+00	± 7.34E-03	1.73E-02		-6.16E-03	± 1.25E-02	1.69E-02
5/31/2016 - 6/7/2016		-2.05E-03	± 1.18E-02	1.64E-02		5.25E-03	± 1.01E-02	1.33E-02
6/7/2016 - 6/14/2016		-1.04E-03	± 8.44E-03	1.17E-02		-2.70E-03	± 1.22E-02	1.69E-02
6/14/2016 - 6/21/2016		1.92E-04	± 9.06E-03	1.28E-02		-2.00E-03	± 8.81E-03	1.21E-02
6/21/2016 - 6/28/2016		-1.92E-03	± 1.03E-02	1.43E-02		-3.04E-03	± 1.11E-02	1.53E-02
6/28/2016 - 7/5/2016		1.61E-03	± 1.34E-02	1.80E-02		-1.84E-03	± 1.32E-02	1.78E-02
7/5/2016 - 7/12/2016		-2.99E-04	± 9.95E-03	1.40E-02		0.00E+00	± 1.61E-03	1.41E-02
7/12/2016 - 7/19/2016		2.09E-03	± 1.02E-02	1.40E-02		4.57E-03	± 7.92E-03	1.02E-02
7/19/2016 - 7/26/2016		1.84E-04	± 8.66E-03	1.22E-02		1.15E-02	± 1.01E-02	1.19E-02
7/26/2016 - 8/2/2016		7.41E-03	± 9.19E-03	1.16E-02		8.29E-04	± 9.27E-03	1.30E-02
8/2/2016 - 8/9/2016		7.84E-03	± 7.64E-03	8.98E-03		-8.52E-04	± 9.53E-03	1.33E-02
8/9/2016 - 8/16/2016		-2.41E-03	± 1.09E-02	1.50E-02		0.00E+00	± 2.32E-03	1.50E-02
8/16/2016 - 8/23/2016		5.64E-04	± 7.73E-03	1.08E-02		1.26E-03	± 8.66E-03	1.20E-02
8/23/2016 - 8/30/2016		4.62E-03	± 8.48E-03	1.11E-02		-5.14E-03	± 1.21E-02	1.64E-02
8/30/2016 - 9/6/2016		-2.69E-03	± 1.22E-02	1.69E-02		2.52E-03	± 9.40E-03	1.29E-02
9/6/2016 - 9/13/2016		9.52E-05	± 8.37E-03	1.18E-02		-2.50E-03	± 1.04E-02	1.43E-02
9/13/2016 - 9/20/2016		0.00E+00	± 2.85E-03	1.82E-02		-2.27E-03	± 1.21E-02	1.67E-02
9/20/2016 - 9/27/2016		-5.05E-03	± 1.25E-02	1.71E-02		-1.34E-03	± 1.42E-02	2.00E-02
9/27/2016 - 10/4/2016		4.21E-03	± 9.15E-03	1.22E-02		2.51E-03	± 8.86E-03	1.20E-02
10/4/2016 - 10/11/2016		-7.86E-04	± 1.04E-02	1.46E-02		5.86E-03	± 7.69E-03	9.48E-03
10/11/2016 - 10/18/2016		-3.40E-03	± 1.20E-02	1.65E-02		1.94E-03	± 9.36E-03	1.29E-02
10/18/2016 - 10/25/2016		0.00E+00	± 5.15E-03	2.02E-02		-1.31E-03	± 1.12E-02	1.57E-02
10/25/2016 - 11/1/2016		3.37E-03	± 7.66E-03	1.01E-02		-1.08E-03	± 8.73E-03	1.22E-02
11/1/2016 - 11/8/2016		2.86E-04	± 9.54E-03	1.35E-02		-2.90E-04	± 9.66E-03	1.36E-02
11/8/2016 - 11/15/2016		5.30E-03	± 9.16E-03	1.20E-02		-4.24E-03	± 1.17E-02	1.55E-02
11/15/2016 - 11/22/2016		-4.80E-03	± 1.20E-02	1.63E-02		2.89E-04	± 9.64E-03	1.52E-02
11/22/2016 - 11/29/2016		-2.69E-04	± 8.96E-03	1.26E-02		5.07E-04	± 1.12E-02	1.58E-02
11/29/2016 - 12/6/2016		1.42E-03	± 9.45E-03	1.31E-02		-4.26E-03	± 1.21E-02	1.65E-02
12/6/2016 - 12/13/2016		-9.12E-05	± 1.00E-02	1.42E-02		-4.00E-03	± 1.14E-02	1.55E-02
12/13/2016 - 12/20/2016		1.41E-03	± 9.56E-03	1.33E-02		5.51E-03	± 7.77E-03	9.81E-03
12/20/2016 - 12/27/2016		4.62E-03	± 8.90E-03	1.17E-02		-1.88E-03	± 1.11E-02	1.54E-02
12/27/2016 - 1/3/2017		-1.16E-03	± 1.12E-02	1.57E-02		2.26E-03	± 1.11E-02	1.53E-02

NVS = Valid sample not obtained due to sampler failure.

RQ= Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE A-4.1
GAMMA SPECTROMETRY RESULTS OF IODINE-131 ON CHARCOAL FILTERS

Results in pCi/cubic meter, corrected for decay during collection period

Collection Period	Station 7				Station 48			
	RQ	Activity	Error	MDA	RQ	Activity	Error	MDA
12/29/2015 - 1/5/2016		3.86E-03 ±	1.08E-02	1.47E-02		7.86E-03 ±	9.90E-03	1.27E-02
1/5/2016 - 1/12/2016		-2.13E-03 ±	1.22E-02	1.70E-02		2.00E-03 ±	9.71E-03	1.34E-02
1/12/2016 - 1/19/2016		5.77E-04 ±	1.11E-02	1.57E-02		5.53E-04 ±	1.07E-02	1.50E-02
1/19/2016 - 1/26/2016		-5.98E-03 ±	1.28E-02	1.73E-02		-1.93E-03 ±	9.40E-03	1.30E-02
1/26/2016 - 2/2/2016		1.89E-03 ±	9.13E-03	1.26E-02		-9.02E-05 ±	9.94E-03	1.40E-02
2/2/2016 - 2/9/2016		-3.24E-03 ±	1.22E-02	1.68E-02		-2.52E-03 ±	1.14E-02	1.58E-02
2/9/2016 - 2/16/2016		-3.14E-03 ±	9.84E-03	1.34E-02		7.17E-03 ±	8.47E-03	1.06E-02
2/16/2016 - 2/23/2016		-9.35E-04 ±	1.05E-02	1.46E-02		-3.17E-03 ±	1.08E-02	1.47E-02
2/23/2016 - 3/1/2016		-7.74E-04 ±	1.02E-02	1.44E-02		1.96E-03 ±	9.55E-03	1.32E-02
3/1/2016 - 3/8/2016		-8.69E-04 ±	9.72E-03	1.36E-02		3.88E-04 ±	1.02E-02	1.44E-02
3/8/2016 - 3/15/2016		3.59E-03 ±	8.99E-03	1.20E-02		7.57E-04 ±	8.97E-03	1.26E-02
3/15/2016 - 3/22/2016		-5.76E-03 ±	1.29E-02	1.74E-02		1.03E-03 ±	1.04E-02	1.45E-02
3/22/2016 - 3/29/2016		-8.30E-04 ±	9.28E-03	1.30E-02		-5.28E-03 ±	1.31E-02	1.78E-02
3/29/2016 - 4/5/2016		6.80E-03 ±	7.99E-03	9.28E-03		-1.05E-03 ±	1.29E-02	1.74E-02
4/5/2016 - 4/12/2016		2.46E-03 ±	1.18E-02	1.57E-02		-3.89E-03 ±	1.38E-02	1.83E-02
4/12/2016 - 4/19/2016		2.66E-03 ±	1.03E-02	1.41E-02		0.00E+00 ±	2.89E-03	1.79E-02
4/19/2016 - 4/26/2016		-1.97E-03 ±	1.05E-02	1.46E-02		1.97E-03 ±	9.51E-03	1.31E-02
4/26/2016 - 5/3/2016		3.00E-04 ±	9.98E-03	1.41E-02		2.21E-03 ±	1.07E-02	1.48E-02
5/3/2016 - 5/10/2016		5.82E-04 ±	7.98E-03	1.12E-02		4.24E-03 ±	1.16E-02	1.57E-02
5/10/2016 - 5/17/2016		-3.17E-04 ±	1.06E-02	1.49E-02		0.00E+00 ±	4.02E-03	2.69E-02
5/17/2016 - 5/24/2016		*3.45E-03 ±	1.06E-02	1.43E-02		1.92E-03 ±	8.93E-03	1.22E-02
5/24/2016 - 5/31/2016		-1.18E-03 ±	1.02E-02	1.42E-02		-5.86E-03 ±	1.19E-02	1.61E-02
5/31/2016 - 6/7/2016		-3.74E-04 ±	8.83E-03	1.24E-02		4.81E-03 ±	9.26E-03	1.22E-02
6/7/2016 - 6/14/2016		3.24E-02 ±	4.84E-02	6.21E-02		-2.74E-03 ±	1.24E-02	1.72E-02
6/14/2016 - 6/21/2016		-2.77E-03 ±	1.09E-02	1.50E-02		-2.08E-03 ±	9.12E-03	1.25E-02
6/21/2016 - 6/28/2016		-6.09E-03 ±	1.29E-02	1.75E-02		-3.14E-03 ±	1.15E-02	1.58E-02
6/28/2016 - 7/5/2016		7.95E-03 ±	8.64E-03	9.90E-03		-1.97E-03 ±	1.42E-02	1.91E-02
7/5/2016 - 7/12/2016		1.16E-03 ±	8.02E-03	1.11E-02		0.00E+00 ±	1.72E-03	1.51E-02
7/12/2016 - 7/19/2016		8.15E-03 ±	9.02E-03	1.12E-02		4.74E-03 ±	8.22E-03	1.06E-02
7/19/2016 - 7/26/2016		2.79E-03 ±	1.06E-02	1.45E-02		9.81E-03 ±	8.66E-03	1.02E-02
7/26/2016 - 8/2/2016		4.99E-03 ±	8.62E-03	1.13E-02		8.57E-04 ±	9.59E-03	1.34E-02
8/2/2016 - 8/9/2016		-4.92E-03 ±	1.16E-02	1.57E-02		-8.67E-04 ±	9.70E-03	1.36E-02
8/9/2016 - 8/16/2016		5.58E-03 ±	8.34E-03	1.07E-02		0.00E+00 ±	2.32E-03	1.50E-02
8/16/2016 - 8/23/2016		-4.56E-03 ±	1.07E-02	1.45E-02		1.24E-03 ±	8.52E-03	1.18E-02
8/23/2016 - 8/30/2016		1.87E-04 ±	8.79E-03	1.24E-02		-5.14E-03 ±	1.21E-02	1.64E-02
8/30/2016 - 9/6/2016		-6.35E-03 ±	1.35E-02	1.84E-02		2.47E-03 ±	9.25E-03	1.26E-02
9/6/2016 - 9/13/2016		-3.71E-04 ±	8.76E-03	1.23E-02		-2.46E-03 ±	1.02E-02	1.40E-02
9/13/2016 - 9/20/2016		8.26E-03 ±	7.59E-03	8.82E-03		-2.20E-03 ±	1.17E-02	1.62E-02
9/20/2016 - 9/27/2016		0.00E+00 ±	6.48E-03	1.51E-02		-1.29E-03 ±	1.37E-02	1.93E-02
9/27/2016 - 10/4/2016		5.63E-04 ±	7.72E-03	1.08E-02		2.47E-03 ±	8.73E-03	1.18E-02
10/4/2016 - 10/11/2016		3.69E-03 ±	9.57E-03	1.45E-02		5.76E-03 ±	7.56E-03	9.33E-03
10/11/2016 - 10/18/2016		-3.31E-03 ±	1.09E-02	1.50E-02		1.88E-03 ±	9.05E-03	1.25E-02
10/18/2016 - 10/25/2016		4.64E-04 ±	1.03E-02	1.44E-02		-1.27E-03 ±	1.09E-02	1.52E-02
10/25/2016 - 11/1/2016		0.00E+00 ±	1.13E-03	1.65E-02		-1.04E-03 ±	8.47E-03	1.18E-02
11/1/2016 - 11/8/2016		-1.02E-03 ±	1.12E-02	1.57E-02		-2.80E-04 ±	9.33E-03	1.32E-02
11/8/2016 - 11/15/2016		4.39E-03 ±	1.08E-02	1.46E-02		2.29E-03 ±	5.74E-03	7.69E-03
11/15/2016 - 11/22/2016		2.85E-03 ±	8.73E-03	1.18E-02		2.80E-04 ±	9.33E-03	1.47E-02
11/22/2016 - 11/29/2016		-6.24E-03 ±	1.27E-02	1.72E-02		4.82E-04 ±	1.07E-02	1.50E-02
11/29/2016 - 12/6/2016		-6.42E-04 ±	1.02E-02	1.43E-02		-3.98E-03 ±	1.13E-02	1.54E-02
12/6/2016 - 12/13/2016		7.70E-03 ±	8.52E-03	1.21E-02		-3.81E-03 ±	1.08E-02	1.47E-02
12/13/2016 - 12/20/2016		1.21E-03 ±	9.87E-03	1.92E-02		5.42E-03 ±	7.65E-03	9.65E-03
12/20/2016 - 12/27/2016		-3.91E-03 ±	1.11E-02	1.51E-02		-1.78E-03 ±	1.05E-02	1.46E-02
12/27/2016 - 1/3/2017		4.59E-04 ±	1.02E-02	1.43E-02		2.19E-03 ±	1.07E-02	1.48E-02

NVS = Valid sample not obtained due to sampler failure.

RQ= Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE A-4.1
GAMMA SPECTROMETRY RESULTS OF IODINE-131 ON CHARCOAL FILTERS

Results in pCi/cubic meter, corrected for decay during collection period

Collection Period	Station 8				Station 57			
	RQ	Activity	Error	MDA	RQ	Activity	Error	MDA
12/29/2015 - 1/5/2016		3.75E-03 ±	1.05E-02	1.42E-02		7.82E-03 ±	9.85E-03	1.27E-02
1/5/2016 - 1/12/2016		-2.01E-03 ±	1.16E-02	1.61E-02		2.01E-03 ±	9.75E-03	1.35E-02
1/12/2016 - 1/19/2016		5.51E-04 ±	1.06E-02	1.50E-02		5.42E-04 ±	1.04E-02	1.47E-02
1/19/2016 - 1/26/2016		-5.77E-03 ±	1.23E-02	1.67E-02		-1.90E-03 ±	9.24E-03	1.27E-02
1/26/2016 - 2/2/2016		1.87E-03 ±	9.04E-03	1.25E-02		-9.04E-05 ±	9.96E-03	1.41E-02
2/2/2016 - 2/9/2016		-3.21E-03 ±	1.20E-02	1.66E-02		-2.55E-03 ±	1.16E-02	1.60E-02
2/9/2016 - 2/16/2016		-3.07E-03 ±	9.61E-03	1.31E-02		6.98E-03 ±	8.24E-03	1.03E-02
2/16/2016 - 2/23/2016		-8.88E-04 ±	9.93E-03	1.39E-02		-3.03E-03 ±	1.03E-02	1.41E-02
2/23/2016 - 3/1/2016		-7.58E-04 ±	1.00E-02	1.41E-02		1.90E-03 ±	9.25E-03	1.28E-02
3/1/2016 - 3/8/2016		-8.69E-04 ±	9.72E-03	1.36E-02		3.69E-04 ±	9.72E-03	1.37E-02
3/8/2016 - 3/15/2016		3.53E-03 ±	8.85E-03	1.19E-02		7.43E-04 ±	8.82E-03	1.23E-02
3/15/2016 - 3/22/2016		-5.47E-03 ±	1.22E-02	1.66E-02		1.01E-03 ±	1.02E-02	1.43E-02
3/22/2016 - 3/29/2016		-8.70E-04 ±	9.73E-03	1.36E-02		-5.11E-03 ±	1.27E-02	1.73E-02
3/29/2016 - 4/5/2016		7.01E-03 ±	8.24E-03	9.57E-03		-1.04E-03 ±	1.27E-02	1.72E-02
4/5/2016 - 4/12/2016		2.43E-03 ±	1.17E-02	1.55E-02		-3.86E-03 ±	1.37E-02	1.82E-02
4/12/2016 - 4/19/2016		2.65E-03 ±	1.02E-02	1.40E-02		0.00E+00 ±	2.80E-03	1.74E-02
4/19/2016 - 4/26/2016		-1.93E-03 ±	1.03E-02	1.43E-02		1.90E-03 ±	9.16E-03	1.26E-02
4/26/2016 - 5/3/2016		2.95E-04 ±	9.83E-03	1.39E-02		2.10E-03 ±	1.02E-02	1.41E-02
5/3/2016 - 5/10/2016		5.89E-04 ±	8.07E-03	1.13E-02		4.04E-03 ±	1.11E-02	1.50E-02
5/10/2016 - 5/17/2016		-2.89E-04 ±	9.62E-03	1.36E-02		0.00E+00 ±	4.02E-03	2.69E-02
5/17/2016 - 5/24/2016		3.17E-03 ±	9.68E-03	1.31E-02 [®]		1.88E-03 ±	8.77E-03	1.20E-02
5/24/2016 - 5/31/2016		-1.19E-03 ±	1.02E-02	1.42E-02		-6.37E-03 ±	1.30E-02	1.75E-02
5/31/2016 - 6/7/2016		-3.72E-04 ±	8.79E-03	1.24E-02		5.28E-03 ±	1.02E-02	1.34E-02
6/7/2016 - 6/14/2016		5.69E-03 ±	8.51E-03	1.09E-02		-2.70E-03 ±	1.22E-02	1.69E-02
6/14/2016 - 6/21/2016		-2.82E-03 ±	1.11E-02	1.53E-02		-2.00E-03 ±	8.81E-03	1.21E-02
6/21/2016 - 6/28/2016		-5.88E-03 ±	1.25E-02	1.69E-02		-2.99E-03 ±	1.09E-02	1.50E-02
6/28/2016 - 7/5/2016		7.76E-03 ±	8.44E-03	9.67E-03		-1.87E-03 ±	1.35E-02	1.81E-02
7/5/2016 - 7/12/2016		1.12E-03 ±	7.78E-03	1.08E-02		0.00E+00 ±	1.72E-03	1.51E-02
7/12/2016 - 7/19/2016		7.85E-03 ±	8.68E-03	1.07E-02		4.73E-03 ±	8.20E-03	1.06E-02
7/19/2016 - 7/26/2016		2.52E-03 ±	9.61E-03	1.32E-02		8.44E-03 ±	7.45E-03	8.78E-03
7/26/2016 - 8/2/2016		5.13E-03 ±	8.87E-03	1.16E-02		8.20E-04 ±	9.17E-03	1.28E-02
8/2/2016 - 8/9/2016		-5.00E-03 ±	1.18E-02	1.60E-02		-8.39E-04 ±	9.38E-03	1.31E-02
8/9/2016 - 8/16/2016		5.76E-03 ±	8.62E-03	1.10E-02		0.00E+00 ±	2.20E-03	1.43E-02
8/16/2016 - 8/23/2016		-4.72E-03 ±	1.11E-02	1.50E-02		1.20E-03 ±	8.26E-03	1.15E-02
8/23/2016 - 8/30/2016		1.93E-04 ±	9.09E-03	1.28E-02		-4.89E-03 ±	1.15E-02	1.56E-02
8/30/2016 - 9/6/2016		-6.57E-03 ±	1.40E-02	1.90E-02		2.43E-03 ±	9.09E-03	1.24E-02
9/6/2016 - 9/13/2016		-3.82E-04 ±	9.02E-03	1.27E-02		-2.37E-03 ±	9.85E-03	1.36E-02
9/13/2016 - 9/20/2016		8.49E-03 ±	7.80E-03	9.06E-03		-2.14E-03 ±	1.13E-02	1.57E-02
9/20/2016 - 9/27/2016		0.00E+00 ±	6.74E-03	1.57E-02		-1.27E-03 ±	1.34E-02	1.89E-02
9/27/2016 - 10/4/2016		5.87E-04 ±	8.04E-03	1.13E-02		2.37E-03 ±	8.36E-03	1.13E-02
10/4/2016 - 10/11/2016		3.92E-03 ±	1.02E-02	1.54E-02		5.58E-03 ±	7.32E-03	9.03E-03
10/11/2016 - 10/18/2016		-3.60E-03 ±	1.19E-02	1.63E-02		1.85E-03 ±	8.90E-03	1.23E-02
10/18/2016 - 10/25/2016		4.93E-04 ±	1.09E-02	1.54E-02		-1.28E-03 ±	1.10E-02	1.53E-02
10/25/2016 - 11/1/2016		0.00E+00 ±	1.15E-03	1.68E-02		-1.03E-03 ±	8.39E-03	1.17E-02
11/1/2016 - 11/8/2016		-1.05E-03 ±	1.16E-02	1.62E-02		-2.75E-04 ±	9.17E-03	1.29E-02
11/8/2016 - 11/15/2016		4.52E-03 ±	1.11E-02	1.50E-02		5.82E-03 ±	5.41E-03	6.43E-03
11/15/2016 - 11/22/2016		3.07E-03 ±	9.39E-03	1.27E-02		2.72E-04 ±	9.07E-03	1.43E-02
11/22/2016 - 11/29/2016		-6.55E-03 ±	1.34E-02	1.81E-02		4.76E-04 ±	1.05E-02	1.48E-02
11/29/2016 - 12/6/2016		-6.75E-04 ±	1.07E-02	1.50E-02		-4.06E-03 ±	1.15E-02	1.57E-02
12/6/2016 - 12/13/2016		8.10E-03 ±	8.97E-03	1.27E-02		-3.86E-03 ±	1.10E-02	1.50E-02
12/13/2016 - 12/20/2016		1.25E-03 ±	1.02E-02	1.99E-02		5.42E-03 ±	7.65E-03	9.65E-03
12/20/2016 - 12/27/2016		-4.03E-03 ±	1.15E-02	1.56E-02		-1.86E-03 ±	1.10E-02	1.53E-02
12/27/2016 - 1/3/2017		4.75E-04 ±	1.05E-02	1.48E-02		2.23E-03 ±	1.09E-02	1.51E-02

NVS = Valid sample not obtained due to sampler failure.

RQ= Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE A-4.2
GAMMA SPECTROMETRY RESULTS OF IODINE-131 ON CHARCOAL FILTERS - SUMMARY

Results in pCi per cubic meter, corrected for decay during collection period

Nuclide		Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
I-131	Ind	4.48E-04	-8.09E-03	3.24E-02	1.43E-02	579	0
I-131	Cntl	4.70E-04	-6.35E-03	8.09E-03	1.39E-02	53	0

TABLE A-5.1
GROSS BETA IN WATER

Results in pCi per liter

Collection Period	ST 26 River/Drinking Cntl				ST 29 River/Drinking Ind			
	RQ	Activity	Error	MDA	RQ	Activity	Error	MDA
12/30/15 - 02/01/16		-1.86E-01 ±	6.94E-01	2.48E+00		4.75E-01 ±	7.17E-01	2.49E+00
02/01/16 - 03/01/16		9.76E-01 ±	7.31E-01	2.40E+00		7.40E-01 ±	7.22E-01	2.40E+00
03/01/16 - 04/01/16		1.17E+00 ±	6.82E-01	2.21E+00		1.21E+00 ±	6.83E-01	2.22E+00
04/01/16 - 05/02/16		1.26E+00 ±	7.27E-01	2.34E+00		-6.40E-01 ±	6.83E-01	2.35E+00
05/02/16 - 06/01/16		1.43E+00 ±	6.75E-01	2.12E+00		7.77E-01 ±	6.33E-01	2.13E+00
06/01/16 - 06/30/16		2.88E-01 ±	6.49E-01	2.30E+00		1.16E-01 ±	6.39E-01	2.30E+00
06/30/16 - 08/01/16		-4.23E-02 ±	7.00E-01	2.52E+00		-1.73E-01 ±	7.04E-01	2.52E+00
08/01/16 - 09/01/16		-6.34E-01 ±	7.43E-01	2.53E+00		1.54E+00 ±	8.02E-01	2.54E+00
09/01/16 - 09/30/16		4.59E-01 ±	6.41E-01	2.22E+00		5.48E-01 ±	6.50E-01	2.23E+00
10/01/16 - 10/31/16		1.81E+00 ±	6.73E-01	2.03E+00		-2.59E-02 ±	5.63E-01	2.04E+00
10/31/16 - 11/30/16		5.96E-01 ±	5.57E-01	1.89E+00		1.48E+00 ±	6.20E-01	1.92E+00
12/01/16 - 01/03/17		-5.14E-01 ±	6.30E-01	2.16E+00		-1.12E+00 ±	6.74E-01	2.18E+00

Collection Period	ST 27 CW Discharge			
	RQ	Activity	Error	MDA
12/30/15 - 02/01/16	+	1.54E+01 ±	1.56E+00	3.08E+00
02/01/16 - 03/01/16	+	7.78E+00 ±	1.27E+00	2.98E+00
03/01/16 - 04/01/16	+	9.19E+00 ±	1.29E+00	2.78E+00
04/01/16 - 05/02/16	+	5.19E+00 ±	1.06E+00	2.75E+00
05/02/16 - 06/01/16	+	1.04E+01 ±	1.31E+00	2.68E+00
06/01/16 - 06/30/16	+	8.98E+00 ±	1.27E+00	2.90E+00
06/30/16 - 08/01/16	+	5.41E+00 ±	1.16E+00	3.05E+00
08/01/16 - 09/01/16	+	4.47E+00 ±	1.02E+00	2.85E+00
09/01/16 - 09/30/16	+	6.57E+00 ±	1.13E+00	2.74E+00
10/01/16 - 10/31/16	+	4.35E+00 ±	9.30E-01	2.43E+00
10/31/16 - 11/30/16	+	1.07E+01 ±	1.25E+00	2.50E+00
12/01/16 - 01/03/17	+	5.90E+00 ±	1.11E+00	2.80E+00

TABLE A-5.2
GROSS BETA IN WATER - SUMMARY

Results in pCi per liter

Location	Average Activity	Activity Low	Activity High	Number of Samples	Number of Positive IDs
ST 26 Control	5.51E-01	-6.34E-01	1.81E+00	12	0
ST 29 Indicator	4.10E-01	-1.12E+00	1.54E+00	12	0
ST 27 Discharge	7.87E+00	4.35E+00	1.54E+01	12	12

TABLE A-6.1
TRITIUM IN WATER

Results in pCi per liter, MDA for all samples is 300 pCi/l

Location	Description	Collection Period	RQ	Activity	Error
26	River/Drinking Control	12/30/15 - 04/01/16		1.45E+02 ±	8.95E+01
		04/01/16 - 06/30/16		5.89E+01 ±	9.02E+01
		06/30/16 - 09/30/16		9.67E+01 ±	8.91E+01
		09/30/16 - 01/03/17		1.10E+02 ±	9.06E+01
29	River/Drinking Indicator	12/30/15 - 04/01/16		2.02E+02 ±	9.09E+01
		04/01/16 - 06/30/16		7.55E+01 ±	9.01E+01
		06/30/16 - 09/30/16		1.24E+02 ±	8.98E+01
		09/30/16 - 01/03/17		1.27E+02 ±	8.94E+01
27	Plant Discharge	12/30/15 - 04/01/16		2.08E+02 ±	8.70E+01
		04/01/16 - 06/30/16		9.82E+01 ±	8.91E+01
		06/30/16 - 09/30/16		1.57E+02 ±	9.01E+01
		09/30/16 - 01/03/17		1.71E+02 ±	9.05E+01
31	Ground Water Well 1	03/09/16		6.48E+01 ±	8.57E+01
		06/08/16		1.07E+01 ±	8.01E+01
		09/14/16		1.53E+02 ±	8.90E+01
		12/14/16		1.91E+02 ±	8.95E+01
32	Ground Water Well 2	03/09/16		1.98E+02 ±	9.11E+01
		06/08/16		1.75E+01 ±	8.34E+01
		09/14/16		8.28E+01 ±	8.66E+01
		12/14/16		1.81E+02 ±	8.92E+01
52	Ground Water Well 3	03/17/16		1.40E+02 ±	8.86E+01
		06/09/16		3.32E+01 ±	8.78E+01
		09/14/16		8.90E+01 ±	8.65E+01
		12/14/16		1.62E+02 ±	8.84E+01

TABLE A-6.2
TRITIUM IN WATER - Summary

Results in pCi per liter

Location Description	Average Activity	Activity Low	Activity High	Number of Samples	Number of Positive IDs
River/Drinking Control	1.03E+02	5.89E+01	1.45E+02	4	0
River/Drinking Indicator	1.32E+02	7.55E+01	2.02E+02	4	0
Discharge Indicator	1.59E+02	9.82E+01	2.08E+02	4	0
Ground Water Indicator	1.10E+02	1.07E+01	1.98E+02	12	0

Quarterly tritium values reported for ST-26, 27, and 29 are average of monthly analysis values.

RQ=Results Qualifier. If blank, result is less than detection limit. If "+", result is above the detection limit.

Table A-7.1

GAMMA SPECTROMETRY RESULTS OF RIVER/DRINKING WATER**Station 26 - Control Station 29 - Indicator**

Results in pCi/liter, corrected for decay during collection period

Location ST-26 collected 2/1/2016					Location ST-26 collected 3/1/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		1.39E+01 ±	3.45E+01	4.95E+01	K-40		2.85E+01 ±	3.81E+01	4.49E+01
CR-51		-3.78E-01 ±	2.81E+01	3.97E+01	CR-51		3.89E+00 ±	2.49E+01	3.37E+01
MN-54		-1.68E+00 ±	3.27E+00	4.04E+00	MN-54		5.67E-01 ±	2.90E+00	3.55E+00
CO-58		-9.82E-02 ±	3.03E+00	3.87E+00	CO-58		-1.88E+00 ±	3.69E+00	4.45E+00
FE-59		-5.05E+00 ±	1.22E+01	1.44E+01	FE-59		3.43E+00 ±	8.42E+00	9.54E+00
CO-60		3.25E+00 ±	2.97E+00	3.47E+00	CO-60		0.00E+00 ±	1.01E+00	4.95E+00
ZN-65		3.96E+00 ±	4.43E+00	4.90E+00	ZN-65		6.08E-01 ±	6.00E+00	7.20E+00
ZRNB-95		1.24E+00 ±	4.82E+00	6.23E+00	ZRNB-95		-7.10E-01 ±	5.96E+00	7.35E+00
I-131		3.87E+00 ±	8.35E+00	1.15E+01	I-131		-5.39E+00 ±	7.78E+00	1.03E+01
CS-134		-1.56E+00 ±	2.95E+00	3.78E+00	CS-134		-2.32E+00 ±	3.46E+00	4.29E+00
CS-137		3.50E-01 ±	2.74E+00	3.59E+00	CS-137		-1.03E+00 ±	3.15E+00	3.94E+00
BALA140		2.22E+00 ±	6.37E+00	7.16E+00	BALA140		2.83E+00 ±	5.94E+00	6.29E+00
BI-214	+	2.70E+01 ±	8.13E+00	9.55E+00	BI-214		0.00E+00 ±	6.26E+00	1.03E+01

Location ST-26 collected 4/1/2016					Location ST-26 collected 5/2/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		1.03E+01 ±	3.24E+01	4.02E+01	K-40		4.85E+00 ±	3.32E+01	5.41E+01
CR-51		2.05E+01 ±	2.64E+01	3.44E+01	CR-51		1.49E+00 ±	2.86E+01	4.24E+01
MN-54		1.46E+00 ±	2.43E+00	2.87E+00	MN-54		-1.36E+00 ±	3.24E+00	4.33E+00
CO-58		-2.46E-01 ±	3.15E+00	3.89E+00	CO-58		1.95E-02 ±	3.00E+00	4.16E+00
FE-59		0.00E+00 ±	7.30E+00	1.52E+01	FE-59		3.95E+00 ±	6.41E+00	8.24E+00
CO-60		1.59E+00 ±	2.77E+00	3.07E+00	CO-60		2.35E+00 ±	2.33E+00	2.83E+00
ZN-65		-3.56E+00 ±	7.97E+00	9.37E+00	ZN-65		3.90E+00 ±	4.83E+00	6.17E+00
ZRNB-95		-6.33E-01 ±	5.55E+00	6.84E+00	ZRNB-95		2.05E-01 ±	5.07E+00	7.24E+00
I-131		2.57E+00 ±	8.42E+00	1.13E+01	I-131		1.34E+00 ±	7.52E+00	1.11E+01
CS-134		-1.12E+00 ±	3.17E+00	3.99E+00	CS-134		-9.45E-01 ±	2.76E+00	3.80E+00
CS-137		1.11E+00 ±	2.75E+00	3.42E+00	CS-137		5.00E-02 ±	2.72E+00	3.86E+00
BALA140		7.71E-01 ±	7.58E+00	8.41E+00	BALA140		-4.58E-01 ±	7.66E+00	1.01E+01
BI-214		0.00E+00 ±	6.20E+00	1.02E+01	BI-214		2.66E+00 ±	6.81E+00	1.01E+01

Location ST-26 collected 6/1/2016					Location ST-26 collected 6/30/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		1.05E+01 ±	4.25E+01	5.11E+01	K-40		3.36E+01 ±	3.65E+01	4.08E+01
CR-51		-1.37E+01 ±	3.09E+01	4.14E+01	CR-51		-3.34E+01 ±	3.42E+01	4.69E+01
MN-54		1.03E+00 ±	2.50E+00	3.00E+00	MN-54		1.22E-01 ±	2.75E+00	3.51E+00
CO-58		1.68E+00 ±	2.94E+00	3.49E+00	CO-58		4.17E-01 ±	2.93E+00	3.72E+00
FE-59		-3.19E-01 ±	8.83E+00	1.04E+01	FE-59		7.12E-01 ±	9.95E+00	1.17E+01
CO-60		1.70E+00 ±	2.52E+00	2.75E+00	CO-60		1.91E+00 ±	2.26E+00	2.54E+00
ZN-65		-1.70E+00 ±	7.54E+00	8.99E+00	ZN-65		6.35E-01 ±	4.95E+00	5.93E+00
ZRNB-95		-3.34E+00 ±	6.67E+00	8.04E+00	ZRNB-95		1.90E+00 ±	5.21E+00	6.53E+00
I-131		-2.10E+00 ±	7.67E+00	1.03E+01	I-131		-3.84E+00 ±	1.14E+01	1.53E+01
CS-134		-2.52E-01 ±	3.07E+00	3.91E+00	CS-134		-1.08E+00 ±	2.52E+00	3.27E+00
CS-137		-1.78E+00 ±	3.34E+00	4.14E+00	CS-137		-6.89E-02 ±	2.73E+00	3.60E+00
BALA140		-2.88E+00 ±	8.93E+00	9.76E+00	BALA140		6.56E-01 ±	1.05E+01	1.20E+01
BI-214	+	9.79E+00 ±	7.31E+00	8.75E+00	BI-214		0.00E+00 ±	5.13E+00	8.44E+00

Table A-7.1

GAMMA SPECTROMETRY RESULTS OF RIVER/DRINKING WATER**Station 26 - Control Station 29 - Indicator**

Results in pCi/liter, corrected for decay during collection period

Location ST-26 collected 8/1/2016				Location ST-26 collected 9/1/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		2.27E+01 ±	4.15E+01	4.91E+01	K-40		1.45E+01 ±	4.27E+01	5.11E+01
CR-51		7.92E+00 ±	2.94E+01	3.97E+01	CR-51		1.41E+01 ±	2.82E+01	3.74E+01
MN-54		1.34E-01 ±	3.07E+00	3.81E+00	MN-54		1.60E+00 ±	2.90E+00	3.46E+00
CO-58		0.00E+00 ±	1.10E+00	4.75E+00	CO-58		5.79E-02 ±	3.43E+00	4.26E+00
FE-59		0.00E+00 ±	3.65E+00	9.74E+00	FE-59		6.84E+00 ±	7.88E+00	8.39E+00
CO-60		-7.39E-01 ±	3.76E+00	4.36E+00	CO-60		8.64E-01 ±	2.70E+00	3.09E+00
ZN-65		4.03E+00 ±	4.88E+00	5.39E+00	ZN-65		1.97E+00 ±	5.12E+00	5.96E+00
ZRNB-95		6.55E-01 ±	6.05E+00	7.46E+00	ZRNB-95		-2.12E+00 ±	7.68E+00	9.22E+00
I-131		1.29E+00 ±	8.16E+00	1.11E+01	I-131		5.49E+00 ±	8.70E+00	1.14E+01
CS-134		-1.60E-01 ±	2.79E+00	3.56E+00	CS-134		1.13E+00 ±	2.91E+00	3.64E+00
CS-137		-1.89E+00 ±	3.27E+00	4.04E+00	CS-137		-7.27E-01 ±	3.20E+00	4.04E+00
BALA140		1.94E+00 ±	7.86E+00	8.61E+00	BALA140		0.00E+00 ±	2.43E+00	1.15E+01
BI-214		1.75E+00 ±	8.08E+00	1.09E+01	BI-214		4.80E-02 ±	7.92E+00	1.08E+01

Location ST-26 collected 9/30/2016				Location ST-26 collected 10/31/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		1.15E+00 ±	4.00E+01	5.97E+01	K-40		1.70E+01 ±	4.25E+01	5.21E+01
CR-51		1.67E+01 ±	2.65E+01	3.82E+01	CR-51		-2.22E+00 ±	2.67E+01	3.96E+01
MN-54		1.22E-01 ±	2.69E+00	3.72E+00	MN-54		-6.96E-02 ±	2.79E+00	3.85E+00
CO-58		3.20E+00 ±	2.66E+00	3.34E+00	CO-58		-1.85E+00 ±	3.74E+00	4.96E+00
FE-59		3.13E+00 ±	7.94E+00	1.03E+01	FE-59		3.11E+00 ±	7.90E+00	1.03E+01
CO-60		-1.24E+00 ±	3.61E+00	4.62E+00	CO-60		1.04E+00 ±	2.70E+00	3.50E+00
ZN-65		2.83E+00 ±	5.11E+00	6.70E+00	ZN-65		4.72E-01 ±	5.25E+00	7.17E+00
ZRNB-95		5.13E-01 ±	4.92E+00	7.01E+00	ZRNB-95		1.23E+00 ±	4.78E+00	6.73E+00
I-131		1.29E+00 ±	8.16E+00	1.21E+01	I-131		3.05E+00 ±	6.78E+00	9.92E+00
CS-134		-5.34E-01 ±	2.84E+00	3.94E+00	CS-134		-7.80E-01 ±	2.86E+00	3.94E+00
CS-137		-6.00E-01 ±	2.99E+00	4.17E+00	CS-137		-1.40E+00 ±	3.04E+00	4.17E+00
BALA140		0.00E+00 ±	1.96E+00	1.27E+01	BALA140		0.00E+00 ±	1.90E+00	1.23E+01
BI-214		0.00E+00 ±	6.63E+00	1.09E+01	BI-214		1.11E+00 ±	7.10E+00	1.05E+01

Location ST-26 collected 11/30/2016				Location ST-26 collected 1/3/2017					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		2.56E+01 ±	3.98E+01	5.08E+01	K-40		3.20E+01 ±	4.21E+01	5.28E+01
CR-51		2.73E+00 ±	2.85E+01	4.07E+01	CR-51		2.77E+01 ±	2.83E+01	3.86E+01
MN-54		-1.10E+00 ±	3.31E+00	4.31E+00	MN-54		-1.34E-01 ±	2.88E+00	3.85E+00
CO-58		-2.27E+00 ±	4.01E+00	5.13E+00	CO-58		-1.37E+00 ±	3.84E+00	4.99E+00
FE-59		4.47E-01 ±	8.83E+00	1.14E+01	FE-59		6.57E+00 ±	7.56E+00	9.14E+00
CO-60		-6.16E-01 ±	2.68E+00	3.42E+00	CO-60		3.08E-01 ±	3.23E+00	4.12E+00
ZN-65		-2.92E+00 ±	7.09E+00	9.00E+00	ZN-65		1.96E+00 ±	5.09E+00	6.59E+00
ZRNB-95		2.27E-01 ±	6.13E+00	8.15E+00	ZRNB-95		-8.93E-01 ±	5.93E+00	7.85E+00
I-131		-3.53E+00 ±	7.89E+00	1.11E+01	I-131		-1.86E+00 ±	8.36E+00	1.19E+01
CS-134		1.46E-01 ±	2.73E+00	3.70E+00	CS-134		-1.32E+00 ±	3.02E+00	4.00E+00
CS-137		-5.17E-01 ±	3.26E+00	4.41E+00	CS-137		5.65E-01 ±	2.33E+00	3.19E+00
BALA140		-1.35E+00 ±	9.38E+00	1.13E+01	BALA140		4.94E+00 ±	6.73E+00	7.92E+00
BI-214		5.12E+00 ±	7.52E+00	1.04E+01	BI-214		4.23E+00 ±	7.55E+00	1.06E+01

Table A-7.1

GAMMA SPECTROMETRY RESULTS OF RIVER/DRINKING WATER**Station 26 - Control Station 29 - Indicator**

Results in pCi/liter, corrected for decay during collection period

Location ST-29 collected 2/1/2016					Location ST-29 collected 3/1/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	4.79E+01	± 3.16E+01	3.13E+01	K-40	+	5.16E+01	± 3.89E+01	4.50E+01
CR-51		-1.46E+01	± 3.43E+01	4.44E+01	CR-51		-4.03E+00	± 2.80E+01	4.13E+01
MN-54		-1.22E+00	± 3.41E+00	4.15E+00	MN-54		1.91E-01	± 2.47E+00	3.43E+00
CO-58		-2.00E+00	± 4.10E+00	4.96E+00	CO-58		1.59E+00	± 2.84E+00	3.79E+00
FE-59		-1.47E+00	± 9.99E+00	1.16E+01	FE-59		8.08E-01	± 6.69E+00	9.08E+00
CO-60		2.59E+00	± 2.73E+00	2.83E+00	CO-60		1.92E+00	± 2.81E+00	3.54E+00
ZN-65		7.34E-01	± 5.27E+00	6.12E+00	ZN-65		6.40E-01	± 5.92E+00	8.00E+00
ZRNB-95		-2.41E+00	± 6.65E+00	8.08E+00	ZRNB-95		0.00E+00	± 2.60E+00	8.38E+00
I-131		4.05E+00	± 9.65E+00	1.25E+01	I-131		-1.77E+00	± 6.62E+00	9.77E+00
CS-134		-1.27E+00	± 3.16E+00	3.96E+00	CS-134		-3.28E-01	± 3.07E+00	4.27E+00
CS-137		-5.13E-01	± 3.31E+00	4.08E+00	CS-137		-8.50E-01	± 2.93E+00	4.07E+00
BALA140		2.00E+00	± 9.71E+00	1.07E+01	BALA140		2.87E+00	± 7.89E+00	9.97E+00
BI-214	+	9.45E+00	± 6.98E+00	9.20E+00	BI-214		1.97E+00	± 7.32E+00	1.08E+01

Location ST-29 collected 4/1/2016					Location ST-29 collected 5/2/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		4.27E+01	± 4.27E+01	5.28E+01	K-40		3.42E+00	± 4.55E+01	5.41E+01
CR-51		5.15E+00	± 3.68E+01	5.25E+01	CR-51		2.98E+00	± 2.94E+01	3.99E+01
MN-54		0.00E+00	± 1.00E+00	4.63E+00	MN-54		1.59E+00	± 2.88E+00	3.44E+00
CO-58		-2.84E-01	± 3.50E+00	4.67E+00	CO-58		-1.93E+00	± 3.87E+00	4.66E+00
FE-59		1.85E+00	± 1.04E+01	1.33E+01	FE-59		0.00E+00	± 7.86E-01	1.50E+01
CO-60		-1.06E+00	± 3.19E+00	4.02E+00	CO-60		1.61E+00	± 3.01E+00	3.37E+00
ZN-65		-2.13E+00	± 7.51E+00	9.60E+00	ZN-65		-8.56E-01	± 6.06E+00	7.24E+00
ZRNB-95		-1.19E+00	± 6.46E+00	8.53E+00	ZRNB-95		1.85E+00	± 6.17E+00	7.52E+00
I-131		0.00E+00	± 6.45E+00	2.77E+01	I-131		-2.43E+00	± 8.19E+00	1.10E+01
CS-134		-2.01E-01	± 2.63E+00	3.58E+00	CS-134		1.64E+00	± 2.70E+00	3.33E+00
CS-137		1.62E-02	± 3.01E+00	4.12E+00	CS-137		9.04E-01	± 2.65E+00	3.30E+00
BALA140		7.11E+00	± 6.84E+00	7.75E+00	BALA140		0.00E+00	± 2.33E+00	1.21E+01
BI-214		1.92E+00	± 6.96E+00	1.01E+01	BI-214	+	1.24E+01	± 6.40E+00	7.31E+00

Location ST-29 collected 6/1/2016					Location ST-29 collected 6/30/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	8.32E+01	± 3.00E+01	2.80E+01	K-40		1.86E+00	± 3.39E+01	8.27E+01
CR-51		-1.25E+01	± 3.16E+01	4.43E+01	CR-51		-2.61E-01	± 2.94E+01	6.45E+01
MN-54		1.67E-01	± 2.87E+00	3.83E+00	MN-54		-5.95E-01	± 2.84E+00	5.98E+00
CO-58		6.10E-01	± 3.32E+00	4.39E+00	CO-58		1.41E+00	± 2.93E+00	6.19E+00
FE-59		4.54E+00	± 7.91E+00	9.83E+00	FE-59		-3.86E+00	± 1.02E+01	2.10E+01
CO-60		1.21E+00	± 2.51E+00	3.16E+00	CO-60		0.00E+00	± 1.65E+00	6.70E+00
ZN-65		-2.31E+00	± 6.76E+00	8.64E+00	ZN-65		-1.73E+00	± 6.39E+00	1.34E+01
ZRNB-95		3.96E+00	± 5.02E+00	6.38E+00	ZRNB-95		2.20E+00	± 3.90E+00	8.91E+00
I-131		7.49E+00	± 5.92E+00	7.92E+00	I-131		-6.83E+00	± 1.03E+01	2.20E+01
CS-134		-7.97E-02	± 2.78E+00	3.78E+00	CS-134		-7.41E-01	± 2.81E+00	5.81E+00
CS-137		4.84E-01	± 2.95E+00	4.01E+00	CS-137		3.50E+00	± 2.21E+00	4.46E+00
BALA140		3.91E+00	± 6.18E+00	7.36E+00	BALA140		4.21E+00	± 7.20E+00	1.58E+01
BI-214		1.14E+00	± 7.12E+00	1.03E+01	BI-214		0.00E+00	± 6.02E+00	1.60E+01

Table A-7.1

GAMMA SPECTROMETRY RESULTS OF RIVER/DRINKING WATER**Station 26 - Control Station 29 - Indicator**

Results in pCi/liter, corrected for decay during collection period

Location ST-29 collected 8/1/2016				Location ST-29 collected 9/1/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		3.61E+01 ±	3.60E+01	4.23E+01	K-40		3.08E+01 ±	4.26E+01	4.67E+01
CR-51		5.76E+00 ±	2.46E+01	3.64E+01	CR-51		8.53E+00 ±	3.06E+01	4.11E+01
MN-54		2.14E+00 ±	2.43E+00	3.15E+00	MN-54		0.00E+00 ±	9.53E-01	4.09E+00
CO-58		0.00E+00 ±	8.80E-01	5.11E+00	CO-58		-8.66E-01 ±	3.43E+00	4.19E+00
FE-59		-2.93E+00 ±	9.92E+00	1.28E+01	FE-59		2.12E+00 ±	9.20E+00	1.06E+01
CO-60		-6.50E-01 ±	3.72E+00	4.81E+00	CO-60		-8.23E-02 ±	3.04E+00	3.57E+00
ZN-65		-1.76E+00 ±	6.67E+00	8.83E+00	ZN-65		9.92E-01 ±	6.48E+00	7.74E+00
ZRNB-95		-9.27E-01 ±	4.97E+00	7.04E+00	ZRNB-95		1.35E+00 ±	6.26E+00	7.66E+00
I-131		-8.44E-01 ±	7.90E+00	1.18E+01	I-131		-6.22E-01 ±	1.22E+01	1.66E+01
CS-134		8.22E-02 ±	2.77E+00	3.88E+00	CS-134		8.56E-01 ±	2.73E+00	3.43E+00
CS-137		-1.25E+00 ±	2.81E+00	3.86E+00	CS-137		0.00E+00 ±	1.69E+00	4.50E+00
BALA140		-3.54E+00 ±	9.51E+00	1.19E+01	BALA140		-2.39E+00 ±	1.16E+01	1.28E+01
BI-214		5.90E-01 ±	6.71E+00	1.01E+01	BI-214		0.00E+00 ±	6.26E+00	1.03E+01

Location ST-29 collected 9/30/2016				Location ST-29 collected 11/1/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		1.30E+01 ±	3.74E+01	5.62E+01	K-40		5.79E+01 ±	3.29E+01	7.01E+01
CR-51		-1.26E+01 ±	2.97E+01	4.32E+01	CR-51		-2.57E+01 ±	3.30E+01	4.72E+01
MN-54		8.54E-01 ±	2.75E+00	3.72E+00	MN-54		1.06E+00 ±	2.76E+00	3.72E+00
CO-58		-5.87E-02 ±	3.24E+00	4.46E+00	CO-58		0.00E+00 ±	5.71E-01	4.95E+00
FE-59		0.00E+00 ±	4.09E+00	1.48E+01	FE-59		8.28E-01 ±	9.62E+00	1.27E+01
CO-60		7.80E-01 ±	3.07E+00	3.99E+00	CO-60		-3.25E-01 ±	3.85E+00	4.99E+00
ZN-65		1.29E+00 ±	4.95E+00	6.70E+00	ZN-65		-7.72E-01 ±	6.86E+00	9.17E+00
ZRNB-95		-1.65E+00 ±	5.20E+00	7.27E+00	ZRNB-95		-1.53E+00 ±	5.66E+00	7.90E+00
I-131		-2.64E+00 ±	8.54E+00	1.25E+01	I-131		-3.59E-01 ±	7.36E+00	1.10E+01
CS-134		8.22E-01 ±	2.35E+00	3.26E+00	CS-134		3.28E-01 ±	2.67E+00	3.73E+00
CS-137		-1.00E+00 ±	3.01E+00	4.17E+00	CS-137		-1.55E+00 ±	3.25E+00	4.45E+00
BALA140		0.00E+00 ±	1.98E+00	1.12E+01	BALA140		3.71E+00 ±	7.09E+00	8.91E+00
BI-214		1.11E+00 ±	6.34E+00	9.60E+00	BI-214		4.21E+00 ±	6.51E+00	9.60E+00

Location ST-29 collected 11/30/2016				Location ST-29 collected 1/3/2017					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		1.02E+01 ±	4.64E+01	5.26E+01	K-40		3.60E+01 ±	3.97E+01	4.75E+01
CR-51		7.77E+00 ±	2.80E+01	3.76E+01	CR-51		-6.37E-01 ±	2.77E+01	4.14E+01
MN-54		4.05E-01 ±	2.71E+00	3.33E+00	MN-54		-1.64E+00 ±	3.44E+00	4.56E+00
CO-58		1.95E+00 ±	3.34E+00	3.97E+00	CO-58		-1.24E+00 ±	3.35E+00	4.50E+00
FE-59		1.24E+00 ±	8.88E+00	1.03E+01	FE-59		7.20E+00 ±	7.74E+00	9.52E+00
CO-60		-1.03E+00 ±	3.46E+00	3.99E+00	CO-60		-9.10E-01 ±	3.43E+00	4.42E+00
ZN-65		0.00E+00 ±	3.27E+00	8.43E+00	ZN-65		-2.28E+00 ±	6.72E+00	8.85E+00
ZRNB-95		4.30E+00 ±	5.73E+00	6.72E+00	ZRNB-95		2.08E-01 ±	4.76E+00	6.83E+00
I-131		5.10E+00 ±	9.25E+00	1.22E+01	I-131		1.58E-01 ±	8.32E+00	1.24E+01
CS-134		-1.28E+00 ±	3.19E+00	3.99E+00	CS-134		1.64E-01 ±	2.43E+00	3.43E+00
CS-137		-2.03E+00 ±	3.49E+00	4.32E+00	CS-137		0.00E+00 ±	9.79E-01	4.54E+00
BALA140		-1.98E+00 ±	9.73E+00	1.07E+01	BALA140		0.00E+00 ±	2.02E+00	1.14E+01
BI-214		1.97E+00 ±	7.16E+00	9.82E+00	BI-214	+	9.54E+00 ±	6.60E+00	9.35E+00

TABLE A-7.2

GAMMA SPECTROMETRY RESULTS OF RIVER/DRINKING WATER - SUMMARY

Station 26 - Control Station 29 - Indicator

Results in pCi/liter, corrected for decay during collection period

Nuclide		Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
K-40	Ind	3.46E+01	1.86E+00	8.32E+01	5.08E+01	12	3
K-40	Cntl	1.79E+01	1.15E+00	3.36E+01	4.97E+01	12	0
CR-51	Ind	-3.35E+00	-2.57E+01	8.53E+00	4.45E+01	12	0
CR-51	Cntl	3.78E+00	-3.34E+01	2.77E+01	3.94E+01	12	0
MN-54	Ind	2.46E-01	-1.64E+00	2.14E+00	4.00E+00	12	0
MN-54	Cntl	5.84E-02	-1.68E+00	1.60E+00	3.69E+00	12	0
CO-58	Ind	-6.81E-02	-2.00E+00	1.95E+00	4.65E+00	12	0
CO-58	Cntl	-1.95E-01	-2.27E+00	3.20E+00	4.25E+00	12	0
FE-59	Ind	8.59E-01	-3.86E+00	7.20E+00	1.25E+01	12	0
FE-59	Cntl	1.90E+00	-5.05E+00	6.84E+00	1.07E+01	12	0
CO-60	Ind	3.39E-01	-1.06E+00	2.59E+00	4.11E+00	12	0
CO-60	Cntl	8.89E-01	-1.24E+00	3.25E+00	3.56E+00	12	0
ZN-65	Ind	-6.82E-01	-2.31E+00	1.29E+00	8.56E+00	12	0
ZN-65	Cntl	1.02E+00	-3.56E+00	4.03E+00	6.95E+00	12	0
ZRNB-95	Ind	7.58E-01	-2.41E+00	4.30E+00	7.55E+00	12	0
ZRNB-95	Cntl	5.00E-02	-3.34E+00	2.83E+00	7.36E+00	12	0
I-131	Ind	1.09E-01	-6.83E+00	7.49E+00	1.39E+01	12	0
I-131	Cntl	1.83E-01	-5.39E+00	5.49E+00	1.14E+01	12	0
CS-134	Ind	-9.23E-04	-1.28E+00	1.64E+00	3.87E+00	12	0
CS-134	Cntl	-7.32E-01	-2.32E+00	1.13E+00	3.82E+00	12	0
CS-137	Ind	-1.91E-01	-2.03E+00	3.50E+00	4.16E+00	12	0
CS-137	Cntl	-4.94E-01	-1.89E+00	1.11E+00	3.88E+00	12	0
BALA140	Ind	1.33E+00	-3.54E+00	7.11E+00	1.09E+01	12	0
BALA140	Cntl	7.24E-01	-2.88E+00	4.94E+00	9.84E+00	12	0
BI-214	Ind	3.69E+00	0.00E+00	1.24E+01	1.02E+01	12	3
BI-214	Cntl	4.31E+00	0.00E+00	2.70E+01	1.01E+01	12	2

TABLE A-8.1
GAMMA SPECTROMETRY RESULTS OF SOIL

Results in pCi/kilogram

Location and Date			Station 1	6/14/2016
Nuclide	RQ	Activity	Error	MDA
BE-7	+	7.73E+02 ±	2.72E+02	2.67E+02
K-40	+	1.45E+04 ±	1.02E+03	3.05E+02
CR-51		2.20E+01 ±	2.51E+02	3.14E+02
MN-54		3.20E+00 ±	3.20E+01	3.66E+01
CO-58		-1.77E-01 ±	3.03E+01	3.50E+01
FE-59		-2.68E+01 ±	1.26E+02	1.33E+02
CO-60		-1.13E+01 ±	5.20E+01	5.47E+01
ZN-65		5.59E+01 ±	6.25E+01	6.61E+01
ZRNB-95		1.41E+01 ±	6.43E+01	7.23E+01
CS-134		-1.42E+01 ±	3.23E+01	3.71E+01
CS-137	+	1.96E+02 ±	3.52E+01	2.54E+01
BALA140		-2.46E+00 ±	2.97E+01	3.26E+01
BI-214	+	5.90E+02 ±	9.42E+01	7.45E+01

Location and Date			Station 5	6/14/2016
Nuclide	RQ	Activity	Error	MDA
BE-7		1.78E+02 ±	3.61E+02	4.00E+02
K-40	+	1.66E+04 ±	1.27E+03	3.94E+02
CR-51		2.45E+01 ±	2.97E+02	3.51E+02
MN-54		8.07E+00 ±	3.94E+01	4.10E+01
CO-58		1.28E+01 ±	4.34E+01	4.50E+01
FE-59		9.04E+00 ±	1.11E+02	1.09E+02
CO-60		-1.78E+00 ±	5.61E+01	5.55E+01
ZN-65		-4.87E+01 ±	1.21E+02	1.21E+02
ZRNB-95		2.89E+01 ±	6.96E+01	7.14E+01
CS-134		3.20E+01 ±	3.22E+01	3.26E+01
CS-137	+	8.10E+01 ±	3.12E+01	2.60E+01
BALA140		0.00E+00 ±	5.15E+00	7.19E+01
BI-214	+	7.57E+02 ±	1.09E+02	7.64E+01

Location and Date			Station 37	6/14/2016
Nuclide	RQ	Activity	Error	MDA
BE-7		3.42E+02 ±	3.14E+02	3.60E+02
K-40	+	1.77E+04 ±	1.28E+03	3.81E+02
CR-51		5.06E+01 ±	2.97E+02	3.72E+02
MN-54		-7.83E+00 ±	4.50E+01	5.09E+01
CO-58		-1.88E+01 ±	4.54E+01	5.06E+01
FE-59		2.38E+01 ±	9.85E+01	1.08E+02
CO-60		-6.04E+00 ±	5.73E+01	6.13E+01
ZN-65		0.00E+00 ±	1.61E+01	1.34E+02
ZRNB-95		1.47E+01 ±	7.51E+01	8.50E+01
CS-134		0.00E+00 ±	1.17E+01	5.52E+01
CS-137		0.00E+00 ±	9.73E+00	4.96E+01
BALA140		0.00E+00 ±	1.65E+01	6.84E+01
BI-214	+	6.88E+02 ±	1.16E+02	9.31E+01

Location and Date			Station 9a	6/14/2016
Nuclide	RQ	Activity	Error	MDA
BE-7	+	5.29E+02 ±	2.81E+02	3.02E+02
K-40	+	1.35E+04 ±	1.09E+03	3.22E+02
CR-51		-6.37E+01 ±	2.91E+02	3.64E+02
MN-54		-6.71E+00 ±	4.35E+01	4.94E+01
CO-58		-1.53E+01 ±	4.24E+01	4.77E+01
FE-59		9.24E+01 ±	9.65E+01	9.89E+01
CO-60		3.46E+00 ±	5.47E+01	5.88E+01
ZN-65		1.65E+00 ±	9.22E+01	1.03E+02
ZRNB-95		2.01E+00 ±	6.91E+01	7.97E+01
CS-134		-6.93E+00 ±	3.71E+01	4.34E+01
CS-137		2.11E+00 ±	5.13E+01	6.01E+01
BALA140		0.00E+00 ±	5.01E+00	6.61E+01
BI-214	+	6.63E+02 ±	1.03E+02	7.98E+01

Location and Date			Station 21	6/14/2016
Nuclide	RQ	Activity	Error	MDA
BE-7		2.82E+02 ±	2.54E+02	2.90E+02
K-40	+	1.63E+04 ±	1.10E+03	3.51E+02
CR-51		6.49E+01 ±	2.16E+02	2.69E+02
MN-54		1.06E+00 ±	3.17E+01	3.64E+01
CO-58		9.32E+00 ±	3.08E+01	3.48E+01
FE-59		1.17E+01 ±	7.51E+01	8.26E+01
CO-60		9.93E+00 ±	4.43E+01	4.70E+01
ZN-65		4.29E+01 ±	6.11E+01	6.57E+01
ZRNB-95		1.10E+01 ±	5.54E+01	6.29E+01
CS-134		-1.32E+00 ±	3.22E+01	3.76E+01
CS-137		1.18E+01 ±	3.28E+01	3.80E+01
BALA140		6.76E+00 ±	3.03E+01	3.26E+01
BI-214	+	4.20E+02 ±	8.50E+01	7.83E+01

TABLE A-8.2
GAMMA SPECTROMETRY RESULTS OF SOIL - SUMMARY

Results in pCi/kilogram

Nuclide		Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
BALA140	Ind	1.08E+00	-2.46E+00	6.76E+00	5.14E+01	4	0
BALA140	Cntl	0.00E+00	0.00E+00	0.00E+00	6.61E+01	1	0
BE-7	Ind	3.94E+02	1.78E+02	7.73E+02	3.29E+02	4	1
BE-7	Cntl	5.29E+02	5.29E+02	5.29E+02	3.02E+02	1	1
BI-214	Ind	6.14E+02	4.20E+02	7.57E+02	8.06E+01	4	4
BI-214	Cntl	6.63E+02	6.63E+02	6.63E+02	7.98E+01	1	1
CO-58	Ind	8.00E-01	-1.88E+01	1.28E+01	4.13E+01	4	0
CO-58	Cntl	-1.53E+01	-1.53E+01	-1.53E+01	4.77E+01	1	0
CO-60	Ind	-2.31E+00	-1.13E+01	9.93E+00	5.46E+01	4	0
CO-60	Cntl	3.46E+00	3.46E+00	3.46E+00	5.88E+01	1	0
CR-51	Ind	4.05E+01	2.20E+01	6.49E+01	3.26E+02	4	0
CR-51	Cntl	-6.37E+01	-6.37E+01	-6.37E+01	3.64E+02	1	0
CS-134	Ind	4.12E+00	-1.42E+01	3.20E+01	4.06E+01	4	0
CS-134	Cntl	-6.93E+00	-6.93E+00	-6.93E+00	4.34E+01	1	0
CS-137	Ind	7.23E+01	0.00E+00	1.96E+02	3.48E+01	4	2
CS-137	Cntl	2.11E+00	2.11E+00	2.11E+00	6.01E+01	1	0
FE-59	Ind	4.44E+00	-2.68E+01	2.38E+01	1.08E+02	4	0
FE-59	Cntl	9.24E+01	9.24E+01	9.24E+01	9.89E+01	1	0
K-40	Ind	1.63E+04	1.45E+04	1.77E+04	3.58E+02	4	4
K-40	Cntl	1.35E+04	1.35E+04	1.35E+04	3.22E+02	1	1
MN-54	Ind	1.13E+00	-7.83E+00	8.07E+00	4.12E+01	4	0
MN-54	Cntl	-6.71E+00	-6.71E+00	-6.71E+00	4.94E+01	1	0
ZN-65	Ind	1.25E+01	-4.87E+01	5.59E+01	9.67E+01	4	0
ZN-65	Cntl	1.65E+00	1.65E+00	1.65E+00	1.03E+02	1	0
ZRNB-95	Ind	1.72E+01	1.10E+01	2.89E+01	7.29E+01	4	0
ZRNB-95	Cntl	2.01E+00	2.01E+00	2.01E+00	7.97E+01	1	0

TABLE A-9.1
GAMMA SPECTROMETRY RESULTS OF SEDIMENT

Results in pCi/kilogram dry material

Station 34 Downstream Indicator

Location & Date				Station 34	5/2/2016	Location & Date				Station 34	9/30/2016
Nuclide	RQ	Activity	Error	MDA		Nuclide	RQ	Activity	Error	MDA	
BE-7		4.99E+02 ±	5.35E+02	5.97E+02		BE-7		0.00E+00 ±	1.86E+02	3.78E+02	
K-40	+	1.52E+04 ±	1.42E+03	4.00E+02		K-40	+	1.72E+04 ±	1.17E+03	2.79E+02	
CR-51		1.64E+01 ±	5.86E+02	7.12E+02		CR-51		-7.51E+01 ±	2.75E+02	3.43E+02	
MN-54		2.04E+01 ±	5.32E+01	5.89E+01		MN-54		2.55E+01 ±	2.79E+01	3.04E+01	
CO-58		-1.17E+01 ±	7.55E+01	8.32E+01		CO-58		8.30E-01 ±	3.39E+01	3.93E+01	
FE-59		6.12E+01 ±	1.75E+02	1.85E+02		FE-59		1.21E+01 ±	1.14E+02	1.23E+02	
CO-60		1.59E+01 ±	6.88E+01	7.13E+01		CO-60		2.90E+01 ±	5.18E+01	5.45E+01	
ZN-65		7.45E+01 ±	1.34E+02	1.38E+02		ZN-65		7.24E+00 ±	8.12E+01	9.05E+01	
ZRNB-95		5.05E+01 ±	1.09E+02	1.19E+02		ZRNB-95		8.69E+00 ±	6.54E+01	7.46E+01	
CS-134		-1.59E+01 ±	6.34E+01	7.13E+01		CS-134		-3.52E+00 ±	2.67E+01	3.18E+01	
CS-137	+	1.94E+02 ±	7.21E+01	6.81E+01		CS-137	+	1.30E+02 ±	4.31E+01	4.22E+01	
BALA140		3.83E+01 ±	1.12E+02	1.16E+02		BALA140		0.00E+00 ±	5.21E+00	5.49E+01	
BI-214	+	8.88E+02 ±	1.59E+02	1.30E+02		BI-214	+	4.78E+02 ±	9.24E+01	8.27E+01	

Station 33 Upstream Control

Location & Date				Station 33	4/21/2016	Location & Date				Station 33	9/28/2016
Nuclide	RQ	Activity	Error	MDA		Nuclide	RQ	Activity	Error	MDA	
BE-7	+	4.45E+02 ±	2.91E+02	3.39E+02		BE-7		1.37E+02 ±	3.15E+02	3.62E+02	
K-40	+	1.51E+04 ±	1.22E+03	3.52E+02		K-40	+	1.89E+04 ±	1.27E+03	3.89E+02	
CR-51		-4.24E+02 ±	5.51E+02	7.50E+02		CR-51		-2.03E+02 ±	3.61E+02	4.24E+02	
MN-54		1.89E+01 ±	3.92E+01	4.81E+01		MN-54		7.38E+00 ±	4.00E+01	4.39E+01	
CO-58		4.83E+00 ±	4.12E+01	5.22E+01		CO-58		-1.75E+01 ±	4.85E+01	5.23E+01	
FE-59		2.74E+01 ±	1.57E+02	1.83E+02		FE-59		1.72E+01 ±	1.17E+02	1.23E+02	
CO-60		0.00E+00 ±	1.97E+01	5.68E+01		CO-60		-5.26E+00 ±	6.21E+01	6.37E+01	
ZN-65		-7.70E+00 ±	9.99E+01	1.20E+02		ZN-65		3.45E+01 ±	7.21E+01	7.47E+01	
ZRNB-95		1.65E+01 ±	8.33E+01	1.05E+02		ZRNB-95		3.29E+01 ±	6.14E+01	6.65E+01	
CS-134		1.67E+01 ±	2.83E+01	3.53E+01		CS-134		8.18E+00 ±	3.10E+01	3.51E+01	
CS-137		1.70E+01 ±	4.45E+01	5.71E+01		CS-137	+	1.09E+02 ±	3.41E+01	2.92E+01	
BALA140		0.00E+00 ±	5.84E+01	1.92E+02		BALA140		0.00E+00 ±	1.40E+01	6.17E+01	
BI-214	+	6.99E+02 ±	1.09E+02	8.89E+01		BI-214	+	5.09E+02 ±	1.02E+02	9.68E+01	

TABLE A-9.2
GAMMA SPECTROMETRY RESULTS OF SEDIMENT - SUMMARY

Results in pCi/kilogram dry material

Nuclide		Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
BALA140	Ind	1.91E+01	0.00E+00	3.83E+01	8.54E+01	2	0
BALA140	Cntl	0.00E+00	0.00E+00	0.00E+00	1.27E+02	2	0
BE-7	Ind	2.49E+02	0.00E+00	4.99E+02	4.88E+02	2	0
BE-7	Cntl	2.91E+02	1.37E+02	4.45E+02	3.51E+02	2	1
BI-214	Ind	6.83E+02	4.78E+02	8.88E+02	1.06E+02	2	2
BI-214	Cntl	6.04E+02	5.09E+02	6.99E+02	9.29E+01	2	2
CO-58	Ind	-5.46E+00	-1.17E+01	8.30E-01	6.13E+01	2	0
CO-58	Cntl	-6.35E+00	-1.75E+01	4.83E+00	5.22E+01	2	0
CO-60	Ind	2.24E+01	1.59E+01	2.90E+01	6.29E+01	2	0
CO-60	Cntl	-2.63E+00	-5.26E+00	0.00E+00	6.03E+01	2	0
CR-51	Ind	-2.94E+01	-7.51E+01	1.64E+01	5.28E+02	2	0
CR-51	Cntl	-3.14E+02	-4.24E+02	-2.03E+02	5.87E+02	2	0
CS-134	Ind	-9.72E+00	-1.59E+01	-3.52E+00	5.15E+01	2	0
CS-134	Cntl	1.24E+01	8.18E+00	1.67E+01	3.52E+01	2	0
CS-137	Ind	1.62E+02	1.30E+02	1.94E+02	5.51E+01	2	2
CS-137	Cntl	6.30E+01	1.70E+01	1.09E+02	4.32E+01	2	1
FE-59	Ind	3.66E+01	1.21E+01	6.12E+01	1.54E+02	2	0
FE-59	Cntl	2.23E+01	1.72E+01	2.74E+01	1.53E+02	2	0
K-40	Ind	1.62E+04	1.52E+04	1.72E+04	3.40E+02	2	2
K-40	Cntl	1.70E+04	1.51E+04	1.89E+04	3.71E+02	2	2
MN-54	Ind	2.29E+01	2.04E+01	2.55E+01	4.46E+01	2	0
MN-54	Cntl	1.31E+01	7.38E+00	1.89E+01	4.60E+01	2	0
ZN-65	Ind	4.09E+01	7.24E+00	7.45E+01	1.14E+02	2	0
ZN-65	Cntl	1.34E+01	-7.70E+00	3.45E+01	9.74E+01	2	0
ZRNB-95	Ind	2.96E+01	8.69E+00	5.05E+01	9.68E+01	2	0
ZRNB-95	Cntl	2.47E+01	1.65E+01	3.29E+01	8.58E+01	2	0

TABLE A-10.1
GAMMA SPECTROMETRY RESULTS OF FISH
 Station 30 Columbia River - Station 38 Snake River
 Results in pCi/kilogram (wet)

Location & Species	Collection Date	Nuclide	RQ	Activity	Error	MDA
Steelhead Station 30 Indicator	10/04/16	K-40	+	3.06E+03	± 3.93E+02	2.15E+02
		MN-54		1.30E+01	± 1.38E+01	1.57E+01
		CO-58		1.30E+01	± 1.38E+01	1.57E+01
		FE-59		1.12E+01	± 3.68E+01	4.26E+01
		CO-60		-6.33E+00	± 2.44E+01	2.88E+01
		ZN-65		-1.02E+01	± 4.35E+01	5.30E+01
		ZRNB-95		1.07E+01	± 2.61E+01	3.30E+01
		CS-134		8.47E+00	± 1.32E+01	1.64E+01
		CS-137		1.04E+01	± 2.04E+01	2.59E+01
		Bi-214	+	2.42E+02	± 4.83E+01	4.54E+01
Bass Station 30 Indicator	09/09/16	K-40	+	4.56E+03	± 5.53E+02	3.28E+02
		MN-54		-7.53E-01	± 2.29E+01	2.84E+01
		CO-58		1.41E+01	± 2.36E+01	2.76E+01
		FE-59		-3.12E+01	± 9.43E+01	1.08E+02
		CO-60		3.57E-01	± 2.63E+01	3.09E+01
		ZN-65		3.06E+01	± 3.92E+01	4.31E+01
		ZRNB-95		-1.14E+01	± 5.05E+01	6.16E+01
		CS-134		1.40E+01	± 2.02E+01	2.46E+01
		CS-137		1.01E+01	± 2.03E+01	2.49E+01
		Bi-214		4.07E+01	± 4.90E+01	5.95E+01
Walleye Station 30 Indicator	12/27/16	K-40	+	3.66E+03	± 4.73E+02	2.78E+02
		MN-54		2.99E+00	± 1.85E+01	2.33E+01
		CO-58		3.42E+00	± 1.53E+01	1.91E+01
		FE-59		-8.28E+00	± 4.60E+01	5.44E+01
		CO-60		8.09E+00	± 2.06E+01	2.38E+01
		ZN-65		-1.51E+01	± 4.59E+01	5.53E+01
		ZRNB-95		5.93E+00	± 2.47E+01	3.16E+01
		CS-134		2.08E+00	± 1.60E+01	2.09E+01
		CS-137		4.26E-01	± 2.18E+01	2.87E+01
		Bi-214	+	8.43E+01	± 4.30E+01	5.31E+01

TABLE A-10.1
GAMMA SPECTROMETRY RESULTS OF FISH
 Station 30 Columbia River - Station 38 Snake River
 Results in pCi/kilogram (wet)

Location & Species	Collection Date	Nuclide	RQ	Activity	Error	MDA
Steelhead Station 38 Control	12/13/16	K-40	+	3.51E+03	± 4.22E+02	2.18E+02
		MN-54		-6.75E+00	± 1.94E+01	2.34E+01
		CO-58		8.69E-01	± 1.64E+01	2.02E+01
		FE-59		0.00E+00	± 1.18E+01	8.56E+01
		CO-60		3.77E+00	± 2.04E+01	2.36E+01
		ZN-65		0.00E+00	± 1.18E+01	5.22E+01
		ZRNB-95		-5.11E+00	± 3.36E+01	4.11E+01
		CS-134		4.74E+00	± 1.78E+01	2.23E+01
		CS-137		5.60E+00	± 2.07E+01	2.60E+01
		Bi-214	+	5.75E+01	± 4.29E+01	5.50E+01
Bass Station 38 Control	07/31/16	K-40	+	4.45E+03	± 5.26E+02	2.84E+02
		MN-54		-1.56E+00	± 2.39E+01	2.95E+01
		CO-58		-4.53E+00	± 4.14E+01	5.10E+01
		FE-59		-1.54E+01	± 1.65E+02	1.92E+02
		CO-60		2.66E+00	± 2.83E+01	3.30E+01
		ZN-65		-1.93E+01	± 6.44E+01	7.60E+01
		ZRNB-95		2.73E+01	± 7.05E+01	8.45E+01
		CS-134		-1.68E+01	± 2.73E+01	3.36E+01
		CS-137		-1.21E+00	± 2.60E+01	3.32E+01
		Bi-214		6.86E+01	± 5.65E+01	7.35E+01
Walleye Station 38 Control	10/18/16	K-40	+	3.16E+03	± 3.59E+02	2.34E+02
		MN-54		1.04E+01	± 1.02E+01	1.30E+01
		CO-58		-1.74E+00	± 1.91E+01	2.65E+01
		FE-59		3.28E+01	± 4.86E+01	6.20E+01
		CO-60		8.85E+00	± 1.56E+01	1.98E+01
		ZN-65		-2.19E+01	± 4.53E+01	5.86E+01
		ZRNB-95		7.19E+00	± 2.00E+01	2.90E+01
		CS-134		-2.42E-01	± 1.39E+01	1.97E+01
		CS-137		1.24E+01	± 1.47E+01	1.97E+01
		Bi-214		9.96E+00	± 3.28E+01	4.52E+01

TABLE A-10.2
GAMMA SPECTROMETRY RESULTS OF FISH - SUMMARY

Results in pCi/kilogram (wet)

Nuclide		Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
Bi-214	Ind	1.22E+02	4.07E+01	2.42E+02	5.26E+01	3	2
Bi-214	Cntl	4.54E+01	9.96E+00	6.86E+01	5.79E+01	3	1
CO-58	Ind	1.02E+01	3.42E+00	1.41E+01	2.08E+01	3	0
CO-58	Cntl	-1.80E+00	-4.53E+00	8.69E-01	3.26E+01	3	0
CO-60	Ind	7.04E-01	-6.33E+00	8.09E+00	2.79E+01	3	0
CO-60	Cntl	5.09E+00	2.66E+00	8.85E+00	2.55E+01	3	0
CS-134	Ind	8.17E+00	2.08E+00	1.40E+01	2.06E+01	3	0
CS-134	Cntl	-4.10E+00	-1.68E+01	4.74E+00	2.52E+01	3	0
CS-137	Ind	6.97E+00	4.26E-01	1.04E+01	2.65E+01	3	0
CS-137	Cntl	5.60E+00	-1.21E+00	1.24E+01	2.63E+01	3	0
FE-59	Ind	-9.43E+00	-3.12E+01	1.12E+01	6.83E+01	3	0
FE-59	Cntl	5.81E+00	-1.54E+01	3.28E+01	1.13E+02	3	0
K-40	Ind	3.76E+03	3.06E+03	4.56E+03	2.74E+02	3	3
K-40	Cntl	3.71E+03	3.16E+03	4.45E+03	2.46E+02	3	3
MN-54	Ind	5.07E+00	-7.53E-01	1.30E+01	2.25E+01	3	0
MN-54	Cntl	6.82E-01	-6.75E+00	1.04E+01	2.20E+01	3	0
ZN-65	Ind	1.74E+00	-1.51E+01	3.06E+01	5.05E+01	3	0
ZN-65	Cntl	-1.37E+01	-2.19E+01	0.00E+00	6.23E+01	3	0
ZRNB-95	Ind	1.74E+00	-1.14E+01	1.07E+01	4.21E+01	3	0
ZRNB-95	Cntl	9.79E+00	-5.11E+00	2.73E+01	5.15E+01	3	0

TABLE A-11.1
IODINE-131 IN MILK

Results in pCi/liter, decay corrected to sample collection time

Collection Date	Station 36 Indicator				Station 9B Control			
	RQ	I-131 Activity	Error	I-131 MDA	RQ	I-131 Activity	Error	I-131 MDA
01/12/16		-3.10E-03	± 2.91E-01	3.19E-01		-5.99E-02	± 1.91E-04	3.48E-01
02/09/16		-1.63E-01	± 2.28E-01	3.15E-01		1.69E-02	± 5.16E-05	3.35E-01
03/08/16		-6.49E-02	± 3.01E-01	3.41E-01		2.66E-02	± 5.95E-05	3.16E-01
04/05/16		-5.07E-02	± 2.66E-01	3.01E-01		7.69E-02	± 2.13E-04	3.13E-01
04/19/16		1.12E-01	± 2.04E-01	2.84E-01		-9.27E-02	± 2.81E-04	3.43E-01
05/10/16		-4.59E-02	± 2.62E-01	2.97E-01		1.17E-02	± 2.29E-05	2.77E-01
05/24/16		1.34E-01	± 2.13E-01	2.95E-01		3.96E-02	± 1.12E-04	3.22E-01
06/07/16		-1.47E-01	± 3.07E-01	3.46E-01		1.52E-01	± 3.08E-04	2.80E-01
06/21/16		4.92E-02	± 2.81E-01	3.19E-01		2.45E-02	± 5.23E-05	3.01E-01
07/05/16		1.48E-01	± 2.02E-01	2.79E-01		-1.94E-02	± 4.53E-05	3.29E-01
07/19/16		8.33E-02	± 4.29E-01	6.04E-01				
08/09/16		-8.81E-02	± 2.72E-01	3.07E-01		6.30E-02	± 1.26E-04	2.88E-01
08/23/16		-8.64E-02	± 2.68E-01	3.03E-01				
09/06/16		-9.77E-03	± 2.80E-01	3.19E-01		1.04E-02	± 2.28E-05	3.11E-01
09/20/16		2.12E-01	± 2.51E-01	2.79E-01				
10/11/16		-1.34E-01	± 2.82E-01	3.18E-01		-4.42E-02	± 1.34E-04	3.44E-01
11/08/16		-1.69E-01	± 3.05E-01	3.43E-01		-2.04E-01	± 4.92E-04	3.32E-01
12/06/16		-1.46E-01	± 2.80E-01	3.15E-01		-1.74E-02	± 5.03E-05	3.30E-01

TABLE A-11.2
IODINE-131 IN MILK

Summary

Results in pCi/liter, decay corrected to sample collection time

Location	Average Activity	Activity Low	Activity High	Average MDA	Number Samples	Number Positive IDs
Indicator- St 36	-2.06E-02	-1.69E-01	2.12E-01	3.27E-01	18	0
Control - St 9b	-1.13E-03	-2.04E-01	1.52E-01	3.18E-01	15	0

NOTE: Starting in July 2016, control milk samples are collected once per month.

TABLE A-12.1
GAMMA SPECTROMETRY RESULTS OF MILK
STATION 36 - Indicator
 Results in pCi per liter

Collection Date: 1/12/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		5.31E-01 ±	4.32E+00	6.57E+00
CO-60		0.00E+00 ±	2.52E+00	7.03E+00
ZN-65		6.10E+00 ±	1.00E+01	1.31E+01
MN-54		0.00E+00 ±	1.90E+00	6.73E+00
CS-134		-4.49E-01 ±	4.62E+00	6.56E+00
CS-137		-2.77E+00 ±	5.88E+00	8.09E+00
BALA140		2.46E+00 ±	3.99E+00	5.17E+00
K-40	+	1.38E+03 ±	1.48E+02	8.63E+01
FE-59		-7.23E-01 ±	1.45E+01	1.95E+01
ZRNB-95		4.21E+00 ±	7.57E+00	1.05E+01
BE-7		-3.59E+00 ±	3.40E+01	5.00E+01

Collection Date: 2/9/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		-8.44E-01 ±	4.82E+00	6.72E+00
CO-60		2.99E+00 ±	4.86E+00	5.39E+00
ZN-65		-3.46E+00 ±	1.21E+01	1.47E+01
MN-54		1.12E-01 ±	4.79E+00	6.11E+00
CS-134		1.71E+00 ±	4.08E+00	5.19E+00
CS-137		-5.55E-01 ±	5.70E+00	7.48E+00
BALA140		1.33E+00 ±	5.11E+00	5.76E+00
K-40	+	1.34E+03 ±	1.46E+02	7.80E+01
FE-59		5.06E+00 ±	1.24E+01	1.43E+01
ZRNB-95		1.53E+00 ±	7.30E+00	9.42E+00
BE-7		1.96E+01 ±	3.43E+01	4.45E+01

Collection Date: 3/8/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		-1.34E+00 ±	4.39E+00	6.57E+00
CO-60		1.58E+00 ±	6.46E+00	8.49E+00
ZN-65		7.91E+00 ±	8.33E+00	1.05E+01
MN-54		3.73E+00 ±	3.67E+00	4.69E+00
CS-134		6.29E-01 ±	4.64E+00	6.56E+00
CS-137		1.89E+00 ±	5.43E+00	7.58E+00
BALA140		3.25E+00 ±	4.14E+00	5.16E+00
K-40	+	1.37E+03 ±	1.46E+02	8.51E+01
FE-59		-2.53E+00 ±	1.58E+01	2.09E+01
ZRNB-95		3.25E+00 ±	6.07E+00	8.50E+00
BE-7		-7.42E+00 ±	3.85E+01	5.58E+01

Collection Date: 4/5/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		-2.68E-01 ±	5.47E+00	7.44E+00
CO-60		0.00E+00 ±	3.39E+00	9.84E+00
ZN-65		2.52E+00 ±	1.05E+01	1.24E+01
MN-54		0.00E+00 ±	1.61E+00	7.32E+00
CS-134		0.00E+00 ±	2.62E+00	5.95E+00
CS-137		3.10E-01 ±	4.70E+00	5.98E+00
BALA140		0.00E+00 ±	1.13E+00	9.78E+00
K-40	+	1.36E+03 ±	1.40E+02	4.46E+01
FE-59		7.37E-01 ±	1.57E+01	1.84E+01
ZRNB-95		-3.12E+00 ±	1.03E+01	1.26E+01
BE-7		-3.04E+00 ±	3.19E+01	4.18E+01

Collection Date: 4/19/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		4.09E+00 ±	3.86E+00	5.38E+00
CO-60		1.42E+00 ±	4.65E+00	6.25E+00
ZN-65		0.00E+00 ±	4.37E+00	1.42E+01
MN-54		-8.96E-01 ±	4.00E+00	5.61E+00
CS-134		4.49E-01 ±	4.92E+00	6.95E+00
CS-137		1.33E+00 ±	3.74E+00	5.34E+00
BALA140		2.00E-01 ±	6.04E+00	8.17E+00
K-40	+	1.26E+03 ±	1.40E+02	8.12E+01
FE-59		-2.17E+00 ±	1.47E+01	1.95E+01
ZRNB-95		-3.83E-01 ±	7.18E+00	1.05E+01
BE-7		-1.56E+01 ±	3.71E+01	5.30E+01

Collection Date: 5/10/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		4.35E+00 ±	4.36E+00	7.30E+00
CO-60		0.00E+00 ±	8.08E+00	1.03E+01
ZN-65		0.00E+00 ±	1.61E+01	2.06E+01
MN-54		0.00E+00 ±	2.38E+00	4.43E+00
CS-134		-1.76E+00 ±	3.49E+00	5.94E+00
CS-137		7.33E-01 ±	3.10E+00	5.55E+00
BALA140		7.52E+00 ±	3.56E+00	1.15E+01
K-40	+	1.44E+03 ±	1.55E+02	8.27E+01
FE-59		3.45E+00 ±	1.32E+01	1.71E+01
ZRNB-95		-1.86E+00 ±	9.77E+00	1.31E+01
BE-7		9.85E+00 ±	3.32E+01	4.56E+01

TABLE A-12.1
GAMMA SPECTROMETRY RESULTS OF MILK
STATION 36 - Indicator
 Results in pCi per liter

Collection Date: 5/24/2016

Nuclide	RQ	Activity	Error	MDA
BA-133		-2.28E+00 ±	5.61E+00	8.00E+00
CO-60		3.90E+00 ±	3.57E+00	4.16E+00
ZN-65		2.24E+00 ±	9.41E+00	1.26E+01
MN-54		0.00E+00 ±	2.46E+00	7.62E+00
CS-134		3.62E+00 ±	3.92E+00	5.07E+00
CS-137		1.66E+00 ±	4.54E+00	6.23E+00
BALA140		4.01E-01 ±	5.57E+00	7.28E+00
K-40	+	1.39E+03 ±	1.47E+02	6.97E+01
FE-59		-3.68E+00 ±	1.60E+01	2.05E+01
ZRNB-95		2.13E+00 ±	6.36E+00	8.67E+00
BE-7		2.05E+01 ±	2.87E+01	3.92E+01

Collection Date: 6/7/2016

Nuclide	RQ	Activity	Error	MDA
BA-133		-2.50E-01 ±	4.88E+00	6.88E+00
CO-60		1.87E+00 ±	5.44E+00	6.33E+00
ZN-65		3.37E+00 ±	9.71E+00	1.16E+01
MN-54		2.98E-01 ±	4.53E+00	5.76E+00
CS-134		-2.52E+00 ±	5.20E+00	6.64E+00
CS-137		6.66E-01 ±	4.21E+00	5.46E+00
BALA140		-1.99E-01 ±	6.00E+00	7.04E+00
K-40	+	1.22E+03 ±	1.36E+02	7.49E+01
FE-59		1.81E+00 ±	1.05E+01	1.23E+01
ZRNB-95		0.00E+00 ±	2.65E+00	1.25E+01
BE-7		1.22E+01 ±	2.74E+01	3.56E+01

Collection Date: 6/21/2016

Nuclide	RQ	Activity	Error	MDA
BA-133		-3.35E-02 ±	4.39E+00	6.00E+00
CO-60		-2.01E+00 ±	6.93E+00	7.95E+00
ZN-65		-4.48E+00 ±	1.33E+01	1.56E+01
MN-54		-5.03E-01 ±	4.74E+00	5.83E+00
CS-134		8.81E-01 ±	4.32E+00	5.43E+00
CS-137		-1.12E+00 ±	4.49E+00	5.59E+00
BALA140		-4.00E-01 ±	5.56E+00	6.16E+00
K-40	+	1.50E+03 ±	1.47E+02	4.46E+01
FE-59		9.32E+00 ±	1.38E+01	4.44E+01
ZRNB-95		5.25E+00 ±	7.40E+00	8.46E+00
BE-7		-7.59E+00 ±	3.80E+01	4.94E+01

Collection Date: 7/5/2016

Nuclide	RQ	Activity	Error	MDA
BA-133		-3.00E+00 ±	5.88E+00	8.56E+00
CO-60		1.63E+00 ±	2.61E+00	4.18E+01
ZN-65		3.91E+00 ±	9.77E+00	1.31E+01
MN-54		7.46E-02 ±	4.51E+00	6.38E+00
CS-134		-5.39E-01 ±	4.48E+00	6.35E+00
CS-137		-1.55E+00 ±	5.20E+00	7.30E+00
BALA140		6.64E-02 ±	3.48E+00	5.16E+00
K-40	+	1.26E+03 ±	1.45E+02	9.20E+01
FE-59		0.00E+00 ±	2.89E+00	2.22E+01
ZRNB-95		5.74E-01 ±	7.62E+00	1.11E+01
BE-7		1.56E+01 ±	3.28E+01	4.68E+01

Collection Date: 7/19/2016

Nuclide	RQ	Activity	Error	MDA
BA-133		3.48E+00 ±	4.20E+00	5.26E+00
CO-60		2.45E+00 ±	7.42E+00	8.50E+00
ZN-65		1.15E+01 ±	1.14E+01	1.24E+01
MN-54		2.32E+00 ±	4.59E+00	5.40E+00
CS-134		-9.12E-01 ±	4.91E+00	6.20E+00
CS-137		0.00E+00 ±	2.54E+00	7.01E+00
BALA140		3.02E+00 ±	4.49E+00	5.48E+00
K-40	+	1.94E+03 ±	1.73E+02	6.02E+01
FE-59		5.65E+00 ±	1.34E+01	1.51E+01
ZRNB-95		-8.64E-01 ±	8.14E+00	1.00E+01
BE-7		-1.22E+01 ±	4.33E+01	5.61E+01

Collection Date: 8/9/2016

Nuclide	RQ	Activity	Error	MDA
BA-133		-8.75E-01 ±	4.71E+00	7.08E+00
CO-60		-3.30E+00 ±	8.01E+00	1.02E+01
ZN-65		1.64E+00 ±	1.04E+01	1.42E+01
MN-54		-2.99E-01 ±	5.06E+00	7.07E+00
CS-134		2.70E-01 ±	3.95E+00	5.69E+00
CS-137		-1.11E-01 ±	4.40E+00	6.40E+00
BALA140		9.30E-01 ±	5.04E+00	6.85E+00
K-40	+	1.21E+03 ±	1.36E+02	7.84E+01
FE-59		0.00E+00 ±	5.78E+00	2.22E+01
ZRNB-95		4.21E+00 ±	5.65E+00	7.71E+00
BE-7		-1.67E+00 ±	3.81E+01	5.58E+01

TABLE A-12.1
GAMMA SPECTROMETRY RESULTS OF MILK
STATION 36 - Indicator
 Results in pCi per liter

Collection Date: 8/23/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		2.21E+00 ±	4.43E+00	5.76E+00
CO-60		3.19E+00 ±	6.03E+00	6.72E+00
ZN-65		5.60E-01 ±	1.30E+01	1.56E+01
MN-54		-2.21E+00 ±	5.51E+00	6.62E+00
CS-134		2.55E+00 ±	4.26E+00	5.15E+00
CS-137		5.42E-01 ±	4.73E+00	5.98E+00
BALA140		0.00E+00 ±	1.96E+00	8.72E+00
K-40	+	1.45E+03 ±	1.52E+02	6.94E+01
FE-59		4.78E+00 ±	1.17E+01	1.30E+01
ZRNB-95		0.00E+00 ±	1.59E+00	1.46E+01
BE-7		0.00E+00 ±	1.05E+01	6.33E+01

Collection Date: 9/6/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		-2.95E+00 ±	5.92E+00	7.80E+00
CO-60		2.01E+00 ±	5.91E+00	6.72E+00
ZN-65		4.76E+00 ±	8.57E+00	9.57E+00
MN-54		1.32E+00 ±	5.14E+00	6.24E+00
CS-134		-5.98E-01 ±	4.50E+00	5.70E+00
CS-137		-1.12E+00 ±	4.49E+00	5.59E+00
BALA140		3.02E+00 ±	4.50E+00	5.50E+00
K-40	+	1.51E+03 ±	1.56E+02	6.81E+01
FE-59		-2.46E+00 ±	1.31E+01	1.51E+01
ZRNB-95		0.00E+00 ±	1.13E+00	1.14E+01
BE-7		-1.52E+00 ±	2.85E+01	3.74E+01

Collection Date: 9/20/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		-1.00E-01 ±	4.73E+00	6.44E+00
CO-60		4.85E+00 ±	5.03E+00	5.21E+00
ZN-65		0.00E+00 ±	5.71E+00	1.75E+01
MN-54		-2.48E+00 ±	5.82E+00	6.98E+00
CS-134		2.77E+00 ±	4.49E+00	5.43E+00
CS-137		-3.99E+00 ±	7.08E+00	8.72E+00
BALA140		5.24E+00 ±	2.92E+00	7.60E+00
K-40	+	1.59E+03 ±	1.52E+02	4.46E+01
FE-59		-5.04E+00 ±	1.74E+01	2.00E+01
ZRNB-95		1.20E+00 ±	7.59E+00	9.28E+00
BE-7		-7.61E-01 ±	3.33E+01	4.39E+01

Collection Date: 10/11/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		0.00E+00 ±	1.80E+00	8.15E+00
CO-60		2.21E+00 ±	4.71E+00	5.21E+00
ZN-65		0.00E+00 ±	2.24E+00	1.66E+01
MN-54		-1.94E-01 ±	3.99E+00	4.93E+00
CS-134		-8.81E-01 ±	5.09E+00	6.43E+00
CS-137		0.00E+00 ±	1.86E+00	8.19E+00
BALA140		-2.02E-01 ±	6.84E+00	7.64E+00
K-40	+	1.46E+03 ±	1.49E+02	5.75E+01
FE-59		0.00E+00 ±	1.48E+00	1.69E+01
ZRNB-95		0.00E+00 ±	1.60E+00	1.37E+01
BE-7		-1.22E+01 ±	3.85E+01	4.96E+01

Collection Date: 11/8/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		-3.44E-01 ±	4.55E+00	6.92E+00
CO-60		-8.62E-01 ±	6.70E+00	8.81E+00
ZN-65		0.00E+00 ±	1.09E+00	1.52E+01
MN-54		5.97E-01 ±	5.09E+00	7.07E+00
CS-134		-8.09E-01 ±	4.65E+00	6.56E+00
CS-137		-2.44E+00 ±	5.27E+00	7.30E+00
BALA140		8.61E-01 ±	3.64E+00	5.15E+00
K-40	+	1.30E+03 ±	1.45E+02	8.84E+01
FE-59		0.00E+00 ±	6.78E+00	2.22E+01
ZRNB-95		7.65E-01 ±	6.27E+00	9.21E+00
BE-7		-1.15E+01 ±	3.78E+01	5.44E+01

Collection Date: 12/6/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		3.43E-01 ±	7.10E-01	8.15E+00
CO-60		5.04E+00 ±	4.44E+00	5.69E+00
ZN-65		3.82E+00 ±	1.06E+01	1.42E+01
MN-54		-1.16E+00 ±	5.38E+00	7.38E+00
CS-134		8.99E-01 ±	3.65E+00	6.35E+00
CS-137		5.55E-01 ±	3.59E+00	6.40E+00
BALA140		2.38E+00 ±	4.22E+00	1.02E+01
K-40	+	1.37E+03 ±	1.45E+02	8.17E+01
FE-59		0.00E+00 ±	1.77E+01	2.34E+01
ZRNB-95		-4.10E-02 ±	9.85E-02	1.05E+01
BE-7		4.78E+00 ±	3.52E+01	5.15E+01

TABLE A-12.1
GAMMA SPECTROMETRY RESULTS OF MILK
STATION 9b - Control
 Results in pCi per liter

Collection Date: 1/12/2016					Collection Date: 2/9/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BA-133		-1.48E+00 ±	4.47E+00	6.15E+00	BA-133		-4.97E-01 ±	5.75E+00	8.10E+00
CO-60		1.26E+00 ±	5.28E+00	6.20E+00	CO-60		1.06E-01 ±	5.88E+00	7.62E+00
ZN-65		6.08E+00 ±	9.99E+00	1.16E+01	ZN-65		-4.64E-01 ±	1.28E+01	1.66E+01
MN-54		0.00E+00 ±	1.89E+00	6.43E+00	MN-54		0.00E+00 ±	1.13E+00	8.24E+00
CS-134		1.28E+00 ±	3.71E+00	4.90E+00	CS-134		2.81E-01 ±	4.02E+00	5.63E+00
CS-137		-3.64E+00 ±	6.58E+00	8.36E+00	CS-137		1.15E-01 ±	5.29E+00	7.20E+00
BALA140		0.00E+00 ±	8.04E-01	7.12E+00	BALA140		0.00E+00 ±	8.03E-01	1.09E+01
K-40	+	1.56E+03 ±	1.58E+02	7.90E+01	K-40	+	1.39E+03 ±	1.54E+02	1.00E+02
FE-59		3.62E+00 ±	8.95E+00	1.01E+01	FE-59		-6.36E+00 ±	1.85E+01	2.33E+01
ZRNB-95		-3.05E+00 ±	8.97E+00	1.15E+01	ZRNB-95		-2.64E+00 ±	9.80E+00	1.30E+01
BE-7		-5.94E+00 ±	3.30E+01	4.60E+01	BE-7		7.54E-01 ±	3.23E+01	4.54E+01

Collection Date: 3/8/2016					Collection Date: 4/5/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BA-133		-6.36E-01 ±	5.36E+00	7.25E+00	BA-133		-7.00E-01 ±	6.37E+00	8.91E+00
CO-60		-1.28E+00 ±	6.94E+00	8.03E+00	CO-60		-2.21E+00 ±	7.83E+00	9.84E+00
ZN-65		-4.76E+00 ±	1.41E+01	1.66E+01	ZN-65		4.02E+00 ±	1.32E+01	1.67E+01
MN-54		-7.36E-01 ±	4.77E+00	5.84E+00	MN-54		9.28E-01 ±	4.44E+00	6.04E+00
CS-134		-9.44E-01 ±	4.73E+00	5.95E+00	CS-134		-1.19E+00 ±	5.44E+00	7.38E+00
CS-137		6.58E-01 ±	3.78E+00	4.73E+00	CS-137		1.08E+00 ±	5.10E+00	6.86E+00
BALA140		0.00E+00 ±	1.14E+00	7.62E+00	BALA140		-1.42E+00 ±	7.00E+00	8.78E+00
K-40	+	1.29E+03 ±	1.38E+02	5.17E+01	K-40	+	1.56E+03 ±	1.55E+02	6.87E+01
FE-59		-6.40E+00 ±	1.86E+01	2.13E+01	FE-59		1.07E+01 ±	1.25E+01	1.51E+01
ZRNB-95		-2.66E+00 ±	9.86E+00	1.20E+01	ZRNB-95		6.64E-01 ±	8.67E+00	1.18E+01
BE-7		0.00E+00 ±	1.14E+01	5.92E+01	BE-7		-1.87E+01 ±	4.44E+01	5.94E+01

Collection Date: 4/19/2016					Collection Date: 5/10/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BA-133		1.51E+00 ±	4.84E+00	7.00E+00	BA-133		1.78E+00 ±	4.89E+00	7.25E+00
CO-60		2.35E+00 ±	4.31E+00	5.52E+00	CO-60		-7.88E-01 ±	5.84E+00	7.82E+00
ZN-65		8.41E+00 ±	7.79E+00	9.35E+00	ZN-65		-3.09E+00 ±	1.34E+01	1.79E+01
MN-54		-1.70E+00 ±	5.18E+00	6.88E+00	MN-54		1.34E+00 ±	4.05E+00	5.61E+00
CS-134		1.57E-01 ±	4.47E+00	6.22E+00	CS-134		-8.99E-02 ±	3.94E+00	5.69E+00
CS-137		0.00E+00 ±	2.46E+00	9.10E+00	CS-137		-3.33E-01 ±	5.69E+00	8.09E+00
BALA140		4.05E-01 ±	5.63E+00	7.36E+00	BALA140		0.00E+00 ±	1.14E+00	9.35E+00
K-40	+	1.60E+03 ±	1.58E+02	7.39E+01	K-40	+	1.45E+03 ±	1.51E+02	8.51E+01
FE-59		4.92E+00 ±	1.34E+01	1.71E+01	FE-59		9.43E+00 ±	9.87E+00	1.21E+01
ZRNB-95		-4.66E-01 ±	8.12E+00	1.11E+01	ZRNB-95		1.15E+00 ±	7.27E+00	1.05E+01
BE-7		1.75E+01 ±	3.18E+01	4.40E+01	BE-7		1.34E+01 ±	2.90E+01	4.16E+01

TABLE A-12.1
GAMMA SPECTROMETRY RESULTS OF MILK
STATION 9b - Control
 Results in pCi per liter

Collection Date: 5/24/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		2.75E+00 ±	5.18E+00	8.18E+00
CO-60		1.09E+00 ±	1.74E+00	8.13E+00
ZN-65		1.68E+00 ±	7.68E+00	2.30E+01
MN-54		1.18E+00 ±	3.19E+00	9.36E+00
CS-134		1.16E+00 ±	3.07E+00	8.63E+00
CS-137		3.09E+00 ±	2.40E+00	6.71E+00
BALA140		3.88E+00 ±	2.68E+00	9.01E+00
K-40	+	1.34E+03 ±	1.39E+02	9.96E+01
FE-59		9.53E+00 ±	9.68E+00	2.24E+01
ZRNB-95		0.00E+00 ±	8.63E+00	1.66E+01
BE-7		3.84E+00 ±	2.65E+01	7.48E+01

Collection Date: 6/7/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		6.70E-01 ±	4.93E+00	6.65E+00
CO-60		2.21E+00 ±	4.71E+00	5.21E+00
ZN-65		-2.52E+00 ±	1.23E+01	1.46E+01
MN-54		-2.09E+00 ±	6.31E+00	7.64E+00
CS-134		1.45E+00 ±	4.37E+00	5.43E+00
CS-137		0.00E+00 ±	2.54E+00	7.62E+00
BALA140		-1.01E+00 ±	6.93E+00	7.63E+00
K-40	+	1.42E+03 ±	1.45E+02	5.13E+01
FE-59		1.97E+00 ±	1.30E+01	1.51E+01
ZRNB-95		4.46E+00 ±	7.32E+00	8.48E+00
BE-7		-3.04E+00 ±	3.78E+01	4.96E+01

Collection Date: 6/21/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		2.22E+00 ±	4.47E+00	6.57E+00
CO-60		-2.30E+00 ±	7.59E+00	9.76E+00
ZN-65		1.09E+00 ±	1.03E+01	1.42E+01
MN-54		-3.36E-01 ±	4.81E+00	6.74E+00
CS-134		0.00E+00 ±	8.81E-01	7.67E+00
CS-137		2.22E-01 ±	4.64E+00	6.72E+00
BALA140		0.00E+00 ±	1.96E+00	1.02E+01
K-40	+	1.60E+03 ±	1.55E+02	7.67E+01
FE-59		3.98E+00 ±	1.36E+01	4.44E+01
ZRNB-95		7.66E-01 ±	6.28E+00	9.22E+00
BE-7		5.03E+00 ±	3.41E+01	5.00E+01

Collection Date: 7/5/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		-9.06E-01 ±	5.25E+00	7.86E+00
CO-60		-1.44E+01 ±	7.04E+00	9.30E+00
ZN-65		9.10E-02 ±	9.34E+00	1.31E+01
MN-54		-5.23E-01 ±	5.08E+00	7.07E+00
CS-134		1.35E+00 ±	4.05E+00	5.69E+00
CS-137		1.11E+00 ±	4.73E+00	6.72E+00
BALA140		2.89E+00 ±	4.11E+00	5.22E+00
K-40	+	1.55E+03 ±	1.53E+02	7.75E+01
FE-59		-5.44E+00 ±	1.62E+01	2.09E+01
ZRNB-95		0.00E+00 ±	1.53E+00	1.26E+01
BE-7		2.06E+01 ±	2.97E+01	4.16E+01

Collection Date: 8/9/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		-2.01E-01 ±	5.18E+00	7.06E+00
CO-60		-3.09E+00 ±	7.89E+00	9.02E+00
ZN-65		5.04E+00 ±	9.75E+00	1.11E+01
MN-54		3.76E+00 ±	4.39E+00	4.93E+00
CS-134		-1.76E+00 ±	5.49E+00	6.87E+00
CS-137		-1.12E+00 ±	6.04E+00	7.62E+00
BALA140		0.00E+00 ±	2.29E+00	8.85E+00
K-40	+	1.49E+03 ±	1.53E+02	6.81E+01
FE-59		1.01E+01 ±	1.39E+01	1.51E+01
ZRNB-95		-2.73E+00 ±	1.03E+01	1.26E+01
BE-7		2.82E+01 ±	3.29E+01	3.98E+01

Collection Date: 9/6/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		-3.01E+00 ±	6.17E+00	8.15E+00
CO-60		0.00E+00 ±	3.53E+00	9.02E+00
ZN-65		6.16E+00 ±	9.87E+00	1.11E+01
MN-54		-1.01E+00 ±	5.11E+00	6.24E+00
CS-134		-5.66E-01 ±	4.70E+00	5.95E+00
CS-137		1.32E+00 ±	5.34E+00	6.69E+00
BALA140		0.00E+00 ±	8.11E-01	8.85E+00
K-40	+	1.39E+03 ±	1.44E+02	5.19E+01
FE-59		1.07E+01 ±	1.25E+01	1.31E+01
ZRNB-95		2.00E-01 ±	9.17E+00	1.14E+01
BE-7		1.14E+01 ±	3.43E+01	4.40E+01

TABLE A-12.1
GAMMA SPECTROMETRY RESULTS OF MILK
STATION 9b - Control
 Results in pCi per liter

Collection Date: 10/11/2016					Collection Date: 11/8/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BA-133		-1.44E+00 ±	5.42E+00	7.81E+00	BA-133		6.70E-02 ±	4.88E+00	6.65E+00
CO-60		-7.84E-01 ±	7.29E+00	9.32E+00	CO-60		2.55E+00 ±	5.39E+00	6.01E+00
ZN-65		-3.09E+00 ±	1.24E+01	1.62E+01	ZN-65		9.80E+00 ±	1.12E+01	1.24E+01
MN-54		-2.76E+00 ±	6.11E+00	7.98E+00	MN-54		-1.20E+00 ±	4.81E+00	5.84E+00
CS-134		-5.04E-01 ±	5.07E+00	6.96E+00	CS-134		-1.89E-01 ±	4.67E+00	5.95E+00
CS-137		-3.14E+00 ±	6.62E+00	8.84E+00	CS-137		2.98E+00 ±	4.05E+00	4.73E+00
BALA140		0.00E+00 ±	1.20E+00	9.21E+00	BALA140		0.00E+00 ±	1.14E+00	6.22E+00
K-40	+	1.35E+03 ±	1.39E+02	5.33E+01	K-40	+	1.18E+03 ±	1.34E+02	5.72E+01
FE-59		7.61E+00 ±	8.07E+00	9.70E+00	FE-59		-1.60E+00 ±	1.45E+01	1.69E+01
ZRNB-95		0.00E+00 ±	3.61E+00	1.05E+01	ZRNB-95		-1.86E+00 ±	9.79E+00	1.20E+01
BE-7		3.85E+00 ±	3.08E+01	4.45E+01	BE-7		-1.98E+01 ±	4.16E+01	5.29E+01

Collection Date: 12/6/2016				
Nuclide	RQ	Activity	Error	MDA
BA-133		6.36E-01 ±	5.07E+00	6.86E+00
CO-60		0.00E+00 ±	1.66E+00	8.50E+00
ZN-65		0.00E+00 ±	5.26E+00	1.75E+01
MN-54		-1.32E+00 ±	5.72E+00	6.98E+00
CS-134		1.04E+00 ±	4.12E+00	5.16E+00
CS-137		-2.36E+00 ±	5.68E+00	7.01E+00
BALA140		-8.06E-01 ±	5.66E+00	6.22E+00
K-40	+	1.51E+03 ±	1.50E+02	5.32E+01
FE-59		-5.16E+00 ±	1.62E+01	1.85E+01
ZRNB-95		0.00E+00 ±	7.98E-01	1.14E+01
BE-7		6.09E+00 ±	3.23E+01	4.19E+01

TABLE A-12.2
GAMMA SPECTROMETRY RESULTS OF MILK - SUMMARY
 Results in pCi per liter

Nuclide		Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
BA-133	Ind	1.52E-01	-3.00E+00	4.35E+00	6.58E+00	18	0
BA-133	Cntl	5.03E-02	-3.01E+00	2.75E+00	6.90E+00	15	0
BALA140	Ind	1.66E+00	-4.00E-01	7.52E+00	6.76E+00	18	0
BALA140	Cntl	2.63E-01	-1.42E+00	3.88E+00	7.66E+00	15	0
BE-7	Ind	3.08E-01	-1.56E+01	2.05E+01	4.60E+01	18	0
BE-7	Cntl	4.22E+00	-1.98E+01	2.82E+01	4.59E+01	15	0
CO-60	Ind	1.50E+00	-3.30E+00	5.04E+00	7.08E+00	18	0
CO-60	Cntl	-6.89E-02	-3.09E+00	2.55E+00	7.46E+00	15	0
CS-134	Ind	2.95E-01	-2.52E+00	3.62E+00	5.69E+00	18	0
CS-134	Cntl	9.75E-02	-1.76E+00	1.45E+00	5.88E+00	15	0
CS-137	Ind	-3.32E-01	-3.99E+00	1.89E+00	6.33E+00	18	0
CS-137	Cntl	-1.12E-03	-3.64E+00	3.09E+00	6.69E+00	15	0
FE-59	Ind	7.89E-01	-5.04E+00	9.32E+00	1.88E+01	18	0
FE-59	Cntl	3.18E+00	-6.40E+00	1.07E+01	1.72E+01	15	0
K-40	Ind	1.41E+03	1.21E+03	1.94E+03	6.77E+01	18	18
K-40	Cntl	1.45E+03	1.18E+03	1.60E+03	6.55E+01	15	15
MN-54	Ind	4.00E-02	-2.48E+00	3.73E+00	5.90E+00	18	0
MN-54	Cntl	-2.98E-01	-2.76E+00	3.76E+00	6.36E+00	15	0
ZN-65	Ind	2.24E+00	-4.48E+00	1.15E+01	1.33E+01	18	0
ZN-65	Cntl	1.90E+00	-4.76E+00	9.80E+00	1.39E+01	15	0
ZRNB-95	Ind	9.36E-01	-3.12E+00	5.25E+00	1.01E+01	18	0
ZRNB-95	Cntl	-4.12E-01	-3.05E+00	4.46E+00	1.09E+01	15	0

Table A-13.1

GAMMA SPECTROMETRY RESULTS OF PLANT DISCHARGE WATER
STATION 27 - Plant Discharge Water Indicator

Results in pCi/liter, corrected for decay during collection period

Location ST-27 collected 2/1/2016					Location ST-27 collected 3/1/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		1.11E+01 ±	4.07E+01	5.97E+01	K-40		2.14E+01 ±	4.14E+01	4.91E+01
CR-51		4.36E+00 ±	2.72E+01	3.81E+01	CR-51		-7.96E+00 ±	2.87E+01	3.87E+01
MN-54		7.34E-01 ±	2.64E+00	3.31E+00	MN-54		-2.15E+00 ±	3.62E+00	4.35E+00
CO-58		-6.72E-01 ±	3.82E+00	4.83E+00	CO-58		0.00E+00 ±	1.63E+00	4.58E+00
FE-59		1.28E+00 ±	9.92E+00	1.19E+01	FE-59		3.51E+00 ±	9.09E+00	1.03E+01
CO-60		-2.86E-01 ±	3.71E+00	4.45E+00	CO-60		-3.81E-01 ±	3.12E+00	3.63E+00
ZN-65		1.51E+00 ±	5.37E+00	6.49E+00	ZN-65		8.52E-01 ±	6.03E+00	7.20E+00
ZRNB-95		2.08E+00 ±	5.64E+00	7.25E+00	ZRNB-95		-3.30E+00 ±	6.49E+00	7.82E+00
I-131		-1.52E+00 ±	8.82E+00	1.24E+01	I-131		9.91E-01 ±	7.26E+00	9.84E+00
CS-134		3.70E-01 ±	2.51E+00	3.28E+00	CS-134		-1.53E+00 ±	3.13E+00	3.91E+00
CS-137		0.00E+00 ±	6.93E-01	4.26E+00	CS-137		3.07E-01 ±	2.51E+00	3.18E+00
BALA140		0.00E+00 ±	3.14E+00	1.49E+01	BALA140		3.04E+00 ±	6.89E+00	7.38E+00
BI-214		5.15E+00 ±	7.03E+00	9.71E+00	BI-214		1.58E+00 ±	7.53E+00	1.03E+01

Location ST-27 collected 4/1/2016					Location ST-27 collected 5/2/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	5.62E+01 ±	3.39E+01	3.83E+01	K-40	+	5.56E+01 ±	3.60E+01	5.41E+01
CR-51		2.89E+01 ±	3.01E+01	4.09E+01	CR-51		-6.43E+00 ±	2.88E+01	3.88E+01
MN-54		1.35E-01 ±	2.52E+00	3.22E+00	MN-54		1.67E-02 ±	3.16E+00	3.93E+00
CO-58		-2.55E+00 ±	3.81E+00	4.72E+00	CO-58		1.13E+00 ±	3.06E+00	3.70E+00
FE-59		1.26E+00 ±	9.56E+00	1.12E+01	FE-59		9.15E-01 ±	9.71E+00	1.13E+01
CO-60		-8.86E-01 ±	3.20E+00	3.70E+00	CO-60		-1.01E+00 ±	3.58E+00	4.12E+00
ZN-65		0.00E+00 ±	1.64E+00	8.31E+00	ZN-65		4.89E-01 ±	5.69E+00	6.82E+00
ZRNB-95		9.01E-01 ±	5.32E+00	6.74E+00	ZRNB-95		-2.44E+00 ±	6.89E+00	8.39E+00
I-131		7.60E+00 ±	1.48E+01	1.98E+01	I-131		1.37E+00 ±	8.04E+00	1.09E+01
CS-134		-9.10E-01 ±	2.64E+00	3.43E+00	CS-134		-6.92E-01 ±	2.93E+00	3.71E+00
CS-137		1.62E+00 ±	2.54E+00	3.23E+00	CS-137		9.69E-01 ±	2.46E+00	3.05E+00
BALA140		7.48E+00 ±	1.16E+01	1.27E+01	BALA140		-2.56E+00 ±	1.03E+01	1.13E+01
BI-214		4.83E-02 ±	5.83E+00	8.38E+00	BI-214		7.33E+00 ±	6.81E+00	9.08E+00

Location ST-27 collected 6/1/2016					Location ST-27 collected 6/30/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		2.62E+01 ±	3.79E+01	5.57E+01	K-40		2.84E+01 ±	3.15E+01	4.92E+01
CR-51		-4.43E+00 ±	2.75E+01	4.06E+01	CR-51		2.15E+01 ±	2.81E+01	4.02E+01
MN-54		1.13E+00 ±	2.55E+00	3.43E+00	MN-54		2.19E+00 ±	2.66E+00	3.46E+00
CO-58		-1.48E+00 ±	3.67E+00	4.90E+00	CO-58		-3.59E-01 ±	2.97E+00	4.10E+00
FE-59		2.04E+00 ±	8.34E+00	1.10E+01	FE-59		0.00E+00 ±	4.04E+00	1.65E+01
CO-60		1.95E-01 ±	3.53E+00	4.61E+00	CO-60		7.16E-01 ±	2.87E+00	3.76E+00
ZN-65		2.01E+00 ±	5.38E+00	7.15E+00	ZN-65		1.77E+00 ±	5.41E+00	7.22E+00
ZRNB-95		1.01E+00 ±	5.06E+00	7.14E+00	ZRNB-95		6.30E-01 ±	5.23E+00	7.42E+00
I-131		-2.09E+00 ±	7.19E+00	1.06E+01	I-131		-5.40E+00 ±	1.08E+01	1.56E+01
CS-134		1.76E+00 ±	2.59E+00	3.50E+00	CS-134		-1.11E+00 ±	2.98E+00	4.09E+00
CS-137		-1.80E+00 ±	3.20E+00	4.36E+00	CS-137		-1.65E+00 ±	3.13E+00	4.26E+00
BALA140		0.00E+00 ±	1.80E+00	1.09E+01	BALA140		-1.87E+00 ±	8.88E+00	1.15E+01
BI-214		1.45E+00 ±	6.36E+00	9.60E+00	BI-214		0.00E+00 ±	6.06E+00	9.96E+00

Table A-13.1

GAMMA SPECTROMETRY RESULTS OF PLANT DISCHARGE WATER
STATION 27 - Plant Discharge Water Indicator

Results in pCi/liter, corrected for decay during collection period

Location ST-27 collected 8/1/2016					Location ST-27 collected 9/1/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		1.25E+01 ±	3.85E+01	5.30E+01	K-40		1.60E+01 ±	3.23E+01	4.61E+01
CR-51		4.41E+00 ±	2.47E+01	3.66E+01	CR-51		2.28E+01 ±	2.93E+01	4.19E+01
MN-54		0.00E+00 ±	5.91E-01	4.32E+00	MN-54		1.64E+00 ±	2.40E+00	3.18E+00
CO-58		1.94E-01 ±	2.64E+00	3.68E+00	CO-58		3.69E-01 ±	3.06E+00	4.22E+00
FE-59		8.47E+00 ±	8.42E+00	1.03E+01	FE-59		4.49E+00 ±	1.07E+01	1.38E+01
CO-60		-1.30E-01 ±	3.68E+00	4.80E+00	CO-60		9.29E-01 ±	1.27E+00	4.80E+00
ZN-65		9.00E-01 ±	5.97E+00	8.03E+00	ZN-65		0.00E+00 ±	1.28E+00	1.00E+01
ZRNB-95		2.55E+00 ±	4.69E+00	6.46E+00	ZRNB-95		5.41E-01 ±	5.92E+00	8.36E+00
I-131		-6.73E+00 ±	8.78E+00	1.25E+01	I-131		6.45E+00 ±	1.15E+01	1.67E+01
CS-134		-2.30E+00 ±	3.36E+00	4.52E+00	CS-134		0.00E+00 ±	9.90E-01	4.83E+00
CS-137		-5.50E-01 ±	2.91E+00	4.07E+00	CS-137		-4.50E-01 ±	3.05E+00	4.27E+00
BALA140		1.02E+00 ±	6.75E+00	8.87E+00	BALA140		-8.58E-02 ±	1.00E+01	1.32E+01
BI-214		0.00E+00 ±	6.44E+00	1.06E+01	BI-214		0.00E+00 ±	7.17E+00	1.18E+01

Location ST-27 collected 9/30/2016					Location ST-27 collected 10/31/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	5.64E+01 ±	4.00E+01	4.49E+01	K-40		6.12E+00 ±	4.56E+01	6.51E+01
CR-51		-5.71E+00 ±	3.09E+01	4.18E+01	CR-51		-6.18E+00 ±	2.90E+01	4.27E+01
MN-54		-2.34E-01 ±	2.89E+00	3.57E+00	MN-54		1.31E+00 ±	2.35E+00	3.15E+00
CO-58		0.00E+00 ±	1.23E+00	4.66E+00	CO-58		-9.82E-02 ±	3.03E+00	4.19E+00
FE-59		3.21E+00 ±	9.30E+00	1.06E+01	FE-59		-6.30E-01 ±	9.13E+00	1.21E+01
CO-60		-6.57E-01 ±	3.43E+00	3.98E+00	CO-60		1.76E+00 ±	2.56E+00	3.23E+00
ZN-65		0.00E+00 ±	9.78E-01	8.70E+00	ZN-65		3.57E+00 ±	5.55E+00	7.19E+00
ZRNB-95		0.00E+00 ±	3.26E+00	9.20E+00	ZRNB-95		2.07E+00 ±	5.26E+00	7.30E+00
I-131		4.45E+00 ±	7.66E+00	1.01E+01	I-131		7.94E-01 ±	8.17E+00	1.22E+01
CS-134		7.32E-01 ±	2.88E+00	3.63E+00	CS-134		4.52E-01 ±	2.73E+00	3.81E+00
CS-137		-1.49E+00 ±	3.32E+00	4.14E+00	CS-137		1.50E-01 ±	2.73E+00	3.86E+00
BALA140		-2.23E+00 ±	9.04E+00	9.93E+00	BALA140		1.43E+00 ±	6.32E+00	8.34E+00
BI-214		2.86E+00 ±	7.39E+00	1.01E+01	BI-214		0.00E+00 ±	6.26E+00	1.03E+01

Location ST-27 collected 11/30/2016					Location ST-27 collected 1/3/2017				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		2.25E+01 ±	4.32E+01	5.48E+01	K-40		2.63E+01 ±	3.90E+01	4.75E+01
CR-51		9.28E+00 ±	3.10E+01	4.40E+01	CR-51		-3.88E+00 ±	2.87E+01	4.25E+01
MN-54		3.88E-01 ±	2.81E+00	3.74E+00	MN-54		6.10E-01 ±	2.52E+00	3.45E+00
CO-58		0.00E+00 ±	6.58E-01	5.26E+00	CO-58		4.90E-01 ±	3.06E+00	4.19E+00
FE-59		5.99E+00 ±	6.96E+00	8.45E+00	FE-59		-6.29E-01 ±	9.11E+00	1.21E+01
CO-60		0.00E+00 ±	9.23E-01	5.39E+00	CO-60		-9.75E-01 ±	3.26E+00	4.21E+00
ZN-65		-6.17E-01 ±	7.31E+00	9.47E+00	ZN-65		2.45E+00 ±	6.12E+00	8.06E+00
ZRNB-95		2.63E+00 ±	5.83E+00	7.58E+00	ZRNB-95		0.00E+00 ±	1.75E+00	9.18E+00
I-131		7.31E+00 ±	1.10E+01	1.53E+01	I-131		6.74E+00 ±	6.57E+00	9.24E+00
CS-134		-6.41E-01 ±	2.83E+00	3.80E+00	CS-134		1.07E+00 ±	2.49E+00	3.43E+00
CS-137		2.05E+00 ±	2.64E+00	3.45E+00	CS-137		2.70E+00 ±	2.68E+00	3.53E+00
BALA140		-4.41E-01 ±	8.62E+00	1.08E+01	BALA140		-1.39E+00 ±	6.16E+00	8.13E+00
BI-214		1.41E+00 ±	7.52E+00	1.08E+01	BI-214		6.53E+00 ±	6.91E+00	9.96E+00

TABLE A-13.2
GAMMA SPECTROMETRY RESULTS OF PLANT DISCHARGE WATER - SUMMARY

Results in pCi/liter, corrected for decay during collection period

Nuclide	Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
K-40	2.82E+01	6.12E+00	5.64E+01	5.15E+01	12	3
CR-51	4.72E+00	-7.96E+00	2.89E+01	4.06E+01	12	0
MN-54	4.80E-01	-2.15E+00	2.19E+00	3.59E+00	12	0
CO-58	-2.49E-01	-2.55E+00	1.13E+00	4.42E+00	12	0
FE-59	2.49E+00	-6.30E-01	8.47E+00	1.16E+01	12	0
CO-60	-6.07E-02	-1.01E+00	1.76E+00	4.22E+00	12	0
ZN-65	1.08E+00	-6.17E-01	3.57E+00	7.89E+00	12	0
ZRNB-95	5.56E-01	-3.30E+00	2.63E+00	7.69E+00	12	0
I-131	1.66E+00	-6.73E+00	7.60E+00	1.29E+01	12	0
CS-134	-2.33E-01	-2.30E+00	1.76E+00	3.83E+00	12	0
CS-137	1.55E-01	-1.80E+00	2.70E+00	3.81E+00	12	0
BALA140	3.66E-01	-2.56E+00	7.48E+00	1.07E+01	12	0
BI-214	2.20E+00	0.00E+00	7.33E+00	1.00E+01	12	0

Table A-14.1

GAMMA SPECTROMETRY RESULTS OF DEEP GROUND WATER**Deep Ground Water Wells - Stations 31, 32, and 52**

Results in pCi/liter

Location ST-31 collected 3/9/2016				Location ST-31 collected 6/8/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		2.17E+01 ±	7.08E+01	1.08E+02	K-40	+	1.09E+02 ±	8.60E+01	9.74E+01
CR-51		-2.68E+00 ±	4.71E+01	7.00E+01	CR-51		2.13E+01 ±	5.00E+01	6.71E+01
MN-54		-1.26E+00 ±	5.73E+00	7.78E+00	MN-54		1.46E+00 ±	6.28E+00	7.70E+00
CO-58		4.88E+00 ±	5.06E+00	6.51E+00	CO-58		-1.89E+00 ±	6.29E+00	7.67E+00
FE-59		-1.34E+00 ±	1.56E+01	2.06E+01	FE-59		0.00E+00 ±	6.25E+00	2.26E+01
CO-60		5.60E+00 ±	5.00E+00	6.00E+00	CO-60		-4.19E-01 ±	7.17E+00	8.42E+00
ZN-65		-4.75E-01 ±	1.26E+01	1.69E+01	ZN-65		2.33E+00 ±	1.43E+01	1.67E+01
ZRNB-95		-1.14E+00 ±	1.06E+01	1.45E+01	ZRNB-95		-3.18E+00 ±	1.20E+01	1.47E+01
I-131		1.13E+00 ±	8.74E+00	1.30E+01	I-131		-6.85E-01 ±	6.62E+00	9.00E+00
CS-134		-4.88E-01 ±	5.89E+00	8.20E+00	CS-134		-4.10E+00 ±	7.80E+00	9.77E+00
CS-137		-3.07E+00 ±	6.71E+00	9.17E+00	CS-137		-2.79E+00 ±	7.06E+00	8.84E+00
BALA140		3.54E+00 ±	8.42E+00	1.07E+01	BALA140		0.00E+00 ±	3.16E+00	1.17E+01
BI-214	+	6.45E+01 ±	1.70E+01	2.05E+01	BI-214	+	1.81E+02 ±	2.34E+01	2.29E+01

Location ST-31 collected 9/14/2016				Location ST-31 collected 12/14/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		9.00E+01 ±	1.04E+02	9.99E+01	K-40	+	1.05E+02 ±	7.64E+01	8.65E+01
CR-51		-1.71E+01 ±	7.14E+01	8.38E+01	CR-51		2.02E+01 ±	5.18E+01	6.94E+01
MN-54		3.87E+00 ±	8.78E+00	9.34E+00	MN-54		-3.13E+00 ±	6.90E+00	8.36E+00
CO-58		5.85E+00 ±	7.72E+00	8.12E+00	CO-58		-4.50E-01 ±	6.62E+00	8.19E+00
FE-59		2.44E+00 ±	2.25E+01	2.31E+01	FE-59		0.00E+00 ±	7.48E+00	2.48E+01
CO-60		1.98E+00 ±	9.79E+00	9.97E+00	CO-60		-5.33E-01 ±	6.32E+00	7.39E+00
ZN-65		6.46E+00 ±	1.57E+01	1.60E+01	ZN-65		-4.79E+00 ±	1.41E+01	1.63E+01
ZRNB-95		-1.49E+00 ±	1.58E+01	1.70E+01	ZRNB-95		-3.43E+00 ±	1.31E+01	1.60E+01
I-131		-1.20E+00 ±	8.53E+00	1.01E+01	I-131		3.20E+00 ±	8.75E+00	1.17E+01
CS-134		5.47E-01 ±	9.05E+00	9.99E+00	CS-134		-6.28E-01 ±	6.73E+00	8.58E+00
CS-137		-1.87E+00 ±	9.21E+00	1.02E+01	CS-137		-7.62E-01 ±	6.69E+00	8.50E+00
BALA140		-1.33E+00 ±	1.18E+01	1.15E+01	BALA140		0.00E+00 ±	1.89E+00	1.52E+01
BI-214	+	4.38E+02 ±	3.42E+01	2.73E+01	BI-214	+	7.63E+01 ±	1.86E+01	2.13E+01

Location ST-32 collected 3/9/2016				Location ST-32 collected 6/8/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		2.99E+01 ±	7.70E+01	1.05E+02	K-40		1.13E+02 ±	8.71E+01	1.19E+02
CR-51		-3.14E+01 ±	5.95E+01	8.58E+01	CR-51		1.02E+01 ±	6.11E+01	8.90E+01
MN-54		5.89E+00 ±	6.05E+00	7.78E+00	MN-54		1.08E+00 ±	7.30E+00	9.81E+00
CO-58		2.24E+00 ±	6.22E+00	8.34E+00	CO-58		4.25E+00 ±	6.89E+00	9.05E+00
FE-59		1.18E+01 ±	1.11E+01	1.34E+01	FE-59		0.00E+00 ±	8.51E+00	2.74E+01
CO-60		3.60E+00 ±	6.09E+00	7.70E+00	CO-60		-4.40E+00 ±	9.59E+00	1.20E+01
ZN-65		6.97E+00 ±	1.09E+01	1.41E+01	ZN-65		7.78E+00 ±	1.39E+01	1.79E+01
ZRNB-95		0.00E+00 ±	2.28E+00	1.68E+01	ZRNB-95		3.38E+00 ±	1.20E+01	1.60E+01
I-131		1.71E-01 ±	1.08E+01	1.61E+01	I-131		-7.60E-02 ±	7.85E+00	1.15E+01
CS-134		-1.79E+00 ±	6.86E+00	9.41E+00	CS-134		3.64E+00 ±	7.46E+00	1.01E+01
CS-137		3.86E+00 ±	5.66E+00	7.65E+00	CS-137		-4.85E+00 ±	9.52E+00	1.29E+01
BALA140		3.83E+00 ±	1.11E+01	1.40E+01	BALA140		-4.78E+00 ±	1.23E+01	1.52E+01
BI-214	+	2.38E+02 ±	2.58E+01	2.39E+01	BI-214	+	7.58E+02 ±	4.27E+01	2.56E+01

Table A-14.1

GAMMA SPECTROMETRY RESULTS OF DEEP GROUND WATER**Deep Ground Water Wells - Stations 31, 32, and 52**

Results in pCi/liter

Location ST-32 collected 9/14/2016				Location ST-32 collected 12/14/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		2.44E+01 ±	9.06E+01	1.28E+02	K-40		4.52E+00 ±	8.01E+01	1.19E+02
CR-51		-2.15E+01 ±	7.09E+01	1.02E+02	CR-51		1.19E+00 ±	5.57E+01	8.21E+01
MN-54		-1.07E+00 ±	8.04E+00	1.08E+01	MN-54		2.07E+00 ±	6.57E+00	8.80E+00
CO-58		4.80E+00 ±	6.87E+00	8.97E+00	CO-58		1.96E+00 ±	5.91E+00	7.95E+00
FE-59		1.60E+01 ±	1.75E+01	2.15E+01	FE-59		-1.63E+00 ±	1.61E+01	2.12E+01
CO-60		2.08E+00 ±	8.35E+00	1.06E+01	CO-60		-1.23E-01 ±	8.25E+00	1.07E+01
ZN-65		-6.05E+00 ±	1.77E+01	2.30E+01	ZN-65		-3.86E+00 ±	1.60E+01	2.09E+01
ZRNB-95		-5.58E-01 ±	1.35E+01	1.82E+01	ZRNB-95		5.95E+00 ±	1.08E+01	1.43E+01
I-131		3.33E+00 ±	7.42E+00	1.07E+01	I-131		-1.37E+00 ±	9.15E+00	1.35E+01
CS-134		1.70E+00 ±	7.96E+00	1.09E+01	CS-134		-1.46E+00 ±	7.00E+00	9.61E+00
CS-137		-2.97E-01 ±	8.36E+00	1.16E+01	CS-137		4.36E+00 ±	6.12E+00	8.26E+00
BALA140		-3.75E-01 ±	1.15E+01	1.44E+01	BALA140		-3.57E+00 ±	1.12E+01	1.40E+01
BI-214	+	1.07E+03 ±	5.13E+01	2.52E+01	BI-214	+	3.26E+02 ±	2.87E+01	2.39E+01

Location ST-52 collected 3/17/2016				Location ST-52 collected 6/9/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		1.57E+01 ±	5.85E+01	9.80E+01	K-40		6.18E+01 ±	7.91E+01	1.05E+02
CR-51		-2.79E+00 ±	4.11E+01	6.09E+01	CR-51		-1.36E+01 ±	4.19E+01	6.12E+01
MN-54		-1.37E+00 ±	5.99E+00	8.09E+00	MN-54		8.48E-01 ±	5.27E+00	7.21E+00
CO-58		1.55E+00 ±	4.88E+00	6.63E+00	CO-58		-1.42E+00 ±	5.63E+00	7.62E+00
FE-59		-3.63E+00 ±	1.43E+01	1.86E+01	FE-59		2.44E+00 ±	1.25E+01	1.65E+01
CO-60		1.20E+00 ±	4.99E+00	6.60E+00	CO-60		5.02E+00 ±	4.99E+00	6.07E+00
ZN-65		4.58E+00 ±	9.86E+00	1.30E+01	ZN-65		4.35E+00 ±	1.16E+01	1.53E+01
ZRNB-95		-4.52E+00 ±	1.12E+01	1.49E+01	ZRNB-95		2.92E+00 ±	9.80E+00	1.32E+01
I-131		-2.18E+00 ±	5.33E+00	7.78E+00	I-131		-1.13E+00 ±	5.85E+00	8.61E+00
CS-134		3.39E+00 ±	4.99E+00	6.74E+00	CS-134		0.00E+00 ±	1.29E+00	1.00E+01
CS-137		-6.93E-01 ±	6.30E+00	8.81E+00	CS-137		0.00E+00 ±	2.50E+00	9.50E+00
BALA140		-2.51E+00 ±	7.59E+00	9.57E+00	BALA140		-1.05E+00 ±	6.54E+00	8.49E+00
BI-214		9.13E+00 ±	1.33E+01	1.97E+01	BI-214	+	4.22E+01 ±	1.43E+01	1.94E+01

Location ST-52 collected 9/14/2016				Location ST-52 collected 12/14/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		3.03E+01 ±	8.02E+01	1.09E+02	K-40		7.13E+01 ±	7.07E+01	8.26E+01
CR-51		-7.98E+00 ±	4.93E+01	7.22E+01	CR-51		-1.03E+01 ±	5.25E+01	7.10E+01
MN-54		-3.16E+00 ±	7.66E+00	1.01E+01	MN-54		-2.88E+00 ±	7.45E+00	9.08E+00
CO-58		1.20E+00 ±	5.08E+00	6.92E+00	CO-58		1.25E+00 ±	5.78E+00	7.07E+00
FE-59		1.07E+01 ±	1.42E+01	1.77E+01	FE-59		0.00E+00 ±	5.92E+00	2.05E+01
CO-60		5.99E+00 ±	5.81E+00	7.06E+00	CO-60		-1.60E+00 ±	6.98E+00	8.10E+00
ZN-65		4.36E+00 ±	1.16E+01	1.53E+01	ZN-65		8.91E+00 ±	1.09E+01	1.19E+01
ZRNB-95		-6.19E-01 ±	1.20E+01	1.63E+01	ZRNB-95		0.00E+00 ±	2.33E+00	1.69E+01
I-131		-1.12E+00 ±	5.93E+00	8.74E+00	I-131		-4.95E+00 ±	9.34E+00	1.24E+01
CS-134		-2.34E+00 ±	6.93E+00	9.46E+00	CS-134		2.85E+00 ±	5.74E+00	7.15E+00
CS-137		-1.88E+00 ±	7.13E+00	9.83E+00	CS-137		-1.14E+00 ±	6.71E+00	8.50E+00
BALA140		2.00E+00 ±	7.26E+00	9.25E+00	BALA140		-9.49E-01 ±	8.34E+00	9.25E+00
BI-214	+	2.86E+02 ±	2.60E+01	2.17E+01	BI-214		1.65E+01 ±	1.51E+01	2.02E+01

TABLE A-14.2
GAMMA SPECTROMETRY RESULTS OF DEEP GROUND WATER - SUMMARY

Results in pCi/liter

Nuclide	Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
K-40	5.64E+01	4.52E+00	1.13E+02	1.05E+02	12	2
CR-51	-4.55E+00	-3.14E+01	2.13E+01	7.63E+01	12	0
MN-54	1.95E-01	-3.16E+00	5.89E+00	8.74E+00	12	0
CO-58	2.02E+00	-1.89E+00	5.85E+00	7.75E+00	12	0
FE-59	3.07E+00	-3.63E+00	1.60E+01	2.06E+01	12	0
CO-60	1.53E+00	-4.40E+00	5.99E+00	8.38E+00	12	0
ZN-65	2.55E+00	-6.05E+00	8.91E+00	1.64E+01	12	0
ZRNB-95	5.34E-01	-3.43E+00	5.95E+00	1.56E+01	12	0
I-131	-4.06E-01	-4.95E+00	3.33E+00	1.11E+01	12	0
CS-134	1.10E-01	-4.10E+00	3.64E+00	9.16E+00	12	0
CS-137	-7.62E-01	-4.85E+00	4.36E+00	9.48E+00	12	0
BALA140	-4.32E-01	-4.78E+00	3.83E+00	1.19E+01	12	0
BI-214	2.92E+02	9.13E+00	1.07E+03	2.26E+01	12	10

TABLE A-15.1
GAMMA SPECTROMETRY RESULTS OF ROOT CROPS

Results in pCi/ kilogram (wet)

Station 37 is Indicator - Station 9c is Control

Station 37 Onion collected 7/26/2016					Station 37 Potato collected 7/26/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	1.11E+03	± 1.82E+02	1.56E+02	K-40	+	4.44E+03	± 3.82E+02	1.29E+02
MN-54		5.32E+00	± 7.15E+00	8.45E+00	MN-54		9.08E-01	± 7.99E+00	1.01E+01
CO-58		-2.05E+00	± 9.16E+00	1.15E+01	CO-58		3.14E+00	± 5.57E+00	6.38E+00
FE-59		0.00E+00	± 1.15E+01	2.95E+01	FE-59		0.00E+00	± 6.50E+00	3.93E+01
CO-60		-5.54E+00	± 1.33E+01	1.70E+01	CO-60		0.00E+00	± 3.10E+00	2.07E+01
ZN-65		1.47E+01	± 2.16E+01	2.54E+01	ZN-65		-6.44E+00	± 2.67E+01	3.24E+01
ZRNB-95		9.12E+00	± 1.35E+01	1.67E+01	ZRNB-95		0.00E+00	± 4.84E+00	1.49E+01
I-131		-5.42E+00	± 1.03E+01	1.42E+01	I-131		-3.69E+00	± 8.66E+00	1.18E+01
CS-134		3.14E+00	± 8.62E+00	1.11E+01	CS-134		1.59E+00	± 6.60E+00	8.46E+00
CS-137		-2.28E+00	± 1.02E+01	1.33E+01	CS-137		-3.43E+00	± 9.48E+00	1.20E+01
BALA140		4.54E+00	± 1.50E+01	1.68E+01	BALA140		2.04E+00	± 8.62E+00	9.61E+00

Station 37 Onion collected 8/16/2016					Station 37 Potato collected 8/16/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	1.11E+03	± 1.91E+02	1.21E+02	K-40	+	3.76E+03	± 3.32E+02	1.17E+02
MN-54		-9.35E-01	± 8.25E+00	1.04E+01	MN-54		-1.70E+00	± 8.51E+00	1.07E+01
CO-58		-1.48E+00	± 7.61E+00	9.51E+00	CO-58		-8.86E-01	± 7.82E+00	9.87E+00
FE-59		3.83E+00	± 1.34E+01	1.51E+01	FE-59		5.81E+00	± 2.96E+01	3.51E+01
CO-60		-8.97E-01	± 8.58E+00	1.02E+01	CO-60		5.95E+00	± 1.28E+01	1.48E+01
ZN-65		-1.71E+00	± 1.53E+01	1.87E+01	ZN-65		-3.24E+00	± 2.06E+01	2.51E+01
ZRNB-95		4.03E-01	± 9.28E+00	1.22E+01	ZRNB-95		0.00E+00	± 4.33E+00	2.10E+01
I-131		1.87E+00	± 5.55E+00	7.50E+00	I-131		-4.02E-01	± 6.37E+00	8.95E+00
CS-134		3.75E+00	± 4.22E+00	4.61E+00	CS-134		3.55E-01	± 6.66E+00	8.74E+00
CS-137		3.23E+00	± 4.95E+00	5.68E+00	CS-137		-1.97E+00	± 7.86E+00	1.01E+01
BALA140		1.47E-01	± 7.68E+00	9.01E+00	BALA140		9.77E-01	± 7.49E+00	8.56E+00

Station 9c Potato collected 9/2/2016				
Nuclide	RQ	Activity	Error	MDA
K-40	+	4.04E+03	± 3.40E+02	1.36E+02
MN-54		0.00E+00	± 1.22E+00	1.64E+01
CO-58		0.00E+00	± 2.51E+00	1.33E+01
FE-59		2.23E+00	± 2.13E+01	2.95E+01
CO-60		-3.29E+00	± 1.29E+01	1.68E+01
ZN-65		1.44E+01	± 1.38E+01	1.70E+01
ZRNB-95		-4.61E+00	± 1.48E+01	2.11E+01
I-131		-3.85E-01	± 9.24E+00	1.43E+01
CS-134		2.92E+00	± 6.32E+00	8.87E+00
CS-137		-3.17E+00	± 8.67E+00	1.22E+01
BALA140		3.97E+00	± 3.97E+00	7.31E+00

TABLE A - 15.2
GAMMA SPECTROMETRY RESULTS OF ROOT CROPS - SUMMARY

Results in pCi/ kilogram (wet)

Nuclide		Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
K-40	Ind	2.61E+03	1.11E+03	4.44E+03	1.31E+02	4	4
K-40	Cntl	4.04E+03	4.04E+03	4.04E+03	1.36E+02	1	1
MN-54	Ind	8.99E-01	-1.70E+00	5.32E+00	9.91E+00	4	0
MN-54	Cntl	0.00E+00	0.00E+00	0.00E+00	1.64E+01	1	0
CO-58	Ind	-3.19E-01	-2.05E+00	3.14E+00	9.32E+00	4	0
CO-58	Cntl	0.00E+00	0.00E+00	0.00E+00	1.33E+01	1	0
FE-59	Ind	2.41E+00	0.00E+00	5.81E+00	2.97E+01	4	0
FE-59	Cntl	2.23E+00	2.23E+00	2.23E+00	2.95E+01	1	0
CO-60	Ind	-1.21E-01	-5.54E+00	5.95E+00	1.57E+01	4	0
CO-60	Cntl	-3.29E+00	-3.29E+00	-3.29E+00	1.68E+01	1	0
ZN-65	Ind	8.10E-01	-6.44E+00	1.47E+01	2.54E+01	4	0
ZN-65	Cntl	1.44E+01	1.44E+01	1.44E+01	1.70E+01	1	0
ZRNB-95	Ind	2.38E+00	0.00E+00	9.12E+00	1.62E+01	4	0
ZRNB-95	Cntl	-4.61E+00	-4.61E+00	-4.61E+00	2.11E+01	1	0
I-131	Ind	-1.91E+00	-5.42E+00	1.87E+00	1.06E+01	4	0
I-131	Cntl	-3.85E-01	-3.85E-01	-3.85E-01	1.43E+01	1	0
CS-134	Ind	2.21E+00	3.55E-01	3.75E+00	8.23E+00	4	0
CS-134	Cntl	2.92E+00	2.92E+00	2.92E+00	8.87E+00	1	0
CS-137	Ind	-1.11E+00	-3.43E+00	3.23E+00	1.03E+01	4	0
CS-137	Cntl	-3.17E+00	-3.17E+00	-3.17E+00	1.22E+01	1	0
BALA140	Ind	1.92E+00	1.47E-01	4.54E+00	1.10E+01	4	0
BALA140	Cntl	3.97E+00	3.97E+00	3.97E+00	7.31E+00	1	0

TABLE A-16.1
GAMMA SPECTROMETRY RESULTS OF FRUITS

Results in pCi/ kilogram (wet)

Station 37 is Indicator - Station 9c is Control

Station 37 Peaches collected 7/26/2016				
Nuclide	RQ	Activity	Error	MDA
K-40	+	1.74E+03	± 2.23E+02	1.43E+02
MN-54		7.18E-01	± 9.56E+00	1.18E+01
CO-58		-4.44E+00	± 1.25E+01	1.53E+01
FE-59		-1.91E+01	± 3.66E+01	4.17E+01
CO-60		4.61E+00	± 1.13E+01	1.29E+01
ZN-65		8.54E-01	± 2.21E+01	2.66E+01
ZRNB-95		-1.16E+01	± 2.25E+01	2.72E+01
I-131		3.96E+00	± 1.01E+01	1.34E+01
CS-134		-5.64E+00	± 1.18E+01	1.48E+01
CS-137		-1.81E-01	± 1.18E+01	1.51E+01
BALA140		3.20E+00	± 1.28E+01	1.39E+01

Station 37 Peaches collected 8/16/2016				
Nuclide	RQ	Activity	Error	MDA
K-40	+	1.82E+03	± 2.12E+02	7.43E+01
MN-54		4.91E+00	± 5.89E+00	6.46E+00
CO-58		9.16E-01	± 6.12E+00	7.45E+00
FE-59		-8.42E-01	± 1.56E+01	1.82E+01
CO-60		-5.79E-01	± 9.69E+00	1.13E+01
ZN-65		2.37E+00	± 1.37E+01	1.62E+01
ZRNB-95		-4.19E+00	± 1.41E+01	1.71E+01
I-131		-3.54E+00	± 7.39E+00	9.67E+00
CS-134		4.51E+00	± 6.46E+00	7.67E+00
CS-137		3.46E+00	± 6.65E+00	7.97E+00
BALA140		0.00E+00	± 2.86E+00	1.10E+01

Station 37 wine grapes collected 8/17/2016				
Nuclide	RQ	Activity	Error	MDA
K-40	+	2.32E+03	± 2.53E+02	1.31E+02
MN-54		-8.34E-01	± 7.36E+00	1.05E+01
CO-58		1.93E+00	± 6.15E+00	8.67E+00
FE-59		0.00E+00	± 8.53E+00	3.03E+01
CO-60		5.35E+00	± 9.36E+00	1.20E+01
ZN-65		3.39E-01	± 1.56E+01	2.21E+01
ZRNB-95		-1.79E+00	± 1.08E+01	1.59E+01
I-131		-2.98E-01	± 5.74E+00	8.91E+00
CS-134		-6.70E-01	± 6.31E+00	9.16E+00
CS-137		-1.86E+00	± 6.33E+00	9.17E+00
BALA140		3.74E+00	± 3.35E+00	5.51E+00

Station 37 white wine grapes collected 8/17/2016				
Nuclide	RQ	Activity	Error	MDA
K-40	+	3.09E+03	± 2.61E+02	1.33E+02
MN-54		-1.12E+00	± 7.23E+00	1.59E+01
CO-58		3.27E+00	± 5.76E+00	1.31E+01
FE-59		8.40E+00	± 1.79E+01	4.00E+01
CO-60		7.65E+00	± 5.35E+00	1.20E+01
ZN-65		-2.55E+00	± 1.72E+01	3.74E+01
ZRNB-95		-3.03E+00	± 1.16E+01	2.59E+01
I-131		-4.33E-02	± 5.68E+00	1.34E+01
CS-134		-4.77E-01	± 5.80E+00	1.32E+01
CS-137		5.87E-02	± 6.63E+00	1.55E+01
BALA140		1.84E+00	± 2.13E+00	1.21E+01

Station 37 Apples collected 8/17/2016				
Nuclide	RQ	Activity	Error	MDA
K-40	+	1.01E+03	± 1.84E+02	1.36E+02
MN-54		7.44E-01	± 6.23E+00	9.18E+00
CO-58		0.00E+00	± 1.97E+00	1.23E+01
FE-59		9.64E+00	± 7.87E+00	1.18E+01
CO-60		-3.81E+00	± 1.31E+01	1.71E+01
ZN-65		9.27E+00	± 1.47E+01	1.95E+01
ZRNB-95		-8.50E-01	± 1.13E+01	1.71E+01
I-131		5.95E-02	± 5.24E+00	8.38E+00
CS-134		0.00E+00	± 7.96E-01	1.03E+01
CS-137		-7.37E-01	± 8.65E+00	1.27E+01
BALA140		1.49E-01	± 7.79E+00	1.16E+01

Station 9c Apples collected 9/2/2016				
Nuclide	RQ	Activity	Error	MDA
K-40	+	1.00E+03	± 1.85E+02	1.45E+02
MN-54		2.74E+00	± 9.83E+00	1.20E+01
CO-58		-6.62E-01	± 9.19E+00	1.14E+01
FE-59		-1.18E+01	± 3.42E+01	3.93E+01
CO-60		5.32E+00	± 1.10E+01	1.25E+01
ZN-65		0.00E+00	± 3.34E+00	3.08E+01
ZRNB-95		9.02E+00	± 1.59E+01	1.89E+01
I-131		1.69E+00	± 1.46E+01	1.98E+01
CS-134		-2.44E+00	± 1.08E+01	1.36E+01
CS-137		-7.01E-01	± 1.06E+01	1.35E+01
BALA140		0.00E+00	± 1.52E+00	2.03E+01

TABLE A - 16.2
GAMMA SPECTROMETRY RESULTS OF FRUITS - SUMMARY

Results in pCi/ kilogram (wet)

Nuclide		Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
K-40	Ind	2.00E+03	1.01E+03	3.09E+03	1.24E+02	5	5
K-40	Cntl	1.00E+03	1.00E+03	1.00E+03	1.45E+02	1	1
MN-54	Ind	8.84E-01	-1.12E+00	4.91E+00	1.08E+01	5	0
MN-54	Cntl	2.74E+00	2.74E+00	2.74E+00	1.20E+01	1	0
CO-58	Ind	3.35E-01	-4.44E+00	3.27E+00	1.14E+01	5	0
CO-58	Cntl	-6.62E-01	-6.62E-01	-6.62E-01	1.14E+01	1	0
FE-59	Ind	-3.74E-01	-1.91E+01	9.64E+00	2.84E+01	5	0
FE-59	Cntl	-1.18E+01	-1.18E+01	-1.18E+01	3.93E+01	1	0
CO-60	Ind	2.64E+00	-3.81E+00	7.65E+00	1.31E+01	5	0
CO-60	Cntl	5.32E+00	5.32E+00	5.32E+00	1.25E+01	1	0
ZN-65	Ind	2.06E+00	-2.55E+00	9.27E+00	2.44E+01	5	0
ZN-65	Cntl	0.00E+00	0.00E+00	0.00E+00	3.08E+01	1	0
ZRNB-95	Ind	-4.29E+00	-1.16E+01	-8.50E-01	2.06E+01	5	0
ZRNB-95	Cntl	9.02E+00	9.02E+00	9.02E+00	1.89E+01	1	0
I-131	Ind	2.86E-02	-3.54E+00	3.96E+00	1.07E+01	5	0
I-131	Cntl	1.69E+00	1.69E+00	1.69E+00	1.98E+01	1	0
CS-134	Ind	-4.55E-01	-5.64E+00	4.51E+00	1.10E+01	5	0
CS-134	Cntl	-2.44E+00	-2.44E+00	-2.44E+00	1.36E+01	1	0
CS-137	Ind	1.48E-01	-1.86E+00	3.46E+00	1.21E+01	5	0
CS-137	Cntl	-7.01E-01	-7.01E-01	-7.01E-01	1.35E+01	1	0
BALA140	Ind	1.79E+00	0.00E+00	3.74E+00	1.08E+01	5	0
BALA140	Cntl	0.00E+00	0.00E+00	0.00E+00	2.03E+01	1	0

TABLE A-17.1
GAMMA SPECTROMETRY RESULTS OF VEGETABLES

Results in pCi/ kilogram (wet)

Stations 37, 48G and 104 are Indicators - Station 9c is Control

Station 104 Broad Leaf Vegetable collected 5/3/2016					Station 37 Broad Leaf Vegetable collected 6/10/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K 40	+	4.68E+03 ±	4.06E+02	1.94E+02	K-40	+	2.64E+03 ±	3.95E+02	4.04E+02
MN-54		-3.13E+00 ±	1.31E+01	1.79E+01	MN-54		1.36E+00 ±	1.22E+01	3.10E+01
CO-58		-3.82E+00 ±	1.20E+01	1.64E+01	CO-58		1.08E+01 ±	9.39E+00	2.38E+01
FE-59		3.50E+01 ±	2.08E+01	4.44E+01	FE-59		6.89E+00 ±	3.73E+01	9.38E+01
CO-60		1.03E+01 ±	1.01E+01	1.22E+01	CO-60		-2.29E+00 ±	2.45E+01	5.16E+01
ZN-65		-1.27E+01 ±	3.46E+01	4.54E+01	ZN-65		0.00E+00 ±	1.38E+01	8.38E+01
ZRNB-95		1.35E+00 ±	1.79E+01	2.60E+01	ZRNB-95		6.86E+00 ±	2.51E+01	5.92E+01
I-131		4.11E+00 ±	8.63E+00	1.28E+01	I-131		-2.08E+00 ±	1.52E+01	3.64E+01
CS-134		-3.77E+00 ±	1.13E+01	1.57E+01	CS-134		-6.12E+00 ±	1.71E+01	3.67E+01
CS-137		7.48E+00 ±	1.09E+01	1.49E+01	CS-137		2.26E+00 ±	1.15E+01	3.01E+01
BALA140		-6.49E-01 ±	1.21E+01	1.68E+01	BALA140		1.74E+01 ±	1.10E+01	3.43E+01

Station 37 Broad Leaf Vegetable collected 6/24/2016					Station 37 Broad Leaf Vegetable collected 7/8/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	3.43E+03 ±	4.08E+02	1.20E+02	K-40	+	4.56E+03 ±	4.84E+02	2.20E+02
MN-54		1.07E+00 ±	1.24E+01	1.53E+01	MN-54		0.00E+00 ±	1.60E+00	2.00E+01
CO-58		4.36E+00 ±	1.11E+01	1.30E+01	CO-58		2.62E+00 ±	8.42E+00	1.23E+01
FE-59		1.26E+00 ±	3.81E+01	4.44E+01	FE-59		0.00E+00 ±	5.10E+00	5.73E+01
CO-60		-3.23E+00 ±	2.01E+01	2.33E+01	CO-60		7.70E+00 ±	1.96E+01	2.55E+01
ZN-65		-7.75E+00 ±	3.95E+01	4.68E+01	ZN-65		0.00E+00 ±	9.54E+00 [®]	5.43E+01
ZRNB-95		-5.48E+00 ±	2.62E+01	3.18E+01	ZRNB-95		-2.03E+00 ±	2.03E+01	3.01E+01
I-131		9.05E-01 ±	9.42E+00	1.27E+01	I-131		-1.40E+00 ±	1.10E+01	1.69E+01
CS-134		0.00E+00 ±	4.53E+00	1.88E+01	CS-134		0.00E+00 ±	4.06E+00	1.76E+01
CS-137		0.00E+00 ±	5.58E+00	1.94E+01	CS-137		3.17E+00 ±	1.09E+01	1.60E+01
BALA140		4.64E+00 ±	1.38E+01	1.45E+01	BALA140		0.00E+00 ±	2.72E+00	2.34E+01

Station 104 Broad Leaf Vegetable collected 7/12/2016					Station 37 Corn collected 7/12/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	7.58E+03 ±	6.15E+02	2.08E+02	K-40	+	2.72E+03 ±	3.56E+02	1.82E+02
MN-54		5.92E+00 ±	1.27E+01	1.75E+01	MN-54		1.16E+00 ±	1.00E+01	1.27E+01
CO-58		0.00E+00 ±	3.00E+00	2.14E+01	CO-58		0.00E+00 ±	1.95E+00	1.54E+01
FE-59		-8.55E+00 ±	5.35E+01	7.05E+01	FE-59		1.46E+01 ±	2.16E+01	2.22E+01
CO-60		2.04E+01 ±	1.82E+01	2.18E+01	CO-60		-4.46E-01 ±	1.27E+01	1.52E+01
ZN-65		5.84E+00 ±	3.22E+01	4.42E+01	ZN-65		0.00E+00 ±	4.79E+00	3.60E+01
ZRNB-95		4.53E+00 ±	1.97E+01	2.87E+01	ZRNB-95		-1.19E+00 ±	1.59E+01	2.07E+01
I-131		-8.06E-01 ±	1.16E+01	1.78E+01	I-131		-8.27E-01 ±	7.87E+00	1.10E+01
CS-134		4.25E+00 ±	1.18E+01	1.66E+01	CS-134		0.00E+00 ±	4.99E+00	1.54E+01
CS-137		-1.87E+00 ±	1.33E+01	1.93E+01	CS-137		1.72E+00 ±	1.04E+01	1.34E+01
BALA140		2.93E+00 ±	1.24E+01	1.75E+01	BALA140		0.00E+00 ±	2.49E+00	1.27E+01

TABLE A-17.1
GAMMA SPECTROMETRY RESULTS OF VEGETABLES

Results in pCi/ kilogram (wet)

Stations 37, 48G and 104 are Indicators - Station 9c is Control

Station 37 Broad Leaf Vegetable collected 7/22/2016					Station 48G Broad Leaf Vegetable collected 8/2/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	2.79E+03 ±	3.10E+02	2.34E+02	K-40	+	5.13E+03 ±	4.90E+02	2.75E+02
MN-54		8.24E-01 ±	7.39E+00	1.88E+01	MN-54		-8.87E+00 ±	2.44E+01	2.97E+01
CO-58		3.43E+00 ±	8.70E+00	2.02E+01	CO-58		-9.13E+00 ±	1.96E+01	2.36E+01
FE-59		0.00E+00 ±	4.87E+00	7.28E+01	FE-59		-1.23E+01 ±	5.44E+01	6.29E+01
CO-60		0.00E+00 ±	1.39E+00	2.94E+01	CO-60		-8.57E+00 ±	2.40E+01	2.76E+01
ZN-65		7.94E+00 ±	1.66E+01	4.12E+01	ZN-65		-1.34E+01 ±	4.63E+01	5.49E+01
ZRNB-95		7.01E+00 ±	1.34E+01	3.20E+01	ZRNB-95		0.00E+00 ±	1.62E+01	4.59E+01
I-131		0.00E+00 ±	3.16E+00	1.97E+01	I-131		9.32E+00 ±	1.60E+01	2.11E+01
CS-134		0.00E+00 ±	2.19E+00	2.39E+01	CS-134		3.80E+00 ±	2.10E+01	2.67E+01
CS-137		4.12E+00 ±	7.41E+00	1.83E+01	CS-137		-1.37E+00 ±	2.17E+01	2.77E+01
BALA140		2.72E+00 ±	3.14E+00	1.79E+01	BALA140		0.00E+00 ±	2.11E+00	3.65E+01

Station 37 Broad Leaf Vegetable collected 8/5/2016					Station 37 Corn collected 8/16/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	4.33E+03 ±	4.66E+02	3.15E+02	K-40	+	2.45E+03 ±	2.79E+02	1.11E+02
MN-54		1.08E+00 ±	1.86E+01	2.37E+01	MN-54		3.15E+00 ±	6.87E+00	7.97E+00
CO-58		2.18E+00 ±	1.76E+01	2.23E+01	CO-58		1.21E+00 ±	6.59E+00	7.97E+00
FE-59		1.69E+01 ±	4.40E+01	5.12E+01	FE-59		-1.82E+00 ±	3.05E+01	3.56E+01
CO-60		2.13E+01 ±	2.07E+01	2.29E+01	CO-60		6.43E+00 ±	1.00E+01	1.08E+01
ZN-65		0.00E+00 ±	1.66E+01	5.96E+01	ZN-65		-5.85E+00 ±	2.39E+01	2.82E+01
ZRNB-95		1.87E+01 ±	2.85E+01	3.56E+01	ZRNB-95		6.30E+00 ±	1.20E+01	1.38E+01
I-131		9.01E+00 ±	1.77E+01	2.41E+01	I-131		3.68E+00 ±	7.43E+00	9.61E+00
CS-134		-2.64E-01 ±	1.87E+01	2.47E+01	CS-134		0.00E+00 ±	3.52E+00	1.13E+01
CS-137		2.92E+00 ±	1.78E+01	2.32E+01	CS-137		-2.25E+00 ±	9.94E+00	1.24E+01
BALA140		-8.79E+00 ±	2.91E+01	3.25E+01	BALA140		-4.43E-01 ±	8.71E+00	9.66E+00

Station 48G Broad Leaf Vegetable collected 8/30/2016					Station 48G Broad Leaf Vegetable collected 8/30/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	4.80E+03 ±	4.76E+02	2.96E+02	K-40	+	3.79E+03 ±	4.46E+02	2.70E+02
MN-54		5.65E+00 ±	1.59E+01	1.98E+01	MN-54		-4.30E+00 ±	2.35E+01	2.89E+01
CO-58		0.00E+00 ±	7.48E+00	2.66E+01	CO-58		-6.58E+00 ±	2.09E+01	2.55E+01
FE-59		0.00E+00 ±	7.99E+00	7.63E+01	FE-59		8.67E+00 ±	4.69E+01	5.43E+01
CO-60		1.83E+01 ±	1.76E+01	1.92E+01	CO-60		9.69E+00 ±	2.08E+01	2.35E+01
ZN-65		2.22E+01 ±	3.47E+01	4.07E+01	ZN-65		2.73E+01 ±	3.82E+01	4.32E+01
ZRNB-95		1.03E+01 ±	2.65E+01	3.39E+01	ZRNB-95		-2.81E+00 ±	3.46E+01	4.28E+01
I-131		-4.67E-01 ±	1.42E+01	2.00E+01	I-131		9.83E+00 ±	1.95E+01	2.59E+01
CS-134		-3.58E+00 ±	1.86E+01	2.44E+01	CS-134		-6.64E+00 ±	2.39E+01	3.02E+01
CS-137		5.97E+00 ±	1.94E+01	2.51E+01	CS-137		-1.84E+01 ±	2.84E+01	3.52E+01
BALA140		-4.60E+00 ±	2.72E+01	3.08E+01	BALA140		-2.94E+00 ±	3.05E+01	3.39E+01

TABLE A-17.1
GAMMA SPECTROMETRY RESULTS OF VEGETABLES

Results in pCi/ kilogram (wet)

Stations 37, 48G and 104 are Indicators - Station 9c is Control

Station 37 Broad Leaf Vegetable collected 9/2/2016					Station 104 Broad Leaf Vegetable collected 9/13/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	2.80E+03 ±	3.76E+02	2.53E+02	K-40	+	3.39E+03 ±	3.97E+02	1.99E+02
MN-54		1.13E+01 ±	1.90E+01	2.27E+01	MN-54		-8.43E-01 ±	1.40E+01	1.67E+01
CO-58		-2.10E-01 ±	1.80E+01	2.24E+01	CO-58		2.51E+00 ±	1.10E+01	1.33E+01
FE-59		1.60E+01 ±	4.64E+01	5.30E+01	FE-59		0.00E+00 ±	1.48E+01	6.29E+01
CO-60		0.00E+00 ±	2.25E+00	3.45E+01	CO-60		8.34E+00 ±	1.93E+01	2.08E+01
ZN-65		-7.58E+00 ±	4.68E+01	5.59E+01	ZN-65		-1.06E+01 ±	4.10E+01	4.58E+01
ZRNB-95		2.49E+01 ±	3.19E+01	3.74E+01	ZRNB-95		0.00E+00 ±	2.47E+00	3.39E+01
I-131		-2.64E+00 ±	1.77E+01	2.40E+01	I-131		1.71E-01 ±	1.27E+01	1.65E+01
CS-134		-8.11E+00 ±	2.41E+01	3.04E+01	CS-134		6.39E+00 ±	9.99E+00	1.17E+01
CS-137		-1.29E+00 ±	1.96E+01	2.50E+01	CS-137		0.00E+00 ±	2.03E+00	1.72E+01
BALA140		3.07E+00 ±	2.02E+01	2.24E+01	BALA140		0.00E+00 ±	2.58E+00	2.22E+01

Station 48G Broad Leaf Vegetable collected 9/27/2016					Station 37 Cabbage collected 9/30/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	3.91E+03 ±	5.51E+02	3.45E+02	K-40	+	2.71E+03 ±	3.10E+02	1.05E+02
MN-54		1.27E+01 ±	1.11E+01	1.35E+01	MN-54		4.19E+00 ±	9.25E+00	1.08E+01
CO-58		-1.33E+00 ±	1.82E+01	2.63E+01	CO-58		4.41E+00 ±	6.99E+00	7.73E+00
FE-59		2.42E+01 ±	3.59E+01	4.69E+01	FE-59		1.34E+01 ±	1.90E+01	1.90E+01
CO-60		3.64E+00 ±	2.11E+01	2.89E+01	CO-60		0.00E+00 ±	2.03E+00	1.95E+01
ZN-65	®	0.00E+00 ±	5.55E+00	6.03E+01	ZN-65		-4.13E+00 ±	2.79E+01	3.33E+01
ZRNB-95		-9.82E-01 ±	2.91E+01	4.36E+01	ZRNB-95		-4.99E+00 ±	1.92E+01	2.32E+01
I-131		0.00E+00 ±	4.98E+00	2.63E+01	I-131		5.60E+00 ±	7.58E+00	9.28E+00
CS-134		2.28E+00 ±	1.62E+01	2.35E+01	CS-134		2.39E+00 ±	8.95E+00	1.11E+01
CS-137		-2.81E+00 ±	1.69E+01	2.50E+01	CS-137		6.53E+00 ±	7.98E+00	8.95E+00
BALA140		-3.57E+00 ±	2.69E+01	3.69E+01	BALA140		1.66E+00 ±	1.11E+01	1.21E+01

Station 37 Broad Leaf Vegetable collected 10/21/2016					Station 9c Broad Leaf Vegetable collected 9/2/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	4.33E+03 ±	4.12E+02	2.79E+02	K-40	+	5.03E+03 ±	5.42E+02	2.44E+02
MN-54		1.10E+01 ±	1.28E+01	1.66E+01	MN-54		2.19E+00 ±	1.11E+01	1.38E+01
CO-58		-4.99E+00 ±	1.34E+01	1.81E+01	CO-58		6.31E+00 ±	9.84E+00	1.11E+01
FE-59		-1.73E+01 ±	4.16E+01	5.32E+01	FE-59		-2.79E+00 ±	3.27E+01	3.89E+01
CO-60		5.41E+00 ±	1.91E+01	2.44E+01	CO-60		-3.37E+00 ±	2.28E+01	2.72E+01
ZN-65		1.08E+01 ±	3.43E+01	4.51E+01	ZN-65		0.00E+00 ±	1.48E+01	6.07E+01
ZRNB-95		-3.96E+00 ±	2.42E+01	3.40E+01	ZRNB-95		-2.97E+00 ±	2.43E+01	3.16E+01
I-131		6.56E-01 ±	1.51E+01	2.26E+01	I-131		1.91E-01 ±	9.00E+00	1.27E+01
CS-134		9.83E+00 ±	1.21E+01	1.63E+01	CS-134		-1.05E+00 ±	1.24E+01	1.62E+01
CS-137		4.52E+00 ±	1.51E+01	2.10E+01	CS-137		5.21E+00 ±	1.22E+01	1.51E+01
BALA140		9.42E+00 ±	1.41E+01	1.72E+01	BALA140		0.00E+00 ±	2.97E+00	2.15E+01

TABLE A - 17.2
GAMMA SPECTROMETRY RESULTS OF VEGETABLES - SUMMARY

Results in pCi/ kilogram (wet)

Nuclide		Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
K-40	Ind	3.88E+03	2.45E+03	7.58E+03	2.36E+02	17	17
K-40	Cntl	5.03E+03	5.03E+03	5.03E+03	2.44E+02	1	1
MN-54	Ind	2.49E+00	-8.87E+00	1.27E+01	1.90E+01	17	0
MN-54	Cntl	2.19E+00	2.19E+00	2.19E+00	1.38E+01	1	0
CO-58	Ind	3.22E-01	-9.13E+00	1.08E+01	1.86E+01	17	0
CO-58	Cntl	6.31E+00	6.31E+00	6.31E+00	1.11E+01	1	0
FE-59	Ind	5.70E+00	-1.73E+01	3.50E+01	5.42E+01	17	0
FE-59	Cntl	-2.79E+00	-2.79E+00	-2.79E+00	3.89E+01	1	0
CO-60	Ind	5.70E+00	-8.57E+00	2.13E+01	2.42E+01	17	0
CO-60	Cntl	-3.37E+00	-3.37E+00	-3.37E+00	2.72E+01	1	0
ZN-65	Ind	7.11E-01	-1.34E+01	2.73E+01	4.82E+01	17	0
ZN-65	Cntl	0.00E+00	0.00E+00	0.00E+00	6.07E+01 ^a	1	0
ZRNB-95	Ind	3.44E+00	-5.48E+00	2.49E+01	3.37E+01	17	0
ZRNB-95	Cntl	-2.97E+00	-2.97E+00	-2.97E+00	3.16E+01	1	0
I-131	Ind	2.06E+00	-2.64E+00	9.83E+00	1.92E+01	17	0
I-131	Cntl	1.91E-01	1.91E-01	1.91E-01	1.27E+01	1	0
CS-134	Ind	2.70E-02	-8.11E+00	9.83E+00	2.09E+01	17	0
CS-134	Cntl	-1.05E+00	-1.05E+00	-1.05E+00	1.62E+01	1	0
CS-137	Ind	6.31E-01	-1.84E+01	7.48E+00	2.07E+01	17	0
CS-137	Cntl	5.21E+00	5.21E+00	5.21E+00	1.51E+01	1	0
BALA140	Ind	1.22E+00	-8.79E+00	1.74E+01	2.30E+01	17	0
BALA140	Cntl	0.00E+00	0.00E+00	0.00E+00	2.15E+01	1	0

TABLE B-1.1
2016 QUARTERLY SPECIAL INTEREST TLD RESULTS

Results in milli-Roentgen (mR) per Standard Quarter

Station ID	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Quarterly Sum
58	23.0	19.1	19.6	22.8	84.4
87	28.4	28.4	29.1	29.9	115.8
88	23.1	23.5	25.6	31.1	103.3
89	25.4	26.2	27.4	24.5	103.5
90	18.4	19.5	19.1	16.8	73.7
119B	20.3	22.3	21.7	23.6	87.9
119Ctrl	21.1	21.9	22.1	21.7	86.8
121	70.7	66.3	70.2	70.4	277.6
122	34.0	34.8	35.7	31.7	136.3
123 (ISFSI)	90.4	94.9	92.0	89.8	367.1
124 (ISFSI)	109.5	110.4	107.8	117.9	445.6
125 (ISFSI)	83.4	80.7	83.0	74.6	321.8
126 (ISFSI)	122.5	125.0	121.3	102.6	471.4
127 (ISFSI)	91.3	-	94.3	90.0	-
128 (ISFSI)	140.3	146.9	139.3	143.8	570.3
129 (ISFSI)	107.2	111.0	106.6	99.6	424.4
136A (ISFSI)	155.7	163.3	-	-	319.0
137A (ISFSI)	231.8	238.4	-	-	470.2
138A (ISFSI)	194.0	199.1	-	-	393.2
136B (ISFSI)	-	-	45.3	45.9	91.2
137B (ISFSI)	-	-	46.5	41.2	87.7
138B (ISFSI)	-	-	47.7	42.4	90.1
150 (Site 1)	17.1	19.3	18.7	16.9	72.0
151 (Site 4)	18.7	19.1	18.8	15.7	72.3
155	23.0	25.0	25.2	26.9	100.1
156	26.8	27.4	28.8	28.6	111.6

TABLE B-1.2
2016 QUARTERLY SPECIAL INTEREST TLD RESULTS- SUMMARY

Results in milli-Roentgen (mR) per Standard Quarter

Location	Average Activity	Activity Low	Activity High	Number of Samples
ISFSI Quarterly Ind	111.0	41.2	238.4	39
SITE 1 & 4 Quarterly Ind	18.0	15.7	19.3	8
Quarterly Control TLDs	19.8	19.6	20.2	4

Stations 58 and 87 to 90 were established in 2009 to monitor exposure from remediation work at the DOE 618-11 burial site.

Station 121 results high due to location being near transformer yard. Station 122 results influenced by ISFSI.

Quarterly Control TLD location is ST-9. See Table A-1.1.

No 2nd quarter TLD result for St-127 obtained from vendor. Based on the available data (3 quarters), the normalized quarterly sum for Station 127 is estimated to be 367.5 mR.

Stations 155 and 156 were added in the 1st quarter 2016. Stations 136A-138A were relocated to new fence starting in the 3rd quarter and redesignated as Stations 136B-138B.

Table B - 2.1
GAMMA SPECTROMETRY RESULTS OF STORM DRAIN WATER
STATION 101B

Results in pCi/liter, corrected for decay during collection period

Location ST-101B collected 2/1/2016				Location ST-101B collected 3/1/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		3.70E+00 ±	3.79E+01	5.48E+01	K-40	+	5.09E+01 ±	3.24E+01	3.25E+01
CR-51		-2.81E+01 ±	3.72E+01	4.75E+01	CR-51		3.90E+00 ±	2.47E+01	3.46E+01
MN-54		-9.00E-01 ±	3.30E+00	4.03E+00	MN-54		8.32E-01 ±	2.63E+00	3.28E+00
CO-58		0.00E+00 ±	1.72E+00	5.14E+00	CO-58		-1.19E+00 ±	3.35E+00	4.18E+00
FE-59		4.68E+00 ±	8.15E+00	9.05E+00	FE-59		1.41E+00 ±	7.51E+00	8.90E+00
CO-60		-1.03E+00 ±	3.96E+00	4.47E+00	CO-60		2.14E+00 ±	2.58E+00	2.81E+00
ZN-65		1.63E-01 ±	6.71E+00	7.88E+00	ZN-65		0.00E+00 ±	1.45E+00	8.76E+00
ZRNB-95		-1.42E+00 ±	6.69E+00	8.21E+00	ZRNB-95		1.00E+00 ±	4.67E+00	6.05E+00
I-131		-4.29E+00 ±	9.74E+00	1.26E+01	I-131		2.59E-01 ±	6.64E+00	9.38E+00
CS-134		7.27E-01 ±	2.50E+00	3.15E+00	CS-134		-1.31E+00 ±	3.31E+00	4.28E+00
CS-137		7.85E-01 ±	3.08E+00	3.76E+00	CS-137		-4.50E-01 ±	3.05E+00	3.98E+00
BALA140		5.68E-01 ±	8.29E+00	9.24E+00	BALA140		-1.48E+00 ±	7.07E+00	8.15E+00
BI-214	+	1.63E+01 ±	6.76E+00	8.55E+00	BI-214		0.00E+00 ±	5.83E+00	9.59E+00

Location ST-101B collected 4/1/2016				Location ST-101B collected 5/2/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		1.23E+01 ±	3.89E+01	4.71E+01	K-40		5.19E+00 ±	4.21E+01	5.11E+01
CR-51		-1.22E+01 ±	3.74E+01	5.03E+01	CR-51		1.25E+01 ±	2.93E+01	3.92E+01
MN-54		-2.73E-01 ±	3.14E+00	3.88E+00	MN-54		-8.39E-01 ±	2.93E+00	3.57E+00
CO-58		7.71E-01 ±	3.00E+00	3.65E+00	CO-58		2.67E+00 ±	2.82E+00	3.23E+00
FE-59		1.48E-01 ±	1.09E+01	1.28E+01	FE-59		4.97E+00 ±	6.61E+00	7.04E+00
CO-60		1.93E+00 ±	1.95E+00	1.95E+00	CO-60		1.57E+00 ±	2.51E+00	2.75E+00
ZN-65		3.50E+00 ±	6.07E+00	6.98E+00	ZN-65		-3.19E+00 ±	7.15E+00	8.38E+00
ZRNB-95		4.78E+00 ±	5.82E+00	6.78E+00	ZRNB-95		2.23E+00 ±	5.23E+00	6.28E+00
I-131		0.00E+00 ±	4.85E+00	2.46E+01	I-131		-2.43E+00 ±	9.62E+00	1.30E+01
CS-134		4.42E-01 ±	3.00E+00	3.81E+00	CS-134		-7.32E-01 ±	3.10E+00	3.92E+00
CS-137		-1.37E+00 ±	3.39E+00	4.23E+00	CS-137		-4.52E-01 ±	2.61E+00	3.30E+00
BALA140		2.54E+00 ±	1.25E+01	1.38E+01	BALA140		0.00E+00 ±	7.66E-01	1.25E+01
BI-214		1.53E+00 ±	7.33E+00	1.01E+01	BI-214		2.11E+00 ±	7.64E+00	1.04E+01

Location ST-101B collected 6/1/2016				Location ST-101B collected 7/2/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	4.00E+01 ±	3.59E+01	3.84E+01	K-40		2.39E+01 ±	3.46E+01	4.38E+01
CR-51		1.19E+01 ±	2.38E+01	3.26E+01	CR-51		-4.25E+00 ±	3.07E+01	4.32E+01
MN-54		-1.18E+00 ±	3.54E+00	4.45E+00	MN-54		2.19E+00 ±	2.34E+00	2.81E+00
CO-58		6.34E-01 ±	2.52E+00	3.15E+00	CO-58		-8.29E-02 ±	2.89E+00	3.70E+00
FE-59		-3.04E+00 ±	9.04E+00	1.06E+01	FE-59		3.07E+00 ±	9.63E+00	1.11E+01
CO-60		1.10E+00 ±	3.60E+00	4.25E+00	CO-60		-9.10E-02 ±	2.98E+00	3.59E+00
ZN-65		0.00E+00 ±	1.78E+00	8.77E+00	ZN-65		-1.99E+00 ±	6.03E+00	7.14E+00
ZRNB-95		-2.62E+00 ±	6.40E+00	8.22E+00	ZRNB-95		9.68E-02 ±	5.47E+00	7.00E+00
I-131		3.81E+00 ±	6.36E+00	8.66E+00	I-131		6.76E-01 ±	9.63E+00	1.31E+01
CS-134		1.07E+00 ±	2.60E+00	3.35E+00	CS-134		-4.81E-01 ±	2.47E+00	3.23E+00
CS-137		-8.50E-01 ±	3.34E+00	4.35E+00	CS-137		3.45E-01 ±	2.34E+00	3.06E+00
BALA140		1.81E-01 ±	5.48E+00	6.42E+00	BALA140		7.17E+00 ±	7.65E+00	8.07E+00
BI-214		1.11E+00 ±	6.54E+00	9.36E+00	BI-214		5.26E+00 ±	5.24E+00	7.39E+00

Table B - 2.1

**GAMMA SPECTROMETRY RESULTS OF STORM DRAIN WATER
STATION 101B**

Results in pCi/liter, corrected for decay during collection period

Location ST-101B collected 8/1/2016				Location ST-101B collected 9/1/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		8.02E+00 ±	3.85E+01	5.77E+01	K-40		2.34E+01 ±	3.87E+01	4.75E+01
CR-51		-1.07E+01 ±	2.79E+01	4.08E+01	CR-51		2.11E+01 ±	2.54E+01	3.63E+01
MN-54		3.31E-01 ±	2.70E+00	3.72E+00	MN-54		0.00E+00 ±	1.74E+00	4.80E+00
CO-58		7.77E-02 ±	2.63E+00	3.68E+00	CO-58		3.65E-01 ±	3.03E+00	4.17E+00
FE-59		-2.27E+00 ±	9.14E+00	1.19E+01	FE-59		2.21E+00 ±	7.48E+00	9.93E+00
CO-60		2.66E+00 ±	2.65E+00	3.23E+00	CO-60		6.51E-01 ±	3.06E+00	3.99E+00
ZN-65		7.03E+00 ±	4.76E+00	8.46E+00	ZN-65		-2.17E+00 ±	7.59E+00	9.97E+00
ZRNB-95		-9.19E-01 ±	5.28E+00	7.45E+00	ZRNB-95		-1.18E+00 ±	5.90E+00	8.27E+00
I-131		4.48E+00 ±	6.52E+00	9.41E+00	I-131		-8.24E+00 ±	1.24E+01	1.78E+01
CS-134		1.68E+00 ±	2.70E+00	3.66E+00	CS-134		-1.24E-01 ±	2.83E+00	3.96E+00
CS-137		7.00E-01 ±	2.34E+00	3.29E+00	CS-137		1.85E+00 ±	2.53E+00	3.41E+00
BALA140		6.32E+00 ±	5.69E+00	6.65E+00	BALA140		-2.43E+00 ±	1.06E+01	1.35E+01
BI-214	+	8.26E+00 ±	6.26E+00	8.12E+00	BI-214		0.00E+00 ±	5.98E+00	9.84E+00

Location ST-101B collected 9/30/2016				Location ST-101B collected 10/31/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		3.44E+01 ±	3.51E+01	3.72E+01	K-40	+	5.36E+01 ±	2.89E+01	3.20E+01
CR-51		-5.09E+00 ±	2.96E+01	4.00E+01	CR-51		-1.96E+01 ±	3.10E+01	4.10E+01
MN-54		2.68E-01 ±	2.90E+00	3.58E+00	MN-54		-2.16E+00 ±	3.64E+00	4.37E+00
CO-58		-1.95E+00 ±	3.90E+00	4.71E+00	CO-58		2.19E+00 ±	2.76E+00	3.20E+00
FE-59		0.00E+00 ±	2.26E+00	1.29E+01	FE-59		1.96E+00 ±	8.51E+00	9.80E+00
CO-60		8.01E-01 ±	3.27E+00	3.78E+00	CO-60		1.13E+00 ±	2.93E+00	3.33E+00
ZN-65		-3.43E+00 ±	7.17E+00	8.38E+00	ZN-65		-2.81E+00 ±	7.38E+00	8.69E+00
ZRNB-95		-1.60E+00 ±	6.58E+00	8.06E+00	ZRNB-95		-1.45E+00 ±	5.74E+00	7.01E+00
I-131		9.65E+00 ±	7.81E+00	9.77E+00	I-131		6.99E+00 ±	7.10E+00	9.08E+00
CS-134		0.00E+00 ±	2.12E+00	3.99E+00	CS-134		0.00E+00 ±	1.41E+00	4.18E+00
CS-137		1.13E+00 ±	2.83E+00	3.53E+00	CS-137		-6.62E-01 ±	3.05E+00	3.84E+00
BALA140		3.93E-01 ±	7.69E+00	8.58E+00	BALA140		1.82E-01 ±	7.92E+00	8.86E+00
BI-214		7.17E-01 ±	7.39E+00	1.02E+01	BI-214		2.56E+00 ±	7.48E+00	1.02E+01

Location ST-101B collected 11/30/2016				Location ST-101B collected 1/3/2017					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		2.29E+01 ±	3.96E+01	4.71E+01	K-40		2.19E+01 ±	3.51E+01	4.85E+01
CR-51		-3.95E+00 ±	3.50E+01	4.75E+01	CR-51		1.25E-01 ±	2.72E+01	4.06E+01
MN-54		1.34E+00 ±	2.68E+00	3.20E+00	MN-54		0.00E+00 ±	1.48E+00	3.98E+00
CO-58		-1.18E-01 ±	3.14E+00	3.90E+00	CO-58		-1.16E+00 ±	3.10E+00	4.18E+00
FE-59		-1.99E+00 ±	1.06E+01	1.23E+01	FE-59		1.25E+00 ±	8.49E+00	1.13E+01
CO-60		1.23E-01 ±	2.64E+00	3.09E+00	CO-60		-1.17E+00 ±	4.05E+00	5.16E+00
ZN-65		-1.61E+00 ±	6.84E+00	8.12E+00	ZN-65		2.96E+00 ±	6.16E+00	8.05E+00
ZRNB-95		7.67E-01 ±	6.03E+00	7.43E+00	ZRNB-95		3.19E+00 ±	4.78E+00	6.51E+00
I-131		1.78E+00 ±	1.07E+01	1.44E+01	I-131		1.78E+00 ±	7.48E+00	1.11E+01
CS-134		1.82E+00 ±	2.41E+00	2.92E+00	CS-134		1.07E+00 ±	2.37E+00	3.26E+00
CS-137		6.46E-02 ±	2.76E+00	3.53E+00	CS-137		-2.50E-01 ±	2.73E+00	3.86E+00
BALA140		-3.67E+00 ±	1.29E+01	1.41E+01	BALA140		-7.89E-01 ±	8.47E+00	1.10E+01
BI-214		7.83E+00 ±	6.83E+00	9.08E+00	BI-214		0.00E+00 ±	6.32E+00	1.04E+01

TABLE B-2.2
GAMMA SPECTROMETRY RESULTS OF STORM DRAIN WATER - SUMMARY
STATION 101B

Results in pCi/liter, corrected for decay during collection period

Nuclide	Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
K-40	2.50E+01	3.70E+00	5.36E+01	4.48E+01	12	3
CR-51	-2.87E+00	-2.81E+01	2.11E+01	4.11E+01	12	0
MN-54	-3.30E-02	-2.16E+00	2.19E+00	3.81E+00	12	0
CO-58	1.84E-01	-1.95E+00	2.67E+00	3.91E+00	12	0
FE-59	1.03E+00	-3.04E+00	4.97E+00	1.06E+01	12	0
CO-60	8.19E-01	-1.17E+00	2.66E+00	3.53E+00	12	0
ZN-65	-1.29E-01	-3.43E+00	7.03E+00	8.30E+00	12	0
ZRNB-95	8.70E-02	-3.43E+00	4.78E+00	7.30E+00	12	0
I-131	1.20E+00	-8.24E+00	9.65E+00	1.27E+01	12	0
CS-134	3.46E-01	-1.31E+00	1.82E+00	3.64E+00	12	0
CS-137	6.98E-02	-1.37E+00	1.85E+00	3.68E+00	12	0
BALA140	7.48E-01	-3.67E+00	7.17E+00	1.01E+01	12	0
BI-214	3.81E+00	0.00E+00	1.63E+01	9.43E+00	12	2

TABLE B-3.1
GROSS BETA IN STORM DRAIN WATER

Results in pCi per liter

Location	Collection Period	RQ	Activity	Error	MDA
ST-101B	12/30/15 - 02/01/16		1.01E+00 ±	7.45E-01	2.46E+00
	02/01/16 - 03/01/16		-1.24E-01 ±	6.80E-01	2.39E+00
	03/01/16 - 04/01/16		1.75E+00 ±	7.21E-01	2.21E+00
	04/01/16 - 05/02/16		2.20E+00 ±	7.96E-01	2.35E+00
	05/02/16 - 06/01/16		1.74E+00 ±	7.18E-01	2.16E+00
	06/01/16 - 07/02/16	+	3.96E+00 ±	8.87E-01	2.34E+00
	07/02/16 - 08/01/16		-1.80E-01 ±	7.35E-01	2.55E+00
	08/01/16 - 09/01/16		1.35E-01 ±	7.42E-01	2.60E+00
	09/01/16 - 09/30/16		1.60E+00 ±	7.21E-01	2.24E+00
	10/01/16 - 10/31/16	+	3.42E+00 ±	7.78E-01	2.04E+00
	10/31/16 - 11/30/16		6.98E-01 ±	5.69E-01	1.91E+00
	12/01/16 - 01/03/17		1.59E+00 ±	7.64E-01	2.13E+00

TABLE B-3.2
GROSS BETA IN STORM DRAIN WATER - SUMMARY

Results in pCi per liter

Average Activity	Activity Low	Activity High	Number of Samples	Number of Positive IDs
1.48E+00	-1.80E-01	3.96E+00	12	2

TABLE B-4.1
TRITIUM IN STORM DRAIN WATER

Results in pCi per liter

Location	Collection Period	RQ	Activity	Error
ST-101B	12/30/15 - 02/01/16	+	1.22E+04 ±	2.65E+02
	02/01/16 - 03/01/16	+	1.35E+04 ±	2.79E+02
	03/01/16 - 04/01/16	+	4.47E+03 ±	1.75E+02
	04/01/16 - 05/02/16	+	6.00E+02 ±	1.06E+02
	05/02/16 - 06/01/16	+	3.80E+02 ±	9.67E+01
	06/01/16 - 07/02/16	+	4.98E+02 ±	9.76E+01
	07/02/16 - 08/01/16	+	5.38E+02 ±	1.02E+02
	08/01/16 - 09/01/16	+	5.08E+02 ±	9.88E+01
	09/01/16 - 09/30/16	+	4.45E+02 ±	1.00E+02
	09/30/16 - 10/31/16	+	1.04E+03 ±	1.15E+02
	10/31/16 - 11/30/16	+	4.26E+03 ±	1.72E+02
	11/30/16 - 01/03/17	+	6.48E+03 ±	2.05E+02

TABLE B-4.2
TRITIUM IN STORM DRAIN WATER - SUMMARY

Results in pCi per liter

Average Activity	Activity Low	Activity High	Number of Samples	Number of Positive IDs
3.74E+03	3.80E+02	1.35E+04	12	12

TABLE B-5.1
GROSS ALPHA IN SANITARY WASTE TREATMENT WATER

Results in pCi per liter
ST 102B - SWTF Headworks

Collection Period	RQ	Activity	Error	MDA
12/30/15 - 02/01/16		4.51E+00 ±	1.67E+00	4.73E+00
02/01/16 - 03/01/16		-7.03E-01 ±	1.69E+00	6.76E+00
03/01/16 - 04/01/16		-1.06E+00 ±	1.95E+00	7.73E+00
04/01/16 - 05/02/16		5.05E-01 ±	1.05E+00	4.55E+00
05/02/16 - 06/01/16		1.56E+00 ±	1.61E+00	5.97E+00
06/01/16 - 07/02/16		-1.86E+00 ±	2.23E+00	8.29E+00
07/02/16 - 08/01/16		-1.97E+00 ±	1.82E+00	6.54E+00
08/01/16 - 09/01/16		1.69E+00 ±	1.40E+00	4.96E+00
09/01/16 - 09/30/16		-3.73E+00 ±	2.54E+00	8.55E+00
10/01/16 - 10/31/16		-1.99E+00 ±	2.86E+00	1.09E+01
10/31/16 - 11/30/16		-3.12E-01 ±	2.84E+00	1.20E+01
12/01/16 - 01/03/17		1.69E+00 ±	2.72E+00	1.09E+01

TABLE B-5.2
GROSS ALPHA IN SANITARY WASTE TREATMENT WATER - SUMMARY

Results in pCi per liter

Location	Average Activity	Activity Low	Activity High [®]	Number of Samples	Number of Positive IDs
ST 102B	-1.39E-01	-3.73E+00	4.51E+00	12	0

TABLE B-6.1
GROSS BETA IN SANITARY WASTE TREATMENT WATER

Results in pCi per liter
ST 102B - SWTF Headworks

Collection Period	RQ	Activity	Error	MDA
12/30/15 - 02/01/16	+	2.25E+01 ±	1.70E+00	2.89E+00
02/01/16 - 03/01/16	+	2.00E+01 ±	1.73E+00	3.14E+00
03/01/16 - 04/01/16	+	2.52E+01 ±	1.96E+00	3.14E+00
04/01/16 - 05/02/16	+	2.66E+01 ±	1.88E+00	2.92E+00
05/02/16 - 06/01/16	+	2.45E+01 ±	1.90E+00	2.96E+00
06/01/16 - 07/02/16	+	2.98E+01 ±	2.05E+00	3.09E+00
07/02/16 - 08/01/16	+	1.70E+01 ±	1.80E+00	3.73E+00
08/01/16 - 09/01/16	+	2.07E+01 ±	1.84E+00	3.48E+00
09/01/16 - 09/30/16	+	2.39E+01 ±	1.80E+00	2.83E+00
10/01/16 - 10/31/16	+	2.44E+01 ±	1.84E+00	2.86E+00
10/31/16 - 11/30/16	+	2.87E+01 ±	2.03E+00	2.97E+00
12/01/16 - 01/03/17	+	3.28E+01 ±	2.17E+00	3.30E+00

TABLE B-6.2
GROSS BETA IN SANITARY WASTE TREATMENT WATER - SUMMARY

Results in pCi per liter

Location	Average Activity	Activity Low	Activity High	Number of Samples	Number of Positive IDs
ST 102B	2.47E+01	1.70E+01	3.28E+01	12	12

Table B-7.1

**GAMMA SPECTROMETRY RESULTS OF SANITARY WASTE TREATMENT WATER
STATION 102B**

Results in pCi/liter, corrected for decay during collection period

Location ST-102b collected 2/1/2016				Location ST-102b collected 3/1/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		2.24E+00 ±	4.64E+01	6.95E+01	K-40	+	7.96E+01 ±	5.32E+01	5.81E+01
CR-51		-3.12E+01 ±	4.94E+01	6.59E+01	CR-51		-1.94E+00 ±	4.16E+01	5.67E+01
MN-54		6.39E-01 ±	3.69E+00	4.75E+00	MN-54		-3.00E+00 ±	4.10E+00	4.97E+00
CO-58		1.68E+00 ±	3.57E+00	4.56E+00	CO-58		-1.60E+00 ±	4.07E+00	4.99E+00
FE-59		-2.85E+00 ±	1.18E+01	1.41E+01	FE-59		3.40E-01 ±	1.13E+01	1.33E+01
CO-60		3.75E-01 ±	5.96E-01	4.94E+00	CO-60		1.86E+00 ±	4.08E+00	4.59E+00
ZN-65		1.71E+00 ±	7.44E+00	9.12E+00	ZN-65		-5.16E+00 ±	9.56E+00	1.10E+01
ZRNB-95		-2.74E+00 ±	7.81E+00	9.97E+00	ZRNB-95		-4.13E+00 ±	7.96E+00	9.71E+00
I-131		1.23E+01 ±	1.61E+01	1.69E+01	I-131		1.08E+00 ±	1.00E+01	1.37E+01
CS-134		1.10E+00 ±	3.75E+00	4.92E+00	CS-134		-3.59E+00 ±	4.47E+00	5.61E+00
CS-137		6.17E-01 ±	2.77E+00	4.70E+00	CS-137		1.49E+00 ±	3.58E+00	4.51E+00
BALA140		4.22E+00 ±	7.64E+00	1.28E+01	BALA140		-2.28E+00 ±	1.00E+01	1.11E+01
BI-214	+	3.57E+01 ±	8.43E+00	1.18E+01	BI-214		8.03E+00 ±	1.08E+01	1.40E+01

Location ST-102b collected 4/1/2016				Location ST-102b collected 5/2/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	1.38E+02 ±	4.50E+01	4.68E+01	K-40		2.90E+01 ±	4.52E+01	6.26E+01
CR-51		8.78E-01 ±	4.12E+01	5.63E+01	CR-51		1.85E+01 ±	3.53E+01	5.08E+01
MN-54		-3.24E+00 ±	4.36E+00	5.29E+00	MN-54		1.47E+00 ±	3.25E+00	4.27E+00
CO-58		-2.09E+00 ±	4.39E+00	5.36E+00	CO-58		6.51E-01 ±	3.78E+00	5.03E+00
FE-59		1.50E+00 ±	1.08E+01	1.27E+01	FE-59		0.00E+00 ±	6.22E+00	1.25E+01
CO-60		7.39E-01 ±	3.86E+00	4.40E+00	CO-60		1.82E+00 ±	3.91E+00	4.89E+00
ZN-65		-7.11E-01 ±	8.33E+00	9.77E+00	ZN-65		2.24E+00 ±	6.79E+00	8.78E+00
ZRNB-95		-1.18E+00 ±	8.05E+00	9.95E+00	ZRNB-95		-8.37E-01 ±	7.60E+00	1.01E+01
I-131		4.32E+00 ±	1.18E+01	1.60E+01	I-131		2.55E+00 ±	8.96E+00	1.30E+01
CS-134		2.46E-01 ±	3.88E+00	4.96E+00	CS-134		2.35E+00 ±	3.45E+00	4.62E+00
CS-137		-1.27E+00 ±	4.04E+00	5.11E+00	CS-137		1.20E+00 ±	3.28E+00	4.47E+00
BALA140		6.38E-01 ±	1.08E+01	1.21E+01	BALA140		-4.17E+00 ±	9.82E+00	1.20E+01
BI-214		0.00E+00 ±	8.27E+00	1.36E+01	BI-214		0.00E+00 ±	8.21E+00	1.35E+01

Location ST-102b collected 6/1/2016				Location ST-102b collected 7/2/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	1.67E+02 ±	4.35E+01	4.12E+01	K-40	+	1.11E+02 ±	4.48E+01	4.63E+01
CR-51		4.63E+01 ±	4.28E+01	5.66E+01	CR-51		-1.93E+00 ±	4.63E+01	6.32E+01
MN-54		2.31E-01 ±	3.60E+00	4.46E+00	MN-54		1.48E+00 ±	3.47E+00	4.24E+00
CO-58		-1.42E+00 ±	4.22E+00	5.18E+00	CO-58		-3.35E+00 ±	4.59E+00	5.57E+00
FE-59		2.03E+00 ±	1.23E+01	1.44E+01	FE-59		4.29E-01 ±	1.18E+01	1.39E+01
CO-60		3.12E+00 ±	3.64E+00	4.11E+00	CO-60		-3.12E-01 ±	3.66E+00	4.29E+00
ZN-65		-7.69E-01 ±	8.84E+00	1.04E+01	ZN-65		-4.41E+00 ±	8.29E+00	9.58E+00
ZRNB-95		-1.04E+00 ±	7.66E+00	9.48E+00	ZRNB-95		5.67E-01 ±	8.02E+00	9.94E+00
I-131		-1.20E+01 ±	1.63E+01	2.18E+01	I-131		-1.88E+01 ±	2.27E+01	3.03E+01
CS-134		3.79E-01 ±	3.93E+00	5.02E+00	CS-134		-2.50E-01 ±	3.49E+00	4.46E+00
CS-137		-2.16E-01 ±	3.91E+00	5.00E+00	CS-137		-5.07E-01 ±	3.38E+00	4.31E+00
BALA140		4.47E+00 ±	1.04E+01	1.14E+01	BALA140		-9.76E+00 ±	1.59E+01	1.74E+01
BI-214		4.01E+00 ±	1.04E+01	1.36E+01	BI-214		5.58E+00 ±	9.84E+00	1.27E+01

Table B-7.1

**GAMMA SPECTROMETRY RESULTS OF SANITARY WASTE TREATMENT WATER
STATION 102B**

Results in pCi/liter, corrected for decay during collection period

Location ST-102b collected 8/1/2016					Location ST-102b collected 9/1/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	1.80E+02 ±	4.34E+01	4.02E+01	K-40	+	1.31E+02 ±	4.77E+01	4.83E+01
CR-51		-2.85E+01 ±	4.15E+01	5.56E+01	CR-51		-6.65E+00 ±	4.56E+01	6.20E+01
MN-54		1.74E+00 ±	3.62E+00	4.42E+00	MN-54		1.91E+00 ±	3.63E+00	4.42E+00
CO-58		1.45E+00 ±	4.10E+00	5.02E+00	CO-58		-1.69E+00 ±	4.33E+00	5.30E+00
FE-59		-7.65E+00 ±	1.22E+01	1.40E+01	FE-59		-6.03E+00 ±	1.30E+01	1.50E+01
CO-60		-2.05E+00 ±	4.35E+00	5.03E+00	CO-60		-3.28E-01 ±	3.92E+00	4.60E+00
ZN-65		-7.87E+00 ±	9.85E+00	1.13E+01	ZN-65		-2.23E+00 ±	9.02E+00	1.05E+01
ZRNB-95		-2.47E-01 ±	7.07E+00	8.78E+00	ZRNB-95		1.06E+00 ±	7.30E+00	9.02E+00
I-131		8.11E+00 ±	8.99E+00	1.19E+01	I-131		3.65E-01 ±	1.39E+01	1.90E+01
CS-134		1.13E+00 ±	3.98E+00	5.05E+00	CS-134		0.00E+00 ±	9.52E-01	5.72E+00
CS-137		-1.19E+00 ±	3.89E+00	4.92E+00	CS-137		-4.54E-01 ±	4.01E+00	5.11E+00
BALA140		-4.78E+00 ±	1.06E+01	1.16E+01	BALA140		-1.84E+00 ±	1.21E+01	1.34E+01
BI-214		0.00E+00 ±	8.21E+00	1.35E+01	BI-214		0.00E+00 ±	8.27E+00	1.36E+01

Location ST-102b collected 9/30/2016					Location ST-102b collected 10/31/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	1.28E+02 ±	4.68E+01	4.84E+01	K-40	+	1.27E+02 ±	5.08E+01	7.06E+01
CR-51		1.93E+01 ±	4.07E+01	5.48E+01	CR-51		2.94E+00 ±	3.95E+01	7.02E+01
MN-54		-2.53E+00 ±	4.29E+00	5.23E+00	MN-54		-7.35E-01 ±	4.03E+00	6.64E+00
CO-58		2.39E+00 ±	3.71E+00	4.48E+00	CO-58		3.62E-01 ±	3.94E+00	6.59E+00
FE-59		-8.25E-01 ±	1.09E+01	1.28E+01	FE-59		-1.25E+00 ±	1.13E+01	1.83E+01
CO-60		-5.88E-01 ±	3.86E+00	4.52E+00	CO-60		4.37E-01 ±	3.65E+00	5.90E+00
ZN-65		-2.92E+00 ±	8.75E+00	1.02E+01	ZN-65		9.70E+00 ±	6.83E+00	1.05E+01
ZRNB-95		4.58E+00 ±	7.29E+00	8.85E+00	ZRNB-95		4.89E+00 ±	6.66E+00	1.09E+01
I-131		4.83E+00 ±	1.12E+01	1.51E+01	I-131		1.26E+00 ±	1.11E+01	1.98E+01
CS-134		-6.43E-01 ±	3.93E+00	5.01E+00	CS-134		-1.17E+00 ±	4.03E+00	6.69E+00
CS-137		4.54E-02 ±	4.06E+00	5.19E+00	CS-137		1.27E+00 ±	3.74E+00	6.32E+00
BALA140		-1.10E+00 ±	1.04E+01	1.17E+01	BALA140		0.00E+00 ±	4.44E+00	1.79E+01
BI-214		9.45E+00 ±	1.02E+01	1.33E+01	BI-214		0.00E+00 ±	1.08E+01	1.77E+01

Location ST-102b collected 11/30/2016					Location ST-102b collected 1/3/2017				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		5.00E+00 ±	5.16E+01	7.28E+01	K-40	+	1.35E+02 ±	5.12E+01	5.56E+01
CR-51		4.72E+00 ±	3.88E+01	5.65E+01	CR-51		-3.18E+01 ±	4.54E+01	6.25E+01
MN-54		9.76E-02 ±	3.46E+00	4.63E+00	MN-54		2.93E+00 ±	3.41E+00	4.29E+00
CO-58		2.69E-01 ±	3.98E+00	5.32E+00	CO-58		-1.58E+00 ±	4.26E+00	5.45E+00
FE-59		0.00E+00 ±	5.36E+00	1.65E+01	FE-59		8.28E-01 ±	1.14E+01	1.41E+01
CO-60		2.16E+00 ±	3.41E+00	4.23E+00	CO-60		-1.01E+00 ±	4.19E+00	5.12E+00
ZN-65		5.28E+00 ±	7.03E+00	8.89E+00	ZN-65		-5.40E+00 ±	9.40E+00	1.13E+01
ZRNB-95		5.07E+00 ±	5.93E+00	7.68E+00	ZRNB-95		-3.68E-01 ±	7.61E+00	9.83E+00
I-131		-4.39E+00 ±	1.55E+01	2.25E+01	I-131		4.40E+00 ±	1.10E+01	1.53E+01
CS-134		1.59E+00 ±	3.30E+00	4.45E+00	CS-134		-1.52E+00 ±	4.14E+00	5.41E+00
CS-137		-3.54E-01 ±	3.44E+00	4.73E+00	CS-137		-7.72E-01 ±	3.90E+00	5.16E+00
BALA140		0.00E+00 ±	2.67E+00	1.77E+01	BALA140		-3.39E+00 ±	1.07E+01	1.25E+01
BI-214		6.18E+00 ±	8.61E+00	1.25E+01	BI-214		2.17E+00 ±	1.04E+01	1.40E+01

TABLE B-7.2
GAMMA SPECTROMETRY RESULTS OF SANITARY WASTE TREATMENT WATER - SUMMARY
STATION 102B

Results in pCi/liter, corrected for decay during collection period

Nuclide	Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
K-40	1.03E+02	2.24E+00	1.80E+02	5.50E+01	12	9
CR-51	-7.83E-01	-3.18E+01	4.63E+01	5.93E+01	12	0
MN-54	8.38E-02	-3.24E+00	2.93E+00	4.80E+00	12	0
CO-58	-4.11E-01	-3.35E+00	2.39E+00	5.24E+00	12	0
FE-59	-1.12E+00	-7.65E+00	2.03E+00	1.43E+01	12	0
CO-60	5.18E-01	-2.05E+00	3.12E+00	4.72E+00	12	0
ZN-65	-8.78E-01	-7.87E+00	9.70E+00	1.01E+01	12	0
ZRNB-95	-1.56E-01	-4.13E+00	5.07E+00	9.63E+00	12	0
I-131	3.36E-01	-1.88E+01	1.23E+01	1.79E+01	12	0
CS-134	-3.19E-02	-3.59E+00	2.35E+00	5.16E+00	12	0
CS-137	-1.18E-02	-1.27E+00	1.49E+00	4.96E+00	12	0
BALA140	-1.50E+00	-9.76E+00	4.47E+00	1.35E+01	12	0
BI-214	5.93E+00	0.00E+00	3.57E+01	1.36E+01	12	1

TABLE B-8.1
TRITIUM IN SANITARY WASTE TREATMENT WATER

Results in pCi per liter, MDA for all samples is 300 pCi/l

Location	Description	Collection Period	RQ	Activity	Error
102B	SWTF Headworks	12/30/15 - 02/01/16		1.72E+02	± 9.17E+01
		02/01/16 - 03/01/16		2.12E+02	± 9.06E+01
		03/01/16 - 04/01/16		8.61E+01	± 8.74E+01
		04/01/16 - 05/02/16		7.09E+01	± 9.20E+01
		05/02/16 - 06/01/16		1.33E+02	± 8.90E+01
		06/01/16 - 07/02/16		1.89E+02	± 8.88E+01
		07/02/16 - 08/01/16		1.27E+02	± 9.07E+01
		08/01/16 - 09/01/16		1.37E+02	± 8.85E+01
		09/01/16 - 09/30/16		1.23E+02	± 9.11E+01
		09/30/16 - 10/31/16		8.90E+01	± 8.94E+01
		10/31/16 - 11/30/16		9.46E+01	± 8.66E+01
		11/30/16 - 01/03/17		1.92E+02	± 9.30E+01

TABLE B-8.2
TRITIUM IN SANITARY WASTE TREATMENT WATER - SUMMARY

Results in pCi per liter

Location	Description	Average Activity	Activity Low	Activity High	Number of Samples	Number of Positive IDs
102B	SWTF Headworks	1.36E+02	7.09E+01	2.12E+02	12	0

TABLE B-10.1

GAMMA SPECTROMETRY RESULTS OF GROUNDWATER MONITORING SAMPLES

Results in pCi per liter

Station MW-3 collected 1/27/2016					Station MW-10 collected 2/3/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		8.27E+01 ±	7.82E+01	9.71E+01	K-40		7.15E+00 ±	7.23E+01	1.09E+02
MN-54		-1.41E+00 ±	6.64E+00	8.68E+00	MN-54		-5.34E+00 ±	7.79E+00	9.36E+00
CO-58		-1.54E+00 ±	6.32E+00	8.27E+00	CO-58		-2.65E+00 ±	6.38E+00	7.73E+00
FE-59		-2.01E-01 ±	1.66E+01	2.11E+01	FE-59		8.65E-01 ±	1.51E+01	1.77E+01
CO-60		2.18E+00 ±	6.19E+00	7.59E+00	CO-60		2.55E+00 ±	3.82E+00	7.38E+00
ZN-65		-8.09E+00 ±	1.58E+01	1.93E+01	ZN-65		7.30E-02 ±	1.37E+01	1.61E+01
ZRNB-95		-2.07E+00 ±	1.13E+01	1.48E+01	ZRNB-95		0.00E+00 ±	1.36E+01	1.69E+01
I-131		4.73E+00 ±	8.47E+00	1.18E+01	I-131		-1.90E+00 ±	4.31E+00	9.61E+00
CS-134		4.16E+00 ±	6.03E+00	7.87E+00	CS-134		-1.46E+00 ±	6.57E+00	8.31E+00
CS-137		2.32E+00 ±	6.06E+00	8.10E+00	CS-137		-2.41E+00 ±	5.55E+00	8.85E+00
BALA140		-2.63E+00 ±	1.05E+01	1.26E+01	BALA140		1.07E-01 ±	2.14E+00	1.36E+01
BI-214	+	6.32E+01 ±	1.65E+01	2.07E+01	BI-214	+	1.71E+02 ±	2.07E+01	2.01E+01

Station MW-5 collected 1/27/2016					Station MNW-11 collected 2/3/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	1.53E+02 ±	6.13E+01	5.42E+01	K-40		7.98E+01 ±	8.12E+01	9.39E+01
MN-54		2.57E+00 ±	5.07E+00	6.23E+00	MN-54		-3.88E+00 ±	7.77E+00	9.42E+00
CO-58		-1.78E+00 ±	5.31E+00	6.62E+00	CO-58		3.53E-01 ±	6.43E+00	7.96E+00
FE-59		-9.73E-01 ±	1.60E+01	1.92E+01	FE-59		1.14E+01 ±	1.28E+01	1.38E+01
CO-60		5.47E+00 ±	5.43E+00	5.88E+00	CO-60		-1.40E+00 ±	7.29E+00	8.26E+00
ZN-65		-1.89E+00 ±	1.26E+01	1.55E+01	ZN-65		0.00E+00 ±	2.79E+00	1.86E+01
ZRNB-95		-1.70E+00 ±	1.10E+01	1.40E+01	ZRNB-95		-1.12E+00 ±	1.16E+01	1.43E+01
I-131		-4.59E+00 ±	8.09E+00	1.11E+01	I-131		2.45E-01 ±	8.17E+00	1.11E+01
CS-134		3.25E-01 ±	6.06E+00	7.98E+00	CS-134		-3.90E+00 ±	7.49E+00	9.38E+00
CS-137		2.97E-01 ±	6.00E+00	7.89E+00	CS-137		-1.97E+00 ±	7.28E+00	9.18E+00
BALA140		3.41E-01 ±	7.98E+00	9.36E+00	BALA140		5.69E+00 ±	9.50E+00	1.01E+01
BI-214	+	3.10E+01 ±	1.59E+01	2.08E+01	BI-214	+	1.13E+02 ±	2.17E+01	2.29E+01

Station MW-6 collected 1/27/2016					Station MW-12 collected 2/3/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		5.93E+01 ±	7.71E+01	1.04E+02	K-40		4.34E+01 ±	7.60E+01	1.04E+02
MN-54		-1.42E+00 ±	5.89E+00	7.42E+00	MN-54		2.83E+00 ±	6.46E+00	8.04E+00
CO-58		4.32E+00 ±	5.71E+00	6.90E+00	CO-58		3.71E-01 ±	6.92E+00	8.82E+00
FE-59		0.00E+00 ±	1.84E+00	2.41E+01	FE-59		1.30E+01 ±	1.42E+01	1.57E+01
CO-60		-3.47E+00 ±	7.78E+00	9.11E+00	CO-60		2.67E-01 ±	6.90E+00	8.32E+00
ZN-65		-2.91E+00 ±	1.32E+01	1.62E+01	ZN-65		4.40E+00 ±	1.47E+01	1.79E+01
ZRNB-95		2.35E+00 ±	1.02E+01	1.29E+01	ZRNB-95		2.23E+00 ±	9.54E+00	1.20E+01
I-131		-2.99E+00 ±	8.82E+00	1.23E+01	I-131		-1.12E+00 ±	9.32E+00	1.31E+01
CS-134		-2.60E+00 ±	6.19E+00	7.99E+00	CS-134		-2.60E+00 ±	6.89E+00	8.93E+00
CS-137		-1.88E+00 ±	6.37E+00	8.26E+00	CS-137		3.37E+00 ±	5.77E+00	7.31E+00
BALA140		0.00E+00 ±	2.89E+00	1.04E+01	BALA140		0.00E+00 ±	7.19E+00	1.69E+01
BI-214	+	4.13E+01 ±	1.71E+01	2.08E+01	BI-214	+	5.33E+02 ±	3.48E+01	2.19E+01

Station MW-9 collected 2/3/2016					Station MW-13 collected 1/27/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		4.59E+01 ±	8.24E+01	9.98E+01	K-40		7.74E+00 ±	8.60E+01	1.04E+02
MN-54		-6.54E-01 ±	6.58E+00	8.37E+00	MN-54		-1.88E-01 ±	7.03E+00	8.73E+00
CO-58		1.47E+00 ±	5.51E+00	6.92E+00	CO-58		-1.41E+00 ±	6.67E+00	8.19E+00
FE-59		1.09E+01 ±	1.25E+01	1.37E+01	FE-59		-6.87E+00 ±	1.71E+01	1.96E+01
CO-60		2.13E+00 ±	6.33E+00	7.43E+00	CO-60		1.73E+00 ±	5.72E+00	6.40E+00
ZN-65		-3.90E-01 ±	1.19E+01	1.47E+01	ZN-65		-2.58E+00 ±	1.40E+01	1.63E+01
ZRNB-95		4.60E+00 ±	9.72E+00	1.20E+01	ZRNB-95		-7.37E+00 ±	1.28E+01	1.54E+01
I-131		2.28E+00 ±	5.97E+00	8.27E+00	I-131		-1.68E+00 ±	9.01E+00	1.22E+01
CS-134		1.29E+00 ±	5.72E+00	7.45E+00	CS-134		-6.55E-01 ±	6.64E+00	8.46E+00
CS-137		-6.93E+00 ±	8.58E+00	1.09E+01	CS-137		2.16E+00 ±	6.20E+00	7.76E+00
BALA140		0.00E+00 ±	1.98E+00	1.38E+01	BALA140		-2.88E+00 ±	1.14E+01	1.26E+01
BI-214	+	2.95E+02 ±	2.81E+01	2.36E+01	BI-214	+	3.54E+01 ±	1.86E+01	2.35E+01

RQ = Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE B-10.1

GAMMA SPECTROMETRY RESULTS OF GROUNDWATER MONITORING SAMPLES

Results in pCi per liter

Station MW-14 collected 1/27/2016				
Nuclide	RQ	Activity	Error	MDA
K-40	+	2.22E+02 ±	6.77E+01	5.46E+01
MN-54		-1.97E+00 ±	7.56E+00	9.27E+00
CO-58		-6.47E-01 ±	6.67E+00	8.24E+00
FE-59		-3.88E+00 ±	1.71E+01	1.98E+01
CO-60		1.03E+00 ±	7.61E+00	8.66E+00
ZN-65		4.06E+00 ±	1.41E+01	1.63E+01
ZRNB-95		6.52E+00 ±	1.11E+01	1.33E+01
I-131		-3.27E+00 ±	1.05E+01	1.41E+01
CS-134		-3.59E+00 ±	7.48E+00	9.38E+00
CS-137		-2.16E+00 ±	7.29E+00	9.18E+00
BALA140		1.60E+00 ±	1.11E+01	1.23E+01
BI-214	+	2.93E+02 ±	2.55E+01	1.69E+01

Station MW-9 collected 5/11/2016				
Nuclide	RQ	Activity	Error	MDA
K-40		7.33E+00 ±	1.05E+02	1.24E+02
MN-54		2.97E+00 ±	7.11E+00	8.63E+00
CO-58		4.20E+00 ±	6.36E+00	7.60E+00
FE-59		0.00E+00 ±	6.15E+00	2.69E+01
CO-60		3.29E+00 ±	7.40E+00	8.24E+00
ZN-65		-1.30E+01 ±	1.95E+01	2.23E+01
ZRNB-95		-4.80E+00 ±	1.36E+01	1.66E+01
I-131		1.56E+00 ±	6.91E+00	9.34E+00
CS-134		-7.66E+00 ±	8.46E+00	1.05E+01
CS-137		-7.94E-01 ±	8.06E+00	1.03E+01
BALA140		-5.87E-01 ±	9.07E+00	1.01E+01
BI-214	+	4.25E+02 ±	3.37E+01	2.59E+01

Station MW-3 collected 4/27/2016				
Nuclide	RQ	Activity	Error	MDA
K-40		1.10E+02 ±	9.55E+01	1.12E+02
MN-54		1.70E+00 ±	6.63E+00	8.91E+00
CO-58		-5.18E-01 ±	7.08E+00	9.57E+00
FE-59		0.00E+00 ±	1.22E+00	3.00E+01
CO-60		2.26E+00 ±	7.37E+00	9.45E+00
ZN-65		2.57E+00 ±	1.40E+01	1.85E+01
ZRNB-95		-2.92E+00 ±	1.37E+01	1.83E+01
I-131		1.71E+00 ±	7.18E+00	1.05E+01
CS-134		2.51E+00 ±	7.10E+00	9.68E+00
CS-137		-3.96E+00 ±	7.59E+00	1.03E+01
BALA140		-7.75E-01 ±	9.17E+00	1.17E+01
BI-214	+	5.51E+02 ±	3.53E+01	2.31E+01

Station MW-10 collected 5/11/2016				
Nuclide	RQ	Activity	Error	MDA
K-40		5.47E+01 ±	1.02E+02	1.32E+02
MN-54		-1.89E+00 ±	7.19E+00	9.62E+00
CO-58		-3.22E-01 ±	6.17E+00	8.41E+00
FE-59		5.45E+00 ±	1.61E+01	2.06E+01
CO-60		-1.46E+00 ±	7.31E+00	9.45E+00
ZN-65		0.00E+00 ±	3.23E+00	2.16E+01
ZRNB-95		7.37E+00 ±	1.06E+01	1.39E+01
I-131		3.43E+00 ±	5.36E+00	7.72E+00
CS-134		4.85E-01 ±	7.08E+00	9.78E+00
CS-137		-2.28E+00 ±	6.66E+00	9.16E+00
BALA140		1.07E-01 ±	7.91E+00	1.02E+01
BI-214	+	3.29E+02 ±	2.84E+01	2.36E+01

Station MW-5 collected 4/27/2016				
Nuclide	RQ	Activity	Error	MDA
K-40		1.14E+01 ±	9.46E+01	1.13E+02
MN-54		-6.63E+00 ±	8.58E+00	1.03E+01
CO-58		1.48E+00 ±	6.08E+00	7.45E+00
FE-59		-3.97E+00 ±	1.73E+01	2.01E+01
CO-60		1.85E+00 ±	6.95E+00	7.82E+00
ZN-65		-4.44E+00 ±	1.59E+01	1.84E+01
ZRNB-95		-2.31E+00 ±	1.24E+01	1.53E+01
I-131		1.58E+00 ±	6.79E+00	9.17E+00
CS-134		1.46E+00 ±	7.44E+00	9.45E+00
CS-137		-4.64E+00 ±	8.12E+00	1.01E+01
BALA140		-4.71E+00 ±	1.01E+01	1.10E+01
BI-214	+	2.64E+02 ±	2.77E+01	2.41E+01

Station MW-11 collected 5/11/2016				
Nuclide	RQ	Activity	Error	MDA
K-40		1.47E+01 ±	8.93E+01	1.07E+02
MN-54		-7.75E-01 ±	7.15E+00	8.83E+00
CO-58		-6.65E+00 ±	8.67E+00	1.04E+01
FE-59		-6.75E+00 ±	1.83E+01	2.10E+01
CO-60		-2.76E+00 ±	8.35E+00	9.40E+00
ZN-65		-5.24E+00 ±	1.64E+01	1.90E+01
ZRNB-95		4.31E+00 ±	1.18E+01	1.44E+01
I-131		1.04E+00 ±	7.27E+00	9.87E+00
CS-134		1.20E+00 ±	7.09E+00	9.01E+00
CS-137		-7.94E-01 ±	7.34E+00	9.34E+00
BALA140		-5.89E+00 ±	1.16E+01	1.27E+01
BI-214	+	4.08E+02 ±	3.22E+01	2.44E+01

Station MW-6 collected 4/27/2016				
Nuclide	RQ	Activity	Error	MDA
K-40		3.50E+01 ±	7.18E+01	1.08E+02
MN-54		3.11E+00 ±	5.96E+00	7.91E+00
CO-58		-2.42E+00 ±	6.69E+00	8.93E+00
FE-59		9.31E+00 ±	1.51E+01	1.90E+01
CO-60		-1.73E+00 ±	7.95E+00	1.02E+01
ZN-65		9.51E+00 ±	1.21E+01	1.53E+01
ZRNB-95		-6.82E-01 ±	1.19E+01	1.62E+01
I-131		-4.72E+00 ±	7.42E+00	1.07E+01
CS-134		3.40E+00 ±	6.39E+00	8.67E+00
CS-137		5.44E+00 ±	5.77E+00	7.65E+00
BALA140		-3.51E-01 ±	7.49E+00	9.75E+00
BI-214	+	3.52E+02 ±	3.13E+01	2.61E+01

Station MW-12 collected 5/11/2016				
Nuclide	RQ	Activity	Error	MDA
K-40		5.18E+01 ±	7.99E+01	1.15E+02
MN-54		3.36E+00 ±	5.28E+00	6.97E+00
CO-58		-2.73E+00 ±	6.95E+00	9.24E+00
FE-59		-3.38E+00 ±	1.69E+01	2.18E+01
CO-60		7.99E-01 ±	7.58E+00	9.84E+00
ZN-65		-1.56E+00 ±	1.35E+01	1.79E+01
ZRNB-95		-5.08E-01 ±	1.11E+01	1.51E+01
I-131		1.80E+00 ±	7.47E+00	1.09E+01
CS-134		5.26E+00 ±	6.57E+00	8.78E+00
CS-137		2.57E+00 ±	6.80E+00	9.33E+00
BALA140		-2.25E-01 ±	8.31E+00	1.07E+01
BI-214	+	4.41E+02 ±	3.27E+01	2.44E+01

RQ = Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE B-10.1

GAMMA SPECTROMETRY RESULTS OF GROUNDWATER MONITORING SAMPLES

Results in pCi per liter

Station MW-13 collected 4/27/2016					Station MW-6 collected 8/3/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	1.56E+02	± 9.01E+01	9.31E+01	K-40		5.40E+01	± 7.67E+01	1.12E+02
MN-54		-3.26E+00	± 7.56E+00	9.19E+00	MN-54		5.88E-01	± 5.95E+00	8.11E+00
CO-58		1.81E+00	± 6.49E+00	7.93E+00	CO-58		2.41E+00	± 5.37E+00	7.19E+00
FE-59		-1.14E+01	± 2.24E+01	2.57E+01	FE-59		0.00E+00	± 6.28E+00	2.60E+01
CO-60		5.10E+00	± 6.81E+00	7.38E+00	CO-60		4.65E+00	± 6.04E+00	7.50E+00
ZN-65		1.02E+00	± 1.43E+01	1.67E+01	ZN-65		5.53E+00	± 9.97E+00	1.30E+01
ZRNB-95		-4.84E+00	± 1.36E+01	1.67E+01	ZRNB-95		-2.60E+00	± 1.24E+01	1.67E+01
I-131		-1.36E+00	± 7.83E+00	1.06E+01	I-131		-4.48E+00	± 6.82E+00	9.80E+00
CS-134		-4.46E+00	± 8.58E+00	1.08E+01	CS-134		7.28E-01	± 6.16E+00	8.54E+00
CS-137		4.73E+00	± 6.77E+00	8.32E+00	CS-137		2.77E+00	± 6.02E+00	8.25E+00
BALA140		5.17E+00	± 9.25E+00	9.96E+00	BALA140		-4.71E+00	± 1.10E+01	1.35E+01
BI-214	+	4.18E+02	± 3.08E+01	2.30E+01	BI-214	+	2.18E+02	± 2.33E+01	2.09E+01

Station MW-14 collected 4/27/2016					Station MW-9 collected 8/10/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	1.49E+02	± 6.62E+01	7.77E+01	K-40		2.93E+01	± 8.80E+01	1.25E+02
MN-54		2.19E+00	± 6.54E+00	8.49E+00	MN-54		2.41E+00	± 6.38E+00	8.52E+00
CO-58		3.15E+00	± 6.09E+00	7.86E+00	CO-58		-1.92E+00	± 7.03E+00	9.41E+00
FE-59		2.02E+00	± 1.50E+01	1.92E+01	FE-59		5.83E+00	± 1.55E+01	1.99E+01
CO-60		-1.03E+00	± 8.26E+00	1.01E+01	CO-60		2.81E+00	± 5.54E+00	7.06E+00
ZN-65		1.10E+01	± 9.65E+00	1.13E+01	ZN-65		1.04E+01	± 1.21E+01	1.53E+01
ZRNB-95		8.43E-01	± 1.19E+01	1.56E+01	ZRNB-95		9.58E-01	± 1.16E+01	1.57E+01
I-131		-5.32E+00	± 1.02E+01	1.42E+01	I-131		-3.48E+00	± 6.96E+00	1.01E+01
CS-134		4.24E+00	± 6.33E+00	8.28E+00	CS-134		1.86E+00	± 6.91E+00	9.47E+00
CS-137		-4.13E+00	± 7.87E+00	1.04E+01	CS-137		-1.78E+00	± 7.47E+00	1.03E+01
BALA140		7.48E+00	± 9.01E+00	1.04E+01	BALA140		-1.79E+00	± 9.37E+00	1.18E+01
BI-214	+	1.66E+02	± 2.51E+01	2.48E+01	BI-214	+	4.09E+02	± 3.12E+01	2.34E+01

Station MW-3 collected 8/3/2016					Station MW-10 collected 8/10/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		3.41E+01	± 8.52E+01	1.22E+02	K-40	+	1.01E+02	± 8.55E+01	9.74E+01
MN-54		-3.65E+00	± 7.30E+00	9.64E+00	MN-54		-5.24E+00	± 8.16E+00	9.83E+00
CO-58		-2.27E-01	± 6.64E+00	9.03E+00	CO-58		2.32E+00	± 6.62E+00	8.06E+00
FE-59		-1.04E+01	± 2.06E+01	2.58E+01	FE-59		-7.59E-01	± 1.57E+01	1.84E+01
CO-60		-1.96E+00	± 8.11E+00	1.03E+01	CO-60		9.51E-01	± 7.21E+00	8.41E+00
ZN-65		6.53E+00	± 1.28E+01	1.66E+01	ZN-65		-4.37E-01	± 1.61E+01	1.89E+01
ZRNB-95		7.03E+00	± 1.04E+01	1.36E+01	ZRNB-95		-7.32E+00	± 1.34E+01	1.62E+01
I-131		8.42E-01	± 6.62E+00	9.73E+00	I-131		2.55E+00	± 6.54E+00	8.76E+00
CS-134		-4.04E-01	± 6.67E+00	9.24E+00	CS-134		-4.17E-01	± 7.40E+00	9.45E+00
CS-137		1.98E+00	± 6.51E+00	8.99E+00	CS-137		-3.27E+00	± 7.47E+00	9.34E+00
BALA140		-4.38E+00	± 9.87E+00	1.22E+01	BALA140		-2.31E+00	± 9.15E+00	1.01E+01
BI-214	+	4.27E+02	± 3.14E+01	2.35E+01	BI-214	+	2.80E+02	± 2.89E+01	2.50E+01

Station MW-5 collected 8/3/2016					Station MW-11 collected 8/10/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		6.64E+01	± 8.93E+01	1.11E+02	K-40	+	1.20E+02	± 6.57E+01	8.20E+01
MN-54		-3.54E+00	± 7.15E+00	9.18E+00	MN-54		2.19E+00	± 6.54E+00	8.49E+00
CO-58		1.55E+00	± 5.77E+00	7.56E+00	CO-58		-2.34E+00	± 7.47E+00	9.67E+00
FE-59		-2.09E+00	± 1.42E+01	1.81E+01	FE-59		3.02E-01	± 1.57E+01	2.02E+01
CO-60		3.12E+00	± 6.49E+00	8.02E+00	CO-60		3.54E+00	± 6.22E+00	7.65E+00
ZN-65		0.00E+00	± 2.47E+00	1.79E+01	ZN-65		1.02E+01	± 1.10E+01	1.32E+01
ZRNB-95		-5.66E+00	± 1.31E+01	1.69E+01	ZRNB-95		9.93E+00	± 1.06E+01	1.33E+01
I-131		4.71E+00	± 6.60E+00	9.14E+00	I-131		-2.17E+00	± 9.09E+00	1.29E+01
CS-134		2.63E+00	± 6.71E+00	8.87E+00	CS-134		-5.76E-01	± 6.91E+00	9.26E+00
CS-137		1.91E+00	± 6.75E+00	9.03E+00	CS-137		2.86E-01	± 6.23E+00	8.48E+00
BALA140		5.41E+00	± 7.21E+00	8.39E+00	BALA140		4.16E+00	± 9.36E+00	1.12E+01
BI-214	+	1.77E+02	± 2.41E+01	2.41E+01	BI-214	+	1.91E+02	± 2.39E+01	2.39E+01

RQ = Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE B-10.1

GAMMA SPECTROMETRY RESULTS OF GROUNDWATER MONITORING SAMPLES

Results in pCi per liter

Station MW-12 collected 8/10/2016				Station MW-5 collected 11/2/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		7.30E+01 ±	8.14E+01	1.15E+02	K-40		5.20E+01 ±	8.50E+01	1.13E+02
MN-54		0.00E+00 ±	2.30E+00	8.99E+00	MN-54		-2.07E+00 ±	6.56E+00	8.79E+00
CO-58		1.72E+00 ±	5.71E+00	7.71E+00	CO-58		-1.61E+00 ±	6.19E+00	8.35E+00
FE-59		-3.92E+00 ±	1.71E+01	2.22E+01	FE-59		-3.24E+00 ±	1.52E+01	1.99E+01
CO-60		1.84E+00 ±	6.77E+00	8.70E+00	CO-60		7.35E-01 ±	6.38E+00	8.32E+00
ZN-65		-2.36E+00 ±	1.27E+01	1.68E+01	ZN-65		3.14E-01 ±	1.02E+01	1.40E+01
ZRNB-95		0.00E+00 ±	4.24E+00	1.64E+01	ZRNB-95		3.69E+00 ±	9.94E+00	1.34E+01
I-131		-1.57E+00 ±	8.13E+00	1.20E+01	I-131		3.97E+00 ±	7.24E+00	1.05E+01
CS-134		-1.38E+00 ±	6.91E+00	9.50E+00	CS-134		4.87E-01 ±	5.88E+00	8.19E+00
CS-137		0.00E+00 ±	3.31E+00	1.10E+01	CS-137		-4.26E+00 ±	7.26E+00	9.83E+00
BALA140		0.00E+00 ±	3.13E+00	1.54E+01	BALA140		1.56E+00 ±	8.07E+00	1.04E+01
BI-214	+	1.53E+02 ±	2.22E+01	2.30E+01	BI-214	+	9.36E+01 ±	1.96E+01	2.27E+01

Station MW-13 collected 8/3/2016				Station MW-6 collected 11/2/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		6.92E+01 ±	8.66E+01	1.01E+02	K-40		6.23E+01 ±	8.32E+01	9.74E+01
MN-54		6.12E+00 ±	5.56E+00	6.38E+00	MN-54		5.97E+00 ±	5.59E+00	6.42E+00
CO-58		-2.68E+00 ±	7.41E+00	9.04E+00	CO-58		1.54E+00 ±	6.33E+00	7.75E+00
FE-59		7.88E+00 ±	1.64E+01	1.86E+01	FE-59		-1.11E+01 ±	2.16E+01	2.47E+01
CO-60		2.74E+00 ±	7.05E+00	8.09E+00	CO-60		-4.04E+00 ±	7.67E+00	8.74E+00
ZN-65		6.28E+00 ±	1.46E+01	1.67E+01	ZN-65		0.00E+00 ±	6.84E+00	1.86E+01
ZRNB-95		2.61E+00 ±	1.07E+01	1.31E+01	ZRNB-95		9.87E+00 ±	1.09E+01	1.28E+01
I-131		-2.79E+00 ±	7.81E+00	1.05E+01	I-131		7.58E+00 ±	8.52E+00	1.11E+01
CS-134		7.31E-01 ±	7.08E+00	9.02E+00	CS-134		-2.70E+00 ±	7.77E+00	9.80E+00
CS-137		-4.67E+00 ±	8.67E+00	1.08E+01	CS-137		-2.03E+00 ±	7.77E+00	9.81E+00
BALA140		4.84E-01 ±	9.44E+00	1.05E+01	BALA140		0.00E+00 ±	3.38E+00	1.60E+01
BI-214	+	3.99E+02 ±	3.05E+01	2.28E+01	BI-214	+	2.85E+02 ±	2.75E+01	2.44E+01

Station MW-14 collected 8/3/2016				Station MW-9 collected 11/9/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		7.17E+00 ±	9.81E+01	1.37E+02	K-40		8.55E+00 ±	9.71E+01	1.16E+02
MN-54		2.06E+00 ±	6.52E+00	8.73E+00	MN-54		1.64E+00 ±	7.19E+00	8.83E+00
CO-58		-2.13E+00 ±	7.10E+00	9.49E+00	CO-58		-5.09E+00 ±	7.61E+00	9.14E+00
FE-59		6.84E+00 ±	1.49E+01	1.91E+01	FE-59		-7.11E+00 ±	1.96E+01	2.25E+01
CO-60		1.71E+00 ±	7.58E+00	9.72E+00	CO-60		0.00E+00 ±	3.29E+00	1.02E+01
ZN-65		9.91E+00 ±	9.08E+00	1.12E+01	ZN-65		1.00E+01 ±	1.02E+01	1.09E+01
ZRNB-95		-2.90E+00 ±	1.28E+01	1.71E+01	ZRNB-95		2.80E+00 ±	1.12E+01	1.37E+01
I-131		2.22E+00 ±	6.60E+00	9.64E+00	I-131		-5.27E-01 ±	7.27E+00	9.89E+00
CS-134		-8.09E-02 ±	6.83E+00	9.47E+00	CS-134		-1.46E+00 ±	7.61E+00	9.66E+00
CS-137		3.36E+00 ±	5.77E+00	7.86E+00	CS-137		-7.62E-01 ±	7.46E+00	9.50E+00
BALA140		0.00E+00 ±	2.44E+00	1.29E+01	BALA140		-1.08E+00 ±	9.98E+00	1.11E+01
BI-214	+	2.85E+02 ±	2.69E+01	2.41E+01	BI-214	+	4.09E+02 ±	3.23E+01	2.52E+01

Station MW-3 collected 11/2/2016				Station MW-10 collected 11/9/2016					
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40	+	1.54E+02 ±	8.42E+01	8.57E+01	K-40		5.51E+01 ±	6.78E+01	9.31E+01
MN-54		2.70E+00 ±	6.66E+00	8.09E+00	MN-54		3.43E+00 ±	5.64E+00	7.45E+00
CO-58		-1.23E-01 ±	7.48E+00	9.29E+00	CO-58		-2.43E+00 ±	6.49E+00	8.66E+00
FE-59		-4.73E-01 ±	1.78E+01	2.09E+01	FE-59		5.82E+00 ±	1.38E+01	1.77E+01
CO-60		6.13E+00 ±	6.99E+00	7.74E+00	CO-60		3.43E+00 ±	5.94E+00	7.50E+00
ZN-65		-1.45E+01 ±	2.10E+01	2.40E+01	ZN-65		-7.00E-01 ±	1.39E+01	1.85E+01
ZRNB-95		-7.14E+00 ±	1.40E+01	1.70E+01	ZRNB-95		-3.94E-01 ±	1.15E+01	1.57E+01
I-131		-1.46E+00 ±	7.62E+00	1.03E+01	I-131		1.63E+00 ±	6.13E+00	8.98E+00
CS-134		3.44E+00 ±	7.36E+00	9.23E+00	CS-134		8.09E-02 ±	6.66E+00	9.24E+00
CS-137		-2.67E+00 ±	8.26E+00	1.04E+01	CS-137		-4.16E+00 ±	7.60E+00	1.03E+01
BALA140		-1.37E+00 ±	9.89E+00	1.10E+01	BALA140		1.34E+00 ±	7.24E+00	9.30E+00
BI-214	+	5.07E+02 ±	3.49E+01	2.39E+01	BI-214	+	3.15E+02 ±	2.69E+01	2.14E+01

RQ = Results Qualifier. If blank, result is less than detection limit. If "+", result is above detection limit.

TABLE B-10.1

GAMMA SPECTROMETRY RESULTS OF GROUNDWATER MONITORING SAMPLES

Results in pCi per liter

Station MW-11 collected 11/9/2016					Station MW-13 collected 11/2/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		1.87E+01 ±	9.50E+01	1.13E+02	K-40	+	1.20E+02 ±	7.73E+01	8.65E+01
MN-54		-2.70E+00 ±	7.53E+00	9.19E+00	MN-54		-9.71E-01 ±	7.23E+00	8.92E+00
CO-58		8.72E-01 ±	6.43E+00	7.93E+00	CO-58		1.52E+00 ±	6.54E+00	8.02E+00
FE-59		1.44E+00 ±	1.51E+01	1.77E+01	FE-59		7.13E+00 ±	1.73E+01	1.98E+01
CO-60		1.37E+00 ±	6.96E+00	8.09E+00	CO-60		2.29E+00 ±	7.03E+00	8.10E+00
ZN-65		-1.01E+01 ±	1.87E+01	2.15E+01	ZN-65		0.00E+00 ±	6.26E+00	1.97E+01
ZRNB-95		-5.65E+00 ±	1.43E+01	1.75E+01	ZRNB-95		-7.80E+00 ±	1.46E+01	1.76E+01
I-131		8.43E+00 ±	7.20E+00	9.30E+00	I-131		-8.61E-01 ±	9.95E+00	1.35E+01
CS-134		-1.38E+00 ±	7.85E+00	9.98E+00	CS-134		2.15E+00 ±	6.62E+00	8.34E+00
CS-137		-5.62E+00 ±	8.06E+00	9.97E+00	CS-137		-4.89E+00 ±	7.91E+00	9.82E+00
BALA140		0.00E+00 ±	4.55E+00	1.16E+01	BALA140		3.16E+00 ±	1.11E+01	1.22E+01
BI-214	+	3.56E+02 ±	3.04E+01	2.47E+01	BI-214	+	3.14E+02 ±	2.92E+01	2.54E+01

Station MW-12 collected 11/9/2016					Station MW-14 collected 11/2/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
K-40		7.17E+00 ±	8.03E+01	1.19E+02	K-40	+	1.78E+02 ±	7.49E+01	7.90E+01
MN-54		-3.01E+00 ±	7.54E+00	1.00E+01	MN-54		-8.24E-01 ±	6.80E+00	9.19E+00
CO-58		-2.94E+00 ±	7.00E+00	9.30E+00	CO-58		1.22E+00 ±	5.12E+00	6.99E+00
FE-59		5.28E+00 ±	1.39E+01	1.79E+01	FE-59		-6.91E+00 ±	1.83E+01	2.34E+01
CO-60		2.06E-01 ±	6.74E+00	9.21E+00	CO-60		5.27E+00 ±	7.01E+00	8.70E+00
ZN-65		4.05E+00 ±	1.37E+01	1.79E+01	ZN-65		6.86E+00 ±	1.14E+01	1.48E+01
ZRNB-95		3.01E+00 ±	1.18E+01	1.58E+01	ZRNB-95		-4.97E+00 ±	1.27E+01	1.68E+01
I-131		3.66E+00 ±	6.62E+00	9.57E+00	I-131		4.76E+00 ±	1.03E+01	1.48E+01
CS-134		4.45E+00 ±	6.17E+00	8.29E+00	CS-134		3.65E+00 ±	6.52E+00	8.82E+00
CS-137		5.94E-01 ±	7.17E+00	9.99E+00	CS-137		1.29E+00 ±	6.34E+00	8.81E+00
BALA140		-3.85E+00 ±	1.08E+01	1.34E+01	BALA140		-7.19E-01 ±	1.07E+01	1.37E+01
BI-214	+	3.75E+02 ±	3.02E+01	2.32E+01	BI-214	+	3.34E+02 ±	2.70E+01	2.10E+01

Table B-10.2

GAMMA SPECTROMETRY RESULTS OF GROUNDWATER MONITORING SAMPLES - SUMMARY

Results in pCi/liter

Nuclide	Average Activity	Activity Low	Activity High	Average MDA	Number of Samples	Number of Positive IDs
K-40	6.95E+01	7.15E+00	2.22E+02	1.03E+02	36	9
MN-54	-9.99E-02	-6.63E+00	6.12E+00	8.59E+00	36	0
CO-58	-3.30E-01	-6.65E+00	4.32E+00	8.32E+00	36	0
FE-59	2.77E-01	-1.14E+01	1.30E+01	2.06E+01	36	0
CO-60	1.43E+00	-4.04E+00	6.13E+00	8.42E+00	36	0
ZN-65	9.60E-01	-1.45E+01	1.10E+01	1.70E+01	36	0
ZRNB-95	-1.29E-01	-7.80E+00	9.93E+00	1.52E+01	36	0
I-131	1.37E-01	-5.32E+00	8.43E+00	1.08E+01	36	0
CS-134	2.56E-01	-7.66E+00	5.26E+00	9.03E+00	36	0
CS-137	-9.16E-01	-6.93E+00	5.44E+00	9.30E+00	36	0
BALA140	-4.61E-02	-5.89E+00	7.48E+00	1.17E+01	36	0
BI-214	2.90E+02	3.10E+01	5.51E+02	2.31E+01	36	36

TABLE B-11.1
TRITIUM IN GROUNDWATER MONITORING WELL SAMPLES

Results in pCi per liter

Location	Collection Date	RQ	Activity	Error
MW-3	01/27/16	+	1.36E+03	± 1.23E+02
	04/27/16	+	1.41E+03	± 1.21E+02
	08/03/16	+	1.50E+03	± 1.26E+02
	11/02/16	+	1.36E+03	± 1.22E+02
MW-5	01/27/16	+	1.42E+04	± 2.86E+02
	04/27/16	+	1.44E+04	± 2.85E+02
	08/03/16	+	1.46E+04	± 2.90E+02
	11/02/16	+	1.46E+04	± 2.92E+02
MW-6	01/27/16	+	5.85E+03	± 1.96E+02
	04/27/16	+	5.91E+03	± 1.95E+02
	08/03/16	+	6.12E+03	± 1.99E+02
	11/02/16	+	5.93E+03	± 1.97E+02
MW-9	02/03/16		1.89E+02	± 9.58E+01
	05/11/16		1.49E+02	± 9.06E+01
	08/10/16		1.50E+02	± 9.45E+01
	11/09/16		1.79E+02	± 9.17E+01
MW-10	02/03/16	+	3.69E+02	± 1.00E+02
	05/11/16	+	3.05E+02	± 9.48E+01
	08/10/16	+	3.37E+02	± 9.99E+01
	11/09/16		2.81E+02	± 9.51E+01
MW-11	02/03/16	+	1.06E+03	± 1.17E+02
	05/11/16	+	1.19E+03	± 1.17E+02
	08/10/16	+	1.27E+03	± 1.22E+02
	11/09/16	+	1.26E+03	± 1.19E+02
MW-12	02/03/16	+	6.08E+02	± 1.06E+02
	05/11/16	+	6.55E+02	± 1.05E+02
	08/10/16	+	6.35E+02	± 1.07E+02
	11/09/16	+	7.74E+02	± 1.07E+02
MW-13	01/27/16	+	1.13E+04	± 2.58E+02
	04/27/16	+	1.13E+04	± 2.56E+02
	08/03/16	+	1.15E+04	± 2.60E+02
	11/02/16	+	1.15E+04	± 2.63E+02
MW-14	01/27/16		1.44E+02	± 9.46E+01
	04/27/16		1.15E+02	± 9.03E+01
	08/03/16		2.16E+02	± 9.27E+01
	11/02/16		2.33E+02	± 9.35E+01

Table B-12.1
GAMMA SPECTROMETRY RESULTS OF EVAPORATION POND WATER

Results in pCi/liter

Location EVP-1A collected 5/11/2016			
Nuclide	RQ	Activity	MDA
K-40		2.10E+01 ± 5.72E+01	7.32E+01
CR-51		1.14E+01 ± 2.80E+01	4.15E+01
MN-54		1.57E+00 ± 4.08E+00	5.61E+00
CO-58		1.78E+00 ± 4.07E+00	5.57E+00
FE-59		2.90E+00 ± 8.86E+00	1.21E+01
CO-60		1.58E-01 ± 4.48E+00	6.25E+00
ZN-65		-9.10E-01 ± 8.46E+00	1.19E+01
ZRNB-95		0.00E+00 ± 2.66E+00	1.05E+01
I-131		1.18E+00 ± 3.44E+00	5.15E+00
CS-134		1.71E+00 ± 4.08E+00	5.69E+00
CS-137		-1.11E+00 ± 4.73E+00	6.72E+00
BALA140		0.00E+00 ± 8.05E-01	1.12E+01
BI-214		3.11E+00 ± 1.10E+01	1.64E+01

Location EVP-1B collected 5/11/2016			
Nuclide	RQ	Activity	MDA
K-40	+	8.62E+01 ± 5.09E+01	5.43E+01
CR-51		-6.17E+00 ± 2.89E+01	4.33E+01
MN-54		3.47E+00 ± 3.28E+00	4.15E+00
CO-58		-4.07E-01 ± 4.22E+00	5.96E+00
FE-59		-3.26E+00 ± 1.36E+01	1.80E+01
CO-60		9.46E-01 ± 5.26E+00	7.09E+00
ZN-65		5.82E+00 ± 6.89E+00	8.82E+00
ZRNB-95		-2.87E+00 ± 7.86E+00	1.11E+01
I-131		7.44E-01 ± 3.59E+00	5.43E+00
CS-134		5.39E-01 ± 3.80E+00	5.44E+00
CS-137		0.00E+00 ± 1.09E+00	5.34E+00
BALA140		1.33E+00 ± 5.13E+00	6.89E+00
BI-214		5.40E+00 ± 9.27E+00	1.40E+01

Location EVP-2 collected 5/11/2016			
Nuclide	RQ	Activity	MDA
K-40		7.32E+01 ± 4.78E+01	1.08E+02
CR-51		-1.58E+00 ± 7.48E+00	3.46E+01
MN-54		2.79E+00 ± 2.84E+00	7.25E+00
CO-58		2.72E+00 ± 2.40E+00	6.89E+00
FE-59		1.40E+00 ± 2.43E+00	1.66E+01
CO-60		3.43E-01 ± 7.42E-01	6.70E+00
ZN-65		0.00E+00 ± 1.12E+01	1.11E+01
ZRNB-95		2.52E+00 ± 4.61E+00	1.34E+01
I-131		6.02E+00 ± 6.14E+00	7.45E+00
CS-134		1.54E+00 ± 2.87E+00	8.07E+00
CS-137		0.00E+00 ± 4.64E+00	4.59E+00
BALA140		1.98E+00 ± 2.67E+00	9.84E+00
BI-214		3.07E+00 ± 6.11E+00	2.32E+01

Location EVP-3 collected 5/11/2016			
Nuclide	RQ	Activity	MDA
K-40		2.34E+01 ± 6.13E+01	6.75E+01
CR-51		3.64E+00 ± 3.14E+01	4.25E+01
MN-54		-1.24E+00 ± 5.14E+00	6.24E+00
CO-58		1.00E+00 ± 3.66E+00	4.38E+00
FE-59		4.56E+00 ± 7.39E+00	7.55E+00
CO-60		0.00E+00 ± 3.01E+00	8.68E+00
ZN-65		4.48E+00 ± 7.20E+00	7.82E+00
ZRNB-95		1.60E+00 ± 7.65E+00	9.29E+00
I-131		-1.61E+00 ± 4.05E+00	5.33E+00
CS-134		-2.83E-01 ± 4.05E+00	5.16E+00
CS-137		1.28E+00 ± 3.06E+00	3.66E+00
BALA140		-6.09E-01 ± 6.91E+00	7.66E+00
BI-214		4.67E+00 ± 9.52E+00	1.33E+01

Location EVP-4 collected 5/11/2016			
Nuclide	RQ	Activity	MDA
K-40		3.73E+01 ± 4.70E+01	5.65E+01
CR-51		1.18E+01 ± 3.01E+01	4.32E+01
MN-54		1.48E+00 ± 3.75E+00	5.06E+00
CO-58		-6.99E-01 ± 4.43E+00	6.06E+00
FE-59		-5.00E-01 ± 9.29E+00	1.29E+01
CO-60		1.02E+00 ± 3.01E+00	4.16E+00
ZN-65		5.34E+00 ± 5.75E+00	7.08E+00
ZRNB-95		-2.89E+00 ± 8.44E+00	1.13E+01
I-131		-1.59E+00 ± 4.51E+00	6.49E+00
CS-134		4.35E+00 ± 3.76E+00	4.73E+00
CS-137		9.29E-01 ± 4.15E+00	5.82E+00
BALA140		2.35E+00 ± 4.61E+00	5.82E+00
BI-214		4.60E+00 ± 1.15E+01	1.67E+01

TABLE B-13.1
GAMMA SPECTROMETRY RESULTS OF CGS EVAPORATION POND SEDIMENT

Results in pCi/kilogram dry material

Location & Date					Location & Date				
Evap Pond 1b					Evap Pond 4				
7/21/2016					7/28/2016				
Nuclide	RQ	Activity	Error	MDA	Nuclide	RQ	Activity	Error	MDA
BE-7	+	4.17E+03	± 5.43E+02	2.74E+02	BE-7	+	2.63E+04	± 1.35E+03	5.34E+02
K-40	+	7.14E+03	± 8.51E+02	2.50E+02	K-40	+	6.84E+03	± 8.68E+02	6.78E+02
CR-51		-1.18E+02	± 3.54E+02	3.95E+02	CR-51		-1.09E+02	± 4.10E+02	6.36E+02
MN-54		2.69E+01	± 3.10E+01	2.85E+01	MN-54		-3.03E+00	± 3.76E+01	5.76E+01
CO-58		-1.46E+01	± 4.89E+01	4.90E+01	CO-58		-4.76E+00	± 3.95E+01	6.03E+01
FE-59		-1.25E+01	± 1.15E+02	1.09E+02	FE-59		4.17E+01	± 1.15E+02	1.64E+02
CO-60		3.79E+01	± 4.90E+01	4.38E+01	CO-60	+	1.20E+02	± 3.02E+01	4.99E+01
ZN-65		-3.21E+01	± 1.17E+02	1.11E+02	ZN-65		1.09E+01	± 8.48E+01	1.25E+02
ZRNB-95		0.00E+00	± 1.69E+01	9.42E+01	ZRNB-95		-3.47E+01	± 7.89E+01	1.16E+02
CS-134		-1.69E+00	± 4.16E+01	4.39E+01	CS-134		-3.09E+00	± 3.38E+01	5.24E+01
CS-137		1.65E+01	± 4.44E+01	4.56E+01	CS-137	+	9.43E+01	± 4.07E+01	5.26E+01
BALA140		-1.44E+01	± 6.99E+01	6.27E+01	BALA140		5.16E+01	± 4.42E+01	6.58E+01
BI-214	+	3.60E+02	± 1.14E+02	1.03E+02	BI-214	+	4.09E+02	± 9.95E+01	1.23E+02

Location & Date				
Evap Pond 3				
9/21/2016				
Nuclide	RQ	Activity	Error	MDA
BE-7	+	1.32E+03	± 2.45E+02	2.63E+02
K-40	+	1.58E+04	± 7.26E+02	2.35E+02
CR-51		7.71E+01	± 2.90E+02	3.71E+02
MN-54		5.11E+00	± 1.72E+01	2.04E+01
CO-58		-7.66E+00	± 2.58E+01	3.01E+01
FE-59		2.17E+01	± 9.07E+01	1.01E+02
CO-60	+	1.70E+02	± 2.09E+01	2.51E+01
ZN-65		1.68E+00	± 5.19E+01	5.91E+01
ZRNB-95		-3.07E+01	± 5.50E+01	6.27E+01
CS-134		-5.77E+00	± 1.98E+01	2.35E+01
CS-137		-5.78E+00	± 2.45E+01	2.91E+01
BALA140		-5.10E+01	± 1.23E+02	1.32E+02
BI-214	+	7.80E+02	± 6.26E+01	5.10E+01

TABLE B-14.1
GROSS BETA IN EVAPIORATION POND WATER

Results in pCi per liter

Location	Collection		RQ	Activity	Error	MDA
	Date					
Evaporation Pond 1A	05/11/16			1.43E+00 ±	7.24E-01	2.27E+00
Evaporation Pond 1B	05/11/16			5.70E-01 ±	6.70E-01	2.25E+00
Evaporation Pond 2	05/11/16			5.95E-01 ±	6.63E-01	2.28E+00
Evaporation Pond 3	05/11/16	+		3.13E+00 ±	8.36E-01	2.31E+00
Evaporation Pond 4	05/11/16	+		3.89E+00 ±	8.83E-01	2.35E+00

TABLE B-15.1
TRITIUM IN EVAPORATION POND WATER

Results in pCi per liter, LLD is 300 pCi per liter

Location	Collection		RQ	Activity	Error
	Date				
Evaporation Pond 1A	05/11/16			1.11E+02 ±	9.19E+01
Evaporation Pond 1B	05/11/16			7.21E+01 ±	9.00E+01
Evaporation Pond 2	05/11/16			1.02E+02 ±	9.18E+01
Evaporation Pond 3	05/11/16	+		3.29E+02 ±	9.78E+01
Evaporation Pond 4	05/11/16	+		6.24E+02 ±	1.05E+02

TABLE B-16.1
TRITIUM IN RAINWATER

Results in pCi per liter, LLD is 300 pCi per liter

Location	Sector	Distance from Collection		RQ	Activity	Error
		CGS, miles	Date			
ST-88	WNW	0.17	10/27/16	+	1.07E+03 ±	1.16E+02
ST-101B	ENE	0.22	10/27/16	+	5.68E+02 ±	1.04E+02
Kootenai	SSW	0.70	10/27/16	+	5.60E+02 ±	1.04E+02

Rainwater was collected from puddles near the indicated location

TABLE B-17.1
CARBON 14 IN APPLES

Results in pCi per Kg wet mass

Location	Distance from CGS, miles	Sector from CGS	Sample Type	Collection		Activity	Error	MDA
				Date	RQ			
Kennewick, WA	23.2	SSE	Cntl	9/16/2016	+	2.96E+02 ±	1.17E+02	1.35E+02
Mattawa, WA	34.5	WNW	Cntl	9/2/2016	+	4.75E+02 ±	1.41E+02	1.60E+02
St-37	5.5	ESE	Ind	9/16/2016	+	5.66E+02 ±	1.34E+02	1.50E+02
Ellensburg, WA	>65	WNW	Cntl	8/21/2016	+	3.82E+02 ±	1.09E+02	1.24E+02
St-37	5.50	ESE	Ind	7/8/2016	+	3.14E+02 ±	1.22E+02	1.40E+02
St-37	4.3	ESE	Ind	8/17/2016	+	4.86E+02 ±	1.29E+02	1.46E+02
St-37	4.3	ESE	Ind	8/17/2016	+	4.94E+02 ±	1.30E+02	1.46E+02
St-37	4.3	ESE	Ind	8/17/2016	+	2.94E+02 ±	1.27E+02	1.46E+02

The last three sample results were a blind triplicate analysis of the same sample