APPENDIX G

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

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Docket No: 50-277
50-278

PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 and 3

Annual Radiological Groundwater
Protection Program Report (ARGPPR)

January 1 through December 31, 2019

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Environmental Services

Exelon Generation.

Peach Bottom Atomic Power Station
Delta, PA 17314

May 2020

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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 2019 through 31 December 2019. This evaluation involved numerous station personnel and contractor support personnel. At PBAPS, there are 31 permanent groundwater monitoring wells. Installation of the wells began in 2006. Of these monitoring locations, none were assigned to the station's Radiological Environmental Monitoring Program (REMP). This report covers groundwater, surface water, seep water, and precipitation water samples collected from the environment on station property in 2019. During that time period, 507 analyses were performed on 299 samples from 39 locations. These 39 locations include 25 groundwater monitoring wells, 3 surface water sample points, 3 groundwater seeps, 2 yard drain sumps, and 6 precipitation water sampling points. Phase 1 of the monitoring was part of a comprehensive study initiated by Exelon to determine whether groundwater or surface water in the vicinity of PBAPS had been adversely impacted by any releases of radionuclides. Phase 1 was conducted by Conestoga Rovers and Associates (CRA) and the conclusions were made available to state and federal regulators as well as the public. Phase 2 of the RGPP was conducted by Exelon corporate and station personnel to initiate follow up of Phase 1 and begin long-term monitoring at groundwater and surface water locations selected during Phase 1. All analytical results from Phase 2 monitoring are reported herein.

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

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

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

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

II. Introduction

PBAPS is located along the Susquehanna River between Holtwood and Conowingo Dams in Peach Bottom Township, York County, Pennsylvania. The initial loading of fuel into Unit 1, a 40 MWe (net) high temperature gas-cooled reactor, began on 5 February 1966, and initial criticality was achieved on 3 March 1966. Shutdown of Peach Bottom Unit 1 for decommissioning was on 31 October 1974. For the purposes of the monitoring program, the beginning of the operational period for Unit 1 was considered to be 5 February 1966. A summary of the Unit 1 preoperational monitoring program was presented in a previous report [(1)]. PBAPS Units 2 and 3 are boiling water reactors, each with a power output of approximately 1385 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 2019.

A. Objective of the RGPP

The objectives of the RGPP are as follows:

1. Ensure that the site characterization of geology and hydrology provides an understanding of predominant groundwater gradients based upon current site conditions.

2. Identify site risk based on plant design and work practices.

3. Establish an on-site groundwater monitoring program to ensure timely detection of inadvertent radiological releases to ground water.

4. Establish a remediation protocol to prevent migration of licensed material off-site and to minimize decommissioning impacts.

5. Ensure that records of leaks, spills, remediation efforts are retained and retrievable to meet the requirements of 10 CFR 50.75(g).

6. Conduct initial and periodic briefings of their site specific Groundwater Protection Initiative (GPI) program with the designated State/Local officials.

7. Make informal communication as soon as practicable to appropriate

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

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

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

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

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

B. Implementation of the Objectives

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

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

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

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

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

C. Program Description

1. Sample Collection

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

Groundwater, Surface Water and Precipitation Water

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

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

D. Characteristics of Tritium

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

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

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

Tritium has a half-life of approximately 12.3 years. It decays spontaneously to Helium-3 (He-3). This radioactive decay releases a beta particle (low-energy electron). The radioactive decay of tritium is the source of the health risk from exposure to tritium. Tritium emits a low

energy beta particle and leaves the body relatively quickly. Since tritium is almost always found as water, it goes directly into soft tissues and organs. The associated dose to these tissues is generally uniform and is dependent on the water content of the specific tissue.

III. Program Description

A. Sample Analysis

This section describes the general analytical methodologies used by TBE, Exelon Industrial Services (EIS) and GEL Laboratories (GEL) to analyze the environmental samples for radioactivity for the PBAPS RGPP in 2019.

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

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

B. Data Interpretation

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

1. <u>Lower Limit of Detection</u>
   The lower limit of detection (LLD) is a minimum sensitivity value that must be achieved routinely by the analytical parameter.
2. <u>Laboratory Measurements Uncertainty</u>
   The estimated uncertainty in measurement of tritium in environmental samples is frequently on the order of 50% of the measurement value.

   Statistically, the exact value of a measurement is expressed as a range with a stated level of confidence. The convention is to report results with a 95% level of confidence. The uncertainty comes from factors such as calibration standards, sample volume or weight measurements, and sampling uncertainty. Exelon reports the

uncertainty of a measurement created by statistical process (counting error) as well as all sources of error (Total Propagated Uncertainty or TPU). Each result has two values calculated. Exelon reports the TPU by following the result with plus or minus ± the estimated sample standard deviation.

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

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

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

C. Background Analysis

A pre-operational REMP was conducted to establish background radioactivity levels prior to operation of the Station. The environmental media sampled and analyzed 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 Li present in crystalline rocks by neutrons produced by the radioactive decay of naturally abundant U and Th. Lithogenic production of tritium is usually

negligible compared to other sources due to the limited abundance of Li in rock. The lithogenic tritium is introduced directly to groundwater.

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

b. Precipitation Data

Precipitation samples are routinely collected at stations around the world for the analysis of tritium and other radionuclides. Two publicly available databases that provide tritium concentrations in precipitation are Global Network of Isotopes in Precipitation (GNIP) and USEPA's RadNet database. GNIP provides tritium precipitation concentration data for samples collected worldwide from 1960 to 2006. RadNet provides tritium precipitation concentration data for samples collected at stations throughout the U.S. from 1960 up to and including 2006. Based on GNIP data for sample stations located in the U.S. Midwest, tritium concentrations peaked around 1963. This peak, which approached 10,000 pCi/L for some stations, coincided with the atmospheric testing of thermonuclear weapons. Tritium concentrations in surface water showed a sharp decline until 1975. A gradual decline has followed since that time. Tritium concentrations have typically been below 100 pCi/L since around 1980. 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. These locations include 25 wells and the 2 yard drains sampled during the quarterly sampling events as part of the PGPP program. Tritium was not detected in wells at or near the owner-controlled boundary. The location most representative of potential offsite user of drinking water is less than the MDC.

Low levels of tritium were detected at concentrations greater than the minimum detectable concentration (MDC) in 15 of the 27 locations (25 groundwater monitoring wells and the 2 yard drain locations). The tritium concentrations ranged from the detection limit to 21,400 pCi/L. (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 19 groundwater samples during 2019. Nineteen (19) groundwater locations refers to the 17 wells and the 2 yard

drains sampled during the quarterly sampling events as part of the RGPP program.

Gross Alpha (dissolved) was detected in 5 of 19 groundwater locations analyzed. The concentrations ranged from 1.3 to 6.0 pCi/L.
Gross Alpha (suspended) was detected in 2 of 19 groundwater locations analyzed. The concentrations ranged from 1.6 to 13.0 pCi/L.

Gross Beta (dissolved) was detected in 19 of 19 groundwater locations analyzed. The concentrations ranged from 1.6 to 12.8 pCi/L.

Gross Beta (suspended) was detected in 2 of 19 groundwater locations analyzed. The concentrations ranged from 3.2 to 12.8 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 water locations to establish baseline levels. The analyses for groundwater included Fe-55, Ni-63, Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-234, U-235 and U-238.

U-234 was detected in 7 of 18 groundwater monitoring locations analyzed. The concentrations ranged from 0.77 to 6.05 pCi/L.

U-235 was detected in 1 of 18 groundwater monitoring locations analyzed with a concentration of 0.21 pCi/L.

U-238 was detected in 7 of 18 groundwater monitoring locations analyzed. The concentrations ranged from 0.38 to 4.33 pCi/L. No plant-produced radionuclides were detected.

The activity detected is naturally occurring and the levels are considered to be background. All other Hard-To-Detect analyses were less than the MDC. (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 six surface water locations throughout the year in accordance with the station radiological groundwater protection program. Analytical results are discussed below:

Tritium

Samples from six locations were analyzed for tritium activity. Tritium was not detected in any surface water locations greater than the MDC. (Table B–II.1, Appendix B)

Gamma Emitters

No gamma emitters were detected in any of the samples. (Table B–II.2, Appendix B).

C. Precipitation Water Results

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

Tritium

Samples from six locations were analyzed for tritium activity. Tritium activity was not detected in any location greater than the MDC. (Table B–III.1, Appendix B)

D. Drinking Water Well Survey

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

E. Summary of Results – Inter-Laboratory Comparison Program

Inter-Laboratory Comparison Program results for TBE and GEL are presented in the AREOR.

F. Leaks, Spills and Releases

There were no inadvertent leaks, spills or releases of water containing licensed material to the environment in 2019.

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.

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

Tritium activity in the Unit 3 Turbine Building monitoring wells are trended. Any adverse trend is captured in the Station's Corrective Action Program.

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.

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.

Tritium activity in these wells ranged from less than the MDC to 2,720 pCi/L. Samples from these wells were also analyzed for gamma-emitting isotopes and hard-to-detect radionuclides. All results are less than the MDC for each isotope.

The Unit 2 Turbine Building Moisture Separator floor 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.

MW-PB-24, 25, 26 and 27

Wells MW-PB-24, 25, 26 and 27 are considered the wells of primary interest. These wells were sampled on a frequency ranging from weekly to quarterly. Below are 3 tables. The first lists the highest tritium activity of the wells of primary interest and the date of the sampling. The second table lists the highest tritium activity of the wells during 2019. The third table lists the activity of the wells from the last sampling of 2019. The tritium activity is in pCi/L.

Well #	Tritium Activity	Date
MW-PB-24	1,530	06/06/2018
MW-PB-25	161,000	03/08/2010
MW-PB-26	196,000	03/08/2010
MW-PB-27	71,800	2/22/2010

Well #	Tritium Activity	Date
MW-PB-24	530	06/27/2019
MW-PB-25	21,400	05/09/2019
MW-PB-26	294	12/03/2019
MW-PB-27	600	06/20/2019

Well #	Tritium Activity	Date
MW-PB-24	315	12/03/2019
MW-PB-25	10,200	12/03/2019
MW-PB-26	294	12/03/2019
MW-PB-27	400	12/03/2019

Potential sources of tritium in the groundwater are investigated via

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

I. Actions Taken

1. The Unit 3 Condensate storage tank moat, sump and valve pit were cleaned and recoated to eliminate a potential pathway for licensed material to enter the groundwater. These activities were completed under work order 04602739 and work request 01339203.
2. During P3R21, the Unit 3 Recombiner Jet Compressor room floor drains were found plugged. One plug was removed and the second plug was modified to allow water to drain to the radwaste system in the event of a licensed material leak. This was completed under work request 01369404.
3. Installation of Monitoring Wells

   No groundwater monitoring wells were installed in 2019.
4. Actions to Recover/Reverse Plumes

   There were no actions to recover the plume.

J. Deviations

The data tables show that duplicate samples were obtained at several wells during 2019. These duplicate samples were obtained and analyzed for quality control purposes.

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, 2019 RGPP Summary Monitoring Reports, April 2019, August 2019, October 2019 and February 2019.

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APPENDIX A

SAMPLING LOCATIONS, DISTANCE AND DIRECTION

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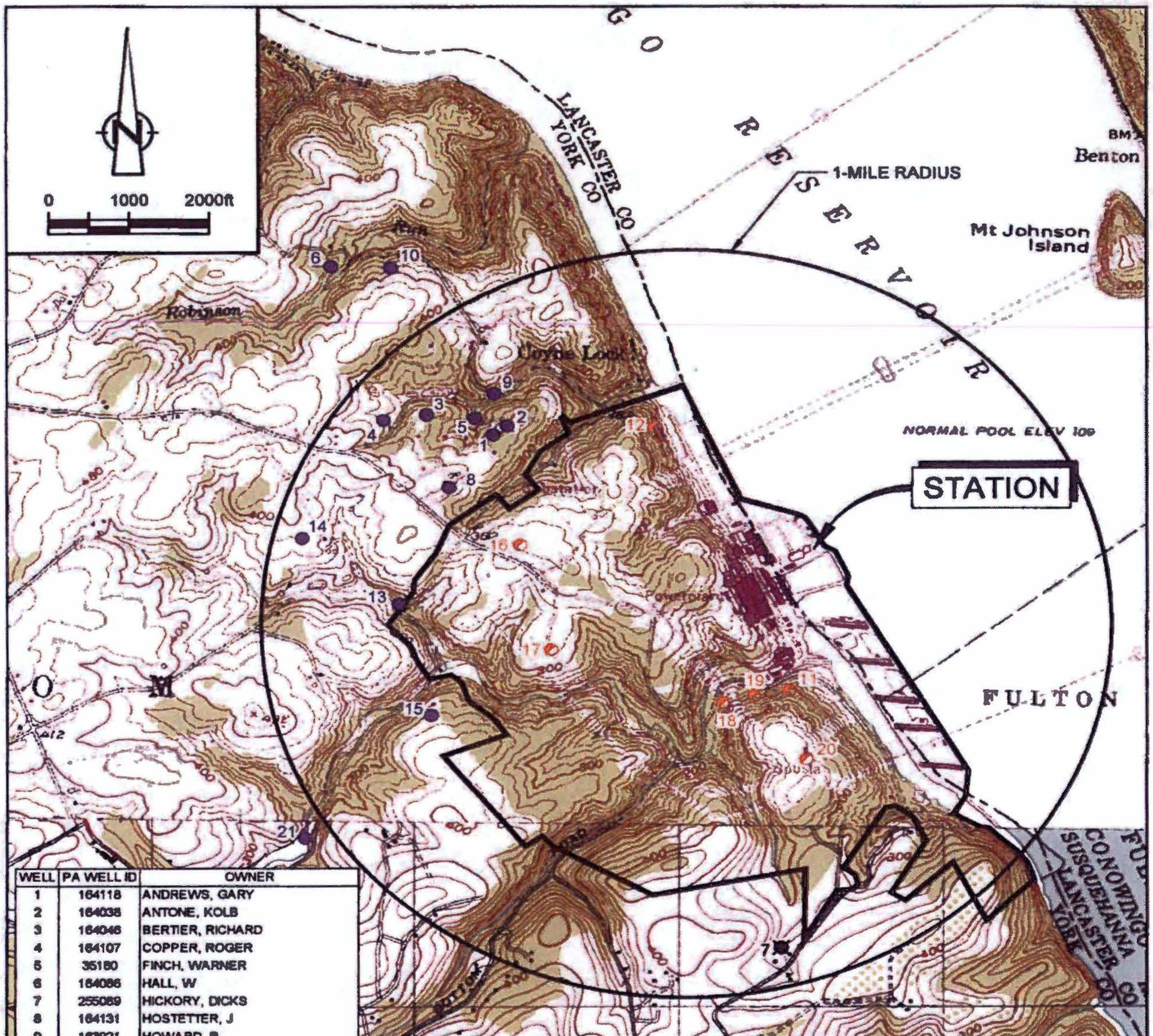
TABLE A-1: Radiological Groundwater Protection Program - Sampling Locations, Distance and Direction, Peach Bottom Atomic Power Station, 2019

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-23	Groundwater Well	NW	249.6
MW-PB-24	Groundwater Well	N	185.9
MW-PB-25	Groundwater Well	N	159.7
MW-PB-26	Groundwater Well	NNE	121.1
MW-PB-27	Groundwater Well	NNE	139.1
MW-PB-28	Groundwater Well	NW	249.6
MW-PB-29	Groundwater Well	SE	325.0
MW-PB-30	Groundwater Well	SE	379.2
MW-PB-31	Groundwater Well	SE	450.1
SW-PB-1	Surface Water	NNW	2,850.5
SW-PB-5	Surface Water	SE	675.1
SW-PB-6	Surface Water	SE	1,305.9
SP-PB-1	Groundwater Seep	S	514.2
SP-PB-2	Groundwater Seep	WNW	311.6
SP-PB-3	Groundwater Seep	NNW	1,281.1
U/2 YARD DRAIN SUMP	Groundwater	SSE	498.7
U/3 YARD DRAIN SUMP	Groundwater	WSW	175.8
1A	Precipitation Water	ESE	1,271
1B	Precipitation Water	NW	2,587
1S	Precipitation Water	S	1,315
1SSE	Precipitation Water	SSE	1,312
1Z	Precipitation Water	SE	1,763
4M	Precipitation Water	SE	45,989



WELL	PA WELL ID	OWNER
1	164118	ANDREWS, GARY
2	164038	ANTONE, KOLB
3	164046	BERTIER, RICHARD
4	164107	COPPER, ROGER
5	35180	FINCH, WARNER
6	164086	HALL, W
7	255089	HICKORY, DICKS
8	164131	HOSTETTER, J
9	163921	HOWARD, R
10	163920	KOSER, D
11*	34279	EXELON - INFORMATION CENTER
12	164028	EXELON HAZMAT YARD
13	163968	ROBINSON, D
14	34295	ROBINSON, DALE
15	164053	STOLTEFUS, STEVEN
16	-	EXELON - NORTH SUBSTATION
17	-	EXELON - SALT WASHDOWN
18*	-	EXELON - PUB BUILDING
19*	-	EXELON - INFORMATION CENTER
20	-	EXELON - SOUTH SUBSTATION
21	483663	STOLTZFUS

LEGEND

PROPERTY BOUNDARY

● # ALL LOCATIONS APPROXIMATE (NOT FIELD VERIFIED)

■ 7 IDENTIFIED ON 2006 SEARCH, NOT IDENTIFIED ON 2012 SEARCH

* ABANDONED

16 EXELON SUPPLY WELL (NON-POTABLE)

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

Exelon.

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

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

Figure A-1
Well Water Locations, Peach Bottom Atomic Power Station, 2019

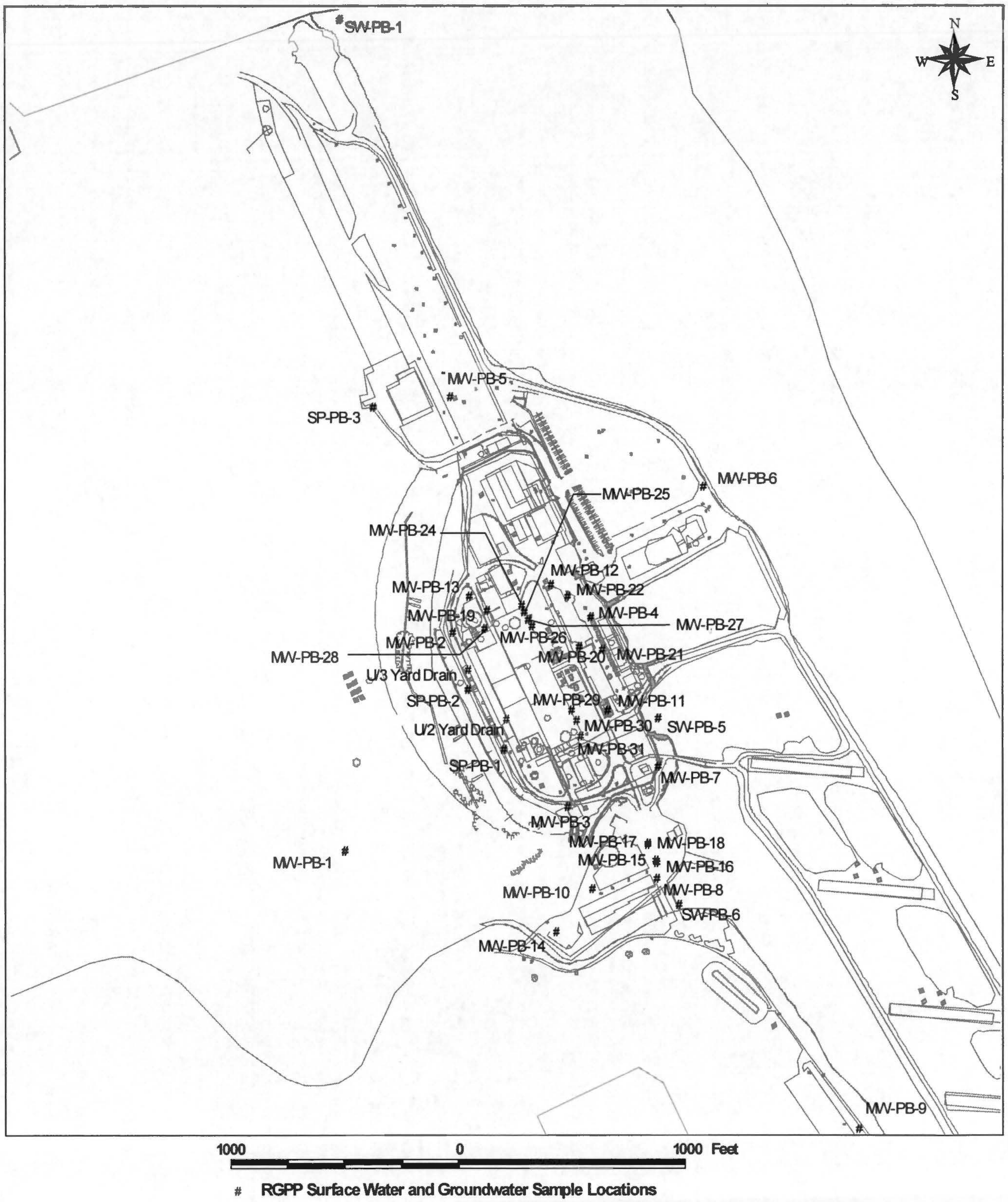


Figure A-2
RGPP Monitoring Locations, Peach Bottom Atomic Power Station, 2019

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APPENDIX B

DATA TABLES

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TABLE B-I.1 CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA AND GROSS BETA IN GROUNDWATER AND SEEP SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, PEACH BOTTOM ATOMIC POWER STATION, 2019

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	06/04/19		< 196						
MW-PB-2	03/13/19		< 190						
MW-PB-2	06/04/19		< 189	< 8.3	< 0.9	5.1 ± 1.1	< 1.0	6.3 ± 0.9	< 1.5
MW-PB-2	09/17/19		< 198						
MW-PB-2	12/03/19		< 173						
MW-PB-3	03/13/19		< 192						
MW-PB-3	06/04/19		< 194	< 7.0	< 0.8	2.8 ± 0.9	< 1.0	2.4 ± 0.8	< 1.5
MW-PB-3	09/18/19		< 198						
MW-PB-3	12/03/19		192 ± 118						
MW-PB-3	12/03/19	*DUP*	< 193						
MW-PB-3	12/03/19	*GEL*	< 150						
MW-PB-4	03/13/19		260 ± 130						
MW-PB-4	06/05/19		< 190						
MW-PB-4	06/05/19	*DUP*	< 197						
MW-PB-4	06/05/19	*GEL*	< 123						
MW-PB-4	09/18/19		< 188						
MW-PB-4	12/03/19		< 172						
MW-PB-5	06/04/19		< 197						
MW-PB-6	06/05/19		< 199						
MW-PB-7	03/12/19		< 192						
MW-PB-7	03/12/19	*DUP*	< 189						
MW-PB-7	03/12/19	*GEL*	< 133						
MW-PB-7	06/05/19		< 190	< 4.4	< 0.7	< 1.5	< 1.0	3.2 ± 1.1	< 1.5
MW-PB-7	09/20/19		< 194						
MW-PB-7	12/05/19		< 192						
MW-PB-7	12/05/19	*DUP*	< 195						
MW-PB-7	12/05/19	*GEL*	< 150						
MW-PB-8	03/12/19		< 145						
MW-PB-8	06/05/19		< 188	< 5.8	< 0.6	< 1.0	< 1.0	12.8 ± 1.4	< 1.5
MW-PB-8	09/20/19		< 195						
MW-PB-8	12/05/19		< 176						
MW-PB-10	03/12/19		< 193						
MW-PB-10	06/05/19		< 192	< 6.3	< 0.6	< 1.0	< 1.0	4.3 ± 1.1	< 1.5
MW-PB-10	09/20/19		< 192						
MW-PB-10	12/05/19		< 184						
MW-PB-12	03/13/19		< 193						
MW-PB-12	03/13/19	*NP*	< 195						
MW-PB-12	06/04/19		< 192						
MW-PB-12	06/04/19	*NP*	< 194						
MW-PB-12	09/18/19		< 194						
MW-PB-12	09/18/19	*NP*	< 189						
MW-PB-12	12/03/19		206 ± 117						
MW-PB-12	12/03/19	*NP*	< 192						
MW-PB-13	03/13/19		< 191						
MW-PB-13	06/04/19		< 193	< 7.3	< 0.6	< 2.3	< 1.6	6.1 ± 1.9	< 2.5
MW-PB-13	09/17/19		< 189						
MW-PB-13	12/03/19		214 ± 116						
MW-PB-14	06/05/19		< 199						
MW-PB-15	03/12/19		< 189						
MW-PB-15	06/05/19		< 189	< 9.8	< 0.7	< 0.9	< 1.0	7.2 ± 1.1	< 1.5
MW-PB-15	06/05/19	*DUP*	< 189	< 5.1	< 0.6	< 0.6	< 0.6	6.5 ± 1.1	< 1.8
MW-PB-15	06/05/19	*GEL*	< 125	< 0.7	< 0.7	< 3.2	*(1)*	7.0 ± 2.2	*(1)*
MW-PB-15	09/18/19		< 189						
MW-PB-15	12/05/19		< 174						

(1) Reported values are TOTAL (not dissolved or suspended)

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, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE		H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
MW-PB-16	03/12/19		< 190						
MW-PB-16	06/05/19		< 194	< 5.6	< 0.6	6.0 ± 1.1	13.0 ± 2.3	9.5 ± 1.0	12.8 ± 1.9
MW-PB-16	09/18/19		< 189						
MW-PB-16	12/05/19		< 171						
MW-PB-19	03/13/19		< 192						
MW-PB-19	06/04/19		< 192	< 5.1	< 0.8	< 0.3	< 0.6	1.6 ± 0.6	< 1.8
MW-PB-19	09/17/19		< 191						
MW-PB-19	12/03/19		< 189						
MW-PB-20	03/13/19		< 196						
MW-PB-20	03/13/19	*NP*	< 190						
MW-PB-20	06/04/19		< 189						
MW-PB-20	06/04/19	*DUP*	< 198						
MW-PB-20	06/04/09	*GEL*	< 126						
MW-PB-20	06/04/19	*NP*	< 199						
MW-PB-20	09/18/19		< 180						
MW-PB-20	09/18/19	*NP*	< 190						
MW-PB-20	12/03/19		< 189						
MW-PB-20	12/03/19	*NP*	< 191						
MW-PB-22	03/13/19		349 ± 136						
MW-PB-22	03/13/19	*NP*	459 ± 143						
MW-PB-22	06/05/19		495 ± 146						
MW-PB-22	06/05/19	*NP*	502 ± 142						
MW-PB-22	09/18/19		504 ± 133						
MW-PB-22	09/18/19	*NP*	417 ± 137						
MW-PB-22	12/03/19		547 ± 132						
MW-PB-22	12/03/19	*NP*	326 ± 133						
MW-PB-24	02/07/19		315 ± 133						
MW-PB-24	03/13/19		225 ± 123						
MW-PB-24	03/13/19	*NP*	< 197						
MW-PB-24	04/04/19		329 ± 135						
MW-PB-24	05/09/19		228 ± 133						
MW-PB-24	05/23/19		386 ± 134						
MW-PB-24	05/29/19		< 185						
MW-PB-24	06/05/19		304 ± 122	< 6.8	< 0.6	< 0.5	< 0.6	4.6 ± 1.0	< 1.8
MW-PB-24	06/05/19	*NP*	203 ± 127						
MW-PB-24	06/13/19		299 ± 125						
MW-PB-24	06/20/19		440 ± 142						
MW-PB-24	06/27/19		530 ± 135						
MW-PB-24	07/03/19		270 ± 129						
MW-PB-24	08/15/19		< 195						
MW-PB-24	09/20/19		358 ± 135						
MW-PB-24	09/20/19	*NP*	< 190						
MW-PB-24	12/03/19		315 ± 123						
MW-PB-24	12/03/19	*NP*	399 ± 137						
MW-PB-25	01/15/19		14100 ± 1450						
MW-PB-25	02/07/19		17300 ± 1780						
MW-PB-25	03/13/19		3960 ± 452						
MW-PB-25	03/13/19	*DUP*	4330 ± 491						
MW-PB-25	03/13/19	*GEL*	4400 ± 257						
MW-PB-25	03/13/19	*NP*	944 ± 169						
MW-PB-25	04/04/19		11000 ± 1170						
MW-PB-25	05/09/19		21400 ± 2200						
MW-PB-25	05/09/19	*Recount*	23000 ± 2340						
MW-PB-25	05/09/19	*Reanalysis*	20600 ± 2120						
MW-PB-25	05/23/19		16900 ± 1740						

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, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE		H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
MW-PB-25	05/29/19		14300 ± 1490						
MW-PB-25	06/05/19		16100 ± 1660	< 6.2	< 0.8	< 0.4	< 1.1	6.7 ± 0.9	< 1.8
MW-PB-25	06/05/19	*NP*	16300 ± 1680						
MW-PB-25	06/13/19		12200 ± 1280						
MW-PB-25	06/20/19		9800 ± 1040						
MW-PB-25	06/27/19		9730 ± 1030						
MW-PB-25	07/03/19		9960 ± 1050						
MW-PB-25	08/15/19		6500 ± 711						
MW-PB-25	09/20/19		4820 ± 542						
MW-PB-25	09/20/19	*NP*	3480 ± 414						
MW-PB-25	12/03/19		10200 ± 1080						
MW-PB-25	12/03/19	*Reanalysis*	11400 ± 1200						
MW-PB-25	12/03/19	*NP*	6990 ± 760						
MW-PB-26	02/07/19		< 192						
MW-PB-26	03/13/19		< 192						
MW-PB-26	03/13/19	*NP*	215 ± 128						
MW-PB-26	04/04/19		< 191						
MW-PB-26	05/09/19		< 196						
MW-PB-26	05/23/19		212 ± 125						
MW-PB-26	05/29/19		< 184						
MW-PB-26	06/05/19		237 ± 118	< 6.9	< 0.7	1.3 ± 0.6	< 0.6	4.1 ± 0.9	< 1.8
MW-PB-26	06/05/19	*NP*	< 197						
MW-PB-26	06/13/19		< 185						
MW-PB-26	06/20/19		225 ± 129						
MW-PB-26	06/27/19		< 186						
MW-PB-26	07/03/19		< 187						
MW-PB-26	08/15/19		< 194						
MW-PB-26	09/20/19		< 192						
MW-PB-26	09/20/19	*NP*	386 ± 132						
MW-PB-26	12/03/19		294 ± 122						
MW-PB-26	12/03/19	*NP*	266 ± 127						
MW-PB-27	02/07/19		532 ± 144						
MW-PB-27	03/13/19		509 ± 141						
MW-PB-27	03/13/19	*NP*	380 ± 138						
MW-PB-27	04/04/19		360 ± 136						
MW-PB-27	05/09/19		571 ± 143						
MW-PB-27	05/23/19		473 ± 138						
MW-PB-27	05/29/19		388 ± 130						
MW-PB-27	06/05/19		540 ± 142	< 8.4	< 1.0	3.0 ± 0.9	< 1.0	5.1 ± 1.0	< 1.5
MW-PB-27	06/05/19	*DUP*	386 ± 141						
MW-PB-27	06/13/19		467 ± 133						
MW-PB-27	06/20/19		600 ± 147						
MW-PB-27	06/27/19		370 ± 129						
MW-PB-27	07/03/19		436 ± 138						
MW-PB-27	08/15/19		530 ± 142						
MW-PB-27	09/20/19		455 ± 139						
MW-PB-27	09/20/19	*NP*	490 ± 139						
MW-PB-27	12/03/19		553 ± 134						
MW-PB-27	12/03/19	*NP*	400 ± 135						
MW-PB-28	03/13/19		< 194						
MW-PB-28	03/13/19	*NP*	< 195						
MW-PB-28	06/04/19		< 191	< 7.0	< 0.9	< 0.5	1.6 ± 1.0	2.3 ± 0.7	3.2 ± 1.2
MW-PB-28	06/04/19	*NP*	< 195						
MW-PB-28	09/17/19		< 190						
MW-PB-28	09/17/19	*NP*	< 193						

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, 2019

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-28	12/03/19		377 ± 125						
MW-PB-28	12/03/19	NP	230 ± 127						
MW-PB-29	03/13/19		< 188						
MW-PB-29	03/13/19	NP	214 ± 130						
MW-PB-29	06/04/19		< 197	< 7.5	< 0.8	< 0.7	< 0.6	2.8 ± 0.7	< 1.8
MW-PB-29	06/04/19	NP	< 195						
MW-PB-29	09/18/19		551 ± 135						
MW-PB-29	09/18/19	NP	468 ± 139						
MW-PB-29	12/03/19		351 ± 123						
MW-PB-29	12/03/19	NP	228 ± 128						
MW-PB-30	03/13/19		197 ± 127						
MW-PB-30	03/13/19	NP	205 ± 128						
MW-PB-30	06/04/19		1430 ± 217	< 5.5	< 0.6	< 0.4	< 0.6	2.8 ± 0.8	< 1.8
MW-PB-30	06/04/19	NP	1990 ± 271						
MW-PB-30	09/18/19		685 ± 143						
MW-PB-30	09/18/19	NP	1030 ± 182						
MW-PB-30	12/03/19		251 ± 117						
MW-PB-30	12/03/19	NP	< 193						
MW-PB-31	03/13/19		< 189						
MW-PB-31	06/04/19		< 200	< 6.8	< 0.7	< 0.4	< 0.6	1.7 ± 0.7	< 1.8
MW-PB-31	09/18/19		< 189						
MW-PB-31	12/03/19		255 ± 118						
U/2 YARD DRAIN	03/14/19		240 ± 131						
U/2 YARD DRAIN	06/06/19		250 ± 130	< 6.4	< 0.5	< 0.6	< 1.0	2.0 ± 0.7	< 1.5
U/2 YARD DRAIN	09/09/19		< 189						
U/2 YARD DRAIN	09/09/19	DUP	< 192						
U/2 YARD DRAIN	09/09/19	GEL	< 159						
U/2 YARD DRAIN	12/09/19		< 188						
U/3 YARD DRAIN	03/14/19		301 ± 133						
U/3 YARD DRAIN	06/06/19		< 194	< 7.2	< 0.7	< 0.5	< 1.0	2.8 ± 0.7	< 1.5
U/3 YARD DRAIN	09/26/19		< 193						
U/3 YARD DRAIN	12/27/19		< 195						

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, 2019

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	06/04/19	< 7	< 7	< 16	< 8	< 14	< 9	< 12	< 12	< 7	< 7	< 33	< 14
MW-PB-2	06/04/19	< 7	< 7	< 13	< 9	< 12	< 6	< 8	< 11	< 8	< 6	< 29	< 12
MW-PB-3	06/04/19	< 5	< 5	< 11	< 5	< 12	< 5	< 9	< 8	< 5	< 6	< 25	< 10
MW-PB-5	06/04/19	< 8	< 9	< 12	< 9	< 14	< 11	< 13	< 15	< 8	< 8	< 39	< 13
MW-PB-6	06/05/19	< 6	< 6	< 13	< 6	< 11	< 6	< 11	< 10	< 6	< 6	< 23	< 8
MW-PB-7	06/05/19	< 9	< 8	< 13	< 11	< 18	< 8	< 13	< 13	< 8	< 8	< 34	< 13
MW-PB-8	03/12/19	< 6	< 7	< 15	< 7	< 13	< 8	< 10	< 13	< 7	< 6	< 35	< 11
MW-PB-8	06/05/19	< 8	< 6	< 12	< 7	< 15	< 8	< 12	< 12	< 8	< 8	< 31	< 11
MW-PB-8	09/20/19	< 4	< 5	< 9	< 5	< 8	< 5	< 8	< 11	< 5	< 4	< 26	< 9
MW-PB-8	12/05/19	< 6	< 8	< 12	< 8	< 16	< 8	< 13	< 13	< 7	< 7	< 33	< 10
MW-PB-10	03/12/19	< 5	< 7	< 17	< 6	< 12	< 11	< 16	< 14	< 8	< 8	< 39	< 15
MW-PB-10	06/05/19	< 7	< 6	< 15	< 11	< 14	< 7	< 9	< 13	< 7	< 8	< 35	< 11
MW-PB-10	09/20/19	< 5	< 6	< 13	< 6	< 10	< 6	< 9	< 14	< 6	< 5	< 37	< 11
MW-PB-10	12/05/19	< 8	< 8	< 17	< 6	< 18	< 11	< 17	< 13	< 10	< 6	< 45	< 12
MW-PB-13	06/04/19	< 5	< 5	< 9	< 5	< 8	< 5	< 7	< 9	< 5	< 5	< 25	< 7
MW-PB-14	06/05/19	< 9	< 7	< 18	< 8	< 20	< 10	< 17	< 14	< 9	< 8	< 42	< 12
MW-PB-15	03/12/19	< 6	< 7	< 11	< 7	< 11	< 8	< 10	< 13	< 7	< 6	< 39	< 11
MW-PB-15	06/05/19	< 7	< 8	< 13	< 7	< 15	< 10	< 13	< 15	< 8	< 8	< 41	< 13
MW-PB-15	06/05/19 *DUP*	< 6	< 6	< 10	< 6	< 11	< 7	< 10	< 11	< 8	< 5	< 28	< 10
MW-PB-15	06/05/19 *GEL*	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 3	< 2	< 2	< 10	< 3
MW-PB-15	09/18/19	< 4	< 3	< 8	< 4	< 8	< 5	< 5	< 9	< 4	< 4	< 22	< 8
MW-PB-15	12/05/19	< 7	< 9	< 21	< 12	< 19	< 11	< 15	< 14	< 9	< 9	< 38	< 11
MW-PB-16	03/12/19	< 6	< 6	< 11	< 5	< 11	< 6	< 10	< 12	< 7	< 6	< 29	< 8
MW-PB-16	06/05/19	< 5	< 5	< 8	< 5	< 12	< 6	< 9	< 9	< 6	< 5	< 26	< 8
MW-PB-16	09/18/19	< 4	< 4	< 8	< 4	< 8	< 4	< 7	< 10	< 4	< 4	< 26	< 8
MW-PB-16	12/05/19	< 6	< 6	< 12	< 7	< 13	< 8	< 11	< 10	< 6	< 6	< 28	< 11
MW-PB-19	06/04/19	< 6	< 5	< 14	< 7	< 13	< 6	< 11	< 10	< 8	< 6	< 26	< 9
MW-PB-24	06/05/19	< 7	< 7	< 15	< 9	< 14	< 11	< 12	< 12	< 7	< 8	< 37	< 13
MW-PB-24	12/03/19	< 6	< 7	< 14	< 8	< 15	< 7	< 10	< 12	< 6	< 5	< 34	< 12
MW-PB-25	05/23/19	< 7	< 6	< 15	< 7	< 12	< 9	< 12	< 11	< 7	< 7	< 32	< 11
MW-PB-25	05/29/19	< 5	< 6	< 14	< 7	< 12	< 6	< 11	< 10	< 7	< 7	< 30	< 7
MW-PB-25	06/05/19	< 7	< 7	< 14	< 8	< 16	< 8	< 10	< 12	< 9	< 7	< 37	< 10
MW-PB-25	06/13/19	< 7	< 7	< 12	< 4	< 17	< 6	< 11	< 9	< 9	< 6	< 33	< 12
MW-PB-25	06/20/19	< 6	< 7	< 14	< 8	< 10	< 8	< 14	< 10	< 9	< 8	< 25	< 11
MW-PB-25	06/27/19	< 4	< 7	< 15	< 6	< 15	< 7	< 12	< 9	< 8	< 7	< 32	< 14
MW-PB-25	07/03/19	< 7	< 7	< 9	< 8	< 17	< 9	< 11	< 11	< 8	< 7	< 29	< 8
MW-PB-25	08/15/19	< 7	< 7	< 16	< 6	< 12	< 8	< 11	< 11	< 8	< 8	< 36	< 8
MW-PB-25	12/03/19	< 6	< 5	< 10	< 7	< 14	< 6	< 12	< 11	< 7	< 7	< 30	< 11
MW-PB-26	06/05/19	< 7	< 6	< 11	< 6	< 14	< 6	< 10	< 10	< 7	< 7	< 27	< 8
MW-PB-26	12/03/19	< 5	< 5	< 11	< 6	< 12	< 6	< 9	< 12	< 6	< 6	< 33	< 9
MW-PB-27	06/05/19	< 5	< 5	< 11	< 6	< 10	< 6	< 9	< 10	< 6	< 5	< 28	< 9
MW-PB-27	12/03/19	< 5	< 5	< 11	< 5	< 13	< 7	< 10	< 11	< 6	< 5	< 29	< 10
MW-PB-28	06/04/19	< 9	< 7	< 16	< 9	< 16	< 11	< 15	< 13	< 8	< 8	< 41	< 14
MW-PB-29	06/04/19	< 7	< 5	< 13	< 9	< 12	< 10	< 14	< 13	< 7	< 7	< 32	< 13
MW-PB-30	06/04/19	< 4	< 6	< 11	< 5	< 9	< 7	< 9	< 10	< 5	< 6	< 36	< 10
MW-PB-31	06/04/19	< 6	< 6	< 14	< 6	< 13	< 8	< 10	< 12	< 7	< 6	< 27	< 11
U/2 YARD DRAIN	06/06/19	< 3	< 4	< 7	< 3	< 7	< 4	< 6	< 9	< 4	< 4	< 21	< 7
U/3 YARD DRAIN	06/06/19	< 3	< 2	< 6	< 3	< 5	< 3	< 6	< 7	< 3	< 3	< 17	< 5

TABLE B-I.3 **CONCENTRATIONS OF HARD-TO-DETECTS IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROECTION PROGRAM, PEACH BOTTOM ATOMIC STATION, 2019**

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-2	06/04/19	< 0.10	< 0.03	< 0.10	< 0.07	< 0.13	4.26 ± 0.57	< 0.02	2.62 ± 0.42		
MW-PB-3	06/04/19	< 0.13	< 0.05	< 0.05	< 0.11	< 0.11	3.24 ± 0.50	< 0.10	1.94 ± 0.37		
MW-PB-7	06/05/19	< 0.10	< 0.02	< 0.02	< 0.18	< 0.04	< 0.13	< 0.13	< 0.18		
MW-PB-8	06/05/19	< 0.05	< 0.02	< 0.06	< 0.15	< 0.11	< 0.19	< 0.13	< 0.10		
MW-PB-10	06/05/19	< 0.06	< 0.02	< 0.04	< 0.08	< 0.12	< 0.02	< 0.05	< 0.06		
MW-PB-13	06/04/19	< 0.11	< 0.05	< 0.09	< 0.12	< 0.19	4.74 ± 0.96	0.21 ± 0.14	4.33 ± 0.89		
MW-PB-15	06/05/19	< 0.13	< 0.09	< 0.09	< 0.05	< 0.13	< 0.09	< 0.03	< 0.13		
MW-PB-15	06/05/19 *DUP*	< 0.15	< 0.09	< 0.12	< 0.04	< 0.13	< 0.08	< 0.11	< 0.16		
MW-PB-15	06/05/19 *GEL*	<					< 0.51	< 0.38	< 0.31		
MW-PB-16	06/05/19	< 0.04	< 0.08	< 0.12	< 0.12	< 0.16	< 0.16	< 0.09	< 0.13		
MW-PB-19	06/04/19	< 0.15	< 0.12	< 0.05	< 0.09	< 0.05	< 0.16	< 0.17	< 0.08		
MW-PB-24	06/05/19	< 0.06	< 0.02	< 0.10	< 0.04	< 0.13	< 0.18	< 0.12	< 0.16	< 45	< 4.7
MW-PB-25	06/05/19	< 0.17	< 0.03	< 0.20	< 0.13	< 0.16	0.77 ± 0.25	< 0.03	0.38 ± 0.16	< 71	< 4.3
MW-PB-26	06/05/19	< 0.13	< 0.03	< 0.09	< 0.16	< 0.15	6.05 ± 1.12	< 0.10	2.49 ± 0.54	< 97	< 4.5
MW-PB-27	06/05/19	< 0.15	< 0.06	< 0.14	< 0.09	< 0.03	5.93 ± 0.72	< 0.05	2.47 ± 0.42	< 44	< 4.4
MW-PB-28	06/04/19	< 0.02	< 0.10	< 0.14	< 0.03	< 0.13	0.59 ± 0.19	< 0.05	0.45 ± 0.17		
MW-PB-29	06/04/19	< 0.03	< 0.05	< 0.14	< 0.02	< 0.07	< 0.09	< 0.08	< 0.12		
MW-PB-30	06/04/19	< 0.06	< 0.06	< 0.02	< 0.19	< 0.12	< 0.04	< 0.08	< 0.11		
MW-PB-31	06/04/19	< 0.12	< 0.02	< 0.10	< 0.03	< 0.18	< 0.02	< 0.05	< 0.10		
U/2 YARD DRAIN	06/06/19	< 0.08	< 0.03	< 0.07	< 0.06	< 0.09	< 0.05	< 0.09	< 0.08		
U/3 YARD DRAIN	06/06/19	< 0.11	< 0.04	< 0.04	< 0.09	< 0.13	< 0.12	< 0.11	< 0.14		

*GEL Labs reports U-234 as U-233/234 and U-235 as U-235/236

TABLE B-II.1 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, PEACH BOTTOM ATOMIC POWER STATION, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE		COLLECTION DATE	H-3
SP-PB-1		03/13/19	< 193
SP-PB-1		06/04/19	< 189
SP-PB-1		09/18/19	< 198
SP-PB-1		12/03/19	< 191
SP-PB-2		03/13/19	< 192
SP-PB-2		06/04/19	< 189
SP-PB-2		09/17/19	< 190
SP-PB-2		12/03/19	< 192
SP-PB-3		03/13/19	< 191
SP-PB-3		06/05/19	< 190
SP-PB-3		09/17/19	< 190
SP-PB-3		12/03/19	< 195
SW-PB-1		03/12/19	< 192
SW-PB-1	*DUP*	03/12/19	< 197
SW-PB-1	*GEL*	03/12/19	< 134
SW-PB-1		06/05/19	< 200
SW-PB-1		09/17/19	< 194
SW-PB-1	*DUP*	09/17/19	< 190
SW-PB-1	*GEL*	09/17/19	< 166
SW-PB-1		12/05/19	< 195
SW-PB-5		03/12/19	< 193
SW-PB-5		06/05/19	< 195
SW-PB-5		09/17/19	< 182
SW-PB-5		12/05/19	< 191
SW-PB-5	*DUP*	12/05/19	< 192
SW-PB-5	*GEL*	12/05/19	< 142
SW-PB-6		03/12/19	< 193
SW-PB-6		06/05/19	< 194
SW-PB-6	*DUP*	06/05/19	< 185
SW-PB-6	*GEL*	06/05/19	< 124
SW-PB-6		09/17/19	< 191
SW-PB-6	*DUP*	09/17/19	< 192
SW-PB-6	*GEL*	09/17/19	< 153
SW-PB-6		12/05/19	< 191

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, 2019**

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
SP-PB-1	06/04/19		< 7	< 7	< 20	< 10	< 15	< 8	< 12	< 15	< 8	< 8	< 41	< 14
SP-PB-2	06/04/19		< 7	< 7	< 17	< 7	< 13	< 8	< 13	< 12	< 9	< 8	< 33	< 9
SP-PB-3	06/05/19		< 5	< 5	< 7	< 4	< 11	< 6	< 8	< 8	< 7	< 5	< 25	< 7
SW-PB-1	06/05/19		< 7	< 6	< 11	< 7	< 11	< 6	< 12	< 10	< 5	< 7	< 30	< 9
SW-PB-5	06/05/19		< 4	< 4	< 14	< 7	< 13	< 5	< 6	< 8	< 6	< 6	< 25	< 10
SW-PB-6	06/05/19		< 6	< 7	< 9	< 7	< 10	< 7	< 10	< 11	< 8	< 6	< 29	< 6
SW-PB-6	06/05/19	*DUP*	< 5	< 5	< 11	< 4	< 11	< 6	< 8	< 9	< 6	< 5	< 20	< 7
SW-PB-6	06/05/19	*GEL*	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 3	< 2	< 2	< 8	< 3

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, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	SITE	COLLECTION DATE	H-3
1A	01/03/19	< 190	1SSE	01/03/19	< 189
1A	01/30/19	< 197	1SSE	01/30/19	< 194
1A	02/28/19	< 193	1SSE	02/28/19	< 194
1A	03/27/19	< 184	1SSE	03/27/19	< 185
1A	05/01/19	< 191	1SSE	05/01/19	< 192
1A	05/29/19	< 195	1SSE	05/29/19	< 193
1A	06/27/19	< 182	1SSE	06/27/19	< 184
1A	08/01/19	< 176	1SSE	08/01/19	< 190
1A	08/29/19	< 190	1SSE	08/29/19	< 195
1A	10/02/19	< 192	1SSE	10/02/19	< 191
1A	10/30/19	< 186	1SSE	10/30/19	< 186
1A	12/04/19	< 189	1SSE	12/04/19	< 189
1B	01/03/19	< 190	1Z	01/03/19	< 188
1B	01/30/19	< 196	1Z	01/30/19	< 192
1B	02/28/19	< 193	1Z	02/28/19	< 193
1B	03/27/19	< 180	1Z	03/27/19	< 180
1B	05/02/19	< 192	1Z	05/01/19	< 188
1B	05/29/19	< 196	1Z	05/29/19	< 195
1B	06/27/19	< 187	1Z	06/27/19	< 183
1B	08/01/19	< 189	1Z	08/01/19	< 190
1B	08/29/19	< 196	1Z	08/29/19	< 192
1B	10/02/19	< 193	1Z	10/02/19	< 188
1B	10/30/19	< 188	1Z	10/30/19	< 186
1B	12/04/19	< 188	1Z	12/04/19	< 183
1S	01/03/19	< 190	4M	01/03/19	< 188
1S	01/30/19	< 194	4M	01/30/19	< 199
1S	02/28/19	< 196	4M	02/28/19	< 197
1S	03/27/19	< 180	4M	03/27/19	< 186
1S	05/01/19	< 193	4M	05/01/19	*(1)*
1S	05/29/19	< 194	4M	05/29/19	< 194
1S	06/27/19	< 185	4M	06/27/19	< 185
1S	08/01/19	< 191	4M	08/01/19	< 194
1S	08/29/19	< 189	4M	08/29/19	< 194
1S	10/02/19	< 189	4M	10/02/19	< 190
1S	10/30/19	< 188	4M	10/30/19	< 188
1S	12/04/19	< 187	4M	12/04/19	< 189

(1) No result due to lab accident - sample lost after receipt

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