Exelon Generation

May 29, 2015

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Peach Bottom Atomic Power Station Unit Nos. 2 and 3
Facility Operating License Nos. DPR-44 and DPR-56
NRC Docket Nos. 50-277 and 50-278

SUBJECT: Annual Radiological Environmental Operating Report 72
January 1, 2014 through December 31, 2014

In accordance with the requirements of Section 5.6.2 of the Peach Bottom Atomic Power Station, Units 2 and 3 Technical Specifications, this letter submits the Annual Radiological Environmental Operating Report 72. This report provides the 2014 results for the Radiological Environmental Monitoring Program (REMP) as called for in the Offsite Dose Calculation Manual.

In assessing the data collected for the REMP, we have concluded that the operation of PBAPS, Units 2 and 3, had no adverse impact on the environment. There are no commitments contained in this letter.

If you have any questions or require additional information, please do not hesitate to contact Gerard Stenclik at (717) 456-4491.

Sincerely,

for P.D. Navin

Patrick D. Navin, Plant Manager
Peach Bottom Atomic Power Station

PDN/FML/GRS/JCC/EAS/bcb

Enclosure

ccn 15-53

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Docket No: 50-277
50-278

# PEACH BOTTOM ATOMIC POWER STATION
# UNITS 2 and 3

Annual Radiological
Environmental Operating Report

Report No. 72
1 January Through 31 December 2014

**Prepared By**


Peach Bottom Atomic Power Station
Delta, PA 17314

**May 2015**

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Appendices

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## I. Executive Summary

In 2014, the dose from both liquid and gaseous effluents was conservatively calculated for the Maximum Exposed Member of the Public for Peach Bottom Atomic Power Station. The results of those calculations and their comparison to the allowable limits were as follows:

| Effluent | Applicable Organ | Estimated Dose | Age Group | Location | | % of Applicable Limit | Limit | Unit |
|---|---|---|---|---|---|---|---|---|
| | | | | Distance (meters) | Direction (toward) | | | |
| Noble Gas | Gamma - Air Dose | 2.53E-01 | All | 1.10E+03 | SSE | 1.27E+00 | 2.00E+01 | mrad |
| Noble Gas | Beta - Air Dose | 1.74E-01 | All | 1.10E+03 | SSE | 4.35E-01 | 4.00E+01 | mrad |
| Noble Gas | Total Body (gamma) | 2.45E-01 | All | 1.10E+03 | SSE | 2.45E+00 | 1.00E+01 | mrem |
| Noble Gas | Skin (Beta) | 3.20E-01 | All | 1.10E+03 | SSE | 1.07E-01 | 3.00E+01 | mrem |
| Gaseous Iodine, Particulate, Carbon-14 & Tritium | Bone | 5.49E-01 | Child | 1.10E+03 | SSE | 1.83E+00 | 3.00E+01 | mrem |
| Gaseous Iodine, Particulate, & Tritium | Thyroid | 1.68E-02 | Infant | 1.10E+03 | SSE | 8.60E-03 | 3.00E+01 | mrem |
| Liquid | Total Body (gamma) | 1.68E-02 | Child | Site Boundary | | 2.80E-01 | 6.00E+00 | mrem |
| Liquid | Liver | 8.32E-03 | Child | | | 4.16E-02 | 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 | | | | | | | | |
| Total Dose | Total Body | 2.62E-01 | All | 1.15E+03 | SSE | 1.05E+00 | 2.50E+01 | mrem |
| Total Dose | Thyroid | 2.58E-03 | All | 1.15E+03 | SSE | 3.45E-03 | 7.50E+01 | mrem |
| Total Dose | Bone | 5.50E-01 | All | 1.15E+03 | SSE | 2.20E+00 | 2.50E+01 | mrem |
| Total Dose | Total Body | 2.62E-01 | All | 1.15E+03 | SSE | 8.74E+00 | 3.00E+00 | mrem |
| Total Dose | Bone | 5.49E-01 | All | 1.15E+03 | SSE | 1.83E+01 | 3.00E+00 | mrem |
| Total Dose | Thyroid | 2.56E-01 | All | 1.15E+03 | SSE | 4.65E-01 | 5.50E+01 | mrem |

Doses calculated were well below all ODCM limits.

This report on the Radiological Environmental Monitoring Program (REMP) conducted for the Peach Bottom Atomic Power Station (PBAPS) by Exelon Nuclear covers the period 1 January 2014 through 31 December 2014. During that time period 1,181 analyses were performed on 936 samples.

Surface water samples were analyzed for concentrations of tritium and gamma emitting nuclides. No tritium, fission or activation products were found.

Drinking water samples were analyzed for concentrations of gross beta, iodine-131 (I-131), tritium (H-3) and gamma emitting nuclides. No fission or activation products were found. Gross beta activity detected was consistent with those observed in previous years. Tritium was not detected in drinking water.

Precipitation samples were analyzed under the Radiological Groundwater Protection Program (RGPP) in 2014.

The remaining sample media representing the aquatic environment included fish and sediment samples. These media were analyzed for concentrations of gamma emitting nuclides. Fish samples showed no detectable fission or activation products from the operation of PBAPS. Cesium-137 (Cs-137) activity was found at one of three sediment locations and was consistent with data from previous years.

The atmospheric environment was divided into two parts for examination: airborne and terrestrial. Sample media for determining airborne affects included air particulates and air iodine samples. Analyses performed on air particulate samples included gross beta and gamma spectrometry. No fission or activation products were found. The gross beta results were consistent with results from the previous years. Furthermore, no notable differences between control and indicator locations were observed. These findings indicate no measurable effects from the operation of PBAPS.

High sensitivity I-131analyses were performed on weekly air samples. All results were less than the minimum detectable activity for I-131.

Examination of the terrestrial environment was accomplished by analyzing milk and food product samples. 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. No PBAPS activation or fission products were detected.

Ambient gamma radiation levels were measured quarterly throughout the year. Most measurements were below 10 mR/standard month and the results were consistent with those measured in previous years.

The results of the Optically-Stimulated Luminescent Dosimetry (OSLD) monitoring program were used to confirm that the Independent Spent Fuel Storage Installation (ISFSI) had no measurable impact on the dose rate in the environs.

In assessing all the data gathered for this report and comparing these results with preoperational data, it was evident that the operation of PBAPS had no adverse radiological impact on the environment.

## 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 115 MWth High Temperature, Gas-cooled Reactor (HTGR) 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 rated full-power output of approximately 3,514 MWth. 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.

The REMP for PBAPS was initiated in 1966. This report covers those analyses performed by Teledyne Brown Engineering (TBE), Landauer and Environmental Inc. (Midwest Labs) on samples collected during the period 01 January 2014 through 31 December 2014.

### A. Objectives

The objectives of the REMP are:

1. Provide data on measurable levels of radiation and radioactive materials in the site environs.

2. Evaluate the relationship between quantities of radioactive material released from the plant and resultant radiation doses to individuals from principal pathways of exposure.

### 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.

## III. Program Description

### A. Sample Collection

Normandeau Associates Inc., (NAI), collected samples for the PBAPS REMP for Exelon Nuclear. This section describes the general collection methods used by NAI to obtain environmental samples for the PBAPS REMP in 2014. 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 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, precipitation, fish and sediment. Surface water from two locations (1LL and 1MM) and drinking water from three locations (13B, 4L and 6I) were collected weekly by automatic sampling equipment. Weekly samples from each of the surface and drinking water locations were composited into a separate monthly sample for analysis. Approximately two quarts of water were removed from the weekly sample container and placed into a clean two-gallon polyethylene bottle to form a monthly composite. Control locations were 1LL and 6I. Fish samples comprising the flesh from two groups: Bottom Feeder (channel catfish, flathead catfish, carp, and shorthead redhorse) and Predator (smallmouth bass, largemouth bass, and bluegill) were collected semiannually from two locations (4 and 6; 6 is the control). Sediment samples composed of recently deposited substrate were collected semiannually at three locations (4J, 4T and 6F; 6F is the control).

Atmospheric Environment

The atmospheric environment was evaluated by performing radiological analyses on air particulate and airborne iodine samples. Air particulate and air iodine samples were collected and analyzed weekly from five locations (1B, 1C, 1Z, 3A and 5H2; 5H2 is the control). Airborne iodine and particulate samples were obtained at each location using a vacuum pump with charcoal and glass fiber filters attached. The pumps were run continuously and sampled air at the rate of approximately 1 cubic foot per minute. The filters were replaced weekly and sent to the laboratory for analysis.

Terrestrial Environment

The terrestrial environment was evaluated by performing radiological analyses on milk and food product samples. Milk samples were collected biweekly at five locations (J, R, S, U 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. All samples were collected in new unused two gallon plastic bottles from the bulk tank at each location, preserved with sodium bisulfite and shipped promptly to the laboratory.

Food product samples were collected annually at three locations (1Q, 2Q and 55; 55 is the control) in May through September. All samples were collected in new unused plastic bags and shipped promptly to the laboratory.

Ambient Gamma Radiation

The ambient gamma radiation in the areas surrounding PBAPS for the REMP is measured using dosimeters, which are exposed in the field during and exchanged quarterly. Optically-Stimulated Luminescent Dosimeters (OSLD) replaced the Thermo-Luminescent Dosimeter (TLD) type in the field starting in 2012. However, to observe how OSLD compares to TLD technology for environmental monitoring, PBAPS decided to continue using TLD in addition to OSLD. Therefore, both technologies are employed at PBAPS but the primary data reported is using the OSLD only. Additionally, only the "gross" exposure (i.e. no background or control subtraction) is reported in this report with OSLD; prior to 2012, TLD data are "net" exposures are used.

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

A site boundary ring, consisting of 20 locations (1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K, 1L, 1M, 1NN, 1P, 1Q, 1R, 2, 2B 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) from PBAPS releases.

An intermediate distance ring, consisting of 24 locations (1T, 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.

The balance of four locations (16, 18, 19 and 24) representing control and special interests areas such as population centers, schools, etc.

The specific dosimeter locations were determined by the following criteria:

1. The presence of relatively dense population;

2. Site meteorological data taking into account distance and elevation for each of the 36 ten-degree sectors around the site, where estimated annual dose from PBAPS, if any, would be more significant;

3. On hills free from local obstructions and within sight of the vents (where practical);

4. And near the dwelling closest to the vents in the prevailing down wind direction.

Each dosimetry location in the environment has either 2 or 4 OSLD and TLD dosimeters which are enclosed in plastic as a moisture barrier. These dosimeters are protected from the environment in either a small formica box or a polyethylene jar approximately six feet above the ground level. These dosimeters are exchanged quarterly and sent to an off-site laboratory for analysis.

B. Sample Analysis

This section describes the general analytical methods used by Teledyne Brown Engineering and Environmental Inc. to analyze the environmental samples for radioactivity for the PBAPS REMP in 2014. The analytical procedures used by the laboratories are listed in Table B-2, Appendix B.

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

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 drinking water, surface water, air and milk.
5. Ambient gamma radiation levels at various site environs.

C. Data Interpretation

The radiological and direct radiation data collected prior to PBAPS becoming operational was used as a baseline with which these operational data were compared. For the purpose of this report, PBAPS was considered operational at initial criticality. 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. Lower Limit of Detection and Minimum Detectable Concentration

The lower limit of detection (LLD) is defined as the smallest concentration of radioactive material in a sample that would yield a net count (above background) that would be detected with only 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 for the presence of activity. All analyses are designed to achieve the required PBAPS detection capabilities for environmental sample analysis.

The minimum detectable concentration (MDC) is defined similarly as above for LLD; however, the MDC is the "after-the-fact" (*a posteriori*) estimate vice a before-the-fact as in LLD.

2. Net Activity Calculation and Reporting of Results

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 will result in sample activity being lower than the background activity affecting a negative number. MDC is reported in all cases where positive activity was not detected.

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

For surface and drinking 11 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), cesium-134 (Cs-134), Cs-137, barium-140 (Ba-140) and lanthanum-140 (La-140) were reported.

For fish eight nuclides, potassium-40 (K-40), Mn-54, Co-58, Fe-59, Co-60, Zn-65, Cs-134 and Cs-137 were

reported.

For sediment six nuclides, K-40, Mn-54, Co-58, Co-60, Cs-134 and Cs-137 were reported.

For air particulate six nuclides, beryllium-7 (Be-7), Mn-54, Co-58, Co-60, Cs-134 and Cs-137 were reported.

For milk five nuclides, K-40, Cs-134, Cs-137, Ba-140 and La-140 were reported.
For food product eight nuclides, Be-7, K-40, Mn-54, Co-58, Co-60, I-131, Cs-134 and Cs-137 were reported.

Means and standard deviations of the results were calculated. The standard deviations represent the variability of measured results for different samples rather than single analysis uncertainty.

D. Program Exceptions

For 2014 the PBAPS REMP had a sample collection recovery rate of better than 99%. The exceptions to this program are listed below:

1. In 2Q2014 and 3Q2014, radiography was conducted in the vicinity of a REMP dosimeter (Williams LP Natural Gas Pumping Station which is near Station 50). Because this radiography is not a result of Peach Bottom operations, the radiation exposure to this dosimeter is not attributed to plant operations.

2. In May of 2014, four samples were unavailable for collection as required:

   a.) Drinking water (Station 13B) was not collected due to Chester Water Authority in a maintenance period, and

   b.) Vegetation at Stations 2B, 1Q and 55 were not collected due to the late planting season which, therefore, does not provide sufficient material for sample collection. No other samples indicated radioactivity above background.

3. In June of 2014, a power failure, due to a tree limb falling on power lines, caused the air sampling pump Station 3A in Delta, PA to fail to draw a sample volume sufficient to meet the minimum

specification of 85 cubic meters for the weekly sample. (A lower sample size means that the required LLDs may not be met and therefore the sample would be considered invalid.) Samples taken before and after indicate no detectable radioactivity and no elevated release occurred during that time period.

4. In June of 2014, the semi-annual sediment sample results at Location 4J (Conowingo Pond, West Shore off Burkins Run) showed positive Cs-137 activity at a level of 2.41E02 pCi/kg. The (minimum detectable concentration) MDC was found to be 1.12E02 pCi/kg (required LLD is 1.80E2 pCi/ kg). The lack of other shorter-lived power-production nuclides in these samples suggests that the contamination is old and therefore due to atmospheric nuclear weapons testing and not attributable to Peach Bottom Atomic Power Station. The detected activity in the sediment is thought to be due to increased storm water runoff which is releasing the Cs-137 from the surrounding soils into the river.

5. In June of 2014, a power failure (blown fuses) caused the Station 1C (South Substation) to stop sampling on 25 JUN 2014. Contractor suspects that the blown fuses were due to thunderstorm activity that evening.

6. The Environmental sampling contractor reported to the REMP Task Manager at Peach Bottom that an incorrect flow rate conversion factor was used for 5 indicator air samplers and, as a result, the calculated volume of air for each sample was incorrect. When the orifices were calibrated in June, the new calibration value was not used in the subsequent calculations. A review of those data since June shows that volume of each sample was under-reported by approximately 10% for each weekly sample affected. Under-reporting of the volume is conservative because it will not affect the LLD requirements from being met per ODCMS Table 4.8.E.2. Samples were collected and are valid per ODCMS 3.8.E.2.

7. In June of 2014, the member of the public which has historically provided vegetation samples has elected not to grow a garden this year at location 2B. Therefore, sampling at this location is suspended indefinitely. This sampling is judged to be unavailable due to farmer opting not to plant. Vegetation/Food Products

sampling is required ONLY if milk sampling is NOT performed. Station 1Q is still available for regular sampling but it is not located in the highest D/Q location. Dosimetry at this location (Station 2B) will continue and is not affected.

8. In June of 2014, Vegetation/Garden/Food Products Station 1Q was low in sample collection inventory (animal consumption) therefore ragweed was substituted to make up the sample mass (satisfactory sample mass specification is 300 g to 1000 g). Edible green leafy vegetation is the preferred sample material, if available.

9. In June of 2014, a hail storm caused the Station 42 (Muddy Run) container to be damaged and the dosimeters were intact and found on the ground. These dosimeters were re-installed in a new container and replaced. The data from these dosimeters is included and was not expected to deviate significantly from previous results.

10. In July of 2014, a power failure (PECO service area outage) caused the Station 5H2 (Manor Substation) to stop sampling on 07 JUL 2014. This sampler was not in service for the entire third quarter of 2014. Review of Three Mile Island's control and indicator locations showed consistency between before and after the loss of 5H2 station and, therefore, this is reasonable assurance that no measurable release to the environment occurred during this period.

11. In July of 2014, Vegetation/Garden/Food Products Station 1Q was low in sample collection inventory therefore tobacco was substituted to make up the sample mass (satisfactory sample mass specification is 300 g to 1000 g). Edible green leafy vegetation is the preferred method.

12. During the quarterly change-out of dosimeters, the REMP contractor noted that the Station 51 was found damaged. The sample bottle appeared to have been hit by flying snow from a snowplow from storms during the winter. There are two dosimeters of each type, OSLD and TLD, at this location. The contractor was able to locate one dosimeter of each type and therefore, these were used as valid samples in the program. No further action was

required and all measured radiation was consistent with previous background levels.

13. In September of 2014, the Station 1C (South Substation) air sample pump was running but not drawing air on 17 SEP 2014. Investigation showed that the ceramic vanes on the pump had shattered (normal wear leads to eventual degradation). Vanes were replaced and pump operation was verified satisfactory. However, sample volume was low out of specification and cannot be used for analysis, therefore sample data for the 1C location was available for the week of 14 SEP 2014 - 20 SEP 2014. Comparison with other sample data indicates that no measureable release to the environment occurred during this period.

14. In November of 2014, semi-annual sediment sample results at Locations 4J, 4T and 6F (4J = Conowingo Pond, West Shore off Burkins Run; 4T = Conowingo Pond -- Near Conowingo Dam 12,875 m (8 mi) SE of PBAPS; 6F = Lake Aldred -- Holtwood Dam-East Shore upstream (PBAPS Control Location) 9334 m (5.8 mi) NW of PBAPS) showed positive Cs-137 activity. Spectfic-Activity was measured for each location 4J at 1.07E02 pCi/ kg, 4T at 2.37E02 pCi/ kg and 6F at 1.41E02 pCi/ kg. The lack of other shorter-lived power-production nuclides in these samples suggests that the contamination is old and therefore due to atmospheric nuclear weapons testing and not attributable to Peach Bottom Atomic Power Station. The detected activity in the sediment is thought to be due to increased storm water runoff which is releasing the Cs-137 from the surrounding soils into the river.

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.

E. Program Changes

1. Vegetation location 2Q was added to the REMP in July of 2014.
2. Dosimeter location 1T was added to the REMP program in the fourth quarter of 2014.

## IV. Results and Discussion

### A. Aquatic Environment

#### 1. Surface Water

Samples were taken from a continuous sampler at two locations (1LL and 1MM) on a monthly schedule. Of these locations, 1MM located downstream, could be affected by Peach Bottom's effluent releases. The following analyses were performed:

Tritium

Monthly samples from both locations were composited quarterly and analyzed for tritium activity (Table C-I.1, Appendix C). No tritium activity was detected.

Iodine

Monthly samples from both locations were analyzed for I-131. All results were less than the MDC (Table C-I.2, Appendix C).

Gamma Spectrometry

Samples from both locations were analyzed for gamma emitting nuclides (Table C-I.3, Appendix C). All nuclides were less than the MDC.

#### 2. Drinking Water

Monthly samples were collected from continuous water samplers at three locations (13B, 4L and 6I). Two locations (13B and 4L) could be affected by Peach Bottom's effluent releases. The following analyses were performed:

Gross Beta

Samples from all locations were analyzed for concentrations of total gross beta activity (Tables C-II.1 and Figures C-1 Appendix C). Gross beta was detected in 25 of 36 samples. The values ranged from 2.0 to 5.6 pCi/l. Concentrations detected were generally below those detected in previous years.

Tritium

Monthly samples from three locations were composited quarterly and analyzed for tritium activity (Table C-II.2, Appendix C). Tritium activity was not detected in any samples.

Iodine

Monthly samples from three locations were analyzed for I-131 (Table C-II.3, Appendix C). All results were less than the MDC.

Gamma Spectrometry

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

3. Precipitation

Precipitation samples were analyzed under the RGPP in 2014.

4. Fish

Fish samples comprised of bottom feeder and predator were collected at two locations (4 and 6) semiannually. Location 4 could be affected by Peach Bottom's effluent releases. The following analysis was performed:

Gamma Spectrometry

The edible portion of fish samples from both locations was analyzed for gamma emitting nuclides (Table C-III.1, Appendix C). Naturally occurring K-40 was found at all stations and ranged from 2,470 to 4,000 pCi/kg wet and was consistent with levels detected in previous years. No Peach Bottom fission or activation products were found in 2014. A gradual increase in the MDC has been observed over the last few years. This change in the baseline is likely the result of historical heat exchanger leaks or nuclear weapons testing legacy material. Historical levels of Cs-137 are shown in Figure C-2, Appendix C.

5. Sediment

Aquatic samples were collected at three locations (4J, 4T and 6F) semiannually. Of these locations two, 4J and 4T located

downstream, could be affected by Peach Bottom's effluent releases. The following analysis was performed:

Gamma Spectrometry

Sediment samples from all three locations were analyzed for gamma emitting nuclides (Table C-IV.1, Appendix C). Potassium-40 was found in all locations and ranged from 11,730 to 26,710 pCi/kg dry. The fission product Cs-137 was detected in four of six samples. The concentration ranged from 107 to 241 pCi/kg dry. The activity of Cs-137 detected was consistent with those detected in the preoperational years. Historical levels of Cs-137 are shown in Figure C-3, Appendix C. No other Peach Bottom fission or activation products were found.

B. Atmospheric Environment

1. Airborne

a. Air Particulates

Continuous air particulate samples were collected from five locations on a weekly basis. The five locations were separated into three groups: Group I represents locations within the PBAPS site boundary (1B, 1C and 1Z), Group II represents the location at an intermediate distance from the PBAPS site (3A) and Group III represents the control location at a remote distance from PBAPS (5H2). The following analyses were performed.
Gross Beta

Weekly samples were analyzed for concentrations of beta emitters (Tables C-V.1 and C-V.2 and Figures C-4 and C-5, Appendix C).

Detectable gross beta activity was observed at all locations. Comparison of results among the three groups aid in determining the effects, if any, resulting from the operation of PBAPS. The results from the On-Site locations (Group I) ranged from 8 to 38 E-3 pCi/$m^3$, with a mean of 17 E-3 pCi/$m^3$. The results from the Intermediate Distance location (Group II) ranged from 9 to 37 E-3 pCi/$m^3$ with a mean of 16 E-3 pCi/$m^3$. The results from the Distant location (Group III) ranged from 8 to 39 E-3 pCi/$m^3$ with a mean of 16 E-3 pCi/$m^3$. A comparison of the weekly mean values for 2014

indicate no notable differences among the three groups (Figure C-4, Appendix C). In addition, a comparison of the 2014 air particulate data with previous years data indicate no effects from the operation of PBAPS (Figure C-5, Appendix C).

Gamma Spectrometry

Weekly samples were composited quarterly and analyzed for gamma emitting nuclides (Table C-V.3, Appendix C). Naturally occurring Be-7 due to cosmic ray activity was detected in 19 of 20 samples. The values ranged from 46 to 93 E-3 $pCi/m^3$. All other nuclides were less than the MDC and all required LLDs were met.

b. Airborne Iodine

Continuous air samples were collected from five locations (1B, 1Z, 1C, 3A, and 5H2) and analyzed weekly for I-131 (Table C-VI.1, Appendix C). All results were less than the MDC for I-131.

2. Terrestrial

a. Milk

Samples were collected from five locations (J, R, S, U and V) biweekly April through November and monthly December through March. Samples from six additional locations (C, D, E, L, P and W) were taken quarterly. The following analyses were performed:

Iodine-131

Milk samples from all locations were analyzed for concentrations of I-131 (Tables C-VII.1, Appendix C). All results were less than the MDC for I-131. All results were less than MDC for I-131 and all required LLDs were met.

Gamma Spectrometry

Each milk sample from locations J, R, S, U and V was 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 1,058 to 1,521 pCi/l. All other nuclides were less than the MDC and all required LLDs were met. Comparison of the 2014 Cs-137 milk data with previous years data indicate no effects from the operation of PBAPS (Figure C-6, Appendix C).

b. Food Products

Food product samples were collected at three locations (1Q, 2Q and 55) when available. Of these locations, 1Q and 55 could be affected by Peach Bottom's effluent releases. The following analysis was performed:

Gamma Spectrometry

Each food product sample from locations 1Q, 2Q and 55 was analyzed for concentrations of gamma emitting nuclides (Table C-VIII.1, Appendix C).

Naturally occurring Be-7 activity was found in 21 of 32 samples and ranged from 188 to 2,806 pCi/kg wet. Potassium-40 activity was found in all samples and ranged from 1,529 to 12,170 pCi/kg wet. All other nuclides were less than the MDC.

C. Ambient Gamma Radiation

Beginning in 2012, Exelon changed the type of dosimetry used for the REMP. OSLDs were deployed. TLD monitoring is continuing at PBAPS as a side-by-side technology comparison study but official reporting is from OSLD data. The relative comparison to control locations remains valid. OSLD technology is different than that used in a TLD but has the same purpose (to measure direct radiation). Results of OSLD measurements are listed in Tables C-IX.1 through C-IX.3 and Figure C-7, Appendix C.

Most gross OSLD measurements were below 10 mR per standard month, with a range of 6.6 to 16.0 mR per standard month. A comparison of the Site Boundary and Intermediate Distance data to the Control locations data indicate that the ambient gamma radiation levels from the Control locations 16, 18, 19 and 24 were essentially the same as the other locations. The historical ambient gamma radiation data from the Control locations was

plotted along with similar data from the Site and the Intermediate Distance locations (Figure C-7, Appendix C).

In 2014, PBAPS replaced the Unit 3 reactor vessel's Steam Dryer in support of the Extended Power Uprate (EPU) project. The Old Steam Dryer (OSD) was removed and is being stored at the Low-Level Radioactive Waste Storage Facility (LLRWSF) at PBAPS until shipment can be conducted. Although this storage location is shielded to minimize exposure off-site and on-site, additional monitoring for environmental exposure due to this additional component in storage is considered prudent. Therefore, a new ambient gamma radiation monitoring location (1T) was added to the REMP to ensure continued compliance with 40 CFR 190 and provide more data for the validation of dose models and projections.

D. Independent Spent Fuel Storage Installation (ISFSI)

ISFSI was utilized beginning June 2000. During 2014, a total of 4 TN-68 casks, each loaded with 68 fuel bundles, were added to the ISFSI pad. Onsite location 1R, which is located on the hillside overlooking the ISFSI showed a general increase of 1 to 2 mR per standard month from pre-ISFSI loading (Figure C-8, Appendix C) for the period of 2000 to about 2007. Location 2B, which represents the location of the Nearest Real Resident, shows a slight increase in exposure from the ISFSI pad. Data from location 2B is used to demonstrate compliance to both 40CFR190 and 10CFR72.104 limits.

The large increase in multiple direct radiation locations after 2012 is a result of the transition in technology used for ambient gamma radiation measurement (from TLD to OSLD) and the use of "gross" data rather than "net".

All radiation levels are well-below regulatory limits.

E. Land Use Census

A Land Use Survey conducted during the fall of 2014 around the PBAPS was performed by Normandeau Associates, Inc., NAI Environmental Services Division for Exelon Nuclear to comply with Section 3.8.E.2 of PBAPS's Offsite Dose Calculation Manual Specifications (ODCMS) and Bases. The purpose of the survey was to document the nearest milk producing animal in each of the sixteen meteorological sectors out to five miles. In addition, the nearest residence and garden of >500 square feet were documented. The distance and direction of all locations were positioned using Global Positioning System (GPS) technology. The results

of this survey are summarized below. There were no changes in the nearest residence, garden or milk farms from the previous year.

| Meteorological Sector and Distance from the Center of PBAPS Reactor Building Exhaust Vents | | | | |
|---|---|---|---|---|
| Sector | | Residence Feet | Garden Feet | Milk Farm Feet |
| 1 | N | 12,365 | 14,003 | 14,455 |
| 2 | NNE | 11,112 | 11,041 | 10,843 |
| 3 | NE | 10,080 | 10,004 | 10,492 |
| 4 | ENE | 10,495 | 12,417 | 10,925 |
| 5 | E | 10,066 | 14,540 | 14,471 |
| 6 | ESE | 16,085 | 20,374 | 20,154 |
| 7 | SE | 19,368 | 19,368 | 19,134 |
| 8 | SSE | 3,912 | 3,912 | - |
| 9 | S | 5,545 | 5,545 | - |
| 10 | SSW | 6,072 | 8,167 | 11,602 |
| 11 | SW | 4,755 | 4,865 | 4,860 |
| 12 | WSW | 4,036 | 9,072 | - |
| 13 | W | 5,327 | 5,327 | 5,136 |
| 14 | WNW | 2,928 | 4,192 | 22,124 |
| 15 | NW | 2,948 | 9,545 | 9,545 |
| 16 | NNW | 5,124 | - | - |

F. Errata Data

There is no errata data for 2014.

G. Secondary Laboratory Analysis

The Appendix D section of this report presents the results of data analysis performed by the QC laboratory, Environmental Inc. Duplicate samples were obtained from several locations and media and split between the primary laboratory, Teledyne Brown Engineering (TBE) and the QC laboratory. Comparisons of the results for all media were within expected ranges.

H. Summary of Results – Inter-Laboratory Comparison Program

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 the following 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, which are based on 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.

In reviewing our environmental inter-laboratory crosscheck programs, we identified 1) duplication of efforts on some matrices and isotopes and 2) that we are performing crosscheck samples on some matrices and isotopes that we do not perform for clients. Since the DOE MAPEP is designed to evaluate the ability of analytical facilities to correctly analyze for radiological constituents representative of those at DOE sites, the needed changes were made to the MAPEP program. Therefore, the following isotopes were removed from the MAPEP program:

Soil – gamma – will be provided by Analytics twice per year, starting in 2015. For 2014, one soil gamma is provided by MAPEP, the 2nd soil gamma is provided by Analytics.

AP – gamma – is currently provided by Analytics.

Water – gamma, H-3, Sr-90, uranium, gross alpha and gross beta currently provided by ERA.

MAPEP evaluates non-reported (NR) analyses as failed if they were reported in the previous series.

For the TBE laboratory, 163 out of 169 analyses performed met the specified acceptance criteria. Six analyses (Ni-63, K-40 and I-131 in water, and two Sr-90s and one Gross Alpha in AP samples) did not meet the specified acceptance criteria for the following reasons:

1. Teledyne Brown Engineering's MAPEP March 2014 Ni-63 in water result of 32.7 ± 1.69 Bq/L was overlooked when reporting the data but would have passed the acceptance range of 23.9 – 44.2 Bq/L. NCR 14-04

2. Teledyne Brown Engineering's MAPEP March 2014 K-40 in water result of 1.63 ± 2.49 Bq/L was overlooked when reporting the data but would have passed the false positive test. NCR 14-04

3. Teledyne Brown Engineering's ERA November 2014 I-131 in water result of 15.8 pCi/L was lower than the known value of 20.3 pCi/L, failing below the lower acceptance limit of 16.8. The result was evaluated as failed with a found to known ratio of 0.778. No cause could be found for the slightly low result. All ERA I-131 evaluations since 2004 have been acceptable. NCR 14-08

4. Teledyne Brown Engineering's MAPEP March 2014 Sr-90 in AP result of 0.822 Bq/sample was lower than the known value of 1.18 Bq/sample, falling below the lower acceptance limit of 0.83 Bq/sample. The rerun result was still low, but fell within the lower acceptance range of 0.836. The rerun result was statistically the same number as the original result. No cause could be found for the slightly low results. NCR 14-04

5. Teledyne Brown Engineering's MAPEP September 2014 Sr-90 in AP result of 0.310 Bq/sample was lower than the known value of 0.703 Bq/sample. The gravimetric yield of 117% was very high (we normally see yields of 60% to 70%) and could account for the low activity. NCR 14-09

6. Teledyne Brown Engineering's MAPEP September 2014 Gr-Alpha in AP result of 0.153 Bq/sample was lower than the known value of 0.53 Bq/sample. The AP sample was counted on the wrong side.

The AP was flipped over and recounted with acceptable results. NCR 14-09

For the EIML laboratory, 85 of 90 analyses met the specified acceptance criteria. Five analyses (Water – Pu-238, Pu-239, Fe-55; AP – Co-57; Soil – Cs134) did not meet the specified acceptance criteria for the following reasons:

1. Environmental Inc., Midwest Laboratory's MAPEP February 2014 water Pu-238 result of 1.28 Bq/L was higher than the known value of 0.83 Bq/L, exceeding the upper control limit of 1.08 Bq/L. The high bias on the plutonium was traced to contamination from a newly purchased standard. The result of the reanalysis with the new tracer was 0.68 Bq/L, which fell within the acceptance criteria.
2. Environmental Inc., Midwest Laboratory's MAPEP February 2014 water Pu-239/240 result of 0.91 Bq/L was higher than the known value of 0.68 Bq/L, exceeding the upper control limit of 0.88 Bq/L. The high bias on the plutonium was traced to contamination from a newly purchased standard. The result of reanalysis with the new tracer was 0.66 Bq/L, which fell within the acceptance criteria.
3. Environmental Inc., Midwest Laboratory's MAPEP February 2014 AP Co-57 result of 1.60 ± 0.05 Bq/total sample failed the false positive test. Interference from the Eu-152 resulted in the misidentification of Co-57.
4. Environmental Inc., Midwest Laboratory's MAPEP February 2014 soil Cs-134 result of 6.10 ± 1.80 Bq/kg failed the false positive test. Long sample counting time lead to interference from naturally occurring Bi-214 in the sample matrix with a close spectral energy.

Environmental Inc., Midwest Laboratory's MAPEP August 2014 water Fe-55 result of 55.10 ± 14.80 Bq/L was higher than the known value of 31.50 Bq/L, exceeding the upper control limit of 41.00 Bq/L. The result of the reanalysis of Fe-55 was 32.63 ± 16.30 Bq/L, which fell within the 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.

## V. 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.

# APPENDIX A

# RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT SUMMARY

## TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE PEACH BOTTOM ATOMIC POWER STATION, 2014

**NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION** **DOCKET NUMBER: 50-277 & 50-278**
**LOCATION OF FACILITY: YORK COUNTY PA** **REPORTING PERIOD: 2014**

| 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 |
|---|---|---|---|---|---|---|---|---|
| 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 |

THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

## TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE PEACH BOTTOM ATOMIC POWER STATION, 2014

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

| 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 |
|---|---|---|---|---|---|---|---|---|
| SURFACE WATER (PCI/LITER) | 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 | 3.1 (18/24) (2/5.6) | 2.8 (7/12) (2.5/3.8) | 3.3 (8/12) (2.5/5.6) | 13B INDICATOR CHESTER WATER AUTHORITY SUSQUEHANNA PUMPIN( 13306 FEET ESE | 0 |
| | H-3 | 12 | 200 | <LLD | <LLD | - | | 0 |
| | I-131 | 36 | 1 | <LLD | <LLD | - | | 0 |
| | GAMMA MN-54 | 36 | 15 | <LLD | <LLD | - | | 0 |
| | CO-58 | | 15 | <LLD | <LLD | - | | 0 |

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**LOCATION OF FACILITY: YORK COUNTY PA** **REPORTING PERIOD: 2014**

| 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 |
|---|---|---|---|---|---|---|---|---|
| DRINKING WATER (PCI/LITER) | 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 |

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FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

## TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE PEACH BOTTOM ATOMIC POWER STATION, 2014

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

| 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 (PCI/KG WET) | GAMMA K-40 | 4 | NA | 3362 (2/2) (3293/3430) | 3499 (2/2) (2997/4000) | 3499 (2/2) (2997/4000) | 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 |

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FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

## TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE PEACH BOTTOM ATOMIC POWER STATION, 2014

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**LOCATION OF FACILITY: YORK COUNTY PA** **REPORTING PERIOD: 2014**

| 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 |
|---|---|---|---|---|---|---|---|---|
| PREDATOR (PCI/KG WET) | GAMMA | 4 | | | | | | |
| | K-40 | | NA | 2989 (2/2) (2470/3508) | 3490 (2/2) (3393/3587) | 3490 (2/2) (3393/3587) | 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 |

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FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

## TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE PEACH BOTTOM ATOMIC POWER STATION, 2014

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

| 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 |
|---|---|---|---|---|---|---|---|---|
| SEDIMENT (PCI/KG DRY) | GAMMA | 6 | | | | | | |
| | K-40 | | NA | 20233 (4/4) (13460/26710) | 14740 (2/2) (11730/17750) | 24720 (2/2) (22730/26710) | 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 | 195 (3/4) (107/241) | 141 (1/2) | 237 (1/2) | 4T INDICATOR CONOWINGO POND NEAR CONOWINGO DAM 41818 FEET SE | 0 |
| AIR PARTICULATE (E-3 PCI/CU.METER) | GR-B | 246 | 10 | 17 (204/206) (8/38) | 16 (39/40) (8/39) | 17 (50/51) (10/38) | 1C INDICATOR PEACH BOTTOM SOUTH SUB STATION 4513 FEET SSE | 0 |
| | GAMMA | 20 | | | | | | |
| | BE-7 | | NA | 65 (16/16) (46/93) | 64 (3/4) (59/68) | 67 (4/4) (54/75) | 3A INDICATOR DELTA PA SUBSTATION 19114 FEET SW | 0 |

THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

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**LOCATION OF FACILITY: YORK COUNTY PA** **REPORTING PERIOD: 2014**

| 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) | 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 I-131 | 246 | 70 | <LLD | <LLD | - | | 0 |
| MILK (PCI/LITER) | I-131 | 129 | 1 | <LLD | <LLD | - | | 0 |
| | GAMMA K-40 | 129 | NA | 1270 (100/100) (1058/1521) | 1260 (29/29) (1114/1390) | 1377 (4/4) (1328/1399) | D INDICATOR 18533 FEET NE | 0 |

THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

## TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE PEACH BOTTOM ATOMIC POWER STATION, 2014

**NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION** **DOCKET NUMBER: 50-277 & 50-278**
**LOCATION OF FACILITY: YORK COUNTY PA** **REPORTING PERIOD: 2014**

| 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 |
|---|---|---|---|---|---|---|---|---|
| MILK (PCI/LITER) | CS-134 | | 15 | <LLD | <LLD | - | | 0 |
| | CS-137 | | 18 | <LLD | <LLD | - | | 0 |
| | BA-140 | | 60 | <LLD | <LLD | - | | 0 |
| | LA-140 | | 15 | <LLD | <LLD | - | | 0 |
| VEGETATION (PCI/KG WET) | GAMMA | 32 | | | | | | |
| | BE-7 | | NA | 746 (15/20) (208/2806) | 718 (6/12) (188/1509) | 918 (7/11) (264/2806) | 1Q INDICATOR 3274 FEET SE | 0 |
| | K-40 | | NA | 4750 (20/20) (1529/12170) | 5688 (12/12) (3317/8807) | 5785 (11/11) (2161/12170) | 1Q INDICATOR 3274 FEET SE | 0 |
| | MN-54 | | NA | <LLD | <LLD | - | | 0 |
| | CO-58 | | NA | <LLD | <LLD | - | | 0 |
| | CO-60 | | NA | <LLD | <LLD | - | | 0 |

THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

## TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE PEACH BOTTOM ATOMIC POWER STATION, 2014

**NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION** **DOCKET NUMBER: 50-277 & 50-278**
**LOCATION OF FACILITY: YORK COUNTY PA** **REPORTING PERIOD: 2014**

| 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 |
|---|---|---|---|---|---|---|---|---|
| VEGETATION (PCI/KG WET) | I-131 | | 60 | <LLD | <LLD | - | | 0 |
| | CS-134 | | 60 | <LLD | <LLD | - | | 0 |
| | CS-137 | | 80 | <LLD | <LLD | - | | 0 |
| DIRECT RADIATION (MILLIREM/STD.MO.) | OSLD-QUARTERLY | 189 | NA | 9.8 (173/173) (6.6/16.0) | 9.5 (16/16) (7.6/10.9) | 16.0 (1/1) | 1T INDICATOR LAY ROAD 3065 FEET NW | 0 |

THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

# 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, 2014

| Location | Location Description | Distance & Direction from Site |
|---|---|---|
| A. Surface Water | | |
| 1LL | Peach Bottom Units 2 and 3 Intake - Composite (Control) | 1,256 feet NE |
| 1MM | Peach Bottom Canal Discharge -Composite | 5,470 feet SE |
| B. Drinking (Potable) Water | | |
| 4L | Conowingo Dam EL 33' MSL - Composite | 45,721 feet SE |
| 6I | Holtwood Dam Hydroelectric Station - Composite (Control) | 30,337 feet NW |
| 13B | Chester Water Authority (CWA) Susquehanna Pumping Station- Composite | 13,306 feet ESE |
| C. Precipitation | | |
| 1A | | 1,396 feet SE |
| 1B | | 2,587 feet NW |
| 4M | | 45,989 feet SE |
| D. Fish | | |
| 4 | Conowingo Pond | 7,162 feet SE |
| 6 | Holtwood Pond (Control) | 57,347 feet NW |
| E. Sediment | | |
| 4J | Conowingo Pond near Berkin's Run | 7,346 feet SE |
| 4T | Conowingo Pond near Conowingo Dam | 41,818 feet SE |
| 6F | Holtwood Dam (Control) | 31,469 feet NW |
| F. Air Particulate - Air Iodine | | |
| 1B | Weather Station #2 | 2,587 feet NW |
| 1Z | Weather Station #1 | 1,396 feet SE |
| 1A | Weather Station #1 | 1,396 feet SE |
| 1C | Peach Bottom South Sub Station | 4,513 feet SSE |
| 3A | Delta, PA – Substation | 19,144 feet SW |
| 5H2 | Manor Substation (Control) | 162,565 feet NE |
| G. Milk – bi-weekly / monthly | | |
| J | | 5,119 feet W |
| R | | 4,694 feet WSW |
| S | | 19,061 feet SE |
| U | | 14,468 feet SSW |
| V | (Control) | 32,736 feet W |
| H. Milk – quarterly | | |
| C | (Control) | 5,037 feet NW |
| D | | 18,533 feet NE |

TABLE B-1 Radiological Environmental Monitoring Program – Sampling Locations, Distance and Direction from Reactor Buildings, Peach Bottom Atomic Power Station, 2014

| Location | Location Description | Distance & Direction from Site |
|---|---|---|
| H. Milk – quarterly (cont'd) | | |
| E | (Control) | 46,147 feet N |
| L | | 11,194 feet NE |
| P | | 10,982 feet ENE |
| W | | 89,232 feet S |
| I. Food Products – monthly when available | | |
| 1Q | | 4,171 feet NW |
| 2B | | 3,854 feet SSE |
| 2Q | | 9,245 feet SW |
| 55 | (Control) | 52,272 feet NE |
| J. Environmental Dosimetry - OSLD | | |
| Site Boundary | | |
| 1L | Peach Bottom Unit 3 Intake | 1,256 feet NE |
| 1P | Tower B & C Fence | 2,112 feet ESE |
| 1A | Weather Station #1 | 1,396 feet SE |
| 1Q | Tower D & E Fence | 3,274 feet SE |
| 1D | 140° Sector | 3,538 feet SE |
| 2 | Peach Bottom 130° Sector Hill | 4,661 feet SE |
| 2B | Burk Property | 3,768 feet SSE |
| 1M | Discharge | 5,438 feet SE |
| 1R | Transmission Line Hill/ISFSI Pad | 2,798 feet SSE |
| 1I | Peach Bottom South Substation | 2,851 feet SSE |
| 1C | Peach Bottom South Substation | 4,513 feet SSE |
| 1J | Peach Bottom 180° Sector Hill | 3,755 feet S |
| 1K | Peach Bottom Site Area | 4,604 feet SW |
| 1F | Peach Bottom 200° Sector Hill | 2,707 feet SSW |
| 40 | Peach Bottom Site Area | 7,750 feet SW |
| 1NN | Peach Bottom Site | 2,547 feet WSW |
| 1H | Peach Bottom 270° Sector Hill | 3,104 feet W |
| 1G | Peach Bottom North Substation | 3,173 feet WNW |
| 1B | Weather Station #2 | 2,587 feet NW |
| 1E | Peach Bottom 350° Sector Hill | 3,136 feet NNW |
| Intermediate Distance | | |
| 5 | Wakefield, PA | 24,482 feet E |
| 15 | Silver Spring Rd | 19,449 feet N |
| 22 | Eagle Road | 13,230 feet NNE |
| 44 | Goshen Mill Rd | 27,480 feet NE |
| 32 | Slate Hill Rd | 15,213 feet ENE |
| 45 | PB-Keeney Line | 18,524 feet ENE |
| 14 | Peters Creek | 10,397 feet E |
| 17 | Riverview Rd | 21,966 feet ESE |
| 31A | Eckman Rd | 24,105 feet SE |
| 4K | Conowingo Dam Power House Roof | 45,721 feet SE |
| 23 | Peach Bottom 150° Sector Hill | 5,276 feet SSE |
| 27 | N. Cooper Road | 13,859 feet S |
| 48 | Macton Substation | 25,772 feet SSW |

TABLE B-1 Radiological Environmental Monitoring Program – Sampling Locations, Distance and Direction from Reactor Buildings, Peach Bottom Atomic Power Station, 2014

| Location | Location Description | Distance & Direction from Site |
|---|---|---|
| J. Environmental Dosimetry – OSLD (cont'd) | | |
| Intermediate Distance (cont'd) | | |
| 3A | Delta, PA Substation | 19,114 feet SW |
| 49 | PB-Conastone Line | 20,673 feet WSW |
| 50 | TRANSCO Pumping Station | 25,677 feet W |
| 51 | Fin Substation | 20,511 feet WNW |
| 26 | Slab Road | 22,093 feet NW |
| 6B | Holtwood Dam Power House Roof | 30,538 feet NW |
| 42 | Muddy Run Environ. Laboratory | 21,954 feet NNW |
| 43 | Drumore Township School | 26,931 feet NNE |
| 46 | Broad Creek | 23,483 feet SSE |
| 47 | Broad Creek Scout Camp | 22,153 feet S |
| 1T | Lay Road/LLRWSF | 3,065 feet NW |
| Control | | |
| 16 | Nottingham, PA Substation (Control) | 67,788 feet E |
| 24 | Harrisville, MD Substation (Control) | 58,048 feet ESE |
| 18 | Fawn Grove, PA (Control) | 51,413 feet W |
| 19 | Red Lion, PA (Control) | 106,354 feet WNW |

TABLE B-2 Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Peach Bottom Atomic Power Station, 2014

| Sample Medium | Analysis | Sampling Method | Collection Procedure Number | Sample Size | Analytical Procedure Number |
|---|---|---|---|---|---|
| Surface Water | Gamma Spectroscopy | Monthly composite from a continuous water compositor. | NAI-ER15 Collection of water samples for radiological analysis (Peach Bottom Atomic Power Station) | 2 gallon | TBE, TBE-2007 Gamma emitting radioisotope analysis<br><br>Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy |
| Surface Water | Tritium | Quarterly composite from a continuous water compositor. | NAI-ER15 Collection of water samples for radiological analysis (Peach Bottom Atomic Power Station) | 500 ml | TBE, TBE-2010 Tritium and carbon-14 analysis by liquid scintillation<br><br>Env. Inc., T-02 Determination of tritium in water (direct method) |
| Surface Water | I-131 | Monthly composite from a continuous water compositor. | NAI-ER15 Collection of water samples for radiological analysis (Peach Bottom Atomic Power Station) | 2 gallon | TBE, TBE-2012 Radioiodine in various matrices<br><br>Env. Inc., I-131-01 Determination of I-131 in water by an ion exchange |
| Drinking Water | Gross Beta | Monthly composite from a continuous water compositor. | NAI-ER15 Collection of water samples for radiological analysis (Peach Bottom Atomic Power Station) | 2 gallon | TBE, TBE-2008 Gross alpha and/or gross beta activity in various matrices<br><br>Env. Inc., W(DS)-01 Determination of gross alpha and/or gross beta in water (dissolved solids or total residue) |
| Drinking Water | I-131 | Monthly composite from a continuous water compositor. | NAI-ER15 Collection of water samples for radiological analysis (Peach Bottom Atomic Power Station) | 2 gallon | TBE, TBE-2031 Radioiodine in drinking water<br><br>Env. Inc., I-131-01 Determination of I-131 in water by an ion exchange |
| Drinking Water | Gamma Spectroscopy | Monthly composite from a continuous water compositor. | NAI-ER15 Collection of water samples for radiological analysis (Peach Bottom Atomic Power Station) | 2 gallon | TBE, TBE-2007 Gamma emitting radioisotope analysis<br><br>Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy |
| Drinking Water | Tritium | Quarterly composite from a continuous water compositor. | NAI-ER15 Collection of water samples for radiological analysis (Peach Bottom Atomic Power Station) | 500 ml | TBE, TBE-2010 Tritium and carbon-14 analysis by liquid scintillation<br><br>Env. Inc., T-02 Determination of tritium in water (direct method) |
| Fish | Gamma Spectroscopy | Semi-annual samples collected via electroshocking or other techniques | NAI-ER3 Collection of fish samples for radiological analysis (Peach Bottom Atomic Power Station) | 1000 grams (wet) | TBE, TBE-2007 Gamma emitting radioisotope analysis |
| Sediment | Gamma Spectroscopy | Semi-annual grab samples | NAI-ER2 Collection of sediment samples for radiological analysis (Peach Bottom Atomic Power Station) | 500 grams (dry) | TBE, TBE-2007 Gamma emitting radioisotope analysis |

TABLE B-2 Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Peach Bottom Atomic Power Station, 2014

| Sample Medium | Analysis | Sampling Method | Collection Procedure Number | Sample Size | Analytical Procedure Number |
|---|---|---|---|---|---|
| Air Particulates | Gross Beta | One-week composite of continuous air sampling through glass fiber filter paper | NAI-ER16 Collection of air particulate and air iodine samples for radiological analysis (Peach Bottom Atomic Power Station) | 1 filter (approximately 280 cubic meters weekly) | TBE, TBE-2008 Gross alpha and/or gross beta activity in various matrices<br><br>Env. Inc., AP-02 Determination of gross alpha and/or gross beta in air particulate filters |
| Air Particulates | Gamma Spectroscopy | Quarterly composite of each station | TBE, TBE-2023 Compositing of samples<br><br>Env. Inc., AP-03 Procedure for compositing air particulate filters for gamma spectroscopic analysis | 13 filters (approximately 3600 cubic meters) | TBE, TBE-2007 Gamma emitting radioisotope analysis<br><br>Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy |
| 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 (Peach Bottom Atomic Power Station) | 1 filter (approximately 280 cubic meters weekly) | TBE, TBE-2007 Gamma emitting radioisotope analysis<br><br>Env. Inc., I-131-02 Determination of I-131 in charcoal canisters by gamma spectroscopy (batch method) |
| Milk | I-131 | Bi-weekly grab sample when cows are on pasture. Monthly all other times | NAI-ER10 Collection of milk samples for radiological analysis (Peach Bottom Atomic Power Station) | 2 gallon | TBE, TBE-2012 Radioiodine in various matrices<br><br>Env. Inc., I-131-01 Determination of I-131 in milk by an ion exchange |
| Milk | Gamma Spectroscopy | Bi-weekly grab sample when cows are on pasture. Monthly all other times | NAI-ER10 Collection of milk samples for radiological analysis (Peach Bottom Atomic Power Station) | 2 gallon | TBE, TBE-2007 Gamma emitting radioisotope analysis<br><br>Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy |
| Food Products | Gamma Spectroscopy | Monthly when available | NAI-ER12 Collection of vegetation samples for radiological analysis (Peach Bottom Atomic Power Station) | 1000 grams | TBE, TBE-2007 Gamma emitting radioisotope analysis<br><br>Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy |
| 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 (Peach Bottom Atomic Power Station) | 2 dosimeters | Landauer Incorporated |

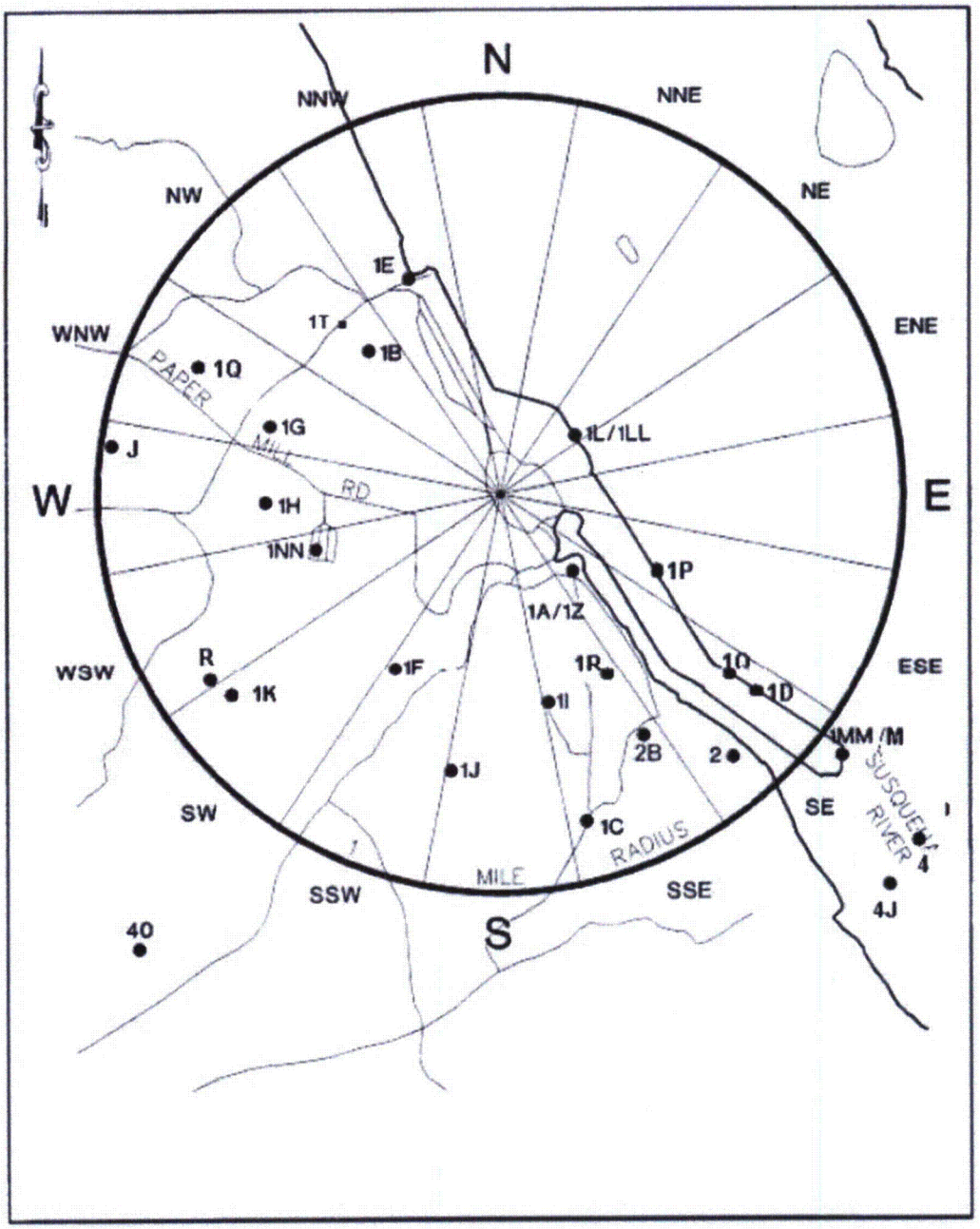



Figure B-1
Environmental Sampling Locations Within One
Mile of the Peach Bottom Atomic Power Station, 2014

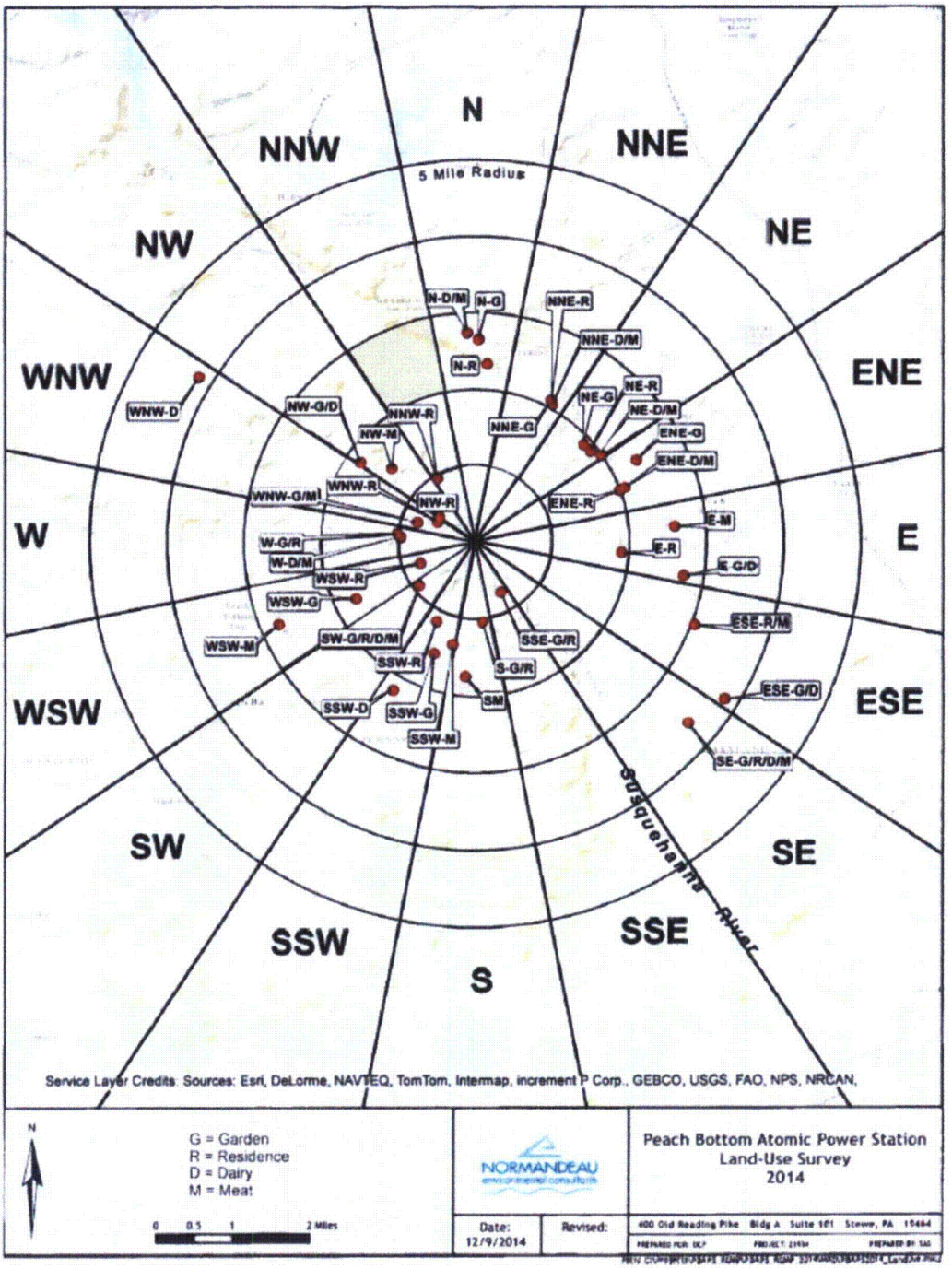



Figure B-2
Environmental Sampling Locations Between One and Approximately Five Miles of the Peach Bottom Atomic Power Station, 2014

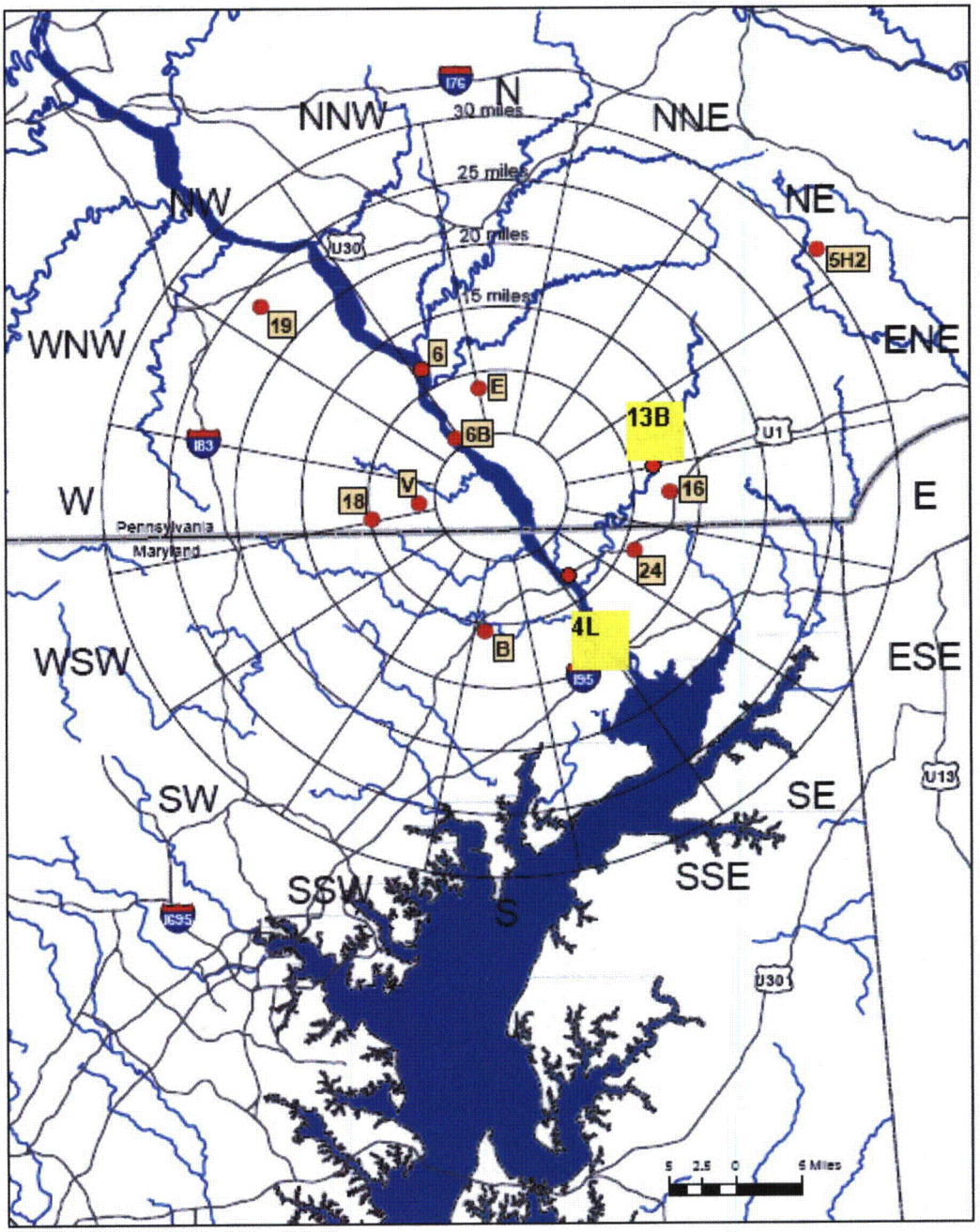



Figure B-3
Environmental Sampling Locations Greater Than
Five Miles from the Peach Bottom Atomic Power Station, 2014

# APPENDIX C

# DATA TABLES AND FIGURES
# PRIMARY LABORATORY

**Table C-I.1** **CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| COLLECTION PERIOD | 1LL | 1MM |
|---|---|---|
| 01/01/14 - 03/26/14 | < 185 | < 183 |
| 03/26/14 - 06/25/14 | < 190 | < 195 |
| 06/25/14 - 10/01/14 | < 184 | < 184 |
| 10/01/14 - 12/31/14 | < 183 | < 183 |
| MEAN | - | - |

**Table C-I.2** **CONCENTRATIONS OF I-131 IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| COLLECTION PERIOD | 1LL | 1MM |
|---|---|---|
| 01/01/14 - 01/29/14 | < 0.8 | < 0.7 |
| 01/29/14 - 02/26/14 | < 0.7 | < 0.5 |
| 02/26/14 - 03/26/14 | < 0.6 | < 0.6 |
| 03/26/14 - 04/30/14 | < 0.7 | < 0.7 |
| 04/30/14 - 05/28/14 | < 0.8 | < 0.8 |
| 05/28/14 - 06/25/14 | < 0.5 | < 0.6 |
| 06/25/14 - 07/30/14 | < 0.5 | < 0.5 |
| 07/30/14 - 08/27/14 | < 0.7 | < 0.6 |
| 08/27/14 - 10/01/14 | < 0.9 | < 0.8 |
| 10/01/14 - 10/29/14 | < 0.6 | < 0.7 |
| 10/29/14 - 11/26/14 | < 0.6 | < 0.5 |
| 11/26/14 - 12/31/14 | < 0.6 | < 0.4 |
| MEAN | - | - |

**Table C-I.3** **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

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 | 01/01/14 - 01/29/14 | < 4 | < 4 | < 11 | < 4 | < 8 | < 7 | < 10 | < 4 | < 5 | < 32 | < 10 |
| | 01/29/14 - 02/26/14 | < 4 | < 5 | < 10 | < 3 | < 7 | < 5 | < 9 | < 4 | < 4 | < 29 | < 10 |
| | 02/26/14 - 03/26/14 | < 4 | < 4 | < 8 | < 3 | < 7 | < 4 | < 7 | < 3 | < 3 | < 25 | < 7 |
| | 03/26/14 - 04/30/14 | < 2 | < 2 | < 5 | < 2 | < 4 | < 2 | < 4 | < 2 | < 2 | < 17 | < 4 |
| | 04/30/14 - 05/28/14 | < 3 | < 3 | < 9 | < 4 | < 7 | < 5 | < 7 | < 3 | < 3 | < 23 | < 7 |
| | 05/28/14 - 06/25/14 | < 5 | < 5 | < 9 | < 4 | < 10 | < 5 | < 7 | < 4 | < 4 | < 24 | < 7 |
| | 06/25/14 - 07/30/14 | < 5 | < 3 | < 8 | < 3 | < 8 | < 4 | < 7 | < 3 | < 4 | < 28 | < 7 |
| | 07/30/14 - 08/27/14 | < 3 | < 4 | < 7 | < 4 | < 7 | < 4 | < 7 | < 3 | < 4 | < 24 | < 7 |
| | 08/27/14 - 10/01/14 | < 4 | < 4 | < 10 | < 4 | < 9 | < 5 | < 8 | < 4 | < 5 | < 33 | < 9 |
| | 10/01/14 - 10/29/14 | < 4 | < 4 | < 9 | < 4 | < 8 | < 4 | < 8 | < 4 | < 4 | < 32 | < 10 |
| | 10/29/14 - 11/26/14 | < 5 | < 5 | < 10 | < 4 | < 13 | < 6 | < 10 | < 6 | < 5 | < 29 | < 11 |
| | 11/26/14 - 12/31/14 | < 5 | < 5 | < 10 | < 6 | < 12 | < 6 | < 9 | < 4 | < 6 | < 27 | < 10 |
| | MEAN | - | - | - | - | - | - | - | - | - | - | - |
| 1MM | 01/01/14 - 01/29/14 | < 6 | < 5 | < 12 | < 8 | < 11 | < 5 | < 8 | < 4 | < 5 | < 29 | < 11 |
| | 01/29/14 - 02/26/14 | < 4 | < 5 | < 12 | < 5 | < 10 | < 5 | < 9 | < 3 | < 5 | < 37 | < 11 |
| | 02/26/14 - 03/26/14 | < 5 | < 6 | < 10 | < 6 | < 10 | < 6 | < 9 | < 4 | < 6 | < 32 | < 14 |
| | 03/26/14 - 04/30/14 | < 2 | < 2 | < 4 | < 2 | < 3 | < 2 | < 3 | < 2 | < 2 | < 12 | < 3 |
| | 04/30/14 - 05/28/14 | < 4 | < 5 | < 9 | < 4 | < 9 | < 5 | < 8 | < 4 | < 5 | < 30 | < 10 |
| | 05/28/14 - 06/25/14 | < 5 | < 4 | < 8 | < 5 | < 8 | < 4 | < 9 | < 4 | < 4 | < 26 | < 8 |
| | 06/25/14 - 07/30/14 | < 4 | < 4 | < 8 | < 4 | < 7 | < 4 | < 7 | < 4 | < 4 | < 29 | < 8 |
| | 07/30/14 - 08/27/14 | < 4 | < 5 | < 10 | < 4 | < 9 | < 5 | < 9 | < 5 | < 4 | < 28 | < 10 |
| | 08/27/14 - 10/01/14 | < 3 | < 4 | < 10 | < 4 | < 8 | < 5 | < 8 | < 4 | < 4 | < 32 | < 12 |
| | 10/01/14 - 10/29/14 | < 4 | < 4 | < 10 | < 4 | < 9 | < 4 | < 8 | < 4 | < 4 | < 29 | < 11 |
| | 10/29/14 - 11/26/14 | < 6 | < 6 | < 15 | < 7 | < 11 | < 6 | < 13 | < 5 | < 7 | < 33 | < 12 |
| | 11/26/14 - 12/31/14 | < 8 | < 8 | < 18 | < 9 | < 17 | < 8 | < 14 | < 7 | < 8 | < 36 | < 11 |
| | MEAN | - | - | - | - | - | - | - | - | - | - | - |

**Table C-II.1** **CONCENTRATIONS OF GROSS BETA IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| COLLECTION PERIOD | 13B | 4L | 6I |
|---|---|---|---|
| 01/02/14 - 01/30/14 | 3.4 ± 1.3 | 2.8 ± 1.4 | 2.6 ± 1.1 |
| 01/30/14 - 02/27/14 | < 2.7 | 2.9 ± 1.9 | < 2.7 |
| 02/27/14 - 03/27/14 | < 2.3 | < 2.3 | < 2.3 |
| 03/27/14 - 05/01/14 | < 1.9 | < 1.9 | < 2.0 |
| 05/01/14 - 05/29/14 (1) | 3.0 ± 1.4 | 2.0 ± 1.3 | < 2.9 |
| 05/29/14 - 06/26/14 | 2.8 ± 1.4 | 2.2 ± 1.4 | 2.5 ± 1.4 |
| 06/26/14 - 07/31/14 | 2.9 ± 1.6 | 2.7 ± 1.6 | < 2.2 |
| 07/31/14 - 08/28/14 | 2.5 ± 1.6 | 4.0 ± 1.7 | 2.8 ± 1.6 |
| 08/28/14 - 10/02/14 | 3.6 ± 1.5 | 4.0 ± 1.6 | 2.7 ± 1.5 |
| 10/02/14 - 10/30/14 | < 2.3 | 3.6 ± 1.7 | 2.5 ± 1.6 |
| 10/30/14 - 11/26/14 | 5.6 ± 1.7 | 3.1 ± 1.5 | 3.8 ± 1.5 |
| 11/26/14 - 01/02/15 | 2.6 ± 1.4 | 2.2 ± 1.3 | 3.0 ± 1.4 |
| MEAN | 3.3 ± 2.0 | 2.9 ± 1.5 | 2.8 ± 0.9 |

**Table C-II.2** **CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| COLLECTION PERIOD | 13B | 4L | 6I |
|---|---|---|---|
| 01/02/14 - 03/27/14 | < 157 | < 160 | < 181 |
| 03/27/14 - 06/26/14 | < 194 (1) | < 192 | < 197 |
| 06/26/14 - 10/02/14 | < 187 | < 188 | < 186 |
| 10/02/14 - 01/02/15 | < 158 | < 182 | < 185 |
| MEAN | - | - | - |

**Table C-II.3** **CONCENTRATIONS OF I-131 IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| COLLECTION PERIOD | 13B | 4L | 6I |
|---|---|---|---|
| 01/02/14 - 01/30/14 | < 0.9 | < 0.8 | < 0.7 |
| 01/30/14 - 02/27/14 | < 0.7 | < 0.5 | < 0.9 |
| 02/27/14 - 03/27/14 | < 0.5 | < 0.7 | < 0.7 |
| 03/27/14 - 05/01/14 | < 0.7 | < 0.6 | < 0.9 |
| 05/01/14 - 05/29/14 | < 0.8 (1) | < 0.8 | < 0.8 |
| 05/29/14 - 06/26/14 | < 0.5 | < 0.5 | < 0.5 |
| 06/26/14 - 07/31/14 | < 0.6 | < 0.6 | < 0.6 |
| 07/31/14 - 08/28/14 | < 0.8 | < 0.5 | < 0.6 |
| 08/28/14 - 10/02/14 | < 0.7 | < 0.8 | < 0.8 |
| 10/02/14 - 10/30/14 | < 0.6 | < 0.5 | < 0.6 |
| 10/30/14 - 11/26/14 | < 0.7 | < 0.5 | < 0.5 |
| 11/26/14 - 01/02/15 | < 0.5 | < 0.5 | < 0.5 |
| MEAN | - | - | - |

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

**Table C-II.4** **CONCENTRATIONS OF GAMMA EMITTER IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

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 | 12/30/13 - 01/27/14 | < 3 | < 3 | < 7 | < 3 | < 5 | < 3 | < 6 | < 3 | < 3 | < 23 | < 7 |
| | 01/27/14 - 02/24/14 | < 4 | < 3 | < 9 | < 4 | < 7 | < 4 | < 9 | < 4 | < 4 | < 30 | < 9 |
| | 02/24/14 - 03/24/14 | < 4 | < 4 | < 10 | < 3 | < 9 | < 5 | < 6 | < 3 | < 3 | < 33 | < 8 |
| | 03/24/14 - 04/28/14 | < 1 | < 2 | < 3 | < 1 | < 3 | < 2 | < 3 | < 1 | < 2 | < 12 | < 4 |
| | 04/28/14 - 05/19/14 | < 1 | < 2 | < 4 | < 2 | < 3 | < 2 | < 3 | < 1 | < 2 | < 18 | < 5 |
| | 05/19/14 - 06/23/14 | (1) < 4 | < 4 | < 8 | < 3 | < 8 | < 4 | < 7 | < 4 | < 4 | < 18 | < 8 |
| | 06/23/14 - 07/28/14 | < 3 | < 4 | < 8 | < 3 | < 7 | < 4 | < 6 | < 3 | < 3 | < 29 | < 8 |
| | 07/28/14 - 08/25/14 | < 3 | < 3 | < 7 | < 3 | < 4 | < 3 | < 5 | < 3 | < 3 | < 26 | < 7 |
| | 08/25/14 - 09/30/14 | < 4 | < 4 | < 8 | < 4 | < 8 | < 4 | < 7 | < 3 | < 3 | < 28 | < 9 |
| | 09/30/14 - 10/27/14 | < 3 | < 3 | < 7 | < 3 | < 6 | < 3 | < 6 | < 3 | < 3 | < 24 | < 9 |
| | 10/27/14 - 11/24/14 | < 4 | < 5 | < 8 | < 4 | < 8 | < 5 | < 9 | < 5 | < 5 | < 28 | < 8 |
| | 11/24/14 - 12/29/14 | < 6 | < 6 | < 16 | < 7 | < 13 | < 6 | < 11 | < 7 | < 6 | < 30 | < 10 |
| | MEAN | - | - | - | - | - | - | - | - | - | - | - |
| 4L | 01/02/14 - 01/30/14 | < 4 | < 4 | < 9 | < 4 | < 8 | < 4 | < 7 | < 4 | < 4 | < 29 | < 10 |
| | 01/30/14 - 02/27/14 | < 4 | < 5 | < 10 | < 4 | < 9 | < 6 | < 9 | < 4 | < 5 | < 32 | < 9 |
| | 02/27/14 - 03/27/14 | < 5 | < 5 | < 10 | < 4 | < 9 | < 6 | < 9 | < 5 | < 6 | < 34 | < 9 |
| | 03/27/14 - 05/01/14 | < 2 | < 2 | < 5 | < 2 | < 4 | < 2 | < 4 | < 2 | < 2 | < 15 | < 5 |
| | 05/01/14 - 05/29/14 | < 4 | < 5 | < 10 | < 5 | < 10 | < 4 | < 7 | < 5 | < 5 | < 30 | < 13 |
| | 05/29/14 - 06/26/14 | < 5 | < 5 | < 8 | < 6 | < 7 | < 5 | < 10 | < 5 | < 5 | < 25 | < 7 |
| | 06/26/14 - 07/31/14 | < 4 | < 5 | < 9 | < 4 | < 9 | < 5 | < 8 | < 4 | < 4 | < 29 | < 8 |
| | 07/31/14 - 08/28/14 | < 4 | < 6 | < 12 | < 5 | < 10 | < 5 | < 10 | < 5 | < 5 | < 31 | < 13 |
| | 08/28/14 - 10/02/14 | < 5 | < 5 | < 10 | < 6 | < 11 | < 6 | < 9 | < 4 | < 5 | < 29 | < 10 |
| | 10/02/14 - 10/30/14 | < 4 | < 4 | < 9 | < 4 | < 8 | < 5 | < 8 | < 4 | < 5 | < 29 | < 10 |
| | 10/30/14 - 11/26/14 | < 6 | < 5 | < 11 | < 6 | < 10 | < 5 | < 9 | < 5 | < 6 | < 30 | < 6 |
| | 11/26/14 - 01/02/15 | < 6 | < 6 | < 10 | < 5 | < 11 | < 7 | < 12 | < 6 | < 7 | < 27 | < 7 |
| | MEAN | - | - | - | - | - | - | - | - | - | - | - |

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

**Table C-II.4** **CONCENTRATIONS OF GAMMA EMITTER IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6I | 01/02/14 - 01/30/14 | < 4 | < 4 | < 10 | < 4 | < 9 | < 5 | < 8 | < 4 | < 4 | < 26 | < 8 |
| | 01/30/14 - 02/27/14 | < 4 | < 4 | < 8 | < 7 | < 10 | < 5 | < 10 | < 5 | < 6 | < 37 | < 11 |
| | 02/27/14 - 03/27/14 | < 4 | < 4 | < 8 | < 4 | < 8 | < 4 | < 9 | < 4 | < 4 | < 26 | < 8 |
| | 03/27/14 - 05/01/14 | < 2 | < 2 | < 4 | < 2 | < 4 | < 2 | < 3 | < 2 | < 2 | < 13 | < 4 |
| | 05/01/14 - 05/29/14 | < 5 | < 5 | < 11 | < 6 | < 10 | < 6 | < 9 | < 4 | < 5 | < 33 | < 13 |
| | 05/29/14 - 06/26/14 | < 6 | < 5 | < 12 | < 6 | < 14 | < 6 | < 11 | < 7 | < 6 | < 31 | < 10 |
| | 06/26/14 - 07/31/14 | < 4 | < 5 | < 12 | < 5 | < 10 | < 6 | < 8 | < 5 | < 5 | < 30 | < 9 |
| | 07/31/14 - 08/28/14 | < 5 | < 5 | < 15 | < 6 | < 12 | < 7 | < 10 | < 5 | < 6 | < 33 | < 11 |
| | 08/28/14 - 10/02/14 | < 4 | < 5 | < 9 | < 5 | < 9 | < 5 | < 8 | < 4 | < 5 | < 28 | < 11 |
| | 10/02/14 - 10/30/14 | < 4 | < 5 | < 9 | < 4 | < 7 | < 5 | < 8 | < 3 | < 5 | < 35 | < 11 |
| | 10/30/14 - 11/26/14 | < 7 | < 8 | < 15 | < 7 | < 14 | < 7 | < 11 | < 6 | < 8 | < 34 | < 11 |
| | 11/26/14 - 01/02/15 | < 5 | < 6 | < 12 | < 5 | < 14 | < 7 | < 10 | < 5 | < 7 | < 25 | < 8 |
| | 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, 2014**

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 | PREDATOR | | | | | | | | |
| | 06/20/14 | 3508 ± 891 | < 41 | < 45 | < 108 | < 51 | < 71 | < 35 | < 40 |
| | 09/26/14 | 2470 ± 575 | < 38 | < 37 | < 80 | < 43 | < 73 | < 30 | < 36 |
| | MEAN | 2989 ± 1468 | - | - | - | - | - | - | - |
| 4 | BOTTOM FEEDER | | | | | | | | |
| | 06/16/14 | 3430 ± 764 | < 54 | < 51 | < 101 | < 48 | < 118 | < 47 | < 49 |
| | 09/26/14 | 3293 ± 637 | < 40 | < 38 | < 93 | < 39 | < 89 | < 44 | < 40 |
| | MEAN | 3362 ± 194 | - | - | - | - | - | - | - |
| 6 | PREDATOR | | | | | | | | |
| | 06/12/14 | 3393 ± 947 | < 61 | < 48 | < 107 | < 57 | < 119 | < 65 | < 59 |
| | 09/29/14 | 3587 ± 1077 | < 58 | < 61 | < 137 | < 56 | < 132 | < 67 | < 68 |
| | MEAN | 3490 ± 274 | - | - | - | - | - | - | - |
| 6 | BOTTOM FEEDER | | | | | | | | |
| | 06/12/14 | 4000 ± 1197 | < 71 | < 76 | < 139 | < 67 | < 137 | < 72 | < 73 |
| | 09/29/14 | 2997 ± 913 | < 37 | < 34 | < 85 | < 31 | < 96 | < 37 | < 43 |
| | MEAN | 3499 ± 1418 | - | - | - | - | - | - | - |

**Table C-IV.1** **CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

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 | 06/16/14 | 18030 ± 1926 | < 66 | < 80 | < 86 | < 79 | 241 ± 112 | (1) |
| | 11/25/14 | 13460 ± 1156 | < 51 | < 42 | < 69 | < 44 | 107 ± 52 | (1) |
| | MEAN | 15745 ± 6463 | - | - | - | - | 174 ± 190 | |
| 4T | 06/16/14 | 26710 ± 2678 | < 138 | < 116 | < 150 | < 118 | < 152 | |
| | 11/25/14 | 22730 ± 3091 | < 131 | < 99 | < 133 | < 111 | 237 ± 113 | (1) |
| | MEAN | 24720 ± 5629 | - | - | - | - | - | |
| 6F | 06/16/14 | 11730 ± 1503 | < 66 | < 78 | < 49 | < 67 | < 72 | |
| | 11/25/14 | 17750 ± 1525 | < 67 | < 55 | < 91 | < 59 | 141 ± 68 | (1) |
| | MEAN | 14740 ± 8514 | - | - | - | - | - | |

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

**Table C-V.1** **CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

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

| COLLECTION PERIOD | GROUP I | | | GROUP II | GROUP III |
|---|---|---|---|---|---|
| | 1B | 1C | 1Z | 3A | 5H2 |
| 12/30/13 - 01/06/14 | | | | | 20 ± 5 |
| 01/01/14 - 01/09/14 | 17 ± 5 | 17 ± 5 | 19 ± 5 | 23 ± 5 | |
| 01/06/14 - 01/13/14 | | | | | 21 ± 5 |
| 01/09/14 - 01/15/14 | 24 ± 7 | 19 ± 6 | 17 ± 6 | 17 ± 6 | |
| 01/13/14 - 01/20/14 | | | | | < 7 |
| 01/15/14 - 01/23/14 | 21 ± 5 | 24 ± 5 | 21 ± 5 | 22 ± 5 | |
| 01/22/14 - 01/27/14 | | | | | 20 ± 7 |
| 01/23/14 - 01/30/14 | 17 ± 5 | 18 ± 5 | 18 ± 5 | 18 ± 5 | |
| 01/27/14 - 02/04/14 | | | | | 15 ± 5 |
| 01/30/14 - 02/06/14 | 20 ± 5 | 19 ± 5 | 23 ± 6 | 23 ± 6 | |
| 02/04/14 - 02/10/14 | | | | | 39 ± 10 |
| 02/06/14 - 02/12/14 | 35 ± 7 | 38 ± 7 | 37 ± 7 | 37 ± 7 | |
| 02/10/14 - 02/17/14 | | | | | 25 ± 6 |
| 02/12/14 - 02/20/14 | 24 ± 5 | 17 ± 5 | 19 ± 5 | 21 ± 5 | |
| 02/17/14 - 02/24/14 | | | | | 13 ± 5 |
| 02/20/14 - 02/27/14 | 15 ± 5 | 15 ± 5 | 17 ± 5 | 17 ± 5 | |
| 02/24/14 - 03/02/14 | | | | | 29 ± 7 |
| 02/27/14 - 03/06/14 | 28 ± 6 | 33 ± 6 | 30 ± 6 | 33 ± 6 | |
| 03/02/14 - 03/10/14 | | | | | 20 ± 5 |
| 03/06/14 - 03/13/14 | 27 ± 6 | 21 ± 5 | 23 ± 5 | 24 ± 5 | |
| 03/10/14 - 03/16/14 | | | | | 21 ± 6 |
| 03/13/14 - 03/20/14 | 13 ± 5 | 13 ± 5 | 13 ± 5 | 11 ± 5 | |
| 03/16/14 - 03/24/14 | | | | | 12 ± 4 |
| 03/20/14 - 03/27/14 | 15 ± 5 | 18 ± 6 | 16 ± 5 | 20 ± 6 | |
| 03/24/14 - 03/31/14 | | | | | 16 ± 5 |
| 03/27/14 - 04/03/14 | 21 ± 5 | 17 ± 5 | 15 ± 5 | 16 ± 5 | |
| 03/31/14 - 04/07/14 | | | | | 15 ± 5 |
| 04/03/14 - 04/09/14 | 14 ± 6 | 10 ± 5 | 14 ± 6 | 15 ± 6 | |
| 04/07/14 - 04/14/14 | | | | | 9 ± 5 |
| 04/09/14 - 04/17/14 | 15 ± 4 | 21 ± 5 | 16 ± 5 | 16 ± 4 | |
| 04/14/14 - 04/21/14 | | | | | 19 ± 5 |
| 04/17/14 - 04/24/14 | 17 ± 6 | 14 ± 5 | 17 ± 6 | 17 ± 5 | |
| 04/21/14 - 04/28/14 | | | | | 18 ± 5 |
| 04/24/14 - 05/01/14 | 15 ± 5 | 10 ± 5 | 15 ± 5 | 9 ± 5 | |
| 04/28/14 - 05/05/14 | | | | | 9 ± 5 |
| 05/01/14 - 05/08/14 | 8 ± 5 | 15 ± 5 | 12 ± 5 | 13 ± 3 | |
| 05/05/14 - 05/12/14 | | | | | 14 ± 5 |
| 05/08/14 - 05/15/14 | 17 ± 5 | 16 ± 5 | 13 ± 5 | 15 ± 5 | |
| 05/12/14 - 05/19/14 | | | | | 10 ± 5 |
| 05/15/14 - 05/22/14 | 12 ± 5 | 12 ± 5 | 15 ± 6 | 13 ± 5 | |
| 05/19/14 - 05/27/14 | | | | | 19 ± 5 |
| 05/22/14 - 05/29/14 | 11 ± 5 | 15 ± 5 | 9 ± 5 | 9 ± 5 | |
| 05/27/14 - 06/02/14 | | | | | 13 ± 5 |
| 05/29/14 - 06/05/14 | 11 ± 5 | 14 ± 5 | 13 ± 5 | 9 ± 5 | |
| 06/02/14 - 06/09/14 | | | | | 14 ± 5 |
| 06/05/14 - 06/12/14 | 9 ± 5 | 10 ± 5 | < 7 | 9 ± 5 | |
| 06/09/14 - 06/16/14 | | | | | 10 ± 5 |
| 06/12/14 - 06/19/14 | 16 ± 5 | 12 ± 5 | 16 ± 5 | (1) | |
| 06/16/14 - 06/23/14 | | | | | 14 ± 5 |
| 06/19/14 - 06/26/14 | 13 ± 5 | < 6 (1) | 18 ± 5 | 15 ± 5 | |
| 06/23/14 - 06/30/14 | | | | | 11 ± 5 |
| 06/26/14 - 07/02/14 | 20 ± 6 | 16 ± 5 | 16 ± 5 | 14 ± 5 | |

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

**Table C-V.1** **CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

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

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

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

**Table C-V.2** **MONTHLY AND YEARLY MEAN VALUES OF GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

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

| GROUP I - ON-SITE LOCATIONS | | | | GROUP II - INTERMEDIATE DISTANCE LOCATIONS | | | | GROUP III - CONTROL LOCATIONS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| COLLECTION PERIOD | MIN | MAX | MEAN ± 2SD | COLLECTION PERIOD | MIN | MAX | MEAN ± 2SD | COLLECTION PERIOD | MIN | MAX | MEAN ± 2SD |
| 01/01/14 - 01/30/14 | 17 | 24 | 19 ± 5 | 01/01/14 - 01/30/14 | 17 | 23 | 20 ± 6 | 12/30/13 - 01/27/14 | 20 | 21 | 20 ± 1 |
| 01/30/14 - 02/27/14 | 15 | 38 | 23 ± 17 | 01/30/14 - 02/27/14 | 17 | 37 | 24 ± 18 | 01/27/14 - 03/02/14 | 13 | 39 | 24 ± 21 |
| 02/27/14 - 04/03/14 | 13 | 33 | 20 ± 13 | 02/27/14 - 04/03/14 | 11 | 33 | 21 ± 16 | 03/02/14 - 03/31/14 | 12 | 21 | 17 ± 8 |
| 04/03/14 - 05/01/14 | 10 | 21 | 15 ± 6 | 04/03/14 - 05/01/14 | 9 | 17 | 14 ± 7 | 03/31/14 - 04/28/14 | 9 | 19 | 15 ± 9 |
| 05/01/14 - 05/29/14 | 8 | 17 | 13 ± 6 | 05/01/14 - 05/29/14 | 9 | 15 | 12 ± 5 | 04/28/14 - 05/27/14 | 9 | 19 | 13 ± 10 |
| 05/29/14 - 07/02/14 | 9 | 20 | 14 ± 6 | 05/29/14 - 07/02/14 | 9 | 15 | 12 ± 6 | 05/27/14 - 06/30/14 | 10 | 14 | 12 ± 4 |
| 07/02/14 - 07/31/14 | 9 | 17 | 14 ± 5 | 07/02/14 - 07/31/14 | 11 | 15 | 13 ± 4 | 06/30/14 - 07/07/14 | 23 | 23 | - |
| 07/31/14 - 09/04/14 | 12 | 20 | 15 ± 5 | 07/31/14 - 09/04/14 | 11 | 17 | 13 ± 4 | 08/04/14 - 09/02/14 | - | - | - |
| 09/04/14 - 10/02/14 | 12 | 29 | 18 ± 10 | 09/04/14 - 10/02/14 | 12 | 20 | 16 ± 8 | 09/02/14 - 09/30/14 | - | - | - |
| 10/02/14 - 10/30/14 | 10 | 23 | 16 ± 8 | 10/02/14 - 10/30/14 | 13 | 20 | 16 ± 6 | 09/30/14 - 11/03/14 | 8 | 17 | 14 ± 8 |
| 10/30/14 - 12/04/14 | 12 | 27 | 18 ± 9 | 10/30/14 - 12/04/14 | 12 | 26 | 16 ± 11 | 11/03/14 - 12/01/14 | 13 | 18 | 16 ± 5 |
| 12/04/14 - 01/02/15 | 8 | 28 | 17 ± 11 | 12/04/14 - 01/02/15 | 9 | 20 | 16 ± 9 | 12/01/14 - 12/29/14 | 9 | 17 | 13 ± 6 |
| 01/01/14 - 01/02/15 | 8 | 38 | 17 ± 11 | 01/01/14 - 01/02/15 | 9 | 37 | 16 ± 11 | 12/30/13 - 12/29/14 | 8 | 39 | 16 ± 12 |

**Table C-V.3** **CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

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 |
|---|---|---|---|---|---|---|---|
| 1B | 01/01/14 - 04/03/14 | 69 ± 22 | < 3 | < 3 | < 3 | < 2 | < 2 |
| | 04/03/14 - 07/02/14 | 83 ± 34 | < 3 | < 4 | < 3 | < 3 | < 3 |
| | 07/02/14 - 10/02/14 | 64 ± 25 | < 3 | < 3 | < 5 | < 3 | < 3 |
| | 10/02/14 - 01/02/15 | 46 ± 3 | < 0.3 | < 0.3 | < 0.3 | < 0.3 | < 0.2 |
| | MEAN | 66 ± 31 | - | - | - | - | - |
| 1C | 01/01/14 - 04/03/14 | 93 ± 27 | < 5 | < 6 | < 4 | < 4 | < 4 |
| | 04/03/14 - 07/02/14 | 54 ± 17 | < 2 | < 2 | < 2 | < 2 | < 2 |
| | 07/02/14 - 10/02/14 | 58 ± 17 | < 2 | < 1 | < 2 | < 2 | < 2 |
| | 10/02/14 - 01/02/15 | 54 ± 6 | < 1 | < 1 | < 1 | < 1 | < 1 |
| | MEAN | 65 ± 38 | - | - | - | - | - |
| 1Z | 01/01/14 - 04/03/14 | 58 ± 26 | < 3 | < 3 | < 3 | < 3 | < 3 |
| | 04/03/14 - 07/02/14 | 66 ± 18 | < 2 | < 2 | < 2 | < 2 | < 2 |
| | 07/02/14 - 10/02/14 | 63 ± 17 | < 2 | < 3 | < 2 | < 3 | < 2 |
| | 10/02/14 - 01/02/15 | 57 ± 21 | < 2 | < 4 | < 3 | < 3 | < 3 |
| | MEAN | 61 ± 9 | - | - | - | - | - |
| 3A | 01/01/14 - 04/03/14 | 75 ± 24 | < 4 | < 3 | < 3 | < 4 | < 3 |
| | 04/03/14 - 07/02/14 | 70 ± 27 | < 3 | < 4 | < 3 | < 3 | < 2 |
| | 07/02/14 - 10/02/14 | 54 ± 23 | < 2 | < 1 | < 2 | < 2 | < 2 |
| | 10/02/14 - 01/02/15 | 69 ± 30 | < 4 | < 4 | < 1 | < 3 | < 3 |
| | MEAN | 67 ± 18 | - | - | - | - | - |
| 5H2 | 12/30/13 - 03/31/14 | 68 ± 24 | < 3 | < 4 | < 3 | < 3 | < 3 |
| | 03/31/14 - 06/30/14 | 65 ± 23 | < 3 | < 3 | < 3 | < 3 | < 3 |
| | 06/30/14 - 07/07/14 | < 203 | < 8 | < 17 | < 7 | < 7 | < 7 |
| | 09/30/14 - 12/29/14 | 59 ± 25 | < 3 | < 3 | < 3 | < 2 | < 2 |
| | MEAN | 64 ± 10 | - | - | - | - | - |

**Table C-VI.1** **CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

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

| COLLECTION PERIOD | GROUP I | | | GROUP II | GROUP III |
|---|---|---|---|---|---|
| | 1B | 1C | 1Z | 3A | 5H2 |
| 12/30/13 - 01/06/14 | | | | | < 26 |
| 01/01/14 - 01/09/14 | < 62 | < 62 | < 61 | < 61 | |
| 01/06/14 - 01/13/14 | | | | | < 18 |
| 01/09/14 - 01/15/14 | < 36 | < 36 | < 35 | < 19 | |
| 01/13/14 - 01/20/14 | | | | | < 28 |
| 01/15/14 - 01/23/14 | < 50 | < 50 | < 50 | < 54 | |
| 01/22/14 - 01/27/14 | | | | | < 47 |
| 01/23/14 - 01/30/14 | < 52 | < 52 | < 51 | < 52 | |
| 01/27/14 - 02/04/14 | | | | | < 10 |
| 01/30/14 - 02/06/14 | < 37 | < 37 | < 36 | < 43 | |
| 02/04/14 - 02/10/14 | | | | | < 33 |
| 02/06/14 - 02/12/14 | < 23 | < 54 | < 54 | < 56 | |
| 02/10/14 - 02/17/14 | | | | | < 28 |
| 02/12/14 - 02/20/14 | < 47 | < 47 | < 46 | < 48 | |
| 02/17/14 - 02/24/14 | | | | | < 18 |
| 02/20/14 - 02/27/14 | < 38 | < 21 | < 39 | < 38 | |
| 02/24/14 - 03/02/14 | | | | | < 22 |
| 02/27/14 - 03/06/14 | < 69 | < 70 | < 69 | < 70 | |
| 03/02/14 - 03/10/14 | | | | | < 22 |
| 03/06/14 - 03/13/14 | < 68 | < 67 | < 67 | < 26 | |
| 03/10/14 - 03/16/14 | | | | | < 24 |
| 03/13/14 - 03/20/14 | < 68 | < 70 | < 69 | < 69 | |
| 03/16/14 - 03/24/14 | | | | | < 22 |
| 03/20/14 - 03/27/14 | < 53 | < 53 | < 22 | < 53 | |
| 03/24/14 - 03/31/14 | | | | | < 29 |
| 03/27/14 - 04/03/14 | < 60 | < 60 | < 60 | < 60 | |
| 03/31/14 - 04/07/14 | | | | | < 28 |
| 04/03/14 - 04/09/14 | < 29 | < 68 | < 68 | < 68 | |
| 04/07/14 - 04/14/14 | | | | | < 24 |
| 04/09/14 - 04/17/14 | < 64 | < 64 | < 64 | < 64 | |
| 04/14/14 - 04/21/14 | | | | | < 19 |
| 04/17/14 - 04/24/14 | < 68 | < 28 | < 67 | < 67 | |
| 04/21/14 - 04/28/14 | | | | | < 24 |
| 04/24/14 - 05/01/14 | < 67 | < 67 | < 67 | < 67 | |
| 04/28/14 - 05/05/14 | | | | | < 33 |
| 05/01/14 - 05/08/14 | < 30 | < 30 | < 29 | < 12 | |
| 05/05/14 - 05/12/14 | | | | | < 35 |
| 05/08/14 - 05/15/14 | < 46 | < 46 | < 46 | < 46 | |
| 05/12/14 - 05/19/14 | | | | | < 35 |
| 05/15/14 - 05/22/14 | < 62 | < 61 | < 24 | < 62 | |
| 05/19/14 - 05/27/14 | | | | | < 22 |
| 05/22/14 - 05/29/14 | < 54 | < 54 | < 53 | < 55 | |
| 05/27/14 - 06/02/14 | | | | | < 38 |
| 05/29/14 - 06/05/14 | < 32 | < 59 | < 59 | < 59 | |
| 06/02/14 - 06/09/14 | | | | | < 18 |
| 06/05/14 - 06/12/14 | < 50 | < 49 | < 49 | < 49 | |
| 06/09/14 - 06/16/14 | | | | | < 16 |
| 06/12/14 - 06/19/14 | < 63 | < 26 | < 62 | (1) | |
| 06/16/14 - 06/23/14 | | | | | < 33 |
| 06/19/14 - 06/26/14 | < 35 | < 34 (1) | < 34 | < 41 | |
| 06/23/14 - 06/30/14 | | | | | < 40 |
| 06/26/14 - 07/02/14 | < 33 | < 33 | < 33 | < 33 | |

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

**Table C-VI.1** **CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

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

| COLLECTION PERIOD | GROUP I | | | GROUP II | GROUP III |
|---|---|---|---|---|---|
| | 1B | 1C | 1Z | 3A | 5H2 |
| 06/30/14 - 07/07/14 | | | | | < 65 |
| 07/02/14 - 07/10/14 | < 53 | < 53 | < 52 | < 52 | |
| 07/07/14 - 07/14/14 | | | | | (1) |
| 07/10/14 - 07/17/14 | < 48 | < 48 | < 20 | < 48 | |
| 07/14/14 - 07/21/14 | | | | | (1) |
| 07/17/14 - 07/23/14 | < 63 | < 62 | < 24 | < 62 | |
| 07/21/14 - 07/28/14 | | | | | (1) |
| 07/23/14 - 07/31/14 | < 13 | < 28 | < 28 | < 25 | |
| 07/28/14 - 08/04/14 | | | | | (1) |
| 07/31/14 - 08/07/14 | < 31 | < 36 | < 36 | < 31 | |
| 08/04/14 - 08/11/14 | | | | | (1) |
| 08/07/14 - 08/14/14 | < 50 | < 57 | < 56 | < 49 | |
| 08/11/14 - 08/18/14 | | | | | (1) |
| 08/14/14 - 08/21/14 | < 39 | < 23 | < 44 | < 39 | |
| 08/18/14 - 08/25/14 | | | | | (1) |
| 08/21/14 - 08/28/14 | < 47 | < 54 | < 53 | < 18 | |
| 08/25/14 - 09/02/14 | | | | | (1) |
| 08/28/14 - 09/04/14 | < 44 | < 50 | < 50 | < 42 | |
| 09/02/14 - 09/08/14 | | | | | (1) |
| 09/04/14 - 09/11/14 | < 24 | < 27 | < 10 | < 23 | |
| 09/08/14 - 09/15/14 | | | | | (1) |
| 09/11/14 - 09/18/14 | < 23 | (1) | < 24 | < 22 | |
| 09/15/14 - 09/22/14 | | | | | (1) |
| 09/18/14 - 09/25/14 | < 15 | < 53 | < 41 | < 38 | |
| 09/22/14 - 09/30/14 | | | | | (1) |
| 09/25/14 - 10/02/14 | < 55 | < 62 | < 56 | < 53 | |
| 09/30/14 - 10/07/14 | | | | | < 24 |
| 10/02/14 - 10/09/14 | < 52 | < 24 | < 54 | < 50 | |
| 10/07/14 - 10/13/14 | | | | | < 55 |
| 10/09/14 - 10/16/14 | < 57 | < 62 | < 58 | < 53 | |
| 10/13/14 - 10/20/14 | | | | | < 27 |
| 10/16/14 - 10/23/14 | < 40 | < 44 | < 41 | < 38 | |
| 10/20/14 - 10/27/14 | | | | | < 42 |
| 10/23/14 - 10/30/14 | < 30 | < 32 | < 30 | < 28 | |
| 10/27/14 - 11/03/14 | | | | | < 14 |
| 10/30/14 - 11/06/14 | < 47 | < 51 | < 47 | < 18 | |
| 11/03/14 - 11/10/14 | | | | | < 8 |
| 11/06/14 - 11/13/14 | < 45 | < 47 | < 45 | < 41 | |
| 11/10/14 - 11/18/14 | | | | | < 11 |
| 11/13/14 - 11/20/14 | < 49 | < 50 | < 19 | < 44 | |
| 11/18/14 - 11/24/14 | | | | | < 28 |
| 11/20/14 - 11/26/14 | < 69 | < 56 | < 68 | < 60 | |
| 11/24/14 - 12/01/14 | | | | | < 42 |
| 11/26/14 - 12/04/14 | < 46 | < 49 | < 45 | < 41 | |
| 12/01/14 - 12/08/14 | | | | | < 22 |
| 12/04/14 - 12/11/14 | < 38 | < 70 | < 65 | < 65 | |
| 12/08/14 - 12/15/14 | | | | | < 8 |
| 12/11/14 - 12/18/14 | < 58 | < 59 | < 69 | < 62 | |
| 12/15/14 - 12/22/14 | | | | | < 15 |
| 12/18/14 - 12/26/14 | < 62 | < 63 | < 61 | < 54 | |
| 12/22/14 - 12/29/14 | | | | | < 33 |
| 12/26/14 - 01/02/15 | < 32 | < 13 | < 31 | < 28 | |
| MEAN | - | - | - | - | - |

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

**Table C-VII.1** **CONCENTRATIONS OF I-131 IN MILK SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| | CONTROL FARM | | | INDICATOR FARM | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| COLLECTION PERIOD | C | E | V | D | J | L | P | R | S | U | W |
| 01/06/14 | | | < 0.6 | | < 0.6 | | | < 0.7 | < 0.6 | < 0.6 | |
| 02/04/14 | < 0.7 | < 0.7 | < 0.6 | < 0.8 | < 0.9 | < 0.7 | < 0.7 | < 0.8 | < 0.7 | < 0.8 | < 0.7 |
| 03/03/14 | | | < 0.9 | | < 0.8 | | | < 0.9 | < 0.9 | < 0.8 | |
| 04/07/14 | | | < 0.8 | | < 0.7 | | | < 0.7 | < 0.9 | < 0.7 | |
| 04/21/14 | | | < 0.6 | | < 0.6 | | | < 0.6 | < 0.7 | < 0.7 | |
| 05/06/14 | < 0.9 | < 0.9 | < 0.4 | < 0.8 | < 0.8 | < 0.8 | < 1.0 | < 0.9 | < 0.9 | < 1.0 | < 0.8 |
| 05/19/14 | | | < 0.8 | | < 0.8 | | | < 0.9 | < 0.7 | < 0.9 | |
| 05/30/14 | | | < 0.5 | | | | | | | | |
| 06/02/14 | | | | | < 0.8 | | | < 0.8 | < 0.8 | < 0.9 | |
| 06/16/14 | | | < 0.5 | | < 0.6 | | | < 0.6 | < 0.6 | < 0.7 | |
| 06/30/14 | | | < 0.7 | | < 0.6 | | | < 0.5 | < 0.7 | < 0.6 | |
| 07/11/14 | | | < 0.5 | | | | | | | | |
| 07/14/14 | | | | | < 0.5 | | | < 0.5 | < 0.5 | < 0.4 | |
| 07/28/14 | | | < 0.6 | | < 0.6 | | | < 0.6 | < 0.7 | < 0.6 | |
| 08/12/14 | < 0.6 | < 0.6 | < 0.6 | < 0.5 | < 0.4 | < 0.5 | < 0.6 | < 0.5 | < 0.5 | < 0.4 | < 0.6 |
| 08/25/14 | | | < 0.7 | | < 0.9 | | | < 0.4 | < 1.0 | < 0.8 | |
| 09/08/14 | | | < 0.6 | | < 0.7 | | | < 0.8 | < 0.8 | < 0.6 | |
| 09/18/14 | | | < 0.6 | | | | | | | | |
| 09/22/14 | | | | | < 0.6 | | | < 0.6 | < 0.6 | < 0.7 | |
| 10/06/14 | | | < 0.7 | | < 0.6 | | | < 0.6 | < 0.7 | < 0.8 | |
| 10/20/14 | | | < 0.7 | | < 0.4 | | | < 0.6 | < 0.8 | < 0.5 | |
| 11/04/14 | < 0.5 | < 0.5 | < 0.6 | < 0.4 | < 0.4 | < 0.4 | < 0.4 | < 0.4 | < 0.5 | < 0.4 | < 0.5 |
| 11/17/14 | | | < 0.9 | | < 0.3 | | | < 0.6 | < 0.6 | < 0.4 | |
| 12/08/14 | | | < 0.8 | | < 0.8 | | | < 0.6 | < 0.8 | < 0.8 | |
| MEAN | - | - | - | - | - | - | - | - | - | - | - |

**Table C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| SITE | COLLECTION PERIOD | K-40 | Cs-134 | Cs-137 | Ba-140 | La-140 |
|---|---|---|---|---|---|---|
| C | 02/03/14 | 1294 ± 183 | < 9 | < 9 | < 45 | < 11 |
| | 05/05/14 | 1330 ± 148 | < 5 | < 6 | < 31 | < 7 |
| | 08/11/14 | 1211 ± 102 | < 4 | < 5 | < 29 | < 9 |
| | 11/03/14 | 1257 ± 115 | < 4 | < 5 | < 23 | < 5 |
| | MEAN | 1273 ± 102 | - | - | - | - |
| E | 02/03/14 | 1214 ± 178 | < 7 | < 7 | < 44 | < 15 |
| | 05/05/14 | 1260 ± 166 | < 6 | < 6 | < 37 | < 9 |
| | 08/11/14 | 1310 ± 156 | < 6 | < 6 | < 41 | < 9 |
| | 11/03/14 | 1281 ± 151 | < 5 | < 6 | < 29 | < 10 |
| | MEAN | 1266 ± 81 | - | - | - | - |
| V | 01/04/14 | 1209 ± 135 | < 6 | < 5 | < 39 | < 12 |
| | 02/01/14 | 1156 ± 118 | < 5 | < 6 | < 32 | < 11 |
| | 03/01/14 | 1185 ± 120 | < 4 | < 4 | < 30 | < 8 |
| | 04/05/14 | 1291 ± 120 | < 5 | < 6 | < 33 | < 7 |
| | 04/19/14 | 1265 ± 120 | < 7 | < 8 | < 43 | < 12 |
| | 05/03/14 | 1165 ± 161 | < 4 | < 7 | < 38 | < 7 |
| | 05/17/14 | 1277 ± 137 | < 5 | < 6 | < 35 | < 4 |
| | 05/30/14 | 1374 ± 112 | < 4 | < 5 | < 31 | < 10 |
| | 06/14/14 | 1390 ± 153 | < 8 | < 9 | < 51 | < 12 |
| | 06/30/14 | 1160 ± 139 | < 5 | < 7 | < 24 | < 5 |
| | 07/11/14 | 1261 ± 190 | < 7 | < 7 | < 41 | < 14 |
| | 07/26/14 | 1114 ± 131 | < 6 | < 6 | < 36 | < 10 |
| | 08/09/14 | 1270 ± 111 | < 4 | < 5 | < 25 | < 7 |
| | 08/23/14 | 1372 ± 90 | < 3 | < 4 | < 26 | < 7 |
| | 09/08/14 | 1389 ± 158 | < 7 | < 7 | < 35 | < 10 |
| | 09/18/14 | 1239 ± 138 | < 4 | < 6 | < 36 | < 12 |
| | 10/06/14 | 1296 ± 167 | < 7 | < 6 | < 41 | < 11 |
| | 10/18/14 | 1207 ± 49 | < 2 | < 2 | < 21 | < 6 |
| | 10/31/14 | 1298 ± 179 | < 7 | < 8 | < 43 | < 12 |
| | 11/15/14 | 1273 ± 105 | < 4 | < 5 | < 56 | < 11 |
| | 12/08/14 | 1180 ± 140 | < 5 | < 5 | < 19 | < 6 |
| | MEAN | 1256 ± 162 | - | - | - | - |
| D | 02/03/14 | 1393 ± 184 | < 7 | < 8 | < 45 | < 11 |
| | 05/06/14 | 1328 ± 205 | < 5 | < 6 | < 33 | < 9 |
| | 08/12/14 | 1399 ± 197 | < 7 | < 9 | < 44 | < 14 |
| | 11/04/14 | 1386 ± 137 | < 5 | < 6 | < 23 | < 8 |
| | MEAN | 1377 ± 66 | - | - | - | - |

**Table C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| SITE | COLLECTION PERIOD | K-40 | Cs-134 | Cs-137 | Ba-140 | La-140 |
|---|---|---|---|---|---|---|
| J | 01/06/14 | 1093 ± 143 | < 5 | < 6 | < 39 | < 12 |
| | 02/03/14 | 1433 ± 193 | < 8 | < 7 | < 39 | < 8 |
| | 03/03/14 | 1352 ± 149 | < 7 | < 7 | < 44 | < 9 |
| | 04/07/14 | 1156 ± 167 | < 7 | < 7 | < 36 | < 12 |
| | 04/21/14 | 1335 ± 142 | < 6 | < 6 | < 33 | < 9 |
| | 05/05/14 | 1212 ± 182 | < 7 | < 8 | < 47 | < 12 |
| | 05/19/14 | 1287 ± 129 | < 7 | < 7 | < 46 | < 11 |
| | 06/02/14 | 1167 ± 130 | < 6 | < 7 | < 39 | < 8 |
| | 06/16/14 | 1223 ± 160 | < 6 | < 7 | < 33 | < 8 |
| | 06/30/14 | 1145 ± 157 | < 6 | < 7 | < 22 | < 8 |
| | 07/14/14 | 1172 ± 165 | < 7 | < 8 | < 36 | < 8 |
| | 07/28/14 | 1273 ± 122 | < 5 | < 5 | < 32 | < 6 |
| | 08/11/14 | 1138 ± 135 | < 5 | < 7 | < 35 | < 11 |
| | 08/25/14 | 1265 ± 115 | < 4 | < 4 | < 34 | < 10 |
| | 09/08/14 | 1201 ± 164 | < 7 | < 8 | < 41 | < 14 |
| | 09/22/14 | 1121 ± 172 | < 7 | < 9 | < 38 | < 13 |
| | 10/06/14 | 1116 ± 184 | < 8 | < 8 | < 40 | < 13 |
| | 10/20/14 | 1239 ± 59 | < 2 | < 2 | < 27 | < 7 |
| | 11/03/14 | 1292 ± 162 | < 8 | < 10 | < 47 | < 11 |
| | 11/17/14 | 1354 ± 121 | < 4 | < 5 | < 34 | < 13 |
| | 12/08/14 | 1274 ± 148 | < 5 | < 7 | < 24 | < 9 |
| | MEAN | 1231 ± 183 | - | - | - | - |
| L | 02/03/14 | 1305 ± 165 | < 6 | < 7 | < 39 | < 12 |
| | 05/05/14 | 1341 ± 152 | < 9 | < 9 | < 43 | < 10 |
| | 08/11/14 | 1374 ± 157 | < 7 | < 7 | < 39 | < 12 |
| | 11/03/14 | 1343 ± 162 | < 6 | < 6 | < 33 | < 10 |
| | MEAN | 1341 ± 56 | - | - | - | - |
| P | 02/03/14 | 1178 ± 146 | < 5 | < 6 | < 35 | < 9 |
| | 05/05/14 | 1058 ± 147 | < 6 | < 8 | < 40 | < 10 |
| | 08/11/14 | 1248 ± 179 | < 5 | < 6 | < 38 | < 11 |
| | 11/03/14 | 1365 ± 139 | < 6 | < 7 | < 29 | < 12 |
| | MEAN | 1212 ± 257 | - | - | - | - |

**Table C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| SITE | COLLECTION PERIOD | K-40 | Cs-134 | Cs-137 | Ba-140 | La-140 |
|---|---|---|---|---|---|---|
| R | 01/06/14 | 1172 ± 135 | < 7 | < 6 | < 36 | < 8 |
| | 02/03/14 | 1506 ± 167 | < 8 | < 9 | < 46 | < 13 |
| | 03/03/14 | 1419 ± 132 | < 5 | < 6 | < 33 | < 8 |
| | 04/07/14 | 1161 ± 145 | < 6 | < 7 | < 38 | < 10 |
| | 04/21/14 | 1298 ± 122 | < 5 | < 5 | < 27 | < 8 |
| | 05/05/14 | 1325 ± 141 | < 6 | < 7 | < 33 | < 11 |
| | 05/19/14 | 1311 ± 113 | < 5 | < 5 | < 26 | < 7 |
| | 06/02/14 | 1521 ± 145 | < 5 | < 7 | < 32 | < 11 |
| | 06/16/14 | 1335 ± 189 | < 9 | < 10 | < 42 | < 10 |
| | 06/30/14 | 1250 ± 149 | < 6 | < 7 | < 20 | < 7 |
| | 07/14/14 | 1134 ± 169 | < 7 | < 8 | < 35 | < 10 |
| | 07/28/14 | 1303 ± 181 | < 5 | < 7 | < 30 | < 6 |
| | 08/11/14 | 1395 ± 116 | < 4 | < 5 | < 28 | < 9 |
| | 08/25/14 | 1378 ± 114 | < 5 | < 5 | < 33 | < 10 |
| | 09/08/14 | 1326 ± 131 | < 5 | < 6 | < 30 | < 8 |
| | 09/22/14 | 1326 ± 153 | < 6 | < 6 | < 33 | < 10 |
| | 10/06/14 | 1176 ± 181 | < 8 | < 11 | < 52 | < 15 |
| | 10/20/14 | 1248 ± 51 | < 2 | < 2 | < 20 | < 7 |
| | 11/03/14 | 1342 ± 170 | < 6 | < 8 | < 36 | < 7 |
| | 11/17/14 | 1200 ± 109 | < 4 | < 5 | < 39 | < 12 |
| | 12/08/14 | 1416 ± 116 | < 4 | < 5 | < 19 | < 6 |
| | MEAN | 1312 ± 215 | - | - | - | - |
| S | 01/06/14 | 1336 ± 122 | < 5 | < 5 | < 26 | < 8 |
| | 02/03/14 | 1205 ± 146 | < 6 | < 5 | < 31 | < 7 |
| | 03/03/14 | 1278 ± 149 | < 6 | < 5 | < 40 | < 13 |
| | 04/07/14 | 1297 ± 135 | < 6 | < 6 | < 30 | < 9 |
| | 04/21/14 | 1286 ± 133 | < 6 | < 6 | < 38 | < 10 |
| | 05/05/14 | 1438 ± 152 | < 8 | < 8 | < 42 | < 11 |
| | 05/19/14 | 1475 ± 169 | < 6 | < 7 | < 44 | < 15 |
| | 06/02/14 | 1314 ± 152 | < 5 | < 6 | < 37 | < 11 |
| | 06/16/14 | 1281 ± 158 | < 7 | < 9 | < 35 | < 12 |
| | 06/30/14 | 1283 ± 132 | < 5 | < 5 | < 22 | < 7 |
| | 07/14/14 | 1260 ± 159 | < 5 | < 6 | < 33 | < 8 |
| | 07/28/14 | 1245 ± 136 | < 5 | < 6 | < 28 | < 7 |
| | 08/11/14 | 1110 ± 132 | < 4 | < 6 | < 29 | < 9 |
| | 08/25/14 | 1249 ± 117 | < 4 | < 5 | < 36 | < 12 |
| | 09/08/14 | 1352 ± 152 | < 7 | < 6 | < 44 | < 8 |
| | 09/22/14 | 1098 ± 118 | < 5 | < 5 | < 29 | < 8 |
| | 10/06/14 | 1433 ± 185 | < 7 | < 8 | < 40 | < 8 |
| | 10/20/14 | 1315 ± 46 | < 1 | < 2 | < 18 | < 5 |
| | 11/03/14 | 1059 ± 172 | < 8 | < 9 | < 47 | < 13 |
| | 11/17/14 | 1305 ± 130 | < 4 | < 6 | < 47 | < 14 |
| | 12/08/14 | 1245 ± 144 | < 6 | < 6 | < 26 | < 7 |
| | MEAN | 1279 ± 209 | - | - | - | - |

**Table C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| SITE | COLLECTION PERIOD | K-40 | Cs-134 | Cs-137 | Ba-140 | La-140 |
|---|---|---|---|---|---|---|
| U | 01/06/14 | 1309 ± 161 | < 7 | < 7 | < 38 | < 9 |
| | 02/03/14 | 1145 ± 167 | < 6 | < 8 | < 35 | < 10 |
| | 03/03/14 | 1271 ± 164 | < 6 | < 7 | < 35 | < 11 |
| | 04/07/14 | 1222 ± 116 | < 4 | < 4 | < 19 | < 6 |
| | 04/21/14 | 1239 ± 154 | < 6 | < 7 | < 32 | < 5 |
| | 05/05/14 | 1233 ± 176 | < 7 | < 8 | < 43 | < 11 |
| | 05/19/14 | 1076 ± 105 | < 4 | < 4 | < 22 | < 7 |
| | 06/02/14 | 1263 ± 102 | < 4 | < 4 | < 23 | < 5 |
| | 06/16/14 | 1366 ± 178 | < 6 | < 8 | < 38 | < 10 |
| | 06/30/14 | 1209 ± 146 | < 8 | < 8 | < 32 | < 8 |
| | 07/14/14 | 1291 ± 163 | < 6 | < 8 | < 35 | < 9 |
| | 07/28/14 | 1192 ± 154 | < 7 | < 7 | < 38 | < 10 |
| | 08/11/14 | 1277 ± 97 | < 4 | < 4 | < 26 | < 7 |
| | 08/25/14 | 1356 ± 84 | < 3 | < 4 | < 22 | < 7 |
| | 09/08/14 | 1224 ± 176 | < 6 | < 7 | < 37 | < 13 |
| | 09/22/14 | 1238 ± 149 | < 6 | < 8 | < 37 | < 13 |
| | 10/06/14 | 1232 ± 149 | < 6 | < 7 | < 40 | < 6 |
| | 10/20/14 | 1212 ± 34 | < 1 | < 1 | < 13 | < 4 |
| | 11/03/14 | 1338 ± 216 | < 8 | < 8 | < 53 | < 5 |
| | 11/17/14 | 1193 ± 136 | < 3 | < 4 | < 29 | < 13 |
| | 12/08/14 | 1139 ± 100 | < 4 | < 4 | < 13 | < 5 |
| | MEAN | 1239 ± 143 | - | - | - | - |
| W | 02/04/14 | 1189 ± 169 | < 7 | < 6 | < 39 | < 5 |
| | 05/05/14 | 1269 ± 185 | < 7 | < 9 | < 36 | < 14 |
| | 08/11/14 | 1385 ± 174 | < 6 | < 7 | < 36 | < 10 |
| | 11/03/14 | 1170 ± 174 | < 5 | < 7 | < 32 | < 9 |
| | MEAN | 1253 ± 195 | - | - | - | - |

**Table C-VIII.1**

## CONCENTRATIONS OF GAMMA EMITTERS IN FOOD PRODUCT SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

| SITE | COLLECTION PERIOD | | Be-7 | K-40 | Mn-54 | Co-58 | Co-60 | I-131 | Cs-134 | Cs-137 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1Q | May 2014 Vegetation Unavailable | (1) | - | - | - | - | - | - | - | - |
| | May 2014 Vegetation Unavailable | (1) | - | - | - | - | - | - | - | - |
| | May 2014 Vegetation Unavailable | (1) | - | - | - | - | - | - | - | - |
| | 06/25/14 Green Cabbage | | < 181 | 2755 ± 395 | < 22 | < 18 | < 21 | < 35 | < 20 | < 19 |
| | 06/25/14 Ragweed Leaves | (1) | 369 ± 78.4 | 4069 ± 251 | < 9 | < 7 | < 9 | < 17 | < 9 | < 9 |
| | 06/25/14 Tobaco Leaves | (1) | 734 ± 276 | 7859 ± 645 | < 27 | < 26 | < 23 | < 38 | < 23 | < 28 |
| | 07/24/14 Head Cabbage | | < 120 | 2161 ± 276 | < 12 | < 13 | < 13 | < 23 | < 11 | < 14 |
| | 07/24/14 Lettuce Leaves | | 708 ± 190 | 3863 ± 438 | < 16 | < 17 | < 17 | < 32 | < 18 | < 19 |
| | 07/24/14 Tobacco Leaves | (1) | 522 ± 251 | 6131 ± 604 | < 20 | < 19 | < 20 | < 38 | < 17 | < 27 |
| | 08/26/14 Pepper Leaves | | 2806 ± 180 | 12170 ± 382 | < 11 | < 13 | < 12 | < 50 | < 10 | < 12 |
| | 08/26/14 Ragweed Leaves | (1) | 1022 ± 80 | 7747 ± 193 | < 8 | < 9 | < 8 | < 36 | < 7 | < 8 |
| | 08/26/14 Tobacco Leaves | (1) | 264 ± 73 | 6817 ± 209 | < 7 | < 8 | < 8 | < 36 | < 7 | < 8 |
| | 09/24/14 Cabbage Leaves | | < 195 | 3588 ± 444 | < 20 | < 17 | < 19 | < 32 | < 16 | < 19 |
| | 09/24/14 Tobacco Leaves | (1) | < 266 | 6474 ± 624 | < 24 | < 31 | < 31 | < 46 | < 26 | < 28 |
| | MEAN | | 918 ± 1740 | 5785 ± 5809 | - | - | - | - | - | - |
| 2Q | May 2014 Vegetation Unavailable | (1) | - | - | - | - | - | - | - | - |
| | May 2014 Vegetation Unavailable | (1) | - | - | - | - | - | - | - | - |
| | May 2014 Vegetation Unavailable | (1) | - | - | - | - | - | - | - | - |
| | 07/24/14 Broccoli Leaves | (2) | 727 ± 282 | 2706 ± 458 | < 23 | < 27 | < 27 | < 47 | < 30 | < 29 |
| | 07/24/14 Kale Leaves | | < 236 | 6816 ± 658 | < 24 | < 25 | < 29 | < 39 | < 20 | < 25 |
| | 07/24/14 Sweet Corn Leaves | | 1945 ± 316 | 4553 ± 556 | < 26 | < 22 | < 19 | < 39 | < 21 | < 23 |
| | 08/26/14 Broccoli Leaves | | 351 ± 137 | 1594 ± 218 | < 12 | < 14 | < 12 | < 59 | < 12 | < 15 |
| | 08/26/14 Cabbage Leaves | | 261 ± 169 | 2290 ± 344 | < 12 | < 12 | < 13 | < 56 | < 11 | < 14 |
| | 08/26/14 Kale Leaves | | 208 ± 75 | 4985 ± 227 | < 9 | < 9 | < 10 | < 47 | < 8 | < 10 |
| | 09/24/14 Broccoli Leaves | | 498 ± 239 | 1529 ± 369 | < 21 | < 19 | < 22 | < 44 | < 22 | < 32 |
| | 09/24/14 Cabbage Leaves | | 341 ± 125 | 2400 ± 292 | < 14 | < 15 | < 16 | < 30 | < 17 | < 18 |
| | 09/24/14 Zuccini Leaves | | 431 ± 135 | 4494 ± 412 | < 17 | < 16 | < 17 | < 31 | < 16 | < 19 |
| | MEAN | | 595 ± 1137 | 3485 ± 3614 | - | - | - | - | - | - |
| 55 | May 2014 Vegetation Unavailable | (1) | - | - | - | - | - | - | - | - |
| | May 2014 Vegetation Unavailable | (1) | - | - | - | - | - | - | - | - |
| | May 2014 Vegetation Unavailable | (1) | - | - | - | - | - | - | - | - |
| | 06/25/14 Kale Leaves | | < 174 | 7185 ± 574 | < 18 | < 16 | < 23 | < 34 | < 15 | < 21 |
| | 06/25/14 Kolrabi Leaves | | 286 ± 249 | 7245 ± 586 | < 23 | < 21 | < 22 | < 40 | < 20 | < 23 |
| | 06/25/14 Sweet Corn Leaves | | 791 ± 92 | 3317 ± 189 | < 7 | < 8 | < 7 | < 28 | < 7 | < 8 |
| | 07/24/14 Kale Leaves | | < 189 | 6073 ± 540 | < 23 | < 21 | < 28 | < 35 | < 22 | < 25 |
| | 07/24/14 Sweet Corn Leaves | | 1509 ± 298 | 3764 ± 513 | < 29 | < 29 | < 34 | < 43 | < 28 | < 28 |
| | 07/24/14 UnwasheD Cabbage Leaves | | 390 ± 193 | 4576 ± 464 | < 26 | < 27 | < 25 | < 41 | < 26 | < 24 |
| | 08/26/14 Red Beet Leaves | | 188 ± 66 | 8807 ± 221 | < 8 | < 8 | < 8 | < 36 | < 8 | < 7 |
| | 08/26/14 Sweet Corn Leaves | | 1141 ± 101 | 4840 ± 216 | < 9 | < 11 | < 9 | < 44 | < 8 | < 9 |
| | 08/26/14 UnwasheD Cabbage Leaves | | < 69 | 6329 ± 188 | < 7 | < 8 | < 7 | < 35 | < 7 | < 7 |
| | 09/24/14 Broccoli Leaves | | < 181 | 5132 ± 550 | < 23 | < 21 | < 19 | < 35 | < 19 | < 23 |
| | 09/24/14 Cabbage Leaves | | < 176 | 5453 ± 534 | < 23 | < 19 | < 22 | < 31 | < 16 | < 24 |
| | 09/24/14 Sweet Corn Leaves | | < 222 | 5531 ± 600 | < 20 | < 25 | < 21 | < 44 | < 23 | < 23 |
| | MEAN | | 718 ± 1052 | 5688 ± 3111 | - | - | - | - | - | - |

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION
(2) SEE PROGRAM CHANGES SECTION FOR EXPLANATION

**Table C-IX.1 QUARTERLY OSLD RESULTS FOR PEACH BOTTOM ATOMIC POWER STATION, 2014**

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

| STATION CODE | MEAN ± 2 S.D. | JAN - MAR | APR - JUN | JUL - SEP | OCT - DEC |
|---|---|---|---|---|---|
| 16 | 10.3 ± 1.1 | 9.6 | 10.9 | 10.5 | 10.3 |
| 18 | 9.9 ± 1.1 | 9.9 | 9.2 | 10.5 | 9.8 |
| 19 | 9.6 ± 0.6 | 9.3 | 9.4 | 9.7 | 10.0 |
| 24 | 8.3 ± 1.3 | 8.0 | 7.6 | 8.8 | 8.9 |
| 5 | 9.4 ± 1.4 | 8.5 | 9.0 | 10.0 | 9.9 |
| 14 | 10.0 ± 0.8 | 9.6 | 10.0 | 10.5 | 9.7 |
| 15 | 9.9 ± 0.6 | 9.6 | 9.7 | 10.1 | 10.2 |
| 17 | 11.0 ± 1.5 | 10.2 | 10.5 | 11.8 | 11.4 |
| 1T | 16.0 ± 0.0 | - | - | - | 16.0 (1) |
| 22 | 10.2 ± 0.9 | 9.6 | 10.0 | 10.6 | 10.5 |
| 23 | 10.3 ± 1.3 | 9.5 | 10.1 | 10.8 | 10.9 |
| 26 | 11.0 ± 1.9 | 9.6 | 11.4 | 11.6 | 11.4 |
| 27 | 10.5 ± 0.8 | 10.1 | 10.3 | 11.0 | 10.5 |
| 32 | 10.4 ± 2.0 | 9.0 | 10.6 | 11.2 | 10.9 |
| 3A | 7.7 ± 0.9 | 7.3 | 7.3 | 8.1 | 8.1 |
| 42 | 9.0 ± 0.5 | 8.8 | 8.7 (2) | 9.2 | 9.2 |
| 43 | 11.0 ± 1.6 | 10.0 | 11.0 | 11.9 | 11.0 |
| 44 | 9.6 ± 1.6 | 8.6 | 9.4 | 10.5 | 9.7 |
| 45 | 9.9 ± 0.6 | 9.7 | 9.6 | 10.0 | 10.3 |
| 46 | 9.4 ± 1.2 | 8.8 | 8.9 | 10.1 | 9.6 |
| 47 | 10.7 ± 1.3 | 10.0 | 10.4 | 11.5 | 11.0 |
| 48 | 10.0 ± 1.8 | 8.8 | 9.7 | 10.8 | 10.6 |
| 49 | 10.0 ± 0.9 | 9.4 | 9.8 | 10.4 | 10.2 |
| 4K | 7.1 ± 0.4 | 6.8 | 7.0 | 7.2 | 7.3 |
| 50 | 12.1 ± 2.7 | 10.5 | 13.7 (2) | 12.5 (2) | 11.8 |
| 51 | 10.0 ± 0.8 | 10.2 | 9.4 | 10.3 | 10.2 (2) |
| 6B | 8.9 ± 0.7 | 8.8 | 8.4 | 9.1 | 9.1 |
| 31A | 8.7 ± 1.2 | 7.9 | 8.9 | 9.3 | 8.6 |
| 2 | 9.9 ± 1.1 | 9.3 | 9.6 | 10.6 | 10.0 |
| 1A | 9.7 ± 0.8 | 9.5 | 9.4 | 10.3 | 9.5 |
| 1B | 8.9 ± 0.9 | 8.4 | 8.6 | 9.4 | 9.1 |
| 1C | 10.2 ± 1.2 | 9.5 | 9.9 | 10.8 | 10.6 |
| 1D | 10.1 ± 1.1 | 9.5 | 9.7 | 10.7 | 10.4 |
| 1E | 9.7 ± 0.8 | 9.3 | 9.3 | 10.1 | 9.9 |
| 1F | 11.0 ± 1.0 | 10.3 | 11.0 | 11.5 | 11.0 |
| 1G | 8.1 ± 0.6 | 7.9 | 7.7 | 8.2 | 8.4 |
| 1H | 10.0 ± 1.0 | 9.6 | 9.5 | 10.6 | 10.2 |
| 1I | 9.4 ± 0.7 | 9.3 | 8.9 | 9.6 | 9.7 |
| 1J | 11.0 ± 0.9 | 10.3 | 11.0 | 11.3 | 11.3 |
| 1K | 10.6 ± 0.9 | 10.2 | 10.4 | 11.2 | 10.5 |
| 1L | 8.5 ± 1.3 | 8.3 | 8.1 | 9.5 | 8.2 |
| 1M | 6.9 ± 0.5 | 6.9 | 6.6 | 7.2 | 7.0 |
| 1P | 7.4 ± 0.3 | 7.4 | 7.2 | 7.5 | 7.4 |
| 1Q | 8.2 ± 0.4 | 8.1 | 8.0 | 8.4 | 8.4 |
| 1R | 12.6 ± 1.7 | 11.6 | 12.3 | 13.5 | 13.1 |
| 2B | 9.5 ± 1.4 | 8.6 | 9.2 | 10.2 | 9.8 |
| 40 | 11.4 ± 2.3 | 10.0 | 11.1 | 12.8 | 11.5 |
| 1NN | 10.9 ± 1.3 | 10.3 | 10.6 | 10.9 | 11.8 |

(1) SEE PROGRAM CHANGES SECTION FOR EXPLANATION
(2) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

**TABLE C-IX.2** **MEAN QUARTERLY OSLD RESULTS FOR THE SITE BOUNDARY, INTERMEDIATE AND CONTROL LOCATIONS FOR PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF MILLIREM/MONTH ± STANDARD DEVIATIONS OF THE STATION DATA

| COLLECTION PERIOD | SITE BOUNDARY ± 2 S.D. | INTERMEDIATE | CONTROL |
|---|---|---|---|
| JAN-MAR | 9.2 ± 2.3 | 9.2 ± 1.9 | 9.2 ± 1.7 |
| APR-JUN | 9.4 ± 2.9 | 9.7 ± 2.7 | 9.3 ± 2.7 |
| JUL-SEP | 10.2 ± 3.2 | 10.4 ± 2.4 | 9.9 ± 1.6 |
| OCT-DEC | 9.9 ± 3.0 | 10.3 ± 3.2 | 9.8 ± 1.2 |

**TABLE C-IX.3** **SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF MILLI-ROENTGEN/STD. MONTH

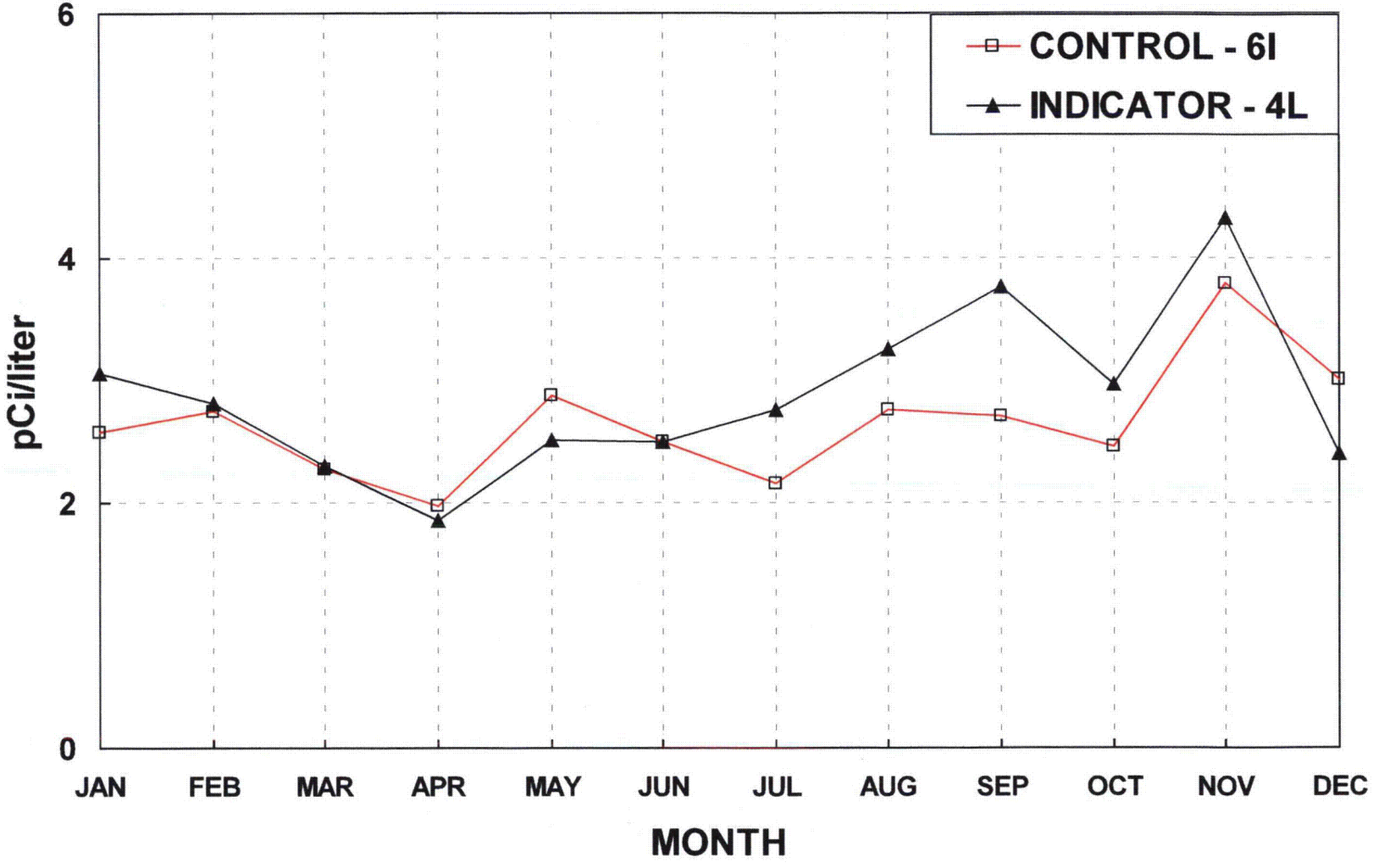
| LOCATION | SAMPLES ANALYZED | PERIOD MINIMUM | PERIOD MAXIMUM | PERIOD MEAN ± 2 S.D. |
|---|---|---|---|---|
| SITE BOUNDARY | 80 | 6.6 | 14 | 9.7 ± 2.9 |
| INTERMEDIATE | 93 | 6.8 | 16 | 9.9 ± 2.8 |
| CONTROL | 16 | 7.6 | 11 | 9.5 ± 1.8 |

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

INTERMEDIATE STATIONS - 14, 15, 17, 1T, 22, 23, 26, 27, 31A, 32, 3A, 42, 43, 44, 45, 46, 47, 48, 49, 4K, 5, 50, 51, 6B

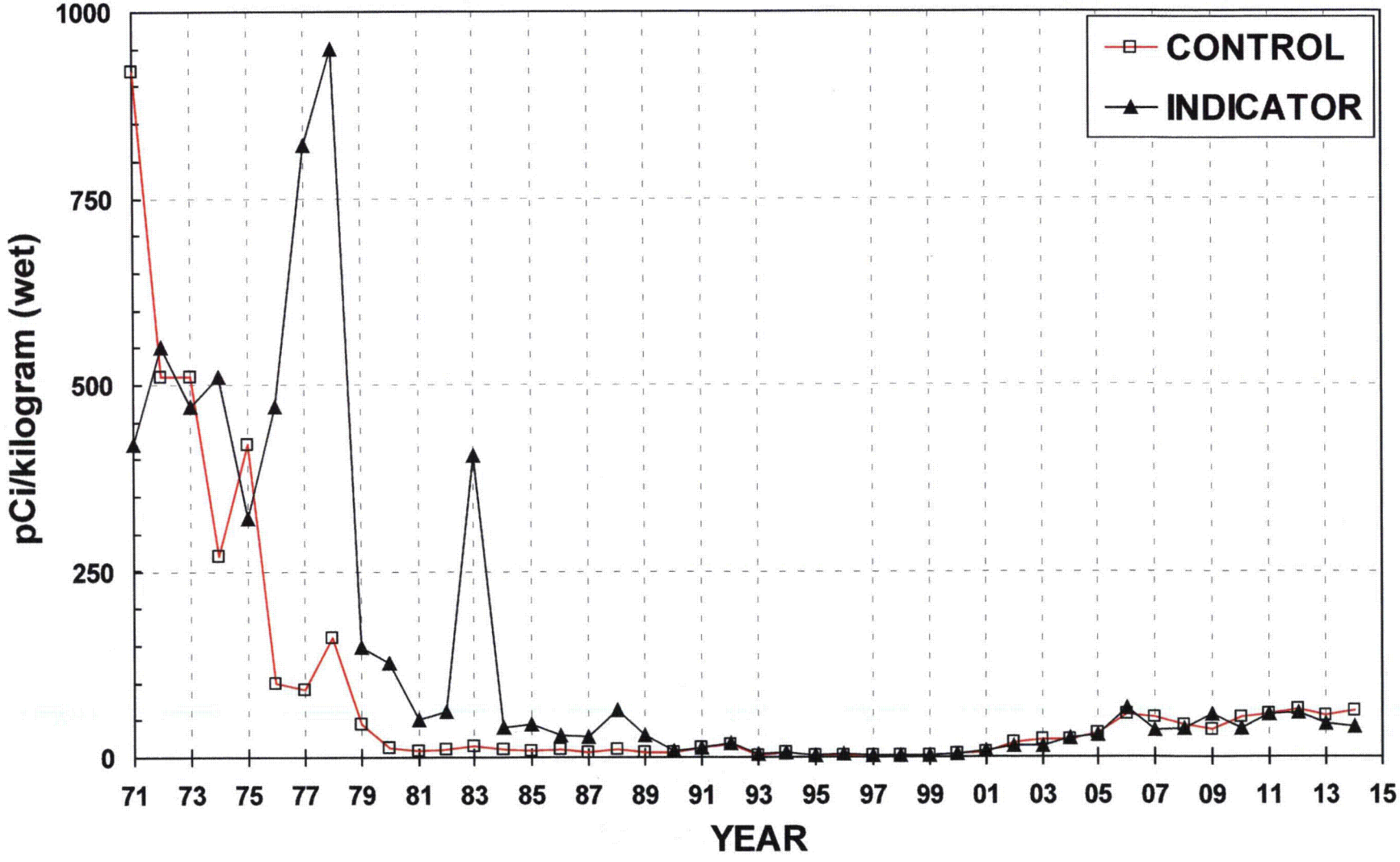
CONTROL STATIONS - 16, 18, 19, 24

# FIGURE C-1
# MONTHLY TOTAL GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 2014

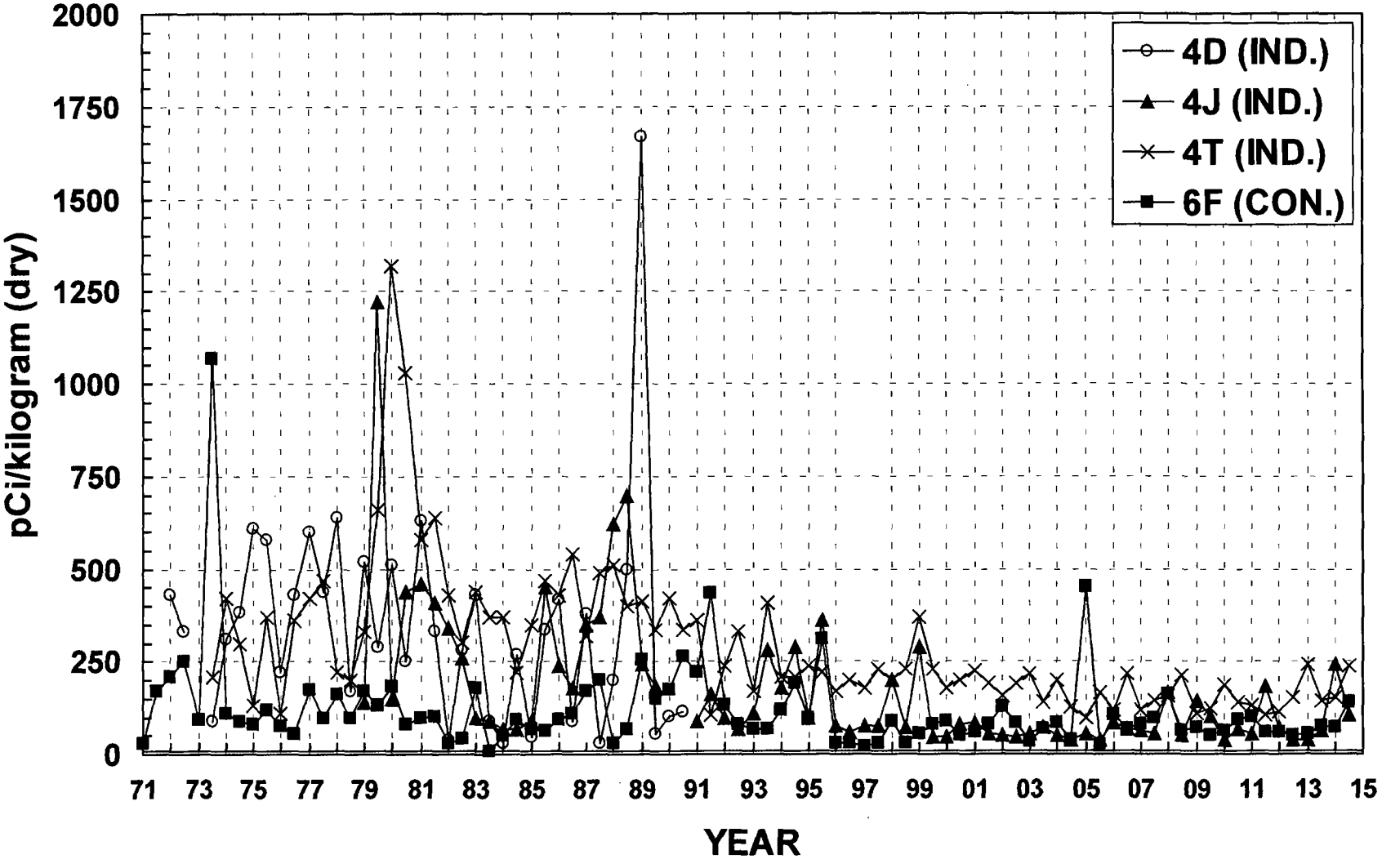



PBAPS changed to total gross beta at the beginning of 2005.
Previous data included summation of less than values.

# FIGURE C-2
# MEAN ANNUAL CS-137 CONCENTRATIONS IN FISH SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 1971 – 2014

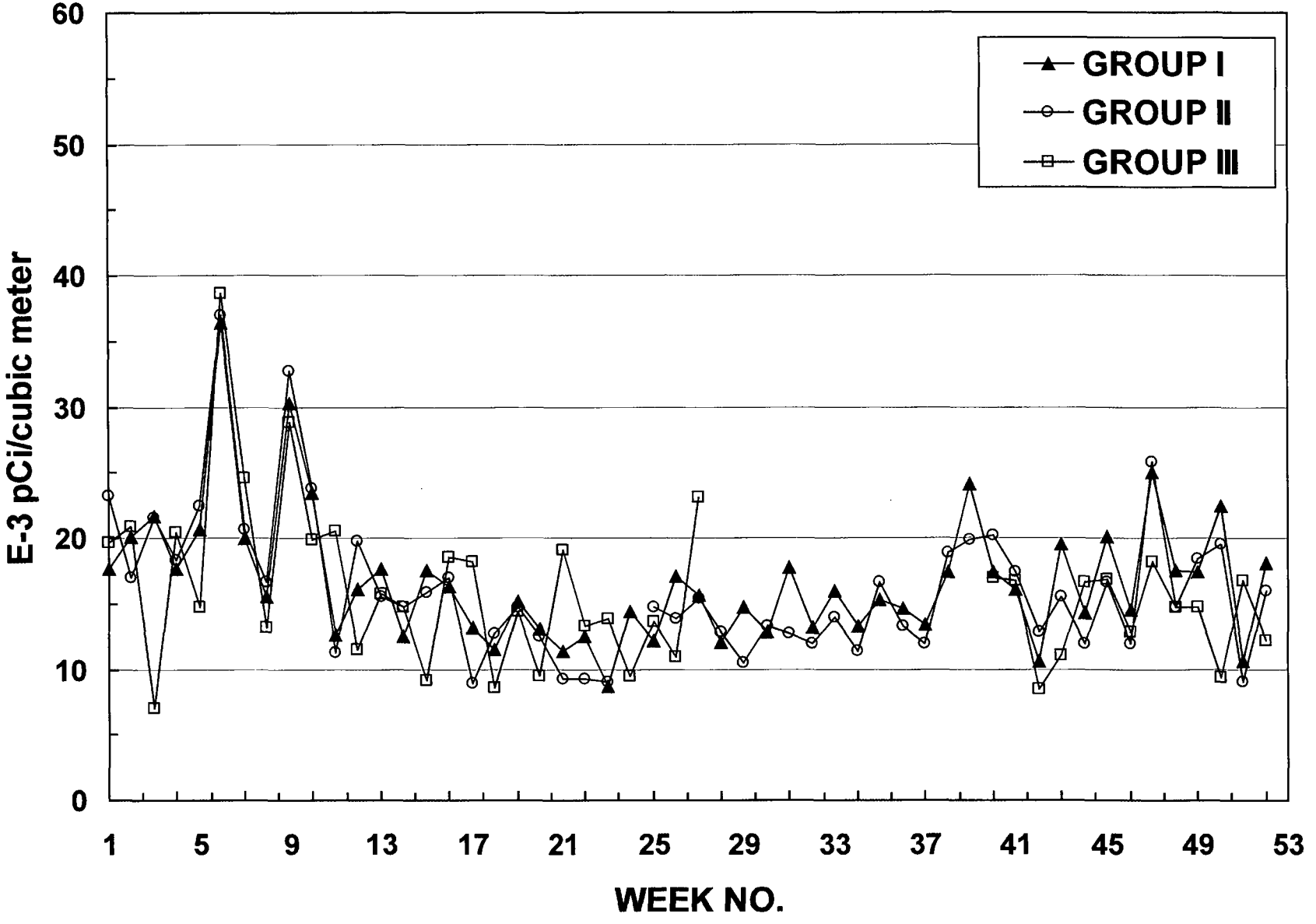


# FIGURE C-3
# MEAN SEMI-ANNUAL CS-137 CONCENTRATIONS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 1971 – 2014

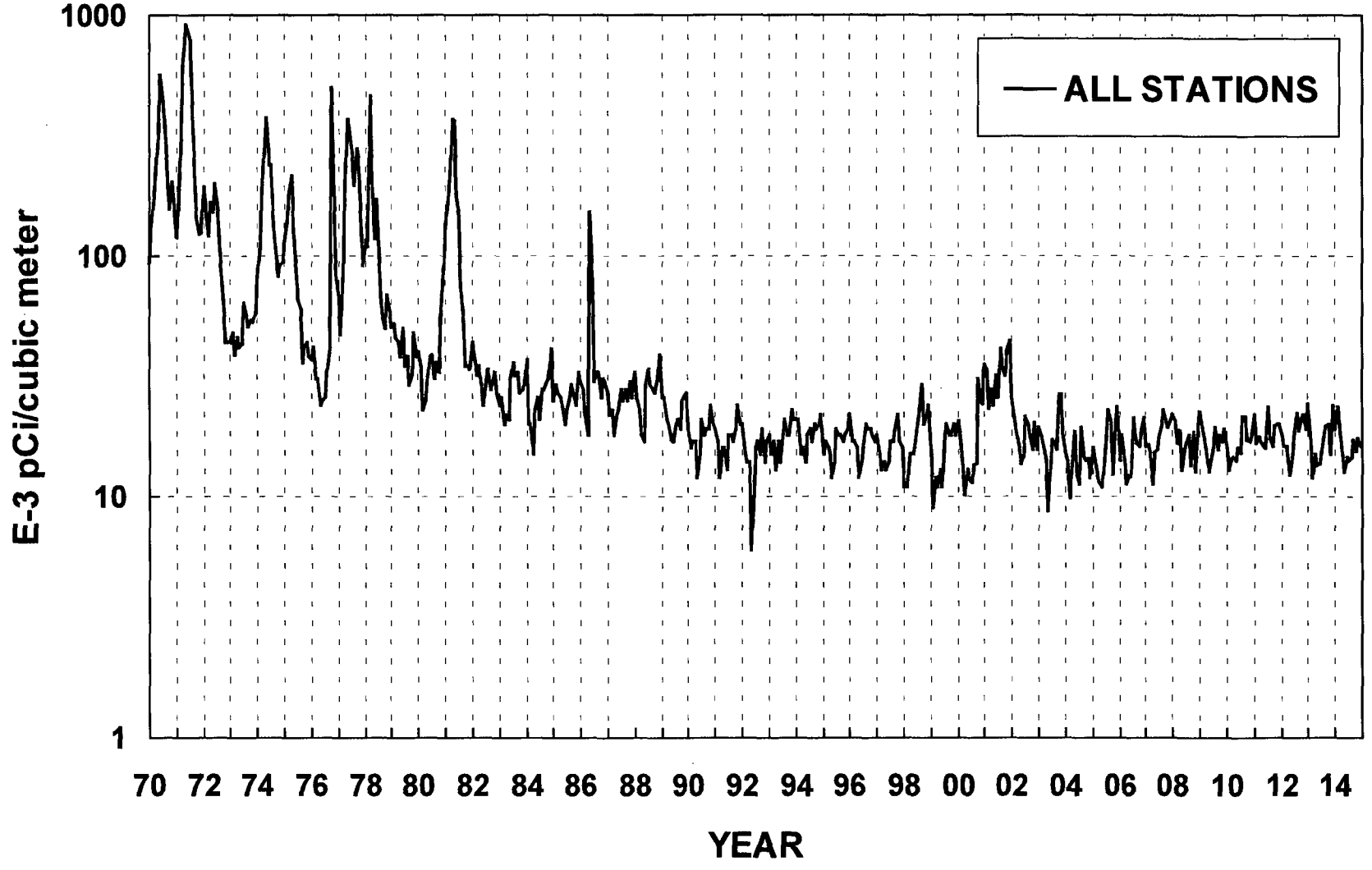



No sample collected from Station 4J in 1990 and
Station 4D discontinued beginning 1991

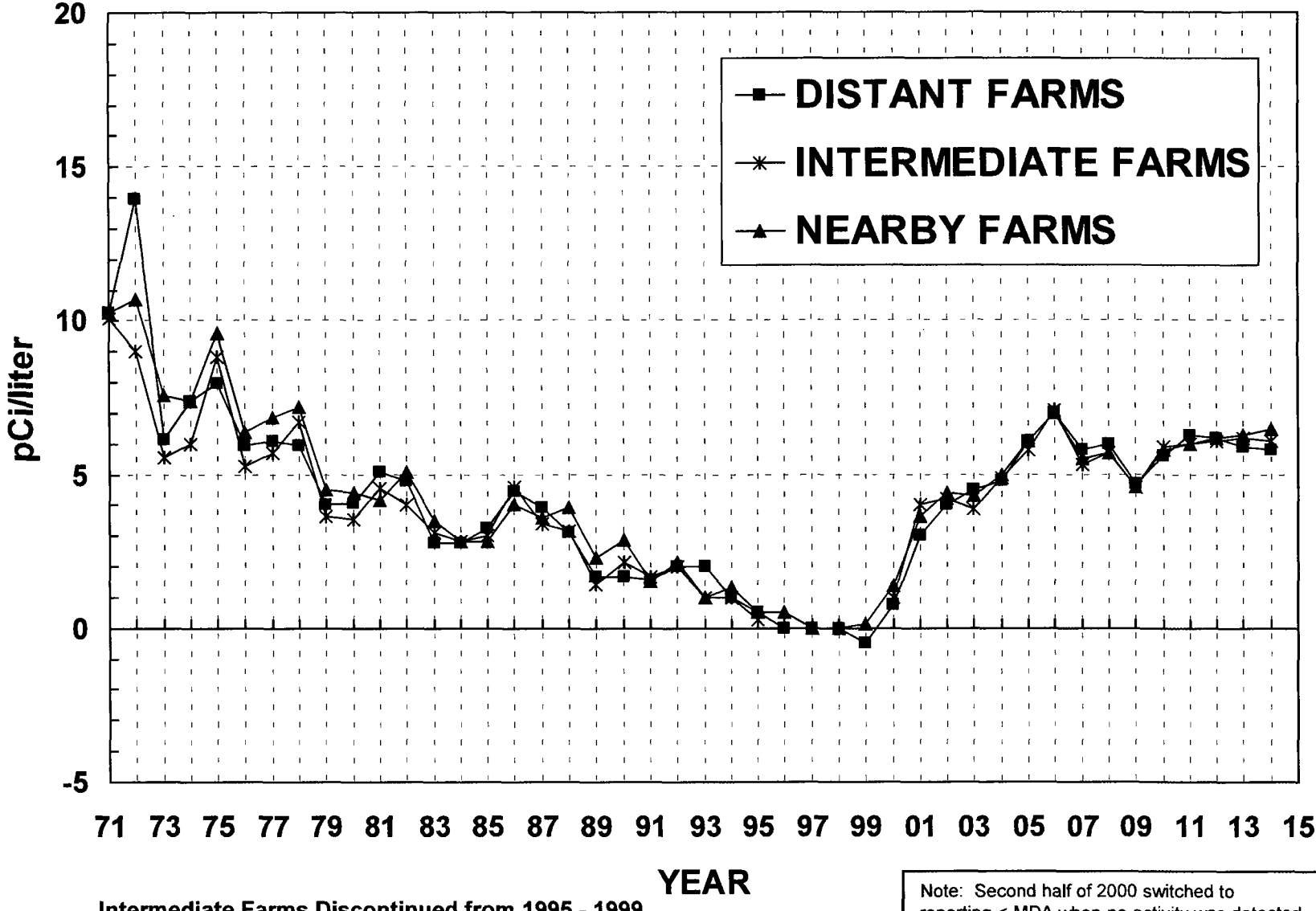
# FIGURE C-4
# MEAN WEEKLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 2014



# FIGURE C-5
# MEAN MONTHLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 1970 – 2014



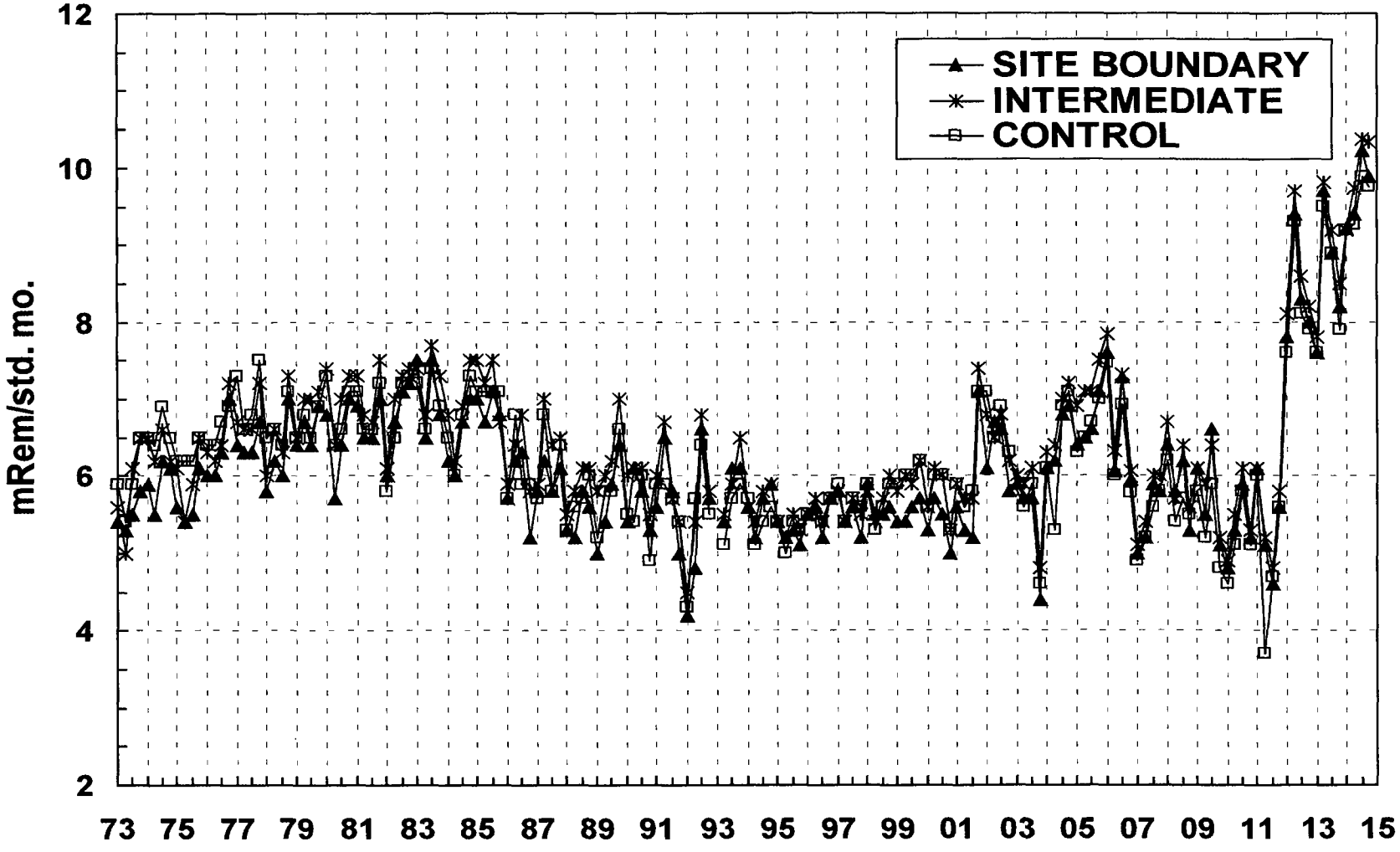
# FIGURE C-6
# MEAN ANNUAL CS-137 CONCENTRATIONS IN MILK SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 1971 - 2014




**Intermediate Farms Discontinued from 1995 - 1999**
**Cs-137 milk LLD = 18 pCi/liter**

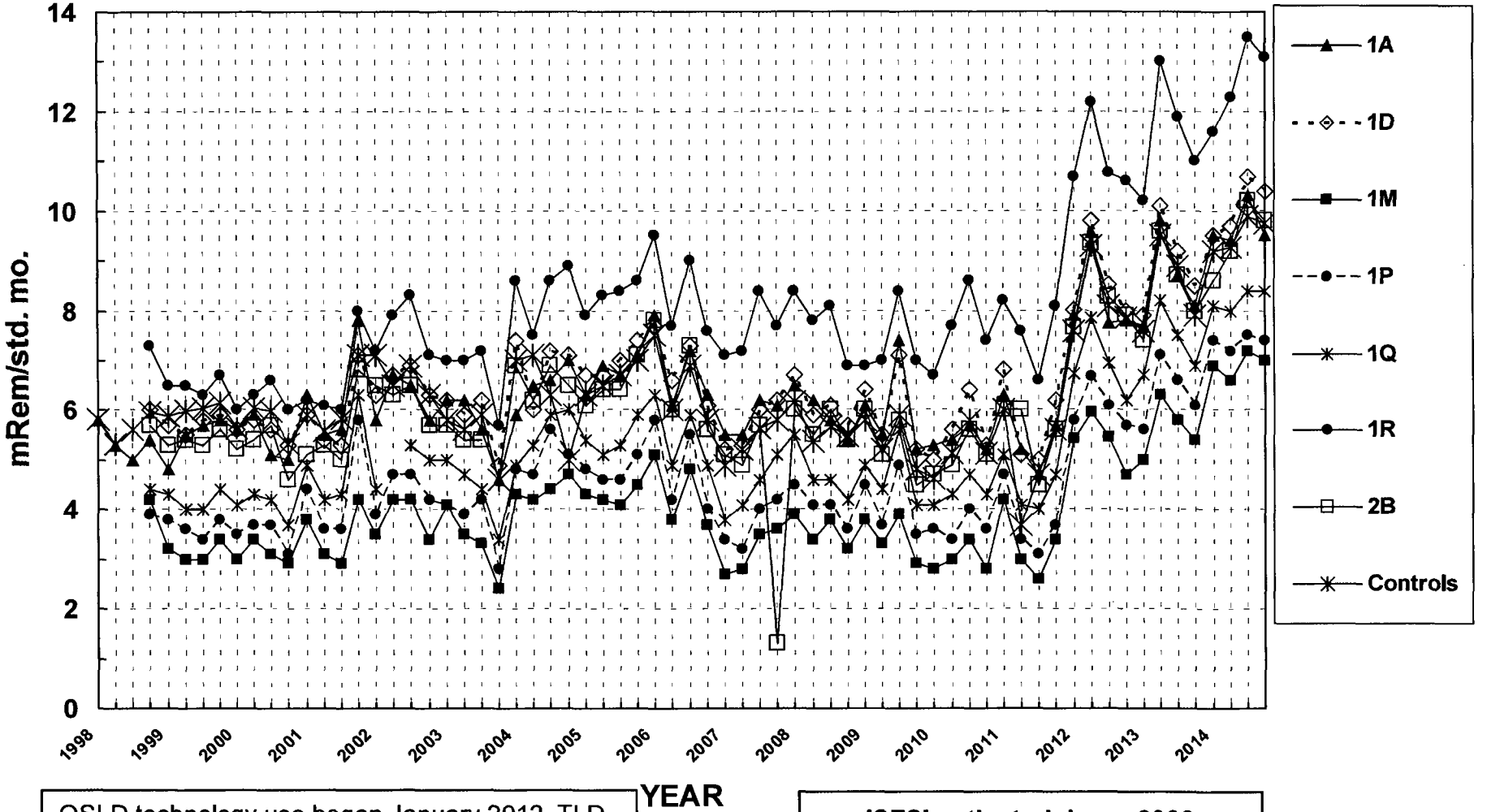
Note: Second half of 2000 switched to reporting < MDA when no activity was detected. Using MDA values result in a larger number.

# FIGURE C- 7
# MEAN QUARTERLY AMBIENT GAMMA RADIATION LEVELS IN THE VICINITY OF PBAPS, 1973 – 2014




OSLD technology use began January 2012, TLD technology ended December 2011. For only OSLD data, Gross mRem per standard month is reported.

# FIGURE C-8
# QUARTERLY AMBIENT GAMMA RADIATION LEVELS NEAR THE INDEPENDENT SPENT FUEL STORAGE INSTALLATION LOCATED AT PBAPS, 1998 – 2014




OSLD technology use began January 2012, TLD technology ended December 2011. For only OSLD data, Gross mRem per standard month is reported.

**ISFSI activated June, 2000**

# APPENDIX D

# DATA TABLES AND FIGURES
# QC LABORATORY

**TABLE D-I.1 CONCENTRATIONS OF GROSS BETA INSOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| COLLECTION PERIOD | 4L |
|---|---|
| JAN | < 1.2 |
| FEB | < 1.8 |
| MAR | < 1.9 |
| APR | < 1.8 |
| MAY | < 1.8 |
| JUN | < 1.9 |
| JUL | < 1.7 |
| AUG | < 1.9 |
| SEP | < 1.9 |
| OCT | < 1.1 |
| NOV | < 1.9 |
| DEC | < 1.3 |
| MEAN | - |

**TABLE D-I.2 CONCENTRATIONS OF GROSS BETA SOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| COLLECTION PERIOD | 4L |
|---|---|
| JAN | 1.7 ± 0.7 |
| FEB | 2.0 ± 0.7 |
| MAR | 2.3 ± 0.8 |
| APR | 1.0 ± 0.5 |
| MAY | 1.8 ± 1.0 |
| JUN | 0.8 ± 0.5 |
| JUL | 1.9 ± 0.9 |
| AUG | 1.8 ± 1.0 |
| SEP | < 1.8 |
| OCT | 3.4 ± 1.1 |
| NOV | 2.3 ± 0.7 |
| DEC | 1.7 ± 0.8 |
| MEAN | 1.9 ± 1.4 |

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES

**TABLE D-I.3 CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| COLLECTION PERIOD | 4L |
|---|---|
| JAN-MAR | < 143 |
| APR-JUN | < 142 |
| JUL-SEP | < 156 |
| OCT-DEC | < 169 |
| MEAN | - |

**TABLE D-I.4 CONCENTRATIONS OF I-131 IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| COLLECTION PERIOD | 4L |
|---|---|
| JAN | < 0.4 |
| FEB | < 0.3 |
| MAR | < 0.5 |
| APR | < 0.3 |
| MAY | < 0.4 |
| JUN | < 0.5 |
| JUL | < 0.3 |
| AUG | < 0.2 |
| SEP | < 0.5 |
| OCT | < 0.3 |
| NOV | < 0.3 |
| DEC | < 0.3 |
| MEAN | - |

**TABLE D-I.5 CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4L | JAN | < 2 | < 3 | < 3 | < 2 | < 2 | < 4 | < 3 | < 2 | < 3 | < 11 | < 2 |
| | FEB | < 2 | < 3 | < 2 | < 2 | < 3 | < 4 | < 2 | < 3 | < 2 | < 11 | < 2 |
| | MAR | < 1 | < 4 | < 2 | < 2 | < 1 | < 4 | < 2 | < 3 | < 2 | < 14 | < 3 |
| | APR | < 2 | < 3 | < 2 | < 2 | < 3 | < 5 | < 3 | < 3 | < 2 | < 14 | < 4 |
| | MAY | < 2 | < 4 | < 2 | < 3 | < 4 | < 5 | < 3 | < 2 | < 3 | < 11 | < 3 |
| | JUN | < 2 | < 3 | < 2 | < 2 | < 3 | < 5 | < 2 | < 2 | < 3 | < 13 | < 3 |
| | JUL | < 3 | < 10 | < 5 | < 3 | < 7 | < 4 | < 6 | < 5 | < 4 | < 26 | < 8 |
| | AUG | < 2 | < 4 | < 2 | < 2 | < 5 | < 3 | < 3 | < 2 | < 2 | < 19 | < 3 |
| | SEP | < 3 | < 3 | < 3 | < 1 | < 1 | < 4 | < 4 | < 2 | < 3 | < 18 | < 3 |
| | OCT | < 2 | < 2 | < 2 | < 3 | < 4 | < 8 | < 3 | < 2 | < 3 | < 18 | < 4 |
| | NOV | < 2 | < 4 | < 3 | < 2 | < 3 | < 3 | < 3 | < 2 | < 3 | < 24 | < 4 |
| | DEC | < 2 | < 3 | < 4 | < 1 | < 2 | < 6 | < 3 | < 3 | < 2 | < 14 | < 2 |
| | MEAN | - | - | - | - | - | - | - | - | - | - | - |

**TABLE D-II.1 CONCENTRATIONS OF GROSS BETA INSOLUBLE IN AIR PARTICULATE AND I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

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

| COLLECTION PERIOD | 1A GROSS BETA | 1A I-131 |
|---|---|---|
| 1 | 28 ± 4 | < 11 |
| 2 | 30 ± 5 | < 23 |
| 3 | 32 ± 4 | < 13 |
| 4 | 24 ± 4 | < 21 |
| 5 | 26 ± 5 | < 13 |
| 6 | 50 ± 6 | < 16 |
| 7 | 33 ± 4 | < 20 |
| 8 | 19 ± 4 | < 18 |
| 9 | 43 ± 5 | < 11 |
| 10 | 28 ± 5 | < 21 |
| 11 | 19 ± 4 | < 18 |
| 12 | 27 ± 4 | < 24 |
| 13 | 18 ± 4 | < 21 |
| 14 | 23 ± 5 | < 26 |
| 15 | 27 ± 4 | < 12 |
| 16 | 30 ± 5 | < 16 |
| 17 | 15 ± 4 | < 17 |
| 18 | 23 ± 4 | < 17 |
| 19 | 23 ± 4 | < 24 |
| 20 | 22 ± 5 | < 15 |
| 21 | 19 ± 4 | < 15 |
| 22 | 17 ± 4 | < 20 |
| 23 | 15 ± 4 | < 10 |
| 24 | 20 ± 4 | < 12 |
| 25 | 16 ± 4 | < 21 |
| 26 | 11 ± 4 | < 28 |
| 27 | 21 ± 3 | < 12 |
| 28 | 19 ± 3 | < 14 |
| 29 | 20 ± 4 | < 2 |
| 30 | 17 ± 3 | < 19 |
| 31 | 20 ± 4 | < 2 |
| 32 | 18 ± 4 | < 14 |
| 33 | 23 ± 4 | < 20 |
| 34 | 20 ± 4 | < 11 |
| 35 | 21 ± 4 | < 20 |
| 36 | 21 ± 4 | < 25 |
| 37 | 21 ± 4 | < 14 |
| 38 | 22 ± 4 | < 25 |
| 39 | 32 ± 4 | < 21 |
| 40 | 23 ± 4 | < 15 |
| 41 | 22 ± 4 | < 17 |
| 42 | 17 ± 4 | < 1 |
| 43 | 30 ± 4 | < 14 |
| 44 | 25 ± 4 | < 23 |
| 45 | 24 ± 4 | < 23 |
| 46 | 24 ± 4 | < 23 |
| 47 | 26 ± 4 | < 15 |
| 48 | 22 ± 3 | < 15 |
| 49 | 20 ± 4 | < 10 |
| 50 | 31 ± 4 | < 16 |
| 51 | 14 ± 3 | < 14 |
| 52 | 29 ± 4 | < 13 |
| MEAN | 23 ± 14 | - |

**TABLE D-II.2** **CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

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 | - | 83 ± 15 | < 1.0 | < 0.6 | < 0.6 | < 1.0 | < 0.5 |
| | - | 91 ± 21 | < 0.8 | < 0.4 | < 0.4 | < 0.4 | < 0.5 |
| | - | 103 ± 23 | < 1.1 | < 0.7 | < 0.4 | < 1.1 | < 0.6 |
| | - | 56 ± 13 | < 0.5 | < 0.6 | < 0.7 | < 0.8 | < 0.4 |
| | MEAN* | 83 ± 40 | - | - | - | - | - |

**TABLE D-III.1 CONCENTRATIONS OF I-131 BY CHEMICAL SEPARATION AND GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| SITE | COLLECTION PERIOD | I-131 | K-40 | Cs-134 | Cs-137 | Ba-140 | La-140 |
|---|---|---|---|---|---|---|---|
| J | 02/03/14 | < 0.3 | 1329 ± 120 | < 4 | < 4 | < 9 | < 3 |
| | 05/05/14 | < 0.2 | 1413 ± 83 | < 2 | < 3 | < 24 | < 3 |
| | 08/11/14 | < 0.5 | 1342 ± 100 | < 2 | < 3 | < 23 | < 6 |
| | 11/03/14 | < 0.3 | 1259 ± 146 | < 5 | < 6 | < 17 | < 2 |
| | MEAN | - | 1336 ± 127 | - | - | - | - |
| S | 02/03/14 | < 0.4 | 1469 ± 119 | < 4 | < 3 | < 13 | < 2 |
| | 05/05/14 | < 0.2 | 1351 ± 77 | < 3 | < 3 | < 27 | < 8 |
| | 08/11/14 | < 0.4 | 1460 ± 102 | < 2 | < 3 | < 28 | < 7 |
| | 11/03/14 | < 0.3 | 806 ± 145 | < 2 | < 7 | < 24 | < 3 |
| | MEAN | - | 1272 ± 630 | - | - | - | - |
| V | 02/03/14 | < 0.5 | 1277 ± 108 | < 2 | < 3 | < 14 | < 3 |
| | 05/05/14 | < 0.2 | 1248 ± 98 | < 3 | < 4 | < 32 | < 8 |
| | 08/11/14 | < 0.5 | 1408 ± 101 | < 4 | < 4 | < 25 | < 4 |
| | 11/03/14 | < 0.5 | 1213 ± 118 | < 4 | < 4 | < 27 | < 2 |
| | MEAN | - | 1286 ± 171 | - | - | - | - |

## TABLE D-IV.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 2014

**DRINKING WATER (GROSS BETA & GAMMA SPECTROSCOPY)**

| COLLECTION PERIOD | 4L |
|---|---|
| JAN | 01/02/14 - 01/30/14 |
| FEB | 01/30/14 - 02/27/14 |
| MAR | 02/27/14 - 03/27/14 |
| APR | 03/27/14 - 05/01/14 |
| MAY | 05/01/14 - 05/29/14 |
| JUN | 05/29/14 - 06/26/14 |
| JUL | 06/26/14 - 07/31/14 |
| AUG | 07/31/14 - 08/28/14 |
| SEP | 08/28/14 - 10/02/14 |
| OCT | 10/02/14 - 10/30/14 |
| NOV | 10/30/14 - 11/26/14 |
| DEC | 11/26/14 - 01/02/15 |

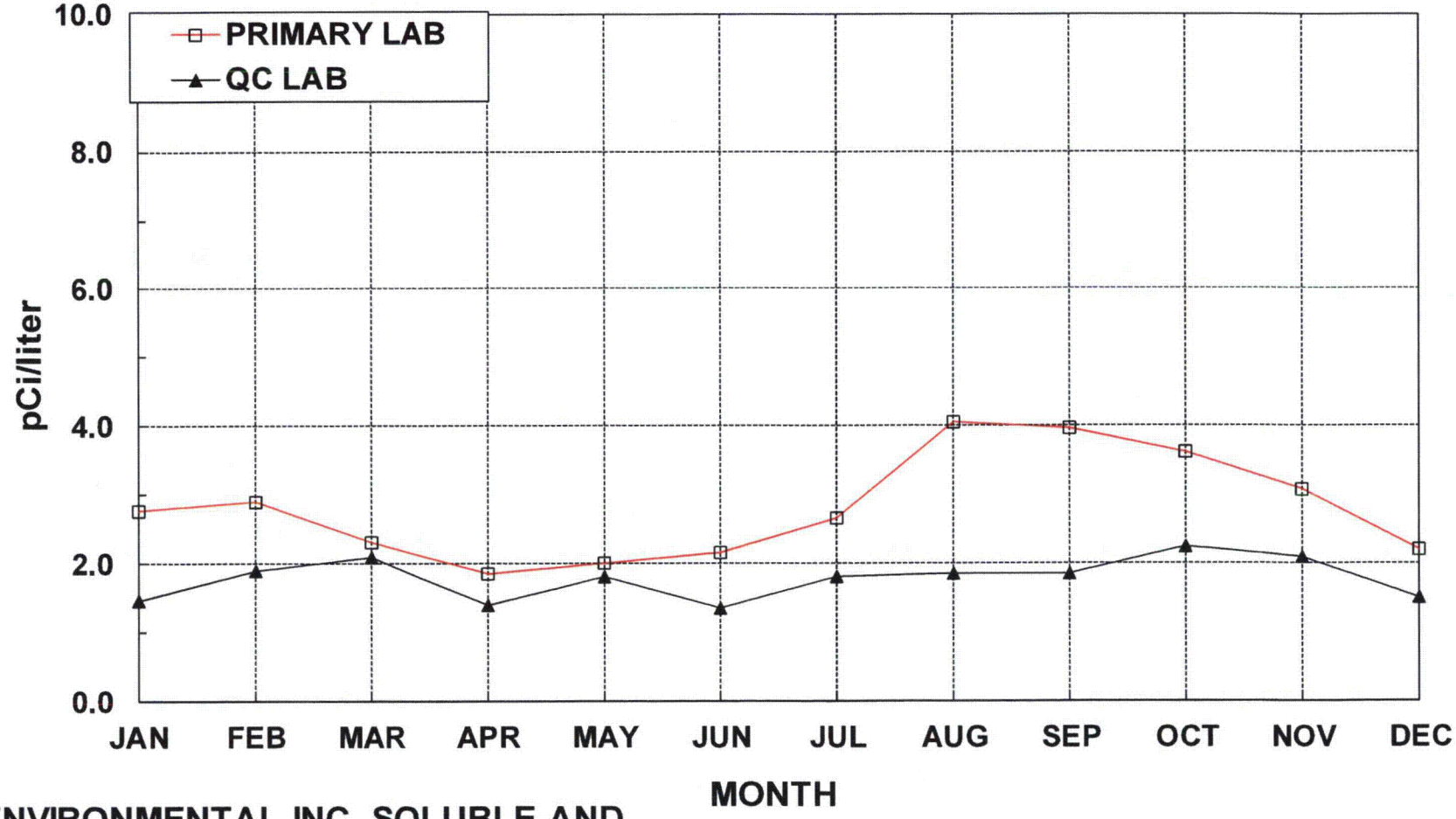
**AIR PARTICULATE (GAMMA SPECTROSCOPY)**

| COLLECTION PERIOD | 1A |
|---|---|
| JAN-MAR | 01/01/14 - 04/03/14 |
| APR-JUN | 04/03/14 - 07/02/14 |
| JUL-SEP | 07/02/14 - 10/02/14 |
| OCT-DEC | 10/02/14 - 01/02/15 |

**AIR PARTICULATE (GROSS BETA) AND AIR IODINE (I-131)**

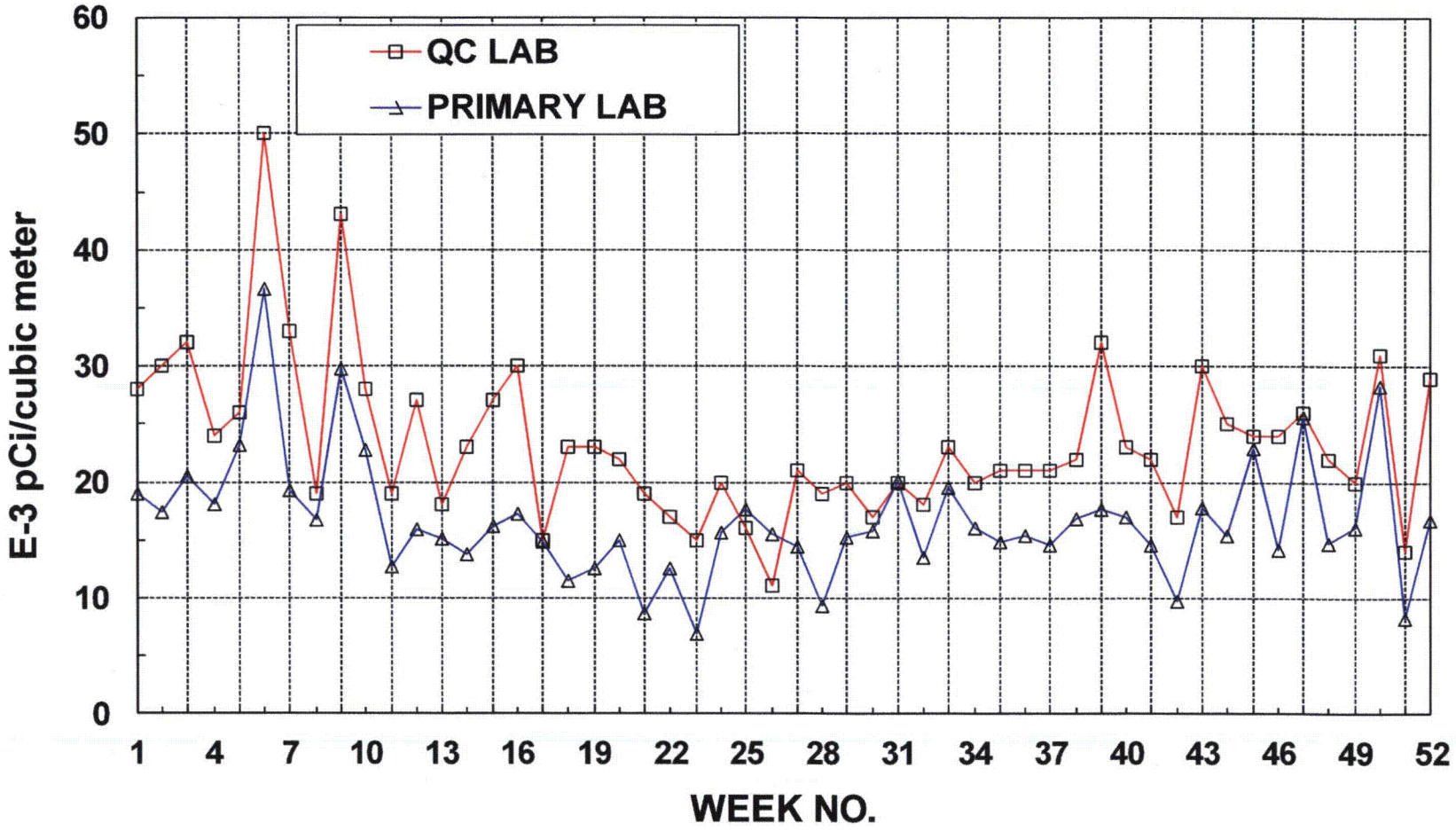
| COLLECTION PERIOD | 1A | COLLECTION PERIOD | 1A |
|---|---|---|---|
| 1 | 01/01/14 - 01/09/14 | 27 | 07/02/14 - 07/10/14 |
| 2 | 01/09/14 - 01/15/14 | 28 | 07/10/14 - 07/17/14 |
| 3 | 01/15/14 - 01/23/14 | 29 | 07/17/14 - 07/23/14 |
| 4 | 01/23/14 - 01/30/14 | 30 | 07/23/14 - 07/31/14 |
| 5 | 01/30/14 - 02/06/14 | 31 | 07/31/14 - 08/07/14 |
| 6 | 02/06/14 - 02/12/14 | 32 | 08/07/14 - 08/14/14 |
| 7 | 02/12/14 - 02/20/14 | 33 | 08/14/14 - 08/21/14 |
| 8 | 02/20/14 - 02/27/14 | 34 | 08/21/14 - 08/28/14 |
| 9 | 02/27/14 - 03/06/14 | 35 | 08/28/14 - 09/04/14 |
| 10 | 03/06/14 - 03/13/14 | 36 | 09/04/14 - 09/11/14 |
| 11 | 03/13/14 - 03/20/14 | 37 | 09/11/14 - 09/18/14 |
| 12 | 03/20/14 - 03/27/14 | 38 | 09/18/14 - 09/25/14 |
| 13 | 03/27/14 - 04/03/14 | 39 | 09/25/14 - 10/02/14 |
| 14 | 04/03/14 - 04/09/14 | 40 | 10/02/14 - 10/09/14 |
| 15 | 04/09/14 - 04/17/14 | 41 | 10/09/14 - 10/16/14 |
| 16 | 04/17/14 - 04/24/14 | 42 | 10/16/14 - 10/23/14 |
| 17 | 04/24/14 - 05/01/14 | 43 | 10/23/14 - 10/30/14 |
| 18 | 05/01/14 - 05/08/14 | 44 | 10/30/14 - 11/06/14 |
| 19 | 05/08/14 - 05/15/14 | 45 | 11/06/14 - 11/13/14 |
| 20 | 05/15/14 - 05/22/14 | 46 | 11/13/14 - 11/20/14 |
| 21 | 05/22/14 - 05/29/14 | 47 | 11/20/14 - 11/26/14 |
| 22 | 05/29/14 - 06/05/14 | 48 | 11/26/14 - 12/04/14 |
| 23 | 06/05/14 - 06/12/14 | 49 | 12/04/14 - 12/11/14 |
| 24 | 06/12/14 - 06/19/14 | 50 | 12/11/14 - 12/18/14 |
| 25 | 06/19/14 - 06/26/14 | 51 | 12/18/14 - 12/26/14 |
| 26 | 06/26/14 - 07/02/14 | 52 | 12/26/14 - 01/02/15 |

# FIGURE D-1
# COMPARISON OF MONTHLY TOTAL GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES SPLIT BETWEEN THE PRIMARY AND QC LABORATORIES, 2014




ENVIRONMENTAL INC. SOLUBLE AND INSOLUBLE FRACTIONS WERE COMBINED FOR TOTAL GROSS BETA

# FIGURE D-2
# COMPARISON OF WEEKLY GROSS BETA CONCENTRATIONS FROM COLLOCATED AIR PARTICULATE LOCATIONS SPLIT BETWEEN THE PRIMARY AND QC LABORATORIES, 2014



# APPENDIX E

# QUALITY CONTROL INTER-LABORATORY COMPARISON PROGRAM

**TABLE E-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM**
**TELEDYNE BROWN ENGINEERING, 2014**
**(PAGE 1 OF 3)**

| Month/Year | Identification Number | Matrix | Nuclide | Units | Reported Value (a) | Known Value (b) | Ratio (c) TBE/Analytics | Evaluation (d) |
|---|---|---|---|---|---|---|---|---|
| March 2014 | E10854 | Milk | Sr-89 | pCi/L | 95.1 | 91.7 | 1.04 | A |
| | | | Sr-90 | pCi/L | 10.9 | 15.1 | 0.72 | W |
| | E10855 | Milk | I-131 | pCi/L | 96.6 | 98.5 | 0.98 | A |
| | | | Ce-141 | pCi/L | 112 | 119 | 0.94 | A |
| | | | Cr-51 | pCi/L | 449 | 491 | 0.91 | A |
| | | | Cs-134 | pCi/L | 186 | 210 | 0.89 | A |
| | | | Cs-137 | pCi/L | 250 | 253 | 0.99 | A |
| | | | Co-58 | pCi/L | 248 | 268 | 0.93 | A |
| | | | Mn-54 | pCi/L | 292 | 297 | 0.98 | A |
| | | | Fe-59 | pCi/L | 230 | 219 | 1.05 | A |
| | | | Zn-65 | pCi/L | 312 | 323 | 0.97 | A |
| | | | Co-60 | pCi/L | 321 | 337 | 0.95 | A |
| | E10857 | AP | Ce-141 | pCi | 53.0 | 53.9 | 0.98 | A |
| | | | Cr-51 | pCi | 232 | 223 | 1.04 | A |
| | | | Cs-134 | pCi | 100 | 95.3 | 1.05 | A |
| | | | Cs-137 | pCi | 122 | 115 | 1.06 | A |
| | | | Co-58 | pCi | 122 | 121 | 1.01 | A |
| | | | Mn-54 | pCi | 135 | 135 | 1.00 | A |
| | | | Fe-59 | pCi | 111 | 99.3 | 1.12 | A |
| | | | Zn-65 | pCi | 140 | 147 | 0.95 | A |
| | | | Co-60 | pCi | 187 | 153 | 1.22 | W |
| | E10856 | Charcoal | I-131 | pCi | 74.1 | 76.4 | 0.97 | A |
| | E10858 | Water | Fe-55 | pCi/L | 2090 | 1760 | 1.19 | A |
| June 2014 | E10913 | Milk | Sr-89 | pCi/L | 85.9 | 91.3 | 0.94 | A |
| | | | Sr-90 | pCi/L | 13.8 | 14.5 | 0.95 | A |
| | E10914 | Milk | I-131 | pCi/L | 86.5 | 90.9 | 0.95 | A |
| | | | Ce-141 | pCi/L | 111 | 124 | 0.90 | A |
| | | | Cr-51 | pCi/L | 255 | 253 | 1.01 | A |
| | | | Cs-134 | pCi/L | 147 | 162 | 0.91 | A |
| | | | Cs-137 | pCi/L | 123 | 120 | 1.03 | A |
| | | | Co-58 | pCi/L | 105 | 112 | 0.94 | A |
| | | | Mn-54 | pCi/L | 155 | 156 | 0.99 | A |
| | | | Fe-59 | pCi/L | 106 | 102 | 1.04 | A |
| | | | Zn-65 | pCi/L | 251 | 252 | 1.00 | A |
| | | | Co-60 | pCi/L | 218 | 224 | 0.97 | A |
| | E10916 | AP | Ce-141 | pCi | 95.1 | 92.6 | 1.03 | A |
| | | | Cr-51 | pCi | 215 | 190 | 1.13 | A |
| | | | Cs-134 | pCi | 122 | 122 | 1.00 | A |
| | | | Cs-137 | pCi | 95.1 | 89.8 | 1.06 | A |
| | | | Co-58 | pCi | 88.7 | 84.1 | 1.05 | A |
| | | | Mn-54 | pCi | 115 | 116 | 0.99 | A |
| | | | Fe-59 | pCi | 72.6 | 76.7 | 0.95 | A |
| | | | Zn-65 | pCi | 193 | 189 | 1.02 | A |
| | | | Co-60 | pCi | 179 | 168 | 1.07 | A |
| | E10915 | Charcoal | I-131 | pCi | 85.6 | 85.2 | 1.00 | A |
| | E10917 | Water | Fe-55 | pCi/L | 1680 | 1810 | 0.93 | A |

**TABLE E-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM**
**TELEDYNE BROWN ENGINEERING, 2014**
**(PAGE 2 OF 3)**

| Month/Year | Identification Number | Matrix | Nuclide | Units | Reported Value (a) | Known Value (b) | Ratio (c) TBE/Analytics | Evaluation (d) |
|---|---|---|---|---|---|---|---|---|
| September 2014 | E10946 | Milk | Sr-89 | pCi/L | 90.7 | 96.9 | 0.94 | A |
| | | | Sr-90 | pCi/L | 14.0 | 16.4 | 0.85 | A |
| | E10947 | Milk | I-131 | pCi/L | 92.0 | 97.6 | 0.94 | A |
| | | | Ce-141 | pCi/L | 117 | 126 | 0.93 | A |
| | | | Cr-51 | pCi/L | 281 | 288 | 0.98 | A |
| | | | Cs-134 | pCi/L | 141 | 158 | 0.89 | A |
| | | | Cs-137 | pCi/L | 186 | 193 | 0.96 | A |
| | | | Co-58 | pCi/L | 137 | 143 | 0.96 | A |
| | | | Mn-54 | pCi/L | 138 | 142 | 0.97 | A |
| | | | Fe-59 | pCi/L | 162 | 158 | 1.03 | A |
| | | | Zn-65 | pCi/L | 75.2 | 73.0 | 1.03 | A |
| | | | Co-60 | pCi/L | 286 | 297 | 0.96 | A |
| | E10949 | AP | Ce-141 | pCi | 97.8 | 82.1 | 1.19 | A |
| | | | Cr-51 | pCi | 212 | 188 | 1.13 | A |
| | | | Cs-134 | pCi | 106 | 103 | 1.03 | A |
| | | | Cs-137 | pCi | 131 | 126 | 1.04 | A |
| | | | Co-58 | pCi | 85.7 | 93.0 | 0.92 | A |
| | | | Mn-54 | pCi | 92.8 | 92.3 | 1.01 | A |
| | | | Fe-59 | pCi | 113 | 103 | 1.10 | A |
| | | | Zn-65 | pCi | 53.2 | 47.5 | 1.12 | A |
| | | | Co-60 | pCi | 202 | 193 | 1.05 | A |
| | E10948 | Charcoal | I-131 | pCi | 83.9 | 89.8 | 0.93 | A |
| | E10950 | Water | Fe-55 | pCi/L | 2010 | 1720 | 1.17 | A |
| | E10951 | Soil | Ce-141 | pCi/g | 0.208 | 0.186 | 1.12 | A |
| | | | Cr-51 | pCi/g | 0.398 | 0.425 | 0.94 | A |
| | | | Cs-134 | pCi/g | 0.216 | 0.233 | 0.93 | A |
| | | | Cs-137 | pCi/g | 0.398 | 0.365 | 1.09 | A |
| | | | Co-58 | pCi/g | 0.197 | 0.211 | 0.93 | A |
| | | | Mn-54 | pCi/g | 0.242 | 0.209 | 1.16 | A |
| | | | Fe-59 | pCi/g | 0.238 | 0.233 | 1.02 | A |
| | | | Zn-65 | pCi/g | 0.117 | 0.108 | 1.08 | A |
| | | | Co-60 | pCi/g | 0.447 | 0.438 | 1.02 | A |
| December 2014 | E11078 | Milk | Sr-89 | pCi/L | 85.7 | 95.7 | 0.90 | A |
| | | | Sr-90 | pCi/L | 12.9 | 15.6 | 0.83 | A |
| | E11079 | Milk | I-131 | pCi/L | 85.9 | 95.1 | 0.90 | A |
| | | | Ce-141 | pCi/L | 205 | 219 | 0.94 | A |
| | | | Cr-51 | pCi/L | 402 | 406 | 0.99 | A |
| | | | Cs-134 | pCi/L | 156 | 164 | 0.95 | A |
| | | | Cs-137 | pCi/L | 194 | 198 | 0.98 | A |
| | | | Co-58 | pCi/L | 122 | 130 | 0.94 | A |
| | | | Mn-54 | pCi/L | 220 | 225 | 0.98 | A |
| | | | Fe-59 | pCi/L | 183 | 175 | 1.05 | A |
| | | | Zn-65 | pCi/L | 287 | 297 | 0.97 | A |
| | | | Co-60 | pCi/L | 224 | 235 | 0.95 | A |

**TABLE E-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM**
**TELEDYNE BROWN ENGINEERING, 2014**
**(PAGE 3 OF 3)**

| Month/Year | Identification Number | Matrix | Nuclide | Units | Reported Value (a) | Known Value (b) | Ratio (c) TBE/Analytics | Evaluation (d) |
|---|---|---|---|---|---|---|---|---|
| December 2014 | E11081 | AP | Ce-141 | pCi | 96.4 | 102 | 0.95 | A |
| | | | Cr-51 | pCi | 171 | 190 | 0.90 | A |
| | | | Cs-134 | pCi | 73.1 | 76.9 | 0.95 | A |
| | | | Cs-137 | pCi | 99.0 | 92.6 | 1.07 | A |
| | | | Co-58 | pCi | 57.5 | 60.8 | 0.95 | A |
| | | | Mn-54 | pCi | 107 | 105 | 1.02 | A |
| | | | Fe-59 | pCi | 74.2 | 81.6 | 0.91 | A |
| | | | Zn-65 | pCi | 144 | 139 | 1.04 | A |
| | | | Co-60 | pCi | 114 | 110 | 1.04 | A |
| | E11080 | Charcoal | I-131 | pCi | 93.5 | 98.2 | 0.95 | A |
| | E11082 | Water | Fe-55 | pCi/L | 1760 | 1970 | 0.89 | A |

*(a) Teledyne Brown Engineering reported result.*

*(b) 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.*

*(c) Ratio of Teledyne Brown Engineering to Analytics results.*

*(d) 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** **ERA ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM**
**TELEDYNE BROWN ENGINEERING, 2014**
**(PAGE 1 OF 1)**

| Month/Year | Identification Number | Media | Nuclide | Units | Reported Value (a) | Known Value (b) | Acceptance Limits | Evaluation (c) |
|---|---|---|---|---|---|---|---|---|
| May 2014 | RAD-97 | Water | Sr-89 | pCi/L | 38.25 | 36.7 | 27.5 - 43.6 | A |
| | | | Sr-90 | pCi/L | 24.65 | 26.5 | 19.2 - 30.9 | A |
| | | | Ba-133 | pCi/L | 89.1 | 87.9 | 74.0 - 96.7 | A |
| | | | Cs-134 | pCi/L | 45.55 | 44.3 | 35.5 - 48.7 | A |
| | | | Cs-137 | pCi/L | 91.15 | 89.1 | 80.2 - 101 | A |
| | | | Co-60 | pCi/L | 65.10 | 64.2 | 57.8 - 73.1 | A |
| | | | Zn-65 | pCi/L | 244 | 235 | 212 - 275 | A |
| | | | Gr-A | pCi/L | 45.65 | 61.0 | 31.9 - 75.8 | A |
| | | | Gr-B | pCi/L | 27.95 | 33.0 | 21.4 - 40.7 | A |
| | | | I-131 | pCi/L | 23.75 | 25.7 | 21.3 - 30.3 | A |
| | | | U-Nat | pCi/L | 9.61 | 10.2 | 7.95 - 11.8 | A |
| | | | H-3 | pCi/L | 8435 | 8770 | 7610 - 9650 | A |
| | MRAD-20 | Filter | Gr-A | pCi/filter | 28.0 | 46.0 | 15.4 - 71.4 | A |
| November 2014 | RAD-99 | Water | Sr-89 | pCi/L | 30.4 | 31.4 | 22.8 - 38.1 | A |
| | | | Sr-90 | pCi/L | 18.6 | 21.8 | 15.6 - 25.7 | A |
| | | | Ba-133 | pCi/L | 46.8 | 49.1 | 40.3 - 54.5 | A |
| | | | Cs-134 | pCi/L | 88.0 | 89.8 | 73.7 - 98.8 | A |
| | | | Cs-137 | pCi/L | 99.0 | 98.8 | 88.9 - 111 | A |
| | | | Co-60 | pCi/L | 92.5 | 92.1 | 82.9 - 104 | A |
| | | | Zn-65 | pCi/L | 325 | 310 | 279 - 362 | A |
| | | | Gr-A | pCi/L | 29.9 | 37.6 | 19.4 - 48.1 | A |
| | | | Gr-B | pCi/L | 27.5 | 27.4 | 17.3 - 35.3 | A |
| | | | I-131 | pCi/L | 15.8 | 20.3 | 16.8 - 24.4 | N (1) |
| | | | U-Nat | pCi/L | 5.74 | 5.80 | 4.34 - 6.96 | A |
| | | | H-3 | pCi/L | 6255 | 6880 | 5940 - 7570 | A |
| | MRAD-21 | Filter | Gr-A | pCi/filter | 27.3 | 36.9 | 12.4 - 57.3 | A |

*(1) The **Iodine-131** was evaluated as failed with a ratio of 0.778. No cause could be found for the slighly low activity. TBE would evaluate this as acceptablle with warning. A rerun was not possible due to I-131 decay. All ERA Iodine-131 evaluations since 2004 have been acceptable. NCR 14-08*

*(a) Teledyne Brown Engineering reported result.*

*(b) 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.*

*(c) ERA evaluation: A=acceptable. Reported result falls within the Warning Limits. NA=not acceptable. Reported result falls outside of the Control Limits. CE=check for Error. Reported result falls within the Control Limits and outside of the Warning Limit.*

**TABLE E-3 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)**
**TELEDYNE BROWN ENGINEERING, 2014**
**(PAGE 1 OF 2)**

| Month/Year | Identification Number | Media | Nuclide* | Units | Reported Value (a) | Known Value (b) | Acceptance Range | Evaluation (c) |
|---|---|---|---|---|---|---|---|---|
| March 2014 | 14-MaW30 | Water | Am-241 | Bq/L | 0.764 | 0.720 | 0.504 - 0.936 | A |
| | | | Cs-134 | Bq/L | 20.7 | 23.1 | 16.2 - 30 0 | A |
| | | | Cs-137 | Bq/L | 28.0 | 28.9 | 20.2 - 37.6 | A |
| | | | Co-57 | Bq/L | 26.5 | 27.5 | 19.3 - 35.8 | A |
| | | | Co-60 | Bq/L | 15.6 | 16.0 | 11.2 - 20.8 | A |
| | | | H-3** | Bq/L | NR | 321 | 225 - 417 | N (3) |
| | | | Mn-54 | Bq/L | 13.5 | 13.9 | 9.7 - 18.1 | A |
| | | | Ni-63 | Bq/L | NR | 34.0 | 23.8 - 44.2 | N (3) |
| | | | Pu-238 | Bq/L | 0.911 | 0.828 | 0.580 - 1.076 | |
| | | | Pu-239/240 | Bq/L | 0.751 | 0.676 | 0.473 - 0.879 | |
| | | | K-40 | Bq/L | NR | | (1) | N (3) |
| | | | Sr-90** | Bq/L | NR | 8.51 | 5.96 - 11.06 | N (3) |
| | | | U-234/233** | Bq/L | NR | 0.225 | 0.158 - 0.293 | N (3) |
| | | | U-238** | Bq/L | NR | 1.45 | 1.02 - 1.89 | N (3) |
| | | | Zn-65 | Bq/L | -0.201 | | (1) | A |
| | 14-MaS30 | Soil | Cs-134 | Bq/kg | 2.02 | | (1) | A |
| | | | Cs-137 | Bq/kg | 1300 | 1238 | 867 - 1609 | A |
| | | | Co-57 | Bq/kg | 1069 | 966 | 676 - 1256 | A |
| | | | Co-60 | Bq/kg | 1.32 | 1.22 | (2) | A |
| | | | Mn-54 | Bq/kg | 1510 | 1430 | 1001 - 1859 | A |
| | | | K-40 | Bq/kg | 669 | 622 | 435 - 809 | A |
| | | | Sr-90 | Bq/kg | 4.14 | | (1) | A |
| | | | Zn-65 | Bq/kg | 763 | 695 | 487 - 904 | A |
| | 14-RdF30 | AP | Cs-134** | Bq/sample | NR | 1.91 | 1.34 - 2.48 | N (3) |
| | | | Cs-137** | Bq/sample | NR | 1.76 | 1.23 - 2.29 | N (3) |
| | | | Co-57** | Bq/sample | NR | | (1) | N (3) |
| | | | Co-60** | Bq/sample | NR | 1.39 | 0.97 - 1.81 | N (3) |
| | | | Mn-54** | Bq/sample | NR | | (1) | N (3) |
| | | | Sr-90 | Bq/sample | 0.8220 | 1.18 | 0.83 - 1.53 | N (3) |
| | | | Zn-65** | Bq/sample | NR | | (1) | N (3) |
| | 14-GrF30 | AP | Gr-A | Bq/sample | 0.606 | 1.77 | 0.53 - 3.01 | A |
| | | | Gr-B | Bq/sample | 0.7507 | 0.77 | 0.39 - 1.16 | A |
| | 14-RdV30 | Vegetation | Cs-134 | Bq/sample | 5.96 | 6.04 | 4.23 - 7.85 | A |
| | | | Cs-137 | Bq/sample | 5.06 | 4.74 | 3.32 - 6.16 | A |
| | | | Co-57 | Bq/sample | 11.8 | 10.1 | 7.1 - 13.1 | A |
| | | | Co-60 | Bq/sample | 7.34 | 6.93 | 4.85 - 9.01 | A |
| | | | Mn-54 | Bq/sample | 8.95 | 8.62 | 6.03 - 11.21 | A |
| | | | Sr-90 | Bq/sample | 1.23 | 1.46 | 1.02 - 1.90 | A |
| | | | Zn-65 | Bq/sample | 8.91 | 7.86 | 5.50 - 10.22 | A |

**TABLE E-3 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)**
**TELEDYNE BROWN ENGINEERING, 2014**
**(PAGE 2 OF 2)**

| Month/Year | Identification Number | Media | Nuclide* | Units | Reported Value (a) | Known Value (b) | Acceptance Range | Evaluation (c) |
|---|---|---|---|---|---|---|---|---|
| September 2014 | 14-MaW31 | Water | Am-241 | Bq/L | 0.705 | 0.88 | 0.62 - 1.14 | A |
| | | | Cs-134*** | Bq/L | NR | | (1) | N (4) |
| | | | Cs-137*** | Bq/L | NR | 18.4 | 12.9 - 23.9 | N (4) |
| | | | Co-57*** | Bq/L | NR | 24.7 | 17.3 - 32.1 | N (4) |
| | | | Co-60*** | Bq/L | NR | 12.4 | 8.7 - 16.1 | N (4) |
| | | | Mn-54*** | Bq/L | NR | 14.0 | 9.8 - 18.2 | N (4) |
| | | | Ni-63 | Bq/L | 24.07 | 24.6 | 17.2 - 32.0 | A |
| | | | Pu-238 | Bq/L | 0.591 | 0.618 | 0.433 - 0.803 | A |
| | | | Pu-239/240 | Bq/L | 0.0153 | 0.0048 | (2) | A |
| | | | K-40*** | Bq/L | NR | 161 | 113 - 209 | N (4) |
| | | | Zn-65*** | Bq/L | NR | 10.9 | 7.6 - 14.2 | N (4) |
| | 14-MaS31 | Soil | Cs-134*** | Bq/kg | NR | 622 | 435 - 809 | N (4) |
| | | | Cs-137*** | Bq/kg | NR | | (1) | N (4) |
| | | | Co-57*** | Bq/kg | NR | 1116 | 781 - 1451 | N (4) |
| | | | Co-60*** | Bq/kg | NR | 779 | 545 - 1013 | N (4) |
| | | | Mn-54*** | Bq/kg | NR | 1009 | 706 - 1312 | N (4) |
| | | | K-40*** | Bq/kg | NR | 824 | 577 - 1071 | N (4) |
| | | | Sr-90 | Bq/kg | 694 | 858 | 601 - 1115 | A |
| | | | Zn-65*** | Bq/kg | NR | 541 | 379 - 703 | N (4) |
| | 14-RdF31 | AP | Sr-90 | Bq/sample | 0.310 | 0.703 | 0.492 - 0.914 | N (4) |
| | 14-GrF31 | AP | Gr-A | Bq/sample | 0.153 | 0.53 | 0.16 - 0.90 | N (4) |
| | | | Gr-B | Bq/sample | 0.977 | 1.06 | 0.53 - 1.59 | A |
| September 2014 | 14-RdV31 | Vegetation | Cs-134 | Bq/sample | 7.31 | 7.38 | 5.17 - 9.59 | A |
| | | | Cs-137 | Bq/sample | 8.93 | 8.14 | 5.70 - 10.58 | A |
| | | | Co-57 | Bq/sample | 10.8 | 9.2 | 6.4 - 12.0 | A |
| | | | Co-60 | Bq/sample | 6.31 | 6.11 | 4.28 - 7.94 | A |
| | | | Mn-54 | Bq/sample | 7.76 | 7.10 | 4.97 - 9.23 | A |
| | | | Sr-90 | Bq/sample | 0.738 | 0.85 | 0.60 - 1.11 | A |
| | | | Zn-65 | Bq/sample | 7.16 | 6.42 | 4.49 - 8.35 | A |

* The MAPEP cross check isotope list has been reduced due to duplication of effort or analysis not being performed for clients.

** These nuclides are no longer part of the TBE cross check program due to duplication of effort or analysis not being performed for clients. MAPEP evaluates non-reported analyses as failed if they were reported in the previous series.

*** All future gamma cross check samples for these isotopes will be provided by Analytics.

*(1) False positive test.*

*(2) Sensitivity evaluation.*

*(3) **Water, Ni-63** overlooked when reporting, but the result of 32.7 +- 1.69 would have passed the acceptance criteria. NCR 14-04*
***Water**, the non-detected **K-40** was overlooked when reporting, but would have passed the false positive test. NCR 14-04*
***AP, Sr-90** rerun was within the low range of the acceptqance criteria. The original and rerun results were statistically the same. No cause could be identified for the slightly low Sr-90 activity. NCR 14-04*
*For non reported (NR) analyses, MAPEP evaluates as failed if they were reported in the previous series. NCR 14-04*

*(4) **AP, Sr-90** gravimetric yield was very high at 117%. Could indicate larger than normal amounts of calcium in the AP. A second fuming $HNO_3$ separation would be required to remove the excess calcium. NCR 14-09*
***AP, Gr-Alpha** was counted on the wrong side. When flipped over and recounted the results were acceptable. NCR 14-09*
*For non reported (NR) analyses, MAPEP evaluates as failed if they were reported in the previous series. NCR 14-09*

*(a) Teledyne Brown Engineering reported result.*

*(b) 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.*

*(c) DOE/MAPEP evaluation: A=acceptable, W=acceptable with warning, N=not acceptable.*

**TABLE E-4** **ERA STATISTICAL SUMMARY PROFICIENCY TESTING PROGRAM[a]**
**ENVIRONMENTAL, INC., 2014**



| Lab Code | Date | Analysis | Concentration (pCi/L) Laboratory Result b | ERA Result c | Control Limits | Acceptance |
|---|---|---|---|---|---|---|
| ERW-1384 | 4/7/2014 | Sr-89 | 40.29 ± 5.76 | 36.70 | 27.50 - 43.60 | Pass |
| ERW-1384 | 4/7/2014 | Sr-90 | 24.08 ± 2.35 | 26.50 | 19.20 - 30.90 | Pass |
| ERW-1385 | 4/7/2014 | Ba-133 | 78.23 ± 3.93 | 87.90 | 74.00 - 96.70 | Pass |
| ERW-1385 | 4/7/2014 | Co-60 | 62.75 ± 3.53 | 64.20 | 57.80 - 73.10 | Pass |
| ERW-1385 | 4/7/2014 | Cs-134 | 44.97 ± 3.99 | 44.30 | 35.50 - 48.70 | Pass |
| ERW-1385 | 4/7/2014 | Cs-137 | 88.54 ± 4.93 | 89.10 | 80.20 - 101.00 | Pass |
| ERW-1385 | 4/7/2014 | Zn-65 | 249.1 ± 10.44 | 235.0 | 212.0 - 275.0 | Pass |
| ERW-1388 | 4/7/2014 | Gr. Alpha | 56.70 ± 2.47 | 61.00 | 31.90 - 75.80 | Pass |
| ERW-1388 | 4/7/2014 | Gr. Beta | 32.10 ± 1.20 | 33.00 | 21.40 - 40.70 | Pass |
| ERW-1391 | 4/7/2014 | I-131 | 25.52 ± 1.12 | 25.70 | 21.30 - 30.30 | Pass |
| ERW-1394 | 4/7/2014 | Uranium | 10.76 ± 0.74 | 10.20 | 7.95 - 11.80 | Pass |
| ERW-1397 | 4/7/2014 | H-3 | 8982 ± 279 | 8770 | 7610 - 9650 | Pass |
| ERW-5382 | 10/6/2014 | Sr-89 | 29.40 ± 5.32 | 31.40 | 22.80 - 38.10 | Pass |
| ERW-5382 | 10/6/2014 | Sr-90 | 19.19 ± 1.85 | 21.80 | 15.60 - 25.70 | Pass |
| ERW-5385 | 10/6/2014 | Ba-133 | 43.54 ± 4.54 | 49.10 | 40.30 - 54.50 | Pass |
| ERW-5385 | 10/6/2014 | Cs-134 | 81.95 ± 7.49 | 89.80 | 73.70 - 98.80 | Pass |
| ERW-5385 | 10/6/2014 | Cs-137 | 95.76 ± 5.50 | 98.80 | 88.90 - 111.00 | Pass |
| ERW-5385 | 10/6/2014 | Co-60 | 90.25 ± 2.77 | 92.10 | 82.90 - 104.00 | Pass |
| ERW-5385 | 10/6/2014 | Zn-65 | 327.4 ± 23.3 | 310.00 | 279.0 - 362.0 | Pass |
| ERW-5388 | 10/6/2014 | Gr. Alpha | 30.88 ± 8.05 | 37.60 | 19.40 - 46.10 | Pass |
| ERW-5388 | 10/6/2014 | G. Beta | 20.47 ± 4.75 | 27.40 | 17.30 - 35.30 | Pass |
| ERW-5392 | 10/6/2014 | I-131 | 19.58 ± 2.35 | 20.30 | 16.80 - 24.40 | Pass |
| ERW-5394 | 10/6/2014 | Uranium | 5.51 ± 0.37 | 5.80 | 4.34 - 6.96 | Pass |
| ERW-5397 | 10/6/2014 | H-3 | 6876 ± 383 | 6880 | 5940 - 7570 | Pass |

a Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing in drinking water conducted by Environmental Resources Associates (ERA).

b Unless otherwise indicated, the laboratory result is given as the mean ± standard deviation for three determinations.

c Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination) and control limits as provided by ERA.

**TABLE E-5 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)**
**ENVIRONMENTAL, INC., 2014**
**(Page 1 of 2)**

| | | | Concentration a | | | |
|---|---|---|---|---|---|---|
| Lab Code b | Date | Analysis | Laboratory result | Known Activity | Control Limits c | Acceptance |
| MAW-1140 | 2/1/2014 | Gr. Alpha | 0.77 ± 0.06 | 0.85 | 0.26 - 1.44 | Pass |
| MAW-1140 | 2/1/2014 | Gr. Beta | 4.31 ± 0.08 | 4.19 | 2.10 - 6.29 | Pass |
| MAW-1184 | 2/1/2014 | Fe-55 | 0.40 ± 3.20 | 0.00 | -0.01 - 2.00 | Pass |
| MAW-1184 | 2/1/2014 | H-3 | 345.10 ± 10.60 | 321.00 | 225.00 - 417.00 | Pass |
| MAW-1184 | 2/1/2014 | Ni-63 | 32.40 ± 3.20 | 34.00 | 23.80 - 44.20 | Pass |
| MAW-1184 | 2/1/2014 | Pu-238 | 1.28 ± 0.12 | 0.83 | 0.58 - 1.08 | Fail (1) |
| MAW-1184 | 2/1/2014 | Pu-239/240 | 0.91 ± 0.10 | 0.68 | 0.47 - 0.88 | Fail (1) |
| MAW-1184 | 2/1/2014 | Sr-90 | 7.00 ± 0.70 | 8.51 | 5.96 - 11.06 | Pass |
| MAW-1184 | 2/1/2014 | U-233/234 | 0.20 ± 0.07 | 0.23 | 0.16 - 0.29 | Pass |
| MAW-1184 | 2/1/2014 | U-238 | 1.25 ± 0.18 | 1.45 | 1.02 - 1.89 | Pass |
| MAW-1184 | 2/1/2014 | Co-57 | 27.86 ± 0.38 | 27.50 | 19.30 - 35.80 | Pass |
| MAW-1184 | 2/1/2014 | Co-60 | 15.99 ± 0.27 | 16.00 | 11.20 - 20.80 | Pass |
| MAW-1184 | 2/1/2014 | Cs-134 | 21.85 ± 0.54 | 23.10 | 16.20 - 30.00 | Pass |
| MAW-1184 | 2/1/2014 | Cs-137 | 28.74 ± 0.49 | 28.90 | 20.20 - 37.60 | Pass |
| MAW-1184 | 2/1/2014 | K-40 | 1.80 ± 2.00 | 0.00 | 0.00 - 10.00 | Pass |
| MAW-1184 | 2/1/2014 | Mn-54 | 14.06 ± 0.40 | 13.90 | 9.70 - 18.10 | Pass |
| MAW-1184 | 2/1/2014 | Zn-65 | 0.00 ± 0.19 | 0.00 | -0.01 - 0.00 | Pass |
| MAVE-1148 | 2/1/2014 | Co-57 | 11.63 ± 0.19 | 10.10 | 7.10 - 13.10 | Pass |
| MAVE-1148 | 2/1/2014 | Co-60 | 7.28 ± 0.18 | 6.93 | 4.85 - 9.01 | Pass |
| MAVE-1148 | 2/1/2014 | Cs-134 | 6.29 ± 0.29 | 6.04 | 4.23 - 7.85 | Pass |
| MAVE-1148 | 2/1/2014 | Cs-137 | 5.18 ± 0.20 | 4.74 | 3.32 - 6.16 | Pass |
| MAVE-1148 | 2/1/2014 | Mn-54 | 9.22 ± 0.26 | 8.62 | 6.03 - 11.21 | Pass |
| MAVE-1148 | 2/1/2014 | Zn-65 | 8.59 ± 0.40 | 7.86 | 5.50 - 10.22 | Pass |
| MAAP-1151 | 2/1/2014 | Co-57 | 1.60 ± 0.05 | 0.00 | NA | Fail (2) |
| MAAP-1151 | 2/1/2014 | Co-60 | 1.38 ± 0.08 | 1.39 | 0.97 - 1.81 | Pass |
| MAAP-1151 | 2/1/2014 | Cs-134 | 1.75 ± 0.11 | 1.91 | 1.34 - 2.48 | Pass |
| MAAP-1151 | 2/1/2014 | Cs-137 | 1.81 ± 0.10 | 1.76 | 1.23 - 2.29 | Pass |
| MAAP-1151 | 2/1/2014 | Mn-54 | 0.01 ± 0.03 | 0.00 | NA | Pass |
| MAAP-1151 | 2/1/2014 | Zn-65 | -0.24 ± 0.09 | 0.00 | -0.50 - 1.00 | Pass |
| MAAP-1151 | 2/1/2014 | Sr-90 | 1.11 ± 0.14 | 1.18 | 0.83 - 1.53 | Pass |
| MAAP-1154 | 2/1/2014 | Gr. Alpha | 0.56 ± 0.06 | 1.77 | 0.53 - 3.01 | Pass |
| MAAP-1154 | 2/1/2014 | Gr. Beta | 0.98 ± 0.06 | 0.77 | 0.39 - 1.16 | Pass |
| MASO-1146 | 2/1/2014 | Ni-63 | 4.80 ± 15.30 | 0.00 | NA | Pass |
| MASO-1146 | 2/1/2014 | Co-57 | 1064.50 ± 3.60 | 966.00 | 676.00 - 1256.00 | Pass |
| MASO-1146 | 2/1/2014 | Co-60 | 1.70 ± 0.50 | 1.22 | (3) | Pass |
| MASO-1146 | 2/1/2014 | Cs-134 | 6.10 ± 1.80 | 0.00 | NA | Fail (4) |
| MASO-1146 | 2/1/2014 | Cs-137 | 1364.30 ± 5.30 | 1238.00 | 867.00 - 1609.00 | Pass |
| MASO-1146 | 2/1/2014 | K-40 | 728.90 ± 15.90 | 622.00 | 435.00 - 809.00 | Pass |
| MASO-1146 | 2/1/2014 | Mn-54 | 1588.00 ± 6.00 | 1430.00 | 1001.00 - 1859.00 | Pass |
| MASO-1146 | 2/1/2014 | Zn-65 | 763.50 ± 6.80 | 695.00 | 487.00 - 904.00 | Pass |
| MASO-1146 | 2/1/2014 | Sr-90 | 1.23 ± 1.37 | 0.00 | NA | Pass |

**TABLE E-5 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP) ENVIRONMENTAL, INC., 2014**



| | | | Concentration [a] | | | |
|---|---|---|---|---|---|---|
| Lab Code [b] | Date | Analysis | Laboratory result | Known Activity | Control Limits [c] | Acceptance |
| MASO-4439 | 8/1/2014 | Ni-63 | 771.62 ± 23.29 | 980.00 | 686.00 - 1274.00 | Pass |
| MASO-4439 | 8/1/2014 | Sr-90 | 778.34 ± 17.82 | 858.00 | 601.00 - 1115.00 | Pass |
| MASO-4439 | 8/1/2014 | Cs-134 | 520.60 ± 7.09 | 622.00 | 435.00 - 809.00 | Pass |
| MASO-4439 | 8/1/2014 | Co-57 | 1135.00 ± 7.40 | 1116.00 | 781.00 - 1451.00 | Pass |
| MASO-4439 | 8/1/2014 | Co-60 | 768.20 ± 7.70 | 779.00 | 545.00 - 1013.00 | Pass |
| MASO-4439 | 8/1/2014 | Mn-54 | 1050.70 ± 12.60 | 1009.00 | 706.00 - 1312.00 | Pass |
| MASO-4439 | 8/1/2014 | Zn-65 | 407.89 ± 15.03 | 541.00 | 379.00 - 703.00 | Pass |
| MAW-4431 | 8/1/2014 | Am-241 | 0.79 ± 0.08 | 0.88 | 0.62 - 1.14 | Pass |
| MAW-4431 | 8/1/2014 | Cs-137 | 18.62 ± 0.54 | 18.40 | 12.90 - 23.90 | Pass |
| MAW-4431 | 8/1/2014 | Co-57 | 24.85 ± 0.42 | 24.70 | 17.30 - 32.10 | Pass |
| MAW-4431 | 8/1/2014 | Co-60 | 12.27 ± 0.38 | 12.40 | 8.70 - 16.10 | Pass |
| MAW-4431 | 8/1/2014 | H-3 | 207.20 ± 10.60 | 208.00 | 146.00 - 270.00 | Pass |
| MAW-4431 | 8/1/2014 | Fe-55 | 55.10 ± 14.80 | 31.50 | 22.10 - 41.00 | Fail (5) |
| MAW-4431 | 8/1/2014 | Mn-54 | 14.36 ± 0.53 | 14.00 | 9.80 - 18.20 | Pass |
| MAW-4431 | 8/1/2014 | Zn-65 | 11.46 ± 0.78 | 10.90 | 7.60 - 14.20 | Pass |
| MAW-4493 | 8/1/2014 | Gr. Alpha | 0.93 ± 0.07 | 1.40 | 0.42 - 2.38 | Pass |
| MAW-4493 | 8/1/2014 | Gr. Beta | 6.31 ± 1.35 | 6.50 | 3.25 - 9.75 | Pass |
| MAAP-4433 | 8/1/2014 | Sr-90 | 0.74 ± 0.10 | 0.70 | 0.49 - 0.91 | Pass |
| MAAP-4444 | 8/1/2014 | Sr-89 | 7.82 ± 0.52 | 9.40 | 6.60 - 12.20 | Pass |
| MAAP-4444 | 8/1/2014 | Sr-90 | 0.76 ± 0.10 | 0.76 | 0.53 - 0.99 | Pass |
| MAVE-4436 | 8/1/2014 | Cs-134 | 7.49 ± 0.18 | 7.38 | 5.17 - 9.59 | Pass |
| MAVE-4436 | 8/1/2014 | Co-57 | 11.20 ± 0.19 | 9.20 | 6.40 - 12.00 | Pass |
| MAVE-4436 | 8/1/2014 | Co-60 | 6.84 ± 0.17 | 6.11 | 4.28 - 7.94 | Pass |
| MAVE-4436 | 8/1/2014 | Mn-54 | 8.11 ± 0.26 | 7.11 | 4.97 - 9.23 | Pass |
| MAVE-4436 | 8/1/2014 | Zn-65 | 7.76 ± 0.43 | 6.42 | 4.49 - 8.35 | Pass |

[a] Results are reported in units of Bq/kg (soil), Bq/L (water) or Bq/total sample (filters, vegetation).

[b] Laboratory codes as follows: MAW (water), MAAP (air filter), MASO (soil), MAVE (vegetation).

[c] *MAPEP results are presented as the known values and expected laboratory precision (1 sigma, 1 determination) and* control limits as defined by the MAPEP. A known value of "zero" indicates an analysis was included in the testing series as a "false positive". MAPEP does not provide control limits.

(1) The high bias on the plutonium crosscheck samples was traced to contamination from a newly purchased standard. The results of reanalysis with replacement tracer purchased from NIST:

| | | | |
|---|---|---|---|
| MAW-1184 | Pu-238 | 0.68 ± 0.10 | Bq / L |
| MAW-1184 | Pu-239/240 | 0.66 ± 0.10 | Bq / L |

(2) Interference from Eu-152 resulted in misidentification of Co-57.

(3) Provided in the series for "sensitivity evaluation". MAPEP does not provide control limits.

(4) False positive test. Long sample counting time lead to interference from naturally occuring Bi-214 in sample matrix with a close spectral energy.

(5) Result of reanalysis Fe-55 32.63 ± 16.30 Bq/L

# APPENDIX F

# ERRATA DATA

There is no errata data for 2014.

# APPENDIX G

# ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

Docket No: 50-277
50-278

# PEACH BOTTOM ATOMIC POWER STATION
# UNITS 2 and 3

Annual Radiological
Groundwater Protection Program Report

1 January 2014 Through 31 December 2014

**Prepared By**

Teledyne Brown Engineering
Environmental Services


Peach Bottom Atomic Power Station
Delta, PA 17314

**May 2015**

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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 2014 through 31 December 2014. 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 REMP. This is the seventh in a series of annual reports on the status of the RGPP conducted at PBAPS. This report covers groundwater, surface water, seep water and precipitation water samples collected from the environment on station property in 2014. During that time period, 720 analyses were performed on more than 231 samples from 41 locations. These 41 locations include 27 groundwater monitoring wells, 3 surface water sample points, 3 groundwater seeps and 2 yard drain sumps (groundwater) 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.

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 no known active releases into the groundwater at PBAPS.

Gamma-emitting radionuclides associated with licensed plant operations were not detected at concentrations greater than their respective Lower Limits of Detection (LLDs) as specified in the Offsite Dose Calculation Manual (ODCM) in any of the groundwater or surface water samples. In the case of tritium, Exelon specified that its laboratories achieve a lower limit of detection 10 times lower than that required by federal regulation.

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

Tritium was not detected in any groundwater locations at 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. Low levels of tritium were detected at concentrations greater than the minimum detectable concentration (MDC) in 11 of 27 groundwater monitoring

wells. The tritium concentrations ranged from 147 ± 71 pCi/L to 8,560 ± 899 pCi/L (Table B–I.1, Appendix B). Tritium was not detected at concentrations greater than the 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. 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).

Gross Alpha and Gross Beta analyses in the dissolved and suspended fractions were performed on groundwater samples during 2014. Gross Alpha (dissolved) was detected in 6 of 25 groundwater locations analyzed. The concentrations ranged from 1.3 to 13.3 pCi/L. Gross Alpha (suspended) was detected in 5 of 25 groundwater locations analyzed. The concentrations ranged from 1.0 to 4.8 pCi/L. Gross Beta (dissolved) was detected in 23 of 25 groundwater locations analyzed. The concentrations ranged from 1.2 to 16.6 pCi/L. Gross Beta (suspended) was detected in 8 of 25 groundwater locations analyzed. The concentrations ranged from 1.4 to 18.9 pCi/L. The activity detected is consistent with historical levels.

Hard-To-Detect analyses were performed on a select group of groundwater and surface water locations to establish baseline levels (Table B–I.3, Appendix B). The analyses for groundwater included iron-55 (Fe-55), nickel-63 (Ni-63), americium-241 (Am-241), curium-242 (Cm-242), Cm-243/244, plutonium-238 (Pu-238), Pu-239/240, uranium-234 (U-234), U-235 and U-238. U-234 was detected in 8 of 24 groundwater monitoring locations analyzed. The concentrations ranged from 0.45 to 7.65 pCi/L. U-235 was detected at one groundwater monitoring location at a concentration of 0.70 pCi/L. U-238 was detected in 8 of 24 groundwater monitoring locations analyzed. The concentrations ranged from 0.18 to 6.27 pCi/L. No plant produced radionuclides were detected.

## 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 1170 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 2014.

### 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 OCDM.

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 or Soil.

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

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

4. EN-PB-408-4160, Peach Bottom RGPP Reference Material

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. Groundwater, surface water, and precipitation water are collected. 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 (H-3)

Tritium (chemical symbol H-3) 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 Environmental Inc. Midwest Laboratories (EIML) to analyze the environmental samples for radioactivity for the PBAPS RGPP in 2014.

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 (Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-233/234, U-235, U-238, Fe-55 and 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 with which these operational data were compared. 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 calibration standards, sample volume or weight measurements, sampling uncertainty and other factors. 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 as TPU, that is obtained by propagating all sources of analytical uncertainty in measurements.

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, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Nb-95, Zr-95, I-131, Cs-134, Cs-137, Ba-140 and 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 during the pre-operational REMP were atmospheric radiation, fall-out, domestic water, surface water, marine life and foodstuffs. The results of the monitoring were detailed in the report entitled PBAPS, Environs Radiation Monitoring Program, Preoperational Summary Report Units 2 and 3, September 1970- August 1973, January 1974 and PBAPS, Environs Radiation Monitoring Program, Preoperational Summary Report Units 2 and 3, June 1977. The pre-operational REMP contained analytical results from samples collected from the surface water, discharge, well and rain water.

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 lithium present in crystalline rocks by neutrons produced by the radioactive decay of naturally abundant uranium and thorium. Lithogenic production of tritium is usually negligible compared to other sources due to the limited abundance of lithium in rock. The lithogenic tritium is introduced directly to groundwater.

A major anthropogenic source of tritium and strontium-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 up until 1975 followed by a gradual decline since that time. Tritium concentrations have typically been below 100 pCi/L since around 1980. 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 during the groundwater level measurement event. The purpose of the surface water monitoring 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 27 locations were analyzed for tritium activity (Table B-I.1, Appendix B). Tritium values ranged from the detection limit to 8,560 pCi/l. The existing wells at or near the owner-controlled boundary showed no tritium. The location most representative of potential offsite user of drinking water is less than the MDC (Table B-I.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 2014. Gross Alpha (dissolved) was detected in 6 of 25 groundwater locations analyzed. The concentrations ranged from 1.3 to 13.3 pCi/L. Gross Alpha (suspended) was detected in 5 of 25 groundwater locations analyzed. The concentrations ranged from 1.0 to 4.8 pCi/L. Gross Beta (dissolved) was detected in 23 of 25 groundwater locations analyzed. The concentrations ranged from 1.2 to 16.6 pCi/L. Gross Beta (suspended) was detected in 8 of 25 groundwater locations analyzed. The concentrations ranged from 1.4 to 18.9 pCi/L. 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 and surface water locations to establish baseline levels. The analyses for groundwater included iron-55 (Fe-55),

nickel-63 (Ni-63), americium-241 (Am-241), curium-242 (Cm-242), Cm-243/244, plutonium-238 (Pu-238), Pu-239/240, uranium-234 (U-234), U-235 and U-238. U-234 was detected in 8 of 24 groundwater monitoring locations analyzed. The concentrations ranged from 0.45 to 7.65 pCi/L. U-235 was detected at one groundwater monitoring location at a concentration of 0.70 pCi/L. U-238 was detected in 8 of 24 groundwater monitoring locations analyzed. The concentrations ranged from 0.18 to 6.27 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

Precipitation Water

Samples were collected at six locations (1A, 1B, 1S, 1SSE, 1Z, and 4M). 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 the 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 leaks, spills or releases of water containing licensed material to environment in 2014.

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. The plume is bounded on the south by wells MW-PB-20 and MW-PB-21.

Wells MW-PB-4, 24, 25, 26 and 27 were each sampled and analyzed 5 times during 2014. On all occasions, MW-PB-25 samples had the highest tritium activity.

All wells exhibited decreasing or steady trends during 2014.

H. Investigations

MW-PB-4

In 2006, monitoring wells MW-PB-1 through MW-PB-14 were installed. Tritium activity was detected in MW-PB-4, located north of the Unit 3 Circulating Water Pump Structure and MW-PB-12, north of the

Administration Building. Groundwater flow on site is from west to east. Monitoring wells were installed to the west, southwest and northwest of monitoring wells MW-PB-4 and MW-PB-12. The wells with the highest tritium activity are the wells installed directly east of and adjacent to the Unit 3 Turbine Building, wells MW-PB-24, 25, 26 and 27.

Investigation of potential sources identified that the likely source of groundwater contamination was due to degraded floor seams in the Unit 3 Turbine Building Moisture Separator area 116' elevation. Leaks internal to the building entered the groundwater through the degraded floor seams. The floor seams were repaired in August 2010. The floor in the Unit 3 Turbine Building Moisture Separator area 116' elevation was sealed and recoated in October 2011. Monitoring well activity has been decreasing since floor seam repairs were completed.

MW-PB-29, 30 and 31

An extent-of-condition inspection of the Unit 2 Turbine Building Moisture Separator area 116' elevation floor was performed in October 2010. Minor degradation of the floor seams was identified and repaired. In May 2011, monitoring wells MW-PB-29 and 30 were installed directly east of and adjacent to the Unit 2 Turbine Building; MW-PB-31 was installed southeast of and adjacent to the Unit 2 Turbine Building. These wells were installed to determine if a condition existed east of the Unit 2 Turbine Building that is similar to the condition east of the Unit 3 Turbine Building.

Wells MW-PB-29, 30 and 31 were sampled quarterly in 2014. Tritium activity in the wells ranged from less than the MDC to 492 ± 141 pCi/L. Samples from these wells were also analyzed for gamma emitting isotopes and hard to detect radionuclides. All results were less than the MDC for each isotope.

The Unit 2 Turbine Building Moisture Separator area 116' elevation floor was sealed and recoated in October 2012. Groundwater intrusion into a ventilation pit on the east side of the area was identified. The groundwater was removed and degraded seams in the ventilation pit were successfully repaired. There is currently no standing water in the pit.

MW-PB-4, 24, 25, 26 and 27

Wells MW-PB-4, 24, 25, 26 and 27 are considered the wells of primary interest. These wells were sampled on a quarterly frequency. Below are 2 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 tritium activity of the wells from the last sampling of 2014. The tritium activity is in pCi/L.

| Well # | Tritium Activity | Date |
|---|---|---|
| MW-PB-4 | 17,200 | 5/24/2010 |
| 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-4 | 271 | 12/03/2014 |
| MW-PB-24 | <193 | 12/03/2014 |
| MW-PB-25 | 8,560 | 12/03/2014 |
| MW-PB-26 | <193 | 12/03/2014 |
| MW-PB-27 | 605 | 12/03/2014 |

Potential sources of tritium in the groundwater were investigated via procedural processes and documented in the corrective action program. The most likely pathway for tritium to enter the groundwater was determined to be leaks internal to the Unit 3 Turbine Building Moisture Separator 116', migrating through degraded floor seams. The floor seams were repaired and the entire floor was sealed and a coating applied during the refuel outage in the fall of 2011. The wells have been on a decreasing trend since these repairs were completed.

I. Actions Taken

1. Compensatory Actions

There were no compensatory actions in 2014.

2. Installation of Monitoring Wells

No groundwater monitoring wells were installed in 2014.

3. 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 2014. These duplicate samples were obtained and analyzed for quality control purposes.

There are no additional deviations to report.

## 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, RGPP Summary Monitoring Report, March 2014, June 2014, October 2014.

# APPENDIX A

# SAMPLING LOCATIONS, DISTANCE AND DIRECTION

TABLE A-1: Radiological Groundwater Protection Program - Sampling Locations, Distance and Direction, Peach Bottom Atomic Power Station, 2014

| 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 |

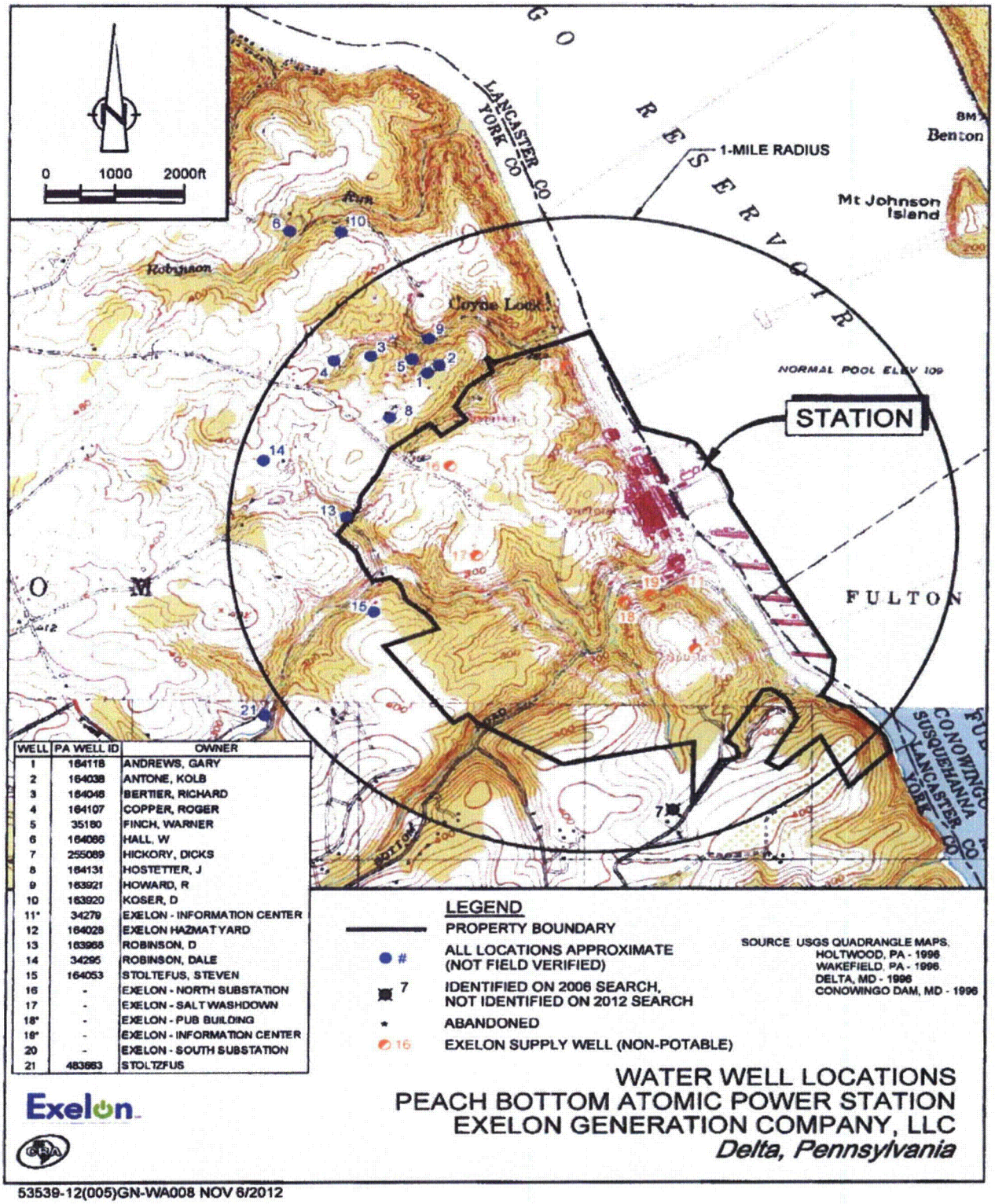


Figure A-1
Well Water Locations, Peach Bottom Atomic Power Station, 2014

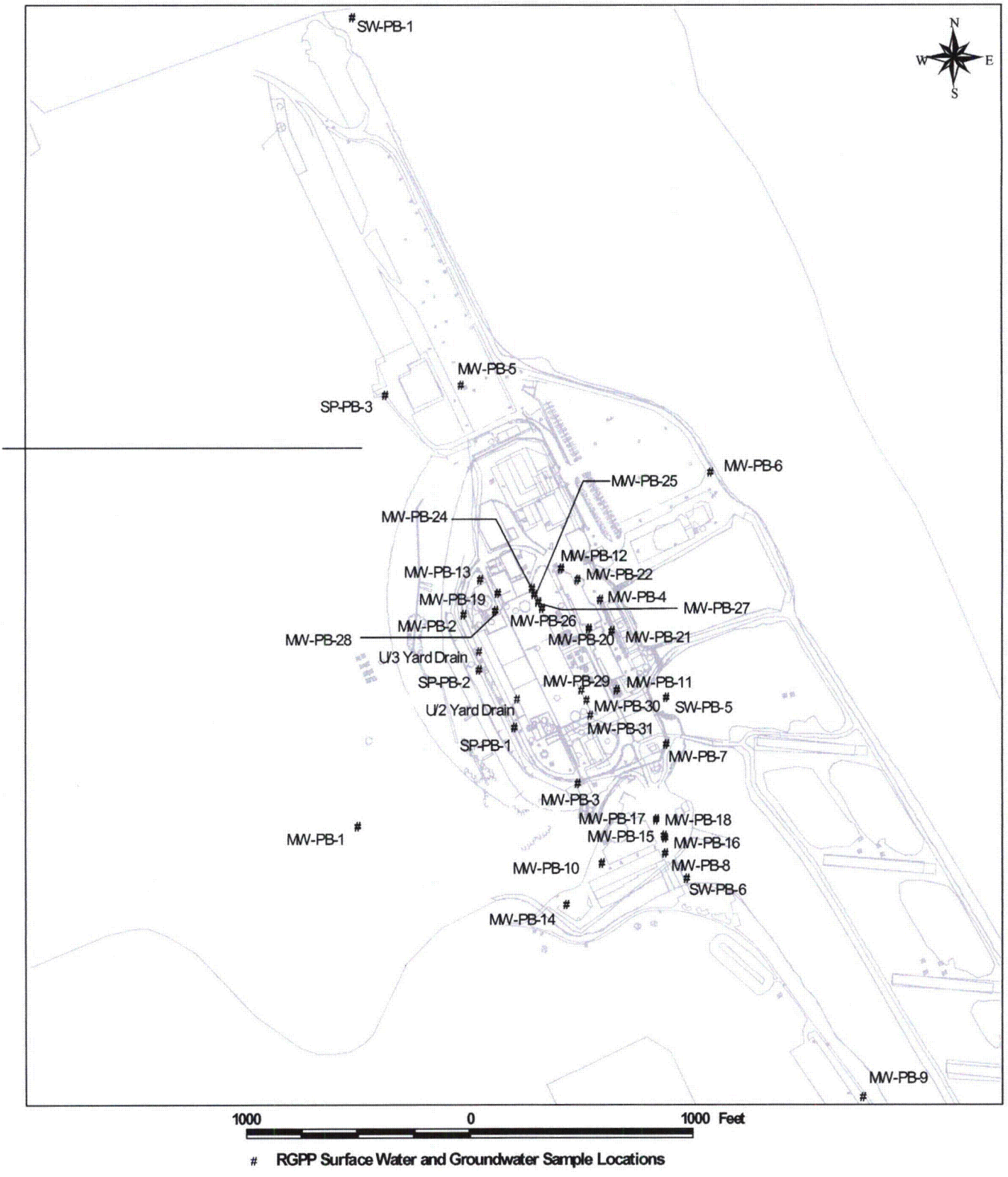


Figure A-2
RGPP Monitoring Locations, Peach Bottom Atomic Power Station, 2014

# APPENDIX B

# DATA TABLES

**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, 2014**

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 | 05/01/14 | | < 174 | | | | | | |
| MW-PB-10 | 01/28/14 | TBE | < 181 | | | | | | |
| MW-PB-10 | 01/28/14 | TBE | < 175 | | | | | | |
| MW-PB-10 | 01/28/14 | EIML | < 152 | | | | | | |
| MW-PB-10 | 04/30/14 | | < 173 | < 5.6 | < 0.5 | < 3.1 | 2.9 ± 1.0 | 7.8 ± 1.5 | 3.4 ± 1.2 |
| MW-PB-10 | 07/31/14 | | < 171 | | | | | | |
| MW-PB-10 | 10/06/14 | TBE | < 188 | | | | | | |
| MW-PB-10 | 10/06/14 | TBE | < 188 | | | | | | |
| MW-PB-10 | 10/06/14 | EIML | < 157 | | | | | | |
| MW-PB-11 | 01/27/14 | | < 185 | | | | | | |
| MW-PB-11 | 04/29/14 | | < 173 | < 4.8 | < 0.6 | < 0.9 | 1.8 ± 0.9 | 1.7 ± 0.7 | < 1.7 |
| MW-PB-11 | 07/30/14 | | < 169 | | | | | | |
| MW-PB-11 | 10/07/14 | | < 183 | | | | | | |
| MW-PB-12 | 01/30/14 | | < 187 | | | | | | |
| MW-PB-12 | 04/29/14 | | 181 ± 117 | < 5.8 | < 0.7 | < 0.8 | < 0.8 | 1.2 ± 0.6 | < 1.6 |
| MW-PB-12 | 07/28/14 | | < 172 | | | | | | |
| MW-PB-12 | 10/07/14 | | < 186 | | | | | | |
| MW-PB-13 | 01/27/14 | | < 177 | | | | | | |
| MW-PB-13 | 04/28/14 | | < 175 | < 6.0 | < 0.6 | 13.3 ± 8.5 | < 1.5 | 15.6 ± 4.0 | < 3.0 |
| MW-PB-13 | 07/30/14 | TBE | < 190 | | | | | | |
| MW-PB-13 | 07/30/14 | TBE | < 172 | | | | | | |
| MW-PB-13 | 07/30/14 | EIML | 147 ± 71 | | | | | | |
| MW-PB-13 | 10/07/14 | | < 185 | | | | | | |
| MW-PB-14 | 04/30/14 | | < 184 | | | | | | |
| MW-PB-15 | 01/28/14 | | < 173 | | | | | | |
| MW-PB-15 | 04/30/14 | | < 180 | < 6.6 | < 0.5 | < 1.4 | < 0.8 | 9.3 ± 1.2 | < 1.6 |
| MW-PB-15 | 07/31/14 | | < 188 | | | | | | |
| MW-PB-15 | 10/06/14 | | < 186 | | | | | | |
| MW-PB-16 | 01/28/14 | | < 175 | | | | | | |
| MW-PB-16 | 04/30/14 | | < 187 | < 4.3 | < 0.6 | 6.3 ± 1.2 | 3.9 ± 1.2 | 7.6 ± 0.9 | 3.0 ± 1.2 |
| MW-PB-16 | 07/31/14 | | < 186 | | | | | | |
| MW-PB-16 | 10/06/14 | | < 175 | | | | | | |
| MW-PB-19 | 01/30/14 | | < 190 | | | | | | |
| MW-PB-19 | 04/28/14 | | < 184 | < 5.6 | < 0.7 | < 0.8 | < 0.8 | 2.6 ± 0.7 | < 1.6 |
| MW-PB-19 | 07/28/14 | | < 192 | | | | | | |
| MW-PB-19 | 10/07/14 | TBE | < 163 | | | | | | |
| MW-PB-19 | 10/07/14 | TBE | < 183 | | | | | | |
| MW-PB-19 | 10/07/14 | EIML | < 157 | | | | | | |
| MW-PB-2 | 01/27/14 | | < 170 | | | | | | |
| MW-PB-2 | 04/28/14 | | < 174 | < 5.5 | < 0.6 | 4.3 ± 1.1 | < 0.8 | 8.9 ± 1.0 | < 1.6 |
| MW-PB-2 | 07/30/14 | | < 169 | | | | | | |
| MW-PB-2 | 10/07/14 | | < 185 | | | | | | |
| MW-PB-20 | 01/27/14 | | < 163 | | | | | | |
| MW-PB-20 | 04/29/14 | | < 187 | < 5.5 | < 0.7 | < 4.8 | < 0.4 | 9.5 ± 1.7 | < 1.3 |
| MW-PB-20 | 07/28/14 | | < 190 | | | | | | |
| MW-PB-20 | 10/07/14 | | < 184 | | | | | | |
| MW-PB-21 | 01/31/14 | | < 187 | | | | | | |
| MW-PB-21 | 04/29/14 | | < 185 | < 1.7 | < 0.7 | < 1.5 | < 0.4 | 7.7 ± 1.2 | < 1.3 |
| MW-PB-21 | 07/28/14 | | 227 ± 127 | | | | | | |
| MW-PB-21 | 10/08/14 | | < 188 | | | | | | |
| MW-PB-22 | 01/30/14 | | 487 ± 144 | | | | | | |
| MW-PB-22 | 04/29/14 | | 669 ± 152 | < 5.0 | < 0.7 | < 1.1 | < 0.5 | 2.8 ± 0.8 | 2.7 ± 1.1 |
| MW-PB-22 | 07/28/14 | | 854 ± 165 | | | | | | |
| MW-PB-22 | 10/08/14 | | 833 ± 160 | | | | | | |
| MW-PB-24 | 01/30/14 | | < 171 | | | | | | |
| MW-PB-24 | 04/29/14 | Original | 1350 ± 196 | < 4.3 | < 0.7 | < 1.2 | < 0.4 | 2.4 ± 0.8 | < 1.3 |
| MW-PB-24 | 04/29/14 | Recount | 1370 ± 198 | | | | | | |
| MW-PB-24 | 04/29/14 | Reanalysis | 1390 ± 196 | | | | | | |
| MW-PB-24 | 07/29/14 | | 844 ± 158 | | | | | | |
| MW-PB-24 | 10/08/14 | | 302 ± 116 | | | | | | |

**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, 2014**

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-24 | 12/03/14 | | < 193 | | | | | | |
| MW-PB-25 | 01/30/14 | TBE | 7380 ± 775 | | | | | | |
| MW-PB-25 | 01/30/14 | TBE | 6840 ± 721 | | | | | | |
| MW-PB-25 | 01/30/14 | EIML | 8203 ± 271 | | | | | | |
| MW-PB-25 | 04/29/14 | | 6440 ± 692 | < 3.4 | < 0.4 | < 1.0 | < 0.4 | 7.4 ± 0.9 | 1.4 ± 0.9 |
| MW-PB-25 | 07/29/14 | | 6220 ± 663 | | | | | | |
| MW-PB-25 | 10/08/14 | | 5830 ± 624 | | | | | | |
| MW-PB-25 | 12/03/14 | Original | 8250 ± 868 | | | | | | |
| MW-PB-25 | 12/03/14 | Recount | 8560 ± 899 | | | | | | |
| MW-PB-25 | 12/03/14 | Reanalysis | 8540 ± 895 | | | | | | |
| MW-PB-26 | 01/30/14 | | 295 ± 127 | | | | | | |
| MW-PB-26 | 04/29/14 | | 332 ± 136 | < 3.3 | < 0.4 | 2.6 ± 0.9 | < 0.4 | 3.9 ± 0.8 | 2.1 ± 1.0 |
| MW-PB-26 | 07/29/14 | | 258 ± 127 | | | | | | |
| MW-PB-26 | 10/08/14 | | 224 ± 110 | | | | | | |
| MW-PB-26 | 12/03/14 | | < 193 | | | | | | |
| MW-PB-27 | 01/30/14 | Original | 1180 ± 171 | | | | | | |
| MW-PB-27 | 01/30/14 | Recount | 1140 ± 171 | | | | | | |
| MW-PB-27 | 04/29/14 | TBE | 724 ± 159 | < 4.6 | < 0.5 | 2.2 ± 0.9 | 1.4 ± 0.7 | 3.3 ± 0.8 | 3.3 ± 1.1 |
| MW-PB-27 | 04/29/14 | TBE | 804 ± 164 | < 4.5 | < 0.6 | 2.6 ± 0.9 | 1.0 ± 0.6 | 4.4 ± 0.9 | 2.0 ± 1.0 |
| MW-PB-27 | 04/29/14 | EIML | 848 ± 109 | < 0.9 | < 0.5 | | | | |
| MW-PB-27 | 07/29/14 | | 960 ± 167 | | | | | | |
| MW-PB-27 | 10/08/14 | | 670 ± 132 | | | | | | |
| MW-PB-27 | 12/03/14 | | 605 ± 157 | | | | | | |
| MW-PB-28 | 01/30/14 | | < 185 | | | | | | |
| MW-PB-28 | 04/28/14 | | < 185 | < 5.2 | < 0.7 | < 0.7 | 4.8 ± 1.7 | 2.0 ± 0.7 | 18.9 ± 2.3 |
| MW-PB-28 | 07/28/14 | | < 190 | | | | | | |
| MW-PB-28 | 10/07/14 | TBE | < 159 | | | | | | |
| MW-PB-28 | 10/07/14 | TBE | < 189 | | | | | | |
| MW-PB-28 | 10/07/14 | EIML | < 157 | | | | | | |
| MW-PB-29 | 01/27/14 | | < 186 | | | | | | |
| MW-PB-29 | 04/28/14 | | < 187 | < 5.1 | < 0.6 | < 0.6 | < 0.4 | 2.5 ± 0.7 | < 1.3 |
| MW-PB-29 | 07/29/14 | TBE | 224 ± 127 | | | | | | |
| MW-PB-29 | 07/29/14 | TBE | 238 ± 129 | | | | | | |
| MW-PB-29 | 07/29/14 | EIML | 277 ± 77 | | | | | | |
| MW-PB-29 | 10/07/14 | | 284 ± 130 | | | | | | |
| MW-PB-3 | 01/27/14 | | < 172 | | | | | | |
| MW-PB-3 | 04/28/14 | | < 177 | < 5.9 | < 0.6 | 1.3 ± 0.8 | < 0.8 | < 1.1 | < 1.6 |
| MW-PB-3 | 07/30/14 | | < 169 | | | | | | |
| MW-PB-3 | 10/07/14 | | < 185 | | | | | | |
| MW-PB-30 | 01/27/14 | | 459 ± 140 | | | | | | |
| MW-PB-30 | 04/28/14 | Original | 705 ± 154 | < 5.0 | < 0.7 | < 0.9 | < 0.4 | 3.6 ± 0.8 | 1.6 ± 0.9 |
| MW-PB-30 | 04/28/14 | Recount | 492 ± 141 | | | | | | |
| MW-PB-30 | 07/29/14 | | < 179 | | | | | | |
| MW-PB-30 | 10/07/14 | | 264 ± 114 | | | | | | |
| MW-PB-31 | 01/27/14 | | < 157 | | | | | | |
| MW-PB-31 | 04/28/14 | | < 183 | < 5.6 | < 0.7 | < 0.9 | < 0.4 | 1.6 ± 0.8 | < 1.3 |
| MW-PB-31 | 07/28/14 | | < 179 | | | | | | |
| MW-PB-31 | 10/07/14 | | 233 ± 111 | | | | | | |
| MW-PB-4 | 01/31/14 | TBE | 457 ± 137 | | | | | | |
| MW-PB-4 | 01/31/14 | TBE | 425 ± 135 | | | | | | |
| MW-PB-4 | 01/31/14 | EIML | 436 ± 100 | | | | | | |
| MW-PB-4 | 04/29/14 | | 276 ± 136 | < 4.3 | < 0.6 | < 5.3 | < 0.8 | 12.3 ± 1.9 | < 1.6 |
| MW-PB-4 | 07/28/14 | | 338 ± 132 | | | | | | |
| MW-PB-4 | 10/08/14 | | 305 ± 115 | | | | | | |
| MW-PB-4 | 12/03/14 | | 271 ± 138 | | | | | | |
| MW-PB-5 | 04/30/14 | | < 178 | | | | | | |
| MW-PB-6 | 04/30/14 | | < 177 | | | | | | |
| MW-PB-7 | 01/28/14 | | < 175 | | | | | | |
| MW-PB-7 | 05/01/14 | TBE | < 186 | < 4.9 | < 0.6 | < 1.8 | < 0.4 | 6.8 ± 1.5 | < 1.3 |
| MW-PB-7 | 05/01/14 | TBE | < 174 | < 5.0 | < 0.7 | < 2.5 | < 0.8 | 6.0 ± 1.4 | < 1.6 |

**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, 2014**

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-7 | 05/01/14 | EIML | < 146 | < 1.1 | < 0.6 | | | | |
| MW-PB-7 | 07/31/14 | | < 167 | | | | | | |
| MW-PB-7 | 10/06/14 | TBE | < 183 | | | | | | |
| MW-PB-7 | 10/06/14 | TBE | < 186 | | | | | | |
| MW-PB-7 | 10/06/14 | EIML | < 157 | | | | | | |
| MW-PB-8 | 01/28/14 | | < 174 | | | | | | |
| MW-PB-8 | 04/30/14 | | < 176 | < 4.5 | < 0.6 | < 2.0 | < 0.8 | 16.6 ± 1.7 | < 1.6 |
| MW-PB-8 | 07/31/14 | | < 165 | | | | | | |
| MW-PB-8 | 10/06/14 | | < 185 | | | | | | |
| SP-PB-1 | 03/20/14 | | < 169 | | | | | | |
| SP-PB-1 | 04/29/14 | | < 169 | | | | | | |
| SP-PB-1 | 07/30/14 | | < 185 | | | | | | |
| SP-PB-1 | 12/03/14 | | < 195 | | | | | | |
| SP-PB-2 | 01/30/14 | | < 186 | | | | | | |
| SP-PB-2 | 04/29/14 | | < 183 | | | | | | |
| SP-PB-2 | 07/30/14 | | < 190 | | | | | | |
| SP-PB-2 | 10/07/14 | | < 185 | | | | | | |
| SP-PB-3 | 01/27/14 | | < 184 | | | | | | |
| SP-PB-3 | 05/01/14 | | < 188 | | | | | | |
| SP-PB-3 | 07/29/14 | | < 187 | | | | | | |
| SP-PB-3 | 12/03/14 | | < 198 | | | | | | |
| U/2 YARD DRAIN | 01/29/14 | | < 174 | | | | | | |
| U/2 YARD DRAIN | 05/07/14 | | < 185 | < 5.3 | < 0.5 | < 0.9 | < 1.4 | 2.2 ± 1.2 | < 2.5 |
| U/2 YARD DRAIN | 09/05/14 | | < 157 | | | | | | |
| U/2 YARD DRAIN | 12/18/14 | | < 152 | | | | | | |
| U/3 YARD DRAIN | 01/30/14 | | < 183 | | | | | | |
| U/3 YARD DRAIN | 05/07/14 | | < 186 | < 7.6 | < 0.6 | < 0.8 | < 1.4 | < 1.7 | < 2.5 |
| U/3 YARD DRAIN | 09/05/14 | | < 158 | | | | | | |
| U/3 YARD DRAIN | 12/04/14 | | < 186 | | | | | | |

**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, 2014**

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 | 05/01/14 | | < 5 | < 5 | < 8 | < 4 | < 7 | < 6 | < 8 | < 10 | < 5 | < 5 | < 22 | < 7 |
| MW-PB-10 | 04/30/14 | | < 8 | < 6 | < 15 | < 8 | < 15 | < 9 | < 13 | < 14 | < 6 | < 7 | < 32 | < 12 |
| MW-PB-11 | 04/29/14 | | < 6 | < 7 | < 12 | < 4 | < 13 | < 7 | < 10 | < 13 | < 7 | < 7 | < 30 | < 10 |
| MW-PB-12 | 04/29/14 | | < 5 | < 5 | < 11 | < 5 | < 10 | < 5 | < 8 | < 11 | < 5 | < 5 | < 23 | < 9 |
| MW-PB-13 | 04/28/14 | | < 5 | < 6 | < 12 | < 5 | < 11 | < 7 | < 9 | < 13 | < 5 | < 6 | < 29 | < 8 |
| MW-PB-14 | 04/30/14 | | < 6 | < 6 | < 11 | < 6 | < 11 | < 7 | < 12 | < 11 | < 5 | < 5 | < 29 | < 10 |
| MW-PB-15 | 01/28/14 | | < 3 | < 3 | < 7 | < 4 | < 6 | < 3 | < 6 | < 10 | < 3 | < 3 | < 22 | < 7 |
| MW-PB-15 | 04/30/14 | | < 6 | < 7 | < 12 | < 7 | < 13 | < 8 | < 11 | < 14 | < 7 | < 7 | < 40 | < 12 |
| MW-PB-15 | 07/31/14 | | < 4 | < 4 | < 9 | < 5 | < 10 | < 5 | < 9 | < 12 | < 5 | < 5 | < 26 | < 10 |
| MW-PB-15 | 10/06/14 | | < 3 | < 3 | < 8 | < 3 | < 7 | < 4 | < 6 | < 13 | < 3 | < 3 | < 22 | < 7 |
| MW-PB-16 | 01/28/14 | | < 2 | < 2 | < 6 | < 2 | < 5 | < 3 | < 5 | < 8 | < 2 | < 3 | < 18 | < 6 |
| MW-PB-16 | 04/30/14 | | < 7 | < 7 | < 15 | < 7 | < 15 | < 8 | < 12 | < 15 | < 7 | < 8 | < 32 | < 12 |
| MW-PB-16 | 07/31/14 | | < 6 | < 6 | < 15 | < 6 | < 11 | < 6 | < 9 | < 15 | < 5 | < 6 | < 34 | < 11 |
| MW-PB-16 | 10/06/14 | | < 4 | < 4 | < 9 | < 3 | < 8 | < 4 | < 7 | < 14 | < 3 | < 4 | < 29 | < 9 |
| MW-PB-19 | 04/28/14 | | < 6 | < 7 | < 14 | < 6 | < 16 | < 8 | < 13 | < 15 | < 7 | < 7 | < 37 | < 12 |
| MW-PB-2 | 04/28/14 | | < 5 | < 6 | < 11 | < 5 | < 10 | < 6 | < 9 | < 12 | < 5 | < 6 | < 29 | < 10 |
| MW-PB-20 | 04/29/14 | | < 4 | < 6 | < 13 | < 4 | < 10 | < 5 | < 9 | < 12 | < 6 | < 5 | < 27 | < 11 |
| MW-PB-21 | 04/29/14 | | < 4 | < 5 | < 9 | < 6 | < 12 | < 7 | < 11 | < 14 | < 6 | < 6 | < 32 | < 14 |
| MW-PB-22 | 04/29/14 | | < 7 | < 7 | < 12 | < 7 | < 15 | < 7 | < 10 | < 14 | < 6 | < 7 | < 39 | < 10 |
| MW-PB-24 | 04/29/14 | | < 4 | < 5 | < 9 | < 4 | < 9 | < 5 | < 6 | < 9 | < 4 | < 4 | < 24 | < 6 |
| MW-PB-24 | 10/08/14 | | < 4 | < 5 | < 11 | < 5 | < 9 | < 5 | < 8 | < 13 | < 4 | < 5 | < 32 | < 9 |
| MW-PB-25 | 04/29/14 | | < 5 | < 4 | < 10 | < 4 | < 8 | < 5 | < 8 | < 11 | < 5 | < 5 | < 29 | < 8 |
| MW-PB-25 | 10/08/14 | | < 5 | < 5 | < 10 | < 4 | < 8 | < 5 | < 9 | < 14 | < 5 | < 5 | < 33 | < 11 |
| MW-PB-26 | 04/29/14 | | < 4 | < 4 | < 9 | < 7 | < 9 | < 6 | < 9 | < 10 | < 5 | < 4 | < 25 | < 8 |
| MW-PB-26 | 10/08/14 | | < 4 | < 4 | < 9 | < 4 | < 8 | < 4 | < 7 | < 13 | < 4 | < 4 | < 28 | < 8 |
| MW-PB-27 | 04/29/14 | TBE | < 5 | < 4 | < 9 | < 4 | < 9 | < 6 | < 8 | < 12 | < 5 | < 4 | < 28 | < 8 |
| MW-PB-27 | 04/29/14 | TBE | < 6 | < 7 | < 15 | < 8 | < 14 | < 7 | < 12 | < 15 | < 6 | < 7 | < 35 | < 8 |
| MW-PB-27 | 04/29/14 | EIML | < 3 | < 3 | < 6 | < 3 | < 8 | < 6 | < 6 | < 8 | < 4 | < 4 | < 32 | < 3 |
| MW-PB-27 | 10/08/14 | | < 3 | < 3 | < 7 | < 4 | < 7 | < 4 | < 6 | < 10 | < 3 | < 3 | < 21 | < 7 |
| MW-PB-28 | 04/28/14 | | < 5 | < 6 | < 14 | < 6 | < 11 | < 7 | < 10 | < 12 | < 6 | < 6 | < 34 | < 11 |
| MW-PB-29 | 04/28/14 | | < 6 | < 6 | < 12 | < 6 | < 11 | < 5 | < 11 | < 10 | < 4 | < 5 | < 27 | < 8 |
| MW-PB-3 | 04/28/14 | | < 4 | < 5 | < 9 | < 6 | < 9 | < 6 | < 9 | < 11 | < 4 | < 6 | < 28 | < 11 |
| MW-PB-30 | 04/28/14 | | < 6 | < 7 | < 14 | < 6 | < 14 | < 7 | < 12 | < 14 | < 8 | < 6 | < 38 | < 11 |
| MW-PB-31 | 04/28/14 | | < 5 | < 7 | < 13 | < 7 | < 12 | < 7 | < 11 | < 14 | < 5 | < 5 | < 38 | < 13 |
| MW-PB-4 | 04/29/14 | | < 6 | < 6 | < 12 | < 6 | < 13 | < 5 | < 10 | < 13 | < 6 | < 6 | < 26 | < 10 |
| MW-PB-4 | 10/08/14 | | < 4 | < 5 | < 10 | < 4 | < 9 | < 5 | < 8 | < 14 | < 4 | < 4 | < 32 | < 10 |
| MW-PB-5 | 04/30/14 | | < 5 | < 5 | < 9 | < 4 | < 9 | < 5 | < 8 | < 9 | < 4 | < 4 | < 22 | < 6 |
| MW-PB-6 | 04/30/14 | | < 5 | < 4 | < 10 | < 3 | < 8 | < 6 | < 8 | < 10 | < 5 | < 5 | < 23 | < 8 |
| MW-PB-7 | 05/01/14 | TBE | < 7 | < 7 | < 14 | < 6 | < 11 | < 7 | < 13 | < 14 | < 7 | < 7 | < 39 | < 9 |
| MW-PB-7 | 05/01/14 | TBE | < 5 | < 4 | < 10 | < 6 | < 10 | < 5 | < 10 | < 9 | < 4 | < 6 | < 23 | < 7 |
| MW-PB-7 | 05/01/14 | EIML | < 2 | < 2 | < 3 | < 2 | < 4 | < 3 | < 4 | < 5 | < 3 | < 2 | < 14 | < 3 |

**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, 2014**

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-8 | 01/28/14 | < 3 | < 4 | < 7 | < 3 | < 6 | < 3 | < 6 | < 10 | < 3 | < 3 | < 21 | < 7 |
| MW-PB-8 | 04/30/14 | < 6 | < 6 | < 13 | < 7 | < 12 | < 7 | < 10 | < 14 | < 6 | < 6 | < 38 | < 11 |
| MW-PB-8 | 07/31/14 | < 6 | < 6 | < 11 | < 7 | < 9 | < 6 | < 9 | < 14 | < 6 | < 6 | < 29 | < 13 |
| MW-PB-8 | 10/06/14 | < 3 | < 4 | < 8 | < 3 | < 7 | < 4 | < 7 | < 14 | < 3 | < 4 | < 30 | < 7 |
| SP-PB-1 | 04/29/14 | < 4 | < 5 | < 12 | < 8 | < 8 | < 6 | < 9 | < 13 | < 5 | < 5 | < 29 | < 9 |
| SP-PB-2 | 04/29/14 | < 5 | < 4 | < 10 | < 6 | < 10 | < 5 | < 9 | < 13 | < 4 | < 6 | < 27 | < 7 |
| SP-PB-3 | 05/01/14 | < 5 | < 5 | < 10 | < 6 | < 11 | < 6 | < 11 | < 11 | < 5 | < 6 | < 26 | < 7 |
| U/2 YARD DRAIN | 05/07/14 | < 1 | < 1 | < 3 | < 1 | < 2 | < 2 | < 2 | < 10 | < 1 | < 1 | < 16 | < 5 |
| U/3 YARD DRAIN | 05/07/14 | < 1 | < 1 | < 3 | < 1 | < 2 | < 2 | < 2 | < 12 | < 1 | < 1 | < 18 | < 5 |

**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, 2014**

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-10 | 04/30/14 | | < 0.06 | < 0.05 | < 0.05 | < 0.02 | < 0.12 | < 0.02 | < 0.10 | < 0.13 | - | - |
| MW-PB-11 | 04/29/14 | | < 0.15 | < 0.14 | < 0.05 | < 0.09 | < 0.11 | < 0.04 | < 0.02 | < 0.04 | - | - |
| MW-PB-12 | 04/29/14 | | < 0.04 | < 0.10 | < 0.06 | < 0.14 | < 0.08 | < 0.02 | < 0.02 | < 0.05 | - | - |
| MW-PB-13 | 04/28/14 | | < 0.15 | < 0.09 | < 0.07 | < 0.15 | < 0.10 | 7.65 ± 1.45 | 0.70 ± 0.27 | 6.27 ± 1.22 | - | - |
| MW-PB-15 | 04/30/14 | | < 0.04 | < 0.04 | < 0.02 | < 0.14 | < 0.07 | < 0.04 | < 0.05 | < 0.05 | - | - |
| MW-PB-16 | 04/30/14 | | < 0.15 | < 0.04 | < 0.02 | < 0.17 | < 0.13 | < 0.06 | < 0.04 | < 0.09 | - | - |
| MW-PB-19 | 04/28/14 | | < 0.11 | < 0.05 | < 0.19 | < 0.09 | < 0.11 | < 0.04 | < 0.05 | < 0.02 | - | - |
| MW-PB-2 | 04/28/14 | | < 0.02 | < 0.06 | < 0.02 | < 0.02 | < 0.09 | 4.36 ± 0.57 | < 0.02 | 2.41 ± 0.40 | - | - |
| MW-PB-20 | 04/29/14 | | < 0.09 | < 0.04 | < 0.02 | < 0.13 | < 0.11 | < 0.13 | < 0.05 | < 0.07 | - | - |
| MW-PB-21 | 04/29/14 | | < 0.10 | < 0.12 | < 0.04 | < 0.10 | < 0.08 | < 0.02 | < 0.05 | < 0.08 | - | - |
| MW-PB-22 | 04/29/14 | | < 0.11 | < 0.03 | < 0.07 | < 0.02 | < 0.06 | < 0.10 | < 0.11 | < 0.10 | - | - |
| MW-PB-24 | 04/29/14 | | < 0.14 | < 0.02 | < 0.04 | < 0.08 | < 0.09 | < 0.02 | < 0.03 | < 0.04 | < 82 | < 3.8 |
| MW-PB-25 | 04/29/14 | | < 0.05 | < 0.03 | < 0.05 | < 0.03 | < 0.06 | 3.51 ± 0.82 | < 0.08 | 1.39 ± 0.43 | < 115 | < 3.8 |
| MW-PB-26 | 04/29/14 | | < 0.18 | < 0.08 | < 0.08 | < 0.07 | < 0.11 | 5.77 ± 1.24 | < 0.11 | 2.18 ± 0.59 | < 79 | < 3.8 |
| MW-PB-27 | 04/29/14 | TBE | < 0.03 | < 0.09 | < 0.06 | < 0.12 | < 0.06 | 6.41 ± 1.45 | < 0.15 | 2.57 ± 0.73 | < 159 | < 3.8 |
| MW-PB-27 | 04/29/14 | TBE | < 0.09 | < 0.02 | < 0.09 | < 0.02 | < 0.07 | 4.92 ± 0.65 | < 0.07 | 1.98 ± 0.38 | < 131 | < 3.8 |
| MW-PB-27 | 04/29/14 | EIML | < 0.10 | - | < 0.37 | < 0.25 | < 0.10 | 5.93 ± 0.53 | - | 2.15 ± 0.32 | < 754 | < 125 |
| MW-PB-28 | 04/28/14 | | < 0.14 | < 0.04 | < 0.08 | < 0.07 | < 0.09 | 0.45 ± 0.16 | < 0.05 | 0.18 ± 0.11 | - | - |
| MW-PB-29 | 04/28/14 | | < 0.09 | < 0.03 | < 0.07 | < 0.04 | < 0.06 | < 0.11 | < 0.03 | < 0.10 | - | - |
| MW-PB-3 | 04/28/14 | | < 0.07 | < 0.05 | < 0.02 | < 0.11 | < 0.08 | 1.24 ± 0.29 | < 0.07 | 0.80 ± 0.23 | - | - |
| MW-PB-30 | 04/28/14 | | < 0.13 | < 0.04 | < 0.09 | < 0.06 | < 0.11 | < 0.11 | < 0.06 | < 0.12 | - | - |
| MW-PB-4 | 04/29/14 | | < 0.06 | < 0.06 | < 0.06 | < 0.09 | < 0.07 | < 0.05 | < 0.12 | < 0.08 | < 147 | < 4.2 |
| MW-PB-7 | 05/01/14 | TBE | < 0.12 | < 0.02 | < 0.05 | < 0.14 | < 0.16 | < 0.14 | < 0.18 | < 0.14 | - | - |
| MW-PB-7 | 05/01/14 | TBE | < 0.04 | < 0.07 | < 0.04 | < 0.14 | < 0.11 | < 0.02 | < 0.07 | < 0.06 | - | - |
| MW-PB-7 | 05/01/14 | EIML | < 0.14 | - | < 0.29 | < 0.13 | < 0.22 | 0.45 ± 0.14 | - | 0.24 ± 0.10 | < 758 | < 122 |
| MW-PB-8 | 04/30/14 | | < 0.08 | < 0.08 | < 0.05 | < 0.11 | < 0.09 | < 0.04 | < 0.03 | < 0.07 | - | - |
| U/2 YARD DRAIN | 05/07/14 | | < 0.10 | < 0.08 | < 0.06 | < 0.09 | < 0.05 | < 0.02 | < 0.05 | < 0.04 | - | - |
| U/3 YARD DRAIN | 05/07/14 | | < 0.10 | < 0.02 | < 0.05 | < 0.02 | < 0.08 | < 0.07 | < 0.07 | < 0.08 | - | - |

**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, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

| SITE | COLLECTION DATE | | H-3 |
|---|---|---|---|
| SW-PB-1 | 01/31/14 | | < 188 |
| SW-PB-1 | 04/28/14 | TBE | < 190 |
| SW-PB-1 | 04/28/14 | TBE | < 185 |
| SW-PB-1 | 04/28/14 | EIML | < 146 |
| SW-PB-1 | 07/30/14 | | < 190 |
| SW-PB-1 | 10/06/14 | | < 183 |
| SW-PB-5 | 01/30/14 | | < 188 |
| SW-PB-5 | 04/28/14 | | < 189 |
| SW-PB-5 | 07/31/14 | TBE | < 193 |
| SW-PB-5 | 07/31/14 | TBE | < 189 |
| SW-PB-5 | 07/31/14 | EIML | < 131 |
| SW-PB-5 | 10/06/14 | | < 159 |
| SW-PB-6 | 01/31/14 | | < 189 |
| SW-PB-6 | 04/28/14 | TBE | < 187 |
| SW-PB-6 | 04/28/14 | TBE | < 189 |
| SW-PB-6 | 04/28/14 | EIML | < 146 |
| SW-PB-6 | 07/31/14 | | < 189 |
| SW-PB-6 | 10/06/14 | | < 163 |

**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, 2014**

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 | 04/28/14 | TBE | < 5 | < 5 | < 12 | < 5 | < 12 | < 4 | < 10 | < 10 | < 5 | < 5 | < 26 | < 15 |
| SW-PB-1 | 04/28/14 | TBE | < 4 | < 4 | < 10 | < 4 | < 9 | < 5 | < 7 | < 11 | < 4 | < 4 | < 24 | < 7 |
| SW-PB-1 | 04/28/14 | EIML | < 2 | < 2 | < 5 | < 2 | < 4 | < 3 | < 5 | < 5 | < 2 | < 3 | < 18 | < 3 |
| SW-PB-5 | 04/28/14 | | < 5 | < 6 | < 10 | < 4 | < 8 | < 5 | < 9 | < 15 | < 4 | < 5 | < 27 | < 9 |
| SW-PB-6 | 04/28/14 | TBE | < 4 | < 4 | < 11 | < 4 | < 10 | < 5 | < 9 | < 12 | < 5 | < 5 | < 29 | < 9 |
| SW-PB-6 | 04/28/14 | TBE | < 6 | < 5 | < 14 | < 5 | < 11 | < 5 | < 10 | < 13 | < 6 | < 6 | < 37 | < 9 |
| SW-PB-6 | 04/28/14 | EIML | < 3 | < 2 | < 3 | < 1 | < 3 | < 2 | < 5 | < 5 | < 3 | < 2 | < 10 | < 4 |

**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, 2014**

RESULTS IN UNITS OF PCI/LITER + 2 SIGMA

| SITE | COLLECTION DATE | H-3 |
|---|---|---|
| 1A | 01/01/14 | < 191 |
| 1A | 01/30/14 | < 176 |
| 1A | 02/27/14 | < 156 |
| 1A | 03/27/14 | < 194 |
| 1A | 05/01/14 | < 176 |
| 1A | 05/29/14 | < 169 |
| 1A | 06/26/14 | < 156 |
| 1A | 07/31/14 | < 194 |
| 1A | 08/28/14 | < 182 |
| 1A | 10/02/14 | < 171 |
| 1A | 10/30/14 | < 154 |
| 1A | 11/25/14 | < 183 |
| 1B | 01/01/14 | < 192 |
| 1B | 01/30/14 | < 165 |
| 1B | 02/27/14 | < 157 |
| 1B | 03/27/14 | < 184 |
| 1B | 05/01/14 | < 177 |
| 1B | 05/29/14 | < 166 |
| 1B | 06/26/14 | < 155 |
| 1B | 07/31/14 | < 192 |
| 1B | 08/28/14 | < 185 |
| 1B | 10/02/14 | < 161 |
| 1B | 10/30/14 | < 191 |
| 1B | 11/25/14 | < 184 |
| 1S | 01/01/14 | < 189 |
| 1S | 03/27/14 | < 188 |
| 1S | 05/01/14 | < 175 |
| 1S | 05/29/14 | < 197 |
| 1S | 06/26/14 | < 177 |
| 1S | 07/31/14 | < 197 |
| 1S | 08/28/14 | < 185 |
| 1S | 10/02/14 | < 161 |
| 1S | 10/30/14 | < 152 |
| 1S | 11/25/14 | < 178 |
| 1SSE | 01/01/14 | < 189 |
| 1SSE | 01/30/14 | < 164 |
| 1SSE | 02/27/14 | < 193 |
| 1SSE | 03/27/14 | < 181 |
| 1SSE | 05/01/14 | < 177 |
| 1SSE | 05/29/14 | < 194 |
| 1SSE | 06/26/14 | < 178 |
| 1SSE | 07/31/14 | < 192 |
| 1SSE | 08/28/14 | < 183 |
| 1SSE | 10/02/14 | < 163 |
| 1SSE | 10/30/14 | < 154 |
| 1SSE | 11/25/14 | < 183 |
| 1Z | 01/01/14 | < 186 |
| 1Z | 01/30/14 | < 166 |
| 1Z | 02/27/14 | < 158 |
| 1Z | 03/27/14 | < 186 |
| 1Z | 05/01/14 | < 178 |
| 1Z | 05/29/14 | < 195 |
| 1Z | 06/26/14 | < 180 |
| 1Z | 07/31/14 | < 197 |
| 1Z | 08/28/14 | < 185 |
| 1Z | 10/02/14 | < 160 |
| 1Z | 10/30/14 | < 154 |
| 1Z | 11/25/14 | < 182 |
| 4M | 01/01/14 | < 197 |

**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, 2014**

RESULTS IN UNITS OF PCI/LITER + 2 SIGMA

| SITE | COLLECTION DATE | H-3 |
|---|---|---|
| 4M | 01/30/14 | < 168 |
| 4M | 02/27/14 | < 154 |
| 4M | 03/27/14 | < 186 |
| 4M | 05/01/14 | < 176 |
| 4M | 05/29/14 | < 166 |
| 4M | 06/26/14 | < 176 |
| 4M | 07/31/14 | < 195 |
| 4M | 08/28/14 | < 184 |
| 4M | 10/02/14 | < 162 |
| 4M | 10/30/14 | < 149 |
| 4M | 11/25/14 | < 182 |