Exelon Generation

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U.S. Nuclear Regulatory Commission
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Subject: Peach Bottom Atomic Power Station Units 1, 2 and 3

Independent Spent Fuel Storage Installation (ISFSI)
Facility Operation License DPR-12, DPR-44 and DPR-56
NRC Docket 50-171, 50-277 and 50-278 and ISFSI Docket 72-29

Annual Radioactive Effluent Release Report 61
January 1, 2018 through December 31, 2018

Enclosed is the Annual Radioactive Effluent Release Report 61, January 1, 2018 through December 31, 2018 for Peach Bottom Atomic Power Station, Units 1, 2 and 3.

This report is being submitted in compliance with 10 CFR 50.36a(2) and the Technical Specifications of Operating Licenses DPR-44 and DPR-56 and to fulfill the requirements of Offsite Dose Calculation Manual Specifications (ODCMS) 3.10.2. Additionally, this report is submitted to satisfy the annual effluent reporting requirements for the ISFSI required by the ODCM.

The ODCM was not revised during the 2018 reporting period. There are no commitments contained in this letter.

If you have any questions or require additional information, please do not hesitate to contact Dr. Amber Donley at 717-456-3056.

Sincerely,

Matthew J. Herr, Plant Manager
Peach Bottom Atomic Power Station

MJH/SMO/GRS/BMR/ASD/asd

Enclosure (1)

cc: USNRC Region I, Regional Administrator (Daniel H. Dorman)
USNRC Senior Resident Inspector, PBAPS (Justin Heinly)
USNRC Region I Inspector (James R. Cassata)

CCN 19-47

PEACH BOTTOM ATOMIC POWER STATION
Unit Numbers 2 and 3
Docket Numbers 50-277 and 50-278
Unit Number 1
Docket Number 50-171
PBAPS Independent Spent Fuel Storage Installation
Docket Number 72-29

RADIOACTIVE EFFLUENT RELEASE REPORT

NO. 61

JANUARY 1, 2018 THROUGH DECEMBER 31, 2018

Submitted to
The United States Nuclear Regulatory Commission
Pursuant to
Facility Operating Licenses DPR-44 and DPR-56

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Technical Concurrence (for accuracy of information):

Siobhan O'Dwyer /Siobhan O'Dwyer 4/19/19
Manager, Site Chemistry and Radwaste Date

INTRODUCTION

In accordance with the Reporting Requirements of Technical Specification 5.6.3 applicable during the reporting period, January 1, 2018 through December 31, 2018, this report summarizes the Effluent Release Data for Peach Bottom Atomic Power Station (PBAPS) Units 2 and 3. The notations E+ and E- are used to denote positive and negative exponents to the base 10, respectively.

The release of radioactive materials during the reporting period was within the Offsite Dose Calculation Manual Specification (ODCMS) limits.

There were three (3) abnormal releases of liquid radioactive material. Two releases were from two different Residual Heat Removal (RHR) heat exchangers (beginning July of 2016 and November 2018) and the other is from groundwater tritium contamination ('tritium plume'). These releases were far below regulatory limits.

There were no abnormal releases of gaseous radioactive material during 2018.

The maximum calculated organ dose (bone) from iodines (I-131, I-133 and I-135), tritium (H-3), carbon-14 (C-14) and particulates to any individual due to all gaseous effluents was 1.38E-01 mrem, which was approximately 4.60E-01% of the annual limit. The maximum calculated air dose in the unrestricted area due to noble gas effluents was 3.02E-01 mrad (gamma) and 2.07E-01 mrad (beta), which was 1.51E+00% and 5.18E-01%, respectively, of the annual limits.

In 2018, there were no direct gaseous or liquid releases or discharges from Unit 1 to the environment. Additionally, there were no gaseous or liquid radioactive releases from the Independent Spent Fuel Storage Installation, NRC Docket No. 72-29 (ISFSI).

No changes made to RW-AA-100 "Process Control Program for Radioactive Waste" or to the ODCM nor the Appendix A during the 2018 reporting period.

Exelon Nuclear common procedures, which provide consistent expectations and standards for Radioactive Effluents Controls Program (RECP), were used to generate this report. PBAPS site specific procedures used to assist with abnormal/unplanned releases were also used to generate this report. They are:

- CY-AA-170-000, Radioactive Effluent and Environmental Monitoring Program
- CY-AA-170-100, Radiological Environmental Monitoring Program
- CY-AA-170-200, Radioactive Effluent Controls Program
- CY-AA-170-300, Offsite Dose Calculation Manual Administration
- CY-AA-170-2000, Annual Radioactive Effluent Release Report
- CY-AA-170-2100, Estimated Errors of Effluent Measurement
- CY-AA-170-3100, Offsite Dose Calculation Manual Revisions
- CY-AA-170-2300, Determination of Carbon-14 in Gaseous Effluents
- CY-PB-170-202, RHR-HPSW Leak Rate Calculation
- CY-PB-170-2020, Radiological Abnormal Gaseous Release Assessment
- CY-PB-170-210, Gaseous Dose and Dose Rate Calculation
- CY-PB-170-2300, OpenEMS Effluent Management System Implementation
- Peach Bottom Atomic Power Station, Offsite Dose Calculation Manual and Specifications (Appendix A)

ATTACHMENT 1: SUPPLEMENTAL INFORMATION

Regulatory Limits

Table 1. Noble Gas Dose Rate and Dose Limits

Maximum Value	Units	Limit Classification	Specification
500	mrem/ yr	annual total body dose rate	ODCM Specification 3.8.C.1.a
3000	mrem/ yr	annual skin dose rate	ODCM Specification 3.8.C.1.a
10	mrad	gamma radiation air dose per quarter	ODCM Specification 3.8.C.2.a
20	mrad	beta radiation in air dose per quarter	ODCM Specification 3.8.C.2.b
20	mrad	gamma radiation in air dose per year	ODCM Specification 3.8.C.2.c
40	mrad	beta radiation in air dose per year	ODCM Specification 3.8.C.2.d

Table 2. Iodines, Tritium and Particulates (with half-lives >8 days) Dose Rate and Dose Limits

Maximum Value	Units	Limit Classification	Specification
1500	mrem/ yr	annual dose rate limit to any organ	ODCM Specification 3.8.C.1.b
15	mrem	annual dose limit to any organ per quarter	ODCM Specification 3.8.C.3.a
30	mrem	dose limit to any organ per year	ODCM Specification 3.8.C.3.b

Table 3. Liquid Effluent Activity Concentration and Dose Rate Limits

Maximum Value	Units	Limit Classification	Specification
≤ 10 times 10 CFR 20, Appendix B, Table 2, Column 2	µCi/mL	Activity Concentration in all liquid releases	ODCM Specification 3.8.B.1.a
2E-04	µCi/mL	total activity concentration for all dissolved and entrained noble gases	ODCM Specification 3.8.B.1.b
3.0	mrem	total body dose limit per quarter	ODCM Specification 3.8.B.2.a
10	mrem	total body dose limit per year	ODCM Specification 3.8.B.2.a
6.0	mrem	dose limit per quarter to any organ	ODCM Specification 3.8.B.2.b
20	mrem	dose limit per year to any organ	ODCM Specification 3.8.B.2.b

Maximum Permissible Concentrations

Gaseous dose rates, rather than effluent concentrations, are used to calculate permissible release rates for gaseous releases. The maximum permissible dose rates for gaseous releases are defined in ODCMS 3.8.C.1.a and 3.8.C.1.b.

The Effluent Concentrations Limits (ECL) specified in 10 CFR 20, Appendix B, Table 2, Column 2 multiplied by 10, for identified nuclides, are used to calculate permissible release rates and concentrations for liquid release per ODCMS 3.8.B.1.

The total activity concentration for all dissolved or entrained noble gases is limited to < 2E-04 µCi/mL (ODCMS 3.8.B.1.b).

Average Energy

The PBAPS ODCM limits the dose-equivalent rates due to the release of noble gases to less than or equal to 500 mrem/year to the total body and less than or equal to 3000 mrem/year to the skin. Therefore, the average beta and gamma energies of the radionuclide mixture in releases of fission and activation gases as described in Regulatory Guide 1.21, Revision 1, "Measuring, Evaluation, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants," are not applicable to PBAPS.

Measures and Approximations of Total Radioactivity

Fission and Activation Gases

The method used for gamma isotopic analysis is the Canberra Genie™ System with a gas marinelli beaker. Grab samples are taken and analyzed weekly to determine the isotopic mixture of noble gas activity released for the week. Airborne effluent gaseous activity was continuously monitored and recorded in accordance with ODCMS Table 4.8.C.1. The data from the noble gas radiation monitor were analyzed to report noble gas effluent activities. When no activity was identified in the grab isotopic analysis (un-id(s) or un-id(v)), the entire release must be assumed to be the radionuclide with the most-limiting dose factors for the release pathway (i.e. krypton-88 (Kr-88) for all ground-level releases, Kr-88 for elevated gamma dose and Kr-87 for elevated beta dose; see ODCM IV.B and NUREG-0133[1]). The activity released is listed as "unidentified" in the Attachment 2 Tables. If activity was found in the grab isotopic analysis, the isotopic mixture for the Noble Gas Monitor was determined from that isotopic mixture.

Iodines

The method used is the Canberra Genie™ System with a charcoal cartridge. Iodine activity was continuously sampled and analyzed in accordance with ODCMS Table 4.8.C.1.

Particulates

The method used is the Canberra Genie™ System with a particulate filter (47 mm diameter). Particulate activity was continuously sampled and analyzed in accordance with ODCM Table 4.8.C.1.

Composite particulate air samples were submitted to an offsite vendor laboratory for analyses of strontium-89 (Sr-89), Sr-90, nickel-63 (Ni-63) and gross alpha.

[1] NUREG 0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants: A Guidance Manual for Users of Standard Technical Specifications," October 1978.

Carbon-14

The amount of C-14 released was estimated using the guidance from the Electric Power Research Institute (EPRI) Technical Report 1021106, "Estimation of Carbon-14 in Nuclear Power Plant Gaseous Effluents". The C-14 was released primarily through the Main Offgas Stack (9.70E+01%) with a small amount (3.00E+00%) through the Reactor Building Exhaust Vents. The C-14 in liquid effluents is not a significant dose pathway, as determined from studies. The resulting annual dose to the maximum conservative receptor is 1.38E-01 mrem, with the limiting receptor as the child bone.

Liquid Effluents

Gamma isotopic activity concentrations are determined on each batch of liquid effluent prior to release using the Canberra Genie^{TM} System in accordance with ODCMS Table 4.8.B.1. The total activity of a released batch is determined by multiplying each nuclide's concentration by the total volume discharged.

Composite liquid radwaste samples are analyzed for tritium on-site and submitted to an offsite vendor laboratory for analyses of iron-55 (Fe-55), phosphorus-32 (P-32), Sr-89, Sr-90, Ni-63, and gross alpha.

Decommissioned Unit 1 Liquid Radioactive Waste Processing

There were no direct gaseous or liquid releases or discharges from Unit 1 to the environment during 2018. However, during the reporting period, a total of 333 gallons of water with low concentrations of H-3 were collected from Unit 1 and stored at Unit 2 and 3, for processing in a future year. No gamma emitting nuclides were identified above detectable limits. During the reporting period, there were no releases of Unit 1 water through the Unit 2 and Unit 3 liquid radwaste system. Therefore, there is no estimated liquid effluent doses for 2018 from Unit 1 water releases through the Unit 2 and Unit 3 liquid radwaste system.

Estimate of Total Error Present

CY-AA-170-2100, "Estimated Errors of Effluent Measurements", provides the methodology to obtain an overall estimate of the error associated with radioactive effluents, which are listed in Attachment 2 of this report.

Batch Releases

Table 4. Quarterly Liquid Batch Release Statistics

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Number of Batch Releases	18*	2	4	8
Total Time for Batch Releases (minutes)	2.31E+03	1.150E+02	3.930E+02	4.730E+02
Maximum time period for batch release (minutes)	1.78E+02	8.000E+01	1.350E+02	1.000E+02
Average time period for batch release (minutes)	1.28E+02	5.750E+01	9.825E+01	5.913E+01
Minimum time period for batch release (minutes)	3.70E+01	3.500E+01	5.000E+01	3.700E+01
Average Stream Flow (ft^3/s)[2,3]	1.95E+05	1.74E+05	2.38E+05	2.65E+05
Dilution volume (liters)	9.49E+09	5.22E+08	1.79E+09	2.15E+09

*Number of releases increased from 2017 due to work on the torus dewatering tank

Table 5. Quarterly Gaseous Batch Release Statistics

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Number of batch releases:	0	0	0	0
Total Time for batch releases (minutes)	0	0	0	0
Maximum time period for batch release (minutes)	0	0	0	0
Average time period for batch release (minutes)	0	0	0	0
Minimum time period for batch release (minutes)	0	0	0	0

Average Stream Flow

The river flow is not used for dose calculations. The actual flow rate of Circulation Water (the water that is circulated within the plant for cooling) is determined for each liquid effluent release because this Circulation Water provides dilution and therefore reduces the projected dose.

[2] Average Stream Flow is not used for dose calculation.

[3] USGS National Water Information System, Site Name: "Susquehanna River at Marietta, PA", Site Number: 01576000. Data accessed 13 March 2019.

Abnormal or Unplanned Releases

'Abnormal' releases are those releases that are not defined as 'normal' releases in the Licensee's ODCM. Systems with a potential for an unplanned release are monitored to ensure if a release were to occur it would be identified and quantified appropriately. Source terms used for dose calculations utilize direct sampling and the maximum concentrations of nuclides to ensure that the most conservative and bounding estimates are used. Methodologies calculate conservative dose utilizing conservative mathematical models to describe intake and exposure pathways. Therefore, reported doses for these abnormal releases are calculated conservatively.

Liquid Releases

Groundwater Tritium Plume

During 2018, during the sampling and analysis of the Radiological Ground Water Protection Program (RGPP), tritium was measured at several locations around the site. The ground water that has detectable tritium has been determined to flow into the plant intake and eventually flow into the normal discharge canal. Details of this program can be found in the Peach Bottom Annual Radiological Environmental Operating Report (AREOR) as an appendix. No other nuclides were detected in monitoring wells.

Analysis of Release

It was assumed from the maximum flow rates measured[4] that ground water flowed to the discharge canal at a steady rate of 3.44E+02 gpm, carrying with it some of the tritium underneath the plant. The ground water flow rate was updated in April 2017, when the new report was provided[4]. The conservative maximum dose for the entire year from this continuous release is calculated to be 2.94E-05 mrem (to the whole-body) and 2.94E-05 mrem (to any organ, except bone[5] which is 0.00E+00 mrem)[6]. This dose contribution projection is well below the limit specified in the ODCM.

Heat Exchanger Leakage

In July of 2016, a small leak developed in the Unit 3 'C' Residual Heat Removal (RHR) Heat Exchanger and on November 13, 2018 a small leak developed in the Unit 2 'B' RHR. The RHR system is designed to circulate water to remove heat from the reactor unit when necessary. The dose model assumes that contaminated torus water leaks from the heat exchanger, regardless of operating pressure to ensure conservatism in calculated dose. As an additional precaution, installed radiation monitoring instrumentation can indicate an inadvertent release of radioactive material should the heat exchanger develop a large leak unexpectedly.

[4] "Estimated Mass Flux Of Tritiated Groundwater To The Conowingo Reservoir And Rock Run Creek, Peach Bottom Atomic Power Station, Delta, Pennsylvania", August 2017, GHD formerly Conestoga-Rovers & Associates.
[5] Tritium dose factor for bone is 0.00E+00; therefore no hypothetical dose is calculated.
[6] These doses are identical because the dose factors are identical for the same nuclide and pathway.

Analysis of Release

It was assumed that the torus water released to the discharge canal, during 2018, contributed a conservative maximum dose of 5.42E-05 mrem to the total body (receptor adult), and a conservative maximum organ dose of 1.54E-04 mrem to the adult GI-LLI. This dose contribution is well below the limits specified in the ODCM.

Samples were analyzed for all the parameters of radioactive effluent releases. Composite liquid torus water samples were counted for tritium and submitted to an offsite vendor laboratory for analyses of Fe-55, P-32, Sr-89, Sr-90, Ni-63 and gross alpha. The dose contributions and isotope quantities from the releases were added to this Radioactive Effluent Release Report for the applicable reporting periods.

Gaseous Releases

There were no gaseous abnormal releases during 2018.

Changes to the ODCM

There were no changes made to the ODCM, nor the ODCM Specifications (Appendix A) during 2018.

Minimum Detectable Concentrations

If a radionuclide was not detected, "<LLD" was reported as the activity. Samples were analyzed with techniques that achieved the required Lower Limits of Detection (LLD) specified in ODCMS Table 4.8.B.1, "Radioactive Liquid Waste Sampling and Analysis" (for liquids) or ODCMS Table 4.8.C.1, "Radioactive Gaseous Waste Sampling and Analysis from Main Stack and Vent Stack" (for gases). In all cases, the LLD requirements were satisfied.

Violations

There were no effluent release violations for the 2018 reporting period.

Dose Assessment

Introduction

A dose assessment for PBAPS was conducted with the measured cumulative 2018 radioactive effluent source terms, provided in Attachment 2, "Effluent Summary," and the 2018 meteorological (MET) data. This dose assessment verifies that PBAPS continues to demonstrate compliance with the limits as well as the requirement of maintaining the doses "as low as is reasonably achievable" as stated in 10 CFR 50, Appendix I.[7]

Liquid Dose Assessment

Hydrologic Conditions and Receptor Locations of Interest

PBAPS is located on the Conowingo Pond formed in the Susquehanna River by the Conowingo Dam. For 2018, the annual average river flow[8] was measured as 8.72E+05 ft^3/s.

Of the three separate flow regimes that were used in the original Appendix I submittal, the most-limiting of them (<1.50E+04 ft^3/s) was used to calculate a dose assessment for this report because this would provide a bounding extreme for all PBAPS liquid effluents. Therefore, although the actual average stream flow for the year was more than double the limiting case, this report will provide an upper limit for the most-limiting dose.

The annual average dilution factor[9] at the Conowingo Intake is 5.40E+00 and the assumption for the reconcentration factor[9] is 1.16E+00. The PBAPS shorewidth factor[10] of 2.00E-01 was also used.

No invertebrate intake was examined because invertebrate ingestion pathways are not considered to be significant in the area close to PBAPS. The pathway factors for the various age groups, used to determine dose to the public from liquid effluents are shown in Table 6.

Table 6. Consumption and Usage Rate Assumptions

Pathway	Adult	Teenager	Child	Infant	Units
Eating Fish[10]	2.10E+01	1.60E+01	6.90E+00	0.00E+00	kg/ yr
Drinking Water[11]	7.30E+02	5.10E+02	5.10E+02	5.10E+02	L/ yr
Swimming[12]	2.80E+02	2.80E+02	0.00E+00	0.00E+00	h/ yr
Boating[12]	1.20E+02	1.20E+02	6.70E+01	0.00E+00	h/ yr
Shoreline Recreation[12]	3.25E+02	3.25E+02	1.40E+01	0.00E+00	h/ yr
Fishing from Conowingo Dam[12]	3.25E+02	3.25E+02	0.00E+00	0.00E+00	h/ yr

[7] 10 CFR 50 Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion "As Low as is Reasonable Achievable" for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents".

[8] USGS National Water Information Service; Monitoring Site 01576000, Susquehanna River at Marietta, PA; http://waterdata.usgs.gov/nwis. Accessed 13 Mar 2019.

[9] From original ODCM.

[10] RG 1.109, Table A-2.

[11] All locations from RG 1.109, Section A-2. Chester Water Authority uses 10% of the RG 1.109 value because it is assumed to have 10% sourced from Conowingo Pond.

[12] PBAPS Environmental Report, Supplement No. 3, Page 19. Boating data is a ratio of Adult:Child rates from RG 1.109, Table A-2.

Liquid Effluent Dose Assessment Conclusion
For all permitted releases in 2018, the calculated total body dose was 5.07E-05 mrem and 5.31E-05 mrem to the limiting organ of adult liver.

Therefore, PBAPS liquid radioactive effluent controls continue to demonstrate compliance with 10 CFR 50, Appendix I objectives for the purposes of keeping doses to members of the public "as low as is reasonably achievable". These limiting or maximum calculated doses are a small fraction of the limits in Appendix I.

Gaseous Dose Assessment

The gaseous dose assessment calculates the conservative dose at the limiting receptor location, as defined in the ODCM and at locations from the land-use census, using the 2018 meteorology to demonstrate compliance with 10 CFR 50, Appendix I. The assessment compares the current ODCM locations to the maximum locations from the land use census to ensure the current ODCM locations are still the most impactful dose locations.

Tables 7 and 8 utilized the CY-PB-170-210 spreadsheet to calculate the doses for elevated and ground releases with the 2018 MET data and gaseous total activity released, including C-14. Table 7 utilized MET data from the locations with the highest X/Q from the Main Offgas Stack and the corresponding Reactor Building Exhaust Vents MET factors. Table 8 utilized MET data from the locations with the highest D/Q sectors from the Reactor Building Exhaust Vents and the corresponding Main Offgas Stack MET factors. The X/Q values are very similar to those used in the ODCM, and therefore the differences in noble gas dose is minimal. The larger discrepancies between Iodine, Particulates, Tritium (I/P/T) organ doses can be explained by the differences in pathways. Tables 7 and 8 assume that there is a milk pathway at each of the listed locations. The ODCM defines the milk pathway at 1500m SW and the D/Qs are more comparable (2018 vent: 2.49E-9 $1/m^2$ vs. ODCM vent: 1.58E-09 $1/m^2$) and therefore, the dose calculated by ODCM methodology is more accurately representative of the dose to members of the public than the dose reported in Tables 7 and 8.

Table 7. Conservative Maximum Elevated Release Dose from 2018 Source Term and 2018 Meteorology

Distance (m)	Direction	2018 Highest MS X/Q (D/Q)	2018 Vent X/Q (D/Q)	Total Body Dose (mrem)	Skin Dose (mrem)	Gamma Air Dose (mrad)	Beta Air Dose (mrad)	I/P/T/C-14 Dose (mrem)	Limiting Receptor
4600	N	4.34E-08 (3.13E-10)	1.47E-07 (7.62E-10)	3.88E-02	5.07E-02	4.02E-02	2.78E-02	1.82E-01	Bone
3800	SW	3.63E-08 (2.38E-10)	1.64E-07 (6.06E-10)	4.33E-02	5.64E-02	4.48E-02	3.08E-02	1.57E-01	Bone

Table 8. Ground-Level Dose from 2018 Source Term and 2018 Meteorology

Distance (m)	Direction	2018 Highest Vent D/Q (X/Q)	2018 MS X/Q (D/Q)	Total Body Dose (mrem)	Skin Dose (mrem)	Gamma Air Dose (mrad)	Beta Air Dose (mrad)	I/P/T/C-14 Dose (mrem)	Limiting Receptor
1200	SSE	1.11E-08 (1.32E-06)	3.28E-09 (6.29E-10)	3.44E-01	4.47E-01	3.56E-01	2.42E-01	1.70E-01	Bone
900	NW	7.61E-09 (1.39E-06)	5.36E-09 (7.18E-10)	3.62E-01	4.70E-01	3.74E-01	2.55E-01	1.85E-01	Bone

Gaseous Radioactive Effluent Dose Assessment Conclusion

The conservative maximum dose was 1.38E-01 mrem with the maximum receptor as the child bone which is due to the incorporation of carbon-14 in the calculation. Without C-14, the maximum dose is 5.55E-03 mrem to the infant thyroid. The noble gas limiting air doses were 3.02E-01 mrad (gamma) and 2.07E-01 mrad (beta). Noble gas plume conservative dose was 2.92E-01 mrem to the total body and 3.08E-01 to the skin mrem for the year.

A dose assessment was performed for members of the public due to their activities inside the site boundary, per ODCMS 3.10.2.f. The location where a member of the public would spend a significant amount of time inside the site boundary is the vehicle checkpoint, approximately 1,300 feet N of the PBAPS Unit 2 and Unit 3 reactor building exhaust vents. Assuming continuous occupancy, the calculated total body and skin doses were 3.85E-01 mrem and 5.01E-01 mrem, respectively. The noble gas limiting air doses were 3.99E-01 mrad (gamma) and 2.71E-01 mrad (beta). The maximum organ dose from the inhalation pathway, not including C-14, is 2.14E-03 mrem to the infant thyroid.

All doses are projected to be much less than the limits, as expected. Again, these dose models incorporate several factors of conservatism including a source term that, by procedure, will use the most dose-limiting noble gas nuclide when no fission gas can be identified by grab sample but activity is detected from the effluent radiation monitor. Exelon Nuclear uses a detailed C-14 dose projection from the Electric Power Research Institute, Technical Report 1021106. Details for the assumptions used in this calculation may be found there.[15]

Therefore, PBAPS gaseous radioactive effluent controls continue to demonstrate compliance with 10 CFR 50, Appendix I objectives for the purposes of keeping doses to members of the public "as low as is reasonably achievable". These limiting or maximum calculated doses are a small fraction of the limits in Appendix I.

[15] PBAPS uses specific Boiling Water Reactor assumptions because the fraction of C-14 that is in the CO_2 form will vary based on general plant design. This is important because the major dose pathway is through photosynthesis and, therefore, only the oxide form is relevant.

ATTACHMENT 2: EFFLUENT SUMMARY

Gaseous Effluents - Summation of All Releases

Period: January 1, 2018 through December 31, 2018 **Unit: Peach Bottom**

A. Fission & Activation Gases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Est. Total Error %
1. Total Release	Ci	1.88E+02	1.58E+02	3.65E+02	1.83E+02	4.00E+01
2. Average release For the Period	uCi/ s	2.42E+01	2.01E+01	4.59E+01	2.30E+01	
3. Gamma Air Dose	mrad	8.62E-02	6.98E-02	7.10E-02	7.49E-02	
4. Beta Air Dose	mrad	5.89E-02	4.75E-02	4.99E-02	5.10E-02	
5. Percent of ODCM limit						
Gamma Air Dose	%	8.62E-01	6.98E-01	7.10E-01	7.49E-01	
Beta Air Dose	%	2.94E-01	2.37E-01	2.49E-01	2.55E-01	

B. Iodines

1. Total I-131	Ci	2.74E-05	1.10E-04	2.70E-04	2.20E-04	1.90E+01
2. Average release For the Period	uCi/ s	3.53E-06	1.41E-05	3.39E-05	2.77E-05	
3. Percent of ODCM limit	%	*	*	*	*	

* No ODCM defined Curie Limit, therefore a percentage of the limit cannot be calculated.

C. Particulate

1. Particulates with T1/2 > 8 days	Ci	6.61E-05	5.48E-05	1.54E-04	2.56E-04	2.80E+01
2. Average release For the Period	uCi/ s	8.50E-06	6.97E-06	1.94E-05	3.22E-05	
3. Percent of ODCM limit	%	*	*	*	*	

* No ODCM defined Curie Limit, therefore a percentage of the limit cannot be calculated.

D. Tritium

1. Total Release	Ci	3.81E+00	1.76E+01	2.94E+01	1.88E+01	1.30E+01
2. Average release For the Period	uCi/ s	4.90E-01	2.24E+00	3.69E+00	2.36E+00	
3. Percent of ODCM limit	%	*	*	*	*	

* No ODCM defined Curie Limit, therefore a percentage of the limit cannot be calculated.

E. Gross Alpha

1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	4.00E+02
2. Average release For the Period	uCi/ s	<LLD	<LLD	<LLD	<LLD	
3. Percent of ODCM limit	%	*	*	*	*	

* No ODCM defined Curie Limit, therefore a percentage of the limit cannot be calculated.

F. Carbon-14

1. Total Release	Ci	9.47E+00	9.47E+00	9.47E+00	9.47E+00
2. Average release For the Period	uCi/ s	1.22E+00	1.20E+00	1.19E+00	1.19E+00

G. Iodine-131, 133 and 135, Tritium, Carbon-14 & Particulate

1. Organ Dose*	mrem	3.45E-02	3.45E-02	3.44E-02	3.44E-02
2. Percent ODCM limit	%	2.30E-01	2.30E-01	2.30E-01	2.30E-01

*C-14 contributes most significantly; therefore, the quarterly dose to the child bone is reported

Gaseous Effluents Release Point: Elevated (Main Offgas Stack)

Period: January 1, 2018 through December 31, 2018 **Unit: Peach Bottom**

Nuclides Released		Continuous Mode				Batch Mode			
1. Fission Gases	**Unit**	**Quarter 1**	**Quarter 2**	**Quarter 3**	**Quarter 4**	**Quarter 1**	**Quarter 2**	**Quarter 3**	**Quarter 4**
Unidentified	Ci	1.95E+01	4.64E+00	<LLD	3.63E+00	<LLD	<LLD	<LLD	<LLD
Ar-41	Ci	<LLD	<LLD	2.27E-01	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	5.38E+00	1.60E+00	1.52E+00	4.78E+00	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	1.11E+00	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	7.08E-01	<LLD	1.09E+00	9.86E-01	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	1.90E+00	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	1.75E+00	2.17E+01	1.69E+02	3.46E+01	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	<LLD	<LLD	4.93E+00	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	1.31E+00	1.42E+01	3.76E-02	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	1.96E+00	<LLD	6.01E+00	<LLD	<LLD	<LLD	<LLD	<LLD
Total For Period	Ci	2.93E+01	2.92E+01	2.00E+02	4.40E+01	<LLD	<LLD	<LLD	<LLD
2. Iodines									
I-131	Ci	2.52E-05	3.26E-05	7.58E-05	1.26E-04	<LLD	<LLD	<LLD	<LLD
I-132	Ci	<LLD	<LLD	1.36E-05	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	5.74E-05	9.60E-05	2.30E-04	9.75E-05	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	4.10E-05	1.10E-04	1.58E-06	<LLD	<LLD	<LLD	<LLD
Total For Period	Ci	8.26E-05	1.70E-04	4.29E-04	2.25E-04	<LLD	<LLD	<LLD	<LLD
3. Particulates									
Sr-89	Ci	2.80E-05	1.91E-05	2.91E-05	2.86E-05	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	3.79E-07	<LLD	7.16E-08	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	6.35E-06	3.51E-06	9.13E-06	8.33E-06	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	3.17E-06	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	3.06E-07	<LLD	<LLD	2.98E-07	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	5.28E-07	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	7.53E-06	2.14E-06	7.90E-06	8.55E-06	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	4.36E-07	<LLD	<LLD	3.38E-06	<LLD	<LLD	<LLD	<LLD
Total For Period	Ci	4.30E-05	2.48E-05	4.62E-05	5.29E-05	<LLD	<LLD	<LLD	<LLD
4. Tritium									
H-3	Ci	2.66E-01	8.78E-01	1.66E+00	5.13E+00	<LLD	<LLD	<LLD	<LLD
5. Gross Alpha									
Gross Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
6. Carbon-14									
C-14	Ci	9.19E+00	9.19E+00	9.19E+00	9.19E+00	<LLD	<LLD	<LLD	<LLD

Gaseous Effluents Release Point: Ground-Level (Units 2 and 3 Reactor Building Exhaust Vents and Abnormal Releases)

Period: January 1, 2018 through December 31, 2018 **Unit: Peach Bottom**

Nuclides Released		Continuous Mode				Batch Mode			
1. Fission Gases	**Unit**	**Quarter 1**	**Quarter 2**	**Quarter 3**	**Quarter 4**	**Quarter 1**	**Quarter 2**	**Quarter 3**	**Quarter 4**
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	3.19E+01	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	3.16E+00	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ar-41	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Unidentified	Ci	1.59E+02	1.29E+02	1.30E+02	1.39E+02	<LLD	<LLD	<LLD	<LLD
Total For Period	Ci	1.59E+02	1.29E+02	1.65E+02	1.39E+02	<LLD	<LLD	<LLD	<LLD
2. Iodines									
I-131	Ci	2.22E-06	7.79E-05	1.94E-04	9.41E-05	<LLD	<LLD	<LLD	<LLD
I-132	Ci	<LLD	<LLD	1.30E-04	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	1.41E-05	4.25E-04	1.14E-03	1.50E-04	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total For Period	Ci	1.63E-05	5.03E-04	1.46E-03	2.44E-04	<LLD	<LLD	<LLD	<LLD
3. Particulates									
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	6.70E-06	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	7.40E-05	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	1.61E-05	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	1.07E-05	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	2.31E-05	3.01E-05	8.81E-05	8.69E-05	<LLD	<LLD	<LLD	<LLD
Sb-124	Ci	<LLD	<LLD	<LLD	2.50E-06	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	1.31E-05	1.29E-05	<LLD	<LLD	<LLD	<LLD
Total For Period	Ci	2.31E-05	3.01E-05	1.08E-04	2.03E-04	<LLD	<LLD	<LLD	<LLD
4. Tritium									
H-3	Ci	3.54E+00	1.67E+01	2.77E+01	1.36E+01	<LLD	<LLD	<LLD	<LLD
5. Gross Alpha									
Gross Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
6. Carbon-14									
C-14	Ci	2.84E-01	2.84E-01	2.84E-01	2.84E-01	<LLD	<LLD	<LLD	<LLD

Liquid Effluents - Summation of All Releases

Period: January 1, 2018 to December 31, 2018 **Unit: Peach Bottom**

A. Fission & Activation Gases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Est. Total Error %
1. Total Release (not including tritium, gases & alpha)	Ci	1.28E-03	7.10E-04	7.44E-04	1.91E-03	1.60E+01
2. Average diluted concentration for the Period	µCi/ mL	2.17E-12	1.07E-12	1.10E-12	2.82E-12	
3. Percent of applicable limit						
Total Body Dose*	%	2.41E-03	5.59E-04	5.57E-04	1.02E-03	
Organ Dose*	%	1.05E-03	3.31E-04	3.27E-04	5.67E-04	

*ODCMS 3.8.B.2.a and ODCMS 3.8.B.2.b (page 7) define the dose limit

B. Tritium						Est. Total Error %
1. Total Release	Ci	4.62E+00	9.93E-01	1.20E+00	9.83E-01	6.40E+00
2. Average diluted concentration for the Period	µCi/ mL	7.85E-09	1.49E-09	1.78E-09	1.45E-09	
3. Percent of applicable limit*	%	7.85E-05	1.49E-05	1.78E-05	1.45E-05	

*10x 10CFR20 Limit of 1.00E-03 µCi/ mL; ODCMS 3.8.B.1.a

C. Dissolved & Entrained Gases						Est. Total Error %
1. Total Release	Ci	<LLD	<LLD	8.05E-06	<LLD	2.80E+01
2. Average diluted concentration for the Period	µCi/ mL	<LLD	<LLD	1.19E-14	<LLD	
3. Percent of ODCM limit*	%	0.00E+00	0.00E+00	5.95E-09	0.00E+00	

*ODCMS 3.8.B.1.b Limit for all noble gases is 2.00E-04 µCi/ mL

D. Gross Alpha Activity						Est. Total Error %
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	2.30E+01

E. Volume of Waste Released (prior to dilution)	Liters	1.58E+08	1.71E+08	1.73E+08	1.73E+08

F. Volume of Dilution Water Used During Period	Liters	5.88E+11	6.66E+11	6.74E+11	6.78E+11

Liquid Effluents Release Points – Liquid Radwaste, RHR Leaks and Groundwater

Period: January 1, 2018 through December 31, 2018 **Unit: Peach Bottom**

Nuclides Released		Continuous Mode				Batch Mode			
	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	9.07E-06	2.09E-07	1.57E-07	6.26E-07	3.09E-07
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	1.01E-04	3.25E-05	1.71E-05	2.55E-05	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	6.79E-04	4.45E-04	5.58E-04	1.42E-03	2.90E-06	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	9.70E-05	4.15E-05	2.32E-05	5.74E-05	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	2.55E-04	1.80E-04	1.38E-04	1.90E-04	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	4.99E-05	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Tc-99m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	4.74E-05	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-55	Ci	3.08E-05	<LLD	<LLD	1.63E-04	<LLD	<LLD	<LLD	<LLD
Sb-124	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-125	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ni-63	Ci	1.53E-05	1.07E-05	6.84E-06	4.68E-05	<LLD	<LLD	<LLD	<LLD
H-3	Ci	7.14E-01	9.93E-01	7.60E-01	9.83E-01	3.90E+00	2.76E-04	4.40E-01	6.06E-04
P-32	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	7.15E-01	9.93E-01	7.61E-01	9.85E-01	3.90E+00	2.76E-04	4.40E-01	6.06E-04
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	8.05E-06	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period (ex-tritium, gases and alpha)	Ci	1.23E-03	7.10E-04	7.44E-04	1.91E-03	5.05E-05	1.57E-07	6.26E-07	3.09E-07

ATTACHMENT 3: SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

Solid Waste Shipped

1.Type of Waste

	Units	2018	Est. error %
A: Spent Resin, Filters, Sludges, Evaporator Bottoms, etc	m^3	1.33E+02	
	Ci	5.09E+02	2.50E+01
B: Dry Compressible Waste, Contaminated Equipment, etc.	m^3	6.02E+02	
	Ci	1.89E+00	2.50E+01
C: Irradiated Components, Control Rods, etc.	m^3	0.00E+00	
	Ci	0.00E+00	2.50E+01
D: Other (Oil, SBLC)	m^3	3.09E+01	
	Ci	2.21E-03	2.50E+01

2.Estimate of Major Nuclide Composition (by type of waste)

a. Spent-Resin, Filters, Sludges, Evaporator Bottoms, etc.

Nuclide	Abundance % (no cutoff)	Activity (Ci)
H-3	3.30E-01%	1.67E+00
C-14	9.80E-01%	5.00E+00
Cr-51	0.00E+00%	1.36E-03
Mn-54	3.49E+00%	1.77E+01
Fe-55	2.79E+01%	1.42E+02
Fe-59	0.00E+00%	2.04E-04
Co-57	1.00E-02%	5.49E-02
Co-58	1.80E-01%	9.00E-01
Co-60	5.31E+01%	2.70E+02
Ni-59	0.00E+00%	1.99E-02
Ni-63	1.27E+00%	6.48E+00
Zn-65	6.21E+00%	3.16E+01
Sr-89	0.00E+00%	3.23E-03
Sr-90	2.00E-02%	1.18E-01
Zr-95	0.00E+00%	3.33E-10
Nb-95	0.00E+00%	1.98E-04
Tc-99	1.00E-02%	3.23E-02
Ru-106	0.00E+00%	5.91E-05

Nuclide	Abundance % (no cutoff)	Activity (Ci)
Ag-110m	2.50E-01%	1.26E+00
Sn-113	0.00E+00%	4.35E-05
Sb-124	0.00E+00%	2.71E-04
Sb-125	1.00E-02%	6.08E-02
I-131	0.00E+00%	6.84E-16
Cs-134	2.00E-02%	7.92E-02
Cs-137	6.17E+00%	3.14E+01
Ba-140	0.00E+00%	1.21E-10
La-140	0.00E+00%	2.59E-65
Ce-141	0.00E+00%	6.43E-06
Ce-144	4.00E-02%	2.16E-01
Pu-238	0.00E+00%	1.17E-03
Pu-239	0.00E+00%	3.07E-04
Pu-241	4.00E-02%	1.95E-01
Am-241	0.00E+00%	7.83E-04
Cm-242	0.00E+00%	8.28E-05
Cm-243	0.00E+00%	6.49E-04
Cm-244	0.00E+00%	1.46E-03

b. Dry, Compressible Waste, Contaminated Equipment, etc.

Nuclide	Abundance % (no cutoff)	Activity (Ci)
H-3	3.70E-01%	6.96E-03
C-14	3.50E-01%	6.61E-03
Cr-51	1.32E+00%	2.49E-02
Mn-54	2.33E+00%	4.40E-02
Fe-55	2.35E+01%	4.43E-01
Fe-59	4.50E-01%	8.56E-03
Co-58	5.90E-01%	1.11E-02
Co-60	6.04E+01%	1.14E+00
Ni-63	8.80E-01%	1.66E-02
Zn-65	4.41E+00%	8.32E-02
Sr-89	4.00E-02%	7.60E-04

Nuclide	Abundance % (no cutoff)	Activity (Ci)
Sr-90	0.00E+00%	8.48E-05
Nb-95	6.00E-02%	1.12E-03
Ag-110m	3.20E-01%	6.04E-03
Sb-125	4.00E-02%	6.99E-04
Cs-137	4.52E+00%	8.53E-02
Ce-144	4.10E-01%	7.75E-03
Pu-239	0.00E+00%	2.78E-07
Pu-241	0.00E+00%	7.30E-05
Am-241	0.00E+00%	2.54E-07
Cm-242	0.00E+00%	1.91E-07
Cm-244	0.00E+00%	7.37E-07

c. Irradiated Components, Control Rods, etc.

There were no shipments of irradiated components or control rods in 2018.

d. Other: Oil

Nuclide	Abundance % (no cutoff)	Activity (Ci)
H-3	3.60E-01%	8.00E-06
Cr-51	2.80E+00%	6.19E-05
Mn-54	2.08E+00%	4.59E-05
Fe-55	1.09E+01%	2.41E-04
Co-58	8.50E-01%	1.88E-05

Nuclide	Abundance % (no cutoff)	Activity (Ci)
Co-60	7.42E+01%	1.64E-03
Ni-63	7.40E-01%	1.63E-05
Zn-65	3.37E+00%	7.44E-05
Cs-137	3.86E+00%	8.52E-05
Ce-144	7.90E-01%	1.75E-05

3. Solid Waste Disposition

Number of shipments	Mode of Transportation	Destination
13	Hittman Transport Services	Energy Solution Services (CVRF) Bear Creek Operations
9	Hittman Transport Services	Energy Solution Services (GRF) Gallaher Road Operations
29	Hittman Transport Services	Energy Solutions LLC Clive Disposal Site- Containerized Waste Facility

Irradiated Fuel Shipments

No shipment of irradiated fuel was made during the reporting period of 2018.

Changes to Process Control Program (PCP)

There were no changes made to RW-AA-100 "Process Control Program for Radioactive Waste" during the 2018 reporting period.

ATTACHMENT 4: RADIOLOGICAL IMPACT ON MAN

Radiological Impact on Man

Effluent	Applicable Organ	Estimated Dose	Age Group	Location		% of Applicable Limit	Limit	Unit
				Distance (meters)	Direction (toward)			
Noble Gas	Gamma - Air Dose	3.02E-01	All	1.10E+03	SSE	1.51E+00	2.00E+01	mrad
Noble Gas	Beta - Air Dose	2.07E-01	All	1.10E+03	SSE	5.18E-01	4.00E+01	mrad
Noble Gas	Total Body (gamma)	2.92E-01	All	1.10E+03	SSE	2.92E+00	1.00E+01	mrem
Noble Gas	Skin (Beta)	3.80E-01	All	1.10E+03	SSE	1.27E+00	3.00E+01	mrem
Gaseous Iodine, Particulate, Carbon-14 & Tritium	Bone	1.38E-01	Child	1.50E+03	SW	4.60E-01	3.00E+01	mrem
Gaseous Iodine, Particulate & Tritium	Thyroid	5.55E-03	Infant	1.50E+03	SW	1.85E-02	3.00E+01	mrem
Liquid	Total Body (gamma)	1.30E-04	Child	Site Boundary		2.17E-03	6.00E+00	mrem
Liquid	GI-LLI	2.28E-04	Adult			1.14E-03	2.00E+01	mrem
Direct Radiation	Total Body	0.00E+00	All	1.19E+03	SSE	0.00E+00	2.20E+01	mrem

40 CFR 190 Doses

Effluent	Applicable Organ	Estimated Dose	Age Group	Location		% of Applicable Limit	Limit	Unit
				Distance (meters)	Direction (toward)			
Total Dose	Total Body	2.92E-01	All	1.19E+03	SSE	1.17E+00	2.50E+01	mrem
Total Dose	Thyroid	5.55E-03	All	1.19E+03	SSE	7.40E-03	7.50E+01	mrem
Total Dose	Bone	1.38E-01	All	1.19E+03	SSE	5.52E-01	2.50E+01	mrem
Total Dose	Total Body	2.92E-01	All	1.19E+03	SSE	9.73E+00	3.00E+00	mrem
Total Dose	Bone	1.38E-01	All	1.19E+03	SSE	4.60E+00	3.00E+00	mrem
Total Dose	Thyroid	3.07E-01	All	1.19E+03	SSE	5.59E-01	5.50E+01	mrem

ATTACHMENT 5: METEOROLOGICAL DATA

Peach Bottom Atomic Power Station

Period of Record: January - March 2018
Stability Class - Extremely Unstable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	1	0	0	0	2
NNE	0	10	1	0	0	0	11
NE	1	7	0	0	0	0	8
ENE	2	6	0	0	0	0	8
E	5	3	0	0	0	0	8
ESE	0	16	1	0	0	0	17
SE	0	5	0	0	0	0	5
SSE	0	3	0	0	0	0	3
S	0	5	6	1	0	0	12
SSW	0	0	6	0	0	0	6
SW	0	0	4	0	0	0	4
WSW	0	1	0	0	0	0	1
W	0	0	1	0	0	0	1
WNW	0	0	0	1	0	0	1
NW	0	0	0	2	0	0	2
NNW	0	1	1	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	8	58	21	4	0	0	91

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Peach Bottom Atomic Power Station

Period of Record: January - March 2018
Stability Class - Moderately Unstable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	4	3	0	0	0	7
NNE	0	4	1	0	0	0	5
NE	3	1	0	0	0	0	4
ENE	1	2	0	0	0	0	3
E	5	0	0	0	0	0	5
ESE	4	3	0	0	0	0	7
SE	0	5	0	0	0	0	5
SSE	0	1	1	0	0	0	2
S	1	3	4	1	0	0	9
SSW	0	3	4	0	0	0	7
SW	0	0	1	0	0	0	1
WSW	0	1	3	0	0	0	4
W	0	2	12	5	0	0	19
WNW	0	1	5	7	0	0	13
NW	0	0	7	13	0	0	20
NNW	0	1	16	13	3	0	33
Variable	0	0	0	0	0	0	0
Total	14	31	57	39	3	0	144

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Peach Bottom Atomic Power Station

Period of Record: January - March 2018
Stability Class - Slightly Unstable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	4	1	0	0	0	6
NNE	0	4	3	0	0	0	7
NE	2	1	0	0	0	0	3
ENE	1	0	0	0	0	0	1
E	2	0	0	0	0	0	2
ESE	2	3	0	0	0	0	5
SE	0	1	0	0	0	0	1
SSE	0	2	4	0	0	0	6
S	0	2	2	0	0	0	4
SSW	0	5	1	1	0	0	7
SW	0	0	0	0	0	0	0
WSW	0	0	2	0	0	0	2
W	0	1	7	0	0	0	8
WNW	0	2	8	9	0	0	19
NW	0	1	21	6	0	0	28
NNW	0	2	17	14	1	0	34
Variable	0	0	0	0	0	0	0
Total	8	28	66	30	1	0	133

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Peach Bottom Atomic Power Station

Period of Record: January - March 2018
Stability Class - Neutral - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	5	34	20	1	0	0	60
NNE	15	31	11	0	0	0	57
NE	19	21	2	0	0	0	42
ENE	21	5	0	0	0	0	26
E	15	0	0	0	0	0	15
ESE	11	12	0	0	0	0	23
SE	6	30	1	0	0	0	37
SSE	15	52	17	1	0	0	85
S	10	47	33	8	0	0	98
SSW	6	12	2	0	0	0	20
SW	4	6	4	0	0	0	14
WSW	3	6	4	0	0	0	13
W	3	18	42	6	0	0	69
WNW	3	42	56	27	0	0	128
NW	5	40	99	43	3	2	192
NNW	4	22	72	56	17	10	181
Variable	0	0	0	0	0	0	0
Total	145	378	363	142	20	12	1060

Hours of calm in this stability class: 1
Hours of missing wind measurements in this stability class: 5
Hours of missing stability measurements in all stability classes: 0

Peach Bottom Atomic Power Station

Period of Record: January - March 2018
Stability Class - Slightly Stable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	10	9	1	0	0	0	20
NNE	12	5	0	0	0	0	17
NE	14	4	0	0	0	0	18
ENE	15	0	0	0	0	0	15
E	22	4	0	0	0	0	26
ESE	31	9	0	0	0	0	40
SE	28	18	3	0	0	0	49
SSE	21	22	4	0	0	0	47
S	20	22	4	0	0	0	46
SSW	17	7	1	0	0	0	25
SW	10	8	0	0	0	0	18
WSW	10	31	3	0	0	0	44
W	14	35	9	0	0	0	58
WNW	15	36	9	0	0	0	60
NW	11	15	1	0	0	0	27
NNW	11	11	2	1	0	0	25
Variable	0	0	0	0	0	0	0
Total	261	236	37	1	0	0	535

Hours of calm in this stability class: 8
Hours of missing wind measurements in this stability class: 2
Hours of missing stability measurements in all stability classes: 0

Peach Bottom Atomic Power Station

Period of Record: January - March 2018
Stability Class - Moderately Stable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	7	1	0	0	0	0	8
NNE	1	0	0	0	0	0	1
NE	5	0	0	0	0	0	5
ENE	4	0	0	0	0	0	4
E	8	0	0	0	0	0	8
ESE	9	3	0	0	0	0	12
SE	6	2	0	0	0	0	8
SSE	1	0	0	0	0	0	1
S	5	1	0	0	0	0	6
SSW	4	0	0	0	0	0	4
SW	5	4	0	0	0	0	9
WSW	13	4	0	0	0	0	17
W	8	5	0	0	0	0	13
WNW	4	1	0	0	0	0	5
NW	6	1	0	0	0	0	7
NNW	6	2	0	0	0	0	8
Variable	0	0	0	0	0	0	0
Total	92	24	0	0	0	0	116

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Peach Bottom Atomic Power Station

Period of Record: January - March 2018
Stability Class - Extremely Stable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	0	0	0	0	0	2
NNE	2	0	0	0	0	0	2
NE	0	0	0	0	0	0	0
ENE	2	0	0	0	0	0	2
E	3	0	0	0	0	0	3
ESE	9	1	0	0	0	0	10
SE	1	0	0	0	0	0	1
SSE	5	0	0	0	0	0	5
S	1	0	0	0	0	0	1
SSW	2	0	0	0	0	0	2
SW	4	0	0	0	0	0	4
WSW	7	0	0	0	0	0	7
W	6	2	0	0	0	0	8
WNW	3	1	0	0	0	0	4
NW	8	0	0	0	0	0	8
NNW	5	0	0	0	0	0	5
Variable	0	0	0	0	0	0	0
Total	60	4	0	0	0	0	64

Hours of calm in this stability class: 1
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Peach Bottom Atomic Power Station

Period of Record: January - March 2018
Stability Class - Extremely Unstable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	3	0	0	0	3
ENE	0	1	1	0	0	0	2
E	0	0	0	0	0	0	0
ESE	0	1	1	0	0	0	2
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	2	5	0	0	0	7

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Peach Bottom Atomic Power Station

Period of Record: January - March 2018
Stability Class - Moderately Unstable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	1	0	0	0	0	1
NE	0	0	2	0	0	0	2
ENE	0	1	1	0	0	0	2
E	0	0	1	0	0	0	1
ESE	0	2	2	0	0	0	4
SE	0	0	3	1	0	0	4
SSE	0	0	1	0	0	0	1
S	0	0	0	1	0	0	1
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	4	10	2	0	0	16

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Peach Bottom Atomic Power Station

Period of Record: January - March 2018
Stability Class - Slightly Unstable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	1	0	0	0	0	1
NE	0	1	2	0	0	0	3
ENE	0	2	0	0	0	0	2
E	0	2	0	0	0	0	2
ESE	0	1	0	0	0	0	1
SE	0	1	6	0	0	0	7
SSE	0	0	0	0	0	0	0
S	0	0	2	1	0	0	3
SSW	0	0	1	2	0	0	3
SW	0	0	1	1	0	0	2
WSW	0	0	0	0	0	0	0
W	0	0	0	2	0	0	2
WNW	0	0	0	0	0	1	1
NW	0	0	0	0	0	4	4
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	8	12	6	0	5	31

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Peach Bottom Atomic Power Station

Period of Record: January - March 2018
Stability Class - Neutral - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	4	9	33	25	6	0	77
NNE	2	8	32	15	1	0	58
NE	0	11	19	16	1	0	47
ENE	1	6	15	4	0	0	26
E	2	3	7	1	0	0	13
ESE	0	11	11	6	0	0	28
SE	3	20	32	2	0	0	57
SSE	3	11	40	7	0	0	61
S	0	13	65	30	13	3	124
SSW	2	11	23	9	0	1	46
SW	1	5	9	3	0	0	18
WSW	3	2	9	12	0	0	26
W	0	6	14	33	33	6	92
WNW	2	4	17	63	45	33	164
NW	1	7	33	88	86	54	269
NNW	0	6	19	69	50	32	176
Variable	0	0	0	0	0	0	0
Total	24	133	378	383	235	129	1282

Hours of calm in this stability class: 1
Hours of missing wind measurements in this stability class: 4
Hours of missing stability measurements in all stability classes: 0

Peach Bottom Atomic Power Station

Period of Record: January - March 2018
Stability Class - Slightly Stable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	14	9	3	0	0	28
NNE	2	6	6	0	0	0	14
NE	5	8	7	4	0	0	24
ENE	6	4	3	0	0	0	13
E	4	9	4	1	0	0	18
ESE	3	17	12	3	0	0	35
SE	2	12	20	5	0	0	39
SSE	3	18	23	15	3	0	62
S	1	21	50	23	12	0	107
SSW	2	13	33	11	3	0	62
SW	0	7	6	3	0	0	16
WSW	1	2	13	14	0	0	30
W	0	4	14	24	5	0	47
WNW	2	4	18	34	14	0	72
NW	4	3	23	34	2	0	66
NNW	3	5	13	11	0	0	32
Variable	0	0	0	0	0	0	0
Total	40	147	254	185	39	0	665

Hours of calm in this stability class: 1
Hours of missing wind measurements in this stability class: 3
Hours of missing stability measurements in all stability classes: 0

Peach Bottom Atomic Power Station

Period of Record: January - March 2018
Stability Class - Moderately Stable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	1	0	0	0	0	2
NNE	0	2	1	0	0	0	3
NE	1	0	2	0	0	0	3
ENE	0	0	0	0	0	0	0
E	0	2	0	0	0	0	2
ESE	0	1	2	0	0	0	3
SE	0	2	1	2	0	0	5
SSE	0	1	3	0	0	0	4
S	1	4	2	0	0	0	7
SSW	1	2	6	1	0	0	10
SW	0	5	4	2	0	0	11
WSW	3	1	5	7	0	0	16
W	1	2	3	3	1	0	10
WNW	1	4	2	2	1	0	10
NW	0	1	1	1	0	0	3
NNW	0	2	7	1	0	0	10
Variable	0	0	0	0	0	0	0
Total	9	30	39	19	2	0	99

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Peach Bottom Atomic Power Station

Period of Record: January - March 2018
Stability Class - Extremely Stable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	2	0	0	0	0	2
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	1	0	0	0	1
SW	1	0	6	1	0	0	8
WSW	1	0	5	3	0	0	9
W	0	1	5	7	0	0	13
WNW	0	1	1	2	0	0	4
NW	1	1	2	0	0	0	4
NNW	1	2	7	0	0	0	10
Variable	0	0	0	0	0	0	0
Total	4	7	27	13	0	0	51

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Peach Bottom Atomic Power Station

Period of Record: April - June 2018
Stability Class - Extremely Unstable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	4	11	3	0	0	0	18
NNE	3	26	0	0	0	0	29
NE	9	2	0	0	0	0	11
ENE	9	4	0	0	0	0	13
E	17	4	0	0	0	0	21
ESE	7	16	4	0	0	0	27
SE	6	12	2	0	0	0	20
SSE	0	7	2	0	0	0	9
S	1	4	8	3	0	0	16
SSW	0	0	5	4	0	0	9
SW	0	0	3	1	0	0	4
WSW	0	0	0	1	0	0	1
W	0	0	1	0	0	0	1
WNW	0	0	5	2	0	0	7
NW	0	0	4	1	0	0	5
NNW	4	7	12	0	0	0	23
Variable	0	0	0	0	0	0	0
Total	60	93	49	12	0	0	214

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: April - June 2018
Stability Class - Moderately Unstable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	3	10	2	0	0	0	15
NNE	7	8	0	0	0	0	15
NE	10	0	0	0	0	0	10
ENE	14	7	0	0	0	0	21
E	6	7	0	0	0	0	13
ESE	1	2	2	0	0	0	5
SE	1	1	1	0	0	0	3
SSE	1	7	6	0	0	0	14
S	0	5	5	3	0	0	13
SSW	0	1	14	0	0	0	15
SW	0	3	9	1	0	0	13
WSW	0	0	4	2	0	0	6
W	0	2	10	2	0	0	14
WNW	0	1	9	5	2	0	17
NW	0	1	14	3	0	0	18
NNW	2	9	29	6	0	0	46
Variable	0	0	0	0	0	0	0
Total	45	64	105	22	2	0	238

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: April - June 2018
Stability Class - Slightly Unstable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	4	4	3	0	0	0	11
NNE	6	2	0	0	0	0	8
NE	6	0	0	0	0	0	6
ENE	1	5	0	0	0	0	6
E	6	0	0	0	0	0	6
ESE	1	2	1	0	0	0	4
SE	2	3	0	0	0	0	5
SSE	4	5	1	0	0	0	10
S	0	4	6	1	0	0	11
SSW	1	3	1	0	0	0	5
SW	1	1	2	0	0	0	4
WSW	0	0	3	1	0	0	4
W	0	5	3	0	0	0	8
WNW	0	2	4	2	1	0	9
NW	2	2	5	0	0	0	9
NNW	2	8	7	2	0	0	19
Variable	0	0	0	0	0	0	0
Total	36	46	36	6	1	0	125

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: April - June 2018
Stability Class - Neutral - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	31	32	7	0	0	0	70
NNE	39	20	0	0	0	0	59
NE	33	4	0	0	0	0	37
ENE	25	5	0	0	0	0	30
E	30	13	2	0	0	0	45
ESE	8	11	3	0	0	0	22
SE	13	22	6	0	0	0	41
SSE	18	53	13	0	0	0	84
S	14	31	22	1	0	0	68
SSW	5	23	6	0	0	0	34
SW	6	8	9	0	0	0	23
WSW	4	13	7	1	0	0	25
W	5	12	22	1	0	0	40
WNW	10	20	33	10	1	0	74
NW	7	20	37	6	0	0	70
NNW	21	36	29	7	0	0	93
Variable	0	0	0	0	0	0	0
Total	269	323	196	26	1	0	815

Hours of calm in this stability class: 1
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: April - June 2018
Stability Class - Slightly Stable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	37	10	0	0	0	0	47
NNE	27	9	0	0	0	0	36
NE	20	1	0	0	0	0	21
ENE	23	2	0	0	0	0	25
E	14	3	0	0	0	0	17
ESE	17	4	0	0	0	0	21
SE	36	6	0	0	0	0	42
SSE	31	27	2	0	0	0	60
S	23	24	4	0	0	0	51
SSW	24	18	0	0	0	0	42
SW	10	8	0	0	0	0	18
WSW	18	21	4	0	0	0	43
W	14	27	5	0	0	0	46
WNW	6	23	0	0	0	0	29
NW	17	34	0	0	0	0	51
NNW	25	14	1	0	0	0	40
Variable	0	0	0	0	0	0	0
Total	342	231	16	0	0	0	589

Hours of calm in this stability class: 9
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: April - June 2018
Stability Class - Moderately Stable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	6	0	0	0	0	0	6
NNE	4	0	0	0	0	0	4
NE	7	0	0	0	0	0	7
ENE	3	0	0	0	0	0	3
E	2	0	0	0	0	0	2
ESE	10	1	0	0	0	0	11
SE	3	0	0	0	0	0	3
SSE	6	1	0	0	0	0	7
S	4	0	0	0	0	0	4
SSW	4	4	0	0	0	0	8
SW	9	1	0	0	0	0	10
WSW	14	2	1	0	0	0	17
W	16	10	0	0	0	0	26
WNW	9	6	0	0	0	0	15
NW	5	1	0	0	0	0	6
NNW	4	4	0	0	0	0	8
Variable	0	0	0	0	0	0	0
Total	106	30	1	0	0	0	137

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: April - June 2018
Stability Class - Extremely Stable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	0	0	0	0	0	2
NNE	0	0	0	0	0	0	0
NE	1	0	0	0	0	0	1
ENE	1	0	0	0	0	0	1
E	4	0	0	0	0	0	4
ESE	9	0	0	0	0	0	9
SE	0	0	0	0	0	0	0
SSE	1	0	0	0	0	0	1
S	2	0	0	0	0	0	2
SSW	0	0	0	0	0	0	0
SW	2	0	0	0	0	0	2
WSW	6	6	0	0	0	0	12
W	4	4	0	0	0	0	8
WNW	2	0	0	0	0	0	2
NW	0	0	0	0	0	0	0
NNW	1	0	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	35	10	0	0	0	0	45

Hours of calm in this stability class: 6
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: April - June 2018
Stability Class - Extremely Unstable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	1	0	0	0	0	1
NE	0	3	2	0	0	0	5
ENE	0	2	1	0	0	0	3
E	0	2	0	0	0	0	2
ESE	1	1	6	0	0	0	8
SE	0	0	0	6	0	0	6
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	1	9	9	6	0	0	25

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: April - June 2018
Stability Class - Moderately Unstable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	0	0	0	0	1
NNE	0	4	2	0	0	0	6
NE	0	3	0	0	0	0	3
ENE	0	1	3	1	0	0	5
E	0	1	0	0	0	0	1
ESE	0	3	2	0	1	0	6
SE	0	0	2	2	0	0	4
SSE	0	0	0	0	0	0	0
S	0	0	0	2	1	0	3
SSW	0	0	0	0	1	0	1
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	13	9	5	3	0	30

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: April - June 2018
Stability Class - Slightly Unstable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	3	3	1	0	0	7
NNE	0	7	2	0	0	0	9
NE	0	1	1	0	0	0	2
ENE	1	3	0	1	0	0	5
E	2	5	0	0	0	0	7
ESE	0	12	2	0	0	0	14
SE	0	1	4	1	1	0	7
SSE	0	1	0	1	0	0	2
S	0	3	0	4	1	0	8
SSW	0	0	2	5	1	0	8
SW	0	0	0	3	0	0	3
WSW	0	0	1	0	1	0	2
W	0	0	1	1	1	0	3
WNW	0	0	4	5	3	0	12
NW	0	0	1	2	0	0	3
NNW	0	3	3	5	1	0	12
Variable	0	0	0	0	0	0	0
Total	3	39	24	29	9	0	104

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: April - June 2018
Stability Class - Neutral - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	6	21	29	9	1	0	66
NNE	9	16	19	6	0	0	50
NE	7	20	14	3	0	0	44
ENE	5	32	21	13	1	0	72
E	13	26	38	28	18	0	123
ESE	5	21	32	18	6	2	84
SE	2	32	36	16	5	1	92
SSE	4	16	18	17	0	0	55
S	1	27	34	34	7	0	103
SSW	0	17	25	19	0	0	61
SW	4	4	17	17	2	0	44
WSW	1	4	13	15	2	0	35
W	2	7	17	25	14	1	66
WNW	1	3	7	48	27	11	97
NW	1	12	27	34	26	3	103
NNW	2	21	42	46	9	0	120
Variable	0	0	0	0	0	0	0
Total	63	279	389	348	118	18	1215

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: April - June 2018
Stability Class - Slightly Stable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	12	13	2	0	0	28
NNE	0	8	26	1	0	0	35
NE	0	5	11	2	0	0	18
ENE	3	13	7	2	0	0	25
E	4	16	12	9	1	0	42
ESE	1	15	16	4	0	0	36
SE	2	19	14	1	0	0	36
SSE	2	22	28	15	0	0	67
S	2	22	11	14	2	0	51
SSW	5	21	37	21	0	0	84
SW	3	15	20	10	1	0	49
WSW	1	7	8	19	2	0	37
W	1	3	5	14	4	0	27
WNW	1	2	5	21	7	0	36
NW	1	5	13	24	3	0	46
NNW	0	8	15	17	1	0	41
Variable	0	0	0	0	0	0	0
Total	27	193	241	176	21	0	658

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: April - June 2018
Stability Class - Moderately Stable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	2	0	0	0	3
NNE	1	0	0	0	0	0	1
NE	2	2	1	0	0	0	5
ENE	0	2	0	0	0	0	2
E	0	5	2	0	0	0	7
ESE	0	3	2	0	0	0	5
SE	1	2	0	0	0	0	3
SSE	3	2	0	0	0	0	5
S	2	0	1	0	0	0	3
SSW	2	5	8	1	0	0	16
SW	1	4	8	1	0	0	14
WSW	1	4	2	0	0	0	7
W	0	2	2	5	0	0	9
WNW	0	1	3	4	2	0	10
NW	1	1	7	4	0	0	13
NNW	1	3	4	1	0	0	9
Variable	0	0	0	0	0	0	0
Total	15	37	42	16	2	0	112

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: April - June 2018
Stability Class - Extremely Stable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	0	0	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	1	0	0	0	1
SW	0	0	6	0	0	0	6
WSW	1	1	11	1	0	0	14
W	0	0	1	1	1	0	3
WNW	0	2	1	2	1	0	6
NW	0	3	0	0	0	0	3
NNW	1	0	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	3	6	20	4	2	0	35

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Period of Record: July - September 2018
Stability Class - Extremely Unstable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	6	14	0	0	0	0	20
NNE	7	17	0	0	0	0	24
NE	15	1	0	0	0	0	16
ENE	13	1	0	0	0	0	14
E	14	0	0	0	0	0	14
ESE	4	5	0	0	0	0	9
SE	3	10	0	0	0	0	13
SSE	1	23	8	0	0	0	32
S	0	4	5	0	0	0	9
SSW	0	2	5	0	0	0	7
SW	0	2	2	0	0	0	4
WSW	0	1	1	0	0	0	2
W	0	1	0	0	0	0	1
WNW	0	0	0	0	0	0	0
NW	0	2	0	0	0	0	2
NNW	0	1	2	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	63	84	23	0	0	0	170

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Peach Bottom Atomic Power Station

Period of Record: July - September 2018
Stability Class - Moderately Unstable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	5	19	0	0	0	0	24
NNE	13	8	0	0	0	0	21
NE	9	0	0	0	0	0	9
ENE	14	0	0	0	0	0	14
E	6	0	0	0	0	0	6
ESE	1	1	0	0	0	0	2
SE	3	2	2	0	0	0	7
SSE	1	15	3	0	0	0	19
S	1	10	7	0	0	0	18
SSW	0	12	6	0	0	0	18
SW	0	2	2	0	0	0	4
WSW	0	2	1	0	0	0	3
W	0	2	0	0	0	0	2
WNW	0	3	0	0	0	0	3
NW	0	1	1	0	0	0	2
NNW	2	20	18	0	0	0	40
Variable	0	0	0	0	0	0	0
Total	55	97	40	0	0	0	192

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Peach Bottom Atomic Power Station

Period of Record: July - September 2018
Stability Class - Slightly Unstable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	4	5	0	0	0	0	9
NNE	4	6	0	0	0	0	10
NE	4	0	0	0	0	0	4
ENE	7	0	0	0	0	0	7
E	3	0	0	0	0	0	3
ESE	2	0	0	0	0	0	2
SE	0	1	0	0	0	0	1
SSE	0	5	6	0	0	0	11
S	1	9	3	0	0	0	13
SSW	2	4	1	0	0	0	7
SW	0	2	0	0	0	0	2
WSW	0	2	1	0	0	0	3
W	0	3	0	0	0	0	3
WNW	0	3	0	0	0	0	3
NW	0	1	0	0	0	0	1
NNW	3	10	3	0	0	0	16
Variable	0	0	0	0	0	0	0
Total	30	51	14	0	0	0	95

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Peach Bottom Atomic Power Station

Period of Record: July - September 2018
Stability Class - Neutral - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	52	24	11	0	0	0	87
NNE	44	27	0	0	0	0	71
NE	40	1	0	0	0	0	41
ENE	28	0	0	0	0	0	28
E	23	0	0	0	0	0	23
ESE	9	5	0	0	0	0	14
SE	6	21	9	0	0	0	36
SSE	7	60	51	0	0	0	118
S	10	49	12	0	0	0	71
SSW	9	23	0	0	0	0	32
SW	5	9	4	0	0	0	18
WSW	6	15	3	0	0	0	24
W	4	16	1	0	0	0	21
WNW	9	26	2	0	0	0	37
NW	14	13	4	0	0	0	31
NNW	23	44	14	0	0	0	81
Variable	0	0	0	0	0	0	0
Total	289	333	111	0	0	0	733

Hours of calm in this stability class: 3
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Peach Bottom Atomic Power Station

Period of Record: July - September 2018
Stability Class - Slightly Stable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	40	23	1	0	0	0	64
NNE	47	19	1	0	0	0	67
NE	29	1	0	0	0	0	30
ENE	21	0	0	0	0	0	21
E	32	5	0	0	0	0	37
ESE	17	3	0	0	0	0	20
SE	19	8	0	0	0	0	27
SSE	29	12	1	0	0	0	42
S	36	20	0	0	0	0	56
SSW	30	7	0	0	0	0	37
SW	20	10	3	0	0	0	33
WSW	30	20	1	0	0	0	51
W	28	21	2	0	0	0	51
WNW	26	14	0	0	0	0	40
NW	36	28	1	0	0	0	65
NNW	31	25	3	0	0	0	59
Variable	0	0	0	0	0	0	0
Total	471	216	13	0	0	0	700

Hours of calm in this stability class: 29
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Peach Bottom Atomic Power Station

Period of Record: July - September 2018
Stability Class - Moderately Stable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	4	0	0	0	0	0	4
NNE	3	0	0	0	0	0	3
NE	4	0	0	0	0	0	4
ENE	3	0	0	0	0	0	3
E	6	0	0	0	0	0	6
ESE	2	0	0	0	0	0	2
SE	0	0	0	0	0	0	0
SSE	4	0	0	0	0	0	4
S	5	1	0	0	0	0	6
SSW	16	1	0	0	0	0	17
SW	19	0	0	0	0	0	19
WSW	43	5	0	0	0	0	48
W	45	4	0	0	0	0	49
WNW	23	1	0	0	0	0	24
NW	14	5	0	0	0	0	19
NNW	8	2	0	0	0	0	10
Variable	0	0	0	0	0	0	0
Total	199	19	0	0	0	0	218

Hours of calm in this stability class: 22
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Peach Bottom Atomic Power Station

Period of Record: July - September 2018
Stability Class - Extremely Stable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	1	0	0	0	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	1	0	0	0	0	0	1
SW	4	0	0	0	0	0	4
WSW	17	11	0	0	0	0	28
W	6	3	0	0	0	0	9
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	29	14	0	0	0	0	43

Hours of calm in this stability class: 2
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Peach Bottom Atomic Power Station

Period of Record: July - September 2018
Stability Class - Extremely Unstable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	2	0	0	0	2
ENE	0	3	1	1	0	0	5
E	0	5	0	0	0	0	5
ESE	0	3	8	0	0	0	11
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	11	11	1	0	0	23

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Peach Bottom Atomic Power Station

Period of Record: July - September 2018
Stability Class - Moderately Unstable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	1	0	0	0	3
NNE	0	4	0	0	0	0	4
NE	0	1	0	0	0	0	1
ENE	0	1	0	0	0	0	1
E	0	3	0	0	0	0	3
ESE	0	6	4	0	0	0	10
SE	0	0	6	0	0	0	6
SSE	0	0	0	0	0	0	0
S	0	1	0	0	0	0	1
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	18	11	0	0	0	29

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Peach Bottom Atomic Power Station

Period of Record: July - September 2018
Stability Class - Slightly Unstable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	4	0	0	0	4
NNE	1	4	1	0	0	0	6
NE	2	5	0	0	0	0	7
ENE	1	5	0	0	0	0	6
E	0	5	0	0	0	0	5
ESE	0	2	2	1	0	0	5
SE	0	2	10	0	0	0	12
SSE	0	0	1	0	0	0	1
S	0	2	3	0	0	0	5
SSW	0	0	4	1	0	0	5
SW	0	1	2	0	0	0	3
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	1	0	0	1
Variable	0	0	0	0	0	0	0
Total	4	26	27	3	0	0	60

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Peach Bottom Atomic Power Station

Period of Record: July - September 2018
Stability Class - Neutral - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	9	32	13	12	1	0	67
NNE	5	24	8	14	5	0	56
NE	18	22	14	11	1	0	66
ENE	18	27	24	12	0	0	81
E	12	26	33	13	1	0	85
ESE	7	11	25	27	1	0	71
SE	5	16	35	57	6	0	119
SSE	2	11	32	17	0	0	62
S	1	10	51	27	0	0	89
SSW	1	8	44	9	0	0	62
SW	1	12	14	3	0	0	30
WSW	2	9	17	2	1	0	31
W	1	5	23	1	0	0	30
WNW	2	6	23	5	0	0	36
NW	3	18	15	13	0	0	49
NNW	6	28	48	19	0	0	101
Variable	0	0	0	0	0	0	0
Total	93	265	419	242	16	0	1035

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Peach Bottom Atomic Power Station

Period of Record: July - September 2018
Stability Class - Slightly Stable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	3	17	33	14	0	0	67
NNE	5	12	12	4	0	0	33
NE	1	13	9	6	1	3	33
ENE	6	37	23	1	3	2	72
E	2	22	17	18	0	0	59
ESE	7	13	23	6	2	0	51
SE	6	11	10	3	0	0	30
SSE	7	18	20	6	0	0	51
S	7	29	43	16	1	0	96
SSW	4	24	36	11	0	0	75
SW	3	16	16	2	2	0	39
WSW	2	15	14	6	1	0	38
W	4	10	21	20	0	0	55
WNW	6	8	9	5	1	0	29
NW	4	11	10	22	0	0	47
NNW	3	9	19	18	0	0	49
Variable	0	0	0	0	0	0	0
Total	70	265	315	158	11	5	824

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Peach Bottom Atomic Power Station

Period of Record: July - September 2018
Stability Class - Moderately Stable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	3	5	2	0	0	0	10
NNE	2	1	1	0	0	0	4
NE	3	1	0	0	0	0	4
ENE	4	1	0	0	0	0	5
E	2	0	1	0	0	0	3
ESE	2	2	0	0	0	0	4
SE	1	6	3	0	0	0	10
SSE	0	5	4	0	0	0	9
S	2	9	8	0	0	0	19
SSW	2	10	8	0	0	0	20
SW	2	12	4	1	0	0	19
WSW	0	10	8	5	0	0	23
W	1	9	16	2	0	0	28
WNW	2	5	6	1	0	0	14
NW	11	6	14	5	0	0	36
NNW	4	6	5	2	0	0	17
Variable	0	0	0	0	0	0	0
Total	41	88	80	16	0	0	225

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Peach Bottom Atomic Power Station

Period of Record: July - September 2018
Stability Class - Extremely Stable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	0	0	0	0	2
NNE	0	1	0	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	1	0	0	0	1
WSW	0	0	1	0	0	0	1
W	0	0	2	0	0	0	2
WNW	0	0	0	0	0	0	0
NW	0	0	1	0	0	0	1
NNW	0	3	0	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	0	6	5	0	0	0	11

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Period of Record: October – December 2018
Stability Class - Extremely Unstable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	2	0	0	0	0	0	2
E	6	1	0	0	0	0	7
ESE	2	4	0	0	0	0	6
SE	0	4	0	0	0	0	4
SSE	0	0	0	0	0	0	0
S	0	1	2	0	0	0	3
SSW	0	0	2	0	0	0	2
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	3	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	10	10	7	0	0	0	27

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: October – December 2018
Stability Class - Moderately Unstable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	3	0	0	0	3
NNE	1	0	0	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	8	0	0	0	0	0	8
E	5	1	0	0	0	0	6
ESE	4	3	0	0	0	0	7
SE	0	6	0	0	0	0	6
SSE	0	1	0	0	0	0	1
S	0	7	4	0	0	0	11
SSW	0	2	4	0	0	0	6
SW	0	1	2	0	0	0	3
WSW	0	1	5	0	0	0	6
W	0	1	5	1	0	0	7
WNW	0	2	2	2	0	0	6
NW	0	1	9	0	0	0	10
NNW	0	6	24	9	0	0	39
Variable	0	0	0	0	0	0	0
Total	18	32	58	12	0	0	120

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: October – December 2018
Stability Class - Slightly Unstable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	0	0	0	0	1
NNE	1	1	1	0	0	0	3
NE	3	0	0	0	0	0	3
ENE	1	0	0	0	0	0	1
E	3	0	0	0	0	0	3
ESE	1	0	0	0	0	0	1
SE	2	1	2	0	0	0	5
SSE	0	3	3	0	0	0	6
S	2	4	5	0	0	0	11
SSW	0	1	2	0	0	0	3
SW	0	2	1	0	0	0	3
WSW	0	3	2	0	0	0	5
W	0	2	10	1	0	0	13
WNW	0	8	13	11	0	0	32
NW	0	3	4	1	0	0	8
NNW	0	5	16	4	0	0	25
Variable	0	0	0	0	0	0	0
Total	13	34	59	17	0	0	123

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: October – December 2018
Stability Class - Neutral - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	13	26	3	0	0	0	42
NNE	23	23	4	0	0	0	50
NE	27	18	0	0	0	0	45
ENE	22	8	0	0	0	0	30
E	26	5	0	0	0	0	31
ESE	18	16	1	0	0	0	35
SE	15	33	10	3	0	0	61
SSE	23	48	8	1	0	0	80
S	15	34	20	3	0	0	72
SSW	11	24	5	0	0	0	40
SW	10	14	6	0	0	0	30
WSW	8	20	3	0	0	0	31
W	4	39	27	1	0	0	71
WNW	4	39	94	26	0	0	163
NW	7	40	78	14	0	0	139
NNW	5	26	79	14	0	0	124
Variable	0	0	0	0	0	0	0
Total	231	413	338	62	0	0	1044

Hours of calm in this stability class: 1
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: October – December 2018
Stability Class - Slightly Stable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	14	9	0	0	0	0	23
NNE	4	3	1	0	0	0	8
NE	18	10	0	0	0	0	28
ENE	26	12	0	0	0	0	38
E	31	5	0	0	0	0	36
ESE	27	4	0	0	0	0	31
SE	37	11	2	0	0	0	50
SSE	19	14	0	0	0	0	33
S	19	13	1	0	0	0	33
SSW	14	6	0	0	0	0	20
SW	12	10	0	0	0	0	22
WSW	22	53	1	0	0	0	76
W	21	77	11	0	0	0	109
WNW	14	44	1	0	0	0	59
NW	15	33	2	0	0	0	50
NNW	11	29	2	1	0	0	43
Variable	0	0	0	0	0	0	0
Total	304	333	21	1	0	0	659

Hours of calm in this stability class: 9
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: October – December 2018
Stability Class - Moderately Stable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	4	0	0	0	0	0	4
NNE	4	0	0	0	0	0	4
NE	3	0	0	0	0	0	3
ENE	3	0	0	0	0	0	3
E	11	2	0	0	0	0	13
ESE	18	0	0	0	0	0	18
SE	5	0	0	0	0	0	5
SSE	3	0	0	0	0	0	3
S	6	0	0	0	0	0	6
SSW	3	0	0	0	0	0	3
SW	3	4	0	0	0	0	7
WSW	18	22	0	0	0	0	40
W	28	15	0	0	0	0	43
WNW	9	1	0	0	0	0	10
NW	5	2	0	0	0	0	7
NNW	10	0	0	0	0	0	10
Variable	0	0	0	0	0	0	0
Total	133	46	0	0	0	0	179

Hours of calm in this stability class: 10
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: October – December 2018
Stability Class - Extremely Stable - 150Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	1	0	0	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	2	0	0	0	0	0	2
SSE	1	0	0	0	0	0	1
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	4	1	0	0	0	0	5
WSW	6	8	0	0	0	0	14
W	3	4	0	0	0	0	7
WNW	1	0	0	0	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	18	13	0	0	0	0	31

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: October – December 2018
Stability Class - Extremely Unstable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: October – December 2018
Stability Class - Moderately Unstable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	1	0	0	0	1
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	1	0	0	0	1

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: October – December 2018
Stability Class - Slightly Unstable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	1	0	0	0	0	1
ESE	0	2	0	0	0	0	2
SE	0	0	2	0	0	0	2
SSE	0	0	0	0	0	0	0
S	0	0	0	1	0	0	1
SSW	0	0	2	0	0	0	2
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	1	0	0	1
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	3	4	2	0	0	9

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: October – December 2018
Stability Class - Neutral - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	10	17	12	0	0	41
NNE	2	11	14	4	0	0	31
NE	0	10	5	9	6	0	30
ENE	6	8	12	10	1	0	37
E	7	12	8	3	0	0	30
ESE	10	21	12	10	0	0	53
SE	1	25	29	23	2	4	84
SSE	1	7	25	9	1	0	43
S	2	21	34	27	16	0	100
SSW	2	2	24	14	0	0	42
SW	0	10	21	8	1	0	40
WSW	0	8	17	12	1	0	38
W	0	6	19	37	32	3	97
WNW	0	10	27	77	71	19	204
NW	1	9	29	94	38	18	189
NNW	1	5	42	52	12	3	115
Variable	0	0	0	0	0	0	0
Total	35	175	335	401	181	47	1174

Hours of calm in this stability class: 1
Hours of missing wind measurements in this stability class: 3
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: October - December 2018
Stability Class - Slightly Stable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	8	13	4	0	0	26
NNE	4	8	6	3	0	0	21
NE	0	5	12	3	2	0	22
ENE	3	8	11	11	3	0	36
E	2	13	17	1	0	0	33
ESE	1	11	31	7	1	0	51
SE	2	19	36	8	0	2	67
SSE	0	27	23	7	0	0	57
S	2	20	36	11	1	0	70
SSW	1	11	23	4	0	0	39
SW	1	6	17	20	0	0	44
WSW	1	9	15	18	4	0	47
W	3	8	24	52	3	1	91
WNW	0	10	22	52	4	0	88
NW	0	7	20	37	5	0	69
NNW	2	9	30	15	2	0	58
Variable	0	0	0	0	0	0	0
Total	23	179	336	253	25	3	819

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 1
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: October – December 2018
Stability Class - Moderately Stable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	3	6	2	0	0	0	11
NNE	0	2	1	0	0	0	3
NE	0	2	0	0	0	0	2
ENE	0	2	0	0	0	0	2
E	0	2	0	0	0	0	2
ESE	0	3	2	1	0	0	6
SE	0	6	7	1	0	0	14
SSE	0	9	9	0	0	0	18
S	0	3	4	0	0	0	7
SSW	3	4	5	0	0	0	12
SW	2	2	2	1	0	0	7
WSW	3	3	4	3	0	0	13
W	0	4	14	6	6	0	30
WNW	2	3	12	7	1	0	25
NW	1	3	6	3	0	0	13
NNW	1	7	2	0	0	0	10
Variable	0	0	0	0	0	0	0
Total	15	61	70	22	7	0	175

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Peach Bottom Atomic Power Station

Period of Record: October – December 2018
Stability Class - Extremely Stable - 316Ft-33Ft Delta-T (F)
Winds Measured at 320 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	0	0	0	0	1
NNE	0	1	0	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	1	0	0	0	1
SSE	0	1	1	1	0	0	3
S	0	2	0	0	0	0	2
SSW	0	0	0	0	0	0	0
SW	0	1	0	0	0	0	1
WSW	0	1	1	0	0	0	2
W	0	0	5	2	0	0	7
WNW	0	1	0	1	0	0	2
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	8	8	4	0	0	20

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5