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PEACH BOTTOM ATOMIC POWER STATION

UNITS 2 and 3

Annual Radiological
Environmental Operating Report

Report No. 75
January 1 through December 31, 2017

Prepared By
Teledyne Brown Engineering
Environmental Services

Exelon Generation.

Peach Bottom Atomic Power Station
Delta, PA 17314

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I. Executive Summary

The 2017 Annual Radiological Environmental Operating Report (AREOR) describes the results of the Radiological Environmental Monitoring Program (REMP) conducted for Peach Bottom Atomic Power Station (PBAPS) by Exelon Nuclear and covers the period of 1 January 2017 through 31 December 2017. Throughout that time period, 1,288 analyses were performed on 996 samples. In assessing all the data gathered for this report and comparing the results with preoperational data, it was evident that the operation of PBAPS had no adverse radiological impact on the environment.

The various media collected in the REMP include aquatic, terrestrial, airborne, and ambient radiation. The corresponding analyses performed on the collected specimen were:

Aquatic:

- Surface water samples were analyzed for concentrations of Iodine-131 (I-131), tritium (H-3) and gamma-emitting nuclides. All nuclides were below minimum detectable activity.
- Drinking water samples were analyzed for concentrations of gross beta, I-131, H-3, and gamma-emitting nuclides. All nuclides were below minimum detectable activity. Any gross beta activity detected was not above the investigation level (15 pCi/L) and therefore, likely due to background radiation.
- Fish and sediment samples were analyzed for concentrations of gamma-emitting nuclides. Fish samples showed no detectable fission or activation products, while Cesium-137 (Cs-137) activity was found at one of three sediment locations in the second sample of the year. The level of Cs-137 was well below the investigation level of 1000 pCi/kg (dry).

Terrestrial:

- Milk samples were analyzed for low level concentrations of I-131 and gamma-emitting nuclides. Food product samples were analyzed for concentrations of gamma-emitting nuclides. All power production nuclides were below minimum detectable activity.

Airborne:

- Air particulates and air iodine samples were analyzed for gross beta, gamma-emitting nuclides, and low level I-131. All nuclides were below minimum detectable activity. The gross beta results were less than the investigation level (1.60E-01 pCi/m^3) and there were no notable differences between control and indicator locations.

Ambient Radiation:

- Ambient gamma radiation levels were measured quarterly. Average measurements were consistent with those measured in previous years, indicating that the Independent Spent Fuel Storage Installation (ISFSI) and plant operations had no measurable impact to the environs.

In 2017, the doses from both liquid and gaseous effluents were conservatively calculated for the Maximum Exposed Member of the Public due to PBAPS Operation. Doses calculated were well below all Offsite Dose Calculations Manual (ODCM) limits. The results of those calculations were as follows:

Effluent	Applicable Organ	Estimated Dose	Age Group	Location Distance (meters)	 Direction (toward)	% of Applicable Limit	Limit	Unit
Noble Gas	Gamma - Air Dose	2.21E-01	All	1.10E+03	SSE	1.11E+00	2.00E+01	mrad
Noble Gas	Beta - Air Dose	1.51E-01	All	1.10E+03	SSE	3.78E-01	4.00E+01	mrad
Noble Gas	Total Body (gamma)	2.14E-01	All	1.10E+03	SSE	2.14E+00	1.00E+01	mrem
Noble Gas	Skin (Beta)	2.79E-01	All	1.10E+03	SSE	9.30E-01	3.00E+01	mrem
Gaseous Iodine, Particulate, Carbon-14 & Tritium	Bone	5.90E-01	Child	1.10E+03	SSE	1.97E+00	3.00E+01	mrem
Gaseous Iodine, Particulate, & Tritium	Thyroid	3.09E-03	Infant	1.10E+03	SSE	1.03E-02	3.00E+01	mrem
Liquid	Total Body (gamma)	1.03E-04	Child	Site Boundary		1.71E-03	6.00E+00	mrem
Liquid	GI-LLI	1.67E-04	Child			8.34E-03	2.00E+01	mrem
Direct Radiation	Total Body	0.00E+00	All	1.15E+03	SSE	0.00E+00	2.20E+01	mrem

40 CFR Part 190 Compliance								
Effluent	Applicable Organ	Estimated Dose	Age Group	Location Distance (meters)	 Direction (toward)	% of Applicable Limit	Limit	Unit
Total Dose	Total Body	2.14E-01	All	1.15E+03	SSE	8.56E-01	2.50E+01	mrem
Total Dose	Thyroid	3.09E-03	All	1.15E+03	SSE	4.12E-03	7.50E+01	mrem
Total Dose	Bone	5.90E-01	All	1.15E+03	SSE	2.36E+00	2.50E+01	mrem
Total Dose	Total Body	2.14E-01	All	1.15E+03	SSE	7.14E+00	3.00E+00	mrem
Total Dose	Bone	5.90E-01	All	1.15E+03	SSE	1.97E+01	3.00E+00	mrem
Total Dose	Thyroid	2.24E-01	All	1.15E+03	SSE	4.08E-01	5.50E+01	mrem

II. Introduction

PBAPS is located along the Susquehanna River between Holtwood and Conowingo Dams in Peach Bottom Township, York County, Pennsylvania. PBAPS Units 2 and 3 are boiling water reactors, each with a rated full-power output of approximately 4,016 MWth while Unit 1 is a decommissioned 115 MWth High Temperature, Gas-cooled Reactor (HTGR). The initial environmental monitoring program began 5 February 1966. A summary of the Unit 1 preoperational monitoring program was presented in a previous report [(1)]. Preoperational summary reports [(2)(3)] for Units 2 and 3 have been previously issued and summarize the results of all analyses performed on samples collected from 5 February 1966 through 8 August 1973.

The sampling and analysis requirements are contained in the PBAPS ODCM and the ODCM Specifications (ODCMS). This AREOR covers those analyses performed by Teledyne Brown Engineering (TBE), Landauer, Exelon Industrial Services (EIS) and GEL Laboratories on samples collected during the period 01 January 2017 through 31 December 2017.

A. Objectives

The objectives of the REMP are:

1. Provide data on measurable levels of radiation and radioactive materials in the publicly-used environs;

2. Evaluate the principal pathways of exposure to the public as described in the ODCM and determine the relationship between quantities of radioactive material released from the plant and resultant radiation doses to members of the public.

B. Implementation of the Objectives

Implementation of the objectives is accomplished by:

1. Identifying significant exposure pathways,

2. Establishing baseline radiological data of media within those pathways,

3. Continuously monitoring those media before and during plant operation to assess station radiological effects (if any) on man and the environment.

As the REMP is established to measure the impact of power plant operations (release of radionuclides) on man and the environment, it is important to understand radiation/radioactivity, the units used to measure them, and natural sources of radiation in the environment. A brief explanation is provided to differentiate radiation from nuclear power production and other sources, be they man-made or natural. The doses produced from the other sources of radiation can be compared to the data presented in this report.

C. Radiation and Radioactivity

All matter is made of atoms. An atom is the smallest part into which matter can be broken down and still maintain all its chemical properties. Nuclear radiation is energy, in the form of waves or particles that is given off by unstable, radioactive atoms. Radioactive material exists naturally and has always been a part of our environment. The earth's crust, for example, contains radioactive uranium, radium, thorium and potassium. Some radioactivity is a result of nuclear weapons testing. Examples of radioactive fallout that is normally present in environmental samples are Cs-137 and Strontium-90 (Sr-90). Some examples of radioactive materials released from a nuclear power plant are Cs-137, I-131, Sr-90 and Cobalt-60 (Co-60).

Radiation is measured in units of millirem; much like temperature is measured in degrees. A millirem is a measure of the biological effect of the energy deposited in tissue. The natural and man-made radiation dose received in one year by the average American is 300 to 400 mrem (References 5, 6, 7 in Table 1 below). Radioactivity is measured in curies. A curie is that amount of radioactive material needed to produce 3.70E+10 nuclear disintegrations per second. This is an extremely large amount of radioactivity in comparison to environmental radioactivity. That is why radioactivity in the environment is measured in picocuries. One picocurie is equal to 1.00E-12 (one trillionth) of a curie.

D. Sources of Radiation

As mentioned previously, naturally occurring radioactivity has always been a part of our environment. Table I shows the typical doses received from natural and man-made sources.

Table 1

Radiation Sources and Corresponding Doses [4]

NATURAL		MAN-MADE	
Source	Radiation Dose (millirem/year)	Source	Radiation Dose (millirem/year)
Internal, inhalation [a]	228	Medical [b]	300
External, space	33	Consumer [c]	13
Internal, ingestion	29	Industrial[d]	0.3
External, terrestrial	21	Occupational	0.5
		Weapons Fallout	<1
		Nuclear Power Plants	<1
Approximate Total	311	Approximate Total	314

Cosmic radiation from the sun and outer space penetrates the earth's atmosphere and continuously bombards us with rays and charged particles. Some of this cosmic radiation interacts with gases and particles in the atmosphere, making them radioactive. These radioactive byproducts from cosmic ray bombardment are referred to as cosmogenic radionuclides. Isotopes such as Beryllium-7 (Be-7) and Carbon-14 (C-14) are formed in this way. Exposure to cosmic and cosmogenic sources of radioactivity results in a dose of 33 mrem per year.

Additionally, natural radioactivity is in our body, in the food we eat (about 29 millirem/yr), in the ground we walk on (about 21 millirem/yr), and in the air we breathe (about 228 millirem/yr). One percent of all potassium in nature is the radioactive Potassium-40 (K-40). The majority of a person's annual dose results from exposure to radon and thoron in the air we breathe. These gases and their radioactive decay products arise from the decay of naturally occurring uranium, thorium and radium in soil and in building products such as brick, stone and concrete. Radon and thoron levels vary greatly with location, primarily due to changes in the concentration of uranium and thorium in the soil. Residents at some locations in Colorado, New York, Pennsylvania, and New Jersey have a higher annual dose as a result of higher levels of radon/thoron gases in these areas. In total, these various sources of naturally occurring radiation and radioactivity contribute to a total dose of about 311 mrem per year.

In addition to natural radiation, we are normally exposed to radiation from a number of man-made sources. The single largest dose from man-made sources result from therapeutic and diagnostic applications of x-rays and radiopharmaceuticals. The annual dose to an individual in the U.S. from medical and dental exposure is about 300 mrem.

Consumer products, such as televisions and smoke detectors, contribute about 13 mrem/yr. Much smaller doses result from weapons fallout and nuclear power plants (less than 1 mrem/yr). Typically, the average person in the United States receives about 314 mrem per year from man-made sources.

Some of the natural radioactive nuclides discussed above were identified in PBAPS REMP samples. The typical power production radionuclides, described in the next sections, were not identified and thus it can be concluded that PBAPS did not impact man and the environs during the 2017 operating period.

III. Program Description

A. Sample Collection

Normandeau Associates Inc., (NAI) contracted by Exelon Industrial Services (EIS) collected REMP samples for PBAPS Exelon Nuclear. This section describes the collection methods used by NAI/ESI to obtain environmental samples for the PBAPS REMP in 2017. Sample locations and descriptions can be found in Table B-1 and Figures B-1 through B-3, Appendix B. The collection procedures used by NAI/EIS are listed in Table B-2, Appendix B.

Aquatic Environment

The aquatic environment was evaluated by performing radiological analyses on samples of surface water, drinking water, fish and sediment. Surface water is sampled from two locations as prescribed by the ODCM: one upstream (1LL) and one downstream (1MM) of the plant discharge canal. Drinking water is sampled from a control location (6I) and up to 3 locations nearest to public drinking water supplies. Two locations are identified in the ODCM as the closest drinking water supplies, the Conowingo Dam (4L) and Chester Water Authority (13B). All samples were collected weekly by automatic sampling equipment or as grab samples. Weekly samples from each location were composited into two one-gallon monthly samples for analysis. A separate quarterly composite of the monthly samples was also collected.

Fish sample collection locations required by the ODCM are in an area close to the discharge of PBAPS (4) and a control location, unaffected by plant discharge (6). These samples are comprised of the flesh of commercially and recreationally important species specific to the environs around PBAPS. Fish samples were collected semiannually from two groups: Bottom Feeder (channel catfish, flathead catfish, carp, and shorthead redhorse) and Predator (smallmouth bass, largemouth bass, and walleye), as these are the types of fish commonly collected by the public from the river around PBAPS. The total weight of fish flesh was approximately 1000 grams. The samples were preserved on ice for shipping to the laboratory.

The ODCM requires one sediment sample to be collected downstream of the plant in an area with existing or potential recreational value. The REMP collects samples from three locations (4J, 4T and 6F; 6F is the control). Sediment samples, composed of recently deposited substrate, were collected semiannually. Multiple grab samples of the sediment were collected to obtain an approximately homogenous, representative sample totaling 1000 grams.

Terrestrial Environment

The terrestrial environment was evaluated by performing radiological analyses on milk and food product samples. The ODCM requires milk samples at three locations with the highest dose potential, within three miles of PBAPS and one sample at a control location. The REMP meets these requirements and also samples extra locations. Milk samples were collected biweekly at five locations (J, R, S, U, X and V; V is the control) from April through November and monthly from December through March. Six additional locations (C, D, E, L, P and W; C and E are the controls) were sampled quarterly. Two-gallon samples were collected directly from the bulk tank at each location, preserved with sodium bisulfite, and shipped promptly to the laboratory.

The ODCM only requires food products be collected from the area of highest dose impact and a control location, if milk sampling is unavailable in those locations. Food product samples, comprised of annual broad green leaf vegetation, were collected monthly at five locations (1C, 2B, 1B, X, 3Q and 55; 55 is the control) in June through September. Typically, the 'planting' season starts late April/early May, with the plants gaining sufficient mass for collection in late June or July. Approximately 1000 g of unwashed samples were collected in plastic bags and shipped promptly to the laboratory, but sample size varied on garden production.

Airborne Environment

The airborne atmospheric environment was evaluated by performing radiological analyses on air particulate and radioiodine samples. The ODCM requires sampling from five locations, including three site boundary locations with greatest dose impact, one location within a local community with the highest dose impact, and one control location. Air particulate and radioiodine samples were collected and analyzed weekly from five locations (1B, 1C, 1Z/1A, 3A and 5H2; 5H2 is the control, 1A is the duplicate QA location), using a vacuum pump with charcoal cartridges and glass fiber filters attached. The pumps were run continuously and sampled air at the rate of approximately 1 cubic foot per minute to obtain a minimum total volume of 280 cubic meters. The weekly filters were composited for a quarterly sample.

Ambient Gamma Radiation

The ambient gamma radiation in the areas surrounding PBAPS is measured using dosimeters, which are exposed to ambient radiation in the field and exchanged quarterly. The ODCM requires at least 40 routine monitoring stations with two or more dosimeters at each location for continuous monitoring. The REMP contains 48 dosimeter monitoring locations.

Optically-Stimulated Luminescent Dosimeters (OSLD) replaced the Thermo-Luminescent Dosimeter (TLD) starting in 2012. However, PBAPS continued using TLD in addition to OSLD to compare the two technologies. The primary data reported after 2012 is from OSLD. Additionally, only the "gross" OSLD exposure (i.e. no background or control subtraction) is reported; prior to 2012, "net' TLD exposures data were reported. This explains the increase in ambient radiation levels displayed in Figure C-6.

The OSLD locations were placed on and around the PBAPS site as follows:

A site boundary ring, consisting of 19 locations (1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K, 1L, 1M, 1NN, 1P, 1Q, 1R, 2, and 40), near and within the site perimeter representing fence post doses (i.e., at locations where the doses will be potentially greater than maximum annual off-site doses).

An intermediate distance ring, consisting of 23 locations (14, 15, 17, 22, 23, 26, 27, 31A, 32, 3A, 42, 43, 44, 45, 46, 47, 48, 49, 4K, 5, 50, 51 and 6B), extending to approximately 5 miles from the site and designed to measure possible exposures to close-in population.

Six locations (16, 18, 19, 24, 2B and 1T) represent control and special interests areas such as population centers, schools, and nearest residents.

The specific dosimeter locations were determined by the following criteria:

1. The presence of relatively dense population, nearby residences, schools, and control locations;

2. Site meteorological data taking into account distance and elevation for each of the sixteen 22.5 degree sectors around the site, where estimated annual dose from PBAPS, if any, would be more significant;

3. And on hills free from local obstructions and within sight of the main stack and/or reactor building roof vents (where practical).

Each dosimetry location in the environment has 2 OSLD and 2 TLD dosimeters which were enclosed in plastic as a moisture barrier. Dosimeter housing (Formica boxes and polyethylene jars) were replaced with mesh tubes, aligned horizontally and facing the plant in the same locations. Dosimeters were placed vertically in the tubes so that no dosimeter was covered by another dosimeter and all dosimeters properly faced the plant.

B. Sample Analysis

This section describes the analytical methods used by TBE, EIS and GEL Labs to analyze the environmental samples for radioactivity. The analytical procedures used by the laboratories are listed in Table B-2, Appendix B.

The required ODCM analyses include:

1. Concentrations of beta emitters in drinking water and air particulates;
2. Concentrations of gamma-emitting nuclides in surface and drinking water, air particulates, milk, fish, sediment and food products;
3. Concentrations of tritium in surface and drinking water;
4. Concentrations of I-131 in air, milk, and food products. Although not required by the ODCM, I-131 is also analyzed in drinking and surface water;
5. Ambient gamma radiation levels at various site environs.

C. Data Interpretation

The radiological environmental and direct radiation data collected prior to PBAPS becoming operational was used as a baseline with which the 2017 operational data were compared. In addition, data were compared to previous years' operational data for consistency and trending. Several factors are important in the interpretation of the data.

1. <u>Lower Limit of Detection and Minimum Detectable Concentration</u>

The lower limit of detection (LLD) is defined as the smallest concentration of radioactive material in a sample that would yield a detectable net count (above background) that would only have a 5% probability of falsely concluding that a blank observation represents a "real" signal. The LLD is intended as a "before-the-fact" (*a priori*) estimate of a system (including instrumentation, procedure and sample type) and not as an "after-the-fact" (*a* *posteriori*) measurement. All analyses are designed to achieve the required detection limits for environmental samples, as described in the PBAPS ODCM.

The minimum detectable concentration or activity (MDC or MDA) is defined as the "after-the-fact" (*a posteriori*) estimate determined during the analysis of the sample.

2. <u>Net Activity Calculation and Reporting of Results</u>

Net activity for a sample is calculated by subtracting background activity from the sample activity. Since the REMP measures extremely small changes in radioactivity in the environment, background variations can result in sample activity being lower than the background activity causing a negative number. MDC is reported in all cases where positive activity was not detected. In previous years, when net activity was reported (and not the MDC), a lower baseline is seen in trending compared to 2017 results.

Gamma spectroscopy results for each type of sample were grouped as follows:

- For surface and drinking water, twelve nuclides, Manganese-54 (Mn-54), Cobalt-58 (Co-58), Iron-59 (Fe-59), Cobalt-60 (Co-60), Zinc-65 (Zn-65), Zirconium-95 (Zr-95), Niobium-95 (Nb-95), I-131, Cesium-134 (Cs-134), Cs-137, Barium-140 (Ba-140), and Lanthanum-140 (La-140) were reported.
- For fish, eight nuclides, K-40, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Cs-134 and Cs-137 were reported.
- For sediment, seven nuclides, K-40, Mn-54, Co-58, Co-60, I-131, Cs-134 and Cs-137 were reported.
- For air particulates, six nuclides, Be-7, Mn-54, Co-58, Co-60, Cs-134 and Cs-137 were reported.
- For milk, six nuclides, K-40, I-131, Cs-134, Cs-137, Ba-140 and La-140 were reported.
- For food products, eight nuclides, Be-7, K-40, Mn-54, Co-58, Co-60, I-131, Cs-134 and Cs-137 were reported.

Positive activity values (greater than MDC) were recorded and the mean and standard deviation of the results were calculated. The mean standard deviation represents the variability of measured results for different samples of the same media rather than a single analysis uncertainty.

D. Program Exceptions

For 2017 the PBAPS REMP had a sample collection recovery rate of > 99%. The exceptions to this program are listed below:

Table 2 LIST OF SAMPLE ANOMALIES

Sample Type	Location Code	Collection Date	Reason
Dosimeters	24, 26, 45	1Q2017	Substation construction led to relocation of dosimeters
Food Products	1B and X	3Q2017	Garden 1B unable to sustain production; samples collected at a garden co-located with Milk Farm X

Table 3 LIST OF MISSING SAMPLES

Sample Type	Location Code	Collection Date	Reason
Dosimeters	24 1P	1Q2017	All OSLD and TLD missing One TLD missing
AP/AI*	1C	07/13/17 - 07/20/17	Air sample pump found tripped due to summer storms causing invalid sample volume
AP/AI*	1B	08/17/17 - 08/24/17	Air sample pump found tripped due to summer storms causing invalid sample volume
Food Products	1B	July 2017 Aug-Sept 2017	Only 2/3 samples available due to predation No sample collected due to predation

**AP/AI = Air Particulates/Air Iodine*

Each program exception was reviewed to understand the causes of the program exception. Sampling and maintenance errors were reviewed with the personnel involved to prevent a recurrence. Occasional equipment breakdowns and power outages were unavoidable.

IV. Program Changes

The REMP contractor was changed from NAI to EIS at the beginning of 2017. EIS procedures were approved and implemented for collecting drinking/surface water, vegetation, milk, dosimeters, and air samples. NAI was contracted to continue collecting PB REMP samples, but used the EIS procedures described. NAI procedures were still used to collect fish and sediment samples. EIS laboratory analyzed duplicate QA samples for milk, air, and surface water. GEL laboratory analyzed duplicate QA water samples for tritium.

Garden 1B was removed from the ODCM and Milk Farm X was added to the ODCM. Milk Farm X has been a part of the REMP since 2016 and is in the same meteorological sector as Garden 1B. Milk samples are preferred over food products, as it is a direct measurement of the most significant dose pathway, as described in the ODCM.

Dosimeter locations for stations 24, 26, and 45 were moved due to construction occurring at the beginning of the year. The new locations were still within the same meteorological sectors, but the distance to the plant vent stacks had to be updated. The ODCM was updated to include the new distances for these station locations.

V. Results and Discussion

Appendix A contains a summary of all 2017 PBAPS REMP results which meets the requirement of the Table 3 of NUREG 1302 'Branch Technical Position Paper'[5]. Table A-1 lists results by each sample media and analyses performed. The total number of analyses performed, required LLD, the number of positive results for each indicator and control location are listed. From the positive results identified (greater than the MDA) the mean value, range and station locations with highest annual mean are listed. Commonly identified nuclides are gross beta, K-40, and Be-7. A graphical representation is provided in Figure A-1.

A. Aquatic Environment

1. Surface Water

A summary of the 2017 analysis results for surface water samples from stations 1LL and 1MM are listed below:

Tritium

Quarterly samples were analyzed for tritium activity (Table C-I.1, Appendix C). No tritium activity was detected and the required LLD was met.

Iodine

Monthly samples were analyzed for low level I-131. All results were less than the MDC and the required LLD was met. (Table C-I.2, Appendix C).

Gamma Spectrometry

Monthly samples were analyzed for gamma-emitting nuclides (Table C-I.3, Appendix C). All nuclides were less than the MDC and all required LLDs were met.

2. Drinking Water

The results from the drinking water samples collected in 2017 from stations 13B, 4L and 6I are described below:

Gross Beta

Samples from all locations were analyzed monthly for concentrations of gross beta activity (Table C-II.1 and Figure C-1 Appendix C). Gross beta activity was detected in 24 of 36 samples. The values ranged from 1.9 to 4.6 pCi/L with a mean value of 2.8 ± 1.7 pCi/L. The mean detected gross beta activity was less than the required LLD (4 pCi/L) which indicates the sensitivity of the measurement technique. The detectable gross beta activity was well below the procedural investigation level (15 pCi/L). Concentrations detected were generally below those detected in previous years.

Tritium

Monthly samples were composited quarterly and analyzed for tritium activity (Table C-II.2, Appendix C). Tritium activity was not detected in any samples and the required LLD was met.

Iodine

Monthly samples were analyzed for low level I-131 (Table C-II.3, Appendix C). All results were less than the MDC and the required LLD was met.

Gamma Spectrometry

Samples from the three locations were analyzed monthly for gamma-emitting nuclides (Table C-II.4, Appendix C). All nuclides were less than the MDC and all required LLDs were met.

3. Fish

Results from fish samples collected at locations 4 and 6 in 2017 are described below:

Gamma Spectrometry

The edible portions of the collected fish samples were analyzed semiannually for gamma-emitting nuclides (Table C-III.1, Appendix C). Naturally occurring K-40 was found at all stations and ranged from 2,152 to 4,016 pCi/kg (wet), with a mean value of 3,068 ± 1,315 pCi/kg (wet), consistent with levels detected in previous years. No fission or activation products, due to plant operations were found in 2017 and all required LLDs were met. Figure C-2, Appendix C, displays the various gamma radionuclide MDC results for locations 4 and 6, based on the type of fish collected. All MDC results are less than the nuclide specific LLDs. The last 15-year average Cs-137 MDC is also shown to trend 2017 results with historical results. There have been no detectable levels of Cs-137 in fish since 1983.

4. Sediment

Sediment samples were collected at locations 6F, 4J, and 4T and the results are described below:

Gamma Spectrometry

Sediment samples were analyzed for gamma-emitting nuclides (Table C-IV.1, Appendix C). K-40 was found in all locations and ranged from 9,080 to 21,950 pCi/kg (dry) with a mean value of 14,227 ± 9,985 pCi/kg (dry). The fission product Cs-137 was detected in 1 of the 6 samples at a concentration of 187 pCi/kg (dry), which is just above the required LLD of 180 pCi/kg (dry). The positive result was less than the procedural investigation level of 1000 pCi/kg (dry). 2017 Cs-137 results are plotted against the average value from the last 15 years. Locations 4J and 6F are less than the historical average, whereas location 4T was not, indicating the presence of background interferences at that location. There was not enough Cs-137 to indicate that the positive samples results were a consequence of plant operation. Historical levels of Cs-137 are shown in Figure C-3, Appendix C. No other fission or activation products were found and all LLDs were met.

B. Atmospheric Environment

1. Airborne Particulates

Continuous air particulate samples were collected from five locations. The five locations were separated into three groups: Group I represents locations within the PBAPS site boundary (1B, 1C and 1Z/1A), Group II represents the location of the closest local community (3A) and Group III represents the control location at a remote distance from PBAPS (5H2). 1A results will be discussed in Appendix D. The results from samples collected in 2017 are described below:

Gross Beta

Weekly samples were analyzed for concentrations of beta-emitters (Tables C-V.1, Appendix C). Detectable gross beta activity was observed at all locations. The results from Group I ranged from 8E-3 to 34E-3 pCi/m^3, with a mean of 19E-3 ± 11E-3 pCi/m^3. The results from Group II ranged from 7E-3 to 37E-3 pCi/m^3 with a mean of 22E-3 ± 11E-3 pCi/m^3. The results from the Group III ranged from 6E-3 to 22E-3 pCi/m^3 with a mean of 15E-3 ± 8E-3 pCi/m^3.

The mean value from all locations are the same within error, indicating the gross beta activity is not a result of the operation of PBAPS, as shown below in Figure C-4, Appendix C. In addition, a comparison of the 2017 air particulate data with historical data indicates a decreasing trend in gross beta activity since initial operation of the plant (Figure C-4, Appendix C).

Gamma Spectrometry

Quarterly samples were analyzed for gamma-emitting nuclides (Table C-V.2, Appendix C). Naturally-occurring Be-7 activity, from cosmic rays, was detected in all 20 samples. The values ranged from 49E-3 to 125E-3 pCi/m^3, with a mean value of 89E-3 ± 48E-3pCi/m^3. All power production nuclides were less than the MDC and all required LLDs were met.

2. Airborne Iodine

Weekly samples were also analyzed for low level I-131 (Table C-VI.1, Appendix C). All results were less than the MDC for I-131 and the required LLD was met.

C. Terrestrial

1. <u>Milk</u>

During 2017, 156 milk samples were collected and analyzed from the following locations: D, J, R, L, P, S, U, W, X (indicators) and C, E, V (controls). The results are described below:

<u>Iodine-131</u>

Milk samples from all locations were analyzed for concentrations of I-131 (Tables C-VII.1, Appendix C). Figure C-5 displays the 2017 milk I-131 results for both indicator and control locations. All results are less than the LLD (1 pCi/L) and much less than the reporting level (3 pCi/L).

<u>Gamma Spectrometry</u>

Milk samples from all locations were analyzed for concentrations of gamma-emitting nuclides (Table C-VII.2, Appendix C). Naturally-occurring K-40 was found in all samples and ranged from 889 to 1,712 pCi/l, with a mean value of 1265 ± 236 pCi/L. All other nuclides were less than the MDC and all required LLDs were met.

2017 Cs-134 and Cs-137 MDC results are plotted in Figure C-5 with the required LLDs and Reporting Levels. All results are much less than the LLDs and reporting levels. The last 15-year average MDC of Cs-137 in milk is also plotted in Figure C-5, Appendix C. There is no statistical difference between the 2017 MDC Cs-137 results and the 15-year historical MDC.

2. <u>Food Products</u>

Throughout 2017, 59 samples of various green leafy vegetation (kale, cabbage, collard greens, broccoli, etc.) were collected and analyzed for concentrations of gamma-emitting nuclides (Table C-VIII.1, Appendix C). The results are discussed below:

<u>Gamma Spectrometry</u>

Naturally-occurring Be-7 activity was found in 25 of 59 samples and ranged from 189 to 4,232 pCi/kg (wet), with a mean of 1154 ± 2477 pCi/kg (wet). Also, naturally occurring K-40 activity was found in all samples and ranged from 982 to 5,490 pCi/kg (wet), with a mean of 3195 ± 2,491 pCi/kg (wet). All power production nuclides were less than the MDC and all required LLDs were met.

D. Ambient Gamma Radiation

Results of OSLD measurements are listed in Tables C-IX.1 through C-IX.3 and Figure C-6, Appendix C.

The mean gross OSLD measurement for all indicator locations was 8.9 ± 3.0 mRem per standard month, with a range of 5.2 to 13.4 mRem per standard month. The period mean for the control locations (16, 18, 19 and 24) was 8.2 ± 2.5 mRem per standard month, which is the same, within error, of the OSLDs located within the site boundary and intermediate distances. These results indicate PBAPS operation had no impact on the ambient gamma radiation levels in the areas surrounding PBAPS. This trend has occurred throughout the history of the plant and can be seen in Figure C-6, Appendix C. The increase in ambient radiation reading in 2012, seen in Figure C-6, was due to the change from TLD to OSLD monitoring and the reporting of gross rather than net measurement values.

E. Independent Spent Fuel Storage Installation (ISFSI)

ISFSI was initiated in June 2000. Six new casks were added to the ISFSI pad in 2017. Site boundary OSLDs which measure the ambient gamma radiation closest to ISFSI are locations 1A, 1D, 1M, 1P, 1Q, 1R, with 1R being the closest. Location 2B is the nearest real resident which could be impacted by ISFSI. Location 1R, showed a general increase of 1 to 3 mRem per standard month from pre-ISFSI loading (Figure C-7, Appendix C). Location 2B, follows closely with values from locations 1A, 1D, and controls, indicating no impact from ISFSI on nearest real resident. Data from location 2B is used to demonstrate compliance to both 40CFR190 and 10CFR72.104 limits. All radiation levels are well below regulatory limits.

The pre-operational (pre-op) ambient gamma radiation level is not a gross value, therefore, Figure C-7 displays a 'Pre-Op + Transit' value which adds an average transit dose to the pre-op value. Transit dose is any dose recorded by the OSLDs when they are not actively measuring ambient radiation in the field (e.g. during transportation and dosimeter change outs). Transit dose can be measured anywhere from 3 to 8 mrem per month. An average value of 5 mrem per month was added to show that even though an increased dose is observed due to ISFSI operations, ISFSI is not increasing ambient gamma radiation levels above background and pre-operation levels. Location 1R is approaching the pre-operational levels, but the other locations around ISFSI are still well below background levels.

F. Land Use Census

A Land Use Survey, conducted during the fall of 2017, was performed by Exelon Industrial Services (EIS), to comply with Section 3.8.E.2 of PBAPS's ODCM Specifications. The survey documented the nearest milk-producing and meat animal, nearest residence, and garden larger than 500 square feet in each of the sixteen meteorological sectors out to five miles.

Also, because PBAPS is an elevated release facility, an additional requirement of identifying all gardens larger than 500 square feet and every dairy operation within three (3) miles was included in the 2017 survey. The distance and direction of all locations were positioned using Global Positioning System (GPS) technology. The results of this survey are summarized below. There was no change in nearest residents compared to the 2016 report. Two new gardens were identified in 2017 with one in the WSW sector as the nearest garden for that sector. The closest meat animals in each sector for the 2017 report remained the same as the previous year while in the N sector a closer dairy farm was identified.

Location of the Nearest Residence, Garden, Milk, Meat, Animal within a Five-Mile Radius of PBAPS Reactor Building Exhaust Vents

Sector		Residence Feet	Garden Feet	Milk Farm Feet	Meat Animal Feet
1	N	12,362	14,003	14,183	14,455
2	NNE	11,112	11,041	10,843	10,843
3	NE	10,080	10,004	10,492	10,492
4	ENE	10,495	11,554	10,925*	10,925
5	E	10,066	14,540	14,471	13,712
6	ESE	16,085	20,374	20,154	16,085
7	SE	10,772	10,772	19,134*	19,134
8	SSE	3,912	3,912	-	-
9	S	5,545	5,545	-	9,247
10	SSW	6,072	8,167	11,602	7,187
11	SW	4,755	4,865	4,860*	4,860
12	WSW	4,036	7,487	-	13,366
13	W	5,327	5,327	5,136*	5,136
14	WNW	2,928	4,192	22,124	3,926
15	NW	2,948	9,545	9,545	7,582
16	NNW	5,124	-	-	-

*Denotes current REMP milk sample location

G. Errata Data

There is no errata data for 2017.

H. Secondary Laboratory Analysis

Appendix D of this report presents the results of data analyses performed by the QC laboratory, EIS and GEL. Duplicate samples were obtained from several locations and analyzed by both the primary and QC laboratories. GEL was only used for H-3 analyses of water samples because EIS could not perform those analyses. Comparisons of the results for all media were within expected ranges.

I. Summary of Results – Quality Control (QC) Laboratory Analysis

The primary and secondary laboratories analyzed Performance Evaluation (PE) samples of air particulate, air iodine, milk, soil, food products and water matrices (Appendix E). The PE samples, supplied by Eckert & Ziegler Analytics, Inc., Environmental Resource Associates (ERA) and DOE's Mixed Analyte Performance Evaluation Program (MAPEP), were evaluated against a pre-set acceptance criteria described in Appendix E.

For the Teledyne Brown Engineering (TBE) laboratory, 168 out of 173 analyses performed met the specified acceptance criteria. Five analyses (Water - Zn-65, Sr-89, and Sr-90, Air Particulate – U-238, and Soil – Cr-51) did not meet the specified acceptance criteria and are documented in Appendix E. TBE has addressed each issue through the TBE Corrective Action Program.

For the EIS laboratory, 74 of 75 analyses met the specified acceptance criteria. One analysis (Water – Gross Alpha) did not meet the specified acceptance criteria for the reasons described in Appendix E.

For the GEL laboratory, 8 of 8 H-3 analyses met the specified acceptance criteria.

The Inter-Laboratory Comparison Program provides evidence of "in control" counting systems and methods, and that the laboratories are producing accurate and reliable data.

VI. References

1. Preoperational Environs Radioactivity Survey Summary Report, March 1960 through January 1966. (September 1967)

2. Interex Corporation, Peach Bottom Atomic Power Station Regional Environs Radiation Monitoring Program Preoperational Summary Report, Units 2 and 3, 5 February 1966 through 8 August 1973, June 1977, Natick, Massachusetts

3. Radiation Management Corporation Publication, Peach Bottom Atomic Power Station Preoperational Radiological Monitoring Report for Unit 2 and 3, January 1974, Philadelphia, Pennsylvania

4. Information from NCRP Reports 160 and 94

   a. Primarily from airborne radon and its radioactive progeny

   b. Includes CT (147 mrem), nuclear medicine (77 mrem), interventional fluoroscopy (43 mrem) and conventional radiography and fluoroscopy (33 mrem)

   c. Primarily from cigarette smoking (4.6 mrem), commercial air travel (3.4 mrem), building materials (3.5 mrem), and mining and agriculture (0.8 mrem)

   d. Industrial, security, medical, educational, and research

5. Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors, Generic Letter 89-01, Supplement No. 1 (NUREG-1302), April 1991

APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT SUMMARY

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FIGURE A-1
TOTAL REMP ANALYSES FOR 2017 AND SPECIFIC
NUCLIDE ANALYSES WITH ACTIVITY GREATER THAN MDC

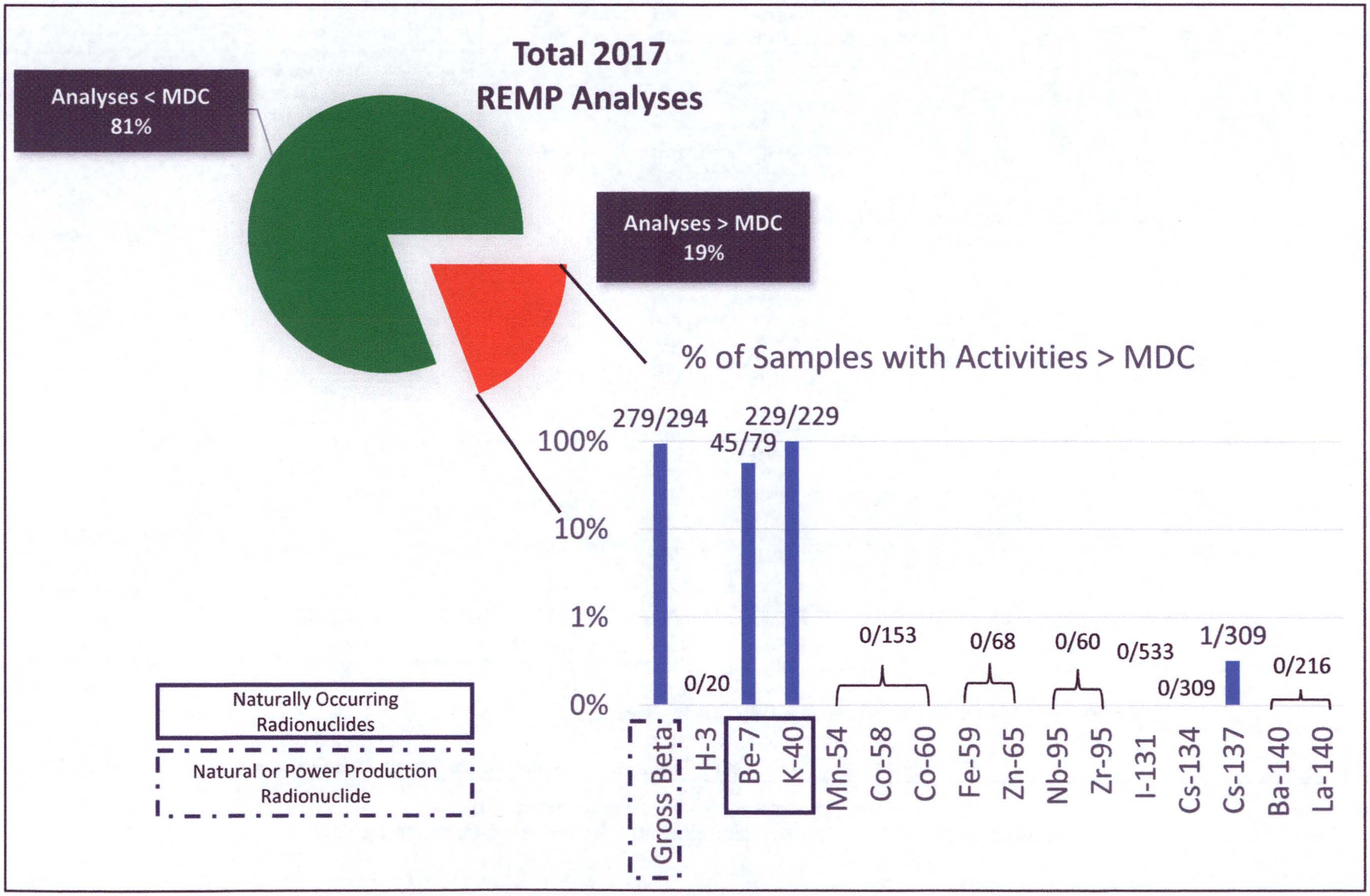

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE PEACH BOTTOM ATOMIC POWER STATION, 2017

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION **DOCKET NUMBER:** 50-277 & 50-278
LOCATION OF FACILITY: YORK COUNTY , PA **REPORTING PERIOD:** 2017

MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) *RANGE*	CONTROL LOCATION MEAN (M) (F) *RANGE*	LOCATION WITH HIGHEST ANNUAL MEAN (M): MEAN (M) (F) *RANGE*	LOCATION WITH HIGHEST ANNUAL MEAN (M): STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER *(PCI/LITER)*	**H-3**	8	200	<LLD	<LLD	-		0
	I-131	24	1	<LLD	<LLD	-		0
	GAMMA	24						
	Mn-54		15	<LLD	<LLD	-		0
	Co-58		15	<LLD	<LLD	-		0
	Fe-59		30	<LLD	<LLD	-		0
	Co-60		15	<LLD	<LLD	-		0
	Zn-65		30	<LLD	<LLD	-		0
	Nb-95		15	<LLD	<LLD	-		0
	Zr-95		30	<LLD	<LLD	-		0
	Cs-134		15	<LLD	<LLD	-		0
	Cs-137		18	<LLD	<LLD	-		0
	Ba-140		60	<LLD	<LLD	-		0
	La-140		15	<LLD	<LLD	-		0
DRINKING WATER *(PCI/LITER)*	**GR-B**	36	4	2.8 (17/24) *1.9 - 4.6*	2.6 (7/12) *1.9 - 4.1*	2.8 (10/12) *1.9 - 4.6*	13B INDICATOR CHESTER WATER AUTH. SUSQUEHANNA PUMPING STA. 13306 FEET ESE	0
	H-3	12	200	<LLD	<LLD	-		0
	I-131 (LOW LVL)	36	1	<LLD	<LLD	-		0
	GAMMA	36						
	MN-54		15	<LLD	<LLD	-		0
	CO-58		15	<LLD	<LLD	-		0
	FE-59		30	<LLD	<LLD	-		0
	CO-60		15	<LLD	<LLD	-		0
	ZN-65		30	<LLD	<LLD	-		0
	NB-95		15	<LLD	<LLD	-		0
	ZR-95		30	<LLD	<LLD	-		0
	CS-134		15	<LLD	<LLD	-		0
	CS-137		18	<LLD	<LLD	-		0
	BA-140		60	<LLD	<LLD	-		0
	LA-140		15	<LLD	<LLD	-		0

(M) The Mean Values are calculated using the positive values. (F) Fraction of detectable measurement are indicated in parentheses.

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE PEACH BOTTOM ATOMIC POWER STATION, 2017

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION **DOCKET NUMBER:** 50-277 & 50-278

LOCATION OF FACILITY: YORK COUNTY , PA **REPORTING PERIOD:** 2017

MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) *RANGE*	CONTROL LOCATION MEAN (M) (F) *RANGE*	LOCATION WITH HIGHEST ANNUAL MEAN (M): MEAN (M) (F) *RANGE*	LOCATION WITH HIGHEST ANNUAL MEAN (M): STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
BOTTOM FEEDER	**GAMMA**	4						
(PCI/KG WET)	*K-40*		NA	2843 (2/2) *2229 - 3457*	3649 (2/2) *3282 - 4016*	3649 (2/2) *3282 - 4016*	6 CONTROL HOLTWOOD POND 57347 FEET NW	0
	MN-54		130	<LLD	<LLD	-		0
	CO-58		130	<LLD	<LLD	-		0
	FE-59		260	<LLD	<LLD	-		0
	CO-60		130	<LLD	<LLD	-		0
	ZN-65		260	<LLD	<LLD	-		0
	CS-134		130	<LLD	<LLD	-		0
	CS-137		150	<LLD	<LLD	-		0
PREDATOR	**GAMMA**	4						
(PCI/KG WET)	*K-40*		NA	2749 (2/2) *2152 - 3346*	3030 (2/2) *2637 - 3423*	3030 (2/2) *2637 - 3423*	6 CONTROL HOLTWOOD POND 57347 FEET NW	0
	MN-54		130	<LLD	<LLD	-		0
	CO-58		130	<LLD	<LLD	-		0
	FE-59		260	<LLD	<LLD	-		0
	CO-60		130	<LLD	<LLD	-		0
	ZN-65		260	<LLD	<LLD	-		0
	CS-134		130	<LLD	<LLD	-		0
	CS-137		150	<LLD	<LLD	-		0
SEDIMENT	**GAMMA**	6						
(PCI/KG DRY)	*K-40*		NA	16675 (4/4) *12730 - 21950*	9331 (2/2) *9080 - 9585*	20000 (2/2) *18050 - 21950*	4T INDICATOR CONOWINGO POND NEAR CONOWINGO DAM 41818 FEET SE	0
	MN-54		NA	<LLD	<LLD	-		0
	CO-58		NA	<LLD	<LLD	-		0
	CO-60		NA	<LLD	<LLD	-		0
	CS-134		150	<LLD	<LLD	-		0
	CS-137		180	<LLD	167 (1/2)	167 (1/2)	6F CONTROL HOLTWOOD DAM 31469 FEET NW	0

(M) The Mean Values are calculated using the positive values. (F) Fraction of detectable measurement are indicated in parentheses.

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE PEACH BOTTOM ATOMIC POWER STATION, 2017

NAME OF FACILITY:	**PEACH BOTTOM ATOMIC POWER STATION**	**DOCKET NUMBER:**	**50-277 & 50-278**
LOCATION OF FACILITY:	**YORK COUNTY , PA**	**REPORTING PERIOD:**	**2017**

MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	**INDICATOR LOCATIONS** MEAN (M) (F) *RANGE*	**CONTROL LOCATION** MEAN (M) (F) *RANGE*	**LOCATION WITH HIGHEST ANNUAL MEAN (M)** MEAN (M) (F) *RANGE*	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
AIR PARTICULATE *(E-3 PCI/CU.METER)*	**GR-B**	258	10	19 (204/206) *7 - 37*	16 (51/52) *6 - 22*	22 (52/52) *7 - 37*	3A INDICATOR DELTA PA SUBSTATION 19114 FEET SW	0
	GAMMA	20						
	BE-7		NA	96.5 (16/16) *61.7 - 125*	61.2 (4/4) *48.9 - 76.8*	105.3 (4/4) *90 - 124.9*	3A INDICATOR DELTA PA SUBSTATION 19114 FEET SW	0
	MN-54		NA	<LLD	<LLD	-		0
	CO-58		NA	<LLD	<LLD	-		0
	CO-60		NA	<LLD	<LLD	-		0
	CS-134		50	<LLD	<LLD	-		0
	CS-137		60	<LLD	<LLD	-		0
AIR IODINE *(E-3 PCI/CU.METER)*	**GAMMA**	258						
	I-131		70	<LLD	<LLD	-		0
MILK *(PCI/LITER)*	**I-131 (LOW LVL)**	156	1	<LLD	<LLD	-		0
	GAMMA	156						
	K-40		NA	1271 (126/126) *889 - 1712*	1240 (30/30) *1021 - 1460*	1321 (4/4) *1149 - 1537*	W INDICATOR 89232 FEET S	0
	CS-134		15	<LLD	<LLD	-		0
	CS-137		18	<LLD	<LLD	-		0
	BA-140		60	<LLD	<LLD	-		0
	LA-140		15	<LLD	<LLD	-		0

(M) The Mean Values are calculated using the positive values. (F) Fraction of detectable measurement are indicated in parentheses.

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE PEACH BOTTOM ATOMIC POWER STATION, 2017

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION **DOCKET NUMBER:** 50-277 & 50-278
LOCATION OF FACILITY: YORK COUNTY , PA **REPORTING PERIOD:** 2017

MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	**INDICATOR LOCATIONS** MEAN (M) (F) *RANGE*	**CONTROL LOCATION** MEAN (M) (F) *RANGE*	**LOCATION WITH HIGHEST ANNUAL MEAN (M)** MEAN (M) (F) *RANGE*	**LOCATION WITH HIGHEST ANNUAL MEAN (M)** STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
VEGETATION	**GAMMA**	59						
(PCI/KG WET)	*BE-7*		NA	1397.9	528.1	1653.6	X INDICATOR	0
				(18/47)	(7/12)	(6/6)	56/76 SPRING RD.	
				235.8 - 4232	*188.8 - 1093*	*315.3 - 3593*	9545 FEET NW	
	K-40		NA	2934.3	4218.2	4218.2	55 CONTROL	0
				(47/47)	(12/12)	(12/12)	NE SECTOR	
				982.2 - 5377	*2753 - 5490*	*2753 - 5490*	52272 FEET NE	
	MN-54		NA	<LLD	<LLD	-		0
	CO-58		NA	<LLD	<LLD	-		0
	CO-60		NA	<LLD	<LLD	-		0
	I-131		60	<LLD	<LLD	-		0
	CS-134		60	<LLD	<LLD	-		0
	CS-137		80	<LLD	<LLD	-		0
DIRECT RADIATION	**OSLD-QUARTERLY**	191	NA	8.9	8.2	12.4	1R INDICATOR	0
(MILLI-ROENTGEN/STD.MO.)				(176/176)	(15/15)	(4/4)	TRANSMISSION LINE HILL	
				5.2 - 13.4	*6.4 - 11.1*	*11.4 - 13.4*	2798 FEET SSE	

(M) The Mean Values are calculated using the positive values. (F) Fraction of detectable measurement are indicated in parentheses.

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APPENDIX B

SAMPLE DESIGNATION AND LOCATIONS

TABLE B-1 Radiological Environmental Monitoring Program – Sampling Locations, Distance and Direction from Reactor Buildings, Peach Bottom Atomic Power Station, 2017

Location	Location Description	Distance & Direction from Site per PBAPS ODCM
A. Surface Water		
1LL	Peach Bottom Units 2 and 3 Intake - Composite (Control)	1,200 feet ENE
1MM	Peach Bottom Canal Discharge -Composite	5,500 feet SE
B. Drinking (Potable) Water		
4L	Conowingo Dam EL 33' MSL - Composite	45,900 feet SE
6I	Holtwood Dam Hydroelectric Station - Composite (Control)	30,500 feet NW
13B	Chester Water Authority (CWA) Susquehanna Pumping Station- Composite	13,300 feet ESE
C. Fish		
4	Conowingo Pond	6,000 – 10,000 feet SE
6	Holtwood Pond (Control)	50,000 – 70,000 feet NNW
D. Sediment		
4J	Conowingo Pond near Berkin's Run	7,400 feet SE
4T	Conowingo Pond near Conowingo Dam	41,800 feet SE
6F	Holtwood Dam (Control)	31,500 feet NW
E. Air Particulate - Air Iodine		
1B	Weather Station #2	2,500 feet NW
1Z	Weather Station #1	1,500 feet SE
1A	Weather Station #1	1,500 feet SE
1C	Peach Bottom South Sub Station	4,700 feet SSE
3A	Delta, PA – Substation	19,300 feet SW
5H2	Manor Substation (Control)	162,400 feet NE
F. Milk – bi-weekly / monthly		
J		5,100 feet W
R		4,900 feet SW
S		19,100 feet SE
U		11,200 feet SSW
V	(Control)	32,600 feet W
X		9,500 feet NW
G. Milk – quarterly		
C	(Control)	5,000 feet NW
D		18,500 feet NE
E	(Control)	46,100 feet N
L		11,200 feet NE
P		11,000 feet ENE
W		89,200 feet S
H. Food Products – monthly when available		
1B*		2,500 feet NW
1C		4,700 feet SSE
2Q		9,200 feet SW
3Q		9,500 feet W
55	(Control)	51,900 feet NE
X		9,500 feet NW

**1B had severe animal predation and was removed from sampling program in ODCM Rev 16*

TABLE B-1 Radiological Environmental Monitoring Program – Sampling Locations, Distance and Direction from Reactor Buildings, Peach Bottom Atomic Power Station, 2017

Location	Location Description	Distance & Direction from Site per PBAPS ODCM
J. Environmental Dosimetry - OSLD		
Site Boundary		
1L	Peach Bottom Unit 3 Intake	1,100 feet NE
1P	Tower B & C Fence	2,200 feet ESE
1A	Weather Station #1	1,500 feet SE
1Q	Tower D & E Fence	3,300 feet SE
1D	140 ° Sector	3,500 feet SE
2	Peach Bottom 130° Sector Hill	4,700 feet SE
2B	Burk Property	3,900 feet SSE
1M	Discharge	5,400 feet SE
1R	Transmission Line Hill/ISFSI Pad	2,800 feet SSE
1I	Peach Bottom South Substation	2,900 feet SSE
1C	Peach Bottom South Substation	4,700 feet SSE
1J	Peach Bottom 180° Sector Hill	4,000 feet S
1K	Peach Bottom Site Area	4,700 feet SW
1F	Peach Bottom 200° Sector Hill	2,900 feet SSW
40	Peach Bottom Site Area	8,000 feet SW
1NN	Peach Bottom Site	2,700 feet WSW
1H	Peach Bottom 270° Sector Hill	3,200 feet W
1G	Peach Bottom North Substation	3,100 feet WNW
1B	Weather Station #2	2,500 feet NW
1E	Peach Bottom 350° Sector Hill	3,000 feet NNW
Intermediate Distance		
5	Wakefield, PA	24,400 feet E
15	Silver Spring Rd	19,300 feet N
22	Eagle Road	12,500 feet NNE
44	Goshen Mill Rd	26,700 feet NE
32	Slate Hill Rd	14,400 feet ENE
45	PB-Keeney Line	18,500 feet ENE
14	Peters Creek	10,300 feet E
17	Riverview Rd	21,500 feet ESE
31A	Eckman Rd	24,100 feet SE
4K	Conowingo Dam Power House Roof	45,900 feet SE
23	Peach Bottom 150° Sector Hill	5,500 feet SSE
27	N. Cooper Road	14,400 feet S
48	Macton Substation	26,500 feet SSW
3A	Delta, PA Substation	19,300 feet SW
49	PB-Conastone Line	21,500 feet WSW
50	TRANSCO Pumping Station	26,400 feet W
51	Fin Substation	21,000 feet WNW
26	Slab Road	21,800 feet NW
6B	Holtwood Dam Power House Roof	30,400 feet NW
42	Muddy Run Environ. Laboratory	21,600 feet NNW
43	Drumore Township School	26,200 feet NNE
46	Broad Creek	23,800 feet SSE
47	Broad Creek Scout Camp	22,700 feet S
1T	Lay Road/LLRWSF	3,100 feet WNW
Control		
16	Nottingham, PA Substation (Control)	67,100 feet E
24	Harrisville, MD Substation (Control)	58,200 feet ESE
18	Fawn Grove, PA (Control)	52,200 feet W
19	Red Lion, PA (Control)	124,000 feet WNW

TABLE B-2 Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Peach Bottom Atomic Power Station, 2017

Sample Medium	Analysis	Sampling Method	Collection Procedure Number	Sample Size	Analytical Procedure Number
Surface Water	Gamma Spectroscopy	Monthly composite from a continuous water compositor	CY-ES-210 EIS Collection of Water Samples for Radiological Analysis (PBAPS)	2 gallon	TBE, TBE-2007 Gamma emitting radioisotope analysis EIS, CY-ES-205, Rev. 001 Gamma Counting Using the HPGe Detector with the Genie PC Counting System
Surface Water	Tritium	Quarterly composite from a continuous water compositor	CY-ES-210 EIS Collection of Water Samples for Radiological Analysis (PBAPS)	500 ml	TBE, TBE-2010 Tritium and carbon-14 analysis by liquid scintillation GEL, EPA906.0 Mod, for Tritium analysis by Liquid Scintillation
Surface Water	I-131	Monthly composite from a continuous water compositor	CY-ES-210 EIS Collection of Water Samples for Radiological Analysis (PBAPS)	2 gallon	TBE, TBE-2012 Radioiodine in various matrices EIS, CY-ES-205, Rev. 001 Gamma Counting Using the HPGe Detector with the Genie PC Counting System
Drinking Water	Gross Beta	Monthly composite from a continuous water compositor	CY-ES-210 EIS Collection of Water Samples for Radiological Analysis (PBAPS)	2 gallon	TBE, TBE-2008 Gross alpha and/or gross beta activity in various matrices CY-ES-206, Operation of the Tennelec S5E Proportional Counter
Drinking Water	I-131	Monthly composite from a continuous water compositor	CY-ES-210 EIS Collection of Water Samples for Radiological Analysis (PBAPS)	2 gallon	TBE, TBE-2031 Radioiodine in drinking water EIS, CY-ES-205, Rev. 001 Gamma Counting Using the HPGe Detector with the Genie PC Counting System
Drinking Water	Gamma Spectroscopy	Monthly composite from a continuous water compositor	CY-ES-210 EIS Collection of Water Samples for Radiological Analysis (PBAPS)	2 gallon	TBE, TBE-2007 Gamma emitting radioisotope analysis EIS, CY-ES-205, Rev. 001 Gamma Counting Using the HPGe Detector with the Genie PC Counting System
Drinking Water	Tritium	Quarterly composite from a continuous water compositor	CY-ES-210 EIS Collection of Water Samples for Radiological Analysis (PBAPS)	500 ml	TBE, TBE-2010 Tritium and carbon-14 analysis by liquid scintillation GEL, EPA906.0 Mod, for Tritium analysis by Liquid scintillation
Fish	Gamma Spectroscopy	Semi-annual samples collected via electroshocking or other techniques	NAI-ER3 Collection of fish samples for radiological analysis (PBAPS)	1000 grams (wet)	TBE, TBE-2007 Gamma emitting radioisotope analysis EIS, CY-ES-205, Rev. 001 Gamma Counting Using the HPGe Detector with the Genie PC Counting System

TABLE B-2 Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Peach Bottom Atomic Power Station, 2017

Sample Medium	Analysis	Sampling Method	Collection Procedure Number	Sample Size	Analytical Procedure Number
Sediment	Gamma Spectroscopy	Semi-annual grab samples	NAI-ER3 Collection of sediment samples for radiological analysis (PBAPS)	500 grams (dry)	TBE, TBE-2007 Gamma emitting radioisotope analysis EIS, CY-ES-205, Rev. 001 Gamma Counting Using the HPGe Detector with the Genie PC Counting System
Air Particulates	Gross Beta	One-week composite of continuous air sampling through glass fiber filter paper	NAI-ER8 Collection of air particulate and air iodine samples for radiological analysis (PBAPS) CY-ES-208 Sample Collection of Air Iodine and Air Particulate for Radiological Analysis (PBAPS)	1 filter (~ 280 cubic meters weekly)	TBE, TBE-2008 Gross alpha and/or gross beta activity in various matrices EIS, CY-ES-206, Rev. 001 Operation of the Tennelec S5E Proportional Counter
Air Particulates	Gamma Spectroscopy	Quarterly composite of each station	TBE, TBE-2023 Compositing of samples CY-ES-204, Rev. 001 Sample Preparation for Gamma and Beta Counting	13 filters (~ 3600 cubic meters)	TBE, TBE-2007 Gamma emitting radioisotope analysis EIS, CY-ES-205, Rev. 001 Gamma Counting Using the HPGe Detector with the Genie PC Counting System
Air Iodine	Gamma Spectroscopy	One-week composite of continuous air sampling through charcoal filter	NAI-ER8 Collection of air particulate and air iodine samples for radiological analysis (PBAPS) CY-ES-208 Sample Collection of Air Iodine and Air Particulate for Radiological Analysis (PBAPS)	1 filter (~ 280 cubic meters weekly)	TBE, TBE-2007 Gamma emitting radioisotope analysis EIS, CY-ES-205, Rev. 001 Gamma Counting Using the HPGe Detector with the Genie PC Counting System
Milk	I-131	Bi-weekly grab sample when cows are on pasture. Monthly all other times	CY-ES-209 EIS Sample Collection for Gamma Counting - Milk (PBAPS)	2 gallon	TBE, TBE-2012 Radioiodine in various matrices EIS, CY-ES-205, Rev. 001 Gamma Counting Using the HPGe Detector with the Genie PC Counting System
Milk	Gamma Spectroscopy	Bi-weekly grab sample when cows are on pasture; Monthly all other times	CY-ES-209 EIS Sample Collection for Gamma Counting - Milk (PBAPS)	2 gallon	TBE, TBE-2007 Gamma emitting radioisotope analysis EIS, CY-ES-205, Rev. 001 Gamma Counting Using the HPGe Detector with the Genie PC Counting System
Food Products	Gamma Spectroscopy	Monthly when available	CY-ES-207 Sample Collection for Gamma Counting - Vegetation (PBAPS)	1000 grams	TBE, TBE-2007 Gamma emitting radioisotope analysis EIS, CY-ES-205, Rev. 001 Gamma Counting Using the HPGe Detector with the Genie PC Counting System
OSLD	Optically Stimulated Luminescence Dosimetry	Quarterly OSLDs comprised of two Al_2O_3:C Landauer Incorporated elements.	NAI-ER9 Collection of OSLD samples for radiological analysis (PBAPS)	2 dosimeters	Landauer Incorporated

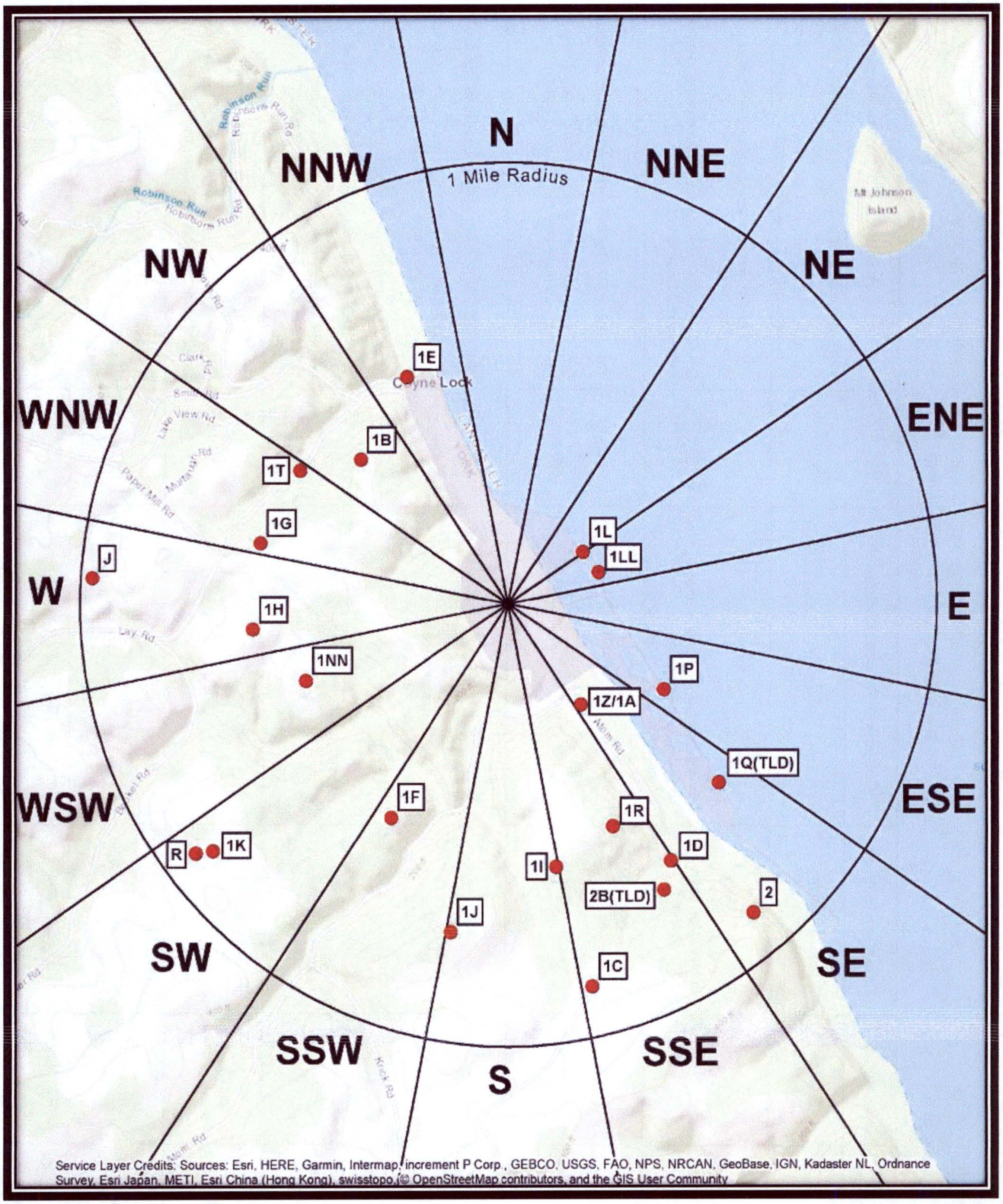

Figure B-1
Environmental Sampling Locations Within One Mile
of the Peach Bottom Atomic Power Station, 2017

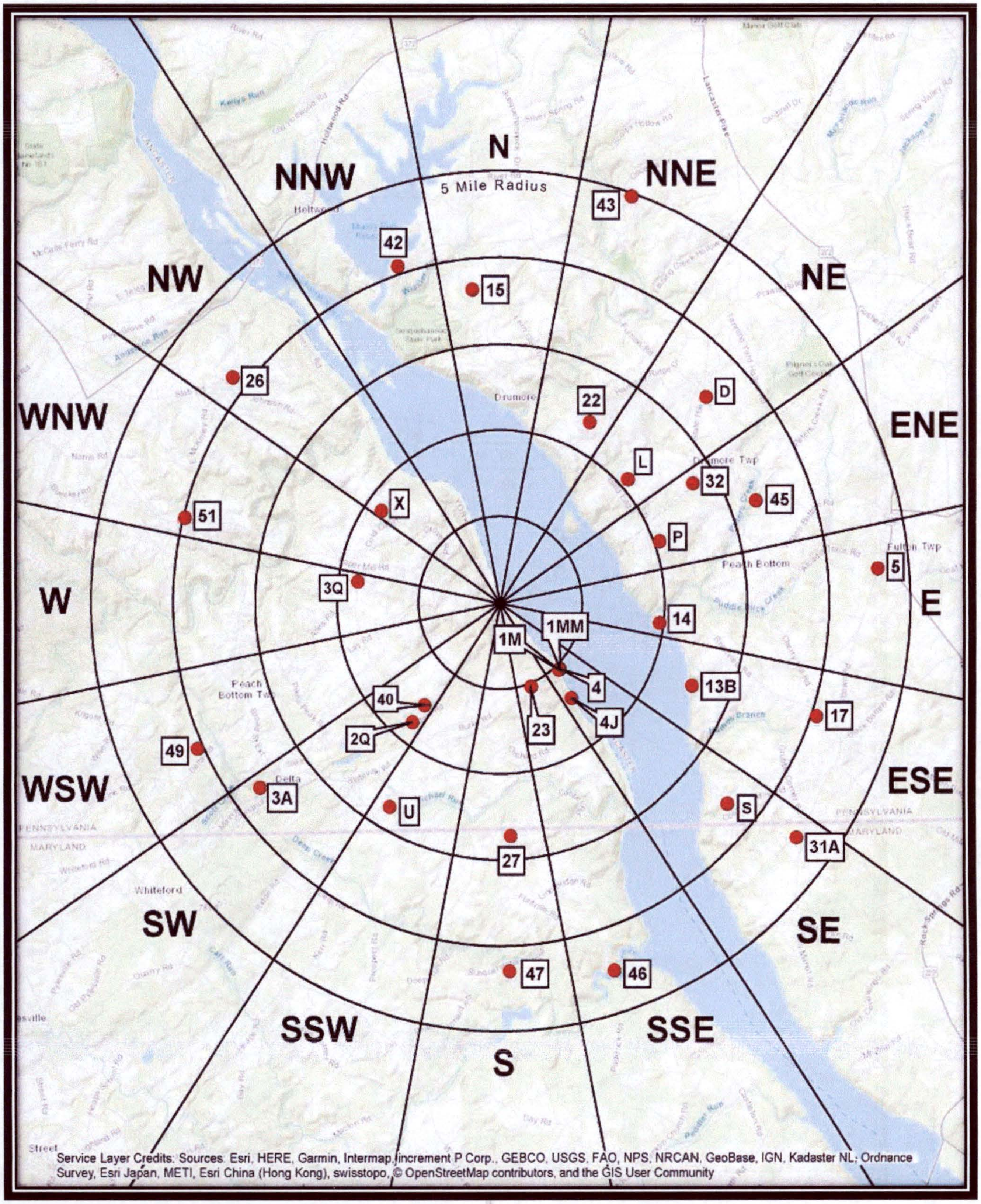

Figure B-2
Environmental Sampling Locations Between One and Approximately Five Miles of the Peach Bottom Atomic Power Station, 2017

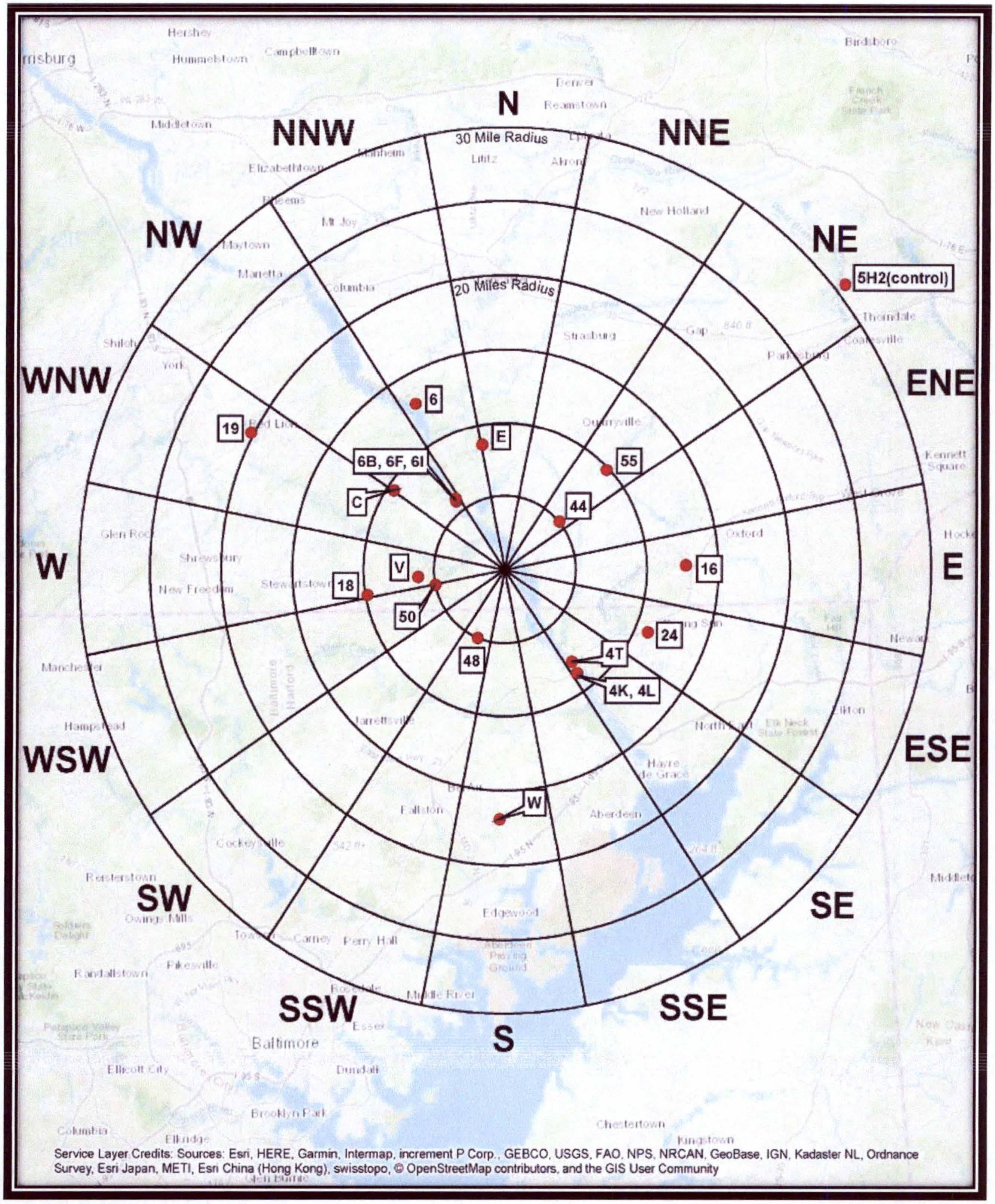

Figure B-3
Environmental Sampling Locations Greater Than
Five Miles from the Peach Bottom Atomic Power Station, 2017

APPENDIX C

DATA TABLES AND FIGURES
PRIMARY LABORATORY

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Table C-I.1 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	1LL	1MM
12/28/16 - 03/29/17	< 196	< 194
03/29/17 - 06/28/17	< 189	< 182
06/28/17 - 09/27/17	< 183	< 180
09/27/17 - 12/27/17	< 197	< 196
MEAN	-	-

Table C-I.2 CONCENTRATIONS OF LOW LEVEL I-131 IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	1LL	1MM
12/28/16 - 02/01/17	< 0.2	< 0.3
02/01/17 - 03/01/17	< 0.4	< 0.4
03/01/17 - 03/29/17	< 0.4	< 0.8
03/29/17 - 04/26/17	< 0.5	< 0.5
04/26/17 - 05/31/17	< 0.4	< 0.3
05/31/17 - 06/28/17	< 0.9	< 0.6
06/28/17 - 07/26/17	< 0.3	< 0.4
07/26/17 - 08/30/17	< 0.9	< 0.8
08/30/17 - 09/27/17	< 0.3	< 0.5
09/27/17 - 11/01/17	< 0.6	< 0.6
11/01/17 - 11/29/17	< 0.8	< 0.7
11/29/17 - 12/27/17	< 0.7	< 0.5
MEAN	-	-

Table C-I.3 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
1LL	12/28/16 - 02/01/17	< 8	< 7	< 13	< 8	< 14	< 9	< 10	< 8	< 9	< 33	< 8
	02/01/17 - 03/01/17	< 5	< 5	< 13	< 6	< 9	< 6	< 9	< 5	< 6	< 29	< 9
	03/01/17 - 03/29/17	< 6	< 7	< 14	< 7	< 15	< 8	< 11	< 8	< 7	< 32	< 9
	03/29/17 - 04/26/17	< 6	< 7	< 13	< 6	< 13	< 6	< 9	< 6	< 6	< 32	< 8
	04/26/17 - 05/31/17	< 8	< 7	< 14	< 7	< 16	< 7	< 13	< 7	< 8	< 37	< 9
	05/31/17 - 06/28/17	< 7	< 7	< 14	< 7	< 12	< 7	< 11	< 7	< 6	< 36	< 10
	06/28/17 - 07/26/17	< 6	< 5	< 13	< 8	< 15	< 7	< 13	< 8	< 5	< 27	< 7
	07/26/17 - 08/30/17	< 6	< 8	< 17	< 8	< 13	< 7	< 12	< 8	< 8	< 33	< 14
	08/30/17 - 09/27/17	< 7	< 7	< 12	< 7	< 13	< 8	< 14	< 7	< 7	< 38	< 11
	09/27/17 - 11/01/17	< 4	< 6	< 15	< 5	< 13	< 7	< 11	< 7	< 6	< 29	< 9
	11/01/17 - 11/29/17	< 7	< 7	< 15	< 8	< 14	< 7	< 11	< 7	< 7	< 21	< 10
	11/29/17 - 12/27/17	< 5	< 4	< 10	< 7	< 9	< 5	< 8	< 5	< 6	< 20	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-
1MM	12/28/16 - 02/01/17	< 6	< 5	< 11	< 6	< 13	< 7	< 12	< 6	< 7	< 31	< 8
	02/01/17 - 03/01/17	< 6	< 6	< 13	< 5	< 12	< 6	< 9	< 6	< 7	< 24	< 9
	03/01/17 - 03/29/17	< 9	< 9	< 15	< 10	< 18	< 8	< 16	< 9	< 8	< 34	< 14
	03/29/17 - 04/26/17	< 5	< 6	< 12	< 6	< 17	< 6	< 11	< 8	< 8	< 32	< 11
	04/26/17 - 05/31/17	< 5	< 8	< 11	< 5	< 16	< 5	< 14	< 5	< 5	< 26	< 15
	05/31/17 - 06/28/17	< 6	< 6	< 14	< 8	< 13	< 7	< 12	< 7	< 7	< 30	< 10
	06/28/17 - 07/26/17	< 9	< 9	< 16	< 8	< 17	< 10	< 13	< 10	< 9	< 35	< 15
	07/26/17 - 08/30/17	< 7	< 9	< 16	< 9	< 18	< 9	< 11	< 10	< 7	< 34	< 13
	08/30/17 - 09/27/17	< 7	< 8	< 17	< 9	< 16	< 8	< 10	< 8	< 8	< 41	< 9
	09/27/17 - 11/01/17	< 5	< 5	< 11	< 6	< 14	< 7	< 12	< 7	< 6	< 36	< 9
	11/01/17 - 11/29/17	< 6	< 8	< 10	< 7	< 9	< 8	< 8	< 9	< 8	< 25	< 8
	11/29/17 - 12/27/17	< 9	< 9	< 21	< 12	< 13	< 11	< 16	< 13	< 9	< 43	< 12
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-II.1 CONCENTRATIONS OF GROSS BETA IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	13B	4L	6I
12/29/16 - 02/02/17	2.1 ± 1.3	< 1.8	< 1.7
02/02/17 - 03/02/17	1.9 ± 1.3	< 1.8	< 1.8
03/02/17 - 03/30/17	< 1.9	< 1.8	2.3 ± 1.3
03/30/17 - 04/27/17	< 2.0	< 2.0	< 2.0
04/27/17 - 06/01/17	2.5 ± 1.4	< 1.8	1.9 ± 1.2
06/01/17 - 06/29/17	2.1 ± 1.4	2.7 ± 1.4	< 1.9
06/29/17 - 07/27/17	3.3 ± 1.6	3.0 ± 1.3	1.9 ± 1.3
07/27/17 - 08/31/17	4.6 ± 1.5	3.0 ± 1.4	2.8 ± 1.4
08/31/17 - 09/28/17	2.0 ± 1.3	3.7 ± 1.4	3.1 ± 1.4
09/28/17 - 11/02/17	4.6 ± 1.7	3.3 ± 1.6	4.1 ± 1.6
11/06/17 - 11/29/17	3.1 ± 1.4	1.9 ± 1.2	2.1 ± 1.3
11/30/17 - 12/28/17	2.4 ± 1.4	2.3 ± 1.3	< 1.8
MEAN ± 2 STD DEV	2.8 ± 2.0	2.8 ± 1.2	2.6 ± 1.6

Table C-II.2 CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	13B	4L	6I
12/29/16 - 03/30/17	< 197	< 197	< 194
03/30/17 - 06/29/17	< 182	< 182	< 181
06/29/17 - 09/28/17	< 171	< 174	< 171
09/28/17 - 12/28/17	< 195	< 192	< 194
MEAN	-	-	-

Table C-II.3 CONCENTRATIONS OF LOW LEVEL I-131 IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	13B	4L	6I
12/29/16 - 02/02/17	< 0.3	< 0.2	< 0.3
02/02/17 - 03/02/17	< 0.5	< 0.4	< 0.4
03/02/17 - 03/30/17	< 0.9	< 0.7	< 0.8
03/30/17 - 04/27/17	< 0.5	< 0.4	< 0.5
04/27/17 - 06/01/17	< 0.5	< 1.0	< 0.5
06/01/17 - 06/29/17	< 1.0	< 0.6	< 0.8
06/29/17 - 07/27/17	< 0.4	< 0.3	< 0.3
07/27/17 - 08/31/17	< 0.7	< 0.5	< 0.7
08/31/17 - 09/28/17	< 0.9	< 0.4	< 0.4
09/28/17 - 11/02/17	< 0.6	< 0.7	< 0.7
11/06/17 - 11/29/17	< 0.6	< 1.0	< 0.6
11/30/17 - 12/28/17	< 0.5	< 0.8	< 0.4
MEAN	-	-	-

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

Table C-II.4

CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER + 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
13B	12/27/16 - 01/30/17	< 6	< 7	< 12	< 7	< 15	< 8	< 13	< 7	< 8	< 34	< 10
	01/30/17 - 02/27/17	< 6	< 7	< 16	< 8	< 14	< 8	< 13	< 8	< 6	< 43	< 11
	02/27/17 - 03/27/17	< 6	< 6	< 14	< 6	< 16	< 7	< 13	< 7	< 7	< 32	< 14
	03/27/17 - 04/24/17	< 5	< 5	< 7	< 6	< 11	< 7	< 8	< 6	< 5	< 23	< 9
	04/24/17 - 05/30/17	< 6	< 8	< 16	< 7	< 12	< 9	< 14	< 8	< 9	< 36	< 10
	05/30/17 - 06/26/17	< 6	< 5	< 13	< 6	< 12	< 7	< 13	< 7	< 6	< 35	< 8
	06/26/17 - 07/24/17	< 5	< 7	< 14	< 6	< 13	< 5	< 10	< 5	< 6	< 28	< 11
	07/24/17 - 08/28/17	< 6	< 6	< 16	< 5	< 12	< 7	< 12	< 7	< 6	< 35	< 7
	08/28/17 - 09/25/17	< 5	< 6	< 10	< 7	< 12	< 6	< 9	< 5	< 6	< 28	< 11
	09/25/17 - 11/02/17	< 8	< 7	< 14	< 7	< 15	< 8	< 11	< 7	< 8	< 35	< 6
	11/06/17 - 11/29/17	< 8	< 5	< 14	< 9	< 12	< 8	< 9	< 8	< 7	< 29	< 7
	11/29/17 - 12/26/17	< 7	< 6	< 15	< 7	< 15	< 7	< 10	< 8	< 6	< 27	< 8
	MEAN	-	-	-	-	-	-	-	-	-	-	-
4L	12/29/16 - 02/02/17	< 8	< 7	< 15	< 5	< 12	< 9	< 13	< 8	< 7	< 27	< 8
	02/02/17 - 03/02/17	< 11	< 8	< 19	< 10	< 19	< 9	< 9	< 8	< 9	< 32	< 11
	03/02/17 - 03/30/17	< 6	< 7	< 12	< 7	< 17	< 7	< 14	< 7	< 6	< 37	< 12
	03/30/17 - 04/27/17	< 10	< 9	< 17	< 9	< 22	< 10	< 16	< 11	< 10	< 44	< 14
	04/27/17 - 06/01/17	< 8	< 8	< 15	< 7	< 15	< 8	< 12	< 6	< 8	< 32	< 9
	06/01/17 - 06/29/17	< 8	< 8	< 19	< 11	< 20	< 8	< 14	< 9	< 8	< 38	< 14
	06/29/17 - 07/27/17	< 10	< 8	< 19	< 10	< 18	< 10	< 15	< 12	< 9	< 36	< 10
	07/27/17 - 08/31/17	< 9	< 8	< 17	< 7	< 17	< 9	< 15	< 8	< 8	< 43	< 11
	08/31/17 - 09/28/17	< 5	< 4	< 7	< 5	< 9	< 5	< 8	< 5	< 4	< 24	< 7
	09/28/17 - 11/02/17	< 6	< 5	< 19	< 5	< 15	< 4	< 11	< 7	< 6	< 29	< 9
	11/02/17 - 11/30/17	< 8	< 6	< 16	< 8	< 15	< 7	< 12	< 10	< 8	< 24	< 10
	11/30/17 - 12/28/17	< 6	< 6	< 10	< 7	< 11	< 6	< 11	< 6	< 7	< 32	< 6
	MEAN	-	-	-	-	-	-	-	-	-	-	-
6I	12/29/16 - 02/02/17	< 8	< 9	< 14	< 9	< 20	< 9	< 14	< 10	< 9	< 36	< 11
	02/02/17 - 03/02/17	< 5	< 5	< 12	< 7	< 10	< 6	< 11	< 7	< 7	< 29	< 7
	03/02/17 - 03/30/17	< 7	< 5	< 11	< 7	< 12	< 6	< 9	< 7	< 7	< 30	< 8
	03/30/17 - 04/27/17	< 8	< 8	< 12	< 7	< 17	< 8	< 14	< 8	< 9	< 38	< 12
	04/27/17 - 06/01/17	< 7	< 9	< 14	< 10	< 15	< 9	< 13	< 7	< 10	< 32	< 15
	06/01/17 - 06/29/17	< 8	< 9	< 21	< 8	< 14	< 9	< 18	< 10	< 9	< 37	< 15
	06/29/17 - 07/27/17	< 7	< 5	< 11	< 8	< 14	< 6	< 12	< 7	< 7	< 27	< 4
	07/27/17 - 08/31/17	< 8	< 9	< 15	< 9	< 20	< 10	< 17	< 11	< 10	< 42	< 14
	08/31/17 - 09/28/17	< 7	< 7	< 14	< 6	< 13	< 6	< 15	< 8	< 7	< 34	< 14
	09/28/17 - 11/02/17	< 7	< 6	< 11	< 5	< 14	< 7	< 9	< 6	< 6	< 27	< 12
	11/02/17 - 11/30/17	< 8	< 5	< 14	< 6	< 21	< 8	< 12	< 8	< 7	< 32	< 7
	11/30/17 - 12/28/17	< 6	< 8	< 14	< 8	< 13	< 7	< 12	< 8	< 8	< 37	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-III.1 **CONCENTRATIONS OF GAMMA EMITTERS IN PREDATOR AND BOTTOM FEEDER (FISH) SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017**

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

SITE	COLLECTION PERIOD	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137
4	06/06/17	2152 ± 1035	< 66	< 65	< 142	< 82	< 129	< 71	< 65
PREDATOR	10/10/17	3346 ± 1147	< 66	< 70	< 138	< 81	< 146	< 94	< 78
	MEAN ± 2 STD DEV	2749 ± 1689	-	-	-	-	-	-	-
4	06/06/17	2229 ± 749	< 51	< 51	< 111	< 59	< 126	< 66	< 69
BOTTOM FEEDER	10/10/17	3457 ± 1124	< 48	< 53	< 128	< 51	< 140	< 55	< 50
	MEAN ± 2 STD DEV	2843 ± 1737	-	-	-	-	-	-	-
6	06/07/17	2637 ± 886	< 64	< 70	< 94	< 71	< 167	< 71	< 72
PREDATOR	10/17/17	3423 ± 1007	< 69	< 68	< 146	< 97	< 159	< 88	< 76
	MEAN ± 2 STD DEV	3030 ± 1112	-	-	-	-	-	-	-
6	06/07/17	3282 ± 820	< 51	< 55	< 108	< 47	< 118	< 65	< 63
BOTTOM FEEDER	10/17/17	4016 ± 821	< 63	< 64	< 142	< 93	< 165	< 74	< 74
	MEAN ± 2 STD DEV	3649 ± 1038	-	-	-	-	-	-	-

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

Table C-IV.1 CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PC/KG DRY ± 2 SIGMA

SITE	COLLECTION PERIOD	K-40	Mn-54	Co-58	Co-60	Cs-134	Cs-137
4J	06/27/17	13970 ± 1309	< 46	< 41	< 41	< 46	< 48
	11/29/17	12730 ± 1206	< 49	< 48	< 56	< 57	< 57
	MEAN ± 2 STD DEV	13350 ± 1754	-	-	-	-	-
4T	06/27/17	18050 ± 2161	< 107	< 94	< 128	< 141	< 135
	11/29/17	21950 ± 1961	< 100	< 78	< 89	< 123	187 ± 78
	MEAN ± 2 STD DEV	20000 ± 5515	-	-	-	-	187 ± 0
6F	06/27/17	9080 ± 1125	< 82	< 66	< 77	< 81	< 85
	11/29/17	9582 ± 1543	< 77	< 65	< 80	< 89	< 94
	MEAN ± 2 STD DEV	9331 ± 710	-	-	-	-	-

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

Table C-V.1 **CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017**

RESULTS IN UNITS OF E-3 PCI/CUBIC METER ± 2 SIGMA

COLLECTION	GROUP I			GROUP II	GROUP III
PERIOD	1B	1C	1Z	3A	5H2
12/29/16 - 01/05/17	21 ± 6	15 ± 5	20 ± 5	18 ± 5	
01/03/17 - 01/09/17					15 ± 6
01/05/17 - 01/12/17	20 ± 5	13 ± 5	19 ± 5	15 ± 4	
01/09/17 - 01/17/17					11 ± 4
01/12/17 - 01/19/17	31 ± 6	15 ± 5	25 ± 5	27 ± 5	
01/17/17 - 01/24/17					8 ± 5
01/19/17 - 01/26/17	17 ± 5	14 ± 5	17 ± 5	13 ± 4	
01/24/17 - 01/30/17					11 ± 6
01/26/17 - 02/02/17	20 ± 5	12 ± 5	15 ± 4	20 ± 5	
01/30/17 - 02/06/17					15 ± 5
02/02/17 - 02/08/17	30 ± 7	18 ± 6	31 ± 6	37 ± 6	
02/06/17 - 02/13/17					17 ± 5
02/08/17 - 02/16/17	24 ± 6	15 ± 4	19 ± 4	21 ± 4	
02/13/17 - 02/21/17					20 ± 5
02/16/17 - 02/23/17	27 ± 6	21 ± 5	30 ± 5	25 ± 5	
02/21/17 - 02/27/17					16 ± 5
02/23/17 - 03/02/17	17 ± 5	12 ± 4	20 ± 4	20 ± 4	
02/27/17 - 03/06/17					12 ± 5
03/02/17 - 03/09/17	28 ± 6	13 ± 5	21 ± 5	24 ± 5	
03/06/17 - 03/13/17					12 ± 5
03/09/17 - 03/16/17	19 ± 5	12 ± 5	19 ± 4	20 ± 5	
03/13/17 - 03/20/17					14 ± 5
03/16/17 - 03/23/17	34 ± 6	20 ± 5	31 ± 5	29 ± 5	
03/20/17 - 03/27/17					18 ± 5
03/23/17 - 03/30/17	29 ± 6	16 ± 5	24 ± 5	25 ± 5	
03/27/17 - 04/03/17					8 ± 4
03/30/17 - 04/06/17	9 ± 5	< 8	9 ± 5	14 ± 5	
04/03/17 - 04/10/17					8 ± 4
04/06/17 - 04/13/17	20 ± 5	11 ± 5	16 ± 4	21 ± 5	
04/10/17 - 04/17/17					16 ± 5
04/13/17 - 04/20/17	16 ± 5	14 ± 5	15 ± 4	15 ± 5	
04/17/17 - 04/24/17					13 ± 4
04/20/17 - 04/27/17	< 7	11 ± 5	8 ± 4	7 ± 4	
04/24/17 - 05/02/17					8 ± 4
04/27/17 - 05/04/17	22 ± 5	19 ± 5	21 ± 4	20 ± 4	
05/02/17 - 05/08/17					10 ± 5
05/04/17 - 05/11/17	17 ± 5	16 ± 4	16 ± 4	17 ± 4	
05/08/17 - 05/15/17					< 6
05/11/17 - 05/18/17	12 ± 4	8 ± 4	13 ± 4	17 ± 4	
05/15/17 - 05/22/17					18 ± 5
05/18/17 - 05/25/17	15 ± 4	13 ± 4	14 ± 4	15 ± 4	
05/22/17 - 05/30/17					6 ± 4
05/25/17 - 06/01/17	11 ± 4	10 ± 4	12 ± 4	12 ± 4	
05/30/17 - 06/05/17					14 ± 5
06/01/17 - 06/08/17	17 ± 5	15 ± 4	21 ± 4	20 ± 4	
06/05/17 - 06/12/17					14 ± 5
06/08/17 - 06/15/17	30 ± 5	20 ± 5	30 ± 5	21 ± 4	
06/12/17 - 06/19/17					18 ± 4
06/15/17 - 06/22/17	15 ± 5	15 ± 4	18 ± 4	20 ± 4	
06/19/17 - 06/27/17					12 ± 4
06/22/17 - 06/29/17	23 ± 5	13 ± 4	17 ± 4	20 ± 4	
06/27/17 - 07/03/17					13 ± 5
06/29/17 - 07/06/17	30 ± 6	25 ± 5	25 ± 4	27 ± 5	
07/03/17 - 07/11/17					20 ± 4
07/06/17 - 07/13/17	24 ± 5	20 ± 5	23 ± 5	24 ± 5	

Table C-V.1

CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF E-3 PCI/CUBIC METER ± 2 SIGMA

COLLECTION	GROUP I			GROUP II	GROUP III
PERIOD	1B	1C	1Z	3A	5H2
07/11/17 - 07/17/17					16 ± 6
07/13/17 - 07/20/17	29 ± 6	*(1)*	23 ± 4	23 ± 4	
07/17/17 - 07/24/17					19 ± 5
07/20/17 - 07/27/17	25 ± 5	18 ± 4	24 ± 4	22 ± 4	
07/24/17 - 07/31/17					13 ± 5
07/27/17 - 08/03/17	16 ± 4	*13 ± 4*	14 ± 4	19 ± 4	
07/31/17 - 08/08/17					14 ± 4
08/03/17 - 08/10/17	14 ± 5	11 ± 5	14 ± 4	17 ± 4	
08/08/17 - 08/14/17					18 ± 6
08/10/17 - 08/17/17	26 ± 5	14 ± 5	22 ± 5	24 ± 5	
08/14/17 - 08/22/17					16 ± 4
08/17/17 - 08/24/17	*(1)*	20 ± 5	26 ± 5	28 ± 5	
08/22/17 - 08/28/17					12 ± 5
08/24/17 - 08/31/17	13 ± 3	18 ± 4	19 ± 4	20 ± 4	
08/28/17 - 09/05/17					18 ± 4
08/31/17 - 09/07/17	11 ± 2	9 ± 5	13 ± 4	17 ± 5	
09/05/17 - 09/11/17					13 ± 5
09/07/17 - 09/14/17	11 ± 2	15 ± 5	22 ± 5	19 ± 5	
09/11/17 - 09/19/17					14 ± 4
09/14/17 - 09/21/17	16 ± 3	21 ± 5	27 ± 5	28 ± 6	
09/19/17 - 09/25/17					20 ± 6
09/21/17 - 09/28/17	16 ± 3	16 ± 5	23 ± 5	24 ± 5	
09/25/17 - 10/02/17					12 ± 4
09/28/17 - 10/05/17	13 ± 2	16 ± 5	22 ± 5	22 ± 5	
10/02/17 - 10/10/17					12 ± 4
10/05/17 - 10/12/17	16 ± 3	19 ± 5	20 ± 4	22 ± 5	
10/10/17 - 10/16/17					15 ± 5
10/12/17 - 10/19/17	11 ± 2	9 ± 4	16 ± 4	17 ± 4	
10/16/17 - 10/23/17					21 ± 5
10/19/17 - 10/26/17	17 ± 2	22 ± 5	26 ± 4	27 ± 5	
10/23/17 - 10/30/17					14 ± 5
10/26/17 - 11/02/17	11 ± 2	11 ± 4	19 ± 4	18 ± 4	
10/30/17 - 11/06/17					19 ± 5
11/02/17 - 11/09/17	13 ± 2	11 ± 4	23 ± 5	23 ± 5	
11/06/17 - 11/13/17					12 ± 5
11/09/17 - 11/16/17	19 ± 4	23 ± 5	29 ± 5	27 ± 5	
11/13/17 - 11/20/17					14 ± 5
11/16/17 - 11/22/17	17 ± 5	16 ± 5	23 ± 5	26 ± 6	
11/20/17 - 11/27/17					22 ± 5
11/22/17 - 11/30/17	21 ± 4	17 ± 4	25 ± 4	31 ± 5	
11/27/17 - 12/04/17					17 ± 5
11/30/17 - 12/07/17	17 ± 4	18 ± 5	22 ± 5	28 ± 5	
12/04/17 - 12/11/17					20 ± 5
12/07/17 - 12/14/17	25 ± 5	24 ± 5	27 ± 5	32 ± 6	
12/11/17 - 12/18/17					10 ± 5
12/14/17 - 12/21/17	18 ± 4	24 ± 5	27 ± 5	28 ± 5	
12/18/17 - 12/26/17					15 ± 4
12/21/17 - 12/28/17	19 ± 4	23 ± 5	24 ± 5	30 ± 5	
12/26/17 - 01/02/18					16 ± 5
MEAN ± 2 STD DEV	19 ± 13	16 ± 9	21 ± 11	22 ± 11	15 ± 8

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES
(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-V.2 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF E-3 PCI/CUBIC METER ± 2 SIGMA

SITE	COLLECTION PERIOD	Be-7	Mn-54	Co-58	Co-60	Cs-134	Cs-137
1B	12/29/16 - 03/30/17	125 ± 32	< 3	< 4	< 4	< 4	< 4
	03/30/17 - 06/29/17	113 ± 23	< 2	< 3	< 2	< 2	< 2
	06/29/17 - 09/28/17	85 ± 22	< 2	< 3	< 3	< 2	< 2
	09/28/17 - 12/28/17	68 ± 18	< 2	< 3	< 2	< 2	< 1
	MEAN ± 2 STD DEV	98 ± 52	-	-	-	-	-
1C	12/29/16 - 03/30/17	90 ± 28	< 3	< 5	< 4	< 4	< 3
	03/30/17 - 06/29/17	93 ± 29	< 3	< 3	< 4	< 3	< 3
	06/29/17 - 09/28/17	75 ± 25	< 3	< 3	< 3	< 2	< 2
	09/28/17 - 12/28/17	70 ± 24	< 3	< 4	< 3	< 3	< 3
	MEAN ± 2 STD DEV	82 ± 23	-	-	-	-	-
1Z	12/29/16 - 03/30/17	111 ± 37	< 3	< 4	< 4	< 4	< 4
	03/30/17 - 06/29/17	119 ± 26	< 3	< 3	< 3	< 3	< 3
	06/29/17 - 09/28/17	112 ± 27	< 3	< 3	< 3	< 2	< 2
	09/28/17 - 12/28/17	62 ± 26	< 3	< 4	< 3	< 3	< 2
	MEAN ± 2 STD DEV	101 ± 53	-	-	-	-	-
3A	12/29/16 - 03/30/17	125 ± 27	< 4	< 4	< 4	< 3	< 3
	03/30/17 - 06/29/17	100 ± 18	< 2	< 3	< 2	< 2	< 2
	06/29/17 - 09/28/17	90 ± 33	< 3	< 5	< 3	< 4	< 3
	09/28/17 - 12/28/17	107 ± 38	< 3	< 5	< 3	< 4	< 3
	MEAN ± 2 STD DEV	105 ± 30	-	-	-	-	-
5H2	01/03/17 - 04/03/17	77 ± 26	< 3	< 3	< 2	< 3	< 2
	04/03/17 - 07/03/17	60 ± 18	< 2	< 2	< 3	< 3	< 3
	07/03/17 - 10/02/17	49 ± 19	< 3	< 3	< 3	< 2	< 2
	10/02/17 - 01/02/18	59 ± 17	< 2	< 2	< 3	< 2	< 2
	MEAN ± 2 STD DEV	61 ± 23	-	-	-	-	-

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

Table C-VI.1 CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF E-3 PCI/CUBIC METER ± 2 SIGMA

COLLECTION	GROUP I			GROUP II	GROUP III
PERIOD	1B	1C	1Z	3A	5H2
12/29/16 - 01/05/17	< 30	< 30	< 26	< 28	
01/03/17 - 01/09/17					< 13
01/05/17 - 01/12/17	< 52	< 52	< 16	< 45	
01/09/17 - 01/17/17					< 34
01/12/17 - 01/19/17	< 51	< 51	< 14	< 44	
01/17/17 - 01/24/17					< 21
01/19/17 - 01/26/17	< 50	< 50	< 23	< 44	
01/24/17 - 01/30/17					< 16
01/26/17 - 02/02/17	< 35	< 35	< 30	< 30	
01/30/17 - 02/06/17					< 19
02/02/17 - 02/08/17	< 39	< 39	< 17	< 34	
02/06/17 - 02/13/17					< 24
02/08/17 - 02/16/17	< 66	< 56	< 25	< 50	
02/13/17 - 02/21/17					< 12
02/16/17 - 02/23/17	< 47	< 47	< 40	< 42	
02/21/17 - 02/27/17					< 15
02/23/17 - 03/02/17	< 48	< 48	< 17	< 41	
02/27/17 - 03/06/17					< 15
03/02/17 - 03/09/17	< 40	< 40	< 35	< 34	
03/06/17 - 03/13/17					< 15
03/09/17 - 03/16/17	< 47	< 47	< 39	< 42	
03/13/17 - 03/20/17					< 13
03/16/17 - 03/23/17	< 45	< 45	< 15	< 39	
03/20/17 - 03/27/17					< 19
03/23/17 - 03/30/17	< 32	< 32	< 27	< 28	
03/27/17 - 04/03/17					< 10
03/30/17 - 04/06/17	< 41	< 41	< 34	< 35	
04/03/17 - 04/10/17					< 10
04/06/17 - 04/13/17	< 31	< 31	< 25	< 27	
04/10/17 - 04/17/17					< 15
04/13/17 - 04/20/17	< 46	< 46	< 39	< 42	
04/17/17 - 04/24/17					< 18
04/20/17 - 04/27/17	< 56	< 53	< 45	< 45	
04/24/17 - 05/02/17					< 13
04/27/17 - 05/04/17	< 41	< 41	< 35	< 35	
05/02/17 - 05/08/17					< 28
05/04/17 - 05/11/17	< 46	< 46	< 40	< 40	
05/08/17 - 05/15/17					< 14
05/11/17 - 05/18/17	< 68	< 66	< 23	< 30	
05/15/17 - 05/22/17					< 8
05/18/17 - 05/25/17	< 43	< 43	< 34	< 37	
05/22/17 - 05/30/17					< 14
05/25/17 - 06/01/17	< 49	< 48	< 16	< 44	
05/30/17 - 06/05/17					< 23
06/01/17 - 06/08/17	< 47	< 47	< 40	< 40	
06/05/17 - 06/12/17					< 16
06/08/17 - 06/15/17	< 34	< 34	< 29	< 29	
06/12/17 - 06/19/17					< 15
06/15/17 - 06/22/17	< 51	< 45	< 40	< 16	
06/19/17 - 06/27/17					< 16
06/22/17 - 06/29/17	< 53	< 52	< 45	< 45	
06/27/17 - 07/03/17					< 19
06/29/17 - 07/06/17	< 58	< 52	< 42	< 44	
07/03/17 - 07/11/17					< 15
07/06/17 - 07/13/17	< 65	< 61	< 52	< 52	

Table C-VI.1 CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF E-3 PCI/CUBIC METER ± 2 SIGMA

COLLECTION	GROUP I			GROUP II	GROUP III
PERIOD	1B	1C	1Z	3A	5H2
07/11/17 - 07/17/17					< 30
07/13/17 - 07/20/17	< 63	*(1)*	< 48	< 51	
07/17/17 - 07/24/17					< 15
07/20/17 - 07/27/17	< 42	< 41	< 34	< 36	
07/24/17 - 07/31/17					< 11
07/27/17 - 08/03/17	< 38	< 38	< 32	< 33	
07/31/17 - 08/08/17					< 15
08/03/17 - 08/10/17	< 47	< 47	< 38	< 39	
08/08/17 - 08/14/17					< 24
08/10/17 - 08/17/17	< 46	< 46	< 40	< 41	
08/14/17 - 08/22/17					< 10
08/17/17 - 08/24/17	*(1)*	< 49	< 43	< 42	
08/22/17 - 08/28/17					< 17
08/24/17 - 08/31/17	< 19	< 66	< 57	< 57	
08/28/17 - 09/05/17					< 14
08/31/17 - 09/07/17	< 17	< 40	< 35	< 36	
09/05/17 - 09/11/17					< 28
09/07/17 - 09/14/17	< 6	< 43	< 37	< 38	
09/11/17 - 09/19/17					< 14
09/14/17 - 09/21/17	< 23	< 54	< 46	< 49	
09/19/17 - 09/25/17					< 21
09/21/17 - 09/28/17	< 19	< 44	< 38	< 39	
09/25/17 - 10/02/17					< 18
09/28/17 - 10/05/17	< 15	< 34	< 30	< 32	
10/02/17 - 10/10/17					< 30
10/05/17 - 10/12/17	< 12	< 53	< 46	< 47	
10/10/17 - 10/16/17					< 19
10/12/17 - 10/19/17	< 23	< 30	< 47	< 49	
10/16/17 - 10/23/17					< 25
10/19/17 - 10/26/17	< 15	< 36	< 32	< 33	
10/23/17 - 10/30/17					< 19
10/26/17 - 11/02/17	< 14	< 33	< 30	< 31	
10/30/17 - 11/06/17					< 12
11/02/17 - 11/09/17	< 12	< 24	< 25	< 26	
11/06/17 - 11/13/17					< 15
11/09/17 - 11/16/17	< 23	< 49	< 43	< 45	
11/13/17 - 11/20/17					< 18
11/16/17 - 11/22/17	< 51	< 60	< 55	< 55	
11/20/17 - 11/27/17					< 17
11/22/17 - 11/30/17	< 30	< 36	< 32	< 33	
11/27/17 - 12/04/17					< 14
11/30/17 - 12/07/17	< 19	< 23	< 20	< 21	
12/04/17 - 12/11/17					< 17
12/07/17 - 12/14/17	< 40	< 43	< 21	< 42	
12/11/17 - 12/18/17					< 16
12/14/17 - 12/21/17	< 9	< 29	< 26	< 29	
12/18/17 - 12/26/17					< 23
12/21/17 - 12/28/17	< 50	< 60	< 55	< 59	
12/26/17 - 01/02/18					< 40
MEAN	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VII.1

CONCENTRATIONS OF LOW LEVEL I-131 IN MILK SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION	CONTROL FARMS			INDICATOR FARMS								
PERIOD	C	E	V	D	J	L	P	R	S	U	W	X
01/09/17			< 0.8		< 0.6			< 0.5	< 0.4	< 0.5		< 0.6
02/14/17	< 0.9	< 0.6	< 0.6	< 0.7	< 0.7	< 0.6	< 0.8	< 0.7	< 0.9	< 0.5	< 0.8	< 0.5
03/13/17			< 0.6		< 0.8			< 0.8	< 0.8	< 0.7		< 0.7
04/03/17			< 0.9		< 0.9			< 0.6	< 0.6	< 0.8		< 0.7
04/17/17			< 0.7		< 0.6			< 0.6	< 0.6	< 0.8		< 0.6
05/02/17	< 0.5	< 0.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.4	< 0.8	< 0.6	< 0.5	< 0.3	< 0.5
05/15/17			< 0.5		< 0.4			< 0.5	< 0.5	< 0.4		< 0.4
05/30/17			< 0.5		< 0.5			< 0.4	< 0.3	< 0.5		< 0.6
06/12/17			< 1.0		< 0.8			< 0.7	< 0.4	< 0.8		< 0.7
06/26/17			< 0.9		< 0.7			< 0.7	< 0.7	< 0.7		< 0.6
07/10/17			< 0.6		< 0.8			< 0.4	< 0.7	< 0.8		< 0.7
07/24/17			< 0.8		< 0.6			< 0.7	< 0.8	< 0.8		< 0.8
08/08/17	< 0.5	< 0.7	< 0.9	< 0.6	< 0.6	< 0.5	< 0.7	< 0.7	< 0.6	< 0.8	< 0.5	< 0.6
08/22/17			< 0.5		< 0.5			< 0.5	< 0.4	< 0.4		< 0.4
09/04/17			< 0.7		< 0.7			< 0.5	< 0.6	< 0.8		< 0.6
09/18/17			< 0.6		< 0.6			< 0.7	< 0.4	< 0.6		< 0.5
10/02/17			< 0.7		< 0.7			< 0.4	< 0.9	< 0.8		< 0.4
10/16/17			< 0.9		< 0.8			< 0.6	< 0.8	< 0.7		< 0.9
10/25/17			< 0.7									
10/30/17					< 0.9			< 0.7	< 0.8	< 1.0		< 0.9
11/14/17	< 0.7	< 0.6	< 0.8	< 0.8	< 0.7	< 0.5	< 0.4	< 0.9	< 0.8	< 0.8	< 0.7	< 0.9
11/22/17			< 0.9									
11/27/17					< 0.9			< 0.7	< 0.6	< 0.8		< 0.8
12/11/17			< 0.9		< 1.0			< 0.9	< 0.8	< 0.8		< 0.6
MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	K-40	Cs-134	Cs-137	Ba-140	La-140
C	02/13/17	1201 ± 137	< 7	< 7	< 21	< 8
	05/01/17	1314 ± 203	< 9	< 9	< 30	< 11
	08/07/17	1400 ± 193	< 9	< 8	< 26	< 7
	11/13/17	1235 ± 110	< 5	< 5	< 15	< 5
MEAN ± 2 STD DEV		1288 ± 177	-	-	-	-
E	02/14/17	1250 ± 138	< 8	< 8	< 23	< 9
	05/01/17	1283 ± 164	< 10	< 8	< 29	< 4
	08/07/17	1317 ± 167	< 11	< 9	< 36	< 12
	11/13/17	1178 ± 140	< 6	< 5	< 19	< 8
MEAN ± 2 STD DEV		1257 ± 119	-	-	-	-
V	01/07/17	1183 ± 167	< 6	< 8	< 29	< 6
	02/11/17	1125 ± 171	< 7	< 9	< 38	< 11
	03/13/17	1348 ± 188	< 9	< 10	< 33	< 7
	03/31/17	1232 ± 167	< 8	< 7	< 31	< 8
	04/17/17	1290 ± 135	< 7	< 6	< 22	< 8
	04/29/17	1167 ± 168	< 9	< 9	< 37	< 9
	05/13/17	1254 ± 160	< 8	< 6	< 27	< 8
	05/27/17	1044 ± 170	< 10	< 8	< 51	< 14
	06/10/17	1270 ± 177	< 10	< 8	< 33	< 11
	06/24/17	1298 ± 191	< 7	< 5	< 32	< 13
	07/10/17	1336 ± 200	< 11	< 10	< 34	< 11
	07/24/17	1371 ± 165	< 9	< 8	< 33	< 9
	08/04/17	1268 ± 240	< 11	< 9	< 36	< 15
	08/18/17	1193 ± 155	< 8	< 6	< 33	< 10
	09/02/17	1021 ± 183	< 8	< 9	< 34	< 14
	09/16/17	1134 ± 185	< 8	< 7	< 41	< 12
	10/02/17	1171 ± 138	< 5	< 6	< 20	< 5
	10/13/17	1277 ± 214	< 9	< 9	< 41	< 13
	10/25/17	1139 ± 166	< 9	< 8	< 33	< 12
	11/13/17	1460 ± 198	< 10	< 8	< 30	< 4
	11/22/17	1227 ± 190	< 8	< 8	< 36	< 11
	12/09/17	1215 ± 148	< 7	< 6	< 26	< 7
MEAN ± 2 STD DEV		1228 ± 209	-	-	-	-
D	02/13/17	1329 ± 158	< 6	< 6	< 28	< 6
	05/02/17	1314 ± 198	< 8	< 10	< 35	< 10
	08/08/17	1180 ± 163	< 8	< 7	< 28	< 8
	11/14/17	1331 ± 125	< 6	< 5	< 19	< 6
MEAN ± 2 STD DEV		1289 ± 145	-	-	-	-

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

Table C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	K-40	Cs-134	Cs-137	Ba-140	La-140
J	01/09/17	1385 ± 161	< 6	< 7	< 27	< 8
	02/13/17	1328 ± 164	< 7	< 7	< 24	< 9
	03/13/17	1290 ± 197	< 10	< 10	< 25	< 6
	04/03/17	1225 ± 182	< 10	< 10	< 31	< 11
	04/17/17	1334 ± 125	< 5	< 4	< 19	< 6
	05/01/17	1422 ± 163	< 9	< 8	< 31	< 10
	05/15/17	1339 ± 136	< 6	< 5	< 14	< 5
	05/30/17	1223 ± 192	< 9	< 8	< 40	< 8
	06/12/17	1291 ± 128	< 5	< 5	< 21	< 5
	06/26/17	1338 ± 148	< 7	< 5	< 22	< 6
	07/10/17	1372 ± 158	< 6	< 7	< 22	< 7
	07/24/17	1064 ± 171	< 9	< 9	< 24	< 8
	08/07/17	1569 ± 205	< 8	< 8	< 33	< 10
	08/21/17	1290 ± 179	< 11	< 8	< 39	< 11
	09/04/17	1089 ± 189	< 8	< 7	< 33	< 11
	09/18/17	1171 ± 140	< 7	< 5	< 34	< 10
	10/02/17	1244 ± 187	< 13	< 10	< 42	< 8
	10/16/17	1260 ± 188	< 8	< 8	< 24	< 6
	10/30/17	1205 ± 169	< 9	< 7	< 25	< 6
	11/13/17	1167 ± 205	< 10	< 9	< 39	< 13
	11/27/17	1396 ± 157	< 6	< 6	< 19	< 4
	12/11/17	1313 ± 142	< 9	< 8	< 34	< 7
MEAN ± 2 STD DEV		1287 ± 227	-	-	-	-
L	02/13/17	1240 ± 118	< 5	< 5	< 19	< 5
	05/02/17	1414 ± 187	< 10	< 8	< 34	< 9
	08/08/17	1375 ± 190	< 11	< 10	< 37	< 10
	11/14/17	1171 ± 133	< 9	< 9	< 28	< 8
MEAN ± 2 STD DEV		1300 ± 228	-	-	-	-
P	02/13/17	1156 ± 135	< 5	< 6	< 24	< 7
	05/01/17	1261 ± 183	< 8	< 7	< 34	< 4
	08/07/17	1196 ± 193	< 8	< 8	< 26	< 8
	11/13/17	1194 ± 158	< 9	< 9	< 32	< 9
MEAN ± 2 STD DEV		1202 ± 87	-	-	-	-

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

Table C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	K-40	Cs-134	Cs-137	Ba-140	La-140
R	01/09/17	1234 ± 224	< 9	< 10	< 39	< 9
	02/13/17	1265 ± 156	< 8	< 9	< 36	< 9
	03/13/17	1270 ± 225	< 11	< 9	< 36	< 10
	04/03/17	1178 ± 167	< 8	< 8	< 22	< 7
	04/17/17	1258 ± 175	< 8	< 7	< 21	< 8
	05/01/17	1433 ± 196	< 7	< 8	< 29	< 7
	05/15/17	1342 ± 190	< 7	< 7	< 19	< 6
	05/30/17	1545 ± 224	< 9	< 9	< 40	< 15
	06/12/17	1283 ± 186	< 8	< 8	< 27	< 9
	06/26/17	1444 ± 220	< 8	< 8	< 30	< 5
	07/10/17	1364 ± 156	< 7	< 7	< 24	< 6
	07/24/17	1180 ± 156	< 9	< 7	< 24	< 7
	08/07/17	1504 ± 227	< 10	< 12	< 34	< 10
	08/21/17	1409 ± 193	< 11	< 11	< 46	< 15
	09/04/17	1250 ± 222	< 11	< 10	< 41	< 14
	09/18/17	1325 ± 159	< 7	< 7	< 40	< 10
	10/02/17	1179 ± 195	< 10	< 8	< 31	< 15
	10/16/17	1398 ± 161	< 7	< 6	< 25	< 5
	10/30/17	1259 ± 184	< 11	< 8	< 30	< 6
	11/13/17	1069 ± 201	< 11	< 10	< 29	< 9
	11/27/17	1266 ± 192	< 9	< 9	< 31	< 7
	12/11/17	1241 ± 171	< 7	< 7	< 26	< 10
	MEAN ± 2 STD DEV	1304 ± 232	-	-	-	-
S	01/09/17	1369 ± 204	< 8	< 9	< 27	< 7
	02/13/17	1712 ± 186	< 7	< 6	< 29	< 9
	03/13/17	1237 ± 196	< 7	< 9	< 29	< 9
	04/03/17	1262 ± 203	< 7	< 9	< 32	< 9
	04/17/17	1229 ± 136	< 6	< 6	< 24	< 6
	05/01/17	1139 ± 204	< 9	< 8	< 41	< 7
	05/15/17	1273 ± 136	< 6	< 7	< 19	< 5
	05/30/17	1530 ± 206	< 9	< 9	< 43	< 8
	06/12/17	1296 ± 166	< 6	< 7	< 25	< 8
	06/26/17	1337 ± 180	< 7	< 8	< 28	< 10
	07/10/17	1033 ± 211	< 13	< 9	< 30	< 9
	07/24/17	1217 ± 144	< 6	< 6	< 22	< 6
	08/07/17	1171 ± 174	< 9	< 10	< 35	< 9
	08/21/17	1261 ± 184	< 6	< 7	< 37	< 14
	09/04/17	1158 ± 164	< 9	< 10	< 32	< 12
	09/18/17	1189 ± 171	< 9	< 8	< 40	< 9
	10/02/17	1465 ± 214	< 9	< 8	< 34	< 12
	10/16/17	1477 ± 229	< 14	< 12	< 40	< 13
	10/30/17	1339 ± 171	< 11	< 11	< 40	< 11
	11/13/17	1289 ± 187	< 10	< 6	< 32	< 7
	11/27/17	1320 ± 168	< 7	< 7	< 25	< 8
	12/11/17	1209 ± 180	< 8	< 9	< 26	< 10
	MEAN ± 2 STD DEV	1296 ± 297	-	-	-	-

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

Table C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	K-40	Cs-134	Cs-137	Ba-140	La-140
U	01/09/17	1273 ± 208	< 8	< 8	< 35	< 9
	02/13/17	1181 ± 135	< 6	< 6	< 23	< 7
	03/13/17	1107 ± 207	< 10	< 9	< 39	< 11
	04/03/17	1218 ± 153	< 9	< 8	< 27	< 8
	04/17/17	1302 ± 158	< 7	< 7	< 25	< 6
	05/01/17	1293 ± 172	< 8	< 7	< 23	< 12
	05/15/17	1185 ± 174	< 10	< 9	< 31	< 8
	05/30/17	1321 ± 203	< 12	< 9	< 48	< 14
	06/12/17	1259 ± 154	< 8	< 7	< 25	< 7
	06/26/17	889 ± 194	< 12	< 11	< 40	< 9
	07/10/17	1177 ± 188	< 10	< 8	< 30	< 5
	07/24/17	995 ± 150	< 8	< 7	< 25	< 7
	08/07/17	1217 ± 167	< 11	< 11	< 45	< 13
	08/22/17	1347 ± 227	< 13	< 9	< 44	< 8
	09/04/17	1088 ± 158	< 6	< 9	< 29	< 7
	09/18/17	1195 ± 212	< 12	< 11	< 46	< 14
	10/02/17	1301 ± 169	< 8	< 8	< 33	< 11
	10/16/17	1145 ± 188	< 7	< 7	< 36	< 10
	10/30/17	1177 ± 160	< 10	< 9	< 30	< 11
	11/13/17	1090 ± 151	< 12	< 11	< 45	< 12
	11/27/17	1152 ± 200	< 11	< 11	< 30	< 11
	12/11/17	1140 ± 147	< 8	< 8	< 29	< 10
MEAN ± 2 STD DEV		1184 ± 219	-	-	-	-
W	02/14/17	1307 ± 148	< 6	< 6	< 20	< 6
	05/02/17	1289 ± 201	< 9	< 7	< 23	< 9
	08/08/17	1537 ± 192	< 11	< 11	< 42	< 12
	11/14/17	1149 ± 116	< 6	< 6	< 20	< 6
MEAN ± 2 STD DEV		1321 ± 321	-	-	-	-
X	01/09/17	1401 ± 170	< 8	< 9	< 34	< 9
	02/13/17	1412 ± 177	< 8	< 6	< 25	< 8
	03/13/17	1296 ± 163	< 10	< 9	< 33	< 6
	04/03/17	1378 ± 158	< 7	< 8	< 22	< 6
	04/17/17	1405 ± 135	< 9	< 8	< 33	< 7
	05/01/17	1382 ± 166	< 7	< 7	< 23	< 8
	05/15/17	1205 ± 189	< 7	< 7	< 29	< 9
	05/30/17	1210 ± 182	< 13	< 13	< 52	< 12
	06/12/17	1266 ± 126	< 8	< 8	< 27	< 7
	06/26/17	1254 ± 218	< 10	< 9	< 33	< 11
	07/10/17	1292 ± 163	< 12	< 10	< 38	< 10
	07/24/17	1153 ± 140	< 9	< 9	< 31	< 7
	08/07/17	1302 ± 175	< 10	< 8	< 29	< 5
	08/21/17	1231 ± 199	< 10	< 9	< 39	< 7
	09/04/17	1382 ± 161	< 10	< 8	< 32	< 7
	09/18/17	988 ± 185	< 10	< 8	< 49	< 9
	10/02/17	1301 ± 201	< 9	< 9	< 36	< 11
	10/16/17	1218 ± 173	< 7	< 7	< 31	< 9
	10/30/17	1218 ± 198	< 11	< 9	< 35	< 8
	11/13/17	1274 ± 154	< 7	< 7	< 24	< 7
	11/27/17	1295 ± 194	< 9	< 7	< 29	< 6
	12/11/17	1258 ± 156	< 8	< 8	< 26	< 7
MEAN ± 2 STD DEV		1278 ± 197	-	-	-	-

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

Table C-VIII.1 **CONCENTRATIONS OF GAMMA EMITTERS IN FOOD PRODUCT SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017**

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

SITE	COLLECTION PERIOD	VEGETATION TYPE	Be-7	K-40	Mn-54	Co-58	Co-60	I-131	Cs-134	Cs-137
1B [(1)]	06/21/17	*Swiss Chard*	< 436	1957 ± 629	< 54	< 40	< 38	< 57	< 53	< 53
	06/21/17	*Collards*	< 293	1484 ± 573	< 36	< 32	< 37	< 41	< 43	< 42
	06/21/17	*Cabbage*	< 355	1357 ± 534	< 50	< 44	< 55	< 49	< 48	< 56
	07/19/17	*Cabbage*	< 250	2064 ± 734	< 45	< 52	< 47	< 50	< 43	< 53
	07/19/17	*Swiss Chard*	553 ± 393	1440 ± 526	< 51	< 52	< 44	< 51	< 54	< 58
		MEAN ± 2 STD DEV	553 ± 0	1660 ± 650	-	-	-	-	-	-
1C	06/21/17	*Kale*	< 387	3339 ± 725	< 38	< 35	< 41	< 42	< 39	< 45
	06/21/17	*Cabbage*	< 393	4296 ± 849	< 41	< 39	< 47	< 40	< 37	< 60
	06/21/17	*Corn Leaves*	637 ± 320	2182 ± 560	< 26	< 31	< 30	< 37	< 30	< 35
	07/19/17	*Kale*	< 294	1355 ± 437	< 28	< 28	< 35	< 43	< 32	< 34
	07/19/17	*Cabbage*	< 353	2104 ± 719	< 50	< 41	< 51	< 58	< 53	< 53
	07/19/17	*Collards*	< 426	1575 ± 652	< 41	< 43	< 41	< 48	< 45	< 49
	08/16/17	*Kale*	569 ± 277	1607 ± 446	< 25	< 23	< 21	< 30	< 28	< 31
	08/16/17	*Cabbage Leaves*	< 286	982 ± 345	< 30	< 29	< 38	< 38	< 40	< 36
	08/16/17	*Collard Leaves*	< 392	1373 ± 389	< 35	< 33	< 37	< 46	< 42	< 36
	09/13/17	*Collard Leaves*	< 105	2176 ± 194	< 12	< 11	< 11	< 40	< 13	< 11
	09/13/17	*Cabbage Leaves*	< 174	1331 ± 232	< 16	< 18	< 14	< 58	< 18	< 19
	09/13/17	*Field Corn Leaves*	3689 ± 178	2293 ± 208	< 12	< 11	< 11	< 40	< 12	< 12
		MEAN ± 2 STD DEV	1632 ± 3564	2051 ± 1890	-	-	-	-	-	-
2Q	06/21/17	*Kale*	< 233	5204 ± 775	< 32	< 30	< 39	< 31	< 31	< 32
	06/21/17	*Cabbage*	< 317	3115 ± 718	< 37	< 31	< 28	< 35	< 36	< 37
	06/21/17	*Cauliflower*	< 314	3659 ± 659	< 30	< 27	< 34	< 31	< 33	< 24
	07/19/17	*Cabbage*	< 269	2451 ± 432	< 25	< 30	< 31	< 32	< 32	< 33
	07/19/17	*Broccoli*	< 286	2257 ± 577	< 29	< 21	< 25	< 31	< 26	< 24
	07/19/17	*Cauliflower*	427 ± 242	2233 ± 555	< 37	< 33	< 35	< 38	< 41	< 39
	08/16/17	*Cabbage Leaves*	481 ± 237	2550 ± 583	< 19	< 25	< 35	< 29	< 29	< 28
	08/16/17	*Broccoli Leaves*	< 318	2553 ± 574	< 28	< 24	< 33	< 33	< 28	< 32
	08/16/17	*Sweet Corn Leaves*	3008 ± 387	4072 ± 621	< 26	< 28	< 21	< 35	< 36	< 27
	09/13/17	*Cabbage Leaves*	< 189	2364 ± 288	< 18	< 18	< 17	< 53	< 18	< 18
	09/13/17	*Broccoli Leaves*	< 139	2023 ± 201	< 13	< 15	< 12	< 42	< 14	< 14
	09/13/17	*Cauliflower Leaves*	492 ± 134	2295 ± 256	< 13	< 13	< 13	< 42	< 15	< 13
		MEAN ± 2 STD DEV	1102 ± 2542	2898 ± 1910	-	-	-	-	-	-

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VIII.1 **CONCENTRATIONS OF GAMMA EMITTERS IN FOOD PRODUCT SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017**

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

SITE	COLLECTION PERIOD	VEGETATION TYPE	Be-7	K-40	Mn-54	Co-58	Co-60	I-131	Cs-134	Cs-137
3Q	06/21/17	*Cabbage*	< 402	5377 ± 1008	< 56	< 52	< 52	< 50	< 53	< 52
	06/21/17	*Collards*	332 ± 182	4697 ± 791	< 26	< 27	< 44	< 38	< 35	< 25
	06/21/17	*Kale*	< 314	4484 ± 574	< 36	< 33	< 33	< 42	< 41	< 40
	07/19/17	*Collards*	< 357	4190 ± 755	< 43	< 37	< 34	< 43	< 49	< 44
	07/19/17	*Cabbage*	585 ± 297	3158 ± 702	< 29	< 34	< 37	< 36	< 33	< 35
	07/19/17	*Kale*	< 311	3733 ± 789	< 37	< 35	< 36	< 41	< 37	< 36
	08/16/17	*Cabbage Leaves*	< 278	2131 ± 542	< 31	< 29	< 35	< 30	< 35	< 25
	08/16/17	*Kale Leaves*	< 326	3158 ± 669	< 40	< 33	< 32	< 38	< 49	< 38
	08/16/17	*Collard Leaves*	< 359	4581 ± 737	< 33	< 24	< 33	< 35	< 38	< 33
	09/13/17	*Kale Leaves*	236 ± 183	4230 ± 436	< 17	< 22	< 20	< 58	< 20	< 19
	09/13/17	*Sweet Corn Leaves*	4232 ± 208	4608 ± 321	< 14	< 15	< 15	< 47	< 18	< 16
	09/13/17	*Collard Leaves*	< 135	4592 ± 227	< 13	< 14	< 13	< 46	< 15	< 14
		MEAN ± 2 STD DEV	1346 ± 3859	4078 ± 1776	-	-	-	-	-	-
55	06/21/17	*Cabbage*	< 277	4588 ± 692	< 31	< 23	< 31	< 37	< 35	< 28
	06/21/17	*Kale*	< 382	5490 ± 746	< 42	< 40	< 44	< 42	< 47	< 44
	06/21/17	*Collards*	< 289	5484 ± 805	< 38	< 38	< 35	< 40	< 49	< 30
	07/19/17	*Kale*	347 ± 200	3666 ± 565	< 28	< 32	< 31	< 35	< 34	< 32
	07/19/17	*Cabbage*	395 ± 211	4348 ± 653	< 48	< 32	< 48	< 46	< 42	< 44
	07/19/17	*Collards*	< 269	4435 ± 570	< 26	< 18	< 24	< 34	< 24	< 22
	08/16/17	*Collard Leaves*	498 ± 334	4029 ± 578	< 29	< 25	< 32	< 30	< 32	< 29
	08/16/17	*Kale Leaves*	< 289	2942 ± 561	< 31	< 31	< 32	< 37	< 32	< 32
	08/16/17	*Cabbage Leaves*	1093 ± 294	2753 ± 505	< 36	< 37	< 38	< 41	< 42	< 37
	09/13/17	*Cabbage Leaves*	189 ± 107	4676 ± 267	< 10	< 11	< 12	< 33	< 11	< 11
	09/13/17	*Collard Leaves*	494 ± 130	4377 ± 293	< 12	< 13	< 12	< 42	< 13	< 12
	09/13/17	*Kale Leaves*	680 ± 126	3830 ± 264	< 12	< 13	< 14	< 43	< 14	< 13
		MEAN ± 2 STD DEV	528 ± 583	4218 ± 1697	-	-	-	-	-	-
X (1)	08/16/17	*Sweet Corn Leaves*	3593 ± 426	2895 ± 612	< 36	< 20	< 28	< 35	< 38	< 32
	08/16/17	*Squash Leaves*	1139 ± 306	3978 ± 639	< 31	< 26	< 23	< 30	< 36	< 34
	08/16/17	*Green Bean Leaves*	994 ± 264	4183 ± 585	< 28	< 31	< 30	< 38	< 34	< 34
	09/13/17	*Squash Leaves*	918 ± 205	2847 ± 364	< 17	< 19	< 18	< 58	< 21	< 19
	09/13/17	*Radish Leaves*	315 ± 145	4105 ± 393	< 15	< 18	< 15	< 55	< 18	< 17
	09/13/17	*Field Corn Leaves*	2962 ± 204	3275 ± 302	< 15	< 16	< 15	< 50	< 17	< 15
		MEAN ± 2 STD DEV	1654 ± 2608	3547 ± 1230	-	-	-	-	-	-

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-IX.1 QUARTERLY OSLD RESULTS FOR PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF MILLIREM/STD. MONTH ± STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
2	9.0 ± 1.4	10.0	8.6	8.5	8.9
5	8.6 ± 1.8	9.8	8.0	8.8	7.9
14	8.8 ± 1.2	9.7	8.5	8.8	8.3
15	9.4 ± 1.6	10.5	9.2	9.1	8.7
16	9.0 ± 2.9	11.1	8.5	8.5	7.8
17	10.3 ± 2.2	11.9	9.9	9.4	9.8
18	9.3 ± 1.2	10.1	9.1	9.1	8.7
19	7.6 ± 1.6	8.7	7.4	7.0	7.1
1A	9.4 ± 1.7	10.5	9.5	9.2	8.5
1B	8.0 ± 1.4	9.0	7.6	7.9	7.5
1C	9.1 ± 1.8	10.4	8.7	8.8	8.4
1D	9.3 ± 1.9	10.6	8.9	9.2	8.3
1E	8.9 ± 1.4	9.8	8.3	9.1	8.3
1F	10.3 ± 2.1	11.8	10.0	9.9	9.4
1G	6.2 ± 2.4	8.0	5.7	5.7	5.5
1H	8.9 ± 1.7	10.1	8.4	8.8	8.2
1I	8.3 ± 1.7	9.5	7.9	8.0	7.7
1J	10.4 ± 1.9	11.8	9.9	10.4	9.6
1K	10.1 ± 1.8	11.3	10.0	9.7	9.2
1L	7.4 ± 2.5	9.2	6.4	7.3	6.8
1M	5.8 ± 1.9	7.2	5.2	5.6	5.3
1P	6.6 ± 2.2	8.2	6.0	6.3	5.9
1Q	7.6 ± 1.7	8.8	7.4	7.3	6.8
1R	12.4 ± 1.6	13.4	12.2	12.4	11.4
1T	9.2 ± 1.9	10.4	8.7	9.5	8.3
22	9.2 ± 1.9	10.6	8.9	8.7	8.6
23	9.5 ± 1.3	10.4	9.2	9.5	8.9
24	6.7 ± 0.8	*(1)*	6.6	7.2	6.4
26	10.1 ± 3.0	12.0	9.9	10.0	8.3
27	9.3 ± 1.5	10.4	8.8	9.3	8.8
2B	8.5 ± 2.0	9.9	8.0	7.7	8.2
32	9.7 ± 1.8	10.9	8.9	9.9	9.2
3A	7.2 ± 1.9	8.6	6.7	6.7	6.6
40	10.5 ± 1.9	11.9	10.0	10.2	9.8
42	8.4 ± 1.6	9.5	8.4	8.0	7.7
43	10.0 ± 2.4	11.7	9.5	9.7	8.9
44	8.8 ± 1.9	10.2	8.1	8.5	8.4
45	9.5 ± 2.0	10.9	9.1	9.3	8.5
46	8.3 ± 2.1	9.7	7.4	8.3	7.6
47	9.7 ± 1.3	10.6	9.5	9.6	9.1
48	9.5 ± 2.0	10.7	8.9	9.8	8.5
49	9.5 ± 2.8	11.6	8.9	8.9	8.6
4K	6.2 ± 1.9	7.5	6.0	6.2	5.2
50	10.5 ± 1.9	11.8	10.1	10.2	9.7
51	9.0 ± 1.8	10.2	8.4	9.2	8.3
6B	7.9 ± 1.7	9.0	7.3	7.2	8.1
1NN	9.9 ± 1.7	10.8	9.4	10.4	9.0
31A	7.8 ± 1.7	9.1	7.5	7.4	7.3

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

SITE BOUNDARY STATIONS

1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K, 1L, 1M, 1NN, 1P, 1Q, 1R, 1T, 2, 2B, 40

INTERMEDIATE STATIONS

14, 15, 17, 22, 23, 26, 27, 31A, 32, 3A, 42, 43, 44, 45, 46, 47, 48, 49, 4K, 5, 50, 51, 6B

CONTROL STATIONS

16, 18, 19, 24

Table C-IX.2 MEAN QUARTERLY OSLD RESULTS FOR THE SITE BOUNDARY, INTERMEDIATE, AND CONTROL LOCATIONS FOR PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF MILLI-ROENTGEN/MONTH STANDARD DEVIATIONS OF THE STATION DATA

COLLECTION PERIOD	SITE BOUNDARY ± 2 S.D.	INTERMEDIATE ± 2 S.D.	CONTROL ± 2 S.D.
JAN-MAR	10.1 ± 2.9	10.3 ± 2.3	10.0 ± 2.4
APR-JUN	8.4 ± 3.4	8.6 ± 2.1	7.9 ± 2.2
JUL-SEP	8.7 ± 3.3	8.8 ± 2.1	8.0 ± 2.0
OCT-DEC	8.1 ± 3.0	8.3 ± 2.0	7.5 ± 2.0

Table C-IX.3 SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF MILLI-ROENTGEN/STD. MONTH

LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S.D.
SITE BOUNDARY	76	5.2	13.4	8.8 ± 3.4
INTERMEDIATE	92	5.2	12.0	9.0 ± 2.5
CONTROL	23	6.4	11.1	8.2 ± 2.5

FIGURE C-1
MONTHLY TOTAL GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 2017

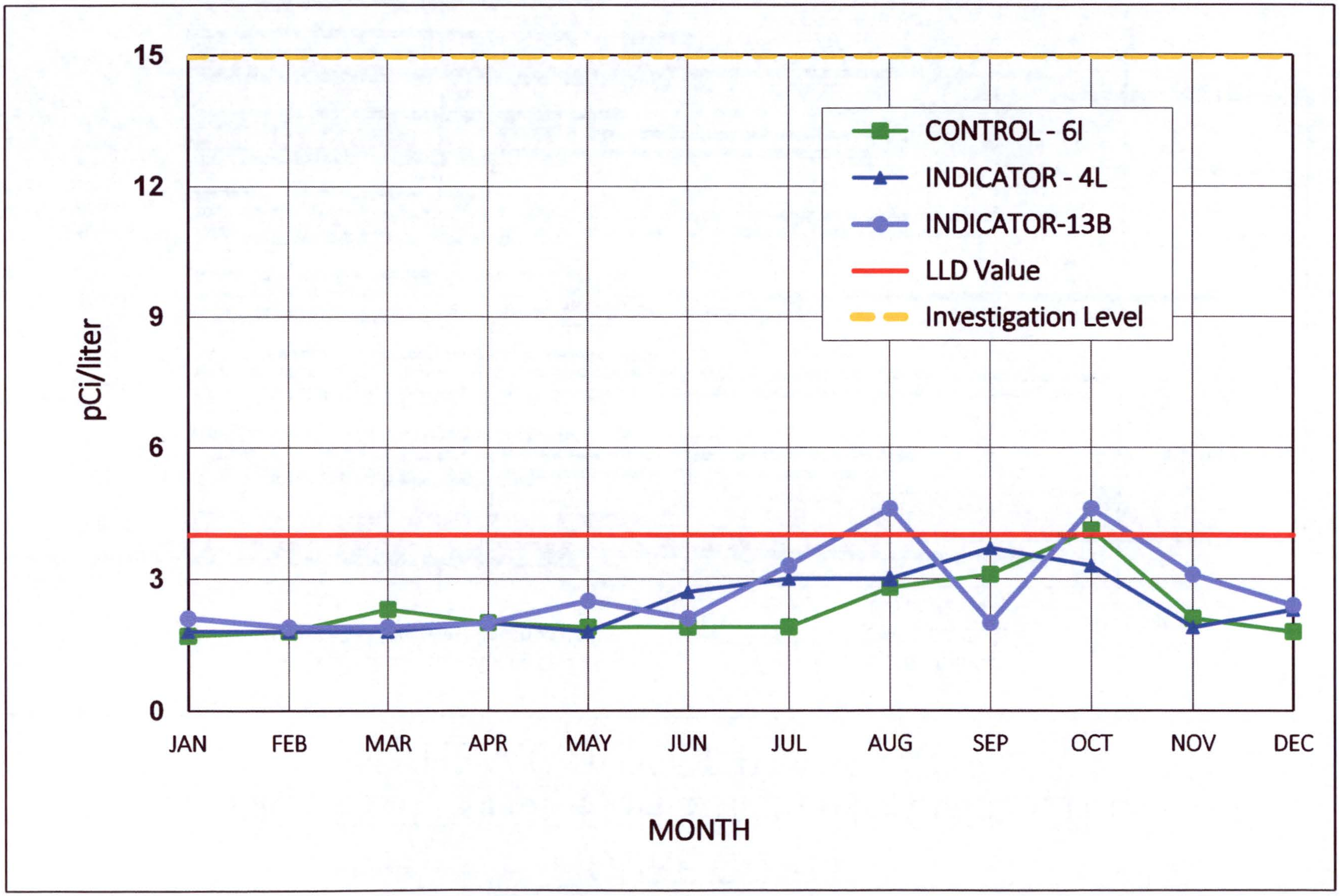


FIGURE C-2
MDC RESULTS FOR FISH SAMPLING COLLECTED IN THE VICINITY OF PBAPS, 2017

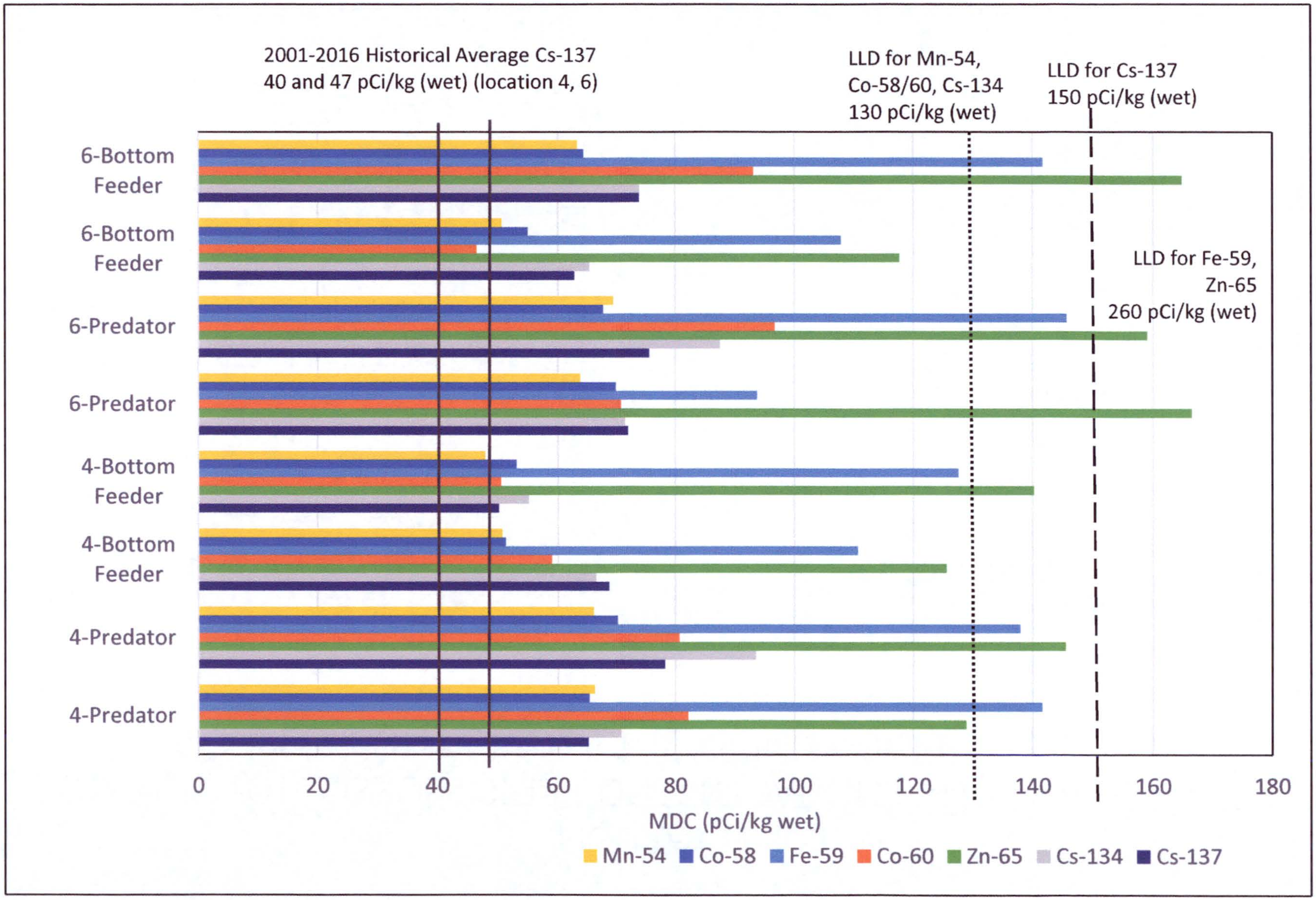


FIGURE C-3
SEMI-ANNUAL CS-137 CONCENTRATIONS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 2017

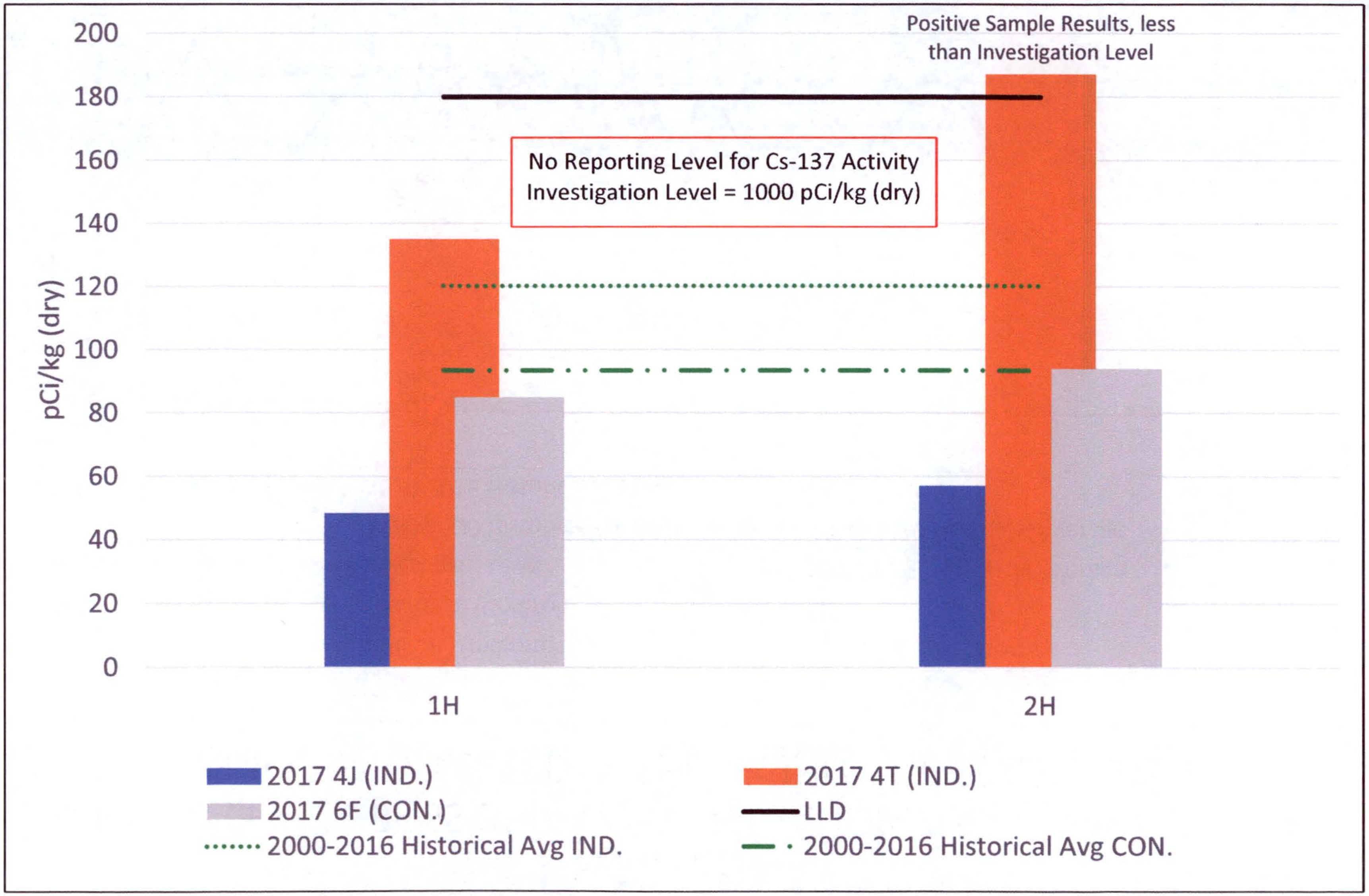
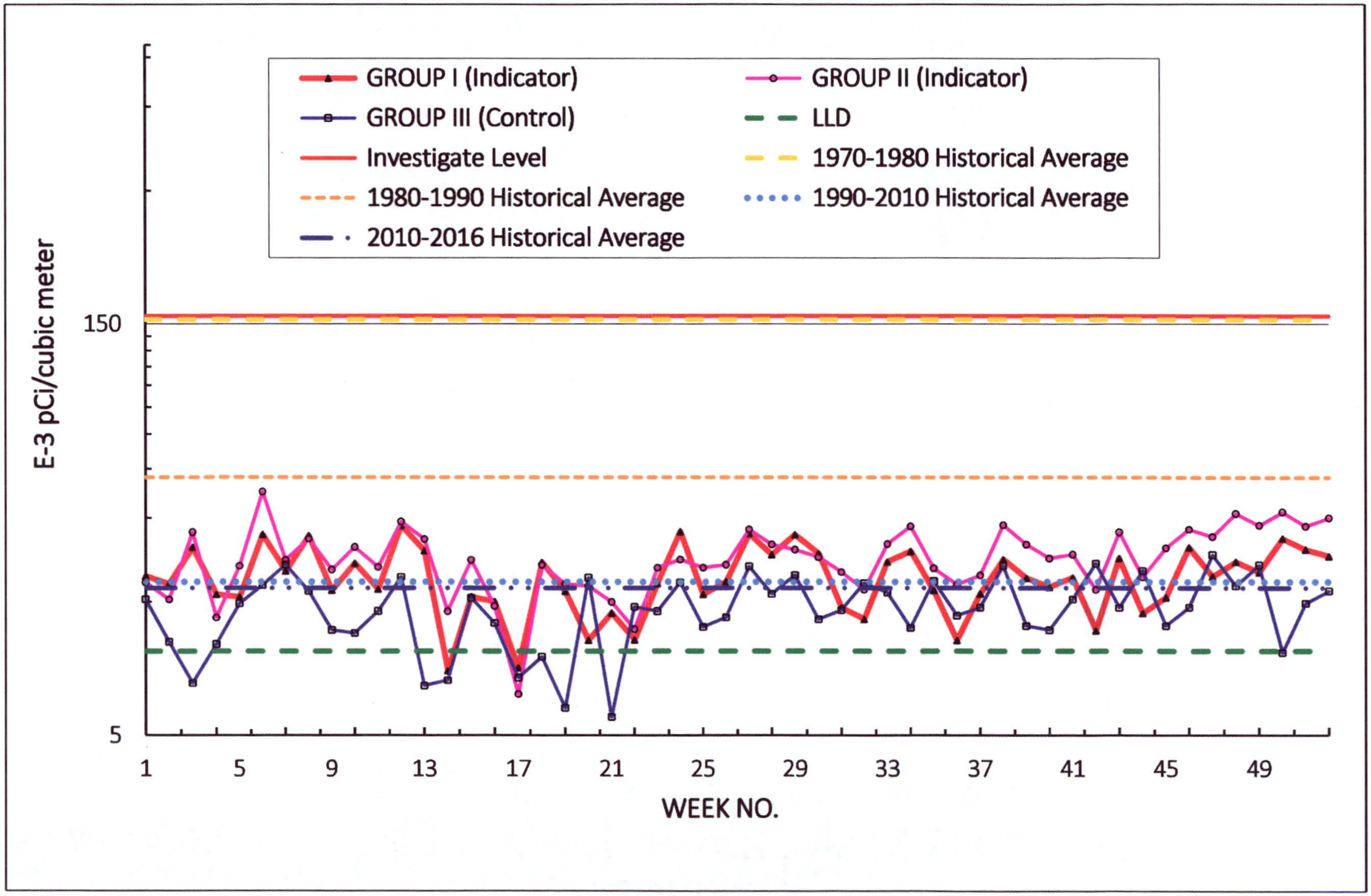


FIGURE C-4
MEAN WEEKLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 2017



No Required Reporting Level for Gross Beta Activities

FIGURE C-5
AVERAGE MONTHLY MDC RESULTS FOR REMP MILK SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 2017

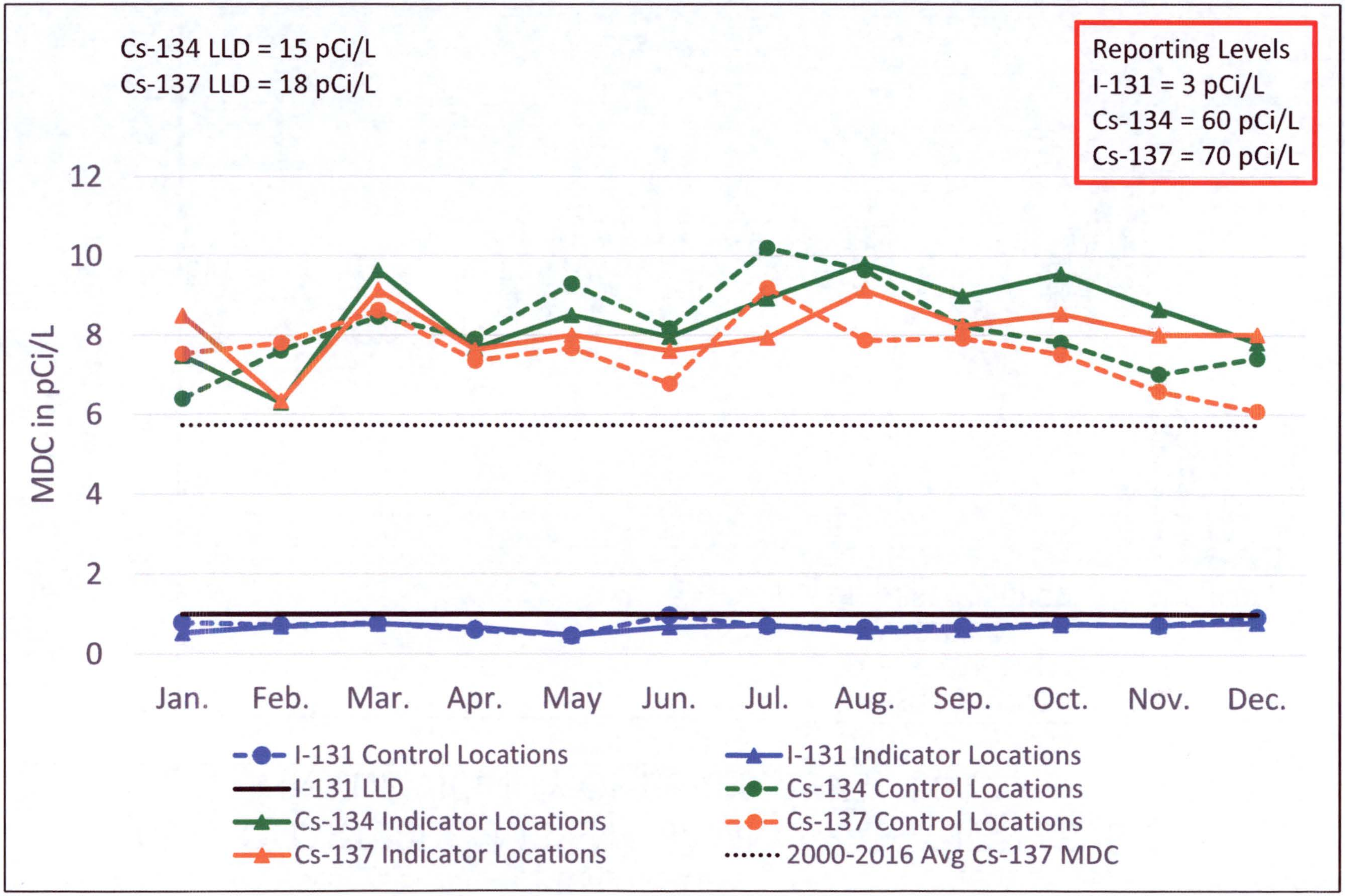


FIGURE C-6
MEAN QUARTERLY AMBIENT GAMMA RADIATION LEVELS
IN THE VICINITY OF PBAPS, 1973 - 2017

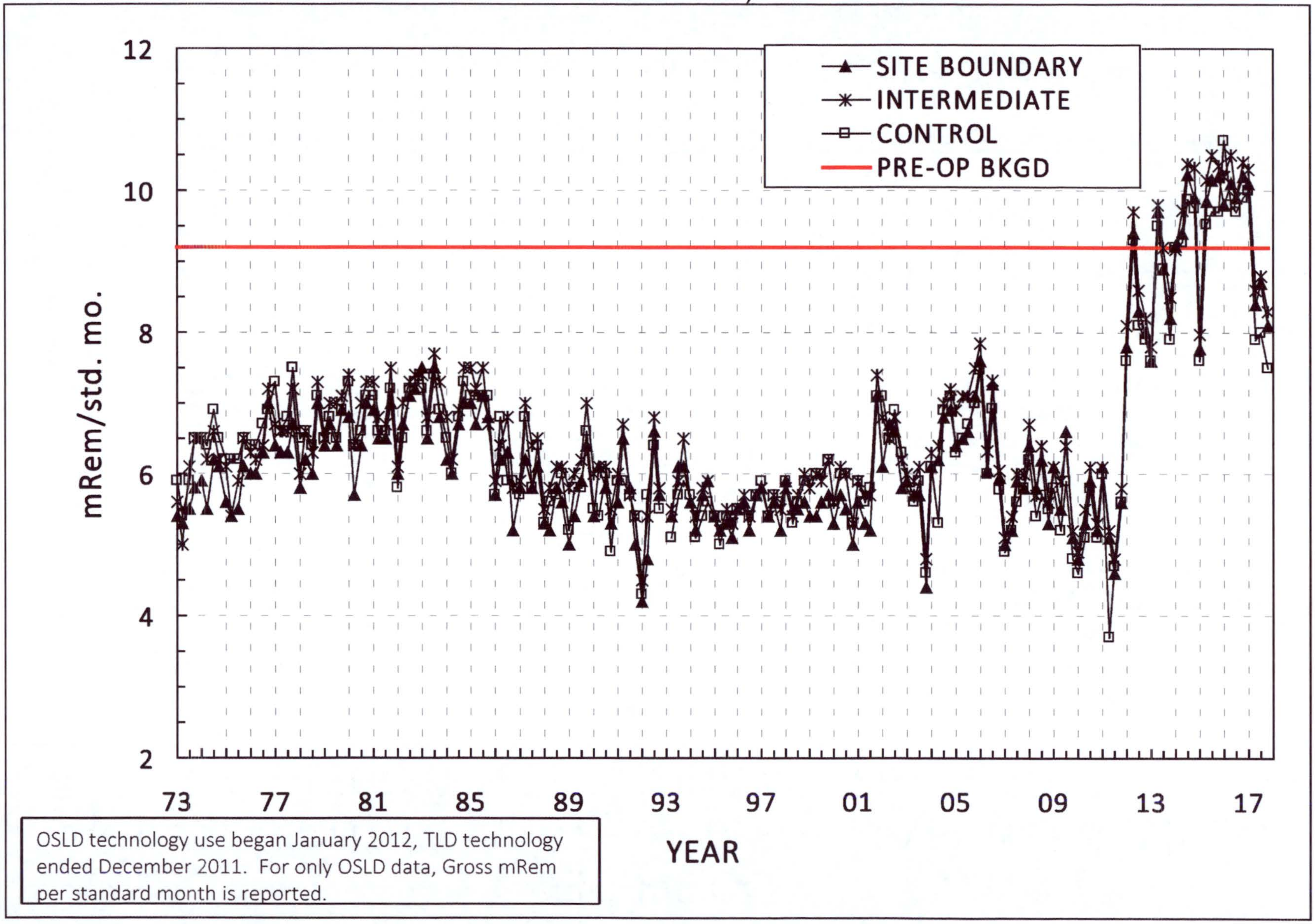
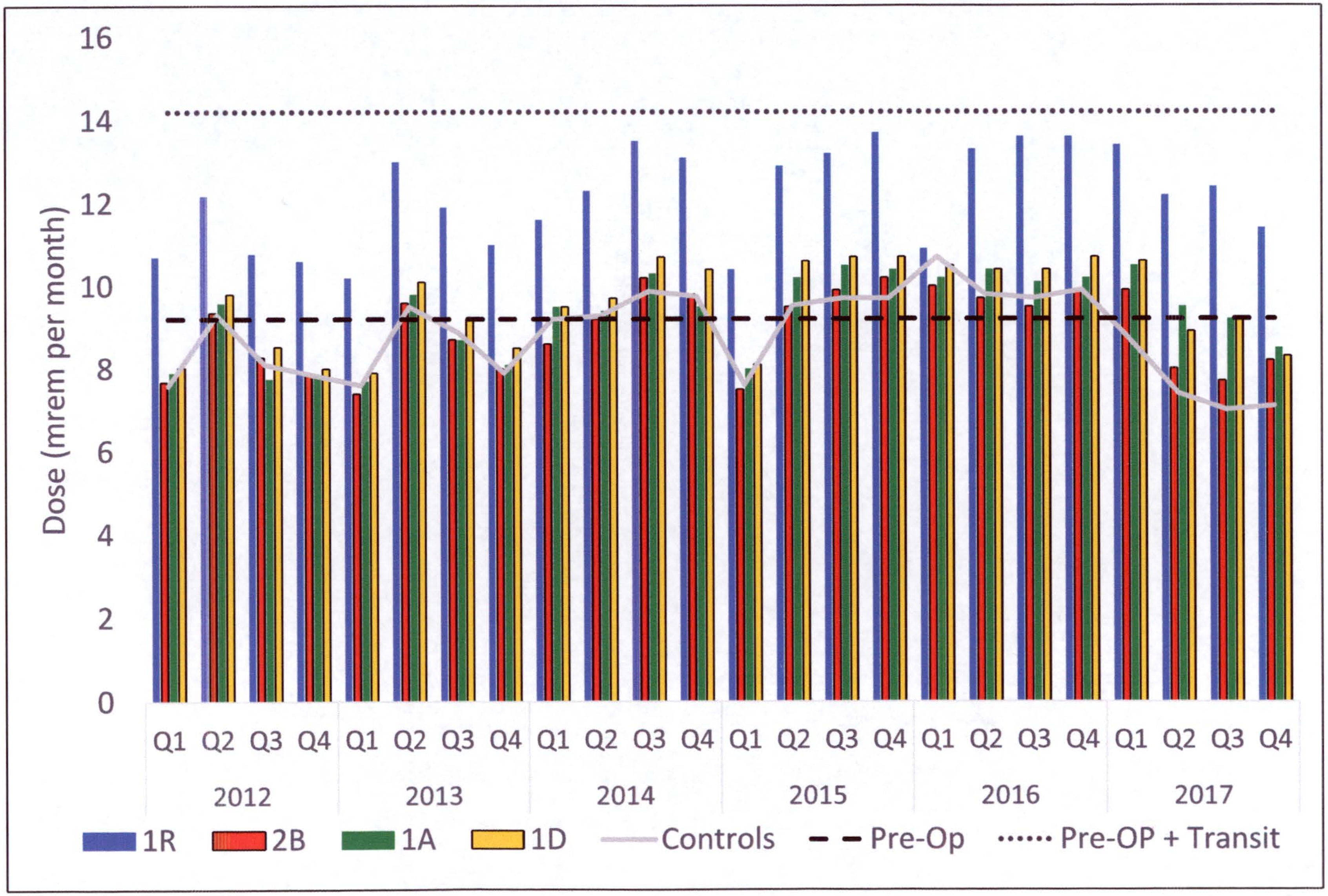


FIGURE C-7
ISFSI AND CONTROL OSLD RESULTS COMPARED TO PRE-OPERATION HISTORICAL VALUES



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APPENDIX D

DATA TABLES AND FIGURES
QC LABORATORY

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TABLE D-I.1 **CONCENTRATIONS OF GROSS BETA SOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	4L	Lab
12/29/16 - 02/02/17	0.9 ± 0.6	EIS
02/02/17 - 03/02/17	1.3 ± 0.6	EIS
03/02/17 - 03/30/17	0.9 ± 0.6	EIS
03/30/17 - 04/27/17	1.8 ± 0.6	EIS
04/27/17 - 06/01/17	1.6 ± 0.6	EIS
06/01/17 - 06/29/17	2.5 ± 0.7	EIS
06/29/17 - 07/27/17	3.0 ± 0.7	EIS
07/27/17 - 08/31/17	1.9 ± 0.7	EIS
08/31/17 - 09/28/17	2.5 ± 0.7	EIS
09/28/17 - 11/02/17	1.3 ± 0.8	EIS
11/06/17 - 11/29/17	1.4 ± 0.6	EIS
11/30/17 - 12/28/17	2.3 ± 0.7	EIS
MEAN ± 2 STD DEV	1.8 ± 1.4	

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

TABLE D-I.2 CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	4L	Lab
12/29/16 - 03/30/17	< 192	GEL
03/30/17 - 06/29/17	< 109	GEL
06/29/17 - 09/28/17	< 115	GEL
09/28/17 - 12/28/17	< 135	GEL
MEAN	-	

TABLE D-I.3 CONCENTRATIONS OF I-131 IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	4L	Lab
12/29/16 - 02/02/17	< 0.7	EIS
02/02/17 - 03/02/17	< 0.7	EIS
03/02/17 - 03/30/17	< 0.7	EIS
03/30/17 - 04/27/17	< 0.9	EIS
04/27/17 - 06/01/17	< 0.3	EIS
06/01/17 - 06/29/17	< 0.8	EIS
06/29/17 - 07/27/17	< 0.6	EIS
07/27/17 - 08/31/17	< 0.3	EIS
08/31/17 - 09/28/17	< 0.7	EIS
09/28/17 - 11/02/17	< 0.5	EIS
11/06/17 - 11/29/17	< 0.6	EIS
11/30/17 - 12/28/17	< 0.8	EIS
MEAN	-	

TABLE D-I.4 **CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Fe-59	Co-58	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140	Lab
4L	12/29/16 - 02/02/17	< 3	< 7	< 4	< 4	< 8	< 6	< 4	< 4	< 4	< 5	< 5	EIS
	02/02/17 - 03/02/17	< 4	< 8	< 4	< 4	< 7	< 8	< 4	< 4	< 4	< 8	< 8	EIS
	03/02/17 - 03/30/17	< 1	< 3	< 2	< 2	< 3	< 3	< 2	< 1	< 2	< 3	< 2.8	EIS
	03/30/17 - 04/27/17	< 4	< 8	< 4	< 4	< 8	< 6	< 5	< 4	< 4	< 8	< 8.3	EIS
	04/27/17 - 06/01/17	< 3	< 7	< 3	< 4	< 9	< 6	< 3	< 4	< 4	< 5	< 4.7	EIS
	06/01/17 - 06/29/17	< 3	< 7	< 3	< 3	< 6	< 6	< 4	< 3	< 3	< 9	< 9.5	EIS
	06/29/17 - 07/27/17	< 4	< 9	< 3	< 4	< 8	< 7	< 3	< 4	< 4	< 8	< 8	EIS
	07/27/17 - 08/31/17	< 5	< 11	< 4	< 5	< 10	< 8	< 5	< 4	< 4	< 8	< 8.3	EIS
	08/31/17 - 09/28/17	< 5	< 10	< 5	< 4	< 12	< 8	< 5	< 4	< 5	< 9	< 9	EIS
	09/28/17 - 11/02/17	< 3	< 6	< 3	< 3	< 6	< 5	< 3	< 3	< 3	< 4	< 4	EIS
	11/06/17 - 11/29/17	< 4	< 11	< 5	< 5	< 10	< 7	< 5	< 4	< 5	< 10	< 9.7	EIS
	11/30/17 - 12/28/17	< 4	< 10	< 5	< 5	< 11	< 9	< 5	< 4	< 5	< 11	< 11	EIS
	MEAN	-	-	-	-	-	-	-	-	-	-	-	

TABLE D-II.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE AND 1-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

COLLECTION PERIOD	1A GROSS BETA	1A I-131
12/29/16 - 01/05/17	30 ± 3	< 18
01/05/17 - 01/12/17	33 ± 3	< 14
01/12/17 - 01/19/17	41 ± 3	< 13
01/19/17 - 01/26/17	26 ± 2	< 18
01/26/17 - 02/02/17	28 ± 2	< 16
02/02/17 - 02/08/17	49 ± 3	< 26
02/08/17 - 02/16/17	35 ± 3	< 17
02/16/17 - 02/23/17	41 ± 3	< 16
02/23/17 - 03/02/17	35 ± 3	< 10
03/02/17 - 03/09/17	33 ± 3	< 14
03/09/17 - 03/16/17	24 ± 3	< 18
03/16/17 - 03/23/17	36 ± 3	< 14
03/23/17 - 03/30/17	33 ± 3	< 13
03/30/17 - 04/06/17	13 ± 2	< 13
04/06/17 - 04/13/17	23 ± 3	< 16
04/13/17 - 04/20/17	26 ± 3	< 11
04/20/17 - 04/27/17	12 ± 2	< 17
04/27/17 - 05/04/17	28 ± 2	< 14
05/04/17 - 05/11/17	26 ± 2	< 23
05/11/17 - 05/18/17	23 ± 2	< 13
05/18/17 - 05/25/17	22 ± 2	< 10
05/25/17 - 06/01/17	11 ± 2	< 14
06/01/17 - 06/08/17	27 ± 2	< 16
06/08/17 - 06/15/17	37 ± 3	< 16
06/15/17 - 06/22/17	28 ± 2	< 9
06/22/17 - 06/29/17	26 ± 2	< 16
06/29/17 - 07/06/17	40 ± 3	< 16
07/06/17 - 07/13/17	34 ± 3	< 19
07/13/17 - 07/20/17	32 ± 3	< 12
07/20/17 - 07/27/17	32 ± 3	< 26
07/27/17 - 08/03/17	33 ± 3	< 12
08/03/17 - 08/10/17	27 ± 2	< 12
08/10/17 - 08/17/17	37 ± 3	< 9
08/17/17 - 08/24/17	40 ± 3	< 8
08/24/17 - 08/31/17	32 ± 2	< 16
08/31/17 - 09/07/17	25 ± 3	< 11
09/07/17 - 09/14/17	24 ± 3	< 11
09/14/17 - 09/21/17	43 ± 3	< 19
09/21/17 - 09/28/17	49 ± 3	< 13
09/28/17 - 10/05/17	28 ± 3	< 19
10/05/17 - 10/12/17	33 ± 3	< 9
10/12/17 - 10/19/17	30 ± 2	< 14
10/19/17 - 10/26/17	40 ± 3	< 15
10/26/17 - 11/02/17	31 ± 2	< 15
11/02/17 - 11/09/17	32 ± 3	< 15
11/09/17 - 11/16/17	34 ± 3	< 18
11/16/17 - 11/22/17	37 ± 3	< 16
11/22/17 - 11/30/17	47 ± 3	< 19
11/30/17 - 12/07/17	44 ± 3	< 17
12/07/17 - 12/14/17	42 ± 3	< 21
12/14/17 - 12/21/17	46 ± 3	< 17
12/21/17 - 12/28/17	41 ± 3	< 18
MEAN	32 ± 17	-

TABLE D-II.2 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

SITE	COLLECTION PERIOD	Be-7	Mn-54	Co-58	Co-60	Cs-134	Cs-137
1A	12/30/15 - 03/31/16	83 ± 9	< 0.9	< 0.9	< 0.9	< 0.7	< 0.8
	03/31/16 - 06/30/16	< 92	< 1.3	< 1.3	< 1.4	< 1.0	< 1.2
	06/30/16 - 09/29/16	86 ± 11	< 1.1	< 1.2	< 1.2	< 1.0	< 1.1
	09/29/16 - 12/29/16	77 ± 11	< 1.3	< 1.4	< 1.1	< 1.1	< 1.2
	MEAN ± 2 STD DEV	85 ± 12	-	-	-	-	-

TABLE D-III.1 CONCENTRATIONS OF I-131 AND GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	I-131	K-40	Cs-134	Cs-137	Ba-140	La-140
J	02/13/17	< 0.8	1420 ± 115	< 5	< 6	< 11	< 11
	05/01/17	< 1.0	1424 ± 117	< 5	< 6	< 10	< 10
	08/07/17	< 0.5	1490 ± 97	< 4	< 5	< 7	< 7
	11/13/17	< 0.9	1433 ± 115	< 5	< 6	< 14	< 14
	MEAN ± 2 STD DEV	-	1442 ± 65	-	-	-	-
S	02/13/17	< 0.7	1591 ± 101	< 5	< 5	< 10	< 10
	05/01/17	< 0.8	1377 ± 87	< 4	< 4	< 6	< 6
	08/07/17	< 0.6	1471 ± 119	< 5	< 6	< 8	< 8
	11/13/17	< 0.6	1454 ± 96	< 4	< 5	< 13	< 13
	MEAN ± 2 STD DEV	-	1473 ± 177	-	-	-	-
V	02/11/17	< 0.7	1452 ± 90	< 4	< 4	< 10	< 10
	04/29/17	< 1.0	1302 ± 93	< 4	< 5	< 9	< 9
	08/04/17	< 0.6	1377 ± 86	< 4	< 4	< 9	< 9
	11/13/17	< 0.8	1501 ± 92	< 4	< 4	< 9	< 9
	MEAN ± 2 STD DEV	-	1408 ± 174	-	-	-	-

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

FIGURE D-1
COMPARISON OF MONTHLY TOTAL GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES FROM STATION 4L ANALYZED BY THE PRIMARY AND QC LABORATORIES, 2017

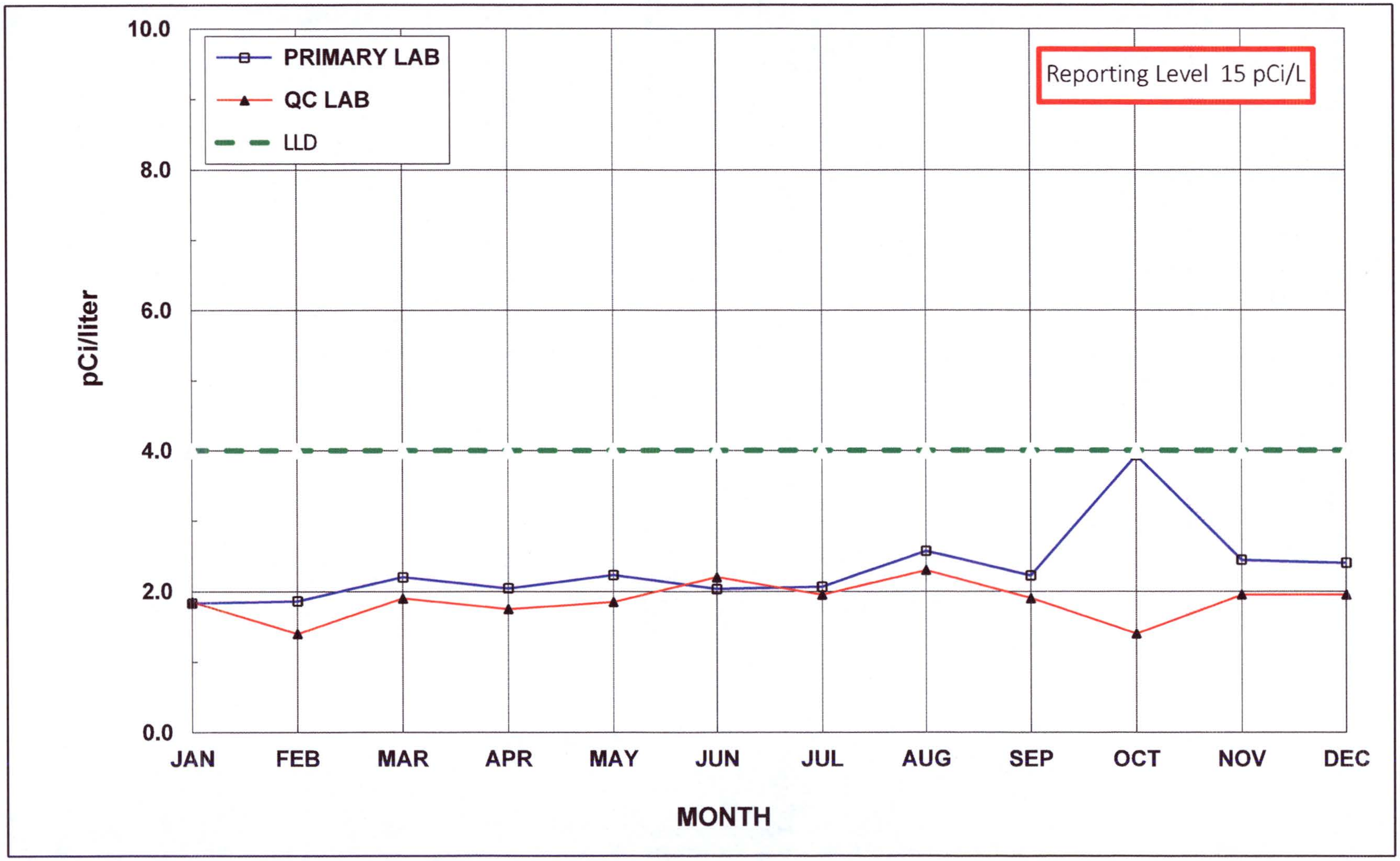
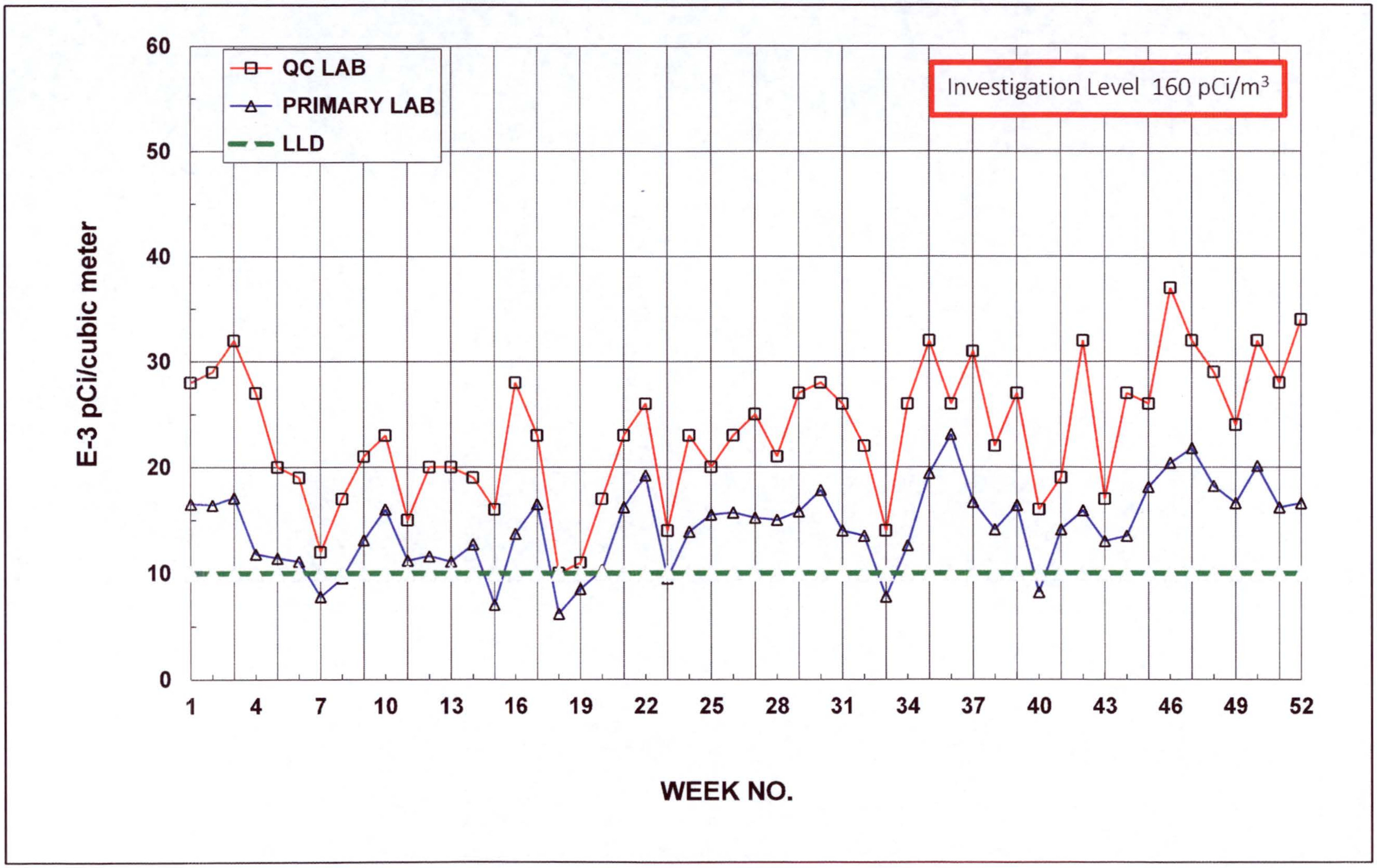


FIGURE D-2

COMPARISON OF WEEKLY GROSS BETA CONCENTRATIONS FROM CO-LOCATED AIR PARTICULATE LOCATIONS (1Z/1A) ANALYZED BY THE PRIMARY AND QC LABORATORIES, 2017



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APPENDIX E

INTER-LABORATORY COMPARISON PROGRAM ACCEPTANCE CRITERIA AND RESULTS

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A. Pre-set Acceptance Criteria

1. Analytics Evaluation Criteria

Analytics' evaluation report provides a ratio of laboratory results and Analytics' known value. Since flag values are not assigned by Analytics, TBE-ES evaluates the reported ratios based on internal QC requirements and the DOE MAPEP criteria.

2. ERA Evaluation Criteria

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

3. DOE Evaluation Criteria

MAPEP's evaluation report provides an acceptance range with associated flag values.

The MAPEP defines three levels of performance: Acceptable (flag = "A"), Acceptable with Warning (flag = "W"), and Not Acceptable (flag = "N"). Performance is considered acceptable when a mean result for the specified analyte is ± 20% of the reference value. Performance is acceptable with warning when a mean result falls in the range from ±20% to ±30% of the reference value (i.e., 20% < bias < 30%). If the bias is greater than 30%, the results are deemed not acceptable.

Note: The Department of Energy (DOE) Mixed Analyte Performance Evaluation Program (MAPEP) samples are created to mimic conditions found at DOE sites which do not resemble typical environmental samples obtained at commercial nuclear power facilities.

B. TBE PE Results and Discussion

1. Two nuclides in the water sample from the ERA April 2017 were evaluated as *Not Acceptable*. (NCR 17-09)

a. The Zn-65 result of 39.3 pCi/L, exceeded the lower acceptance limit of 47.2. The known value was unusually low for this study. The sample was run in duplicate on two different detectors with results of 39.3 ± 18.2 pCi/L and 59.3 ± 8.23 pCi/L. The result from the 2nd detector would have been well within the acceptable range (47.2 – 65.9) at 110.2% of the known value of 53.8 pCi/L.

b. The Sr-89 result of 40.7 pCi/L exceeded the lower acceptance limit of 53.8. All associated QC and recoveries were reviewed and no apparent cause could be determined for the failure.

2. The DOE MAPEP August 2017 air particulate U-238 result of 0.115 ± 0.025 Bq/sample was higher than the known value of 0.087 ± 0.002 with a ratio of 1.32, therefore the upper ratio of 1.30 (acceptable with warning) was exceeded. TBE's result with error easily overlaps with the acceptable range. MAPEP does not evaluate results with any associated error and the spike level for this sample was very low (2.35 pCi) compared to TBE's normal LCS of 6 pCi. TBE considers this result as passing. (NCR 17-15)

3. The Analytics September 2017 soil Cr-51 result was evaluated as *Not Acceptable* (Ratio of TBE to known result at 0.65). The reported value was 0.230 ± 0.144 pCi/g and the known value was 0.355 ± 0.00592 pCi/g. The sample was counted overnight for 14 hours, however the Cr-51 was spiked at a very low level and with a 27-day half-life, low-level quantification is difficult. The known value is significantly lower than TBE's typical MDC for this nuclide in a soil matrix and would typically not be reported to clients (unless specified). (NCR 17-16)

4. The ERA November 2017 water Sr-90 sample was evaluated as *Not Acceptable*. TBE's result of 27.1 pCi/L exceeded the lower acceptance range (30.8 – 48.0 pCi/L). After reviewing the associated QC data for this sample, it was determined that although the spike recovery for Sr-90 was within our laboratory guidelines (70% -130%), both the spike result and our ERA result were biased low. The sample was consumed and we were unable to reanalyze before submitting the result. (NCR 17-19).

C. EIS Laboratory PE Results and Discussion

1. The March 2017 water Gross Alpha result was evaluated as Not Acceptable (Ratio of EIS result to known at 0.78). The reported value was 217 pCi/L and the known value was 279 pCi/L. Low recovery of evaporated sample was the cause of this failure.

Improved laboratory technique was initiated and subsequent samples saw an improved recovery and passed NRC resolution test criteria without further issue.

D. GEL Labs PE Results and Discussion

All H-3 performance evaluation analyses met the specified acceptance criteria.

TABLE E.1 **Analytics Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services, 2017

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value (a)	Ratio of TBE to Analytics Result	Evaluation (b)
March 2017	E11811	Milk	Sr-89	pCi/L	87	97.7	0.89	A
			Sr-90	pCi/L	12.4	16.2	0.77	W
	E11812	Milk	Ce-141	pCi/L	135	145	0.93	A
			Co-58	pCi/L	153	150	1.02	A
			Co-60	pCi/L	182	183	1.00	A
			Cr-51	pCi/L	258	290	0.89	A
			Cs-134	pCi/L	104	120	0.87	A
			Cs-137	pCi/L	142	140	1.02	A
			Fe-59	pCi/L	135	129	1.05	A
			I-131	pCi/L	92.6	97.9	0.95	A
			Mn-54	pCi/L	173	164	1.05	A
			Zn-65	pCi/L	208	199	1.04	A
	E11813	Charcoal	I-131	pCi	92	93.9	0.98	A
	E11814	AP	Ce-141	pCi	99.9	101	0.99	A
			Co-58	pCi	95.4	104	0.92	A
			Co-60	pCi	140	127	1.10	A
			Cr-51	pCi	211	201	1.05	A
			Cs-134	pCi	82.1	83.2	0.99	A
			Cs-137	pCi	92.8	97.0	0.96	A
			Fe-59	pCi	107	89.3	1.20	A
			Mn-54	pCi	106	114	0.93	A
			Zn-65	pCi	137	138	0.99	A
	E11816	Soil	Ce-141	pCi/g	0.258	0.250	1.03	A
			Co-58	pCi/g	0.241	0.258	0.93	A
			Co-60	pCi/g	0.312	0.315	0.99	A
			Cr-51	pCi/g	0.439	0.500	0.88	A
			Cs-134	pCi/g	0.176	0.207	0.85	A
			Cs-137	pCi/g	0.304	0.317	0.96	A
			Fe-59	pCi/g	0.210	0.222	0.95	A
			Mn-54	pCi/g	0.292	0.283	1.03	A
			Zn-65	pCi/g	0.353	0.344	1.03	A
	E11815	Water	Fe-55	pCi/L	1600	1890	0.85	A

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

(b) Analytics evaluation based on TBE internal QC limits:
A = Acceptable - reported result falls within ratio limits of 0.80-1.20
W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30
N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

TABLE E.1 **Analytics Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services, 2017

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value (a)	Ratio of TBE to Analytics Result	Evaluation (b)
June 2017	E11844	Milk	Sr-89	pCi/L	81.3	92.6	0.88	A
			Sr-90	pCi/L	12.1	13.5	0.90	A
	E11846	Milk	Ce-141	pCi/L	142	151	0.94	A
			Co-58	pCi/L	147	155	0.95	A
			Co-60	pCi/L	185	191	0.97	A
			Cr-51	pCi/L	321	315	1.02	A
			Cs-134	pCi/L	168	188	0.89	A
			Cs-137	pCi/L	148	150	0.99	A
			Fe-59	pCi/L	116	115	1.01	A
			I-131	pCi/L	102	93.6	1.09	A
			Mn-54	pCi/L	168	172	0.98	A
			Zn-65	pCi/L	195	204	0.96	A
	E11847	Charcoal	I-131	pCi	87.9	84.8	1.04	A
	E11845	AP	Sr-89	pCi	70.8	79.1	0.90	A
			Sr-90	pCi	9.10	11.5	0.79	W
	E11848	AP	Ce-141	pCi	112	116	0.96	A
			Co-58	pCi	119	119	1.00	A
			Co-60	pCi	171	146	1.17	A
			Cr-51	pCi	270	241	1.12	A
			Cs-134	pCi	152	144	1.05	A
			Cs-137	pCi	114	115	0.99	A
			Fe-59	pCi	94.1	88.3	1.07	A
			Mn-54	pCi	139	132	1.06	A
			Zn-65	pCi	141	156	0.90	A
	E11849	Water	Fe-55	pCi/L	1840	1890	0.97	A
July 2017	E11901	AP	GR-A	pCi	50.1	44.2	1.13	A
			GR-B	pCi	218	233	0.93	A

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

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

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

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

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

TABLE E.1 **Analytics Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services, 2017

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value (a)	Ratio of TBE to Analytics Result	Evaluation (b)
September 2017	E11914	Milk	Sr-89	pCi/L	84.3	82.7	1.02	A
			Sr-90	pCi/L	12.6	12.1	1.04	A
	E11915	Milk	Ce-141	pCi/L	93.9	87.0	1.08	A
			Co-58	pCi/L	115	117	0.98	A
			Co-60	pCi/L	265	262	1.01	A
			Cr-51	pCi/L	273	217	1.26	W
			Cs-134	pCi/L	186	201	0.93	A
			Cs-137	pCi/L	175	172	1.02	A
			Fe-59	pCi/L	137	125	1.09	A
			I-131	pCi/L	78.0	71.0	1.10	A
			Mn-54	pCi/L	128	123	1.04	A
			Zn-65	pCi/L	206	184	1.12	A
	E11916	Charcoal	I-131	pCi	71.9	64.4	1.12	A
	E11917	AP	Ce-141	pCi	80.1	86.3	0.93	A
			Co-58	pCi	110	116	0.95	A
			Co-60	pCi	277	260	1.07	A
			Cr-51	pCi	275	215	1.28	W
			Cs-134	pCi	192	199	0.96	A
			Cs-137	pCi	165	170	0.97	A
			Fe-59	pCi	122	124	0.98	A
			Mn-54	pCi	120	122	0.99	A
			Zn-65	pCi	175	183	0.96	A
	E11918	Water	Fe-55	pCi/L	1630	1630	1.00	A
	E11919	Soil	Ce-141	pCi/g	0.136	0.142	0.96	A
			Co-58	pCi/g	0.179	0.191	0.94	A
			Co-60	pCi/g	0.405	0.429	0.94	A
			Cr-51	pCi/g	0.230	0.355	0.65	N (1)
			Cs-134	pCi/g	0.272	0.328	0.83	A
			Cs-137	pCi/g	0.336	0.356	0.94	A
			Fe-59	pCi/g	0.210	0.205	1.02	A
			Mn-54	pCi/g	0.210	0.201	1.05	A
			Zn-65	pCi/g	0.301	0.301	1.00	A

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

(b) Analytics evaluation based on TBE internal QC limits:
A = Acceptable - reported result falls within ratio limits of 0.80-1.20
W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30
N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

(1) See NCR 17-16

TABLE E.1 **Analytics Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services, 2017

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [(a)]	Ratio of TBE to Analytics Result	Evaluation [(b)]
December 2017	E12054	Milk	Sr-89	pCi/L	92.1	92.3	1.00	A
			Sr-90	pCi/L	18.3	16.9	1.09	A
	E12055	Milk	Ce-141	pCi/L	97.8	98.3	0.99	A
			Co-58	pCi/L	92.3	89.9	1.03	A
			Co-60	pCi/L	176	173	1.02	A
			Cr-51	pCi/L	226	242	0.93	A
			Cs-134	pCi/L	118	125	0.95	A
			Cs-137	pCi/L	148	141	1.05	A
			Fe-59	pCi/L	123	113	1.08	A
			I-131	pCi/L	66.0	57.8	1.14	A
			Mn-54	pCi/L	173	161	1.08	A
			Zn-65	pCi/L	233	211	1.10	A
	E12056	Charcoal	I-131	pCi	48.1	47.5	1.01	A
	E12057A	AP	Ce-141	pCi	108	111	0.97	A
			Co-58	pCi	89.5	102	0.88	A
			Co-60	pCi	223	196	1.14	A
			Cr-51	pCi	311	274	1.13	A
			Cs-134	pCi	141	142	1.00	A
			Cs-137	pCi	162	160	1.01	A
			Fe-59	pCi	121	129	0.94	A
			Mn-54	pCi	177	182	0.97	A
			Zn-65	pCi	203	239	0.85	A
	E12058	Water	Fe-55	pCi/L	1970	1740	1.13	A
	E12059	AP	Sr-89	pCi	71.2	87.4	0.81	A
			Sr-90	pCi	12.9	16.0	0.81	A

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

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

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

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

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

TABLE E.2 **DOE's Mixed Analyte Performance Evaluation Program (MAPEP)**
Teledyne Brown Engineering Environmental Services, 2017

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value (a)	Acceptance Range	Evaluation (b)
February 2017	17-MaS36	Soil	Ni-63	Bq/kg	-5.512		*(1)*	A
			Sr-90	Bq/kg	571	624	437 - 811	A
	17-MaW36	Water	Am-241	Bq/L	0.693	0.846	0.592 - 1.100	A
			Ni-63	Bq/L	13.4	12.2	8.5 - 15.9	A
			Pu-238	Bq/L	0.7217	0.703	0.492 - 0.914	A
			Pu-239/240	Bq/L	0.9277	0.934	0.654 - 1.214	A
	17-RdF36	AP	U-234/233	Bq/sample	0.0911	0.104	0.073 - 0.135	A
			U-238	Bq/sample	0.0967	0.107	0.075 - 0.139	A
	17-RdV36	Vegetation	Cs-134	Bq/sample	6.44	6.95	4.87 - 9.04	A
			Cs-137	Bq/sample	4.61	4.60	3.22 - 5.98	A
			Co-57	Bq/sample	-0.0229		*(1)*	A
			Co-60	Bq/sample	8.52	8.75	6.13 - 11.38	A
			Mn-54	Bq/sample	3.30	3.28	2.30 - 4.26	A
			Sr-90	Bq/sample	1.30	1.75	1.23 - 2.28	W
			Zn-65	Bq/sample	5.45	5.39	3.77 - 7.01	A
August 2017	17-MaS37	Soil	Ni-63	Bq/kg	1130	1220	854 - 1586	A
			Sr-90	Bq/kg	296	289	202 - 376	A
	17-MaW37	Water	Am-241	Bq/L	0.838	0.892	0.624 - 1.160	A
			Ni-63	Bq/L	-0.096		*(1)*	A
			Pu-238	Bq/L	0.572	0.603	0.422 - 0.784	A
			Pu-239/240	Bq/L	0.863	0.781	0.547 - 1.015	A
	17-RdF37	AP	U-234/233	Bq/sample	0.103	0.084	0.059 - 0.109	W
			U-238	Bq/sample	0.115	0.087	0.061 - 0.113	N (2)
	17-RdV37	Vegetation	Cs-134	Bq/sample	2.34	2.32	1.62 - 3.02	A
			Cs-137	Bq/sample	0.05		*(1)*	A
			Co-57	Bq/sample	3.32	2.8	2.0 - 3.6	A
			Co-60	Bq/sample	2.09	2.07	1.45 - 2.69	A
			Mn-54	Bq/sample	2.90	2.62	1.83 - 3.41	A
			Sr-90	Bq/sample	1.17	1.23	0.86 - 1.60	A
			Zn-65	Bq/sample	6.07	5.37	3.76 - 6.98	A

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

(b) DOE/MAPEP evaluation:

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

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

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

(1) False positive test

(2) See NCR 17-15

TABLE E.3 **ERA Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services, 2017

Month/Year	Identrification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [(a)]	Acceptance Limits	Evaluation [(b)]
March 2017	MRAD-26	AP	GR-A	pCi/sample	76.3	85.5	28.6 - 133	A
April 2017	RAD-109	Water	Ba-133	pCi/L	49.2	49.7	40.8 - 55.1	A
			Cs-134	pCi/L	83.2	90.1	74.0 - 99.1	A
			Cs-137	pCi/L	202	206	185 - 228	A
			Co-60	pCi/L	51.2	54.7	49.2 - 62.7	A
			Zn-65	pCi/L	39.3	53.8	47.2 - 65.9	N [(1)]
			GR-A	pCi/L	53.6	75.0	39.5 - 92.3	A
			GR-B	pCi/L	42.7	38.5	25.5 - 46.0	A
			U-Nat	pCi/L	50.1	55.6	45.2 - 61.7	A
			H-3	pCi/L	7080	6850	5920 - 7540	A
			Sr-89	pCi/L	40.7	66.2	53.8 - 74.3	N [(1)]
			Sr-90	pCi/L	26.9	26.7	19.3 - 31.1	A
			I-131	pCi/L	26.7	29.9	24.9 - 34.9	A
September 2017	MRAD-27	AP	GR-A	pCi/sample	40.9	50.1	16.8 - 77.8	A
		AP	GR-B	pCi/sample	58.0	61.8	39.1 - 90.1	A
October 2017	RAD-111	Water	Ba-133	pCi/L	71.3	73.7	61.7 - 81.1	A
			Cs-134	pCi/L	43.0	53.0	42.8 - 58.3	A
			Cs-137	pCi/L	48.2	52.9	47.6 - 61.1	A
			Co-60	pCi/L	69.0	69.5	62.6 - 78.9	A
			Zn-65	pCi/L	335	348	313 - 406	A
			GR-A	pCi/L	32.5	35.6	18.3 - 45.8	A
			GR-B	pCi/L	24.3	25.6	16.0 - 33.6	A
			U-Nat	pCi/L	36.6	37.0	30.0 - 40.9	A
			H-3	pCi/L	6270	6250	5390 - 6880	A
			I-131	pCi/L	26.4	24.2	20.1 - 28.7	A
November 2017	111317O	Water	Sr-89	pCi/L	57.1	50.0	39.4 - 57.5	A
			Sr-90	pCi/L	27.1	41.8	30.8 - 48.0	N [(2)]

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

(b) ERA evaluation:
A = Acceptable - Reported value falls within the Acceptance Limits
N = Not Acceptable - Reported value falls outside of the Acceptance Limits

(1) See NCR 17-09
(2) See NCR 17-19

TABLE E.4 **Analytics Environmental Radioactivity Cross Check Program**
Exelon Industrial Services, 2017

Month/Year	Identification Number	Matrix	Nuclide	Units	EIS Reported Value	Known Value [(a)]	Ratio of Analytics to EIS Result	Evaluation [(b)]
March 2017	E11785	Water	GR-A	pCi/L	217	279	1.29	Fail
	E11786	Charcoal	I-131	pCi	87	96.4	1.11	Pass
	E11787	Water	H-3	pCiL	9860	9980	1.01	Pass
	E11784	Milk	I-131	pCi	103	97.9	0.95	Pass
			Ce-141	pCi	165.0	145	0.88	Pass
			Cr-51	pCi	299	290	0.97	Pass
			Cs-134	pCi	118.0	120.0	1.02	Pass
			Cs-137	pCi	165	140	0.85	Pass
			Co-58	pCi	148.0	150	1.01	Pass
			Mn-54	pCi	176	164	0.93	Pass
			Fe-59	pCi	136	129.0	0.95	Pass
			Zn-65	pCi	215	199	0.93	Pass
			Co-60	pCi	192	183	0.95	Pass
June 2017	E11884	Water	GR-B	pCi/L	242	249	1.03	Pass
	E11885	Water	I-131	pCi/L	99	97	0.98	Pass
			Ce-141	pCi/L	220	199	0.90	Pass
			Cr-51	pCi/L	503	413	0.82	Pass
			Cs-134	pCi/L	242	247	1.02	Pass
			Cs-137	pCi/L	218	197	0.90	Pass
			Co-58	pCi/L	222	204	0.92	Pass
			Mn-54	pCi/L	255	225	0.88	Pass
			Fe-59	pCi/L	170	151.0	0.89	Pass
			Zn-65	pCi/L	307	267	0.87	Pass
			Co-60	pCi/L	278	250	0.90	Pass
	E11886	AP	Ce-141	pCi/Filter	122	118	0.97	Pass
			Cr-51	pCi/Filter	238	246	1.03	Pass
			Cs-134	pCi/Filter	129	147	1.14	Pass
			Cs-137	pCi/Filter	121	117	0.97	Pass
			Co-58	pCi/Filter	116	121	1.04	Pass
			Mn-54	pCi/Filter	140	134	0.96	Pass
			Fe-59	pCi/Filter	99	89.9	0.91	Pass
			Zn-65	pCi/Filter	175	159	0.91	Pass
			Co-60	pCi/Filter	144	149	1.03	Pass

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

(b) Analytics evaluation based on EIS internal QC limits in accordance with the NRC Resolution Test criteria

TABLE E.4 **Analytics Environmental Radioactivity Cross Check Program**
Exelon Industrial Services, 2017

Month/Year	Identification Number	Matrix	Nuclide	Units	EIS Reported Value	Known Value [(a)]	Ratio of Analytics to EIS Result	Evaluation [(b)]
September 2017	E11902	Water	H-3	pCi/L	14900	14200	0.95	Pass
	E11947	Water	GR-B	pCi/L	64.2	67.2	1.05	Pass
December 2017	E11672	Milk	I-131	pCi/L	71.4	57.8	0.81	Pass
			Ce-141	pCi/L	113	98.3	0.87	Pass
			Cr-51	pCi/L	254	242	0.95	Pass
			Cs-134	pCi/L	129	125	0.97	Pass
			Cs-137	pCi/L	163	141	0.87	Pass
			Co-58	pCi/L	89.5	89.9	1.00	Pass
			Mn-54	pCi/L	184	161	0.88	Pass
			Fe-59	pCi/L	127	113	0.89	Pass
			Zn-65	pCi/L	218	211	0.97	Pass
			Co-60	pCi/L	185	173	0.94	Pass
	E12028A	AP	Ce-141	pCi/Filter	61.9	59.4	0.96	Pass
			Cr-51	pCi/Filter	123	146	1.19	Pass
			Cs-134	pCi/Filter	62.8	75.4	1.20	Pass
			Cs-137	pCi/Filter	82.8	85.3	1.03	Pass
			Co-58	pCi/Filter	50.1	54.3	1.08	Pass
			Mn-54	pCi/Filter	97	97.1	1.00	Pass
			Fe-59	pCi/Filter	69.6	68.5	0.98	Pass
			Zn-65	pCi/Filter	124	127	1.02	Pass
			Co-60	pCi/Filter	95.7	104	1.09	Pass
	E12029	Water	GR-B	pCi/L	284	265	0.93	Pass
	E12030A	AP	Charcoal	pCi	44.0	47.5	1.08	Pass

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

(b) Analytics evaluation based on EIS internal QC limits in accordance with the NRC Resolution Test criteria

TABLE E.5 **ERA Environmental Radioactivity Cross Check Program**
Exelon Industrial Services, 2017

Month/Year	ID Number	Matrix	Nuclide	Units	EIS Reported Value	Known Value [(a)]	Acceptance Limits	Acceptance Ratio of ERA to EIS Result	Evaluation [(b)]
April 2017	RAD-109	Water	Ba-133	pCi/L	50.2	49.7	40.8 - 55.1	0.99	Pass
			Cs-134	pCi/L	88.3	90.1	74.0 - 99.1	1.02	Pass
			Cs-137	pCi/L	226	206	185 - 228	0.91	Pass
			Co-60	pCi/L	59.5	54.7	49.2 - 62.7	0.92	Pass
			Zn-65	pCi/L	66.2	53.8	47.2 - 65.9	0.81	Pass
			I-131	pCi/L	29.1	29.9	24.9 - 34.9	1.03	Pass
			GR-B	pCi/L	32.4	38.5	25.5 - 46.0	1.19	Pass
			H-3	pCi/L	7347	6850	5920 - 7540	0.93	Pass
July 2017	RAD-110		H-3	pCi/L	5305	5060	4340 - 5570	0.95	Pass
September 2017	MRAD-27	AP	Cs-134	pCi/Filter	1334	1440	916 - 1790	1.08	Pass
			Cs-137	pCi/Filter	1050	954	717 - 1250	0.91	Pass
			Co-60	pCi/Filter	309	271	210 - 339	0.88	Pass
			Zn-65	pCi/Filter	153	123	88.1 - 170	0.80	Pass
October 2017	RAD-111	Water	Ba-133	pCi/L	76.2	73.7	61.7 - 81.1	0.97	Pass
			Cs-134	pCi/L	54.3	53.0	42.8 - 58.3	0.98	Pass
			Cs-137	pCi/L	58.5	52.9	47.6 - 61.1	0.90	Pass
			Co-60	pCi/L	74.9	69.5	62.6 - 78.9	0.93	Pass
			Zn-65	pCi/L	411.5	348	313 - 406	0.85	Pass
			I-131	pCi/L	25.9	24.2	20.1 - 28.7	0.93	Pass

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

(b) Analytics evaluation based on EIS internal QC limits in accordance with the NRC Resolution Test criteria

TABLE E.6 **DOE's Mixed Analyte Performance Evaluation Program (MAPEP)**
GEL Laboratories - H-3 Only, 2017

Quarter/Year	Identification Number	Matrix	Nuclide	Units	GEL Reported Value	Known Value (a)	Acceptance Range	Evaluation (b)
2nd/2017	17-MaW36	Water	H-3	Bq/kg	245	249.0	174 -324	A
4th/2017	17-MaW37	Water	H-3	Bq/kg	250	258	181 - 335	A

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

(b) DOE/MAPEP evaluation:

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

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

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

TABLE E.7

ERA Environmental Radioactivity Cross Check Program
GEL Laboratories - H-3 Only, 2017

Quarter/Year	Identrification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [(a)]	Acceptance Limits	Evaluation [(b)]
1st/2017	RAD-108	Water	H-3	pCi/L	11300	12500	10900 - 13800	A
			H-3	pCi/L	11600	12500	10900 - 13800	A
2nd/2017	MRAD-26	Water	H-3	pCi/L	18900	19400	13000 - 27700	A
3rd/2017	RAD-111	Water	H-3	pCi/L	5120	5060	4340 - 5570	A
			H-3	pCi/L	46200	5060	4340 - 5570	A
4th/2017	MRAD-27	Water	H-3	pCi/L	21100	22500	15100 - 32100	A

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

(b) ERA evaluation:

A = Acceptable - Reported value falls within the Acceptance Limits

N = Not Acceptable - Reported value falls outside of the Acceptance Limits

APPENDIX F

ERRATA DATA

There is no errata data for 2017.

APPENDIX G

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

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Docket No: 50-277
50-278

PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 and 3

Annual Radiological Groundwater
Protection Program Report (ARGPPR)

January 1 through December 31, 2017

Prepared By
Teledyne Brown Engineering
Environmental Services

Exelon Generation

Peach Bottom Atomic Power Station
Delta, PA 17314

May 2018

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Appendices

I. Summary and Conclusions

This report on the Radiological Groundwater Protection Program (RGPP) conducted for the Peach Bottom Atomic Power Station (PBAPS) by Exelon Nuclear covers the period 01 January 2017 through 31 December 2017. This evaluation involved numerous station personnel and contractor support personnel. At PBAPS, there are 31 permanent groundwater monitoring wells. Installation of the wells began in 2006. Of these monitoring locations, none were assigned to the station's Radiological Environmental Monitoring Program (REMP). This report covers groundwater, surface water, seep water, and precipitation water samples collected from the environment on station property in 2017. During that time period, 1,208 analyses were performed on 265 samples from 44 locations. These 44 locations include 27 groundwater monitoring wells, 3 surface water sample points, 3 groundwater seeps, 2 yard drain sumps, 2 recapture points, 1 moat sump and 6 precipitation water sampling points. Phase 1 of the monitoring was part of a comprehensive study initiated by Exelon to determine whether groundwater or surface water in the vicinity of PBAPS had been adversely impacted by any releases of radionuclides. Phase 1 was conducted by Conestoga Rovers and Associates (CRA) and the conclusions were made available to state and federal regulators as well as the public. Phase 2 of the RGPP was conducted by Exelon corporate and station personnel to initiate follow up of Phase 1 and begin long-term monitoring at groundwater and surface water locations selected during Phase 1. All analytical results from Phase 2 monitoring are reported herein.

Samples supporting the RGPP were analyzed for Tritium (H-3), Strontium-89 (Sr-89), Strontium-90 (Sr-90), gross alpha, gross beta, gamma-emitting radionuclides associated with licensed plant operations and isotopes known as 'hard to detects'.

In assessing all the data gathered for this report, it was concluded that the operation of PBAPS had no adverse radiological impact on the environment and there are currently no known active releases into the groundwater at PBAPS.

Tritium was not detected at any location in concentrations greater than the United States Environmental Protection Agency (USEPA) drinking water standard (and the Nuclear Regulatory Commission [NRC] Reporting Limit) of 20,000 pCi/L.

Tritium was not detected at concentrations greater than the minimum detectable concentration (MDC) in any surface water, seep water or precipitation water sample locations. Based on the sample data, tritium is not migrating off the station property at detectable concentrations.

II. Introduction

PBAPS is located along the Susquehanna River between Holtwood and Conowingo Dams in Peach Bottom Township, York County, Pennsylvania. The initial loading of fuel into Unit 1, a 40 MWe (net) high temperature gas-cooled reactor, began on 5 February 1966, and initial criticality was achieved on 3 March 1966. Shutdown of Peach Bottom Unit 1 for decommissioning was on 31 October 1974. For the purposes of the monitoring program, the beginning of the operational period for Unit 1 was considered to be 5 February 1966. A summary of the Unit 1 preoperational monitoring program was presented in a previous report (1). PBAPS Units 2 and 3 are boiling water reactors, each with a power output of approximately 1366 MWe. The first fuel was loaded into Peach Bottom Unit 2 on 9 August 1973. Criticality was achieved on 16 September 1973 and full power was reached on 16 June 1974. The first fuel was loaded into Peach Bottom Unit 3 on 5 July 1974. Criticality was achieved on 7 August 1974 and full power was first reached on 21 December 1974. Preoperational summary reports (2)(3) for Units 2 and 3 have been previously issued and summarize the results of all analyses performed on samples collected from 5 February 1966 through 8 August 1973.

This report covers those analyses performed by Teledyne Brown Engineering (TBE) on samples collected in 2017.

A. Objective of the RGPP

The objectives of the RGPP are as follows:

1. Ensure that the site characterization of geology and hydrology provides an understanding of predominant groundwater gradients based upon current site conditions.
2. Identify site risk based on plant design and work practices.
3. Establish an on-site groundwater monitoring program to ensure timely detection of inadvertent radiological releases to ground water.
4. Establish a remediation protocol to prevent migration of licensed material off-site and to minimize decommissioning impacts.
5. Ensure that records of leaks, spills, remediation efforts are retained and retrievable to meet the requirements of 10 CFR 50.75(g).
6. Conduct initial and periodic briefings of their site specific Groundwater Protection Initiative (GPI) program with the designated State/Local officials.
7. Make informal communication as soon as practicable to appropriate

State/Local officials, with follow-up notifications to the NRC, as appropriate, regarding significant on-site leaks/spills into groundwater and on-site or off-site water sample results exceeding the criteria in the REMP as described in the Offsite Dose Calculation Manual (ODCM).

8. Submit a written 30-day report to the NRC for any water sample result for on-site groundwater that is or may be used as a source of drinking water that exceeds any of the criteria in the licensee's existing REMP/ODCM for 30-day reporting of off-site water sample results.

9. Document all on-site groundwater sample results and a description of any significant on-site leaks/spills into groundwater for each calendar year in the Annual Radiological Environmental Operating Report (AREOR) for REMP or the Annual Radioactive Effluent Release Report (ARERR).

10. Perform a self-assessment of the GPI program.

11. Conduct a review of the GPI program, including at a minimum the licensee's self-assessments, under the auspices of the Nuclear Energy Institute (NEI).

B. Implementation of the Objectives

The objectives identified have been implemented at PBAPS via Corporate and Site specific procedures. These procedures include:

1. EN-AA-407, Response to Inadvertent Releases of Licensed Materials to Groundwater, Surface Water, Soil or Engineered Structures

2. EN-AA-408, Radiological Groundwater Protection Program

3. EN-AA-408-4000, Radiological Groundwater Protection Program Implementation

4. EN-PB-408-4160, RGPP Reference Material for Peach Bottom Atomic Power Station

C. Program Description

1. Sample Collection

Sample locations can be found in Table A–1 and Figures A–1 and A–2, Appendix A.

Groundwater, Surface Water and Precipitation Water

Samples of water are collected, managed, transported and analyzed in accordance with approved procedures. Sample locations, sample collection frequencies and analytical frequencies are controlled in accordance with approved station procedures. Contractor and/or station personnel are trained in the collection, preservation management and shipment of samples, as well as in documentation of sampling events. Analytical laboratories are subject to internal quality assurance programs, industry cross-check programs, as well as nuclear industry audits. Station personnel review and evaluate all analytical data deliverables as data are received.

Analytical data results are reviewed by both station personnel and an independent hydro geologist for adverse trends or changes to hydrogeologic conditions.

D. Characteristics of Tritium

Tritium is a radioactive isotope of hydrogen. The most common form of tritium is tritium oxide, which is also called "tritiated water." The chemical properties of tritium are essentially those of ordinary hydrogen.

Tritiated water behaves the same as ordinary water in both the environment and the body. Tritium can be taken into the body by drinking water, breathing air, eating food or absorption through skin. Once tritium enters the body it disperses quickly and is uniformly distributed throughout the body. Tritium is excreted primarily through urine with a clearance rate characterized by an effective biological half-life of about 14 days. Within one month or so after ingestion essentially all tritium is cleared. Organically bound tritium (tritium that is incorporated in organic compounds) can remain in the body for a longer period.

Tritium is produced naturally in the upper atmosphere when cosmic rays strike air molecules. Tritium is also produced during nuclear weapons explosions, as a by-product in reactors producing electricity and in special production reactors, where the isotopes Lithium-7 (Li-7) and/or Boron-10 (B-10) are activated to produce tritium. Like normal water, tritiated water is colorless and odorless. Tritiated water behaves chemically and physically like non-tritiated water in the subsurface and therefore tritiated water will travel at the same velocity as the average groundwater velocity.

Tritium has a half-life of approximately 12.3 years. It decays spontaneously to Helium-3 (He-3). This radioactive decay releases a beta particle (low-energy electron). The radioactive decay of tritium is the source of the health risk from exposure to tritium. Tritium emits a low energy beta particle and leaves the body relatively quickly. Since tritium is almost always found as water, it goes directly into soft tissues and organs. The associated dose to these tissues is generally uniform and is dependent on the water content of the specific tissue.

III. Program Description

A. Sample Analysis

This section describes the general analytical methodologies used by TBE and GEL Laboratories (GEL) to analyze the environmental samples for radioactivity for the PBAPS RGPP in 2017.

In order to achieve the stated objectives, the current program includes the following analyses:

1. Concentrations of gamma emitters in groundwater and surface water.

2. Concentrations of strontium in groundwater.

3. Concentrations of tritium in groundwater, surface water and precipitation water.

4. Concentrations of 'hard-to-detect' isotopes, Americium-241 (Am-241), Cerium-242/243/244 (Cm-242, Cm-243, Cm-244), Plutonium-238/239/240 (Pu-238, Pu-239, Pu-240), Uranium-233/234/235/238 (U-233, U-234, U-235, U-238), Iron-55 (Fe-55), and Nickel-63 (Ni-63) in groundwater. These analyses are required based on tritium results.

B. Data Interpretation

The radiological data collected prior to PBAPS becoming operational were used as a baseline for operational data comparison. For the purpose of this report, PBAPS was considered operational at initial criticality. Several factors were important in the interpretation of the data:

1. <u>Lower Limit of Detection</u>

   The lower limit of detection (LLD) is a minimum sensitivity value that must be achieved routinely by the analytical parameter.

2. Laboratory Measurements Uncertainty

The estimated uncertainty in measurement of tritium in environmental samples is frequently on the order of 50% of the measurement value.

Statistically, the exact value of a measurement is expressed as a range with a stated level of confidence. The convention is to report results with a 95% level of confidence. The uncertainty comes from factors such as calibration standards, sample volume or weight measurements, and sampling uncertainty. Exelon reports the uncertainty of a measurement created by statistical process (counting error) as well as all sources of error (Total Propagated Uncertainty or TPU). Each result has two values calculated. Exelon reports the TPU by following the result with plus or minus ± the estimated sample standard deviation.

Analytical uncertainties are reported at the 95% confidence level in this report for reporting consistency with the AREOR.

Gamma spectroscopy results for each type of sample were grouped as follows:

> For groundwater and surface water 12 nuclides, Manganese-54 (Mn-54), Colbalt-58/60 (Co-58, Co-60), Iron-59 (Fe-59), Zinc-65 (Zn-65), Niobium-95 (Nb-95), Zirconium-95 (Zr-95), Iodine-131 (I-131), Cesium-134/137 (Cs-134, Cs-137), Barium-140 (Ba-140) and Lanthanum-140 (La-140) are measured.

C. Background Analysis

A pre-operational REMP was conducted to establish background radioactivity levels prior to operation of the Station. The environmental media sampled and analyzed were atmospheric radiation, fall-out, domestic water, surface water, marine life, precipitation, well water, and foodstuffs. The results of the monitoring program were detailed in the PBAPS, Environs Radiation Monitoring Program, Preoperational Summary Reports referenced in Section V.

1. Background Concentrations of Tritium

The purpose of the following discussion is to summarize background measurements of tritium in various media performed by others. Additional detail may be found by consulting references (CRA 2006)[(1)].

a. Tritium Production

Tritium is created in the environment from naturally occurring processes both cosmic and subterranean, as well as from anthropogenic (i.e., man-made) sources. In the upper atmosphere, "Cosmogenic" tritium is produced from the bombardment of stable nuclides and combines with oxygen to form tritiated water, which will then enter the hydrologic cycle. Below ground, "lithogenic" tritium is produced by the bombardment of natural Li present in crystalline rocks by neutrons produced by the radioactive decay of naturally abundant U and Th. Lithogenic production of tritium is usually negligible compared to other sources due to the limited abundance of Li in rock. The lithogenic tritium is introduced directly to groundwater.

A major anthropogenic source of tritium and Sr-90 comes from the former atmospheric testing of thermonuclear weapons. Levels of tritium in precipitation increased significantly during the 1950s and early 1960s and later with additional testing, resulting in the release of significant amounts of tritium to the atmosphere. The Canadian heavy water nuclear power reactors, other commercial power reactors, nuclear research and weapons production continue to influence tritium concentrations in the environment.

b. Precipitation Data

Precipitation samples are routinely collected at stations around the world for the analysis of tritium and other radionuclides. Two publicly available databases that provide tritium concentrations in precipitation are Global Network of Isotopes in Precipitation (GNIP) and USEPA's RadNet database. GNIP provides tritium precipitation concentration data for samples collected worldwide from 1960 to 2006. RadNet provides tritium precipitation concentration data for samples collected at stations throughout the U.S. from 1960 up to and including 2006. Based on GNIP data for sample stations located in the U.S. Midwest, tritium concentrations peaked around 1963. This peak, which approached 10,000 pCi/L for some stations, coincided with the atmospheric testing of thermonuclear weapons. Tritium concentrations in surface water showed a sharp decline until 1975. A gradual decline has followed since that time. Tritium concentrations have typically been below 100 pCi/L since around 1980, but tritium concentrations in wells may still be above the 200 pCi/L detection limit from the external causes described above. Water from previous years and decades is naturally captured in groundwater, so some well water sources today are affected by the surface water from the 1960s that was elevated in tritium.

c. Surface Water Data

Surface water level measurements were collected at the surface water monitoring locations. The purpose of the surface water measurements was to provide surface water elevation data to evaluate the groundwater/surface water interaction at the Station.

The USEPA RadNet surface water data typically has a reported 'Combined Standard Uncertainty' of 35 to 50 pCi/L. According to USEPA, this corresponds to a ± 70 to 100 pCi/L 95% confidence bound on each given measurement. Therefore, the typical background data provided may be subject to measurement uncertainty of approximately ± 70 to 100 pCi/L.

The radio-analytical laboratory is counting tritium results to an Exelon-specified LLD of 200 pCi/L. Typically, the lowest positive measurement will be reported within a range of 40 – 240 pCi/L or 140 ± 100 pCi/L. Clearly, these sample results cannot be distinguished as different from background at this concentration.

IV. Results and Discussion

A. Groundwater Results

Groundwater

Samples were collected from on-site wells throughout the year in accordance with the station radiological groundwater protection program. Analytical results and anomalies are discussed below:

Tritium

Samples from 32 locations were analyzed for tritium activity (Tables B-I.1 and B-II.1, Appendix B). Tritium values ranged from the detection limit to 17,600 pCi/L. Tritium was not detected in wells at or near the owner-controlled boundary. The location most representative of potential offsite user of drinking water is less than the MDC (Table B-I.1, Appendix B).

Low levels of tritium were detected at concentrations greater than the minimum detectable concentration (MDC) in 11 of 30 groundwater monitoring wells and the two yard drain locations. The concentrations ranged from 181 pCi/L to 17,600 pCi/L (Table B–I.1, Appendix B).

No tritium was detected in any surface water samples (Table B–II.1, Appendix B). No tritium was detected in any precipitation water samples (Table B–III.1, Appendix B).

Strontium

Sr-89 and Sr-90 were not detected in any of the samples (Table B-I.1, Appendix B).

Gross Alpha and Gross Beta (dissolved and suspended)

Gross Alpha and Gross Beta analyses in the dissolved and suspended fractions were performed on groundwater samples during 2017.

Gross Alpha (dissolved) was detected in 6 of 20 groundwater locations analyzed. The concentrations ranged from 2.1 to 15.6 pCi/L.

Gross Alpha (suspended) was detected in 1 of 19 groundwater locations analyzed with a concentration of 3.5 pCi/L.

Gross Beta (dissolved) was detected in 20 of 20 groundwater locations analyzed. The concentrations ranged from 2.3 to 15.4 pCi/L.

Gross Beta (suspended) was not detected in any of the 19 groundwater locations analyzed.

The activity detected is consistent with historical levels. The activity detected is naturally occurring and the levels are considered to be background (Table B-I.1, Appendix B).

Hard-To-Detect

Hard-To-Detect analyses were performed on a select group of groundwater water locations to establish baseline levels. The analyses for groundwater included Fe-55, Ni-63, Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-234, U-235 and U-238. Only the isotopes listed below were identified.

U-234 was detected in 3 of 6 groundwater monitoring locations analyzed. The concentrations ranged from 0.61 to 5.64 pCi/L. .

U-235 was detected in 2 of 6 groundwater monitoring locations analyzed. The concentrations ranged from 0.54 to 0.55 pCi/L.

U-238 was detected in 3 of 6 groundwater monitoring locations analyzed. The concentrations ranged from 0.29 to 2.58 pCi/L.

No plant-produced radionuclides were detected. The activity detected is naturally occurring and the levels are considered to be background (Table B–I.3, Appendix B).

Gamma Emitters

No power-production gamma emitters were detected in any of the samples (Table B–I.2, Appendix B).

B. Surface Water Results

Surface Water

Samples were collected from surface water locations throughout the year in accordance with the station radiological groundwater protection program. Analytical results are discussed below.

Tritium

Samples from three locations were analyzed for tritium activity. Tritium was not detected in any samples (Table B–II.1, Appendix B).

Gamma Emitters

No power-production gamma emitters were detected in any of the samples. No other gamma emitting nuclides were detected (Table B–II.2, Appendix B).

C. Precipitation Water Results

Samples were collected at six locations (1A, 1B, 1S, 1SSE, 1Z, and 4M) in accordance with the station radiological groundwater protection program. The following analysis was performed:

Tritium

Samples from six locations were analyzed for tritium activity. Tritium activity was not detected in any samples (Table B-III.1, Appendix B).

D. Drinking Water Well Survey

A drinking water well survey was conducted during the summer 2006 by CRA (CRA 2006)[1] around PBAPS. The water well inventory was updated in 2012[4]. The updated water well database search indicated a new water well off Station property within a one mile radius of the Station. The well is described as a "test" well and its use is listed as "unused". In summary, there were no significant changes in off Station groundwater use from 2006-2012.

E. Summary of Results – Inter-Laboratory Comparison Program

Inter-Laboratory Comparison Program results for TBE and Environmental Inc. (Midwest Labs) are presented in the AREOR.

F. Leaks, Spills and Releases

There were no inadvertent leaks, spills or releases of water containing licensed material to the environment in 2017.

G. Trends

A tritium plume has been identified northeast of the Unit 3 Turbine Building. The plume extends eastward toward well MW-PB-4. The plume is bounded on the north by wells MW-PB-12 and MW-PB-22 and bounded on the south by wells MW-PB-20 and MW-PB-21.

The tritium plume is a result of licensed material entering the groundwater through degraded floor seams and penetration seals in the Unit 3 Turbine Building. The activity currently detected in the Unit 3 Turbine Building monitoring wells, MW-PB-24, 25, 26 and 27, is the result of legacy licensed material under the turbine building being transported eastward by natural hydrogeologic groundwater flow.

to quarterly. Below are 3 tables. The first lists the highest tritium activity of the wells of primary interest and the date of the sampling. The second table lists the highest tritium activity of the wells during 2017. The third table lists the activity of the wells from the last sampling of 2017. The tritium activity is in pCi/L.

Well #	Tritium Activity	Date
MW-PB-24	33,500	3/15/2010
MW-PB-25	161,000	3/8/2010
MW-PB-26	196,000	3/8/2010
MW-PB-27	71,800	2/22/2010

Well #	Tritium Activity	Date
MW-PB-24	2,250	4/3/2017
MW-PB-25	17,600	2/27/2017
MW-PB-26	418	3/20/2017
MW-PB-27	942	4/3/2017

Well #	Tritium Activity	Date
MW-PB-24	510	12/21/2017
MW-PB-25	12,800	12/21/2017
MW-PB-26	237	12/21/2017
MW-PB-27	467	12/21/2017

Potential sources of tritium in the groundwater are investigated via procedural processes and documented in the corrective action program. The most likely pathway for tritium to enter the groundwater has been determined to be leaks internal to the Unit 3 Turbine Building Moisture Separator 116', migrating through degraded floor seams or other unidentified openings in the floor.

I. Actions Taken

1. The Unit 3 Condensate storage tank moat, sump and valve pit were cleaned and recoated to eliminate a potential pathway for licensed material to enter the groundwater. These activities were completed under work order 04602739 on 3/15/17 and work request 01339203 on 4/11/17.

2. During P3R21, the Unit 3 Recombiner Jet Compressor room floor drains were found plugged. One plug was removed and the second plug was modified to allow water to drain to the radwaste system in the event of a licensed material leak. This was completed under work request 01369404 on 11/6/17.

3. Installation of Monitoring Wells

   No groundwater monitoring wells were installed in 2017.

4. Actions to Recover/Reverse Plumes

   There were no actions to recover the plume.

J. Deviations

The data tables show that duplicate samples were obtained at several wells during 2017. These duplicate samples were obtained and analyzed for quality control purposes.

Due to regional drought conditions, seep SP-PB-3, located west of the Low Level RadWaste Storage Facility was dry during the 4th quarter of 2017. No sample was obtained or analyzed.

V. References

1. Conestoga Rovers and Associates, Fleetwide Assessment, Peach Bottom Atomic Power Station, Delta, PA, Fleetwide Assessment, Rev. 1, September 1, 2006.

2. Peach Bottom Atomic Power Station, Environs Radiation Monitoring Program, Preoperational Summary Report Units 2 and 3, June 1977.

3. Peach Bottom Atomic Power Station, Environs Radiation Monitoring Program, Preoperational Summary Report Units 2 and 3, September 1970-August 1973, January 1974.

4. Conestoga Rovers and Associates, Hydrogeologic Investigation Report, Peach Bottom Atomic Power Station, November 2012.

5. AMO Environmental Decisions, 2017 RGPP Summary Monitoring Reports, April 2017, August 2017, October 2017 and February 2017.

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1. Conestoga Rovers and Associates, Fleetwide Assessment, Peach Bottom Atomic Power Station, Delta, PA, Fleetwide Assessment, Rev. 1, September 1, 2006.

2. Peach Bottom Atomic Power Station, Environs Radiation Monitoring Program, Preoperational Summary Report Units 2 and 3, June 1977.

3. Peach Bottom Atomic Power Station, Environs Radiation Monitoring Program, Preoperational Summary Report Units 2 and 3, September 1970-August 1973, January 1974.

4. Conestoga Rovers and Associates, Hydrogeologic Investigation Report, Peach Bottom Atomic Power Station, November 2012.

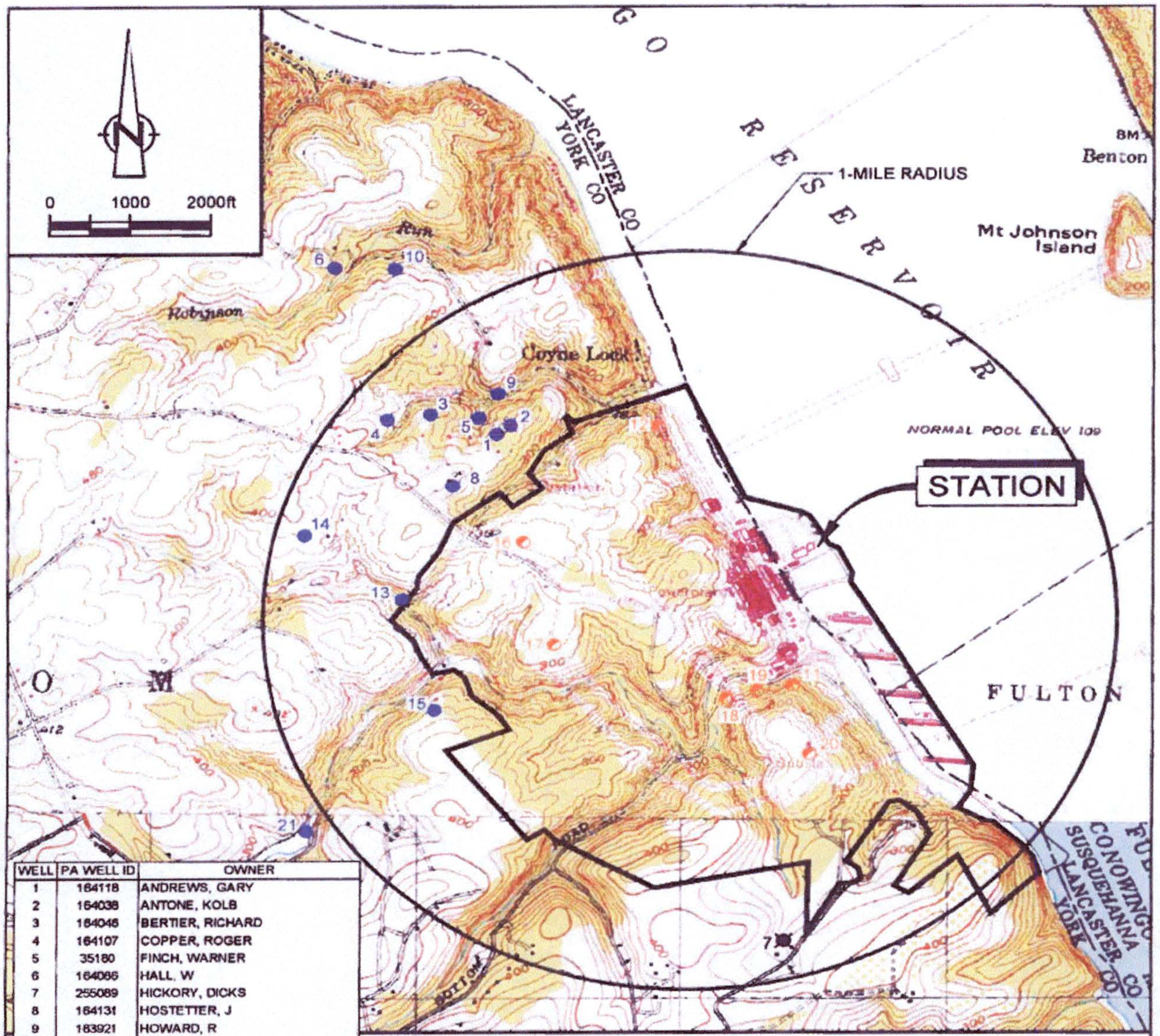
5. AMO Environmental Decisions, 2017 RGPP Summary Monitoring Reports, April 2017, August 2017, October 2017 and February 2017.

APPENDIX A

SAMPLING LOCATIONS, DISTANCE AND DIRECTION

TABLE A-1: Radiological Groundwater Protection Program - Sampling Locations, Distance and Direction, Peach Bottom Atomic Power Station, 2017

Site	Site Type	Sector	Distance (ft.)
MW-PB-1	Groundwater Well	SW	1,166.6
MW-PB-2	Groundwater Well	WNW	309.0
MW-PB-3	Groundwater Well	SSE	709.7
MW-PB-4	Groundwater Well	ENE	350.2
MW-PB-5	Groundwater Well	NNW	1,146.1
MW-PB-6	Groundwater Well	NE	1,072.4
MW-PB-7	Groundwater Well	SE	813.9
MW-PB-8	Groundwater Well	SE	1,167.0
MW-PB-9	Groundwater Well	SE	2,816.9
MW-PB-10	Groundwater Well	SSE	1,125.1
MW-PB-11	Groundwater Well	SE	438.4
MW-PB-12	Groundwater Well	NNE	317.2
MW-PB-13	Groundwater Well	NW	329.4
MW-PB-14	Groundwater Well	S	1,231.2
MW-PB-15	Groundwater Well	SE	1,087.9
MW-PB-16	Groundwater Well	SE	1,101.6
MW-PB-17	Groundwater Well	SE	1,005.4
MW-PB-18	Groundwater Well	SE	1,010.0
MW-PB-19	Groundwater Well	NW	226.8
MW-PB-20	Groundwater Well	E	260.5
MW-PB-21	Groundwater Well	E	363.3
MW-PB-22	Groundwater Well	NE	315.4
MW-PB-24	Groundwater Well	N	185.9
MW-PB-25	Groundwater Well	N	159.7
MW-PB-26	Groundwater Well	NNE	121.1
MW-PB-27	Groundwater Well	NNE	139.1
MW-PB-28	Groundwater Well	NW	249.6
MW-PB-29	Groundwater Well	SE	325.0
MW-PB-30	Groundwater Well	SE	379.2
MW-PB-31	Groundwater Well	SE	450.1
SW-PB-1	Surface Water	NNW	2,850.5
SW-PB-5	Surface Water	SE	675.1
SW-PB-6	Surface Water	SE	1,305.9
SP-PB-1	Groundwater Seep	S	514.2
SP-PB-2	Groundwater Seep	WNW	311.6
SP-PB-3	Groundwater Seep	NNW	1,281.1
U/2 YARD DRAIN SUMP	Groundwater	SSE	498.7
U/3 YARD DRAIN SUMP	Groundwater	WSW	175.8
1A	Precipitation Water	ESE	1,271
1B	Precipitation Water	NW	2,587
1S	Precipitation Water	S	1,315
1SSE	Precipitation Water	SSE	1,312
1Z	Precipitation Water	SE	1,763
4M	Precipitation Water	SE	45,989



WELL	PA WELL ID	OWNER
1	164118	ANDREWS, GARY
2	164038	ANTONE, KOLB
3	164046	BERTIER, RICHARD
4	164107	COPPER, ROGER
5	35180	FINCH, WARNER
6	164066	HALL, W
7	255089	HICKORY, DICKS
8	164131	HOSTETTER, J
9	163921	HOWARD, R
10	163920	KOSER, D
11*	34279	EXELON - INFORMATION CENTER
12	164028	EXELON HAZMAT YARD
13	163968	ROBINSON, D
14	34295	ROBINSON, DALE
15	164053	STOLTEFUS, STEVEN
16	-	EXELON - NORTH SUBSTATION
17	-	EXELON - SALT WASHDOWN
18*	-	EXELON - PUB BUILDING
19*	-	EXELON - INFORMATION CENTER
20	-	EXELON - SOUTH SUBSTATION
21	483663	STOLTZFUS

LEGEND

PROPERTY BOUNDARY

● # ALL LOCATIONS APPROXIMATE (NOT FIELD VERIFIED)

7 IDENTIFIED ON 2006 SEARCH, NOT IDENTIFIED ON 2012 SEARCH

* ABANDONED

16 EXELON SUPPLY WELL (NON-POTABLE)

SOURCE: USGS QUADRANGLE MAPS,
HOLTWOOD, PA - 1996
WAKEFIELD, PA - 1996
DELTA, MD - 1996
CONOWINGO DAM, MD - 1996

WATER WELL LOCATIONS
PEACH BOTTOM ATOMIC POWER STATION
EXELON GENERATION COMPANY, LLC
Delta, Pennsylvania

Exelon.

CRA

53539-12(005)GN-WA008 NOV 6/2012

Figure A-1
Well Water Locations, Peach Bottom Atomic Power Station, 2017

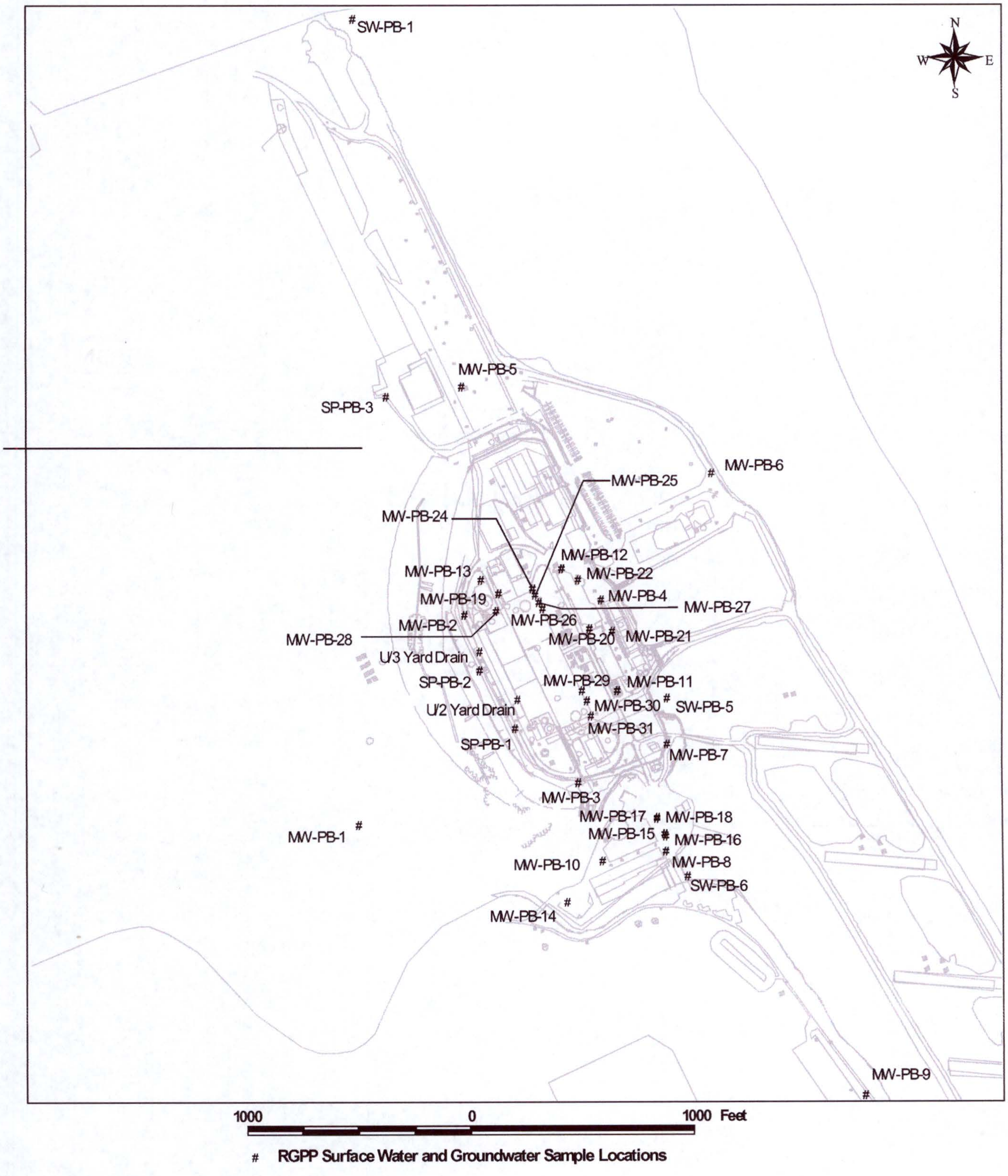


Figure A-2
RGPP Monitoring Locations, Peach Bottom Atomic Power Station, 2017

APPENDIX B

DATA TABLES

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TABLE B-I.1

CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA AND GROSS BETA IN GROUNDWATER AND SEEP SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE		H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
MW-PB-1	05/10/17	TBE	< 183						
MW-PB-1	05/10/17	TBE	< 187						
MW-PB-1	05/10/17	GEL	< 115	< 0.7	< 0.7	< 2.5 (1)		4.1 ± 2.3 (1)	
MW-PB-2	01/18/17		< 115						
MW-PB-2	02/17/17		< 181						
MW-PB-2	05/09/17		< 197	< 5.1	< 0.8	3.6 ± 0.9	< 0.8	6.0 ± 0.8	< 1.4
MW-PB-2	08/14/17		< 176						
MW-PB-2	12/11/17		< 181						
MW-PB-3	01/18/17	TBE	< 195						
MW-PB-3	01/18/17	TBE	< 180						
MW-PB-3	01/18/17	GEL	< 144						
MW-PB-3	05/09/17		< 193	< 6.8	< 0.9	< 1.1	< 0.8	5.8 ± 1.0	< 1.4
MW-PB-3	08/14/17		< 177						
MW-PB-3	12/11/17		< 180						
MW-PB-3	12/11/17	TBE	< 188						
MW-PB-3	12/11/17	TBE	< 183						
MW-PB-3	12/11/17	GEL	< 137						
MW-PB-4	01/19/17		201 ± 128						
MW-PB-4	05/09/17		< 195						
MW-PB-4	08/14/17	TBE	< 179						
MW-PB-4	08/14/17	TBE	< 176						
MW-PB-4	08/14/17	GEL	138 ± 81						
MW-PB-4	12/12/17		< 179						
MW-PB-5	05/10/17		< 194						
MW-PB-6	05/10/17		< 195						
MW-PB-7	01/19/17		< 193						
MW-PB-7	05/10/17	TBE	< 196	< 8.2	< 0.8	< 1.5	< 0.8	7.3 ± 1.2	< 1.4
MW-PB-7	05/10/17	TBE	< 192	< 4.3	< 0.5	< 1.5	< 0.8	7.5 ± 1.2	< 1.4
MW-PB-7	05/10/17	GEL	< 145	< 0.6	< 0.7	< 3.5 (1)		4.6 ± 1.5 (1)	
MW-PB-7	08/15/17		< 176						
MW-PB-7	12/12/17		< 183						
MW-PB-8	01/19/17		< 194						
MW-PB-8	05/10/17		< 195	< 5.5	< 0.5	< 1.7	< 0.8	15.4 ± 1.5	< 1.4
MW-PB-8	08/15/17		< 175						
MW-PB-8	12/12/17		< 183						
MW-PB-10	01/19/17		< 193						
MW-PB-10	05/10/17		< 196	< 5.4	< 0.8	< 4.2	< 2.0	8.7 ± 3.7	< 3.7
MW-PB-10	08/16/17		< 172						
MW-PB-10	12/12/17		< 187						
MW-PB-11	01/18/17		< 193						
MW-PB-12	01/19/17		< 193						
MW-PB-12	05/09/17		< 193						
MW-PB-12	08/14/17		< 172						
MW-PB-12	12/12/17		< 183						
MW-PB-13	01/18/17		214 ± 129						
MW-PB-13	02/17/17		230 ± 122						
MW-PB-13	05/09/17		< 197	< 4.0	< 0.7	15.6 ± 5.8	< 1.8	18.8 ± 4.8	< 3.3
MW-PB-13	08/14/17		205 ± 114						
MW-PB-13	12/11/17		192 ± 119						
MW-PB-14	05/10/17		< 196						
MW-PB-15	01/19/17		< 192						
MW-PB-15	05/10/17		< 198	< 5.1	< 0.6	< 1.2	< 0.8	8.0 ± 1.2	< 1.4
MW-PB-15	08/16/17		< 174						
MW-PB-15	12/12/17		< 181						

(1) Reported values are TOTAL (not Dissolved)

TABLE B-I.1 CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA AND GROSS BETA IN GROUNDWATER AND SEEP SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE		H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
MW-PB-16	01/19/17		< 189						
MW-PB-16	05/10/17		< 183	< 7.7	< 0.9	4.0 ± 1.1	3.5 ± 1.1	11.9 ± 1.2	< 1.5
MW-PB-16	08/16/17		< 172						
MW-PB-16	12/12/17		< 183						
MW-PB-19	01/18/17		< 193						
MW-PB-19	02/17/17		< 180						
MW-PB-19	05/09/17		< 180	< 9.7	< 0.9	< 0.7	< 0.5	2.3 ± 0.7	< 1.5
MW-PB-19	08/14/17		< 171						
MW-PB-19	12/11/17		< 179						
MW-PB-20	01/18/17		< 192						
MW-PB-20	05/09/17		< 192						
MW-PB-20	08/14/17		< 170						
MW-PB-20	12/12/17		< 181						
MW-PB-21	01/19/17		< 189						
MW-PB-21	05/09/17		< 180						
MW-PB-21	09/11/17		< 177						
MW-PB-21	12/12/17		181 ± 119						
MW-PB-22	01/19/17		322 ± 135						
MW-PB-22	05/09/17		220 ± 122						
MW-PB-22	08/14/17		379 ± 122						
MW-PB-22	12/12/17		663 ± 140						
MW-PB-24	01/18/17		260 ± 132						
MW-PB-24	02/17/17		257 ± 125						
MW-PB-24	02/21/17		355 ± 137						
MW-PB-24	02/27/17		298 ± 134						
MW-PB-24	03/06/17		650 ± 149						
MW-PB-24	03/06/17	*Recount*	815 ± 155						
MW-PB-24	03/06/17	*Reanalysis*	757 ± 152						
MW-PB-24	03/13/17		735 ± 154						
MW-PB-24	03/27/17		504 ± 138						
MW-PB-24	04/03/17		2250 ± 284						
MW-PB-24	04/12/17		1680 ± 232						
MW-PB-24	04/17/17		1660 ± 232						
MW-PB-24	04/24/17		922 ± 171						
MW-PB-24	05/09/17		1840 ± 248	< 9.2	< 1.0	< 1.2	< 0.5	3.3 ± 1.0	< 1.5
MW-PB-24	06/15/17		1540 ± 218						
MW-PB-24	07/11/17		1490 ± 218						
MW-PB-24	08/15/17		1490 ± 214						
MW-PB-24	09/11/17		1850 ± 246						
MW-PB-24	12/12/17		284 ± 127						
MW-PB-24	12/21/17		510 ± 140						
MW-PB-25	01/18/17	TBE	8540 ± 903						
MW-PB-25	01/18/17	TBE	6610 ± 714						
MW-PB-25	01/18/17	GEL	9100 ± 415						
MW-PB-25	02/02/17		5400 ± 584						
MW-PB-25	02/17/17		16300 ± 1680						
MW-PB-25	02/21/17		10800 ± 1130						
MW-PB-25	02/27/17		17600 ± 1810						
MW-PB-25	03/06/17		10900 ± 1140						
MW-PB-25	03/13/17		13500 ± 1400						
MW-PB-25	03/20/17		4800 ± 533						
MW-PB-25	03/27/17		6070 ± 668						
MW-PB-25	04/03/17		4420 ± 496						
MW-PB-25	04/12/17		6400 ± 692						
MW-PB-25	04/17/17		6210 ± 674						
MW-PB-25	04/24/17		7760 ± 835						
MW-PB-25	05/09/17		5810 ± 633	< 5.8	< 0.7	< 0.8	< 0.5	8.5 ± 1.0	< 1.5
MW-PB-25	06/15/17		5130 ± 569						
MW-PB-25	07/11/17		4950 ± 554						

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA AND GROSS BETA IN GROUNDWATER AND SEEP SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, PEACH BOTTOM ATOMIC POWER STATION, 2017**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE		H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
MW-PB-25	08/15/17	TBE	5240 ± 577						
MW-PB-25	08/15/17	TBE	6610 ± 715						
MW-PB-25	08/15/17	GEL	6230 ± 273						
MW-PB-25	09/11/17		4860 ± 539						
MW-PB-25	12/12/17		13900 ± 1440						
MW-PB-25	12/12/17	*Recount*	13800 ± 1430						
MW-PB-25	12/12/17	*Reanalysis*	12700 ± 1320						
MW-PB-25	12/21/17		12800 ± 1330						
MW-PB-26	01/18/17		239 ± 129						
MW-PB-26	02/21/17		< 193						
MW-PB-26	02/27/17		245 ± 130						
MW-PB-26	03/06/17		252 ± 126						
MW-PB-26	03/13/17		256 ± 130						
MW-PB-26	03/20/17		418 ± 137						
MW-PB-26	03/27/17		272 ± 127						
MW-PB-26	04/03/17		217 ± 127						
MW-PB-26	04/12/17		319 ± 133						
MW-PB-26	04/17/17		333 ± 136						
MW-PB-26	04/24/17		< 191						
MW-PB-26	05/09/17		< 193	< 3.9	< 0.8	2.7 ± 1.0	< 0.5	5.1 ± 0.9	< 1.5
MW-PB-26	06/15/17		< 195						
MW-PB-26	07/11/17		201 ± 122						
MW-PB-26	08/15/17		267 ± 122						
MW-PB-26	09/11/17		< 176						
MW-PB-26	12/12/17		189 ± 124						
MW-PB-26	12/21/17		237 ± 126						
MW-PB-27	01/18/17		816 ± 157						
MW-PB-27	02/21/17		476 ± 144						
MW-PB-27	02/27/17		533 ± 144						
MW-PB-27	03/06/17		482 ± 138						
MW-PB-27	03/13/17		563 ± 145						
MW-PB-27	03/20/17		730 ± 153						
MW-PB-27	03/27/17		890 ± 164						
MW-PB-27	04/03/17		942 ± 163						
MW-PB-27	04/12/17		596 ± 145						
MW-PB-27	04/17/17		773 ± 155						
MW-PB-27	04/24/17		847 ± 163						
MW-PB-27	05/09/17	TBE	676 ± 152	< 4.3	< 0.7	2.3 ± 0.9	< 0.5	5.1 ± 1.0	< 1.5
MW-PB-27	05/09/17	TBE	560 ± 147	< 4.6	< 0.7	2.1 ± 0.9	< 0.5	4.5 ± 0.9	< 1.5
MW-PB-27	05/09/17	GEL	603 ± 129	< 1.4	< 0.8	6.3 ± 1.7 (1)		3.7 ± 0.7 (1)	
MW-PB-27	06/15/17		608 ± 149						
MW-PB-27	07/11/17		758 ± 152						
MW-PB-27	08/15/17		621 ± 141						
MW-PB-27	09/11/17		610 ± 140						
MW-PB-27	12/12/17		504 ± 137						
MW-PB-27	12/21/17		467 ± 137						
MW-PB-28	01/18/17		< 193						
MW-PB-28	02/17/17		< 179						
MW-PB-28	05/09/17		< 185	< 5.1	< 0.8	< 0.8	< 0.9	3.4 ± 0.8	< 1.6
MW-PB-28	08/14/17		< 169						
MW-PB-28	12/11/17	TBE	< 184						
MW-PB-28	12/11/17	TBE	190 ± 119						
MW-PB-28	12/11/17	GEL	< 139						
MW-PB-28	12/12/17		< 183						

(1) Reported values are TOTAL (not Dissolved)

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA AND GROSS BETA IN GROUNDWATER AND SEEP SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, PEACH BOTTOM ATOMIC POWER STATION, 2017**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE		H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
MW-PB-29	01/18/17		476 ± 142						
MW-PB-29	02/02/17		287 ± 124						
MW-PB-29	04/11/17		341 ± 132						
MW-PB-29	05/09/17		285 ± 128	< 6.4	< 0.8	< 0.6	< 0.8	2.7 ± 0.7	< 1.6
MW-PB-29	08/15/17		310 ± 120						
MW-PB-29	09/12/17		< 189						
MW-PB-29	10/06/17		594 ± 142						
MW-PB-29	10/06/17	*Recount*	446 ± 132						
MW-PB-29	10/06/17	*Reanalysis*	427 ± 127						
MW-PB-29	12/11/17		318 ± 127						
MW-PB-30	01/18/17	TBE	1350 ± 200						
MW-PB-30	01/18/17	TBE	1440 ± 209						
MW-PB-30	01/18/17	GEL	1480 ± 184						
MW-PB-30	02/02/17		1050 ± 162						
MW-PB-30	04/11/17		920 ± 161						
MW-PB-30	05/09/17		338 ± 130	< 5.4	< 0.7	< 0.6	< 0.9	2.4 ± 0.7	< 1.6
MW-PB-30	08/15/17	TBE	2510 ± 303						
MW-PB-30	08/15/17	TBE	2720 ± 325						
MW-PB-30	08/15/17	GEL	2600 ± 185						
MW-PB-30	09/12/17		2390 ± 300						
MW-PB-30	10/06/17		1700 ± 237						
MW-PB-30	12/11/17		448 ± 134						
MW-PB-31	01/19/17		< 191						
MW-PB-31	05/09/17		< 184	< 6.1	< 0.7	< 0.9	< 0.9	2.3 ± 0.8	< 1.6
MW-PB-31	08/14/17		< 171						
MW-PB-31	09/12/17		< 184						
MW-PB-31	10/06/17		< 186						
MW-PB-31	12/11/17		< 183						
U/2 YARD DRAIN	01/20/17		242 + 129						
U/2 YARD DRAIN	02/17/17		205 + 123						
U/2 YARD DRAIN	04/19/17		< 189	< 4.0	< 0.4	< 0.8	< 0.7	2.8 ± 0.8	< 1.5
U/2 YARD DRAIN	07/20/17		< 169						
U/2 YARD DRAIN	10/16/17		< 187						
U/3 YARD DRAIN	01/20/17		1150 + 180						
U/3 YARD DRAIN	02/16/17		1020 + 165						
U/3 YARD DRAIN	02/21/17		631 ± 153						
U/3 YARD DRAIN	02/27/17		731 ± 153						
U/3 YARD DRAIN	03/06/17		516 ± 142						
U/3 YARD DRAIN	03/13/17		564 ± 146						
U/3 YARD DRAIN	03/20/17		529 ± 144						
U/3 YARD DRAIN	03/27/17		391 ± 133						
U/3 YARD DRAIN	04/03/17		463 ± 138						
U/3 YARD DRAIN	04/11/17		335 ± 135						
U/3 YARD DRAIN	04/17/17		348 ± 139						
U/3 YARD DRAIN	05/10/17		203 ± 130	< 4.7	< 0.7	< 1.1	< 1.4	3.7 ± 1.1	< 2.7
U/3 YARD DRAIN	09/11/17		< 175						
U/3 YARD DRAIN	12/11/17		195 + 124						
U/3 CST E RECAPTURE	02/27/17		< 194						
U/3 CST S RECAPTURE	02/27/17		< 191						
U/3 MOAT SUMP	02/17/17		8180 + 865						

TABLE B-I.2 **CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER AND SEEP WATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, PEACH BOTTOM ATOMIC POWER STATION, 2017**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE		Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
MW-PB-1	05/10/17	TBE	< 3	< 4	< 8	< 3	< 7	< 3	< 6	< 10	< 4	< 3	< 20	< 8
MW-PB-1	05/10/17	TBE	< 3	< 4	< 9	< 4	< 8	< 5	< 7	< 13	< 4	< 4	< 27	< 8
MW-PB-1	05/10/17	GEL	< 1	< 1	< 3	< 2	< 3	< 2	< 3	< 5	< 2	< 2	< 10	< 3
MW-PB-2	05/09/17		< 3	< 4	< 9	< 4	< 7	< 4	< 8	< 14	< 4	< 4	< 28	< 9
MW-PB-3	05/09/17		< 4	< 5	< 11	< 5	< 10	< 6	< 9	< 15	< 5	< 5	< 32	< 13
MW-PB-4	05/09/17		< 4	< 4	< 10	< 4	< 9	< 5	< 8	< 14	< 4	< 4	< 31	< 8
MW-PB-5	05/10/17		< 4	< 5	< 11	< 4	< 8	< 5	< 9	< 13	< 4	< 5	< 32	< 13
MW-PB-6	05/10/17		< 4	< 4	< 10	< 4	< 11	< 5	< 9	< 15	< 5	< 5	< 32	< 12
MW-PB-7	05/10/17		< 5	< 5	< 10	< 4	< 9	< 4	< 9	< 14	< 4	< 5	< 32	< 12
MW-PB-7	05/10/17		< 4	< 4	< 9	< 4	< 8	< 4	< 6	< 12	< 4	< 4	< 25	< 8
MW-PB-7	05/10/17	GEL	< 1	< 1	< 3	< 1	< 3	< 1	< 3	< 5	< 1	< 2	< 10	< 4
MW-PB-8	01/19/17		< 5	< 5	< 11	< 5	< 11	< 6	< 8	< 15	< 5	< 5	< 31	< 11
MW-PB-8	05/10/17		< 4	< 5	< 9	< 3	< 8	< 5	< 8	< 15	< 4	< 4	< 29	< 8
MW-PB-8	08/15/17		< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 14	< 2	< 2	< 24	< 7
MW-PB-8	12/12/17		< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 11	< 2	< 2	< 19	< 6
MW-PB-10	01/19/17		< 3	< 4	< 8	< 3	< 7	< 4	< 7	< 10	< 4	< 4	< 23	< 7
MW-PB-10	05/10/17		< 4	< 4	< 8	< 4	< 10	< 5	< 8	< 15	< 4	< 4	< 31	< 8
MW-PB-10	08/16/17		< 2	< 2	< 6	< 2	< 5	< 3	< 5	< 13	< 2	< 2	< 23	< 8
MW-PB-10	12/12/17		< 2	< 3	< 6	< 3	< 5	< 3	< 5	< 14	< 3	< 3	< 25	< 8
MW-PB-12	05/09/17		< 3	< 5	< 10	< 5	< 10	< 5	< 8	< 15	< 5	< 5	< 31	< 12
MW-PB-13	05/09/17		< 4	< 4	< 11	< 4	< 8	< 5	< 8	< 15	< 5	< 5	< 28	< 12
MW-PB-14	05/10/17		< 4	< 4	< 9	< 4	< 8	< 4	< 8	< 15	< 5	< 4	< 29	< 9
MW-PB-15	01/19/17		< 2	< 3	< 7	< 3	< 6	< 3	< 6	< 8	< 2	< 3	< 20	< 6
MW-PB-15	05/10/17		< 3	< 5	< 10	< 4	< 7	< 4	< 8	< 14	< 5	< 4	< 30	< 8
MW-PB-15	08/16/17		< 2	< 2	< 6	< 2	< 4	< 3	< 5	< 14	< 2	< 2	< 24	< 7
MW-PB-15	12/12/17		< 2	< 2	< 5	< 2	< 5	< 3	< 4	< 12	< 2	< 2	< 21	< 7
MW-PB-16	01/19/17		< 3	< 3	< 7	< 3	< 6	< 3	< 6	< 8	< 3	< 3	< 19	< 6
MW-PB-16	05/10/17		< 3	< 4	< 10	< 3	< 9	< 5	< 7	< 14	< 5	< 4	< 33	< 11
MW-PB-16	08/16/17		< 2	< 3	< 5	< 2	< 5	< 3	< 5	< 15	< 3	< 2	< 25	< 7
MW-PB-16	12/12/17		< 2	< 3	< 6	< 3	< 5	< 3	< 5	< 15	< 3	< 2	< 25	< 8
MW-PB-19	05/09/17		< 2	< 3	< 5	< 3	< 4	< 3	< 4	< 9	< 3	< 3	< 18	< 6
MW-PB-20	05/09/17		< 2	< 2	< 4	< 2	< 4	< 3	< 4	< 9	< 2	< 2	< 17	< 5
MW-PB-21	05/09/17		< 3	< 3	< 8	< 3	< 6	< 4	< 6	< 14	< 4	< 3	< 28	< 7
MW-PB-22	05/09/17		< 2	< 3	< 6	< 3	< 5	< 3	< 5	< 11	< 3	< 3	< 23	< 7
MW-PB-24	05/09/17		< 3	< 4	< 9	< 4	< 7	< 4	< 7	< 13	< 4	< 4	< 27	< 10
MW-PB-24	12/12/17		< 2	< 2	< 6	< 2	< 4	< 3	< 4	< 13	< 2	< 2	< 22	< 7
MW-PB-25	05/09/17		< 3	< 3	< 7	< 3	< 5	< 3	< 6	< 12	< 3	< 3	< 24	< 7
MW-PB-25	12/12/17		< 2	< 3	< 6	< 2	< 5	< 3	< 5	< 14	< 3	< 2	< 25	< 8
MW-PB-26	05/09/17		< 3	< 3	< 6	< 3	< 5	< 3	< 5	< 10	< 3	< 3	< 23	< 7
MW-PB-26	12/12/17		< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 11	< 2	< 2	< 20	< 8

TABLE B-I.2 **CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER AND SEEP WATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, PEACH BOTTOM ATOMIC POWER STATION, 2017**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
MW-PB-27	05/09/17	< 2	< 3	< 6	< 2	< 4	< 3	< 4	< 8	< 3	< 2	< 17	< 5
MW-PB-27	05/09/17	< 3	< 3	< 8	< 3	< 6	< 4	< 6	< 10	< 4	< 3	< 21	< 7
MW-PB-27	05/09/17 GEL	< 1	< 1	< 3	< 2	< 3	< 1	< 2	< 4	< 1	< 1	< 10	< 3
MW-PB-27	12/12/17	< 2	< 3	< 6	< 2	< 5	< 3	< 4	< 11	< 2	< 2	< 23	< 9
MW-PB-28	05/09/17	< 3	< 3	< 6	< 3	< 5	< 3	< 5	< 9	< 3	< 3	< 21	< 7
MW-PB-29	05/09/17	< 4	< 4	< 9	< 4	< 8	< 5	< 7	< 11	< 4	< 4	< 26	< 10
MW-PB-30	05/09/17	< 3	< 4	< 8	< 4	< 6	< 4	< 6	< 12	< 4	< 3	< 23	< 8
MW-PB-31	05/09/17	< 3	< 4	< 7	< 3	< 7	< 4	< 6	< 15	< 4	< 3	< 28	< 8
U/2 YARD DRAIN	04/19/17	< 5	< 5	< 11	< 5	< 10	< 7	< 10	< 11	< 5	< 6	< 29	< 8
U/3 YARD DRAIN	05/10/17	< 4	< 4	< 10	< 4	< 9	< 4	< 8	< 11	< 4	< 4	< 25	< 10

TABLE B-I.3

CONCENTRATIONS OF HARD-TO-DETECTS IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE		Am-241	Cm-242	Cm-243/244	Pu-238	Pu-239/240	U-234 *	U-235*	U-238	Fe-55	Ni-63
MW-PB-1	05/10/17	GEL	< 0.28	< 0.36	< 0.28	< 0.52	< 0.52	< 0.51	0.55 ± 0.50	< 0.57	< 68	< 3.7
MW-PB-7	05/10/17	GEL	< 0.45	< 0.30	< 0.35	< 0.59	< 0.59	< 0.48	< 0.54	< 0.58	< 67	< 3.2
MW-PB-24	05/09/17		< 0.16	< 0.07	< 0.12	< 0.06	< 0.10	< 0.12	< 0.15	< 0.12	< 169	< 3.9
MW-PB-25	05/09/17		< 0.09	< 0.10	< 0.05	< 0.08	< 0.14	0.61 ± 0.21	< 0.10	0.29 ± 0.15	< 189	< 4.1
MW-PB-26	05/09/17		< 0.05	< 0.07	< 0.15	< 0.04	< 0.11	5.40 ± 1.51	< 0.12	1.48 ± 0.70	< 124	< 4.0
MW-PB-27	05/09/17	TBE	< 0.05	< 0.05	< 0.19	< 0.04	< 0.13	5.08 ± 1.33	< 0.11	1.23 ± 0.59	< 149	< 3.9
MW-PB-27	05/09/17	TBE	< 0.07	< 0.05	< 0.13	< 0.07	< 0.18	5.64 ± 1.67	< 0.13	2.58 ± 1.04	< 164	< 3.9
MW-PB-27	05/09/17	GEL	< 0.39	< 0.27	< 0.24	< 0.47	< 0.80	4.48 ± 1.10	0.54 ± 0.47	1.69 ± 0.69	< 67	< 3.8

*GEL Labs reports U-234 as U-234/235 and U-235 as U-235/236

TABLE B-II.1 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE		COLLECTION DATE	H-3
SW-PB-1		01/19/17	< 188
SW-PB-1		05/10/17	< 187
SW-PB-1		08/16/17	< 171
SW-PB-1		12/12/17	< 189
SW-PB-5		01/19/17	< 191
SW-PB-5		05/10/17	< 185
SW-PB-5		08/15/17	< 172
SW-PB-5		12/11/17	< 179
SW-PB-5	TBE	12/12/17	< 181
SW-PB-5	TBE	12/12/17	< 190
SW-PB-5	GEL	12/12/17	< 135
SW-PB-6	TBE	01/18/17	< 188
SW-PB-6	TBE	01/18/17	< 194
SW-PB-6	GEL	01/18/17	< 149
SW-PB-6		05/10/17	< 185
SW-PB-6		08/15/17	< 170
SW-PB-6		12/12/17	< 189
SP-PB-1		01/18/17	< 190
SP-PB-1		05/09/17	< 186
SP-PB-1		08/14/17	< 172
SP-PB-1		12/11/17	< 190
SP-PB-2		01/18/17	< 191
SP-PB-2		02/17/17	< 181
SP-PB-2		05/09/17	< 185
SP-PB-2		08/14/17	< 168
SP-PB-2		12/11/17	< 189
SP-PB-3		03/27/17	< 188
SP-PB-3		05/09/17	< 183
SP-PB-3		09/11/17	< 186

TABLE B-II.2 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, PEACH BOTTOM ATOMIC POWER STATION, 2017**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
SW-PB-1	05/10/17	< 4	< 4	< 9	< 5	< 8	< 5	< 8	< 13	< 4	< 5	< 26	< 10
SW-PB-5	05/10/17	< 3	< 4	< 7	< 4	< 7	< 4	< 7	< 12	< 4	< 3	< 25	< 7
SW-PB-6	05/10/17	< 4	< 4	< 11	< 5	< 9	< 5	< 9	< 13	< 5	< 5	< 32	< 12
SP-PB-1	05/09/17	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 11	< 3	< 3	< 21	< 6
SP-PB-2	05/09/17	< 4	< 4	< 10	< 4	< 7	< 5	< 7	< 13	< 5	< 5	< 30	< 9
SP-PB-3	05/09/17	< 4	< 4	< 10	< 4	< 9	< 5	< 8	< 14	< 4	< 4	< 30	< 9

TABLE B-III.1 CONCENTRATIONS OF TRITIUM IN PRECIPITATION WATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
1A	02/02/17	< 188
1A	03/02/17	< 189
1A	03/30/17	< 193
1A	04/27/17	< 186
1A	06/01/17	< 183
1A	06/29/17	< 196
1A	07/27/17	< 175
1A	08/31/17	< 174
1A	09/28/17	< 175
1A	11/02/17	< 182
1A	11/30/17	< 195
1A	12/28/17	< 185
1B	02/02/17	< 192
1B	03/02/17	< 193
1B	03/30/17	< 192
1B	04/27/17	< 182
1B	06/01/17	< 182
1B	06/29/17	< 198
1B	07/27/17	< 178
1B	08/31/17	< 179
1B	09/28/17	< 177
1B	11/02/17	< 178
1B	11/30/17	< 193
1B	12/28/17	< 189
1S	02/02/17	< 190
1S	03/02/17	< 191
1S	03/30/17	< 190
1S	04/27/17	< 166
1S	06/01/17	< 185
1S	06/29/17	< 198
1S	07/27/17	< 178
1S	08/31/17	< 184
1S	09/28/17	< 175
1S	11/02/17	< 184
1S	11/30/17	< 193
1S	12/28/17	< 186
1SSE	02/02/17	< 191
1SSE	03/02/17	< 189
1SSE	03/30/17	< 189
1SSE	04/27/17	< 164
1SSE	06/01/17	< 183
1SSE	06/29/17	< 194
1SSE	07/27/17	< 179
1SSE	08/31/17	< 184
1SSE	09/28/17	< 176
1SSE	11/02/17	< 182
1SSE	11/30/17	< 194
1SSE	12/28/17	< 183
1Z	02/02/17	< 191
1Z	03/02/17	< 193
1Z	03/30/17	< 194

TABLE B-III.1 CONCENTRATIONS OF TRITIUM IN PRECIPITATION WATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, PEACH BOTTOM ATOMIC POWER STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
1Z	04/27/17	< 171
1Z	06/01/17	< 183
1Z	06/29/17	< 196
1Z	07/27/17	< 179
1Z	08/31/17	< 177
1Z	09/28/17	< 171
1Z	11/02/17	< 184
1Z	11/30/17	< 197
1Z	12/28/17	< 179
4M	02/02/17	< 189
4M	03/02/17	< 192
4M	03/30/17	< 193
4M	04/27/17	< 184
4M	06/01/17	< 183
4M	06/29/17	< 198
4M	07/27/17	< 179
4M	08/31/17	< 178
4M	09/28/17	< 178
4M	11/02/17	< 181
4M	11/30/17	< 183
4M	12/28/17	< 184