Enclosure A
L-15-104

2014 Radioactive Effluent Release Report
and
2014 Annual Radiological Environmental Operating Report
(Reports follow)

RTL# A9.690E

FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION

2014 RADIOACTIVE EFFLUENT RELEASE REPORT

AND

2014 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

UNITS NO. 1 AND 2

LICENSES DPR-66 AND NPF-73

BEAVER VALLEY POWER STATION

ENVIRONMENTAL & CHEMISTRY SECTION

Technical Report Approval:

2014 RADIOACTIVE EFFLUENT RELEASE REPORT

AND

2014 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

UNITS NO. 1 AND 2

LICENSES DPR-66 AND NPF-73

Prepared by: Rebecca E. Novak Rebecca Novak Date: 4/16/15

Prepared by: Alyssa M. Hartung, Ph.D. Alyssa M. Hartung, PhD Date: 4/16/15

Reviewed by: Beth H. Furdak Beth H Furdak Date: 4/16/15

Approved by: Donald J. Salera Donald J Salera Date: 4-16-15

Subject: **Beaver Valley Power Station, Unit Nos. 1 and 2**
BV-1 Docket No. 50-334, License No. DPR-66
BV-2 Docket No. 50-412, License No. NPF-73
Radioactive Effluent Release Report for 2014, and
Annual Radiological Environmental Operating Report for 2014

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Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222

INPO
700 Galleria Parkway SE
Suite 100
Atlanta, GA 30339-5957

Beaver County Cooperative Extension
156 Cowpath Road
Aliquippa, PA 15001-5842

Hancock County Office of Emergency Services
PO Box 884
New Cumberland, WV 20647

Ohio Department of Health
246 North High Street
Columbus, OH 43266-0288

Ohio Emergency Management Agency
2855 West Dublin Granville Road
Columbus, OH 43235

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2220 Michigan Avenue
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Bureau of Radiation Protection HP3
Ohio Department of Health
Northeast District Office
161 South High Street, Suite 400
Akron, OH 44308-1612

Copies of Report for FENOC Addressees:

DJ Salera, BVPS; Manager, Site Chemistry (A-BV-A)
BH Furdak, BVPS; Supervisor, Nuclear Chemistry Services (A-BV-A)
R Novak, BVPS; Chemistry REMP and RETS Administrator (A-BV-A) 10 copies
PH Lashley, Akron; Fleet Licensing (A-WAC-B1) 2 copies
JB Bowden, BVPS; Operations Oversight (A-BV-NCD3)
K Gillespie, BVPS, Radiation Monitor System Engineer (A-BV-SOSB6)
TJ Ponticel, BVPS, Liquid Waste System Engineer (A-BV-SOSB6)
Z Warhol, BVPS, BOP Systems Engineer Supervisor (A-BV-SOSB-6)
RL Evans, Akron; Director, Environmental (A-GO-13)
DW Jenkins, Akron; Sr. Attorney II, Legal (A-GO-15)
M Hall, Akron; Vice President, Energy Policy (A-GO-18)
MJ Jirousek, Akron; Manager, Environmental Generation Services (A-GO-13)
GW Gillespie, Akron; Fleet Chemistry/Environmental (A-WAC-A3)
JB Burnett, Perry RETS & REMP Administrator (A-PY-CCB125)
AM Percival, Davis-Besse RETS & REMP Administrator (A-DB-1041)
B Grob, Manager, Environmental, Inc.
RJ Dinello, Field Specialist, Environmental, Inc

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Annual Radiological Environmental Operating Report

Form 1/2-ENV-01.05.F01 (page 1 of 39), Rev 3
Beaver Valley Power Station - Units 1 & 2

2014 Radioactive Effluent Release Report

FirstEnergy Nuclear Operating Company
FENOC

Beaver Valley Power Station - Units 1 & 2
Unit 1 License No. DPR-66
Unit 2 License No. NPF-73

Radioactive Effluent Release Report

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Note: The Total Error values (%) listed in this report are documented in Calculation Package No. ERS-ATL-04-002

Radioactive Effluent Release Report

Calendar Year - 2014

Executive Summary - Report Submittal Requirements

Report Submittal and Requirements: The report was prepared and submitted in accordance with the requirements contained in the following documents:

BVPS Integrated Technical Specifications, Administrative Control 5.6.2

Offsite Dose Calculation Manual (ODCM) procedure 1/2-ODC-3.03, "*Controls for RETS and REMP Programs*", Attachment U, Control 6.9.3

BVPS procedure 1/2-ENV-01.05, *"Compliance with Regulatory Guide 1.21 and Technical Specifications"*

NUREG-1301, "*Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors, Generic Letter 89-01, Supplement No.1, April 1991"*

Regulatory Guide 1.21, "*Measuring Evaluating and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Material in Liquid and Gaseous Effluents from Light-Water Cooled Nuclear Power Plants, Revision 1, June 1974"*

BVPS Condition Report No. CR2014-01024, Loss of sample flow on RM-1GW-108
BVPS Condition Report No. CR2014-01290, Liquid waste discharge secured due to 2SGC-RQI100 sample pump trip
BVPS Condition Report No. CR2014-04159, Rad Monitor channel check not performed
BVPS Condition Report No. CR2014-06776, RM-1VS-101B Low sample flow in alarm
BVPS Condition Report No. CR2014-07023, RM-1VS-107B Low flow alarm will not clear
BVPS Condition Report No. CR2014-07542, RM-1GW-109 channels 3-7 and 3-9 are NONFUNCTIONAL
BVPS Condition Report No. CR2014-08937, RM-1MS-100C (C Main Steam Rad Monitor) declared nonfunctional due to multiple High-High alarm spikes
BVPS Condition Report No. CR2014-09085, RM-1VS-101B Sample flow low out of spec
BVPS Condition Report No. CR2014-10483, Iodine 131 indentified in Unit 2 Lift Station
BVPS Condition Report No. CR2014-12240, Spent S/G Blowdown Resin found on ground in South Yard
BVPS Condition Report No. CR2014-12534, Repeated tripping of RM-1DA-100 sample pump
BVPS Condition Report No. CR2014-12723, Ni-63 identified in Groundwater Remediation
BVPS Condition Report No. CR2014-13719, Unit 2 plant rad monitor indications failed
BVPS Condition Report No. CR2014-15056, REMP Drinking water sample damaged in transit results in missed surveillance.
BVPS Condition Report No. CR2014-15147, Groundwater extraction well showing increase in tritium
BVPS Condition Report No. CR2014-16110, Abnormal trend in MW-16
BVPS Condition Report No. CR2014-16253, FR-1LW-103 indicates 1.4 gpm flow while no flow exists
BVPS Condition Report No. CR2014-16348, Groundwater samples that were not obtained for spring and fall sampling
BVPS Condition Report No. CR2014-16651, FR-1LW-103 indicates flow erroneously
BVPS Condition Report No. CR2014-17177, FR-1VS-101 Sample Flow indicates low out of expected range
BVPS Condition Report No. CR2014-18482, NRC Radiation Effluent Inspection - Inconsistencies in stated height of gaseous waste discharge release point
BVPS Condition Report No. CR2014-18499, 2014 NRC Radiation Effluent Inspection - Xe-138 Sample Data from February 2013
BVPS Condition Report No. CR2014-18702, SPING Rad Monitors exceed 30 days OOS.
BVPS SAP Order No. 600873875, 2014 RETS and REMP Report

Radioactive Effluent Release Report

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Executive Summary - Liquid and Gaseous Effluent Control (Part 1 of 2)

Onsite Groundwater Monitoring: Twenty (20) onsite monitoring wells were sampled in the spring, twenty-four (24) on-site monitoring wells were sampled in the fall and twenty (20) on-site monitoring wells were sampled in the winter. Four (4) wells (MW-1, MW-12S, MW-12D, and P-3) could not be sampled in the spring due to access issues and equipment failures. One (1) well sample (MW-1) could not be sampled in the fall due to access issues (CR 2014-16348). MW-1 will be retired in 2015. Sixteen (16) wells returned results of less than the pre-operational mean (440 pCi/L) during all sample periods in 2014. Five (5) wells returned results >440 pCi/L, but <2000 pCi/L. Four (4) wells returned results >2000 pCi/L. One (1) well exceeded 20,000 pCi/L with the highest concentration recorded as 23,201 pCi/L (CR 2014-15147). The tritium concentration in monitoring well MW-16 showed an increasing tritium trend from 8,789 pCi/L in Spring to 23,201 pCi/L in the Fall. The remedation well, EW-1, also showed an increase in tritium from the Spring to Fall 2014 (CR 2014-16110). Sampling in MW-16 was increased to a monthly frequency and an extra set of samples were taken at 19 other monitoring wells.

No adverse effect to the offsite environment has been detected at this time, because all offsite groundwater, drinking water and surface water samples were <440 pCi/L. See Enclosure 2, Page xvii for additional details.

Onsite Spills: There were no onsite spills >100 gallons.

Decommissioning File Update: There was one item added to the site decommissioning files in accordance with 10CFR50.75(g). This item included Licensed Radioactive Material identified in U2 System Generator Resin that was spilled on the ground in the South Yard. See Enclosure 2, Page xvi for additional details.

Abnormal Liquid Releases: There were no abnormal liquid releases.

Abnormal Gaseous Releases: There were no abnormal gaseous releases.

Liquid Radwaste Treatment System: The site operated via a shared Liquid Radwaste Treatment System, even though each Unit has its own ion-exchange vessels. Shared operation allowed either Unit to process liquid waste at the Unit of origin, or at the other Unit. Typically, when Unit 1 or 2 high level liquid waste was processed (e.g., coolant recovery waste) it was performed at Unit 1, because it has a carbon pre-conditioning filter.

Gaseous Radwaste Treatment System: The site operated via a shared Gaseous Radwaste Treatment System, even though each Unit has its own charcoal delay beds and storage/decay tanks. Shared operation allowed either Unit to process gaseous waste at the Unit of origin, or at the other Unit. Since Unit 2 has four (4) additional storage tanks, gaseous waste was tranferred from storage/ decay at Unit 2 when either Unit went to a shutdown condition.

Radioactive Effluent Release Report

Calendar Year - 2014

Executive Summary - Liquid and Gaseous Effluent Control (Part 1 of 2)

Lower Limits of Detectability (LLD): All a-priori calculated LLD met the minimum requirements specified in the ODCM.

Effluent Monitoring Channels Inoperable >30 Days: There was one (1) Effluent Monitoring Instrumentation Channels not returned to Operable status within 30 days. See Enclosure 2, Page 18 for details.

ODCM Surveillance Deficiencies: There were two ODCM Surveillance Deficiency in the reporting period and a follow up to one reported previously. See Page 20 for details.

ODCM Changes: There were two changes made to the ODCM during the report period. See ODCM procedure 1/2-ODC-1.01, "ODCM: Index, Matrix and History ODCM Changes" for a complete description of the change and the change justification. All changes maintain the level of radioactive effluent control required by 10 CFR 20.1302, 40 CFR Part 190, 10 CFR 50.36a, and Appendix I to 10 CFR 50. Detailed descriptions of the ODCM changes are provided in Enclosure 2, Page 21 Table 9 and Attachment 2.

Meteorological Data Recovery: The Meteorological Data Recovery met the minimum requirement of at-least 90%, as specified in Section 5 of Revision 1 to Regulatory Guide 1.23, Meteorological Monitoring Programs for Nuclear Power Plants.

Population Dose vs. Natural Background: The 0-50 mile total and average population doses were calculated using liquid and gaseous release quantities and real time meteorology. The average population dose is based on four (4) million people within 0-50 miles of the BVPS site. The following comparison to natural background radiation demonstrates that BVPS operations did not adversely affect the surrounding environment.

72 man-mrem =BVPS Total Population Dose for the year

0.0000179 mrem = BVPS Average Individual Dose for the year

296 mrem = Natural Background Individual Dose for the year. This dose value is documented as natural background radiation exposure for an individual in a year from the 1990 BEIR V Report.

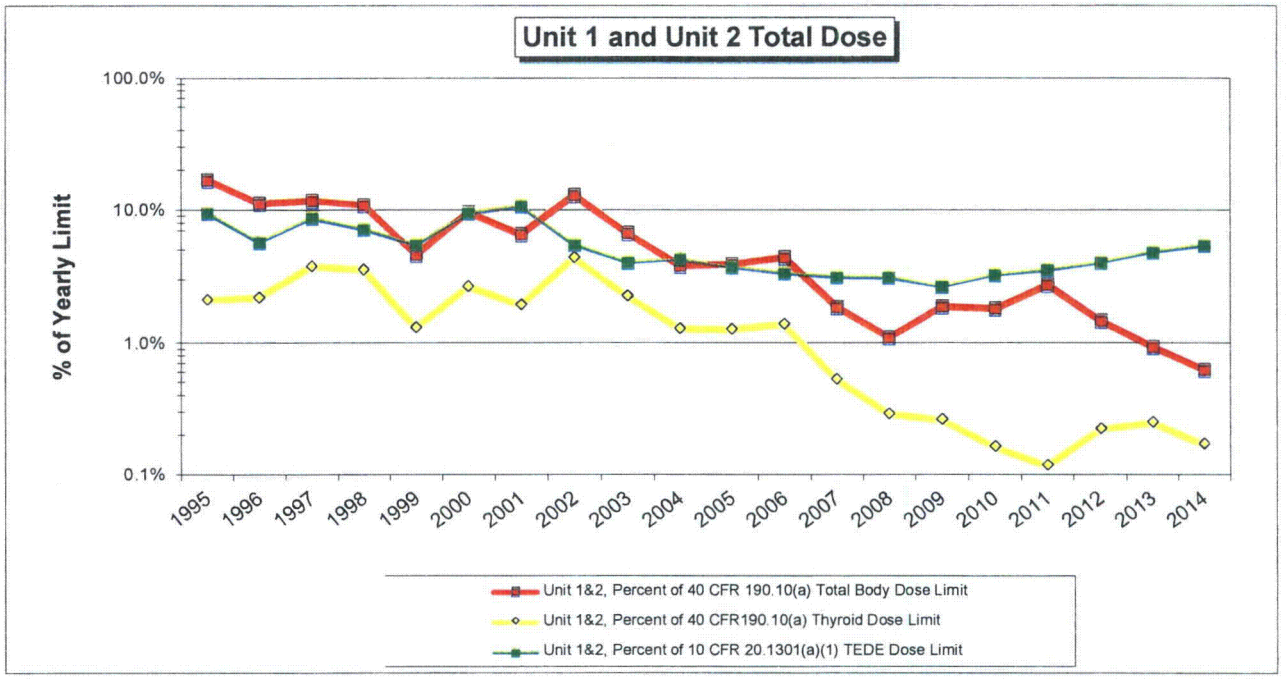
Carbon-14 Dose Assessment: Carbon-14 dose was calculated using actual sample measurements from gaseous release quantities and the default ODCM receptor. The highest organ doses were to the bone (child). Details of the dose assessment due to releases of Carbon-14 in gaseous effluents are provided in Attachment 3 of this report.

Radioactive Effluent Release Report

Calendar Year - 2014

Executive Summary - Trends of Total Dose

Trends of Total Dose: The following graph provides a comparison of the ODCM dose projections from all facility releases and direct radiation exposures to show compliance with Member of the Public dose limits from 10 CFR 20.1301 and 40 CFR Part 190. The graph reflects the results of the efforts to stabilize and reduce offsite dose.

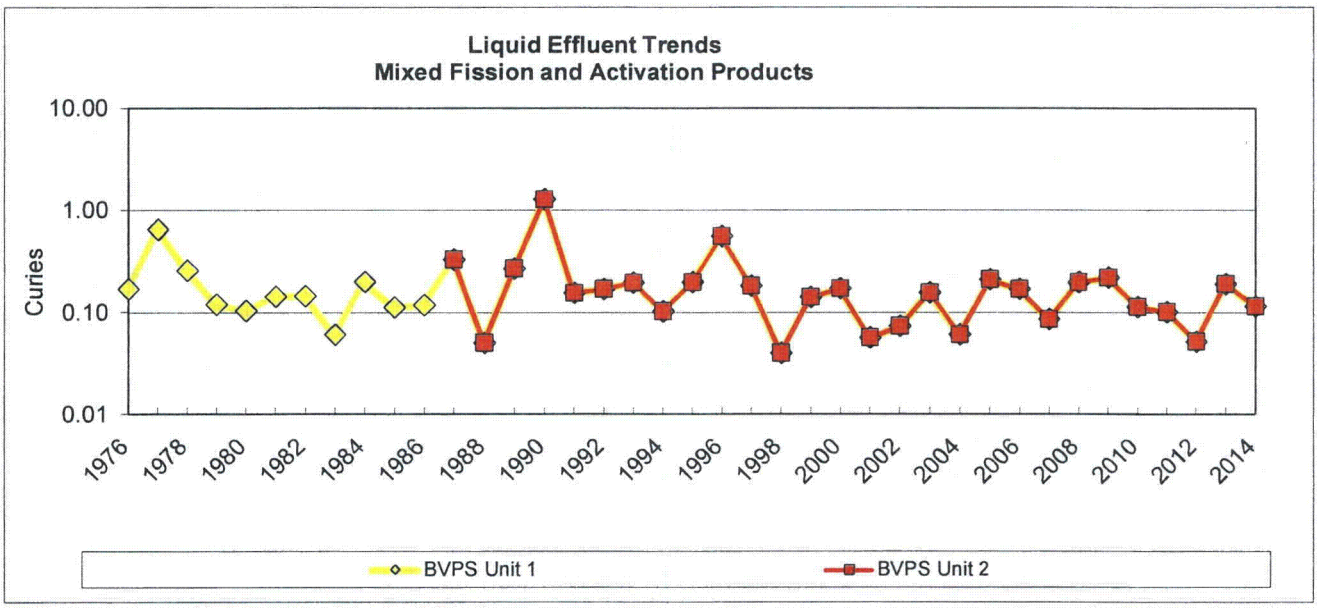


Radioactive Effluent Release Report

Calendar Year - 2014

Executive Summary - Trends of Liquid Release Activity (Fission and Activation Products)

Liquid Release Activity (Fission and Activation Products): The following graph provides a comparison of total liquid mixed fission and activation product (particulate) radioactivity discharged from the site from 1976 to present.

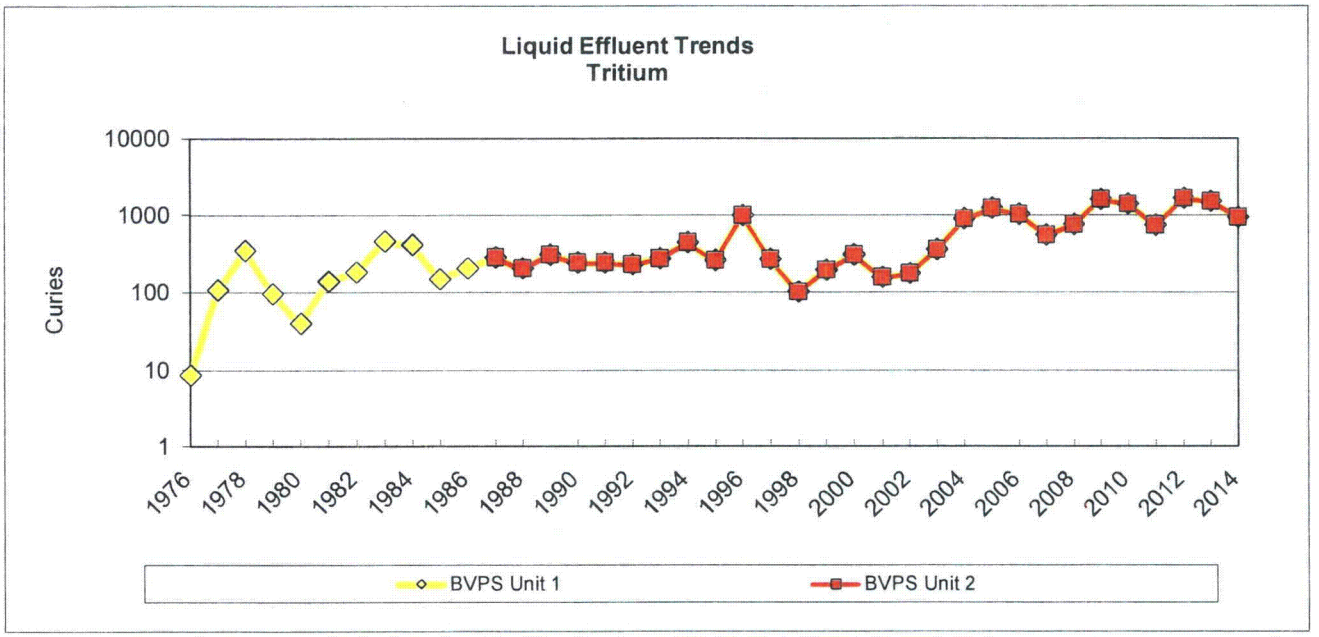


Radioactive Effluent Release Report

Calendar Year - 2014

Executive Summary - Trends of Liquid Release Activity (Tritium)

Liquid Release Activity (Tritium): The following graph provides a comparison of total liquid tritium radioactivity discharged from the site from 1976 to present. The recent increases were due to efforts to reduce overall offsite dose. Specifically, discharging liquid radioactive inventory provided the benefit of reduced total offsite dose, due to reduction in evaporative losses from the fuel pools.

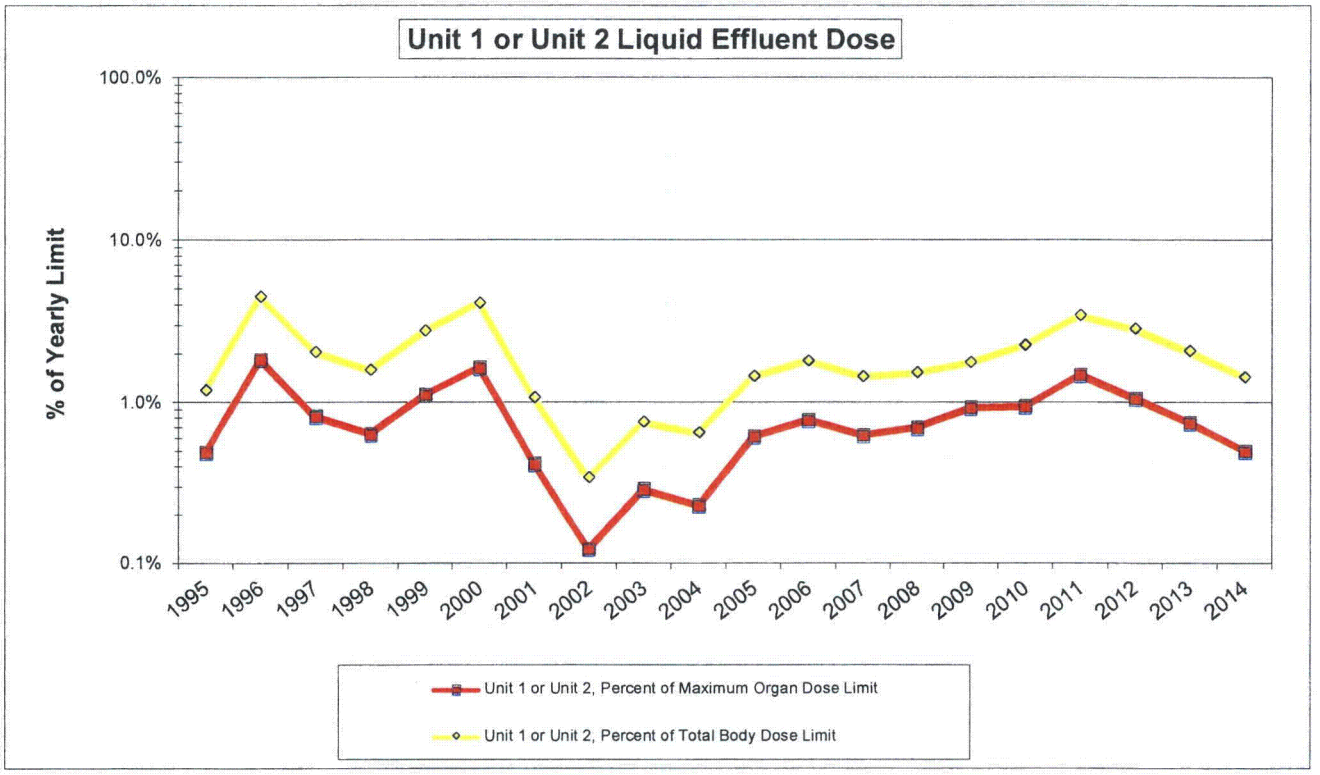


Radioactive Effluent Release Report

Calendar Year - 2014

Executive Summary - Trends of Liquid Release Offsite Dose Projections

Liquid Release Offsite Dose Projections: The following graph provides a comparison of liquid offsite dose projections that were calculated to the maximum individual per 10 CFR 50, Appendix I and the ODCM. The projections use ODCM default flow rates for the receiving water (Ohio River), and were performed prior to release authorization.

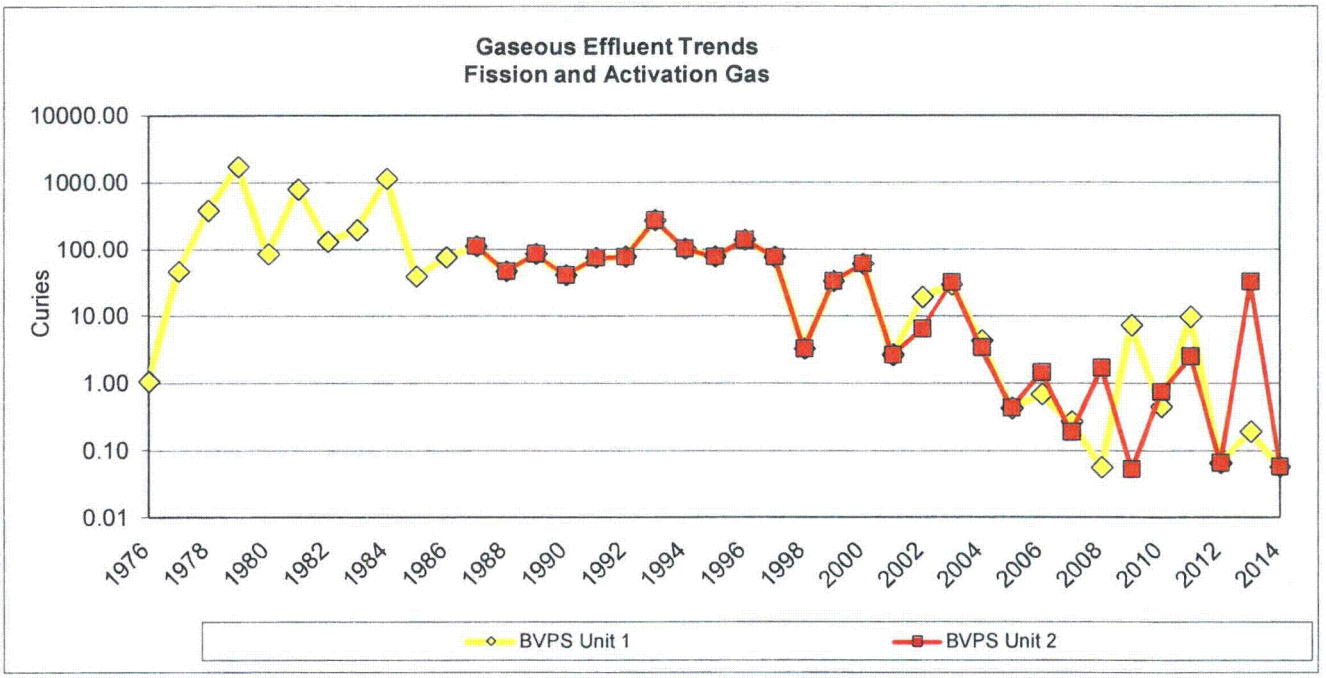


Radioactive Effluent Release Report

Calendar Year - 2014

Executive Summary - Trends of Gaseous Release Activity (Fission and Activation Gas)

Gaseous Release Activity (Fission and Activation Gas): The following graph provides a comparison of total gaseous fission and activation gas discharged from the site from 1976 to present.

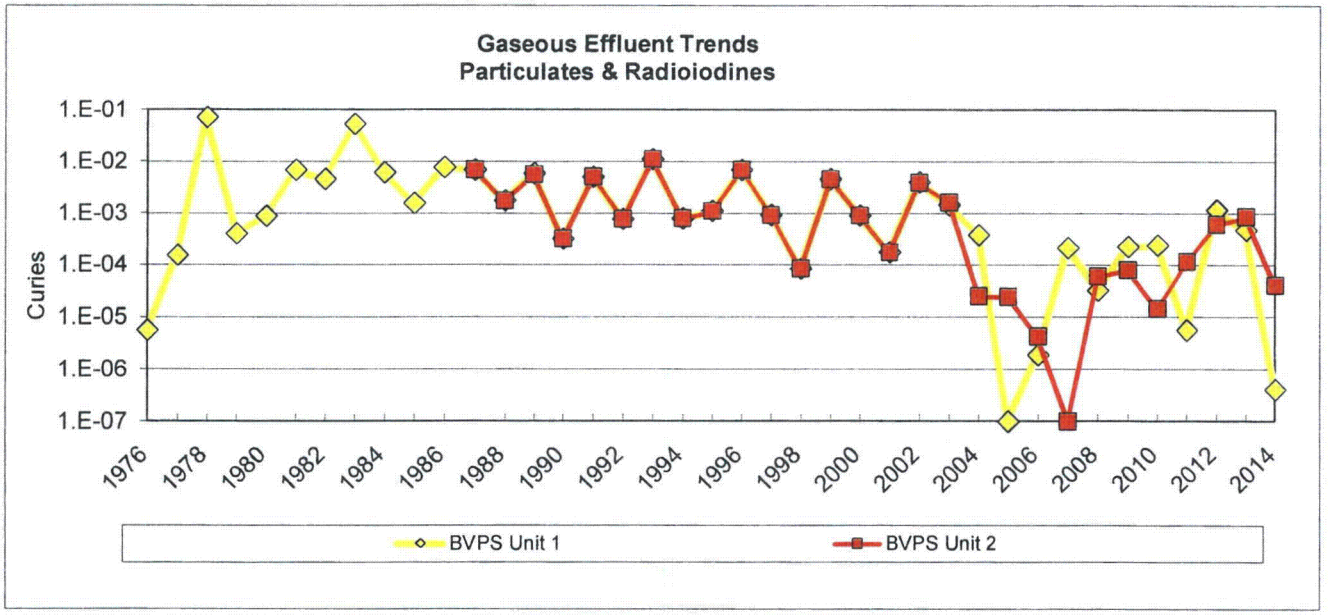


Radioactive Effluent Release Report

Calendar Year - 2014

Executive Summary - Trends of Gaseous Release Activity (Particulates and Radioiodines)

Gaseous Release Activity (Particulates and Radioiodines): The following graph provides a comparison of total gaseous particulates and radioiodines discharged from the site from 1976 to present.

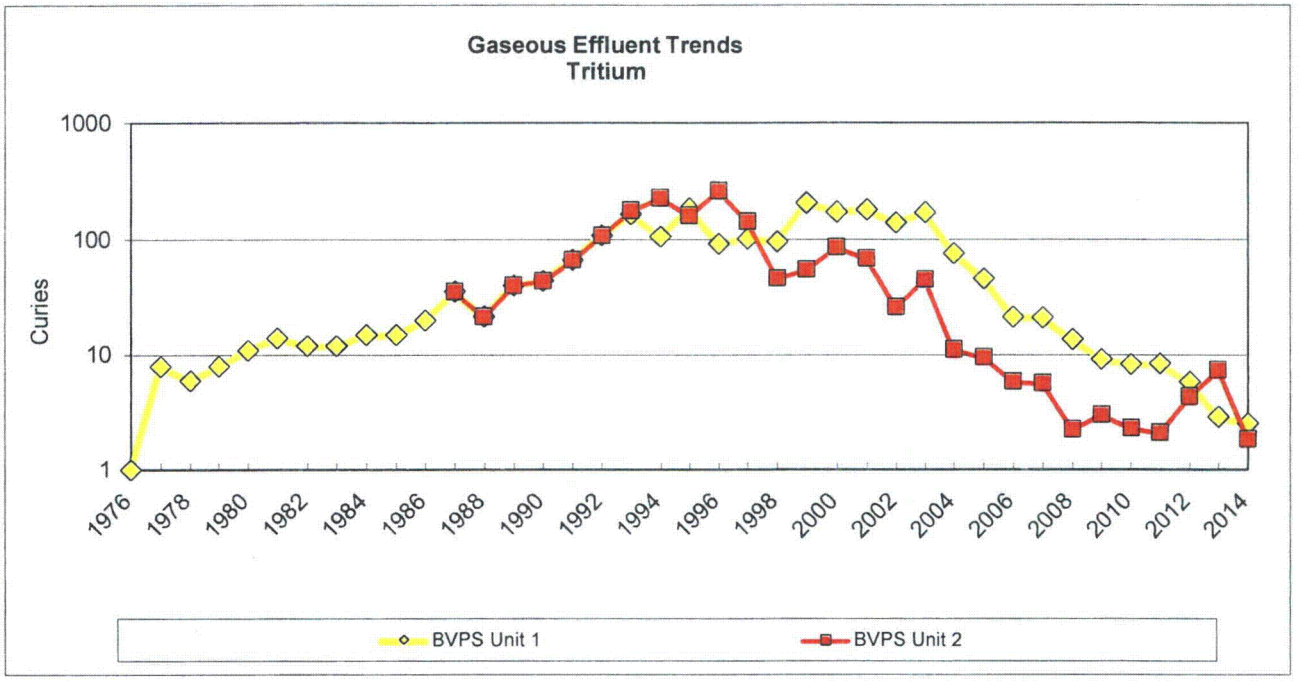


Radioactive Effluent Release Report

Calendar Year - 2014

Executive Summary - Trends of Gaseous Release Activity (Tritium)

Gaseous Release Activity (Tritium): The following graph provides a comparison of total gaseous tritium discharged from the site from 1976 to present.

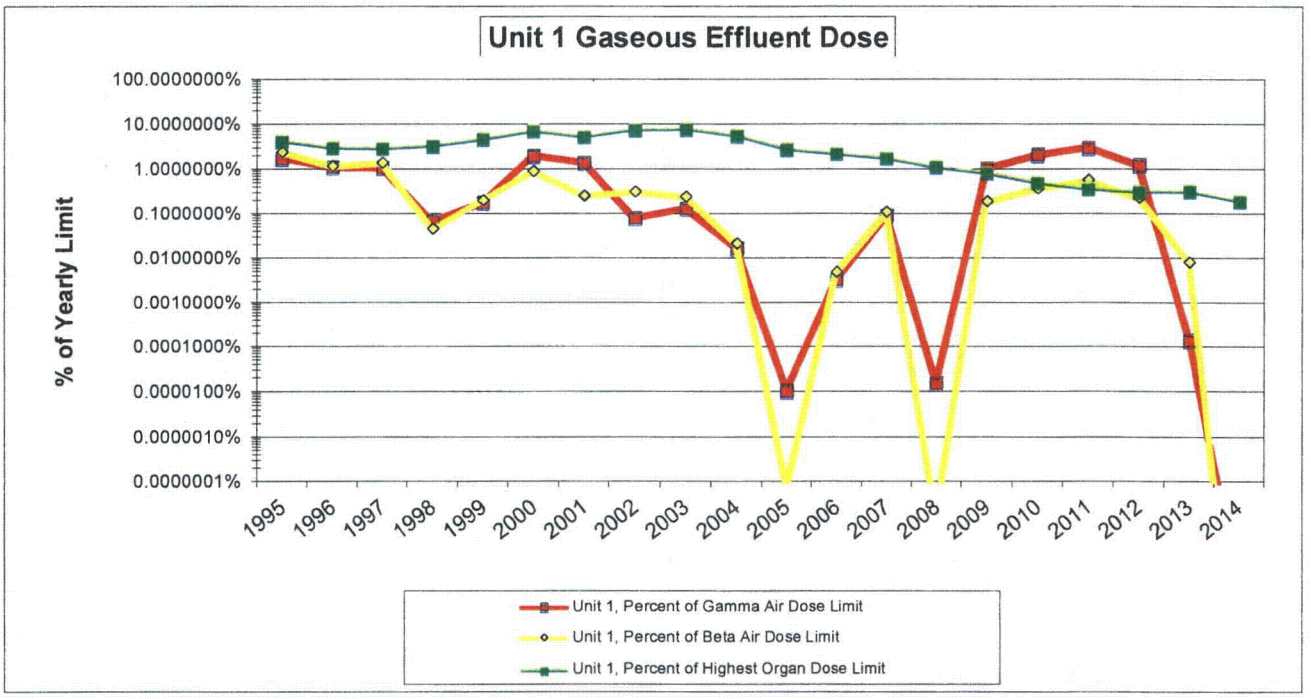


Radioactive Effluent Release Report

Calendar Year - 2014

Executive Summary - Trends of Unit 1 Gaseous Release Offsite Dose Projections

Unit 1 Gaseous Release Offsite Dose Projections: The following graph provides a comparison of Unit 1 gaseous offsite dose projections that were calculated to the maximum individual per 10 CFR 50, Appendix I and the ODCM. The projections use ODCM default meteorological parameters for the atmospheric conditions surrounding the plant site, and were performed prior to release authorization. The steady decrease in highest organ dose were due to efforts to reduce overall offsite dose.



Radioactive Effluent Release Report

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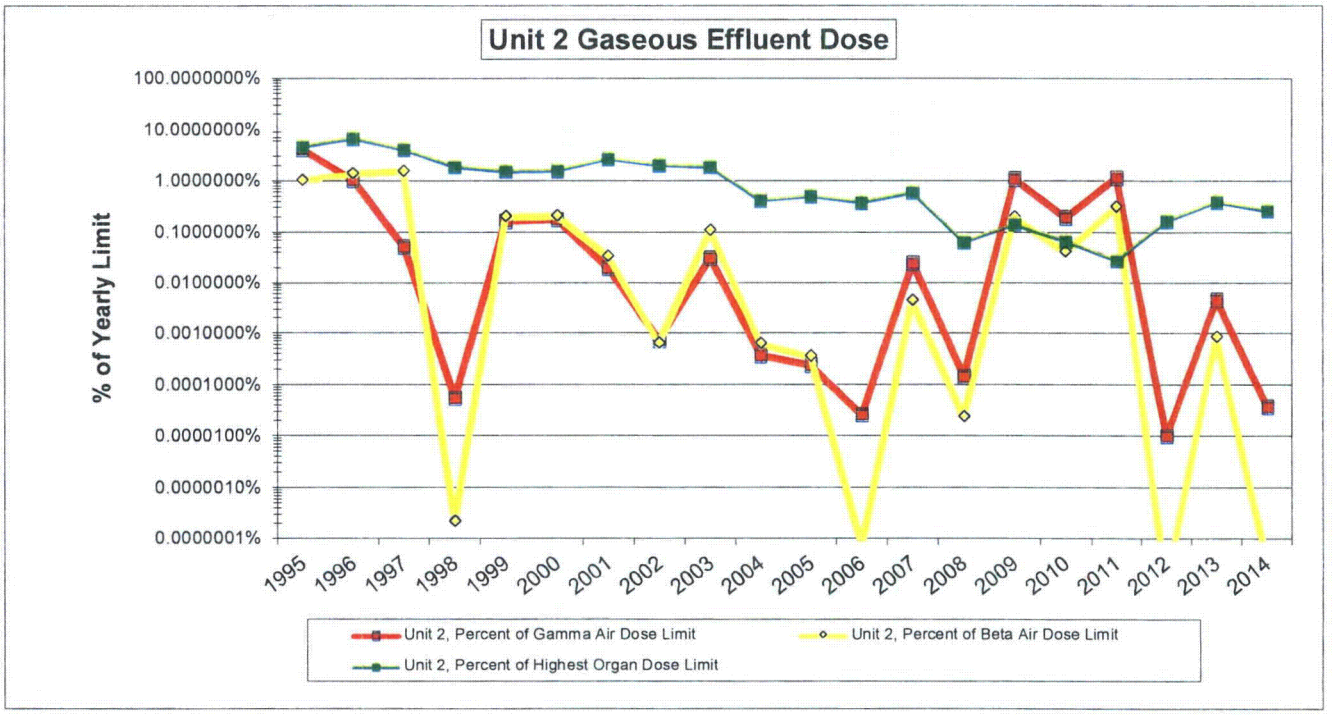
Executive Summary - Trends of Unit 1 Gaseous Release Offsite Dose Projections

Unit 2 Gaseous Release Offsite Dose Projections: The following graph provides a comparison of Unit 2 gaseous offsite dose projections that were calculated to the maximum individual per 10 CFR 50, Appendix I and the ODCM. The projections use ODCM default meteorological parameters for the atmospheric conditions surrounding the plant site, and were performed prior to release authorization. The decrease in highest organ dose was due to efforts to reduce overall offsite dose.



Radioactive Effluent Release Report

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Results of Abnormal Releases

Abnormal Liquid Releases: None.

Abnormal Gas Releases: None.

Radioactive Effluent Release Report

Calendar Year - 2014

Results of Onsite Spills and Items Added to Decommissioning Files per 10CFR50.75(g)

Summary of Onsite Spills (>100 gallons): None

Summary of Items added to Decommissioning Files per 10CFR50.75(g) Files:

Item 1 of 1 (Unit 2 Steam Generator Blowdown): Tour Operator found a thin layer of U2 Steam Generator Blowdown resin spilled on the ground in the South Yard. Area of spill was approximately 20x30 ft and less than 5 gallons. All visible resin was manually removed. Catch Basins in the area were cleaned out in order to check for radioactive debris. There was no indication that any resin/radioactivity entered the environment via the catch basin system. All surveys and isotopic analyses of remediation indicated no licensed radioactive material left at the scene. (CR-2014-12240)

Radioactive Effluent Release Report

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Results of Onsite Groundwater Monitoring Program

Summary of Onsite Groundwater Samples

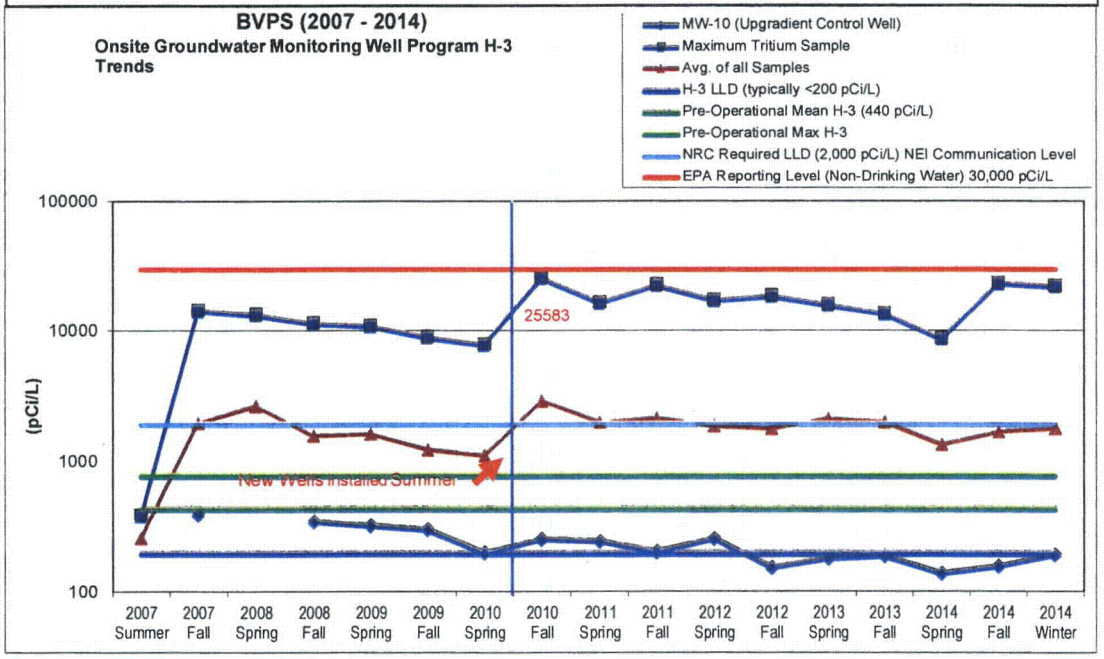
	2014 H-3 Maximum (pCi/L)	2014 H-3 Minimum (pCi/L)	2014 H-3 Average (pCi/L)	Typical H-3 LLD (pCi/L)	Required H-3 LLD (pCi/L)	Pre Operational Mean For H-3 (pCi/L)	Are Any H-3 Analyses Greater Than The Pre Operational Mean For H-3 ?	NEI and FENOC Communication Level For H-3 (pCi/L)	EPA Reporting Level For H-3 (pCi/L)
2nd Quarter	8789	138	1354	<200	<2000	440	Yes	2000	30000
3rd Quarter	23201	151	1700	<200	<2000	440	Yes	2000	30000
4th Quarter	22077	194	1807	<200	<2000	440	Yes	2000	30000

H-3 Summary: In 2014, twenty (20) on-site monitoring wells were sampled in the spring, twenty-four (24) on-site monitoring wells were sampled in the fall and twenty (20) on-site monitoring wells were sampled in the winter. Four (4) wells (MW-1, MW-12S, MW-12D, and P-3) could not be sampled in the spring due to access issues and equipment failures. One (1) well sample (MW-1) could not be sampled in the fall due to access issues (CR 2014-16348). The access issues for MW-1 were caused by a casing extension that no longer allows a pump to pass through. Due to this, MW-1 was evaluated and it was determined that it could be retired. The impact to the BVPS groundwater monitoring program is negligible since MW-1 is upgradient from MW-13S/D.

Sixteen (16) wells returned results of less than the pre-operational mean (440 pCi/L) during all sample periods in 2014. Five (5) wells returned results >440 pCi/L, but <2000 pCi/L. Four (4) wells returned results >2000 pCi/L. One (1) well exceeded 20,000 pCi/L with the highest concentration recorded as 23,201 pCi/L (CR 2014-15147). The tritium concentration in monitoring well MW-16 showed an increasing tritium trend from 8,789 pCi/L in Spring to 23,201 pCi/L in the Fall. The remedation well, EW-1, also showed an increase in tritium from the Spring to Fall 2014 (CR 2014-16110). Sampling in MW-16 was increased to a monthly frequency and an extra set of samples were taken at 19 other monitoring wells. Environmental Resources Management (ERM) was contacted to evaluate the tritium data from the groundwater wells and perform boron and tritium age dating samples. Results from the additional samples will be available in Spring 2015. Levels in other wells over 2,000 pCi/L are showed an overall downward trends in concentration. The NEI/FENOC communication level was reached for MW-12S & MW-12D during 2007. Notification to local, state & federal agencies was performed on 10/08/07. Additional communication for new well results was performed on 09/08/10 for those new wells that exceeded 2000 pCi/L.

The newly installed well MW-20D exceeded 2,000 pCi/L on its first sample, but this was expected since the well was installed to monitor the previously identified plume intercepting MW-16. No adverse effect to the offsite environment has been detected at this time, because all offsite groundwater, drinking water and surface water samples were <440 pCi/L. Mitigation activities (catch basin sleeving) to prevent tritiated condensate water from reaching the groundwater were completed 12/17/11. Remediation activities commenced in the fall of 2013.

Principal Gamma Emmitter Summary: Twenty (20) onsite monitoring wells were sampled on at least two occasions during the year and analyzed for Principle Gamma Emitters. The results showed no positive indication of Licensed Radioactive Material (LRM) in any of the analyses.



Radioactive Effluent Release Report

Calendar Year - 2014

Corrections to previous Radioactive Effluent Release Reports

Correction(s) to Previous Radioactive Effluent Release Reports:

There were two (2) correction to previous Radioactive Effluent Release Reports.
1) There was one (1) correction to the 2012 Radioactive Effluent Release Report. During review of the 2012 Radioactive Effluent Release Report it was noted on page 2 Table 1A (Gaseous Effluents – Summation of all Releases) Section C Particulates was incorrect. Section C currently shows 0 Ci of particulates were released though gaseous effluents. In 2012 BV released a total of 1.92 E-3 Ci of particulates via gaseous effluents. The individual particulates and associated curie content was correctly identified on Pages 3 through 8 but the data was not transferred to the summary in Section C on Page 2. The summary section has been corrected and an addendum has been submitted to records.

C. Particulates							
1. Particulates with half-lives > 8 days	Ci	2.54E-04	3.86E-04	1.14E-03	1.33E-04	1.92E-03	30.0%
1a. Unit 1 Particulates	Ci	2.00E-04	3.82E-04	5.71E-04	1.41E-05	1.17E-03	
1b. Unit 2 Particulates	Ci	5.43E-05	3.18E-06	5.72E-04	1.19E-04	7.49E-04	
2. Average release rate for period	uCi/sec	3.22E-05	4.89E-05	1.45E-04	1.69E-05	6.08E-05	
3. Percent of applicable limit	%	N/A	N/A	N/A	N/A	N/A	

1) There was one (1) correction to the 2013 Radioactive Effluent Release Report. During the 2014 NRC Radiation Effluent Inspection the inspector reviewed the Annual Radioactive Effluent Release Report for 2013. He questioned the 32 Ci release of Xe-138 in the 1st quarter for the Unit 2 Ground Level Continuous Release listed on Enclosure 2, page 8 of 21. Upon further investigation it was noted that at the time of the sample analysis, APEX (which is the software used for gross activity analysis) used the counting protocol "VMS_Peak_Search". This protocol was an older and less accurate method of peak identification. The sample was re-processed using the new and more accurate protocol "2nd_Diff_Peak_Search" and Xe-138 was no longer identified. It is believed that the Xe-138 was a misidentification. Since this discovery the table on page 8 of 21 has been corrected and an addendum has been submitted to records. (CR-2014-18499)

Calendar Year - 2013
Table 1C-GC2
Gaseous Effluents - Ground Level Continuous Releases (Unit 2)

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission gases						
argon-41	Ci	LLD	LLD	LLD	5.68E-03	5.68E-03
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85m	Ci	LLD	LLD	LLD	LLD	LLD
krypton-87	Ci	LLD	LLD	LLD	LLD	LLD
krypton-88	Ci	LLD	LLD	LLD	LLD	LLD
xenon-131m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-138	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	ND	5.68E-03	5.68E-03

Radioactive Effluent Release Report

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Supplemental Information Page

FACILITY: B.V.P.S. Units 1 and 2 LICENSEE: FENOC

1. Regulatory Limits	
a. Fission and activation gases:	Annual Unit 1 or 2 Dose: 10 mrad from Gamma, & 20 mrad from Beta
b. Iodines & particulates, half-lives > 8 days:	Annual Unit 1 or 2 Dose: 15 mrem to Any Organ
c. Liquid effluents:	Annual Unit 1 or 2 Dose: 3 mrem to Total Body, & 10 mrem to Any Organ

2. Maximum Permissable Concentrations Used In Determining Allowable Release Rates Or Concentrations	
a. Fission and activation gases:	Site Release Rate: 500 mrem/yr to Total Body, & 3000 mrem/yr to the Skin
b. Iodines & particulates, half-lives > 8 days:	Site Release Rate: 1500 mrem/yr to Any Organ
c. Liquid effluents:	Site Release Concentration: 10 times 10 CFR 20 Appendix B, Table 2, EC's

3. Average Energy (Not Applicable To The BVPS ODCM)

4. Measurements and Approximations of Total Radioactivity	
The methods used to measure or approximate the total radioactivity in effluents, and the methods used to determine radionuclide composition are as follows:	
a. Fission and activation gases:	Ge Gamma Spectrometry, Liquid Scintillation Counter
b. Iodines:	Ge Gamma Spectrometry
c. Particulates, half-lives > 8 days:	Ge Gamma Spectrometry, Proportional Counter
d. Liquid effluents:	Ge Gamma Spectrometry, Proportional Counter, Liquid Scintillation

5. Batch & Abnormal Release Information	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
a. Liquid Batch Releases						
1. Number of batch releases		40	39	70	46	195
2. Total time period for batch releases	minutes	6902	19058	13963	11329	51252
3. Maximum time period for a batch release	minutes	1393	4780	4380	4180	4780
4. Average time period for batch releases	minutes	247	706	241	333	382
5. Minimum time period for a batch release	minutes	3	196	13	196	3
6. Average river flow during release periods	cuft/sec	55853	59501	23879	29828	42265
b. Gaseous Batch Releases						
1. Number of batch releases		9	20	9	8	46
2. Total time period for batch releases	minutes	6324	16114	1044	252	23734
3. Maximum time period for a batch release	minutes	4793	7399	737	129	7399
4. Average time period for batch releases	minutes	1581	1074	441	126	806
5. Minimum time period for a batch release	minutes	156	1	144	123	1
c. Abnormal Liquid Releases						
1. Number of releases		NONE	NONE	NONE	NONE	NONE
2. Total activity released	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
d. Abnormal Gaseous Releases						
1. Number of releases		NONE	NONE	NONE	NONE	NONE
2. Total activity released	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Radioactive Effluent Release Report

Calendar Year - 2014

Table 1A

Gaseous Effluents - Summation Of All Releases

	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year	Total Error, %
A. Fission & Activation Gases							
1. Site Total release	Ci	0.00E+00	1.16E-01	0.00E+00	0.00E+00	1.16E-01	26.5%
1a. Unit 1 Gases	Ci	0.00E+00	5.81E-02	0.00E+00	0.00E+00	5.81E-02	
1b. Unit 2 Gases	Ci	0.00E+00	5.81E-02	0.00E+00	0.00E+00	5.81E-02	
2. Average release rate for period	uCi/sec	0.00E+00	1.47E-02	0.00E+00	0.00E+00	3.68E-03	
3. Percent of applicable limit	%	N/A	N/A	N/A	N/A	N/A	
B. Iodines							
1. Site Total iodine - 131	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	28.3%
1a. Unit 1 iodine - 131	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1b. Unit 2 iodine - 131	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2. Average release rate for period	uCi/sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3. Percent of applicable limit	%	N/A	N/A	N/A	N/A	N/A	
C. Particulates							
1. Particulates with half-lives > 8 days	Ci	4.37E-07	4.14E-05	1.06E-07	0.00E+00	4.19E-05	30.0%
1a. Unit 1 Particulates	Ci	2.19E-07	1.41E-07	5.30E-08	0.00E+00	4.13E-07	
1b. Unit 2 Particulates	Ci	2.19E-07	4.13E-05	5.30E-08	0.00E+00	4.15E-05	
2. Average release rate for period	uCi/sec	5.55E-08	5.25E-06	1.35E-08	0.00E+00	1.33E-06	
3. Percent of applicable limit	%	N/A	N/A	N/A	N/A	N/A	
D. Gross Alpha							
1. Site Gross alpha radioactivity	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	30.0%
1a. Unit 1 Gross alpha	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1b. Unit 2 Gross alpha	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2. Average release rate for period	uCi/sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3. Percent of applicable limit	%	N/A	N/A	N/A	N/A	N/A	
E. Tritium							
1. Site Total release	Ci	1.05E+00	5.97E-01	1.30E+00	1.46E+00	4.41E+00	32.9%
1a. Unit 1 Tritium	Ci	5.06E-01	1.58E-01	1.10E+00	7.88E-01	2.55E+00	
1b. Unit 2 Tritium	Ci	5.45E-01	4.39E-01	2.01E-01	6.72E-01	1.86E+00	
2. Average release rate for period	uCi/sec	1.33E-01	7.58E-02	1.65E-01	1.85E-01	1.40E-01	
3. Percent of applicable limit	%	N/A	N/A	N/A	N/A	N/A	
F. Carbon-14							
1. Site Total release	Ci	1.14E+00	5.45E-01	8.77E-01	3.84E-01	2.95E+00	41.1%
1a. Unit 1 Carbon-14	Ci	8.47E-01	4.48E-01	5.85E-01	2.10E-01	2.09E+00	
1b. Unit 2 Carbon-14	Ci	2.94E-01	9.67E-02	2.92E-01	1.74E-01	8.57E-01	
2. Average release rate for period	uCi/sec	1.45E-01	6.91E-02	1.11E-01	4.87E-02	9.35E-02	
3. Percent of applicable limit	%	N/A	N/A	N/A	N/A	N/A	

N/A = Not Applicable

The amount of time (in seconds) used to calculate the release rates specified in A.2, B.2, C.2, D.2 and E.2 is the average amount of seconds per calendar quarter (7.88E+06 seconds).

Radioactive Effluent Release Report

Calendar Year - 2014
Table 1B-EB
Gaseous Effluents - Elevated Batch Releases

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission gases						
argon-41	Ci	LLD	7.55E-02	LLD	LLD	7.55E-02
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85m	Ci	LLD	9.24E-04	LLD	LLD	9.24E-04
krypton-87	Ci	LLD	LLD	LLD	LLD	LLD
krypton-88	Ci	LLD	LLD	LLD	LLD	LLD
xenon-131m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	LLD	2.05E-02	LLD	LLD	2.05E-02
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	1.56E-02	LLD	LLD	1.56E-02
xenon-135m	Ci	LLD	3.61E-03	LLD	LLD	3.61E-03
xenon-138	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	1.16E-01	ND	ND	1.16E-01
2. Iodines						
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
iodine-133	Ci	LLD	LLD	LLD	LLD	LLD
iodine-135	Ci	LLD	LLD	LLD	LLD	LLD
Total for period	Ci	ND	ND	ND	ND	ND
3. Particulates						
chromium-51	Ci	LLD	LLD	LLD	LLD	LLD
manganese-54	Ci	LLD	LLD	LLD	LLD	LLD
iron-59	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-57	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-58	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-60	Ci	LLD	LLD	LLD	LLD	LLD
zinc-65	Ci	LLD	LLD	LLD	LLD	LLD
strontium-89	Ci	LLD	LLD	LLD	LLD	LLD
strontium-90	Ci	LLD	LLD	LLD	LLD	LLD
molybdenum-99	Ci	LLD	LLD	LLD	LLD	LLD
cesium-134	Ci	LLD	LLD	LLD	LLD	LLD
cesium-137	Ci	LLD	LLD	LLD	LLD	LLD
barium/lanthanum-140	Ci	LLD	LLD	LLD	LLD	LLD
cerium-141	Ci	LLD	LLD	LLD	LLD	LLD
selenium-75	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	ND	ND	ND

LLD = Below the Lower Limit of Detectability, in uCi/cc (Table 4).

ND = None Detected

Radioactive Effluent Release Report

Calendar Year - 2014
Table 1B-EC
Gaseous Effluents - Elevated Continuous Releases

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission gases						
argon-41	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85m	Ci	LLD	LLD	LLD	LLD	LLD
krypton-87	Ci	LLD	LLD	LLD	LLD	LLD
krypton-88	Ci	LLD	LLD	LLD	LLD	LLD
xenon-131m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-138	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	ND	ND	ND
2. Iodines						
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
iodine-133	Ci	LLD	LLD	LLD	LLD	LLD
iodine-135	Ci	LLD	LLD	LLD	LLD	LLD
Total for period	Ci	ND	ND	ND	ND	ND
3. Particulates						
chromium-51	Ci	LLD	LLD	LLD	LLD	LLD
manganese-54	Ci	LLD	LLD	LLD	LLD	LLD
iron-59	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-57	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-58	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-60	Ci	LLD	LLD	LLD	LLD	LLD
zinc-65	Ci	LLD	LLD	LLD	LLD	LLD
strontium-89	Ci	LLD	LLD	LLD	LLD	LLD
strontium-90	Ci	LLD	LLD	LLD	LLD	LLD
molybdenum-99	Ci	LLD	LLD	LLD	LLD	LLD
cesium-134	Ci	LLD	LLD	LLD	LLD	LLD
cesium-137	Ci	LLD	LLD	LLD	LLD	LLD
barium/lanthanum-140	Ci	LLD	LLD	LLD	LLD	LLD
cerium-141	Ci	LLD	LLD	LLD	LLD	LLD
cerium-144	Ci	LLD	LLD	LLD	LLD	LLD
selenium-75	Ci	4.37E-07	2.82E-07	1.06E-07	LLD	8.25E-07
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	4.37E-07	2.82E-07	1.06E-07	ND	8.25E-07

LLD = Below the Lower Limit of Detectability, in uCi/cc (Table 4).

ND = None Detected

Radioactive Effluent Release Report

Calendar Year - 2014
Table 1C-GB1
Gaseous Effluents - Ground Level Batch Releases (Unit 1)

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission gases						
argon-41	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85m	Ci	LLD	LLD	LLD	LLD	LLD
krypton-87	Ci	LLD	LLD	LLD	LLD	LLD
krypton-88	Ci	LLD	LLD	LLD	LLD	LLD
xenon-131m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-138	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	ND	ND	ND
2. Iodines						
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
iodine-133	Ci	LLD	LLD	LLD	LLD	LLD
iodine-135	Ci	LLD	LLD	LLD	LLD	LLD
Total for period	Ci	ND	ND	ND	ND	ND
3. Particulates						
chromium-51	Ci	LLD	LLD	LLD	LLD	LLD
manganese-54	Ci	LLD	LLD	LLD	LLD	LLD
iron-59	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-57	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-58	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-60	Ci	LLD	LLD	LLD	LLD	LLD
zinc-65	Ci	LLD	LLD	LLD	LLD	LLD
strontium-89	Ci	LLD	LLD	LLD	LLD	LLD
strontium-90	Ci	LLD	LLD	LLD	LLD	LLD
molybdenum-99	Ci	LLD	LLD	LLD	LLD	LLD
cesium-134	Ci	LLD	LLD	LLD	LLD	LLD
cesium-137	Ci	LLD	LLD	LLD	LLD	LLD
barium/lanthanum-140	Ci	LLD	LLD	LLD	LLD	LLD
cerium-141	Ci	LLD	LLD	LLD	LLD	LLD
cerium-144	Ci	LLD	LLD	LLD	LLD	LLD
selenium-75	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	ND	ND	ND

LLD = Below the Lower Limit of Detectability, in uCi/cc (Table 4).

ND = None Detected

Radioactive Effluent Release Report

Calendar Year - 2014
Table 1C-GC1
Gaseous Effluents - Ground Level Continuous Releases (Unit 1)

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission gases						
argon-41	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85m	Ci	LLD	LLD	LLD	LLD	LLD
krypton-87	Ci	LLD	LLD	LLD	LLD	LLD
krypton-88	Ci	LLD	LLD	LLD	LLD	LLD
xenon-131m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-138	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	ND	ND	ND
2. Iodines						
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
iodine-133	Ci	LLD	LLD	LLD	LLD	LLD
iodine-135	Ci	LLD	LLD	LLD	LLD	LLD
Total for period	Ci	ND	ND	ND	ND	ND
3. Particulates						
chromium-51	Ci	LLD	LLD	LLD	LLD	LLD
manganese-54	Ci	LLD	LLD	LLD	LLD	LLD
iron-59	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-57	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-58	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-60	Ci	LLD	LLD	LLD	LLD	LLD
zinc-65	Ci	LLD	LLD	LLD	LLD	LLD
strontium-89	Ci	LLD	LLD	LLD	LLD	LLD
strontium-90	Ci	LLD	LLD	LLD	LLD	LLD
molybdenum-99	Ci	LLD	LLD	LLD	LLD	LLD
cesium-134	Ci	LLD	LLD	LLD	LLD	LLD
cesium-137	Ci	LLD	LLD	LLD	LLD	LLD
barium/lanthanum-140	Ci	LLD	LLD	LLD	LLD	LLD
cerium-141	Ci	LLD	LLD	LLD	LLD	LLD
cerium-144	Ci	LLD	LLD	LLD	LLD	LLD
selenium-75	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	ND	ND	ND

LLD = Below the Lower Limit of Detectability, in uCi/cc (Table 4).

ND = None Detected

Radioactive Effluent Release Report

Calendar Year - 2014
Table 1C-GB2
Gaseous Effluents - Ground Level Batch Releases (Unit 2)

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission gases						
argon-41	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85m	Ci	LLD	LLD	LLD	LLD	LLD
krypton-87	Ci	LLD	LLD	LLD	LLD	LLD
krypton-88	Ci	LLD	LLD	LLD	LLD	LLD
xenon-131m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-138	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	ND	ND	ND
2. Iodines						
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
iodine-133	Ci	LLD	LLD	LLD	LLD	LLD
iodine-135	Ci	LLD	LLD	LLD	LLD	LLD
Total for period	Ci	ND	ND	ND	ND	ND
3. Particulates						
beryllium-7	Ci	LLD	LLD	LLD	LLD	LLD
chromium-51	Ci	LLD	LLD	LLD	LLD	LLD
manganese-54	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-57	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-58	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-60	Ci	LLD	LLD	LLD	LLD	LLD
zinc-65	Ci	LLD	LLD	LLD	LLD	LLD
strontium-89	Ci	LLD	LLD	LLD	LLD	LLD
strontium-90	Ci	LLD	LLD	LLD	LLD	LLD
zirconium/niobium-97	Ci	LLD	LLD	LLD	LLD	LLD
cesium-134	Ci	LLD	LLD	LLD	LLD	LLD
cesium-137	Ci	LLD	LLD	LLD	LLD	LLD
barium/lanthanum-140	Ci	LLD	LLD	LLD	LLD	LLD
cerium-141	Ci	LLD	LLD	LLD	LLD	LLD
cerium-144	Ci	LLD	LLD	LLD	LLD	LLD
selenium-75	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	ND	ND	ND

LLD = Below the Lower Limit of Detectability, in uCi/cc (Table 4).

ND = None Detected

Radioactive Effluent Release Report

Calendar Year - 2014
Table 1C-GC2
Gaseous Effluents - Ground Level Continuous Releases (Unit 2)

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission gases						
argon-41	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85m	Ci	LLD	LLD	LLD	LLD	LLD
krypton-87	Ci	LLD	LLD	LLD	LLD	LLD
krypton-88	Ci	LLD	LLD	LLD	LLD	LLD
xenon-131m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-138	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	ND	ND	ND
2. Iodines						
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
iodine-133	Ci	LLD	LLD	LLD	LLD	LLD
iodine-135	Ci	LLD	LLD	LLD	LLD	LLD
Total for period	Ci	ND	ND	ND	ND	ND
3. Particulates						
chromium-51	Ci	LLD	LLD	LLD	LLD	LLD
manganese-54	Ci	LLD	LLD	LLD	LLD	LLD
iron-59	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-57	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-58	Ci	LLD	3.44E-05	LLD	LLD	3.44E-05
cobalt-60	Ci	LLD	LLD	LLD	LLD	LLD
zinc-65	Ci	LLD	LLD	LLD	LLD	LLD
strontium-89	Ci	LLD	LLD	LLD	LLD	LLD
strontium-90	Ci	LLD	LLD	LLD	LLD	LLD
zirconium/niobium-95	Ci	LLD	6.71E-06	LLD	LLD	6.71E-06
cesium-134	Ci	LLD	LLD	LLD	LLD	LLD
cesium-137	Ci	LLD	LLD	LLD	LLD	LLD
barium/lanthanum-140	Ci	LLD	LLD	LLD	LLD	LLD
cerium-141	Ci	LLD	LLD	LLD	LLD	LLD
cerium-144	Ci	LLD	LLD	LLD	LLD	LLD
selenium-75	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	4.11E-05	ND	ND	4.11E-05

LLD = Below the Lower Limit of Detectability, in uCi/cc (Table 4).

ND = None Detected

Radioactive Effluent Release Report

Calendar Year - 2014

Table 2A

Liquid Effluents - Summation Of All Releases

	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year	Total Error, %
A. Fission & activation products							
1. Total release (excl. H-3, gas & alpha)	Ci	2.79E-02	4.07E-02	2.56E-02	2.22E-02	1.16E-01	26.1%
2. Average diluted concentration	uCi/ml	7.59E-09	7.95E-09	4.85E-09	4.79E-09	6.22E-09	
3. Percent of applicable limit	%	1.12E+00	1.63E+00	1.02E+00	8.87E-01	1.16E+00	
B. Tritium							
1. Total release	Ci	4.81E+01	3.88E+02	1.90E+02	3.17E+02	9.43E+02	25.0%
2. Average diluted concentration	uCi/ml	1.31E-05	7.57E-05	3.60E-05	6.84E-05	5.04E-05	
3. Percent of applicable limit	%	1.31E-01	7.57E-01	3.60E-01	6.84E-01	5.04E-01	
C. Dissolved and entrained gases							
1. Total release	Ci	ND	ND	ND	ND	0.00E+00	27.0%
2. Average diluted concentration	uCi/ml						
3. Percent of applicable limit	%						
D. Gross alpha radioactivity (total release)	Ci	LLD	LLD	LLD	LLD	LLD	28.9%
E. Volume of waste released (prior to dilution)	liters	1.28E+07	1.41E+07	1.45E+07	1.37E+07	5.50E+07	11.2%
F. Volume of dilution water used	liters	3.66E+09	5.11E+09	5.26E+09	4.62E+09	1.86E+10	22.9%

LLD = Below the Lower Limit of Detectability, in uCi/ml (Table 4)

A.3 is based on a historical PA-DEP guide of 10 Ci/yr

B.3 is based on a ODCM limit of 1.00E-2 uCi/ml

C.3 is based on a ODCM limit of 2.00E-04 uCi/ml

The values listed at F. are the volumes during actual liquid waste discharge periods. The total dilution volume for a continuous calendar quarter is approximately 1E+10 liters for BVPS-1 & 2 (ie.; ~ 22,800 gpm is the total dilution flowrate from the site)

Radioactive Effluent Release Report

Calendar Year - 2014

Table 2B-B

Liquid Effluents - Batch Releases

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission and activation products						
beryllium-7	Ci	LLD	LLD	LLD	LLD	LLD
sodium-24	Ci	LLD	LLD	LLD	LLD	LLD
chromium-51	Ci	1.01E-04	8.29E-04	LLD	4.25E-04	1.36E-03
manganese-54	Ci	2.16E-04	2.58E-04	8.12E-06	5.69E-05	5.39E-04
iron-55	Ci	7.85E-03	4.58E-03	2.61E-03	2.17E-03	1.72E-02
iron-59	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-57	Ci	2.36E-05	5.73E-05	LLD	LLD	8.10E-05
cobalt-58	Ci	3.11E-03	1.01E-02	3.41E-03	1.67E-03	1.83E-02
cobalt-60	Ci	4.07E-03	5.95E-03	1.90E-03	2.71E-03	1.46E-02
zinc-65	Ci	LLD	LLD	LLD	LLD	LLD
strontium-89	Ci	4.76E-05	LLD	LLD	LLD	4.76E-05
strontium-90	Ci	LLD	LLD	LLD	LLD	LLD
zirconium/niobium-95	Ci	3.01E-04	2.56E-04	LLD	5.61E-06	5.63E-04
zirconium/niobium-97	Ci	LLD	LLD	LLD	LLD	LLD
molybdenum-99/technetium-99m	Ci	LLD	LLD	LLD	LLD	LLD
rhodium-105	Ci	LLD	2.94E-04	LLD	LLD	2.94E-04
tin-113	Ci	LLD	LLD	LLD	LLD	LLD
tin-117m	Ci	LLD	LLD	LLD	LLD	LLD
tin-125	Ci	LLD	LLD	LLD	LLD	LLD
silver-110m	Ci	3.91E-03	3.09E-03	7.16E-04	5.52E-04	8.27E-03
antimony-122	Ci	LLD	LLD	LLD	LLD	LLD
antimony-124	Ci	3.14E-04	3.51E-03	1.96E-03	LLD	5.78E-03
antimony-125	Ci	7.44E-03	1.12E-02	1.46E-02	1.44E-02	4.76E-02
antimony-126	Ci	LLD	LLD	LLD	LLD	LLD
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
iodine-133	Ci	LLD	LLD	LLD	LLD	LLD
cesium-134	Ci	LLD	LLD	LLD	LLD	LLD
cesium-137	Ci	5.10E-04	1.75E-04	4.10E-04	2.10E-04	1.30E-03
barium/lanthanum-141	Ci	LLD	4.43E-04	LLD	LLD	4.43E-04
cerium-141	Ci	LLD	LLD	LLD	LLD	LLD
cerium-144	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	2.79E-02	4.07E-02	2.56E-02	2.22E-02	1.16E-01
2. Dissolved and entrained gases						
Argon-41	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	LLD	LLD	LLD	LLD
carbon-14	Ci	N/A	N/A	N/A	N/A	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	ND	ND	ND

LLD = Below the Lower Limit of Detectability, in uCi/ml (Table 4)

Radioactive Effluent Release Report

Calendar Year - 2014

Table 2B-C

Liquid Effluents - Continuous Releases

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission and activation products						
beryllium-7	Ci	N/A	N/A	N/A	N/A	N/A
sodium-24	Ci	N/A	N/A	N/A	N/A	N/A
chromium-51	Ci	N/A	N/A	N/A	N/A	N/A
manganese-54	Ci	N/A	N/A	N/A	N/A	N/A
iron-55	Ci	N/A	N/A	N/A	N/A	N/A
iron-59	Ci	N/A	N/A	N/A	N/A	N/A
cobalt-57	Ci	N/A	N/A	N/A	N/A	N/A
cobalt-58	Ci	N/A	N/A	N/A	N/A	N/A
cobalt-60	Ci	N/A	N/A	N/A	N/A	N/A
zinc-65	Ci	N/A	N/A	N/A	N/A	N/A
strontium-89	Ci	N/A	N/A	N/A	N/A	N/A
strontium-90	Ci	N/A	N/A	N/A	N/A	N/A
zirconium/niobium-95	Ci	N/A	N/A	N/A	N/A	N/A
zirconium/niobium-97	Ci	N/A	N/A	N/A	N/A	N/A
molybdenum-99	Ci	N/A	N/A	N/A	N/A	N/A
technetium-99m	Ci	N/A	N/A	N/A	N/A	N/A
ruthenium-103	Ci	N/A	N/A	N/A	N/A	N/A
silver-110m	Ci	N/A	N/A	N/A	N/A	N/A
antimony-124	Ci	N/A	N/A	N/A	N/A	N/A
antimony-125	Ci	N/A	N/A	N/A	N/A	N/A
iodine-131	Ci	N/A	N/A	N/A	N/A	N/A
iodine-133	Ci	N/A	N/A	N/A	N/A	N/A
cesium-134	Ci	N/A	N/A	N/A	N/A	N/A
cesium-137	Ci	N/A	N/A	N/A	N/A	N/A
barium/lanthanum-140	Ci	N/A	N/A	N/A	N/A	N/A
cerium-141	Ci	N/A	N/A	N/A	N/A	N/A
cerium-144	Ci	N/A	N/A	N/A	N/A	N/A
unidentified	Ci	N/A	N/A	N/A	N/A	N/A
Total for period	Ci	N/A	N/A	N/A	N/A	N/A
2. Dissolved and entrained gases						
argon-41	Ci	N/A	N/A	N/A	N/A	N/A
xenon-133	Ci	N/A	N/A	N/A	N/A	N/A
xenon-133m	Ci	N/A	N/A	N/A	N/A	N/A
xenon-135	Ci	N/A	N/A	N/A	N/A	N/A
carbon-14	Ci	N/A	N/A	N/A	N/A	N/A
unidentified	Ci	N/A	N/A	N/A	N/A	N/A
Total for period	Ci	N/A	N/A	N/A	N/A	N/A

N/A = Not Applicable (liquids not discharged in a continuous mode during this period)

Radioactive Effluent Release Report

Calendar Year - 2014

Table 3A

Solid Waste And Irradiated Fuel Shipments (Part 1 of 3)

A. Solid Waste Shipped Offsite For Burial Or Disposal (Not irradiated fuel)				
1. Type of Waste (Spent resins, Filter Sludges, Evaporator Bottoms, Oil)		1st Half	2nd Half	Estimated Total Error
a. Volume Shipped		1.99E+00 m3	9.37E+00 m3	0.0% (1)
b. Volume Buried		4.63E+00 m3	3.39E+00 m3	0.0% (1)
c. Total Activity		2.69E+00 Ci	1.22E+02 Ci	30.0%
2. Estimate of Major Nuclide Composition by Type of Waste On This Table (2)		Percent (%)	Percent (%)	
H-3		13.50 %	0.72 %	
C-14		9.59 %	0.17 %	
Mn-54		0.00 %	0.10 %	
Fe-55		10.30 %	6.62 %	
Co-58		0.99 %	0.02 %	
Co-60		3.90 %	3.51 %	
Ni-59		0.00 %	0.55 %	
Ni-63		27.50 %	87.60 %	
Zn-65		0.00 %	0.00 %	
Cs-134		0.00 %	0.11 %	
Cs-137		30.90 %	0.43 %	
Sb-125		3.36 %	0.14 %	
Pu-241		0.00 %	0.00 %	
3. Number of Shipments		1	4	
a. Type of Container Used	LSA	1	4	
	Type A	0	0	
	Type B	0	0	
	Large Quantity	0	0	
b. Solidification Agent Used	Cement	0	0	
	Urea Formaldehyde	0	0	
	None	1	4	
c. Mode of Transport	Truck	1	4	
	Rail	0	0	
d. Final Destination	Erwin, TN	0	1	
	Barnwell, SC	1	0	
	Oak Ridge, TN	0	3	
e. Waste Class per 10 CFR Part 61	Class A	1	3	
	Class B	0	1	
	Class C	0	0	
	> Class C	0	0	

(1) Since container volumes are provided by the burial site, a calculational error of zero is assumed.
(2) Percent values for any nuclide that are <0.01 % are not shown on this table. Data is available upon request.

Radioactive Effluent Release Report

Calendar Year - 2014
Table 3B
Solid Waste And Irradiated Fuel Shipments (Part 2 of 3)

A. Solid Waste Shipped Offsite For Burial Or Disposal (Not irradiated fuel)				
1. Type of Waste (Dry Compressible Waste, Contaminated Equipment, etc.)		1st Half	2nd Half	Estimated Total Error
a. Volume Shipped		4.56E+02 m3	1.22E+02 m3	0.0% (1)
b. Volume Buried		6.49E+01 m3	3.19E+01 m3	0.0% (1)
c. Total Activity		8.97E-01 Ci	1.21E+00 Ci	30.0%
2. Estimate of Major Nuclide Composition by Type of Waste On This Table (2)		Percent (%)	Percent (%)	
H-3		3.07 %	1.23 %	
C-14		0.28 %	0.35 %	
Cr-51		0.00 %	0.00 %	
Mn-54		2.65 %	2.85 %	
Fe-55		60.60 %	70.50 %	
Co-58		4.69 %	0.96 %	
Co-60		12.90 %	15.10 %	
Ni-59		0.00 %	0.00 %	
Ni-63		12.20 %	7.24 %	
Sr-90		0.00 %	0.00 %	
Nb-95		0.69 %	0.02 %	
Zn-65		0.42 %	0.49 %	
Zr-95		0.00 %	0.00 %	
Tc-99		0.00 %	0.00 %	
Ag-110m		0.00 %	0.00 %	
Sb-124		0.00 %	0.00 %	
Sb-125		0.53 %	0.19 %	
I-129		0.00 %	0.00 %	
Sn-113		0.70 %	0.52 %	
Cs-137		1.27 %	0.43 %	
Ce-144/Pr-144		0.00 %	0.00 %	
Pu-241		0.00 %	0.00 %	
3. Number of Shipments		11	2	
a. Type of Container Used	LSA	11	2	
	Type A	0	0	
	Type B	0	0	
	Large Quantity	0	0	
b. Solidification Agent Used	Cement	0	0	
	Urea Formaldehyde	0	0	
	None	11	2	
c. Mode of Transport	Truck	11	2	
	Rail	0	0	
	Other	0	0	
d. Final Destination	Oak Ridge, TN	11	2	
	Wampum, PA	0	0	
e. Waste Class per 10 CFR Part 61	Class A	11	2	
	Class B	0	0	
	Class C	0	0	
	> Class C	0	0	

(1) Since container volumes are provided by the burial site, a calculational error of zero is assumed.
(2) Percent values for any nuclide that are <0.01 % are not shown on this table. Data is available upon request.

Radioactive Effluent Release Report

Calendar Year - 2014
Table 3C
Solid Waste And Irradiated Fuel Shipments (Part 3 of 3)

A. Solid Waste Shipped Offsite For Burial Or Disposal (Not irradiated fuel)				
1. Type of Waste (Irradiated components, Control Rods, etc)		1st Half	2nd Half	Estimated Total Error
a. Volume Shipped		0.00E+00 m3	0.00E+00 m3	0.0% (1)
b. Volume Buried		0.00E+00 m3	0.00E+00 m3	0.0% (1)
c. Total Activity		0.00E+00 Ci	0.00E+00 Ci	0.0%
2. Estimate of Major Nuclide Composition by Type of Waste On This Table (2)		Percent (%)	Percent (%)	
3. Number of Shipments		0	0	
a. Type of Container Used	LSA	0	0	
	Type A	0	0	
	Type B	0	0	
	Large Quantity	0	0	
b. Solidification Agent Used	Cement	0	0	
	Urea Formaldehyde	0	0	
	None	0	0	
c. Mode of Transport	Truck	0	0	
	Rail	0	0	
	Other	0	0	
d. Final Destination	Barnwell, SC	0	0	
	Oak Ridge, TN	0	0	
e. Waste Class per 10 CFR Part 61	Class A	0	0	
	Class B	0	0	
	Class C	0	0	
	> Class C	0	0	
B. No Irradiated Fuel Shipments				

(1) Since container volumes are provided by the burial site, a calculational error of zero is assumed.
(2) Percent values for any nuclide that are <0.01 % are not shown on this table. Data is available upon request.

Radioactive Effluent Release Report

Calendar Year - 2014
Table 4
Lower Limits Of Detectability (LLD)

	RWDA-G 1000 cc Gas Grab Sample		RWDA-L 1000 ml Liquid Grab Sample		Filter Paper / Charcoal Continuous Effluent Sample	
Nuclide	(3) Calculated LLD (uCi/cc)	ODCM Required LLD (uCi/cc)	(3) Calculated LLD (uCi/ml)	ODCM Required LLD (uCi/ml)	(3) Calculated (2) LLD (uCi/cc)	ODCM Required LLD (uCi/cc)
H-3	(4) 1.00E-06	1E-06	1.00E-06	1E-06	-------	-----
Na-24	1.05E-07	1E-04	2.36E-08	5E-07	1.00E-13	1E-11
Ar-41	6.36E-08	1E-04	1.43E-08	5E-07	-------	-----
Cr-51	3.43E-07	1E-04	8.25E-08	5E-07	5.44E-13	1E-11
Mn-54	4.87E-08	1E-04	1.12E-08	5E-07	6.83E-14	1E-11
Fe-55	-------	-----	(1) 1.00E-06	1E-06	-------	-----
Fe-59	1.05E-07	1E-04	2.38E-08	5E-07	1.72E-13	1E-11
Co-57	4.93E-08	1E-04	1.30E-08	5E-07	4.82E-14	1E-11
Co-58	7.20E-08	1E-04	1.65E-08	5E-07	9.49E-14	1E-11
Co-60	9.27E-08	1E-04	2.10E-08	5E-07	8.82E-14	1E-11
Zn-65	1.25E-07	1E-04	2.83E-08	5E-07	2.05E-13	1E-11
Se-75	-------	-------	-------	-------	6.30E-14	1E-11
Kr-85	1.38E-05	1E-04	3.23E-06	1E-05	-------	-----
Kr-85m	5.77E-08	1E-04	1.47E-08	1E-05	-------	-----
Kr-87	1.04E-07	1E-04	2.46E-08	1E-05	-------	-----
Kr-88	1.43E-07	1E-04	3.55E-08	1E-05	-------	-----
Sr-89	-------	-----	(1) 5.00E-08	5E-08	(1) 1.00E-13	1E-11
Sr-90	-------	-----	(1) 5.00E-08	5E-08	(1) 1.00E-14	1E-11
Sr-92	1.24E-07	1E-04	2.78E-08	5E-07	1.16E-13	1E-11
Nb-95	3.97E-08	1E-04	9.15E-09	5E-07	7.82E-14	1E-11
Nb-97	5.10E-08	1E-04	1.19E-08	5E-07	6.19E-14	1E-11
Zr-95	8.21E-08	1E-04	1.89E-08	5E-07	1.98E-13	1E-11
Mo-99	5.58E-08	1E-04	1.44E-08	5E-07	3.67E-14	1E-11
Tc-99m	5.47E-08	1E-04	1.41E-08	5E-07	3.60E-14	1E-11
Ag-110m	4.61E-08	1E-04	1.07E-08	5E-07	5.98E-14	1E-11
Sb-124	4.39E-08	1E-04	1.02E-08	5E-07	6.21E-14	1E-11
Sb-125	1.90E-07	1E-04	4.49E-08	5E-07	2.34E-13	1E-11
I-131	6.08E-08	1E-04	1.45E-08	1E-06	6.61E-14	1E-12
I-133	5.40E-08	1E-04	1.26E-08	5E-07	1.04E-13	1E-10
I-135	3.50E-07	1E-04	7.92E-08	5E-07	6.19E-13	1E-11
Xe-131m	2.01E-06	1E-04	5.07E-07	1E-05	-------	-----
Xe-133	1.10E-07	1E-04	3.28E-08	1E-05	-------	-----
Xe-133m	3.50E-07	1E-04	8.59E-08	1E-05	-------	-----
Xe-135	3.22E-08	1E-04	7.86E-09	1E-05	-------	-----
Xe-135m	6.79E-08	1E-04	1.59E-08	1E-05	-------	-----
Xe-137	8.24E-07	1E-04	1.94E-07	1E-05	-------	-----
Xe-138	2.06E-07	1E-04	5.03E-08	1E-05	-------	-----
Cs-134	4.83E-08	1E-04	1.13E-08	5E-07	5.40E-14	1E-11
Cs-137	5.41E-08	1E-04	1.26E-08	5E-07	8.17E-14	1E-11
Ba-139	2.63E-07	1E-04	6.61E-08	5E-07	1.97E-13	1E-11
Ba-140	1.87E-07	1E-04	4.38E-08	5E-07	2.21E-13	1E-11
La-140	6.99E-08	1E-04	1.66E-08	5E-07	1.17E-13	1E-11
Ce-141	9.02E-08	1E-04	2.31E-08	5E-07	7.29E-14	1E-11
Ce-144	4.08E-07	1E-04	1.05E-07	5E-07	4.41E-13	1E-11
Gross Alpha	-------	-----	(1) 1.00E-07	1E-07	(1) 3.51E-15	1E-11

(1) Sample analyses performed by a contractor laboratory.

(2) These LLD calculations contain a default weekly continuous sample volume of 2.85E+8 cc. Therefore, grab sample LLD values reflect a different volume (ie; 10 cuft or 2.83E+5 cc).

(3) The calculated LLD's, except those denoted by (1), are from a counter/detector calibration on 10/1/14. These values are typical for other counter/detectors used for effluent counting at BVPS.

(4) Based on counting 50 ml of the water that was bubbled through a 20 liter air sample.

Radioactive Effluent Release Report

Calendar Year - 2014
Table 5A
Assessment Of Radiation Doses

		Unit 1 Liquid Effluents									
		1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Calendar Year	
	Batch Releases	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit
	Bone	9.33E-03	0.1866	2.43E-03	0.0486	3.97E-03	0.0794	2.45E-03	0.0490	1.82E-02	0.1818
O	Liver	1.55E-02	0.3100	1.35E-02	0.2700	1.16E-02	0.2320	9.62E-03	0.1924	5.02E-02	0.5022
R	Total Body	1.24E-02	0.8267	1.24E-02	0.8267	9.80E-03	0.6533	8.66E-03	0.5773	4.33E-02	1.4420
G	Thyroid	5.51E-03	0.1102	1.00E-02	0.2000	6.34E-03	0.1268	6.53E-03	0.1306	2.84E-02	0.2838
A	Kidney	9.01E-03	0.1802	1.12E-02	0.2240	8.09E-03	0.1618	7.58E-03	0.1516	3.59E-02	0.3588
N	Lung	6.67E-03	0.1334	1.04E-02	0.2080	6.97E-03	0.1394	6.95E-03	0.1390	3.10E-02	0.3099
(1)	GI-LLI	7.15E-03	0.1430	1.21E-02	0.2420	6.93E-03	0.1386	7.24E-03	0.1448	3.34E-02	0.3342

		Unit 1 Gaseous Effluents									
		1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Calendar Year	
	Batch & Continuous Releases	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit
(2)	Gamma Air	0.00E+00	0.0000	3.64E-11	0.0000	0.00E+00	0.0000	0.00E+00	0.0000	3.64E-11	0.0000
(2)	Beta Air	0.00E+00	0.0000	1.72E-13	0.0000	0.00E+00	0.0000	0.00E+00	0.0000	1.72E-13	0.0000
	Bone	2.07E-08	0.0000	3.21E-09	0.0000	2.22E-09	0.0000	0.00E+00	0.0000	2.61E-08	0.0000
O	Liver	1.59E-02	0.2120	2.47E-03	0.0329	5.82E-03	0.0776	6.49E-03	0.0865	3.07E-02	0.2045
R	Total Body	1.59E-02	0.2120	2.47E-03	0.0329	5.82E-03	0.0776	6.49E-03	0.0865	3.07E-02	0.2045
G	Thyroid	1.59E-02	0.2120	2.47E-03	0.0329	5.82E-03	0.0776	6.49E-03	0.0865	3.07E-02	0.2045
A	Kidney	1.59E-02	0.2120	2.47E-03	0.0329	5.82E-03	0.0776	6.49E-03	0.0865	3.07E-02	0.2045
N	Lung	1.59E-02	0.2120	2.47E-03	0.0329	5.82E-03	0.0776	6.49E-03	0.0865	3.07E-02	0.2045
(3)	GI-LLI	1.59E-02	0.2120	2.47E-03	0.0329	5.82E-03	0.0776	6.49E-03	0.0865	3.07E-02	0.2045

(1) These doses are listed in mrem; they are calculated for the maximum individual for all batch liquid effluents

(2) These doses are listed in mrad; they are calculated at the site boundary for batch & continuous gaseous effluents (0.4 miles NW)

(3) These doses are listed in mrem; they are calculated for the most likely exposed real individual (child) via all real pathways at 0.89 miles NW.

Limits used for calculation of percent (%) are from ODCM procedure 1/2-ODC-3.03, Attachment H Control 3.11.1.2, Attachment L Control 3.11.2.2, and Attachment M Control 3.11.2.3 (considered to be the design objectives).

Radioactive Effluent Release Report

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Table 5B
Assessment Of Radiation Doses

		Unit 2 Liquid Effluents									
		1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Calendar Year	
	Batch Releases	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit
	Bone	9.33E-03	0.1866	2.43E-03	0.0486	3.97E-03	0.0794	2.45E-03	0.0490	1.82E-02	0.1818
O	Liver	1.55E-02	0.3100	1.35E-02	0.2700	1.16E-02	0.2320	9.62E-03	0.1924	5.02E-02	0.5022
R	Total Body	1.24E-02	0.8267	1.24E-02	0.8267	9.80E-03	0.6533	8.66E-03	0.5773	4.33E-02	1.4420
G	Thyroid	5.51E-03	0.1102	1.00E-02	0.2000	6.34E-03	0.1268	6.53E-03	0.1306	2.84E-02	0.2838
A	Kidney	9.01E-03	0.1802	1.12E-02	0.2240	8.09E-03	0.1618	7.58E-03	0.1516	3.59E-02	0.3588
N	Lung	6.67E-03	0.1334	1.04E-02	0.2080	6.97E-03	0.1394	6.95E-03	0.1390	3.10E-02	0.3099
(1)	GI-LLI	7.15E-03	0.1430	1.21E-02	0.2420	6.93E-03	0.1386	7.24E-03	0.1448	3.34E-02	0.3342

		Unit 2 Gaseous Effluents									
		1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Calendar Year	
	Batch & Continuous Releases	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit
(2)	Gamma Air	0.00E+00	0.0000	3.92E-06	0.0001	0.00E+00	0.0000	0.00E+00	0.0000	3.92E-06	0.0000
(2)	Beta Air	0.00E+00	0.0000	6.94E-09	0.0000	0.00E+00	0.0000	0.00E+00	0.0000	6.94E-09	0.0000
	Bone	2.07E-08	0.0000	1.42E-04	0.0019	2.22E-09	0.0000	0.00E+00	0.0000	1.42E-04	0.0009
O	Liver	1.25E-02	0.1667	1.28E-02	0.1707	1.05E-02	0.1400	6.52E-03	0.0869	4.23E-02	0.2821
R	Total Body	1.25E-02	0.1667	1.28E-02	0.1707	1.05E-02	0.1400	6.52E-03	0.0869	4.23E-02	0.2821
G	Thyroid	1.25E-02	0.1667	1.28E-02	0.1707	1.05E-02	0.1400	6.52E-03	0.0869	4.23E-02	0.2821
A	Kidney	1.25E-02	0.1667	1.28E-02	0.1707	1.05E-02	0.1400	6.52E-03	0.0869	4.23E-02	0.2821
N	Lung	1.25E-02	0.1667	1.28E-02	0.1707	1.05E-02	0.1400	6.52E-03	0.0869	4.23E-02	0.2821
(3)	GI-LLI	1.25E-02	0.1667	1.28E-02	0.1707	1.05E-02	0.1400	6.52E-03	0.0869	4.23E-02	0.2821

(1) These doses are listed in mrem; they are calculated for the maximum individual for all batch liquid effluents

(2) These doses are listed in mrad; they are calculated at the site boundary for batch & continuous gaseous effluents (0.4 miles NW)

(3) These doses are listed in mrem; they are calculated for the most likely exposed real individual (child) via all real pathways at 0.89 miles NW.

Limits used for calculation of percent (%) are from ODCM procedure 1/2-ODC-3.03, Attachment H Control 3.11.1.2, Attachment L Control 3.11.2.2, and Attachment M Control 3.11.2.3 (considered to be the design objectives).

Radioactive Effluent Release Report

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Table 6

Effluent Monitoring Instrumentation Channels Not Returned To Operable Status Within 30 Days
There were several Effluent Monitoring Instrumentation Channels that were not returned to operable status within 30 days. **1) Unit 1 SPING Monitors, RM-1VS-109, RM-1VS-110,RM-1GW-109** - On 11/20/14 the SPING Radiation monitors (RM-1VS-109, RM-1VS-110, RM-1GW-109) were removed from service in support to ECP 10-0150, Replacement of BV1 Effluent Radiation Monitoring System Components. The thirty (30) day return to service criteria was exceeded due to extended timeline of ECP completion. The monitors were returned to service 2/27/15 (reference CR 2014-18702)

Radioactive Effluent Release Report

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Table 7

Total Dose Commitments, Total Effective Dose Equivalents and Population Doses

Total Dose Commitment From All Facility Releases To Members of the Public 40 CFR 190.10(a) Environmental Doses				
Organ	(1) Effluent Dose (mrem)	(2) Direct Radiation Dose (mrem)	Total Dose (mrem)	% of ODCM or 40 CFR 190 Limit
Bone	3.65E-02	0.00E+00	3.65E-02	0.15%
Liver	1.73E-01	0.00E+00	1.73E-01	0.69%
Total Body	1.60E-01	0.00E+00	1.60E-01	0.64%
Thyroid	1.30E-01	0.00E+00	1.30E-01	0.17%
Kidney	1.45E-01	0.00E+00	1.45E-01	0.58%
Lung	1.35E-01	0.00E+00	1.35E-01	0.54%
GI-LLI	1.40E-01	0.00E+00	1.40E-01	0.56%

(1) The cumulative dose contributions from liquid and gaseous effluents were determined in accordance with the applicable CONTROLS & SURVEILLANCE REQUIREMENTS listed in ODCM procedure 1/2-ODC-3.03. The dose commitment limits for 40 CFR 190 MEMBERS OF THE PUBLIC (ODCM 1/2-ODC-3.03 Control 3.11.4.1) are as follows:
a) < or = 25 mrem / calendar year (for the total body, or any organ except the thyroid)
b) < or = 75 mrem / calendar year (for the thyroid)

(2) The dose contribution listed for the total body is for Direct Radiation. This was calculated by comparing offsite TLD exposure at the ODCM controlling location (0.8 miles NW; Midland, PA) to TLD exposure at the REMP control location (16.5 miles SSW; Weirton, WV).

Compliance to 100 mrem Limit of 10 CFR 20.1301 For Total Effective Dose Equivalent

Pursuant to 10 CFR 20.1301(a)(1), the Total Effective Dose Equivalent from licensed operation to the maximum individual during the report period, is 5.56 mrem. This is a summation of Direct Radiation Exposure (calculated by comparing the maximum of all perimeter TLD exposures to TLD exposure at the REMP control location) plus Effluent Doses (calculated per the ODCM).

Members of the Public Doses Due To Their Activities Inside The Site Boundary

The radiation doses for MEMBER(S) OF THE PUBLIC due to their activities inside the site boundary are not greater than the doses listed in this table to show compliance with 40 CFR Part 190 or 10 CFR 20.1301. Evaluations have shown that exposure time for individuals not occupationally associated with the plant site is minimal in comparison to the exposure time considered for the dose calculation at or beyond the site boundary. Therefore, a separate assessment of radiation doses from radioactive effluents to MEMBER(S) OF THE PUBLIC, due to their activities inside the site boundary, is not necessary for this report period.

0-50 Mile Population Doses From Liquid and Gaseous Effluents

0-50 mile Total Population Dose from liquid and gaseous effluents =	72	man-mrem (Total Body)
0-50 mile Average Population Dose from liquid and gaseous effluents =	0.0000179	man-mrem (Total Body)

Radioactive Effluent Release Report

Calendar Year - 2014
Table 8

Offsite Dose Calculation Manual Surveillance Deficiencies

There were two Offsite Dose Calculation Manual Surveillance Deficiencies during the reporting period 2013.

1) In March of 2014, a shiftly channel check was not performed. Reactor Operators thought the radiation monitor (2MSS-RQI101C) was OOS and thus did not perform the required channel check. The radiation monitor had been returned to service on 2/18/14 19:26. The channel check was performed 3/1/2014 18:13.
This condition is documented in CR 2014-04159.

2) In September of 2014, the REMP technician collected weekly drinking water samples from Station #5 from 9/9/14 to 9/16/14. The sample was shipped on 9/16/14. Upon receiving the shipment, the vendor noted that the package had been damaged in transit and the majority of the sample had spilled inside the shipment container. This condition is documented in CR 2014-15056.

Radioactive Effluent Release Report

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Table 9

Unit 1 and 2 Offsite Dose Calculation Manual Changes (Description)

There was two changes made to the ODCM during the report period. See ODCM procedure 1/2-ODC-1.01, "ODCM: Index, Matrix and History ODCM Changes" for a complete description of the change and the change justification. A brief description of the change is as follows:

Change (36) to the ODCM (Effective February 2014)

1) **Procedure 1/2-ODC-1.01, "ODCM: Index, Matrix and History of ODCM Changes" (Rev 19)**
   Updated the History of ODCM changes to include this change.

2) **Procedure 1/2-ODC-2.01, "ODCM: Liquid Effluents" (Rev 14)**
   Added descriptions of the new Unit 1 Liquid Radwaste System componets that were installed via ECP 12-0478.

3) **Procedure 1/2-ODC-2.02, "ODCM: Gaseous Effluents" (Rev 4)**
   Added dose equations and dose factors for carbon-14 and dose factors for antimony-126.

4) **Procedure 1/2-ODC-2.03, "ODCM: Radiological Environmental Monitoring Program" (Rev 5)**
   Removed Searight's Dairy farm from milk sample locations.

Change (37) to the ODCM (Effective September 2014)

1) **Procedure 1/2-ODC-1.01, "ODCM: Index, Matrix and History of ODCM Changes" (Rev 20)**
   Updated the History of ODCM changes to include this change and added 10 CFR 72.104 to the reference and acceptance criteria.

2) **Procedure 1/2-ODC-2.02, "ODCM: Gaseous Effluents" (Rev 5)**
   Added definitions for "1.1" in equation 2.1(2)-18 and added 10 CFR 72.104 to the reference and acceptance criteria.

3) **Procedure 1/2-ODC-2.03, "ODCM: Radiological Environmental Monitoring Program" (Rev 6)**
   Added 10 CFR 72.104 to the reference and acceptance criteria.

4) **Procedure 1/2-ODC-2.04, "ODCM: Information Related to 40 CFR 190" (Rev 2)**
   Added 10 CFR 72.104 to the reference and acceptance criteria.

5) **Procedure 1/2-ODC-3.03, "ODCM: Controls for RETS and REMP Programs" (Rev 12)**
   Added 10 CFR 72.104 to the reference and acceptance criteria and noted ISFSI dose considerations are

ENCLOSURE 2, ATTACHMENT 1

Beaver Valley Power Station - Units 1 & 2

Radioactive Effluent Release Report

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Attachment 1
Joint Frequency Distribution Tables

Attachment 1

As specified in the ODCM, an annual summary of hourly meteorological data (in the form of joint frequency distribution) is provided for the calendar year. In summary, the joint frequency distribution data is similar to previous years and close to long-term normals.

Meteorological Data Recovery

The Meteorological Data Recovery for the calendar year met the minimum requirement of at least 90% (as specified in Section 5 of Revision 1 to Regulatory Guide 1.23, Meteorological Monitoring Programs for Nuclear Power Plants). The actual Meteorological Data Recovery is shown in the following table:

PERCENT RECOVERY OF INDIVIDUAL METEOROLOGICAL PARAMETERS
98.5% = Wind Speed 35'
98.7% = Wind Speed 150'
97.9% = Wind Speed 500'
98.7% = Wind Direction 35'
98.7% = Wind Direction 150'
98.9% = Wind Direction 500'
98.7% = Delta Temperature (150' - 35') 1P
98.7% = Delta Temperature (500' - 35') 2P
97.3% = Temperature 35'
99.1% = Precipitation
98.5% = Average Recovery of Individual Meteorological Parameters
PERCENT RECOVERY OF COMPOSITE VARIABLES
98.7% = Wind Speed 35', Wind Direction 35', Delta Temperature 1P
98.7% = Wind Speed 150', Wind Direction 150', Delta Temperature 1P
97.1% = Wind Speed 500', Wind Direction 500', Delta Temperature 2P
98.3% = Average Recovery of Composite Variables

Attachment 1 Clarification

Hourly meteorological data is not provided for specific periods of Abnormal Gaseous Release during the calendar quarters (as indicated in Regulatory Guide 1.21), for the following reasons:

1) All routine Gaseous Releases for the calendar year were determined to be within design objectives, in which, the ODCM Dose Limits and the ODCM Dose Rate Limits are considered to be the design objectives.

2) There were no Abnormal Gaseous Releases during the calendar year.

For a copy of the hourly meteorological data during the calendar quarters, contact Rebecca Novak at 724-682-4255.

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

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Attachment 1

Part 1: Joint Frequency Distribution Tables (35ft)

Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP35P **Direction:** DI35P **Lapse:** DT150-35
Stability Class A Delta Temperature Extremely Unstable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	32	57	1	0	0	0	90
NNE	39	41	0	0	0	0	80
NE	35	17	0	0	0	0	52
ENE	25	24	0	0	0	0	49
E	26	30	0	0	0	0	56
ESE	23	22	0	0	0	0	45
SE	32	18	0	0	0	0	50
SSE	28	29	0	0	0	0	57
S	5	29	1	0	0	0	35
SSW	10	69	8	1	0	0	88
SW	7	55	42	3	0	0	107
WSW	18	80	26	1	0	0	125
W	30	148	27	0	0	0	205
WNW	41	103	19	0	0	0	163
NW	27	56	8	0	0	0	91
NNW	26	47	3	0	0	0	76
Total	404	825	135	5	0	0	1369

Calm Hours not Included above for :	**Total Period**	90
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	1369
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

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Part 1: Joint Frequency Distribution Tables (35ft)

Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP35P **Direction:** DI35P **Lapse:** DT150-35
Stability Class B Delta Temperature Moderately Unstable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	7	11	0	0	0	0	18
NNE	3	3	0	0	0	0	6
NE	5	2	0	0	0	0	7
ENE	4	2	0	0	0	0	6
E	3	0	0	0	0	0	3
ESE	6	2	0	0	0	0	8
SE	1	0	0	0	0	0	1
SSE	1	1	0	0	0	0	2
S	0	3	0	0	0	0	3
SSW	1	13	3	0	0	0	17
SW	3	14	10	0	0	0	27
WSW	2	9	9	0	0	0	20
W	5	15	14	0	0	0	34
WNW	7	14	4	0	0	0	25
NW	6	12	0	0	0	0	18
NNW	5	10	0	0	0	0	15
Total	59	111	40	0	0	0	210

Calm Hours not Included above for :	**Total Period**	90
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	210
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

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Part 1: Joint Frequency Distribution Tables (35ft)

Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP35P **Direction:** DI35P **Lapse:** DT150-35
Stability Class C Delta Temperature Slightly Unstable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	4	7	0	0	0	0	11
NNE	8	8	0	0	0	0	16
NE	1	2	0	0	0	0	3
ENE	3	1	0	0	0	0	4
E	2	2	0	0	0	0	4
ESE	1	1	0	0	0	0	2
SE	3	0	0	0	0	0	3
SSE	1	1	0	0	0	0	2
S	5	6	1	0	0	0	12
SSW	2	3	5	1	0	0	11
SW	5	15	12	2	0	0	34
WSW	11	16	18	1	0	0	46
W	7	27	17	0	0	0	51
WNW	8	21	6	0	0	0	35
NW	8	9	2	0	0	0	19
NNW	5	7	1	0	0	0	13
Total	74	126	62	4	0	0	266

Calm Hours not Included above for :	**Total Period**	90
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	266
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

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Attachment 1

Part 1: Joint Frequency Distribution Tables (35ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP35P **Direction:** DI35P **Lapse:** DT150-35
Stability Class D Delta Temperature Neutral

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	83	76	0	0	0	0	159
NNE	108	25	0	0	0	0	133
NE	109	14	0	0	0	0	123
ENE	94	50	0	0	0	0	144
E	44	23	0	0	0	0	67
ESE	33	3	0	0	0	0	36
SE	24	3	0	0	0	0	27
SSE	32	10	0	0	0	0	42
S	29	39	1	0	0	0	69
SSW	58	70	21	1	0	0	150
SW	73	183	116	16	1	0	389
WSW	71	200	124	12	0	0	407
W	61	268	90	1	0	0	420
WNW	83	157	11	0	0	0	251
NW	99	200	7	0	0	0	306
NNW	94	115	1	0	0	0	210
Total	1095	1436	371	30	1	0	2933

Calm Hours not Included above for :	**Total Period**	90
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	2933
	Total Hours for Period	8760

Beaver Valley Power Station – Units 1 & 2

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Part 1: Joint Frequency Distribution Tables (35ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP35P **Direction:** DI35P **Lapse:** DT150-35
Stability Class E Delta Temperature Slightly Stable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	83	12	0	0	0	0	95
NNE	105	4	0	0	0	0	109
NE	188	15	0	0	0	0	203
ENE	185	27	0	0	0	0	212
E	139	14	0	0	0	0	153
ESE	96	3	0	0	0	0	99
SE	82	1	0	0	0	0	83
SSE	104	5	0	0	0	0	109
S	153	45	2	0	0	0	200
SSW	155	99	8	0	0	0	262
SW	108	87	36	3	0	0	234
WSW	63	52	37	2	0	0	154
W	56	41	13	1	0	0	111
WNW	39	16	6	0	0	0	61
NW	106	9	0	0	0	0	115
NNW	56	13	0	0	0	0	69
Total	1718	443	102	6	0	0	2269

Calm Hours not Included above for :	**Total Period**	90
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	2269
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

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Part 1: Joint Frequency Distribution Tables (35ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP35P **Direction:** DI35P **Lapse:** DT150-35
Stability Class F Delta Temperature Moderately Stable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	15	4	0	0	0	0	19
NNE	19	1	0	0	0	0	20
NE	30	0	0	0	0	0	30
ENE	42	0	0	0	0	0	42
E	92	0	0	0	0	0	92
ESE	167	0	0	0	0	0	167
SE	182	0	0	0	0	0	182
SSE	146	1	0	0	0	0	147
S	110	5	0	0	0	0	115
SSW	70	7	0	0	0	0	77
SW	40	3	0	0	0	0	43
WSW	18	0	0	0	0	0	18
W	9	3	0	0	0	0	12
WNW	8	1	0	0	0	0	9
NW	11	0	0	0	0	0	11
NNW	7	0	0	0	0	0	7
Total	966	25	0	0	0	0	991

Calm Hours not Included above for :	**Total Period**	90
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	991
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2

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Part 1: Joint Frequency Distribution Tables (35ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP35P **Direction:** DI35P **Lapse:** DT150-35
Stability Class G Delta Temperature Extremely Stable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	7	1	0	0	0	0	8
NNE	6	0	0	0	0	0	6
NE	21	0	0	0	0	0	21
ENE	35	0	0	0	0	0	35
E	61	0	0	0	0	0	61
ESE	93	0	0	0	0	0	93
SE	95	1	0	0	0	0	96
SSE	55	0	0	0	0	0	55
S	44	3	0	0	0	0	47
SSW	42	5	0	0	0	0	47
SW	30	1	0	0	0	0	31
WSW	15	0	0	0	0	0	15
W	5	0	0	0	0	0	5
WNW	6	0	0	0	0	0	6
NW	9	0	0	0	0	0	9
NNW	7	0	0	0	0	0	7
Total	531	11	0	0	0	0	542

Calm Hours not Included above for :	**Total Period**	90
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	542
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

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Attachment 1

Part 1: Joint Frequency Distribution Tables (35ft)

Hours at Each Wind Speed and Direction

Summary of All Stability Classes

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP35P **Direction:** DI35P **Lapse:** DT150-35

Delta Temperature

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	231	168	1	0	0	0	400
NNE	288	82	0	0	0	0	370
NE	389	50	0	0	0	0	439
ENE	388	104	0	0	0	0	492
E	367	69	0	0	0	0	436
ESE	419	31	0	0	0	0	450
SE	419	23	0	0	0	0	442
SSE	367	47	0	0	0	0	414
S	346	130	5	0	0	0	481
SSW	338	266	45	3	0	0	652
SW	266	358	216	24	1	0	865
WSW	198	357	214	16	0	0	785
W	173	502	161	2	0	0	838
WNW	192	312	46	0	0	0	550
NW	266	286	17	0	0	0	569
NNW	200	192	5	0	0	0	397
Total	4847	2977	710	45	1	0	8580

Calm Hours not Included above for :	**Total Period**	90
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	8580
	Total Hours for Period	8760

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Radioactive Effluent Release Report

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Part 2: Joint Frequency Distribution Tables (150ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP150P **Direction:** DI150P **Lapse:** DT150-35
Stability Class A Delta Temperature Extremely Unstable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	8	52	23	1	0	0	84
NNE	7	48	38	4	0	0	97
NE	8	18	7	0	0	0	33
ENE	5	44	15	1	0	0	65
E	2	29	14	1	0	0	46
ESE	3	33	30	0	0	0	66
SE	4	45	32	2	0	0	83
SSE	3	27	27	1	0	0	58
S	1	15	48	4	0	0	68
SSW	1	15	30	8	1	0	55
SW	3	10	38	9	3	0	63
WSW	5	25	49	15	0	0	94
W	13	83	78	31	6	0	211
WNW	6	61	90	52	5	0	214
NW	5	31	33	4	0	0	73
NNW	11	26	20	2	0	0	59
Total	85	562	572	135	15	0	1369

Calm Hours not Included above for :	**Total Period**	0
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	1369
Total Hours for Period		8760

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Part 2: Joint Frequency Distribution Tables (150ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP150P **Direction:** DI150P **Lapse:** DT150-35
Stability Class B Delta Temperature Moderately Unstable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	0	7	5	0	0	0	12
NNE	1	6	3	1	0	0	11
NE	1	4	0	0	0	0	5
ENE	2	5	1	0	0	0	8
E	1	4	1	0	0	0	6
ESE	0	4	2	0	0	0	6
SE	0	1	1	0	0	0	2
SSE	0	1	1	1	0	0	3
S	0	1	6	0	0	0	7
SSW	3	4	9	4	0	0	20
SW	0	2	6	5	0	0	13
WSW	1	3	8	1	0	0	13
W	3	10	12	15	5	0	45
WNW	4	7	17	6	1	0	35
NW	4	4	2	1	0	0	11
NNW	2	3	8	0	0	0	13
Total	22	66	82	34	6	0	210

Calm Hours not Included above for :	**Total Period**	0
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	210
Total Hours for Period		8760

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Part 2: Joint Frequency Distribution Tables (150ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP150P **Direction:** DI150P **Lapse:** DT150-35
Stability Class C Delta Temperature Slightly Unstable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	0	3	2	0	0	0	5
NNE	2	11	4	3	0	0	20
NE	0	3	0	0	0	0	3
ENE	0	3	1	0	0	0	4
E	0	1	1	0	0	0	2
ESE	0	1	2	0	0	0	3
SE	2	3	1	0	0	0	6
SSE	1	3	0	0	0	0	4
S	0	6	8	1	0	0	15
SSW	2	3	5	3	1	0	14
SW	2	4	7	10	0	0	23
WSW	2	7	11	10	1	0	31
W	4	12	18	21	5	0	60
WNW	3	9	24	12	1	0	49
NW	8	3	5	2	0	0	18
NNW	1	3	5	0	0	0	9
Total	27	75	94	62	8	0	266

Calm Hours not Included above for :	**Total Period**	0
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	266
Total Hours for Period		8760

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Part 2: Joint Frequency Distribution Tables (150ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP150P **Direction:** DI150P **Lapse:** DT150-35
Stability Class D Delta Temperature Neutral

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	27	70	63	3	0	0	163
NNE	34	63	33	4	0	0	134
NE	33	48	3	0	0	0	84
ENE	34	81	61	0	0	0	176
E	16	42	7	1	0	0	66
ESE	10	18	9	1	0	0	38
SE	12	19	7	0	0	0	38
SSE	15	25	15	2	0	0	57
S	14	39	37	5	0	0	95
SSW	20	38	49	19	1	0	127
SW	26	69	114	42	10	1	262
WSW	35	104	148	62	9	0	358
W	29	74	243	189	22	1	558
WNW	18	101	171	55	3	0	348
NW	28	121	110	8	1	0	268
NNW	11	101	50	0	0	0	162
Total	362	1013	1120	391	46	2	2934

Calm Hours not Included above for :	**Total Period**	0
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	2934
Total Hours for Period		8760

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Part 2: Joint Frequency Distribution Tables (150ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP150P **Direction:** DI150P **Lapse:** DT150-35
Stability Class E Delta Temperature Slightly Stable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	41	37	16	0	0	0	94
NNE	74	39	9	0	0	0	122
NE	90	96	2	0	0	0	188
ENE	67	171	33	0	0	0	271
E	47	62	15	1	0	0	125
ESE	32	35	14	0	0	0	81
SE	21	39	12	0	0	0	72
SSE	36	31	11	2	0	0	80
S	42	56	55	5	0	0	158
SSW	72	84	49	5	1	0	211
SW	71	67	84	16	2	0	240
WSW	45	56	54	20	3	0	178
W	32	58	37	27	4	1	159
WNW	28	79	27	9	4	0	147
NW	22	55	11	0	0	0	88
NNW	29	38	5	0	0	0	72
Total	749	1003	434	85	14	1	2286

Calm Hours not Included above for :	**Total Period**	0
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	2286
Total Hours for Period		8760

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Part 2: Joint Frequency Distribution Tables (150ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP150P **Direction:** DI150P **Lapse:** DT150-35
Stability Class F Delta Temperature Moderately Stable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	54	4	1	0	0	0	59
NNE	94	15	0	0	0	0	109
NE	99	64	0	0	0	0	163
ENE	56	69	0	0	0	0	125
E	24	22	0	0	0	0	46
ESE	15	6	0	0	0	0	21
SE	5	1	0	0	0	0	6
SSE	11	10	0	0	0	0	21
S	31	23	3	0	0	0	57
SSW	63	50	3	0	0	0	116
SW	90	48	0	0	0	0	138
WSW	33	28	1	0	0	0	62
W	17	12	0	1	0	0	30
WNW	12	14	3	0	0	0	29
NW	23	7	0	0	0	0	30
NNW	19	6	0	0	0	0	25
Total	646	379	11	1	0	0	1037

Calm Hours not Included above for :	**Total Period**	0
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	1037
Total Hours for Period		8760

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Part 2: Joint Frequency Distribution Tables (150ft)

Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP150P **Direction:** DI150P **Lapse:** DT150-35
Stability Class G Delta Temperature Extremely Stable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	18	2	0	0	0	0	20
NNE	42	24	0	0	0	0	66
NE	57	55	0	0	0	0	112
ENE	26	24	0	0	0	0	50
E	13	9	0	0	0	0	22
ESE	9	10	0	0	0	0	19
SE	9	10	0	0	0	0	19
SSE	5	10	2	0	0	0	17
S	17	17	4	0	0	0	38
SSW	33	33	2	0	0	0	68
SW	27	19	3	0	0	0	49
WSW	15	11	4	0	0	0	30
W	12	2	0	0	0	0	14
WNW	10	8	0	0	0	0	18
NW	9	2	0	0	0	0	11
NNW	12	3	0	0	0	0	15
Total	314	239	15	0	0	0	568

Calm Hours not Included above for :	**Total Period**	0
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	568
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2

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Part 2: Joint Frequency Distribution Tables (150ft)
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Hours at Each Wind Speed and Direction

Summary of All Stability Classes

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00

Elevation: **Speed:** SP150P **Direction:** DI150P **Lapse:** DT150-35

Delta Temperature

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	148	175	110	4	0	0	437
NNE	254	206	87	12	0	0	559
NE	288	288	12	0	0	0	588
ENE	190	397	111	1	0	0	699
E	103	169	38	3	0	0	313
ESE	69	107	57	1	0	0	234
SE	53	118	53	2	0	0	226
SSE	71	107	56	6	0	0	240
S	105	157	161	15	0	0	438
SSW	194	227	147	39	4	0	611
SW	219	219	252	82	15	1	788
WSW	136	234	275	108	13	0	766
W	110	251	388	284	42	2	1077
WNW	81	279	332	134	14	0	840
NW	99	223	161	15	1	0	499
NNW	85	180	88	2	0	0	355
Total	2205	3337	2328	708	89	3	8670

Calm Hours not Included above for :	**Total Period**	0
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	90
Valid Hours for this Stability Class for:	**Total Period**	8670
Total Hours for Period		8760

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Part 3: Joint Frequency Distribution Tables (500ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP500P **Direction:** DI500P **Lapse:** DT500-35
Stability Class A Delta Temperature Extremely Unstable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	0	3	2	0	0	0	5
NNE	0	3	2	1	0	0	6
NE	0	2	1	0	0	0	3
ENE	0	7	4	0	0	0	11
E	0	6	2	0	0	0	8
ESE	0	4	8	1	0	0	13
SE	0	5	15	2	0	0	22
SSE	0	7	11	0	0	0	18
S	0	0	3	0	0	0	3
SSW	0	2	2	1	0	0	5
SW	0	0	0	0	0	0	0
WSW	0	1	3	0	0	0	4
W	0	2	1	0	0	0	3
WNW	0	3	3	2	0	0	8
NW	0	1	4	2	0	0	7
NNW	1	2	0	0	0	0	3
Total	1	48	61	9	0	0	119

Calm Hours not Included above for :	**Total Period**	1
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	211
Valid Hours for this Stability Class for:	**Total Period**	119
Total Hours for Period		8760

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Part 3: Joint Frequency Distribution Tables (500ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP500P **Direction:** DI500P **Lapse:** DT500-35
Stability Class B Delta Temperature Moderately Unstable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	3	8	7	5	0	0	23
NNE	3	1	3	2	0	0	9
NE	1	1	3	0	0	0	5
ENE	1	14	2	1	0	0	18
E	1	7	5	1	0	0	14
ESE	0	6	16	1	0	0	23
SE	0	14	8	1	0	0	23
SSE	0	3	6	1	0	0	10
S	0	4	5	8	0	0	17
SSW	0	1	2	1	0	0	4
SW	0	2	5	1	1	0	9
WSW	1	2	7	0	0	0	10
W	0	7	16	4	0	0	27
WNW	0	1	8	8	5	1	23
NW	0	2	8	1	0	0	11
NNW	0	4	6	3	0	0	13
Total	10	77	107	38	6	1	239

Calm Hours not Included above for :	**Total Period**	1
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	211
Valid Hours for this Stability Class for:	**Total Period**	239
Total Hours for Period		8760

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Part 3: Joint Frequency Distribution Tables (500ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP500P **Direction:** DI500P **Lapse:** DT500-35
Stability Class C Delta Temperature Slightly Unstable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	3	12	13	3	0	0	31
NNE	1	6	7	3	0	0	17
NE	1	7	3	0	0	0	11
ENE	0	9	2	0	0	0	11
E	0	8	5	0	0	0	13
ESE	0	6	12	1	0	0	19
SE	0	9	11	3	1	0	24
SSE	0	4	13	2	0	0	19
S	0	4	15	7	0	0	26
SSW	0	1	7	7	1	0	16
SW	0	4	9	8	2	0	23
WSW	0	1	5	3	0	0	9
W	1	9	20	7	1	0	38
WNW	0	7	24	32	9	1	73
NW	1	9	11	10	2	0	33
NNW	0	5	12	6	0	0	23
Total	7	101	169	92	16	1	386

Calm Hours not Included above for :	**Total Period**	1
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	211
Valid Hours for this Stability Class for:	**Total Period**	386
Total Hours for Period		8760

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Part 3: Joint Frequency Distribution Tables (500ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP500P **Direction:** DI500P **Lapse:** DT500-35
Stability Class D Delta Temperature Neutral

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	> 25	Total
N	28	55	164	63	2	0	312
NNE	31	40	50	27	4	0	152
NE	35	46	27	13	0	0	121
ENE	33	63	60	31	1	0	188
E	32	59	63	15	0	0	169
ESE	20	69	59	29	8	1	186
SE	23	42	38	41	9	0	153
SSE	13	37	52	20	6	2	130
S	8	23	78	76	9	2	196
SSW	14	28	79	119	57	6	303
SW	18	36	137	196	93	18	498
WSW	22	56	141	222	100	15	556
W	13	62	207	281	169	39	771
WNW	18	68	214	207	46	14	567
NW	16	58	149	105	3	0	331
NNW	19	49	184	49	0	0	301
Total	343	791	1702	1494	507	97	4934

Calm Hours not Included above for :	**Total Period**	1
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	211
Valid Hours for this Stability Class for:	**Total Period**	4934
Total Hours for Period		8760

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Part 3: Joint Frequency Distribution Tables (500ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP500P **Direction:** DI500P **Lapse:** DT500-35
Stability Class E Delta Temperature Slightly Stable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	43	34	22	22	0	0	121
NNE	28	31	18	1	0	0	78
NE	31	42	12	2	1	0	88
ENE	39	56	40	7	2	0	144
E	37	64	49	1	0	0	151
ESE	21	60	52	11	1	0	145
SE	13	40	47	29	9	0	138
SSE	16	48	40	20	1	0	125
S	25	22	35	41	5	0	128
SSW	19	26	43	60	12	2	162
SW	20	28	58	57	44	4	211
WSW	42	45	33	18	7	0	145
W	30	55	72	22	4	0	183
WNW	23	64	38	7	1	0	133
NW	13	30	19	4	0	0	66
NNW	28	32	17	3	0	0	80
Total	428	677	595	305	87	6	2098

Calm Hours not Included above for :	**Total Period**	1
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	211
Valid Hours for this Stability Class for:	**Total Period**	2098
Total Hours for Period		8760

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Part 3: Joint Frequency Distribution Tables (500ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP500P **Direction:** DI500P **Lapse:** DT500-35
Stability Class F Delta Temperature Moderately Stable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	16	9	4	1	0	0	30
NNE	19	23	2	1	0	0	45
NE	11	17	4	0	0	0	32
ENE	13	19	10	0	0	0	42
E	8	24	10	0	0	0	42
ESE	10	29	15	1	0	0	55
SE	7	19	21	5	2	0	54
SSE	5	17	9	9	0	0	40
S	5	18	32	6	0	0	61
SSW	15	21	17	8	2	0	63
SW	14	15	14	9	3	0	55
WSW	9	26	13	5	0	0	53
W	11	15	16	5	0	0	47
WNW	6	19	1	0	0	0	26
NW	4	8	5	0	0	0	17
NNW	10	4	5	0	0	0	19
Total	163	283	178	50	7	0	681

Calm Hours not Included above for :	**Total Period**	1
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	211
Valid Hours for this Stability Class for:	**Total Period**	681
Total Hours for Period		8760

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Part 3: Joint Frequency Distribution Tables (500ft)
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Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP500P **Direction:** DI500P **Lapse:** DT500-35
Stability Class G Delta Temperature Extremely Stable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	> 25	Total
N	0	1	0	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	1	0	0	0	0	0	1
ENE	0	0	0	0	0	0	0
E	1	1	0	0	0	0	2
ESE	0	1	1	0	0	0	2
SE	1	5	1	0	1	0	8
SSE	1	3	5	7	0	0	16
S	1	7	9	8	1	0	26
SSW	1	4	5	9	1	0	20
SW	0	0	2	3	1	0	6
WSW	1	3	0	0	0	0	4
W	0	1	4	0	0	0	5
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Total	7	26	27	27	4	0	91

Calm Hours not Included above for :	**Total Period**	1
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	211
Valid Hours for this Stability Class for:	**Total Period**	91
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2014
Attachment 1

Part 3: Joint Frequency Distribution Tables (500ft)
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Hours at Each Wind Speed and Direction

Summary of All Stability Classes

Total Period

Period of Record = 1/1/2014 00:00 - 12/31/2014 23:00
Elevation: **Speed:** SP500P **Direction:** DI500P **Lapse:** DT500-35

Delta Temperature

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	93	122	212	94	2	0	523
NNE	82	104	82	35	4	0	307
NE	80	115	50	15	1	0	261
ENE	86	168	118	39	3	0	414
E	79	169	134	17	0	0	399
ESE	51	175	163	44	9	1	443
SE	44	134	141	81	22	0	422
SSE	35	119	136	59	7	2	358
S	39	78	177	146	15	2	457
SSW	49	83	155	205	73	8	573
SW	52	85	225	274	144	22	802
WSW	75	134	202	248	107	15	781
W	55	151	336	319	174	39	1074
WNW	47	162	288	256	61	16	830
NW	34	108	196	122	5	0	465
NNW	58	96	224	61	0	0	439
Total	959	2003	2839	2015	627	105	8548

Calm Hours not Included above for :	**Total Period**	1
Variable Direction Hours for:	**Total Period**	0
Invalid Hours for:	**Total Period**	211
Valid Hours for this Stability Class for:	**Total Period**	8548
Total Hours for Period		8760

ENCLOSURE 2, ATTACHMENT 2

Beaver Valley Power Station - Units 1 & 2

Radioactive Effluent Release Report

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Attachment 2
Unit 1 and 2 Offsite Dose Calculation Manual Changes

Attachment 2
Attached is a complete copy of the ODCM that includes: Change (36) of the ODCM (Effective: February 2014) Change (37) of the ODCM (Effective: September 2014)

Attachment 2 Clarification
A complete copy of the ODCM has been provided to the following offices: United States Nuclear Regulatory Commission Attention: Document Control Desk Washington, DC 20555-0001 United States Nuclear Regulatory Commission Regional Administrator 2100 Renaissance Blvd., Suite 100 King of Prussia, PA 19406-2713
For a complete copy of the ODCM, contact Rebecca Novak at 724-682-4255.

ENCLOSURE 2, ATTACHMENT 3

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

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Attachment 3

Unit 1 and 2 Carbon-14 (C-14) Dose Estimates

Carbon-14 Methodology

Gaseous doses from carbon-14 were calculated according to Regulatory Guide 1.109 methodology. However, only daylight growing season hours were utilized for batch releases, which accounted for minimal dose consequence compared to continuous releases. Liquid effluent release doses are considered to be insignificant and are not included in this report. This report does not address the amount of carbon-14 disposed of in shipments of solid waste and irradiated fuel. The term "other" discussed below refers to liver, total body, thyroid, kidney, lung and GI. Doses for these organs are assumed to be equal.

The receptor chosen was selected based upon the default ODCM receptor - NW 1432 meters (0.89 miles). It is assumed that only vegetation and inhalation exposure pathways are available.

The year of 2014 was the third year of carbon-14 sampling (in the form of CO_2) at BVPS for gaseous effluent releases. The large disparity between data from Unit 1 and Unit 2 is believed to be caused by two factors. The first factor being the difference in dilution flow in the ventilations between the units. The second factor is Unit 1 had more gaseous discharges throughout 2014 due to a scheduled outage. Unit 2 had minimal gaseous releases throughout the year, resulting in lower calculated doses.

Dose Calculations for Unit 1

Exposure Pathway	Infant		Child		Teen		Adult	
	Bone	Other*	Bone	Other*	Bone	Other*	Bone	Other*
Inhalation	2.6E-01	5.3E-02	3.7E-01	6.7E-02	2.6E-01	5.0E-02	1.8E-01	3.3E-02
Vegetation Ingestion	-	-	1.8E+00	3.6E-01	7.5E-01	1.5E-01	4.6E-01	9.2E-02
TOTAL	**2.6E-01**	**5.3E-02**	**2.2E+00**	**4.3E-01**	**1.0E+00**	**2.0E-01**	**6.4E-01**	**1.3E-01**

Dose Calculations for Unit 2

Exposure Pathway	Infant		Child		Teen		Adult	
	Bone	Other*	Bone	Other*	Bone	Other*	Bone	Other*
Inhalation	2.3E-06	4.7E-07	3.1E-06	5.7E-07	2.2E-06	4.3E-07	1.6E-06	2.9E-07
Vegetation Ingestion	-	-	8.3E-05	1.7E-05	3.5E-05	6.9E-06	2.1E-05	4.3E-06
TOTAL	**2.3E-06**	**4.7E-07**	**8.6E-05**	**1.8E-05**	**3.7E-05**	**7.3E-06**	**2.3E-05**	**4.6E-06**

Dose Calculations for Total Site

	Infant		Child		Teen		Adult	
	Bone	Other*	Bone	Other*	Bone	Other*	Bone	Other*
TOTAL	**2.6E-01**	**5.3E-02**	**2.2E+00**	**4.3E-01**	**1.0E+00**	**2.0E-01**	**6.4E-01**	**1.3E-01**