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Fax: 724-643-8069April 30, 2012
L-12-085

10 CFR 50.36a

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001**SUBJECT:**

Beaver Valley Power Station, Unit Nos. 1 and 2

Docket No. 50-334, License No. DPR-66

Docket No. 50-412, License No. NPF-73

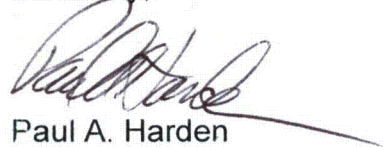
Submittal of 2011 Radioactive Effluent Release Report and 2011 Annual Radiological Environmental Operating Report, and 2011 Annual Environmental Operating Report (Non-Radiological)

In accordance with 10 CFR 50.36a and Beaver Valley Power Station (BVPS), Unit Nos. 1 and 2 Technical Specifications 5.5.1, 5.6.1, and 5.6.2, FirstEnergy Nuclear Operating Company (FENOC) hereby submits the BVPS 2011 Radioactive Effluent Release Report and 2011 Annual Radiological Environmental Operating Report. These reports are provided in a single enclosure (Enclosure A).

FENOC also submits (Enclosure B) the 2011 Annual Environmental Operating Report (Non-Radiological), in accordance with the BVPS Unit No. 2 Operating License, Appendix B – Environmental Protection Plan.

There are no regulatory commitments contained in this letter. If there are any questions or if additional information is required, please contact Mr. Donald J. Salera, Manager – Site Chemistry, at (724) 682-4141.

Sincerely,


Paul A. HardenIE25
IE48
NR

Beaver Valley Power Station, Unit Nos. 1 and 2
L-12-085
Page 2

Enclosures:

- A *2011 Radioactive Effluent Release Report and 2011 Annual Radiological Environmental Operating Report*
- B *2011 Annual Environmental Operating Report (Non-Radiological)*

cc: NRC Region I Administrator
NRC Resident Inspector
NRR Project Manager
Director BRP/DEP
Site BRP/DEP Representative

Enclosure A
L-12-085

*2011 Radioactive Effluent Release Report and
2011 Annual Radiological Environmental Operating Report
(Report follows)*

FIRSTENERGY NUCLEAR OPERATING COMPANY BEAVER VALLEY POWER STATION



2011 RADIOACTIVE EFFLUENT RELEASE REPORT
AND
2011 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:

2011 RADIOACTIVE EFFLUENT RELEASE REPORT

AND

2011 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

UNITS NO. 1 AND 2

LICENSES DPR-66 AND NPF-73

Prepared by: Dr. Lara M. Renz  Date: 4-16-12

Prepared by: Jonathan T. Earle  Date: 18 April 2012

Reviewed by: Beth H. Furdak  Date: 4-18-12

Approved by: Donald J. Salera  Date: 4-18-12

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 2011, and
Annual Radiological Environmental Operating Report for 2011

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U. S. Nuclear Regulatory Commission
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Washington, DC 20555-0001

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Mr. Peter Bamford, NRR Project Manager

U. S. Nuclear Regulatory Commission
Mr. Dave Spindler, NRC Senior Resident Inspector

U. S. Nuclear Regulatory Commission
Mr. William Dean, NRC Region I Administrator

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Department of Environmental Protection (5 copies)
Bureau of Radiation Protection & Toxicology
P.O. Box 2063
Harrisburg, PA 17120

Department of Environmental Protection (2 copies)
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Page 2

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MD Banko, BVPS; Operations Oversight (A-BV-NCD3)
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BVPS Document Control, RTL A9.690E

BVRC - *Keywords: Radioactive Effluent Release Report,
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

2011 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

Calendar Year - 2011
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Attachment 2	Unit 1 and 2 Offsite Dose Calculation Manual (Complete Copy)
Attachment 3	Carbon-14 (C-14) Dose Estimates

Radioactive Effluent Release Report

Calendar Year - 2011
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. 10-80322, Reduced Flow to PAB Ventilation Vent FR-VS-101

BVPS Condition Report No. 10-82309, Elevated Tritium Confirmed in 4 of 7 New Groundwater Wells

BVPS Condition Report No. 10-85877, Se-75 Discharge via the U1/U2 Process Vent

BVPS Condition Report No. 11-89832, Repeat Maintenance - 2HVS-RQ109B, C, and D Loss of Process Flow

BVPS Condition Report No. 11-92214, Documentation of I-131 in BVPS Samples After Fukushima Crisis

BVPS Condition Report No. 11-92328, RM-1MS-100C Failed Downscale During 1OST-43.5 Performance

BVPS Condition Report No. 11-92850, U-2 Aux Boiler Room Contamination Event

BVPS Condition Report No. 11-93037, Documentation of I-131 Found in REMP Milk Sample After Fukushima

BVPS Condition Report No. 11-93095, Failure of Aux Feedwater Drain Rad Monitor

BVPS Condition Report No. 11-94162, RM-1MS-100C Not Returned to Operable Within 30 Days

BVPS Condition Report No. 11-96782, 10CFR50.75(G) Files Not Updated with Groundwater Well Data

BVPS Condition Report No. 11-97516, REMP TLD Station #88 Repeatedly Vandalized

BVPS Condition Report No. 11-97853, 2MSS-RQ101C Alarms

BVPS Condition Report No. 2011-00106, Evaluate Spiking Trend for 2MSS-RQ101C, Main Steam Rad Monitor

BVPS Condition Report No. 2011-00386, RM-1VS-109 Ch 10 Does Not Read Correctly on Return to Service

BVPS Condition Report No. 2011-00688, Damaged Detector on BV-1VS-110

BVPS Condition Report No. 2011-00749, 2MSS-RQ101C High/Alert alarms during 2OST-24.4

BVPS Condition Report No. 2011-01038, Rx Building/SLCRS Rad Monitor Exceeds 30 Days Inoperable

BVPS Condition Report No. 2011-01525, ECP Setpoint Change Not Effectively Implemented, Resulting in Wasted Technician Time - Error Trap

BVPS Condition Report No. 2011-02332, Inability to Meet ODCM Requirements for REMP Milk Sampling in 2011

BVPS Condition Report No. 2011-02350, 2MSS-RQ101C Not Returned to Service Within 30 Days

BVPS Condition Report No. 2012-04412, Unable to Meet Required LLD for Ce-144 in Liquid Liter Bottle Geometry

Radioactive Effluent Release Report

Calendar Year - 2011

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

Onsite Groundwater Monitoring: Twenty-three (23) on-site monitoring wells were sampled in both sampling periods in 2011. No new wells were installed and no wells were retired. Fifteen (15) wells were less than the pre-operational mean (440 pCi/L) during all sample periods in 2011. Two (2) wells were >440 pCi/L, but <2000 pCi/L. Six (6) wells were >2000 pCi/L, but <30,000 pCi/L with only a single well (MW-16) >20,000 pCi/L. 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. There were no wells that reached the 2000 pCi/L Communication Level for the first time in 2011. 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.

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

Decommissioning File Update: Two items were added to the site decommissioning files in accordance with 10CFR50.75(g). These items included extending the condition of onsite groundwater contamination for the new 2010 monitoring wells and the discovery of Licensed Radioactive Material (LRM) in the Unit 1 and Unit 2 Nitrogen Systems. 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. Typically, when Unit 1 or 2 went to a shutdown condition, the gaseous waste was transferred for storage and decay at Unit 2, because Unit 2 has four (4) additional storage tanks.

Radioactive Effluent Release Report

Calendar Year - 2011

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

Lower Limits of Detectability (LLD): All a-priori calculated LLD met the minimum requirements specified in the ODCM for batch radioactive discharge purposes. One RETS geometry is currently under investigation. See Enclosure 2, pages 15 and 21 for additional details.

Effluent Monitoring Channels Inoperable >30 Days: There were six Effluent Monitoring Instrumentation Channels not returned to Operable status within 30 days. See Enclosure 2, pages 18 and 19 for details.

ODCM Surveillance Deficiencies: There was one ODCM Surveillance Deficiency associated with the LLD requirements for the 1 Liter Bottle geometry. See Enclosure 2, page 21 for details.

ODCM Changes: There were three changes made to the ODCM during the report period. 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 22 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.

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

0.0000941 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.

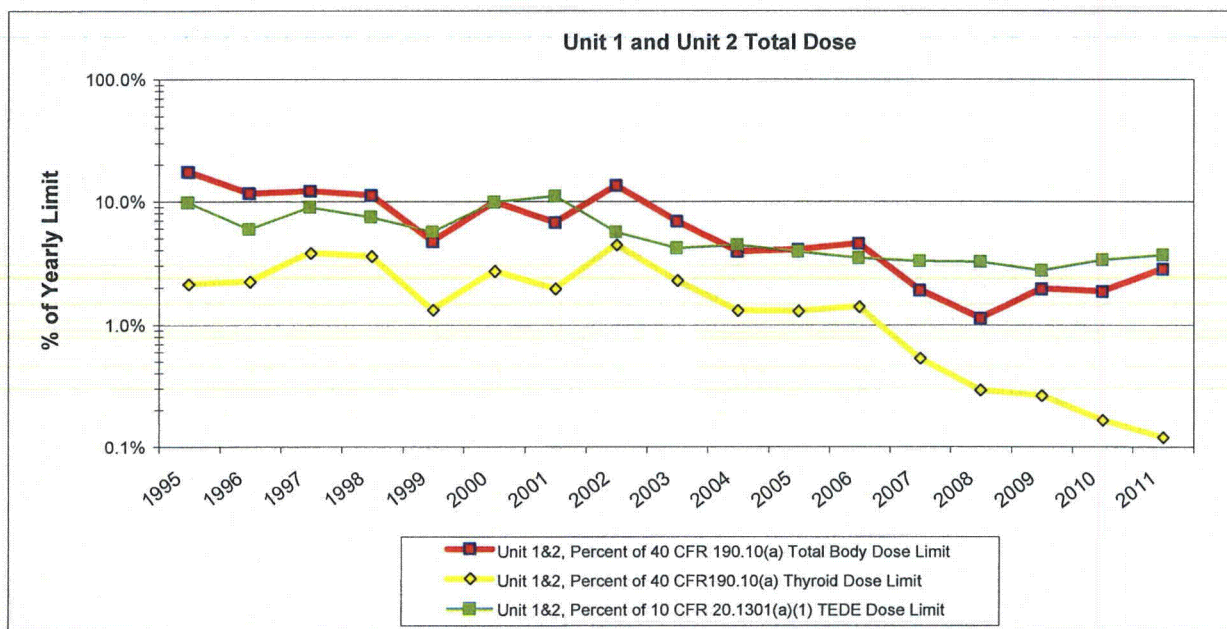
Carbon-14 Dose Assessment: Details of the dose assessment due to releases of Carbon-14 in gaseous effluents are provided in Attachment 3 of this report.

Radioactive Effluent Release Report

Calendar Year - 2011

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. Engineering improvement projects are ongoing to the Liquid Waste System which have caused slight increases in liquid effluents and offsite dose. When the projects are complete and processing techniques are finalized using the new arrangements, trends should return to previous values.

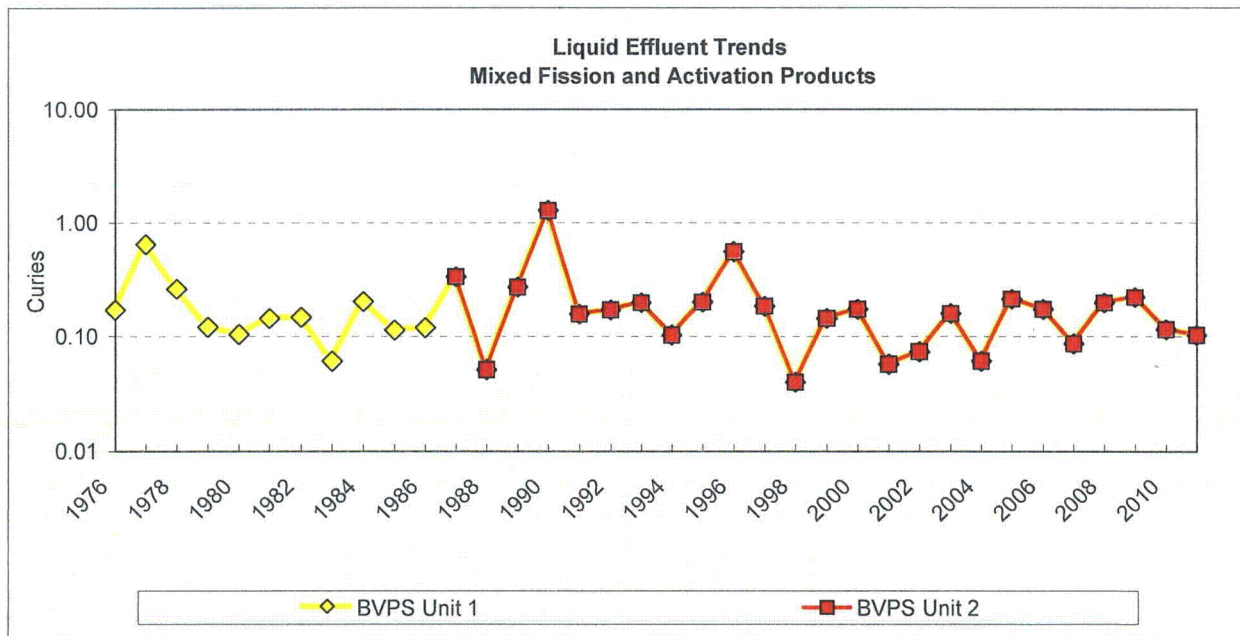


Radioactive Effluent Release Report

Calendar Year - 2011

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.

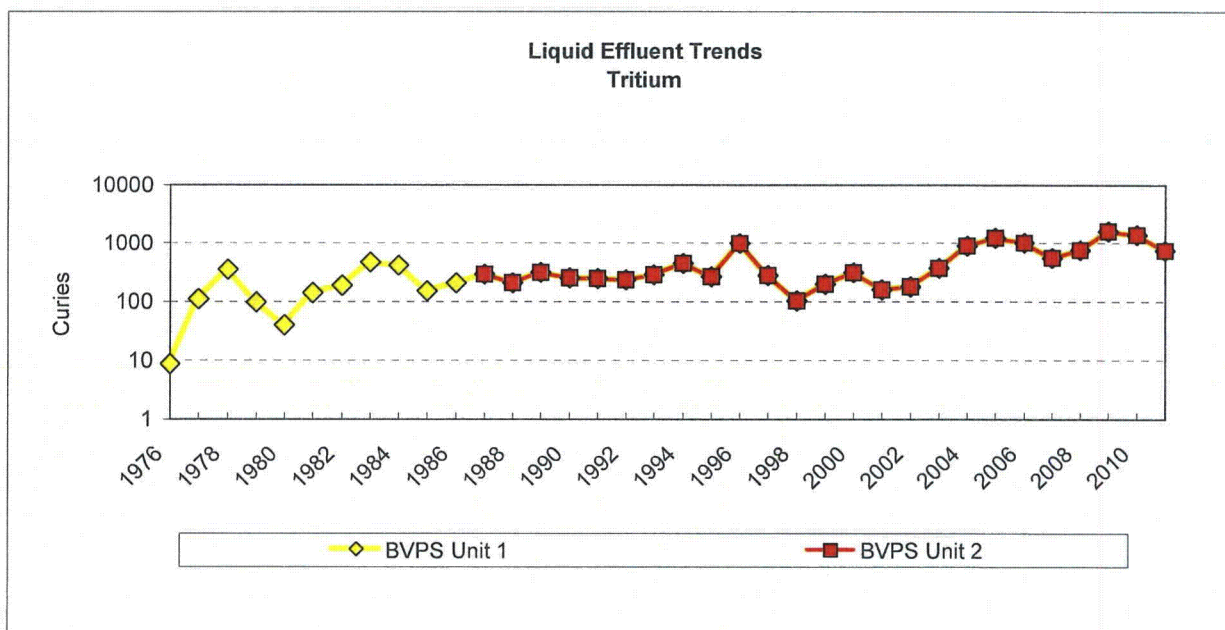


Radioactive Effluent Release Report

Calendar Year - 2011

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.

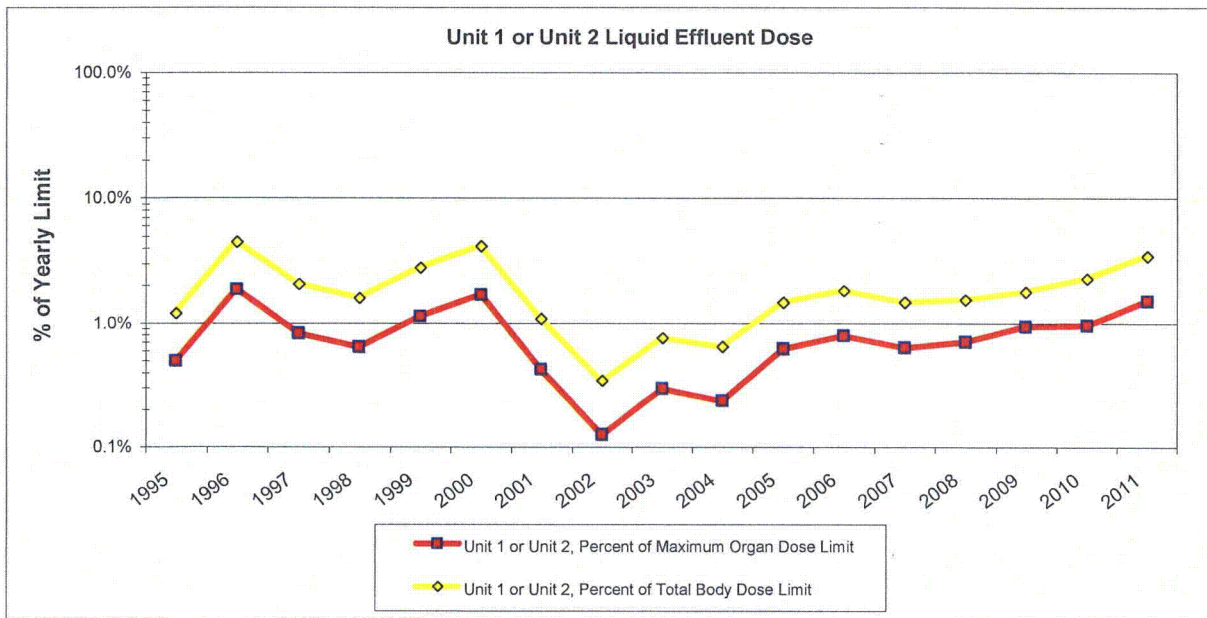


Radioactive Effluent Release Report

Calendar Year - 2011

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. **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. Engineering improvement projects are ongoing to the Liquid Waste System, as well, which have caused slight increases in liquid effluents and offsite dose. When the projects are complete and processing techniques are finalized using the new arrangements, trends should return to previous values.**

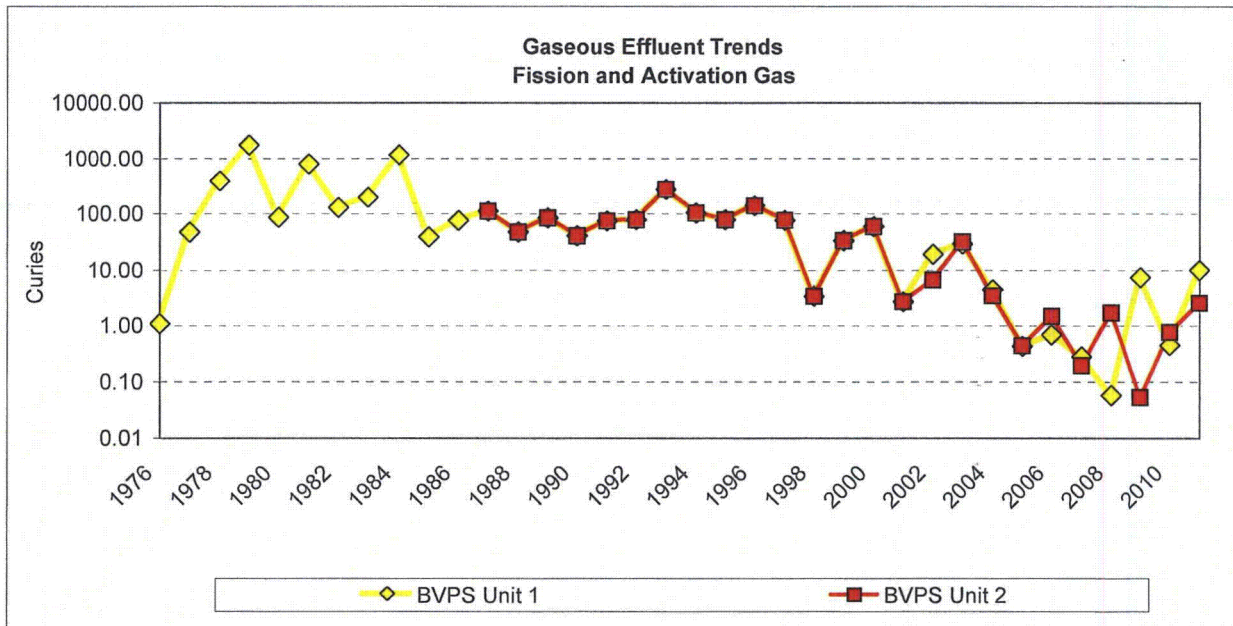


Radioactive Effluent Release Report

Calendar Year - 2011

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.

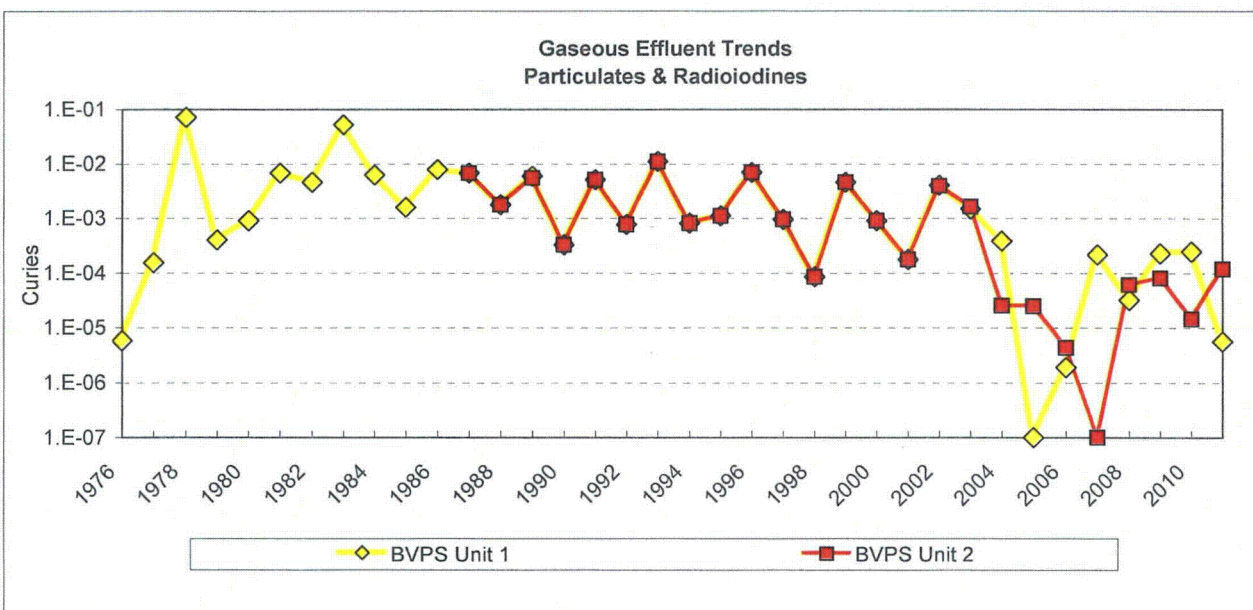


Radioactive Effluent Release Report

Calendar Year - 2011

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. The recent variations are due to identification of Co-58 and Co-60 in weekly effluent pathway samples during refueling outages at both Units 1 and 2, while decreasing trends are due to extended hold-up periods of gas space prior to release. (Radioiodines attributed to Fukushima fallout are not included in the totals.)

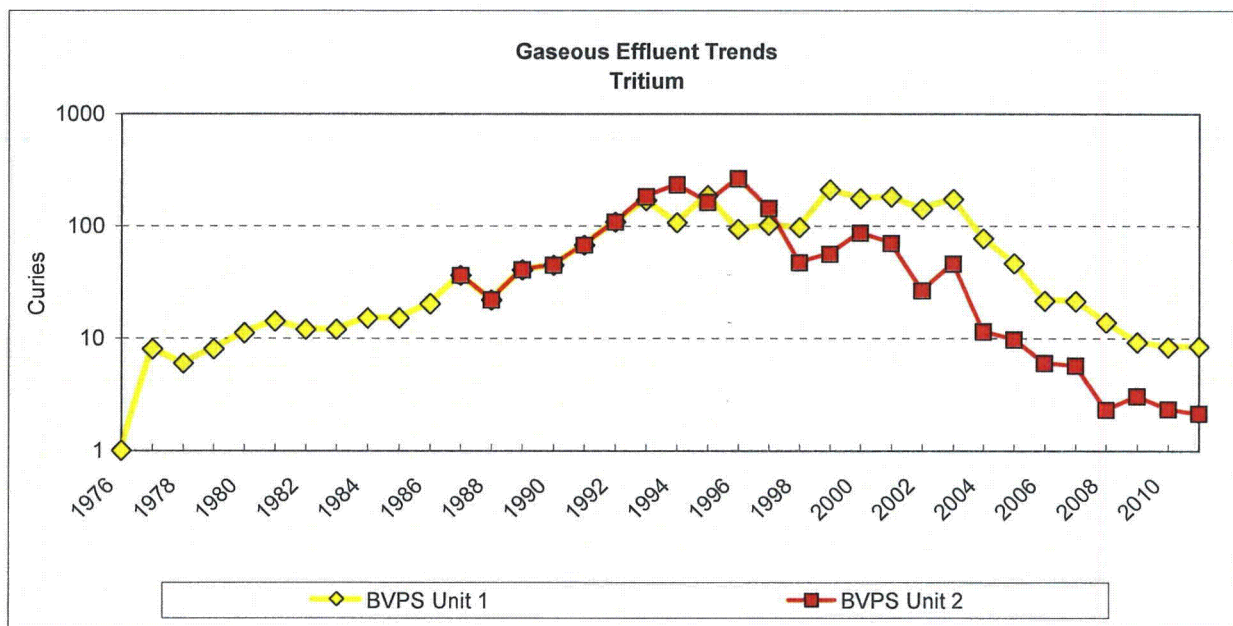


Radioactive Effluent Release Report

Calendar Year - 2011

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. The recent decreases 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.

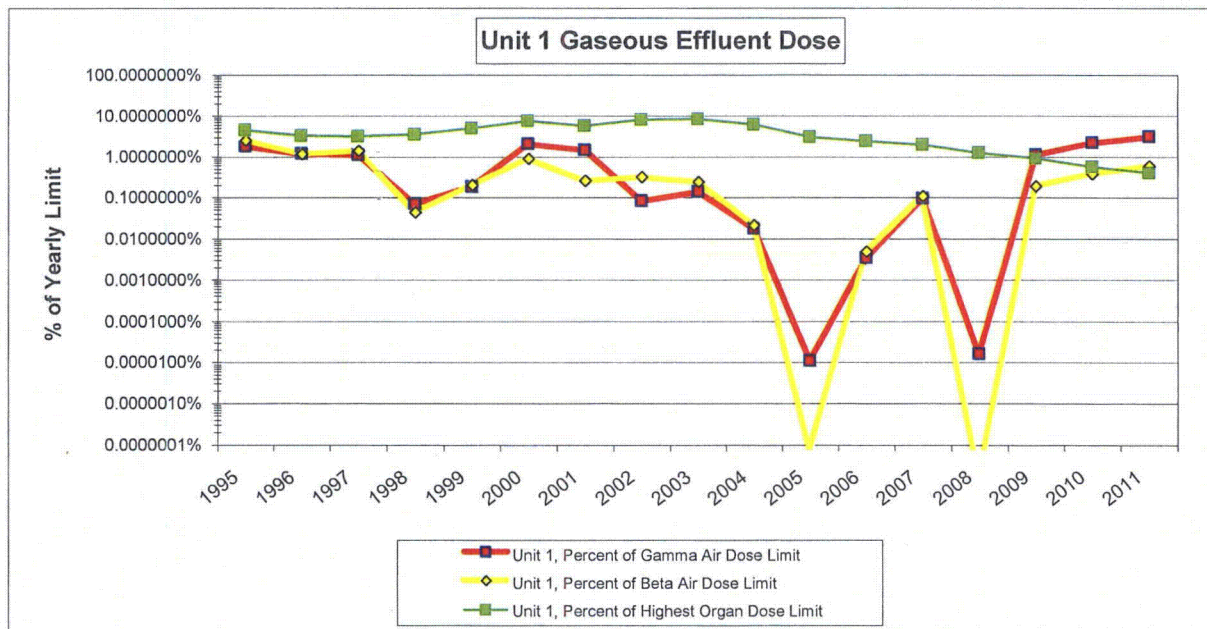


Radioactive Effluent Release Report

Calendar Year - 2011

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. Specifically, discharging liquid radioactive inventory provided the benefit of reduced total offsite dose, due to reduction in evaporative losses from the fuel pools.

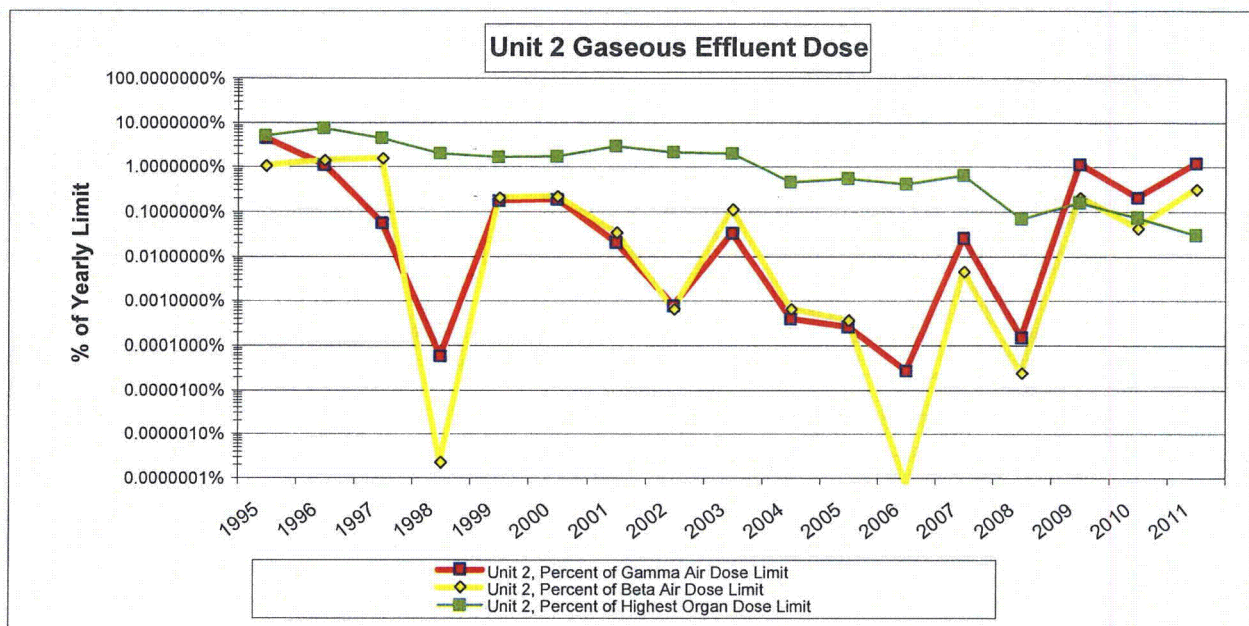


Radioactive Effluent Release Report

Calendar Year - 2011

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 steady decrease in highest organ dose 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 - 2011
Results of Abnormal Releases

Abnormal Liquid Releases: None

Abnormal Gas Releases: None

Radioactive Effluent Release Report

Calendar Year - 2011

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: Two Items

Item 1 of 2 (Groundwater Wells): In July 2011, Unit 1 Groundwater Monitoring wells 12s, 12d, 14s, 14d, 15 and 16 were added to the Decommissioning Files per the requirements of 10CFR50.75(g). Previously, in October of 2007, when the first levels of tritium >2000 pCi/L were discovered in monitoring wells 12s and 12d, the groundwater and monitoring wells were added to the files at that time. However, the monitoring wells that were newly installed in the Fall of 2010 were not documented until 2011. Reference Condition Reports # 10-82309 and 2011-96782.

Item 2 of 2 (Unit 1 and Unit 2 Nitrogen Systems): In April 2011, the Gaseous Nitrogen Systems at both Unit 1 and Unit 2 were found to be contaminated. Because the UFSAR does not consider the Nitrogen System at either unit to be radioactive, then the cost to decommission the site could be significantly greater than anticipated at plant construction. Therefore, a record of this contamination is required to be maintained per the requirements of 10CFR50.75(g). Reference Condition Report # 11-92850.

Radioactive Effluent Release Report

Calendar Year - 2011
 Results of Onsite Groundwater Monitoring Program

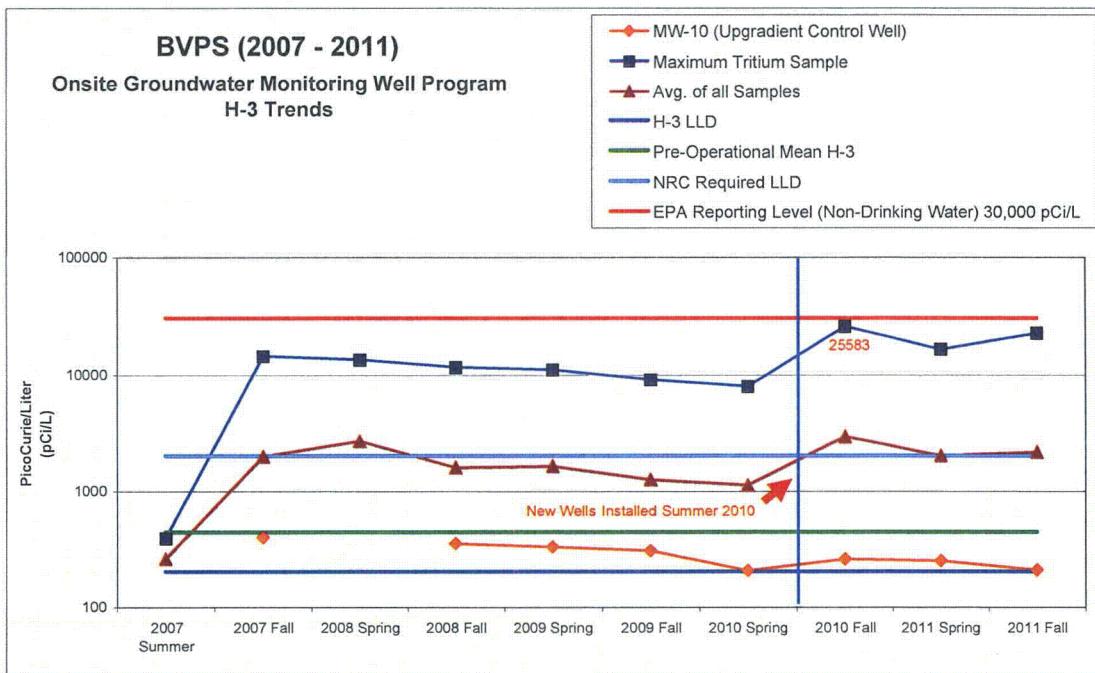
Summary of Onsite Groundwater Samples

	2011 H-3 Maximum (pCi/L)	2011 H-3 Minimum (pCi/L)	2011 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)
Jan	21986	202	7285	<200	<2000	440	Yes	2000	30000
2nd Quarter	16452	140	2001	<200	<2000	440	Yes	2000	30000
4th Quarter	22526	148	2156	<200	<2000	440	Yes	2000	30000

2011 H-3 Summary: Twenty-three (23) on-site monitoring wells were sampled in both sampling periods in 2011. No new wells were installed and no wells were retired. Fifteen (15) wells were less than the pre-operational mean (440 pCi/L) during all sample periods in 2011. Two (2) wells were >440 pCi/L, but <2000 pCi/L. Six (6) wells were >2000 pCi/L, but <30,000 pCi/L with only a single well (MW-16) >20,000 pCi/L. 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. There were no wells that reached the 2000 pCi/L Communication Level for the first time in 2011. 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 (completed on 12/17/11) involved sleeving of deteriorated stormwater piping and repairs of catch basins. The project was performed to allow tritiated process water to be discharged through the catch basin system into the Ohio River as originally designed rather than entering the groundwater.

Principal Gamma Emmitter Summary: Twenty-three (23) 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. Due to high H-3 concentrations in the six (6) wells previously mentioned, a hard-to-detect analysis was conducted. Results from the hard-to-detect analysis also showed no positive indication of LRM.



Radioactive Effluent Release Report

Calendar Year - 2011

Corrections to previous Radioactive Effluent Release Reports

Correction(s) to Previous Radioactive Effluent Release Reports None

Radioactive Effluent Release Report

Calendar Year - 2011

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 Permissible 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		29	28	36	17	110
2. Total time period for batch releases	minutes	14554	14247	7842	5132	41775
3. Maximum time period for a batch release	minutes	2223	3546	269	1601	3546
4. Average time period for batch releases	minutes	502	509	218	302	380
5. Minimum time period for a batch release	minutes	94	96	90	201	90
6. Average river flow during release periods	cuft/sec	79100	78900	17300	61333	59158
b. Gaseous Batch Releases						
1. Number of batch releases		6	13	2	2	23
2. Total time period for batch releases	minutes	9934	9085	120	207	19346
3. Maximum time period for a batch release	minutes	5110	840	77	125	5110
4. Average time period for batch releases	minutes	1656	699	60	104	841
5. Minimum time period for a batch release	minutes	59	41	43	82	41
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

Beaver Valley Power Station - Units 1 & 2

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Radioactive Effluent Release Report

Calendar Year - 2011

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	3.12E-01	7.39E+00	0.00E+00	4.60E+00	1.23E+01	26.5%
1a. Unit 1 Gases	Ci	1.33E-02	7.33E+00	0.00E+00	2.46E+00	9.80E+00	
1b. Unit 2 Gases	Ci	2.99E-01	6.11E-02	0.00E+00	2.14E+00	2.50E+00	
2. Average release rate for period	uCi/sec	3.96E-02	9.38E-01	0.00E+00	5.83E-01	3.90E-01	
3. Percent of applicable limit	%	N/A	N/A	N/A	N/A	N/A	
B. Iodines							
1. Site Total iodine - 131	Ci	7.25E-07 (1)	8.11E-07 (1)	0.00E+00	0.00E+00	1.54E-06 (1)	28.3%
1a. Unit 1 iodine - 131	Ci	0.00E+00	0.00E+00 (1)	0.00E+00	0.00E+00	0.00E+00 (1)	
1b. Unit 2 iodine - 131	Ci	7.25E-07 (1)	8.11E-07 (1)	0.00E+00	0.00E+00	1.54E-06 (1)	
2. Average release rate for period	uCi/sec	9.20E-08	1.03E-07	0.00E+00	0.00E+00	4.87E-08	
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	8.77E-05	8.09E-06	1.89E-06	2.50E-05	1.23E-04	30.0%
1a. Unit 1 Particulates	Ci	8.10E-07	2.79E-06	5.95E-07	1.53E-06	5.73E-06	
1b. Unit 2 Particulates	Ci	8.69E-05	5.29E-06	1.29E-06	2.34E-05	1.17E-04	
2. Average release rate for period	uCi/sec	1.11E-05	1.03E-06	2.40E-07	3.17E-06	3.89E-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	3.82E+00	1.72E+00	1.52E+00	3.48E+00	1.05E+01	32.9%
1a. Unit 1 Tritium	Ci	3.24E+00	1.15E+00	1.20E+00	2.82E+00	8.41E+00	
1b. Unit 2 Tritium	Ci	5.76E-01	5.73E-01	3.23E-01	6.57E-01	2.13E+00	
2. Average release rate for period	uCi/sec	4.84E-01	2.19E-01	1.93E-01	4.41E-01	3.34E-01	
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).

- (1) Not included in 1st Quarter U2 totals is 6.10E-08 Ci of I-131 discharged through the plant ventilation systems attributed to Fukushima.
 Not included in 1st Quarter Site totals is 6.10E-08 Ci of I-131 discharged through the plant ventilation systems attributed to Fukushima.
 Not included in 2nd Quarter U1 totals is 1.16E-05 Ci of I-131 discharged through the plant ventilation systems attributed to Fukushima.
 Not included in 2nd Quarter U2 totals is 6.50E-08 Ci of I-131 discharged through the plant ventilation systems attributed to Fukushima.
 Not included in 2nd Quarter Site totals is 1.16E-05 Ci of I-131 discharged through the plant ventilation systems attributed to Fukushima.
 Reference Condition Reports # 2011-92214 and 2011-93037.

Radioactive Effluent Release Report

Calendar Year - 2011

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	9.31E-03	LLD	LLD	LLD	9.31E-03
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85m	Ci	2.46E-04	LLD	LLD	LLD	2.46E-04
krypton-87	Ci	LLD	LLD	LLD	LLD	LLD
krypton-88	Ci	2.88E-04	LLD	LLD	LLD	2.88E-04
xenon-131m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	6.45E-03	3.76E-06	LLD	LLD	6.45E-03
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	5.96E-03	9.04E-06	LLD	LLD	5.97E-03
xenon-135m	Ci	4.33E-03	LLD	LLD	LLD	4.33E-03
xenon-138	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	2.66E-02	1.28E-05	ND	ND	2.66E-02
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
carbon-14	Ci	N/A	N/A	N/A	N/A	N/A (1)
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

(1) See Attachment 3

Radioactive Effluent Release Report

Calendar Year - 2011

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	1.62E-06	6.71E-07	3.82E-07	LLD	2.67E-06
antimony-124	Ci	LLD	2.45E-06	LLD	LLD	2.45E-06
antimony-125	Ci	LLD	2.47E-06	LLD	LLD	2.47E-06
bromine-82	Ci	LLD	LLD	8.09E-07	3.06E-06	3.86E-06
carbon-14	Ci	N/A	N/A	N/A	N/A	N/A (1)
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	1.62E-06	5.59E-06	1.19E-06	3.06E-06	1.15E-05

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

ND = None Detected

(1) See Attachment 3

Beaver Valley Power Station - Unit 1

Enclosure 2, Page 5 of 22

Radioactive Effluent Release Report

Calendar Year - 2011

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
carbon-14	Ci	N/A	N/A	N/A	N/A	N/A (1)
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

(1) See Attachment 3

Beaver Valley Power Station - Unit 1**Enclosure 2, Page 6 of 22****Radioactive Effluent Release Report**

Calendar Year - 2011

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	6.44E+00	LLD	2.30E+00	8.74E+00
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	3.55E-01	LLD	LLD	3.55E-01
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	5.34E-01	LLD	1.55E-01	6.89E-01
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	7.33E+00	ND	2.46E+00	9.78E+00
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
zirconium/niobium-95	Ci	LLD	LLD	LLD	LLD	LLD
zirconium/niobium-97	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
carbon-14	Ci	N/A	N/A	N/A	N/A	N/A (1)
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

(1) See Attachment 3

Beaver Valley Power Station - Unit 2**Enclosure 2, Page 7 of 22****Radioactive Effluent Release Report**

Calendar Year - 2011

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	7.66E-03	LLD	LLD	LLD	7.66E-03
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	7.66E-03	ND	ND	ND	7.66E-03
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
carbon-14	Ci	N/A	N/A	N/A	N/A	N/A (1)
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

(1) See Attachment 3

Beaver Valley Power Station - Unit 2**Enclosure 2, Page 8 of 22****Radioactive Effluent Release Report**

Calendar Year - 2011

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	6.11E-02	LLD	2.10E+00	2.16E+00
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	2.78E-01	LLD	LLD	LLD	2.78E-01
xenon-133	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	LLD	LLD	4.66E-02	4.66E-02
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	2.78E-01	6.11E-02	ND	2.14E+00	2.48E+00
2. Iodines						
iodine-131	Ci	7.25E-07	8.11E-07	LLD	LLD	1.54E-06
iodine-133	Ci	LLD	LLD	LLD	LLD	LLD
iodine-135	Ci	LLD	LLD	LLD	LLD	LLD
Total for period	Ci	7.25E-07	8.11E-07	ND	ND	1.54E-06
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	7.24E-05	2.50E-06	LLD	LLD	7.49E-05
cobalt-60	Ci	1.37E-05	LLD	6.99E-07	2.19E-05	3.63E-05
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	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
carbon-14	Ci	N/A	N/A	N/A	N/A	N/A (1)
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	8.61E-05	2.50E-06	6.99E-07	2.19E-05	1.11E-04

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

ND = None Detected

(1) See Attachment 3

Beaver Valley Power Station - Units 1 & 2**Enclosure 2, Page 9 of 22****Radioactive Effluent Release Report**

Calendar Year - 2011

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	3.42E-02	2.94E-02	2.97E-02	8.40E-03	1.02E-01	26.1%
2. Average diluted concentration	uCi/ml	3.56E-08	3.15E-08	2.91E-08	2.07E-08	3.06E-08	
3. Percent of applicable limit	%	1.37E+00	1.18E+00	1.19E+00	3.36E-01	1.02E+00	
B. Tritium							
1. Total release	Ci	1.96E+02	4.34E+02	2.49E+01	8.39E+01	7.39E+02	25.0%
2. Average diluted concentration	uCi/ml	2.04E-04	4.65E-04	2.44E-05	2.07E-04	2.23E-04	
3. Percent of applicable limit	%	2.04E+00	4.65E+00	2.44E-01	2.07E+00	2.23E+00	
C. Dissolved and entrained gases							
1. Total release	Ci	7.06E-06	ND	ND	ND	7.06E-06	27.0%
2. Average diluted concentration	uCi/ml	7.36E-12				2.13E-12	
3. Percent of applicable limit	%	3.68E-06				1.06E-06	
D. Gross alpha radioactivity (total release)							
	Ci	LLD	LLD	LLD	LLD	LLD	28.9%
E. Volume of waste released (prior to dilution)							
	liters	2.17E+06	2.33E+06	1.88E+06	1.04E+06	7.42E+06	11.2%
F. Volume of dilution water used							
	liters	9.58E+08	9.31E+08	1.02E+09	4.05E+08	3.31E+09	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)

Beaver Valley Power Station - Units 1 & 2

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Radioactive Effluent Release Report

Calendar Year - 2011

Table 2B-B

Liquid Effluents - Batch Releases

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
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1. Fission and activation products

beryllium-7	Ci	LLD	LLD	LLD	LLD	LLD
sodium-24	Ci	4.98E-05	LLD	LLD	LLD	4.98E-05
chromium-51	Ci	1.38E-04	1.25E-03	LLD	LLD	1.39E-03
manganese-54	Ci	1.39E-04	4.71E-06	4.00E-05	LLD	1.84E-04
iron-55	Ci	2.58E-03	2.03E-03	4.25E-03	2.34E-03	1.12E-02
iron-59	Ci	6.42E-05	1.88E-03	6.39E-05	LLD	2.01E-03
cobalt-57	Ci	7.65E-05	1.40E-05	1.54E-04	4.45E-04	6.90E-04
cobalt-58	Ci	1.61E-02	1.50E-02	1.20E-02	2.75E-03	4.59E-02
cobalt-60	Ci	4.41E-03	1.20E-03	1.66E-03	6.22E-04	7.89E-03
zinc-65	Ci	1.85E-04	LLD	LLD	2.16E-05	2.07E-04
strontium-89	Ci	4.26E-05	LLD	LLD	LLD	4.26E-05
strontium-90	Ci	9.13E-05	LLD	LLD	LLD	9.13E-05
zirconium/niobium-95	Ci	1.67E-05	2.93E-04	4.27E-04	2.54E-06	7.39E-04
zirconium/niobium-97	Ci	3.21E-04	LLD	LLD	LLD	3.21E-04
molybdenum-99/technetium-99m	Ci	LLD	LLD	LLD	LLD	LLD
tin-113	Ci	LLD	LLD	LLD	LLD	LLD
tin-117m	Ci	LLD	5.58E-05	LLD	LLD	5.58E-05
silver-110m	Ci	1.59E-03	2.09E-04	4.29E-03	1.95E-04	6.28E-03
antimony-122	Ci	8.12E-06	LLD	LLD	LLD	8.12E-06
antimony-124	Ci	1.69E-04	1.51E-03	1.35E-03	2.39E-04	3.27E-03
antimony-125	Ci	5.09E-03	3.79E-03	5.38E-03	1.74E-03	1.60E-02
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
cesium-134	Ci	LLD	LLD	LLD	LLD	LLD
cesium-137	Ci	3.13E-03	2.21E-03	4.19E-05	4.47E-05	5.43E-03
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
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	3.42E-02	2.94E-02	2.97E-02	8.40E-03	1.02E-01

2. Dissolved and entrained gases

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
argon-41	Ci	7.06E-06	LLD	LLD	LLD	7.06E-06
carbon-14	Ci	N/A	N/A	N/A	N/A	N/A
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	7.06E-06	ND	ND	ND	7.06E-06

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

Beaver Valley Power Station - Units 1 & 2**Enclosure 2, Page 11 of 22****Radioactive Effluent Release Report**

Calendar Year - 2011

Table 2B-C

Liquid Effluents - Continuous Releases

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
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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

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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	8.67E+00 m3	7.80E+00 m3	0.0% (1)
b. Volume Buried	4.11E-01 m3	7.41E-01 m3	0.0% (1)
c. Total Activity	2.67E+02 Ci	1.48E+02 Ci	30.0%
2. Estimate of Major Nuclide Composition by Type of Waste On This Table (2)	Percent (%)	Percent (%)	
H-3	0.07 %	0.55 %	
C-14	0.11 %	0.02 %	
Mn-54	0.62 %	0.54 %	
Fe-55	14.60 %	3.59 %	
Co-58	0.67 %	0.12 %	
Co-60	24.20 %	17.30 %	
Ni-59	0.31 %	0.36 %	
Ni-63	51.30 %	73.90 %	
Zn-65	4.76 %	0.73 %	
Cs-134	0.31 %	0.11 %	
Cs-137	2.10 %	2.29 %	
Ce-144/Pr-144	0.01 %	0.01 %	
Pu-241	0.03 %	0.00 %	
3. Number of Shipments	5	4	
a. Type of Container Used	LSA	2	4
	Type A	0	0
	Type B	3	0
	Large Quantity	0	0
b. Solidification Agent Used	Cement	0	0
	Urea Formaldehyde	0	0
	None	0	0
c. Mode of Transport	Truck	5	4
	Rail	0	0
d. Final Destination	Erwin, TN	4	3
	Oak Ridge, TN	1	1
e. Waste Class per 10 CFR Part 61	Class A	1	1
	Class B	2	2
	Class C	2	1
	> 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.

Beaver Valley Power Station - Units 1 & 2

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Radioactive Effluent Release Report

Calendar Year - 2011

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		4.13E+02 m3	9.94E+01 m3	0.0% (1)
b. Volume Buried		8.81E+01 m3	2.77E+01 m3	0.0% (1)
c. Total Activity		6.61E-01 Ci	4.66E-01 Ci	30.0%
2. Estimate of Major Nuclide Composition by Type of Waste On This Table (2)		Percent (%)	Percent (%)	
H-3		1.46 %	1.00 %	
C-14		0.89 %	1.13 %	
Cr-51		3.02 %	0.06 %	
Mn-54		1.19 %	1.39 %	
Fe-55		22.30 %	25.90 %	
Co-58		11.20 %	6.21 %	
Co-60		16.00 %	18.20 %	
Ni-59		0.24 %	0.17 %	
Ni-63		16.70 %	35.00 %	
Sr-90		0.00 %	0.01 %	
Nb-95		10.80 %	0.68 %	
Zn-65		2.18 %	0.37 %	
Zr-95		8.19 %	2.89 %	
Ag-110m		2.14 %	1.06 %	
Sb-124		0.03 %	0.01 %	
Sb-125		1.67 %	1.07 %	
I-129		0.02 %	0.00 %	
Cs-134		0.01 %	0.28 %	
Cs-137		0.34 %	3.79 %	
Ce-144/Pr-144		0.14 %	0.26 %	
Pu-241		0.24 %	0.12 %	
3. Number of Shipments		8	2	
a. Type of Container Used	LSA	8	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	0	0	
c. Mode of Transport	Truck	8	2	
	Rail	0	0	
	Other	0	0	
d. Final Destination	Oak Ridge, TN	8	1	
	Wampum, PA	0	1	
e. Waste Class per 10 CFR Part 61	Class A	8	0	
	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

Beaver Valley Power Station - Units 1 & 2

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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.

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Table 4

Lower Limits Of Detectability (LLD)

Nuclide	RWDA-G 1000 cc Gas Grab Sample		RWDA-L 1000 ml Liquid Grab Sample		Filter Paper / Charcoal Continuous Effluent Sample	
	(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-05	-----	-----
Na-24	8.17E-08	1E-04	1.98E-08	5E-07	1.31E-13	1E-11
Ar-41	7.86E-08	1E-04	1.91E-08	5E-07	-----	-----
Cr-51	5.01E-07	1E-04	1.29E-07	5E-07	6.79E-13	1E-11
Mn-54	7.03E-08	1E-04	1.70E-08	5E-07	8.43E-14	1E-11
Fe-55	-----	-----	(1) 1.00E-06	1E-06	-----	-----
Fe-59	1.21E-07	1E-04	2.93E-08	5E-07	1.91E-13	1E-11
Co-57	5.41E-08	1E-04	1.58E-08	5E-07	3.77E-14	1E-11
Co-58	6.17E-08	1E-04	1.50E-08	5E-07	8.26E-14	1E-11
Co-60	8.30E-08	1E-04	2.02E-08	5E-07	1.14E-13	1E-11
Zn-65	1.20E-07	1E-04	2.91E-08	5E-07	1.90E-13	1E-11
Se-75	-----	-----	-----	-----	9.50E-14	1E-11
Kr-85	1.87E-05	1E-04	4.62E-06	1E-05	-----	-----
Kr-85m	5.48E-08	1E-04	1.54E-08	1E-05	-----	-----
Kr-87	8.29E-08	1E-04	2.08E-08	1E-05	-----	-----
Kr-88	1.83E-07	1E-04	4.95E-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	9.16E-08	1E-04	2.22E-08	5E-07	1.47E-13	1E-11
Nb-95	8.29E-08	1E-04	2.01E-08	5E-07	7.81E-14	1E-11
Nb-97	6.94E-08	1E-04	1.69E-08	5E-07	6.92E-14	1E-11
Zr-95	1.39E-07	1E-04	3.36E-08	5E-07	1.39E-13	1E-11
Mo-99	4.73E-08	1E-04	1.34E-08	5E-07	4.03E-14	1E-11
Tc-99m	4.61E-08	1E-04	1.31E-08	5E-07	3.93E-14	1E-11
Ag-110m	7.21E-08	1E-04	1.76E-08	5E-07	7.19E-14	1E-11
Sb-124	7.72E-08	1E-04	1.89E-08	5E-07	6.41E-14	1E-11
Sb-125	1.04E-07	1E-04	2.61E-08	5E-07	1.80E-13	1E-11
I-131	6.81E-08	1E-04	1.72E-08	1E-06	7.61E-14	1E-12
I-133	6.55E-08	1E-04	1.61E-08	5E-07	7.14E-14	1E-10
I-135	2.67E-07	1E-04	6.47E-08	5E-07	4.71E-13	1E-11
Xe-131m	2.25E-06	1E-04	6.23E-07	1E-05	-----	-----
Xe-133	1.42E-07	1E-04	4.84E-08	1E-05	-----	-----
Xe-133m	5.11E-07	1E-04	1.35E-07	1E-05	-----	-----
Xe-135	5.38E-08	1E-04	1.42E-08	1E-05	-----	-----
Xe-135m	6.42E-08	1E-04	1.58E-08	1E-05	-----	-----
Xe-137	1.04E-07	1E-04	2.60E-08	1E-05	-----	-----
Xe-138	1.58E-07	1E-04	4.14E-08	1E-05	-----	-----
Cs-134	8.85E-08	1E-04	2.16E-08	5E-07	6.44E-14	1E-11
Cs-137	6.08E-08	1E-04	1.48E-08	5E-07	8.02E-14	1E-11
Ba-139	2.51E-07	1E-04	6.94E-08	5E-07	2.71E-13	1E-11
Ba-140	1.50E-07	1E-04	3.68E-08	5E-07	2.26E-13	1E-11
La-140	9.75E-08	1E-04	2.34E-08	5E-07	1.57E-13	1E-11
Ce-141	8.26E-08	1E-04	2.33E-08	5E-07	8.31E-14	1E-11
Ce-144 (5)	2.36E-06	1E-04	2.14E-07	5E-07	2.85E-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 03/27/11. 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.

(5) See page 21 for additional information regarding the 1 liter liquid bottle geometry LLDs.

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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
O R G A N (1)	Bone	5.89E-02	1.1780	4.15E-02	0.8300	5.26E-04	0.0105	7.07E-04	0.0141	1.02E-01	1.0163
	Liver	8.22E-02	1.6440	6.31E-02	1.2620	1.80E-03	0.0360	3.10E-03	0.0620	1.50E-01	1.5020
	Total Body	5.56E-02	3.7067	4.35E-02	2.9000	1.59E-03	0.1060	2.75E-03	0.1833	1.03E-01	3.4480
	Thyroid	3.70E-03	0.0740	6.20E-03	0.1240	1.10E-03	0.0220	2.12E-03	0.0424	1.31E-02	0.1312
	Kidney	3.06E-02	0.6120	2.54E-02	0.5080	1.31E-03	0.0262	2.45E-03	0.0490	5.98E-02	0.5976
	Lung	1.25E-02	0.2500	1.26E-02	0.2520	1.20E-03	0.0240	2.23E-03	0.0446	2.85E-02	0.2853
	GI-LLI	8.43E-03	0.1686	9.77E-03	0.1954	2.00E-03	0.0400	2.54E-03	0.0508	2.27E-02	0.2274

		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	2.97E-07	0.0000	3.12E-01	6.2400	0.00E+00	0.0000	0.00E+00	0.0000	3.12E-01	3.1200
(2)	Beta Air	6.27E-10	0.0000	1.16E-01	1.1600	0.00E+00	0.0000	0.00E+00	0.0000	1.16E-01	0.5800
O R G A N (3)	Bone	1.71E-08	0.0000	3.29E-08	0.0000	3.77E-09	0.0000	1.11E-09	0.0000	5.49E-08	0.0000
	Liver	2.40E-02	0.3200	1.35E-02	0.1800	7.31E-03	0.0975	1.39E-02	0.1853	5.87E-02	0.3914
	Total Body	2.40E-02	0.3200	1.35E-02	0.1800	7.31E-03	0.0975	1.39E-02	0.1853	5.87E-02	0.3914
	Thyroid	2.40E-02	0.3200	1.35E-02	0.1800	7.31E-03	0.0975	1.39E-02	0.1853	5.87E-02	0.3914
	Kidney	2.40E-02	0.3200	1.35E-02	0.1800	7.31E-03	0.0975	1.39E-02	0.1853	5.87E-02	0.3914
	Lung	2.40E-02	0.3200	1.35E-02	0.1800	7.31E-03	0.0975	1.39E-02	0.1853	5.87E-02	0.3914
	GI-LLI	2.40E-02	0.3200	1.35E-02	0.1800	7.31E-03	0.0975	1.39E-02	0.1853	5.87E-02	0.3914

(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

Calendar Year - 2011

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
O R G A N (1)	Bone	5.89E-02	1.1780	4.15E-02	0.8300	5.26E-04	0.0105	7.07E-04	0.0141	1.02E-01	1.0163
	Liver	8.22E-02	1.6440	6.31E-02	1.2620	1.80E-03	0.0360	3.10E-03	0.0620	1.50E-01	1.5020
	Total Body	5.56E-02	3.7067	4.35E-02	2.9000	1.59E-03	0.1060	2.75E-03	0.1833	1.03E-01	3.4480
	Thyroid	3.70E-03	0.0740	6.20E-03	0.1240	1.10E-03	0.0220	2.12E-03	0.0424	1.31E-02	0.1312
	Kidney	3.06E-02	0.6120	2.54E-02	0.5080	1.31E-03	0.0262	2.45E-03	0.0490	5.98E-02	0.5976
	Lung	1.25E-02	0.2500	1.26E-02	0.2520	1.20E-03	0.0240	2.23E-03	0.0446	2.85E-02	0.2853
	GI-LLI	8.43E-03	0.1686	9.77E-03	0.1954	2.00E-03	0.0400	2.54E-03	0.0508	2.27E-02	0.2274

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	1.36E-02	0.2720	2.22E-03	0.0444	0.00E+00	0.0000	1.03E-01	2.0600	1.19E-01	1.1882
(2)	Beta Air	2.26E-02	0.2260	1.79E-03	0.0179	0.00E+00	0.0000	3.80E-02	0.3800	6.24E-02	0.3120
O R G A N (3)	Bone	1.71E-08	0.0000	1.20E-04	0.0016	2.08E-05	0.0003	1.71E-04	0.0023	3.12E-04	0.0021
	Liver	5.77E-04	0.0077	1.14E-03	0.0152	1.38E-03	0.0184	1.06E-03	0.0141	4.16E-03	0.0277
	Total Body	5.77E-04	0.0077	1.15E-03	0.0153	1.38E-03	0.0184	1.07E-03	0.0143	4.18E-03	0.0278
	Thyroid	5.77E-04	0.0077	1.25E-03	0.0167	1.38E-03	0.0184	1.06E-03	0.0141	4.27E-03	0.0284
	Kidney	5.77E-04	0.0077	1.13E-03	0.0151	1.38E-03	0.0184	1.06E-03	0.0141	4.15E-03	0.0276
	Lung	5.77E-04	0.0077	1.28E-03	0.0171	1.39E-03	0.0185	1.14E-03	0.0152	4.39E-03	0.0292
	GI-LLI	5.77E-04	0.0077	1.17E-03	0.0156	1.38E-03	0.0184	1.07E-03	0.0143	4.20E-03	0.0280

(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

Calendar Year - 2011

Table 6

Effluent Monitoring Instrumentation Channels Not Returned To Operable Status Within 30 Days

[FR-VS-101] - Unit 1 Ventilation Vent Header Flow Recorder and [RM-1VS-109] Ch-10 - Unit 1 Auxiliary Building Ventilation Exhaust Monitor Flow Device

FR-VS-101, Ventilation Vent Header Flow Recorder and RM-1VS-109, Ch 10, Auxiliary Building Ventilation Exhaust Monitor Flow Device remained out of service for greater than 30 days in 2011. They were taken out of service during MSP on 09/11/10 due to the probe not working as expected. The design flow of 62,000 cfm was used for effluent releases during the out of service time period. This was previously reported in the 2010 ARERR. The current probe design for FR-VS-101 is obsolete and replacement parts to return the monitor to service were not available until August 2011. FR-VS-101 was returned to service on 8/10/11. The alternate channel, RM-1VS-109, Ch 10, remained out of service until 09/02/11 due to erroneous readings caused by inaccurate procedural guidance for the maximum scale limit.

As required by ODCM procedure 1/2-ODC-3.03, "Controls for RETS and REMP Programs", (as referenced in procedure Attachment F, Control 3.3.3.10, Table 3.3-13, Action 28A), effluent releases via this pathway may continue provided that the system/process flow rate is estimate at least once per 4 hours or assumed to be at the ODCM design value. Unit 1 Ventilation Vent flow rate has been assumed at the design value of 62,000 cfm. (Reference CR 10-80322 and SAP Notification #600639358/Order #200425622 and also CR 2011-00386 and 2011-01525 and Notification # 600701466/Order#200472170 for RM-1VS-109 Ch 10).

[RM-1MS-100C] - Unit 1 Atmospheric Dump Valve Steam Release Monitor

On 04/05/11, the Atmospheric Dump Valve Steam Release Monitor [RM-1MS-100C] was declared inoperable. The radiation monitor was not returned to service within 30 days. Due to scheduling of higher priority work activities, work began on 05/03/11. When work began, a technician discovered a disconnected/broken lead which was repaired and determined to be the cause of the instrument failure. The radiation monitor was returned to service on 5/26/11.

As required by ODCM procedure 1/2-ODC-3.03, "Controls for RETS and REMP Programs", (as referenced in Attachment D Control 3.3.3.1, Table 3.3-6, Action 35) restore the inoperable Channel(s) to OPERABLE status within 72 hours or initiate the preplanned alternate method of monitoring, which consists of performing estimated steam generator release rates based on primary-to-secondary leakrate calculations. (Reference CR #11-92328 and #2011-94162 and Notification # 600674432/Order #200450556).

[RM-1DA-100I] - Unit 1 Auxiliary Feed Pump Bay Drain Monitor

On 04/14/11, this monitor was removed from service due to failure of the sample pump. The sample pump had recently been replaced (01/28/11). This pump is a special order item and a replacement pump could not be immediately obtained, therefore the monitor remained out of service for greater than 30 days. The monitor was returned to service on 07/18/11.

As required by ODCM procedure 1/2-ODC-3.03, "Controls for RETS and REMP Programs", (as referenced in procedure Attachment E, Control 3.3.3.9, Table 3.3-12, Action 24), effluent releases via this pathway may continue provided grab samples are analyzed once per 12 hours. However, SINCE this liquid effluent pathway was diverted to the Tunnel Sump / Liquid Radwaste Treatment System on 04/14/11 (and remained diverted until the monitor was returned to operable status on 07/18/11), THEN there were no liquid releases through this effluent pathway. Therefore, grab sampling was not required. (Reference CR # 11-93095 and Notification #600676371/Order #200454563).

Radioactive Effluent Release Report
Calendar Year - 2011
Table 6

Effluent Monitoring Instrumentation Channels Not Returned To Operable Status Within 30 Days

**RM-1VS-1101 - Unit 1 Reactor Building/Supplementary Leak Collection
and Release System (SLCRS) Radiation Monitor**

On 7/25/11, RM-1VS-110, Reactor Building/SLCRS Radiation Monitor was taken out of service for regularly scheduled MSP (1MSP-43.59-I). During the work, it was determined that the Mid Range detector (Channel 7) was broken. A new detector was ordered and the Radiation Monitor was returned to service on 8/25/11.

As required by ODCM procedure 1/2-ODC-3.03, "Controls for RETS and REMP Programs", (as referenced in Attachment D Control 3.3.3.1, Table 3.3-6, Action 35 restore the inoperable Channel(s) to OPERABLE status within 72 hours or initiate the preplanned alternate method of monitoring, which consists of utilizing alternate radiation monitor RM-1VS-112. (Reference CR #2011-00688 and #2011-01038; Orders #200470081 and #2004154485).

**[2HVS-RQ109B] - Unit 2 Supplementary Leak Collection And Release
System (SLCRS) Filtered Radiation Monitor**

2HVS-RQ109B was out of service for greater than 30 days due to loss of process flow caused by circuitry issues. The monitoring instrument was declared inoperable on 02/19/11 and was returned to service on 05/21/11.

As required by ODCM procedure 1/2-ODC-3.03, "Controls for RETS and REMP Programs", (as referenced in Attachment F Control 3.3.3.10, Table 3.3-13, Actions 29 and 32) effluent releases via this pathway may continue provided that grab gas samples are taken at least once every 12 hours with analysis for gross activity completed within 24 hours and particulate and iodine samples continuously collected with auxiliary sampling equipment as required in ODCM Control 3.11.2.1, Table 4.11-2. Because compensatory grab sampling occurred, releases were permitted to continue via this pathway. (Reference CR#11-89832 and Notification #600667096/Order #200449243).

[2MSS-RQ101C] - Unit 2 Main Steam Discharge Radiation Monitor

2MSS-RQ101C was taken out of service on 8/18/11 for spiking during the Unit 2 Turbine Drive Aux Feedwater Pump OST. The monitor was returned to service on 9/17/11 after engineering evaluation.

As required by ODCM procedure 1/2-ODC-3.03, "Controls for RETS and REMP Programs", (as referenced in Attachment D Control 3.3.3.1, Table 3.3-6, Action 35) restore the inoperable Channel(s) to OPERABLE status within 72 hours or initiate the preplanned alternate method of monitoring, which consists of performing estimated steam generator release rates based on primary-to-secondary leakrate calculations. (Reference CRs #2011-00749, 2011-00106, 11-97853 and 2011-02350 and Order #200469386).

Radioactive Effluent Release Report

Calendar Year - 2011

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	2.04E-01	0.00E+00	2.04E-01	0.82%
Liver	3.63E-01	0.00E+00	3.63E-01	1.45%
Total Body	7.01E-01	0.00E+00	7.01E-01	2.80%
Thyroid	8.92E-02	0.00E+00	8.92E-02	0.12%
Kidney	1.82E-01	0.00E+00	1.82E-01	0.73%
Lung	1.20E-01	0.00E+00	1.20E-01	0.48%
GI-LLI	1.08E-01	0.00E+00	1.08E-01	0.43%
(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 **3.66 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 =	376 man-mrem (Total Body)
0-50 mile Average Population Dose from liquid and gaseous effluents =	0.0000941 man-mrem (Total Body)

Beaver Valley Power Station - Units 1 & 2**Enclosure 2, Page 21 of 22****Radioactive Effluent Release Report**

Calendar Year - 2011

Table 8

Offsite Dose Calculation Manual Surveillance Deficiencies

Unable to Meet Required LLD for Ce-144 in Liquid Liter Bottle Geometry

Germanium detectors are not able to meet the ODCM required Lower Limits of Detection (LLD) for Cerium-144 (Ce-144) in the 1 liter bottle geometry. While the geometry is used for some RETS purposes, it is not the geometry utilized for radioactive batch discharge permits. The issue with Ce-144 has been a recurring matter and has been addressed with Step 9.2 of BVPS site procedure 1/2-ENV-01.02, LLD Calculations, stating an exception for some isotopes if Cobalt-60 and Cesium-137 LLDs are acceptable. However, 1/2-ODC-3.03, ODCM: Controls for RETS and REMP Programs, Attachment G states that the LLD specification specifically applies to Ce-144 (among other nuclides) and that unusual circumstances resulting in LLDs higher than required shall be documented in the Radioactive Effluent Release Report. Investigation as to why this isotope cannot pass LLD requirements and associated corrective actions are ongoing and will be documented in Condition Report #2012-04412.

Radioactive Effluent Release Report

Calendar Year - 2011

Table 9

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

There were three changes made to the Offsite Dose Calculation Manual (ODCM) during the report period. See Attachment 2 of this report for a complete copy of the ODCM. For information, that attachment includes ODCM procedure 1/2-ODC-1.01, "Index, Matrix and History of ODCM Changes", which provides a complete description of the changes and the change justifications. A brief description of the changes are as follows:

Change 29 to the ODCM in January 2011

- 1.) Procedure 1/2-ODC-1.01 (Rev 11), "ODCM: Index, Matrix and History of ODCM Changes"
-Updated the History of ODCM Changes to include this change.
- 2.) Procedure 1/2-ODC-2.02 (Rev 3), "ODCM: Gaseous Effluents"
-Corrected a spelling error in the title of Attachment C
-Corrected a typo in equation 2.2-13.
-Added dose factors for Selenium-75 (Se-75) to Attachment H (Table 2.2-13) and Attachment J (Tables 2.3-2 through 2.3-20)
- 3.) Procedure 1/2-ODC-3.03 (Rev 10), "ODCM: Controls for RETS and REMP Programs"
-Added footnote to Control 3.3.3.9 Action b and 3.3.3.10 Action b indicating that Condition Report generation and reporting in the Radioactive Effluent Release Report do not apply when using an alternate to satisfy inoperability of the primary instrument beyond 30 days as was referenced throughout other sections of the ODCM in previous revisions.

Change 30 to the ODCM in September 2011

- 1.) Procedure 1/2-ODC-1.01 (Rev 12), "ODCM: Index, Matrix and History of ODCM Changes"
-Updated the History of ODCM Changes to include this change.
- 2.) Procedure 1/2-ODC-2.03 (Rev 3), "ODCM: Radiological Environmental Monitoring Program"
-Retired TLD Station #88 and added Station #88A due to repeated vandalism of the sample point.

Change 31 to the ODCM in December 2011

- 1.) Procedure 1/2-ODC-1.01 (Rev 13), "ODCM: Index, Matrix and History of ODCM Changes"
-Updated the History of ODCM Changes to include this change.
- 2.) Procedure 1/2-ODC-2.03 (Rev 4), "ODCM: Radiological Environmental Monitoring Program"
-Increased vegetation sampling requirements when milk sampling requirements cannot be met due to milk sampling locations being unavailable.
- 3.) Procedure 1/2-ODC-3.03 (Rev 11), "ODCM: Controls for RETS and REMP Programs"
-Increased vegetation sampling requirements when milk sampling requirements cannot be met due to milk sampling locations being unavailable.

ENCLOSURE 2, ATTACHMENT 1

Beaver Valley Power Station - Units 1 & 2

Radioactive Effluent Release Report

Calendar Year - 2011
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 for the site area.

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

99.7% = Wind Speed 35'

100% = Wind Speed 150'

99.9% = Wind Speed 500'

100% = Wind Direction 35'

100% = Wind Direction 150'

100% = Wind Direction 500'

100% = Delta Temperature (150' - 35') 1P

100% = Delta Temperature (500' - 35') 2P

100% = Temperature 35'

100% = Precipitation

100% = Average Recovery of Individual Meteorological Parameters

PERCENT RECOVERY OF COMPOSITE VARIABLES

100% = Wind Speed 35', Wind Direction 35', Delta Temperature 1P

100% = Wind Speed 150', Wind Direction 150', Delta Temperature 1P

100% = Wind Speed 500', Wind Direction 500', Delta Temperature 2P

100% = 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, where as, 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 Dr. Lara Renz at 724-682-4255.

Enclosure 2, Attachment 1 (Part 1 of 3)

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2011

Attachment 1

Part 1: Joint Frequency Distribution Tables (35ft)

Page 1 of 8

Hours at Each Wind Speed and Direction**Total Period**

Period of Record =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP35P

Direction: DI35P

Lapse: DT150-35

Stability Class A

Delta Temperature

Extremely Unstable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>> 25</u>	<u>Total</u>
N	11	31	0	0	0	0	42
NNE	13	17	0	0	0	0	30
NE	10	13	0	0	0	0	23
ENE	15	29	0	0	0	0	44
E	8	18	0	0	0	0	26
ESE	15	13	0	0	0	0	28
SE	8	9	0	0	0	0	17
SSE	6	9	0	0	0	0	15
S	1	17	0	0	0	0	18
SSW	2	22	1	0	0	0	25
SW	2	29	7	0	0	0	38
WSW	5	48	19	0	0	0	72
W	4	72	12	0	0	0	88
WNW	6	36	4	0	0	0	46
NW	7	42	3	0	0	0	52
NNW	13	36	1	0	0	0	50
Total	126	441	47	0	0	0	614

Calm Hours not Included above for :

Total Period

15

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

614

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 1 of 3)

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2011

Attachment 1

Part 1: Joint Frequency Distribution Tables (35ft)

Page 2 of 8

Hours at Each Wind Speed and Direction**Total Period**

Period of Record =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP35P

Direction: DI35P

Lapse: DT150-35

Stability Class B

Delta Temperature Moderately Unstable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	2	10	0	0	0	0	12
NNE	3	5	0	0	0	0	8
NE	4	1	0	0	0	0	5
ENE	2	2	0	0	0	0	4
E	6	5	0	0	0	0	11
ESE	5	0	0	0	0	0	5
SE	1	0	0	0	0	0	1
SSE	2	1	0	0	0	0	3
S	0	3	0	0	0	0	3
SSW	0	4	2	0	0	0	6
SW	1	8	11	0	0	0	20
WSW	0	14	6	0	0	0	20
W	1	27	2	0	0	0	30
WNW	6	14	1	0	0	0	21
NW	1	9	1	0	0	0	11
NNW	6	11	1	0	0	0	18
Total	40	114	24	0	0	0	178

Calm Hours not Included above for :

Total Period

15

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

178

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 1 of 3)

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2011

Attachment 1

Part 1: Joint Frequency Distribution Tables (35ft)

Page 3 of 8

Hours at Each Wind Speed and Direction**Total Period**

Period of Record =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP35P

Direction: DI35P

Lapse: DT150-35

Stability Class C

Delta Temperature Slightly Unstable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	6	11	0	0	0	0	17
NNE	4	0	0	0	0	0	4
NE	7	2	0	0	0	0	9
ENE	6	1	0	0	0	0	7
E	5	1	0	0	0	0	6
ESE	3	0	0	0	0	0	3
SE	0	0	0	0	0	0	0
SSE	4	0	0	0	0	0	4
S	1	1	0	0	0	0	2
SSW	3	6	1	0	0	0	10
SW	3	10	5	1	0	0	19
WSW	4	10	2	0	0	0	16
W	3	16	1	0	0	0	20
WNW	1	19	1	0	0	0	21
NW	5	12	0	0	0	0	17
NNW	1	10	0	0	0	0	11
Total	56	99	10	1	0	0	166

Calm Hours not Included above for :

Total Period

15

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

166

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 1 of 3)

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 =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP35P

Direction: DI35P

Lapse: DT150-35

Stability Class D

Delta Temperature Neutral

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	90	64	1	0	0	0	155
NNE	79	21	1	0	0	0	101
NE	105	18	0	0	0	0	123
ENE	110	80	0	0	0	0	190
E	65	13	0	0	0	0	78
ESE	29	2	0	0	0	0	31
SE	35	3	0	0	0	0	38
SSE	27	11	0	0	0	0	38
S	29	33	4	0	0	0	66
SSW	42	95	19	1	0	0	157
SW	90	238	162	16	0	0	506
WSW	79	247	88	16	0	0	430
W	85	295	105	3	0	0	488
WNW	104	207	17	0	0	0	328
NW	106	179	7	0	0	0	292
NNW	65	92	1	0	0	0	158
Total	1140	1598	405	36	0	0	3179

Calm Hours not Included above for :

Total Period

15

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

3179

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 1 of 3)

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 =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP35P

Direction: DI35P

Lapse: DT150-35

Stability Class E

Delta Temperature

Slightly Stable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	113	22	0	0	0	0	135
NNE	130	11	0	0	0	0	141
NE	209	26	0	0	0	0	235
ENE	244	60	0	0	0	0	304
E	196	31	0	0	0	0	227
ESE	117	6	0	0	0	0	123
SE	114	3	0	0	0	0	117
SSE	120	20	0	0	0	0	140
S	158	35	1	0	0	0	194
SSW	143	94	17	0	0	0	254
SW	99	124	65	3	0	0	291
WSW	68	84	46	7	0	0	205
W	80	60	33	0	0	0	173
WNW	70	22	5	0	0	0	97
NW	96	38	2	0	0	0	136
NNW	103	40	1	0	0	0	144
Total	2060	676	170	10	0	0	2916

Calm Hours not Included above for :

Total Period

15

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

2916

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 1 of 3)

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 =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP35P

Direction: DI35P

Lapse: DT150-35

Stability Class F

Delta Temperature Moderately Stable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	24	2	0	0	0	0	26
NNE	24	2	0	0	0	0	26
NE	51	2	0	0	0	0	53
ENE	134	1	0	0	0	0	135
E	172	1	0	0	0	0	173
ESE	208	0	0	0	0	0	208
SE	173	0	0	0	0	0	173
SSE	118	4	0	0	0	0	122
S	94	20	1	0	0	0	115
SSW	32	23	0	0	0	0	55
SW	22	5	3	0	0	0	30
WSW	9	1	4	0	0	0	14
W	6	1	1	0	0	0	8
WNW	5	0	0	0	0	0	5
NW	9	2	0	0	0	0	11
NNW	11	2	0	0	0	0	13
Total	1092	66	9	0	0	0	1167

Calm Hours not Included above for :

Total Period

15

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

1167

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 1 of 3)

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 =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP35P

Direction: DI35P

Lapse: DT150-35

Stability Class G

Delta Temperature

Extremely Stable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	5	1	0	0	0	0	6
NNE	10	0	0	0	0	0	10
NE	19	2	0	0	0	0	21
ENE	44	0	0	0	0	0	44
E	101	0	0	0	0	0	101
ESE	103	0	0	0	0	0	103
SE	109	0	0	0	0	0	109
SSE	56	0	0	0	0	0	56
S	27	0	0	0	0	0	27
SSW	19	2	0	0	0	0	21
SW	6	0	0	0	0	0	6
WSW	4	0	0	0	0	0	4
W	0	0	0	0	0	0	0
WNW	3	1	0	0	0	0	4
NW	5	0	0	0	0	0	5
NNW	5	0	0	0	0	0	5
Total	516	6	0	0	0	0	522

Calm Hours not Included above for :

Total Period

15

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

522

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 1 of 3)

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2011

Attachment 1

Part 1: Joint Frequency Distribution Tables (35ft)

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Hours at Each Wind Speed and Direction**Summary of All Stability Classes****Total Period**

Period of Record =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP35P

Direction: DI35P

Lapse: DT150-35

Delta Temperature

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	251	141	1	0	0	0	393
NNE	263	56	1	0	0	0	320
NE	405	64	0	0	0	0	469
ENE	555	173	0	0	0	0	728
E	553	69	0	0	0	0	622
ESE	480	21	0	0	0	0	501
SE	440	15	0	0	0	0	455
SSE	333	45	0	0	0	0	378
S	310	109	6	0	0	0	425
SSW	241	246	40	1	0	0	528
SW	223	414	253	20	0	0	910
WSW	169	404	165	23	0	0	761
W	179	471	154	3	0	0	807
WNW	195	299	28	0	0	0	522
NW	229	282	13	0	0	0	524
NNW	204	191	4	0	0	0	399
Total	5030	3000	665	47	0	0	8742

Calm Hours not Included above for :

Total Period

15

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

8742

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 2 of 3)

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2011

Attachment 1

Part 2: Joint Frequency Distribution Tables (150ft)

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Hours at Each Wind Speed and Direction**Total Period**

Period of Record =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP150P

Direction: DI150P

Lapse: DT150-35

Stability Class A

Delta Temperature Extremely Unstable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	3	28	22	1	0	0	54
NNE	2	11	18	2	0	0	33
NE	1	8	5	0	0	0	14
ENE	2	17	14	0	0	0	33
E	1	19	16	0	0	0	36
ESE	1	13	18	2	0	0	34
SE	2	15	8	1	0	0	26
SSE	0	11	11	0	0	0	22
S	2	14	18	0	0	0	34
SSW	0	8	8	3	0	0	19
SW	0	3	15	0	0	0	18
WSW	0	4	26	8	0	0	38
W	1	23	37	23	1	0	85
WNW	1	37	24	16	1	0	79
NW	3	15	21	1	0	0	40
NNW	0	24	25	0	0	0	49
Total	19	250	286	57	2	0	614

Calm Hours not Included above for :

Total Period

0

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

614

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 2 of 3)

Beaver Valley Power Station – Units 1 & 2

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 =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP150P

Direction: DI150P

Lapse: DT150-35

Stability Class B

Delta Temperature

Moderately Unstable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	2	5	6	0	0	0	13
NNE	0	2	3	0	0	0	5
NE	0	3	0	0	0	0	3
ENE	2	3	0	0	0	0	5
E	0	6	0	0	0	0	6
ESE	0	7	1	0	0	0	8
SE	3	3	0	0	0	0	6
SSE	0	1	1	0	0	0	2
S	0	2	3	1	0	0	6
SSW	1	1	4	2	0	0	8
SW	0	1	10	1	0	0	12
WSW	0	6	7	2	0	0	15
W	0	17	19	3	0	0	39
WNW	3	6	9	4	0	0	22
NW	2	5	3	2	0	0	12
NNW	1	6	9	0	0	0	16
Total	14	74	75	15	0	0	178

Calm Hours not Included above for :

Total Period

0

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

178

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 2 of 3)

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**Total Period**

Period of Record =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP150P

Direction: DI150P

Lapse: DT150-35

Stability Class C

Delta Temperature Slightly Unstable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>> 25</u>	<u>Total</u>
N	4	5	5	0	0	0	14
NNE	3	6	0	0	0	0	9
NE	0	2	1	0	0	0	3
ENE	0	4	0	0	0	0	4
E	0	5	2	0	0	0	7
ESE	1	3	1	0	0	0	5
SE	0	6	0	0	0	0	6
SSE	0	2	0	0	0	0	2
S	1	2	2	0	0	0	5
SSW	0	2	5	1	0	0	8
SW	0	0	4	3	0	0	7
WSW	1	8	5	1	0	0	15
W	0	12	10	1	0	0	23
WNW	4	7	17	3	1	0	32
NW	5	3	5	0	0	0	13
NNW	0	6	7	0	0	0	13
Total	19	73	64	9	1	0	166

Calm Hours not Included above for :

Total Period

0

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

166

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 2 of 3)

Beaver Valley Power Station – Units 1 & 2

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 =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP150P

Direction: DI150P

Lapse: DT150-35

Stability Class D

Delta Temperature Neutral

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>> 25</u>	<u>Total</u>
N	28	77	37	1	0	0	143
NNE	36	72	22	2	0	0	132
NE	27	44	13	0	0	0	84
ENE	19	91	47	7	0	0	164
E	18	51	14	0	0	0	83
ESE	10	31	4	1	0	0	46
SE	20	27	8	2	0	0	57
SSE	7	23	8	0	0	0	38
S	14	59	32	5	0	0	110
SSW	13	61	68	16	1	0	159
SW	28	75	164	55	3	0	325
WSW	31	111	138	49	8	0	337
W	39	166	261	138	30	6	640
WNW	39	172	190	86	10	0	497
NW	26	111	82	12	0	0	231
NNW	25	73	35	0	0	0	133
Total	380	1244	1123	374	52	6	3179

Calm Hours not Included above for :

Total Period

0

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

3179

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 2 of 3)

Beaver Valley Power Station – Units 1 & 2

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 =**

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP150P**Direction:** DI150P**Lapse:** DT150-35**Stability Class** E**Delta Temperature** Slightly Stable**Wind Speed (mph)**

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	50	56	13	2	0	0	121
NNE	85	54	10	2	0	0	151
NE	130	101	11	0	0	0	242
ENE	102	153	73	5	0	0	333
E	55	77	23	1	0	0	156
ESE	29	32	18	2	0	0	81
SE	33	29	3	0	0	0	65
SSE	30	48	10	1	0	1	90
S	52	83	47	0	0	0	182
SSW	64	89	51	16	0	0	220
SW	83	113	91	34	0	0	321
WSW	64	91	58	29	4	1	247
W	54	86	69	31	20	0	260
WNW	27	131	44	8	2	0	212
NW	35	76	16	2	0	0	129
NNW	22	67	17	1	0	0	107
Total	915	1286	554	134	26	2	2917

Calm Hours not Included above for :**Total Period**

0

Variable Direction Hours for:**Total Period**

0

Invalid Hours for:**Total Period**

3

Valid Hours for this Stability Class for:**Total Period**

2917

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 2 of 3)

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2011

Attachment 1

Part 2: Joint Frequency Distribution Tables (150ft)

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Hours at Each Wind Speed and Direction**Total Period**

Period of Record =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP150P

Direction: DI150P

Lapse: DT150-35

Stability Class F

Delta Temperature

Moderately Stable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	54	8	0	0	0	0	62
NNE	128	17	1	0	0	0	146
NE	124	70	1	0	0	0	195
ENE	51	55	5	0	0	0	111
E	28	16	0	0	0	0	44
ESE	16	9	0	0	0	0	25
SE	15	10	0	0	0	0	25
SSE	11	14	9	0	0	0	34
S	31	26	14	3	0	0	74
SSW	63	49	10	0	0	0	122
SW	79	51	9	1	0	0	140
WSW	38	14	5	3	0	0	60
W	21	15	1	3	0	1	41
WNW	15	8	1	1	0	0	25
NW	20	7	0	0	0	0	27
NNW	21	18	1	0	0	0	40
Total	715	387	57	11	0	1	1171

Calm Hours not Included above for :

Total Period

0

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

1171

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 2 of 3)

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**Total Period**

Period of Record =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP150P

Direction: DI150P

Lapse: DT150-35

Stability Class G

Delta Temperature Extremely Stable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	15	0	0	0	0	0	15
NNE	42	16	0	0	0	0	58
NE	61	38	0	0	0	0	99
ENE	24	28	1	0	0	0	53
E	9	14	0	0	0	0	23
ESE	9	11	0	0	0	0	20
SE	7	9	0	0	0	0	16
SSE	12	14	4	0	0	0	30
S	16	24	1	0	0	0	41
SSW	38	27	2	0	0	0	67
SW	25	24	3	0	0	0	52
WSW	13	5	1	0	0	0	19
W	9	4	0	0	0	0	13
WNW	3	6	0	0	0	0	9
NW	7	1	0	0	0	0	8
NNW	8	1	0	0	0	0	9
Total	298	222	12	0	0	0	532

Calm Hours not Included above for :

Total Period

0

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

532

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 2 of 3)

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2011

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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 =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP150P

Direction: DI150P

Lapse: DT150-35

Delta Temperature

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>> 25</u>	<u>Total</u>
N	156	179	83	4	0	0	422
NNE	296	178	54	6	0	0	534
NE	343	266	31	0	0	0	640
ENE	200	351	140	12	0	0	703
E	111	188	55	1	0	0	355
ESE	66	106	42	5	0	0	219
SE	80	99	19	3	0	0	201
SSE	60	113	43	1	0	1	218
S	116	210	117	9	0	0	452
SSW	179	237	148	38	1	0	603
SW	215	267	296	94	3	0	875
WSW	147	239	240	92	12	1	731
W	124	323	397	199	51	7	1101
WNW	92	367	285	118	14	0	876
NW	98	218	127	17	0	0	460
NNW	77	195	94	1	0	0	367
Total	2360	3536	2171	600	81	9	8757

Calm Hours not Included above for :

Total Period

0

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

3

Valid Hours for this Stability Class for:

Total Period

8757

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 3 of 3)

Beaver Valley Power Station – Units 1 & 2

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Attachment 1

Part 3: Joint Frequency Distribution Tables (500ft)

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Hours at Each Wind Speed and Direction**Total Period**

Period of Record =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP500P

Direction: DI500P

Lapse: DT500-35

Stability Class A

Delta Temperature Extremely Unstable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	0	4	5	2	0	0	11
NNE	0	1	0	0	0	0	1
NE	0	0	1	0	0	0	1
ENE	0	5	1	0	0	0	6
E	0	1	4	0	0	0	5
ESE	0	3	2	0	1	0	6
SE	0	2	1	0	0	0	3
SSE	0	2	1	1	0	0	4
S	0	0	6	0	0	0	6
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	1	1	0	0	2
W	0	1	4	1	0	0	6
WNW	0	3	5	2	0	0	10
NW	0	4	4	2	0	0	10
NNW	0	2	2	0	0	0	4
Total	0	28	37	9	1	0	75

Calm Hours not Included above for :

Total Period

1

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

35

Valid Hours for this Stability Class for:

Total Period

75

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 =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP500P

Direction: DI500P

Lapse: DT500-35

Stability Class B

Delta Temperature Moderately Unstable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	1	2	4	3	0	0	10
NNE	0	2	2	2	0	0	6
NE	1	3	0	0	0	0	4
ENE	1	3	8	0	0	0	12
E	0	6	7	0	0	0	13
ESE	0	3	9	2	0	0	14
SE	0	3	7	1	0	0	11
SSE	0	3	5	0	0	0	8
S	1	3	6	0	0	0	10
SSW	0	1	6	1	0	0	8
SW	0	1	3	1	0	0	5
WSW	1	1	12	6	0	0	20
W	0	5	13	1	1	0	20
WNW	0	7	16	9	1	0	33
NW	0	2	6	5	0	0	13
NNW	0	4	3	3	0	0	10
Total	5	49	107	34	2	0	197

Calm Hours not Included above for :

Total Period

1

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

35

Valid Hours for this Stability Class for:

Total Period

197

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 =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP500P

Direction: DI500P

Lapse: DT500-35

Stability Class C

Delta Temperature Slightly Unstable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	1	3	8	4	0	0	16
NNE	1	2	7	0	0	0	10
NE	0	2	3	1	0	0	6
ENE	3	2	5	0	0	0	10
E	0	4	9	1	0	0	14
ESE	2	7	11	1	1	0	22
SE	0	6	5	0	0	0	11
SSE	1	6	5	2	0	0	14
S	0	4	13	2	0	0	19
SSW	0	2	11	5	0	0	18
SW	0	3	10	6	1	0	20
WSW	0	1	17	6	1	0	25
W	2	9	16	12	6	1	46
WNW	0	5	14	6	2	1	28
NW	3	2	15	6	0	0	26
NNW	0	6	10	6	0	0	22
Total	13	64	159	58	11	2	307

Calm Hours not Included above for :

Total Period 1

Variable Direction Hours for:

Total Period 0

Invalid Hours for:

Total Period 35

Valid Hours for this Stability Class for:

Total Period 307

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 =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP500P

Direction: DI500P

Lapse: DT500-35

Stability Class D

Delta Temperature Neutral

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>> 25</u>	<u>Total</u>
N	18	75	159	50	0	0	302
NNE	23	41	40	22	3	0	129
NE	24	44	37	12	2	0	119
ENE	16	57	70	40	9	0	192
E	23	75	71	17	0	0	186
ESE	16	64	64	26	9	0	179
SE	18	64	44	23	7	0	156
SSE	8	32	42	14	1	0	97
S	12	36	77	46	6	1	178
SSW	13	44	123	112	39	6	337
SW	15	48	137	235	121	12	568
WSW	22	59	168	152	63	17	481
W	17	72	190	242	118	53	692
WNW	23	84	251	187	84	21	650
NW	18	49	172	69	12	0	320
NNW	17	71	162	47	0	0	297
Total	283	915	1807	1294	474	110	4883

Calm Hours not Included above for :

Total Period

1

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

35

Valid Hours for this Stability Class for:

Total Period

4883

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 =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP500P

Direction: DI500P

Lapse: DT500-35

Stability Class E

Delta Temperature

Slightly Stable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	11	18	30	18	1	0	78
NNE	10	26	18	8	1	0	63
NE	39	29	13	6	0	0	87
ENE	46	60	50	14	1	0	171
E	53	70	49	4	0	0	176
ESE	43	66	40	10	0	0	159
SE	25	59	51	24	5	0	164
SSE	26	48	44	22	2	1	143
S	16	36	56	59	12	1	180
SSW	29	22	38	54	21	3	167
SW	46	29	86	124	35	6	326
WSW	42	71	47	17	7	0	184
W	39	92	84	33	8	2	258
WNW	25	55	52	12	1	0	145
NW	25	23	35	14	0	0	97
NNW	12	12	29	7	0	0	60
Total	487	716	722	426	94	13	2458

Calm Hours not Included above for :

Total Period

1

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

35

Valid Hours for this Stability Class for:

Total Period

2458

Total Hours for Period

8760

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Beaver Valley Power Station – Units 1 & 2

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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 =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP500P

Direction: DI500P

Lapse: DT500-35

Stability Class F

Delta Temperature

Moderately Stable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	6	9	4	1	0	0	20
NNE	7	11	3	1	0	0	22
NE	13	12	1	0	0	0	26
ENE	10	18	6	3	0	0	37
E	25	35	5	0	0	0	65
ESE	20	27	9	5	0	0	61
SE	16	27	17	9	1	0	70
SSE	7	17	15	5	0	0	44
S	14	20	26	20	5	0	85
SSW	15	13	19	19	1	0	67
SW	15	6	13	14	6	0	54
WSW	10	19	3	2	0	0	34
W	16	16	13	8	0	0	53
WNW	5	16	5	0	0	0	26
NW	11	8	5	0	0	0	24
NNW	13	4	3	1	0	0	21
Total	203	258	147	88	13	0	709

Calm Hours not Included above for :

Total Period

1

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

35

Valid Hours for this Stability Class for:

Total Period

709

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 =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP500P

Direction: DI500P

Lapse: DT500-35

Stability Class G

Delta Temperature

Extremely Stable

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	1	0	0	0	0	0	1
ENE	2	0	0	0	0	0	2
E	4	5	0	0	0	0	9
ESE	1	7	1	0	0	0	9
SE	0	8	0	0	0	0	8
SSE	0	9	3	0	0	0	12
S	2	8	11	1	0	0	22
SSW	1	8	2	4	1	0	16
SW	0	1	6	5	4	0	16
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Total	11	46	23	10	5	0	95

Calm Hours not Included above for :

Total Period

1

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

35

Valid Hours for this Stability Class for:

Total Period

95

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**Summary of All Stability Classes****Total Period**

Period of Record =

1/1/2011 00:00 - 12/31/2011 23:00

Elevation: Speed: SP500P

Direction: DI500P

Lapse: DT500-35

Delta Temperature

Wind Speed (mph)

<u>Wind Direction</u>	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>≥ 25</u>	<u>Total</u>
N	37	111	210	78	1	0	437
NNE	41	83	70	33	4	0	231
NE	78	90	55	19	2	0	244
ENE	78	145	140	57	10	0	430
E	105	196	145	22	0	0	468
ESE	82	177	136	44	11	0	450
SE	59	169	125	57	13	0	423
SSE	42	117	115	44	3	1	322
S	45	107	195	128	23	2	500
SSW	58	90	199	195	62	9	613
SW	76	88	255	385	167	18	989
WSW	75	151	248	184	71	17	746
W	74	195	320	297	133	56	1075
WNW	53	170	343	216	88	22	892
NW	57	88	237	96	12	0	490
NNW	42	99	209	64	0	0	414
Total	1002	2076	3002	1919	600	125	8724

Calm Hours not Included above for :

Total Period

1

Variable Direction Hours for:

Total Period

0

Invalid Hours for:

Total Period

35

Valid Hours for this Stability Class for:

Total Period

8724

Total Hours for Period

8760