

Enclosure A
L-14-147

2013 Radioactive Effluent Release Report
and
2013 Annual Radiological Environmental Operating Report
(Reports follow)

FIRSTENERGY NUCLEAR OPERATING COMPANY BEAVER VALLEY POWER STATION



2013 RADIOACTIVE EFFLUENT RELEASE REPORT

AND

2013 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:

2013 RADIOACTIVE EFFLUENT RELEASE REPORT

AND

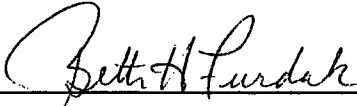
2013 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

UNITS NO. 1 AND 2

LICENSES DPR-66 AND NPF-73

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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 2013, and
Annual Radiological Environmental Operating Report for 2013

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Annual Radiological Environmental Operating Report*

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Beaver Valley Power Station - Units 1 & 2

2013 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 - 2013
Index

	Title	Page
	Cover	i
	Index	ii
	Executive Summary - Report Submittal Requirements	iii
	Executive Summary - Liquid and Gaseous Effluent Control (Part 1 of 2)	iv
	Executive Summary - Liquid and Gaseous Effluent Control (Part 2 of 2)	v
	Executive Summary - Trends of Total Dose	vi
	Executive Summary - Trends of Liquid Release Activity (Fission and Activation Products)	vii
	Executive Summary - Trends of Liquid Release Activity (Tritium)	viii
	Executive Summary - Trends of Liquid Release Offsite Dose Projections	ix
	Executive Summary - Trends of Gaseous Release Activity (Fission and Activation Gas)	x
	Executive Summary - Trends of Gaseous Release Activity (Particulates and Radioiodines)	xi
	Executive Summary - Trends of Gaseous Release Activity (Tritium)	xii
	Executive Summary - Trends of Unit 1 Gaseous Release Offsite Dose Projections	xiii
	Executive Summary - Trends of Unit 2 Gaseous Release Offsite Dose Projections	xiv
	Results of Abnormal Releases	xv
	Results of Onsite Spills and Items Added to Decommissioning Files per 10CFR50.75(g)	xvi
	Results of Onsite Groundwater Monitoring Program	xvii
	Corrections to Previous Radioactive Effluent Release Reports	xviii
	Supplemental Information Page	1
Table 1A	Gaseous Effluents - Summation Of All Releases	2
Table 1B-EB	Gaseous Effluents - Elevated Batch Releases	3
Table 1B-EC	Gaseous Effluents - Elevated Continuous Releases	4
Table 1C-GB1	Gaseous Effluents - Ground Level Batch Releases (Unit 1)	5
Table 1C-GC1	Gaseous Effluents - Ground Level Continuous Releases (Unit 1)	6
Table 1C-GB2	Gaseous Effluents - Ground Level Batch Releases (Unit 2)	7
Table 1C-GC2	Gaseous Effluents - Ground Level Continuous Releases (Unit 2)	8
Table 2A	Liquid Effluents - Summation Of All Releases	9
Table 2B-B	Liquid Effluents - Batch Releases	10
Table 2B-C	Liquid Effluents - Continuous Releases	11
Table 3A	Solid Waste And Irradiated Fuel Shipments (Part 1 of 3)	12
Table 3B	Solid Waste And Irradiated Fuel Shipments (Part 2 of 3)	13
Table 3C	Solid Waste And Irradiated Fuel Shipments (Part 3 of 3)	14
Table 4	Lower Limits Of Detectability	15
Table 5A	Assessment Of Radiation Doses (Unit 1)	16
Table 5B	Assessment Of Radiation Doses (Unit 2)	17
Table 6	Effluent Monitoring Instrumentation Channels Not Returned To Operable Status Within 30 Days	18
Table 7	Total Dose Commitments, Total Effective Dose Equivalents and Population Doses	19
Table 8	Offsite Dose Calculation Manual Surveillance Deficiencies	20
Table 9	Unit 1 and 2 Offsite Dose Calculation Manual Changes (Description)	21
Attachment 1	Part 1: Joint Frequency Distribution Tables (35 ft) Part 2: Joint Frequency Distribution Tables (150 ft) Part 3: Joint Frequency Distribution Tables (500 ft)	
Attachment 2	Unit 1 and 2 Offsite Dose Calculation Manual (Complete Copy)	

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

Radioactive Effluent Release Report

Calendar Year - 2013

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. CR2013-01129, Unauthorized radioactive release to Unit 1 River Water.

BVPS Condition Report No. CR2013-01750, Sample Pump Failure on BV-RM-1GW-109.

BVPS Condition Report No. CR2013-08883, ODCM controls for the U1 Cable Vault Sump not followed/implemented properly

BVPS Condition Report No. CR2013-09691, Cobalt-58 identified in Unit 2 Catch Basin 2CB-4.

BVPS Condition Report No. CR2013-10965, Potential Release of Radioactivity to the Environment from Unit 2 Hot Water Heat

BVPS Condition Report No. CR2013-11001, Samples missing for liquid waste composites.

BVPS Condition Report No. CR2013-11580, 2MSS-RW101A [Main Steam Discharge Radiation Monitor] not restored within 30 days per ODCM.

BVPS Condition Report No. CR2013-12456, Radiation Monitor RM-1VS-101B, RM-1VS-107B and RM-1GW-108B Calibrations did not include flow calibration.

BVPS Condition Report No. CR2013-12572, Gaseous Waste discharges performed with RM-1GW-108B Non-Functional without performance of required actions in ODCM

BVPS Condition Report No. CR2013-13220, Cobalt-58 found in catch basin and man hole.

BVPS Condition Report No. CR2013-17741, RM-1RW-100 has exceeded 30 days out of service allowed by 1/2-ODC-3.03.

BVPS Condition Report No. CR2013-19058, RM-1GW-109 not restored before the thirty day requirement.

BVPS Condition Report No. CR2013-19612, ODCM Rad Monitors OOS greater than 30 days.

BVPS Condition Report No. CR2013-19685, The Unit 2 Main Steam Rad Monitors have been out of service for greater than 30 days.

BVPS Condition Report No. CR2013-19922, No pre-release RWDA-L permit created for Cable Vault Sump

BVPS SAP Order No. 600804455, 2013 RETS and REMP Report

Radioactive Effluent Release Report

Calendar Year - 2013

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

Onsite Groundwater Monitoring: Twenty-four (24) on-site monitoring wells were sampled in the spring and twenty-three (23) on-site monitoring wells were sampled in the fall sampling periods in 2013. A single well (P-3) could not be sampled in the fall, after multiple attempts, due to access issues. Two (2) wells were officially retired within 2013, MW-4 and WW-S. Three (3) new monitoring wells were installed in total. Sixteen (16) wells returned results of less than the pre-operational mean (440 pCi/L) during all sample periods in 2013. One (1) well returned results >440 pCi/L, but <2000 pCi/L. Seven (7) wells returned results >2000 pCi/L. No wells exceeded 20,000 pCi/L with the highest concentration recorded as 15,842 pCi/L. Levels in all wells over 2,000 pCi/L are showing overall downward trends in concentration. The NEI/FENOC communication level was reached for MW-12S & MW-12D during 2007. Notification to local, state & federal agencies was performed on 10/08/07. Additional communication for new well results was performed on 09/08/10 for those new wells that exceeded 2000 pCi/L. No new tritium plumes were identified in 2013. No adverse effect to the offsite environment has been detected at this time, because all offsite groundwater, drinking water and surface water samples were <440 pCi/L. Mitigation activities (catch basin sleeving) to prevent tritiated condensate water from reaching the groundwater were completed 12/17/11. Remediation activities commenced in the fall of 2013. See Enclosure 2, Page xvii for additional details.

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

Decommissioning File Update: There were two items added to the site decommissioning files in accordance with 10CFR50.75(g). This item included Licensiced Radioactive Material identified in the Unit 2 Hot Water Heating system and the Unit 2 Turbine Building and Yard Drain Systems . See Enclosure 2, Page xvi for additional details.

Abnormal Liquid Releases: There were two (2) abnormal releases during the sampling period of 2013. See Page xv for additional details.

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 - 2013

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

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

Effluent Monitoring Channels Inoperable >30 Days: There were five (5) Effluent Monitoring Instrumentation Channels not returned to Operable status within 30 days. See Enclosure 2, Page 18 for details.

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

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

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

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

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

0.0000589 mrem = BVPS Average Individual Dose for the year

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

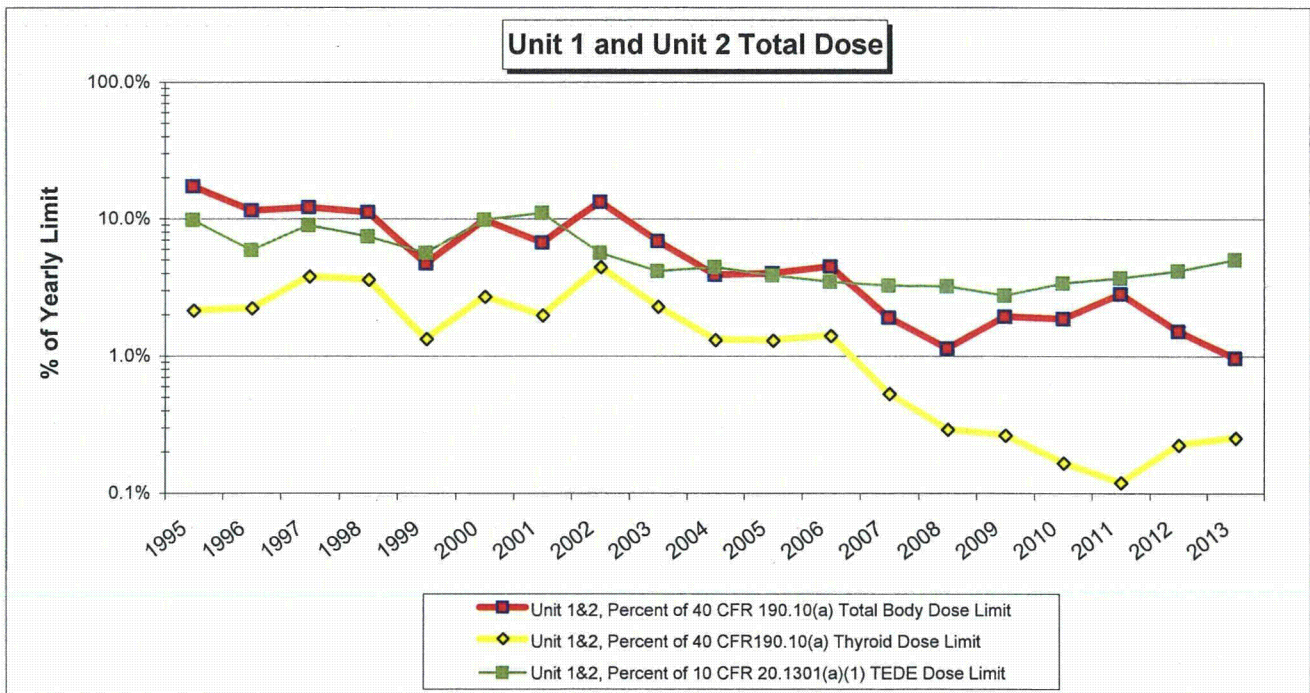
Carbon-14 Dose Assessment: Carbon-14 dose was calculated using actual sample measurements from gaseous release quantities and the default ODCM receptor. The highest organ doses were to the bone (child). Details of the dose assessment due to releases of Carbon-14 in gaseous effluents are provided in Attachment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

Radioactive Effluent Release Report

Calendar Year - 2013

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.

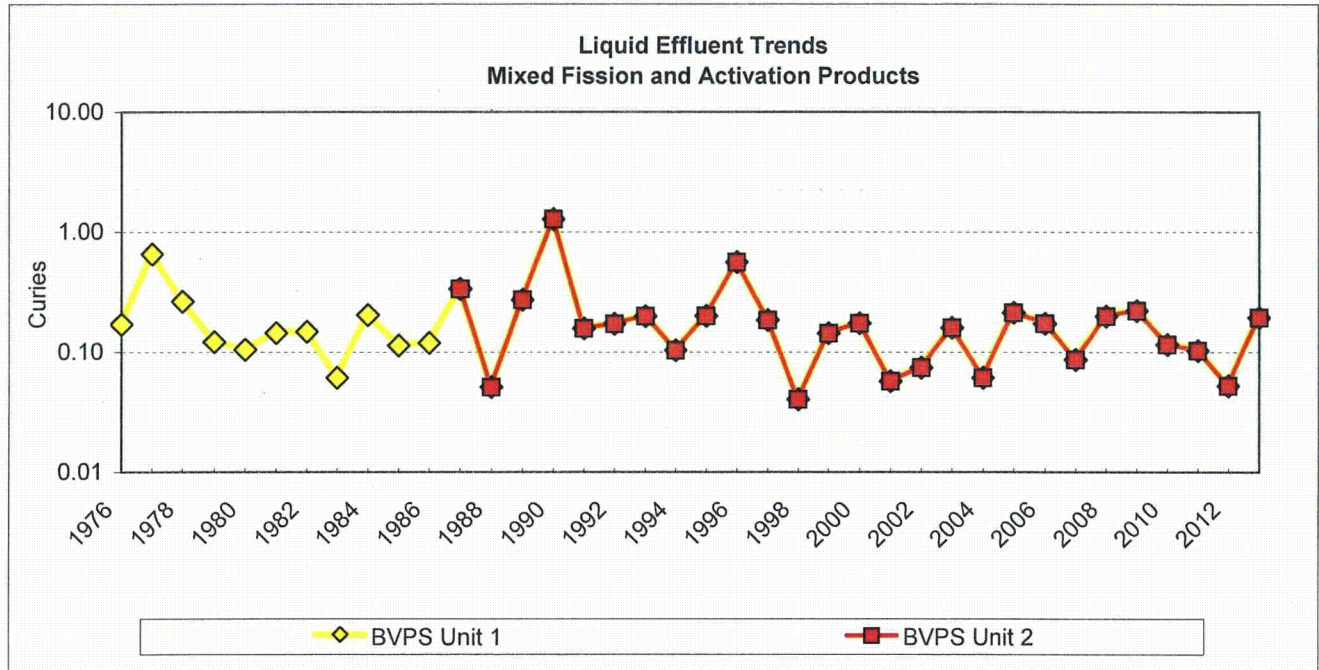


Radioactive Effluent Release Report

Calendar Year - 2013

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.

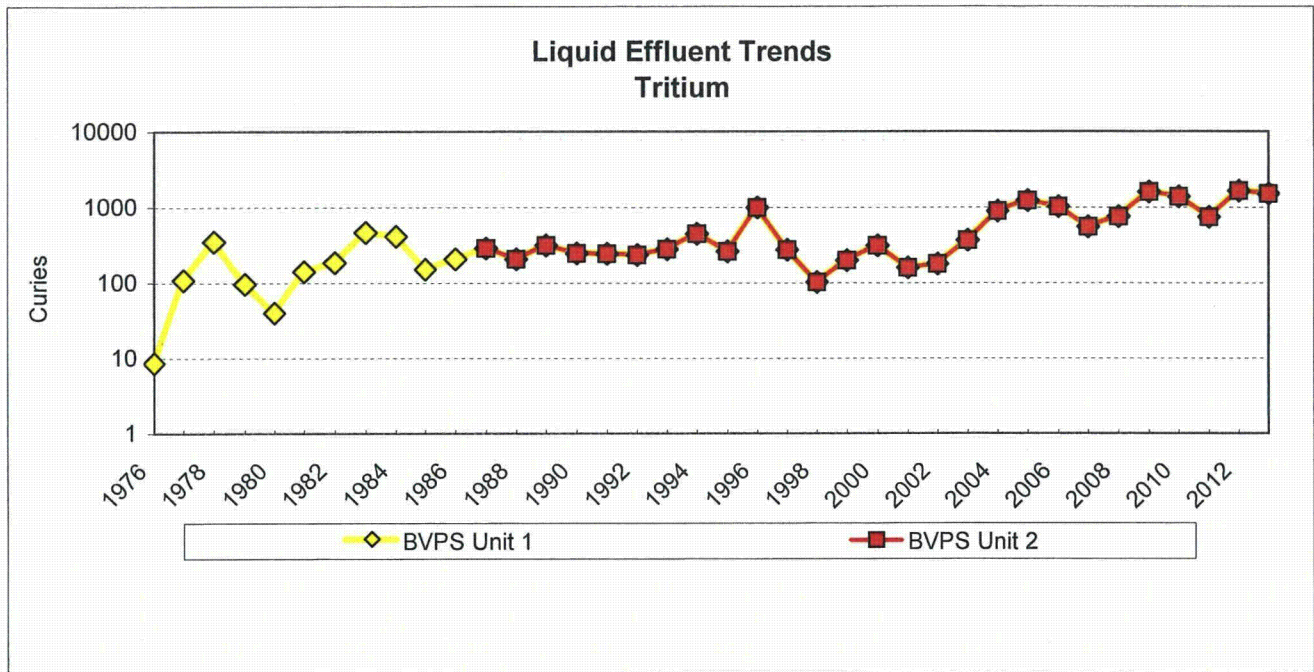


Radioactive Effluent Release Report

Calendar Year - 2013

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.

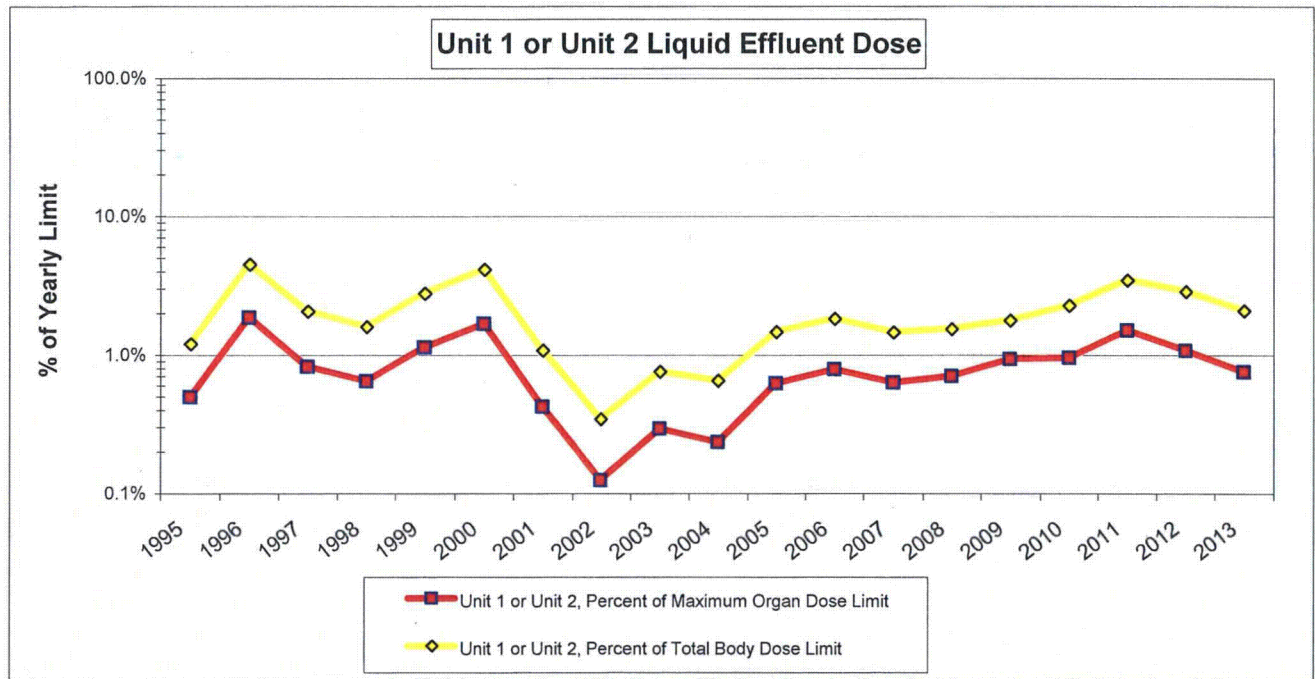


Radioactive Effluent Release Report

Calendar Year - 2013

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.

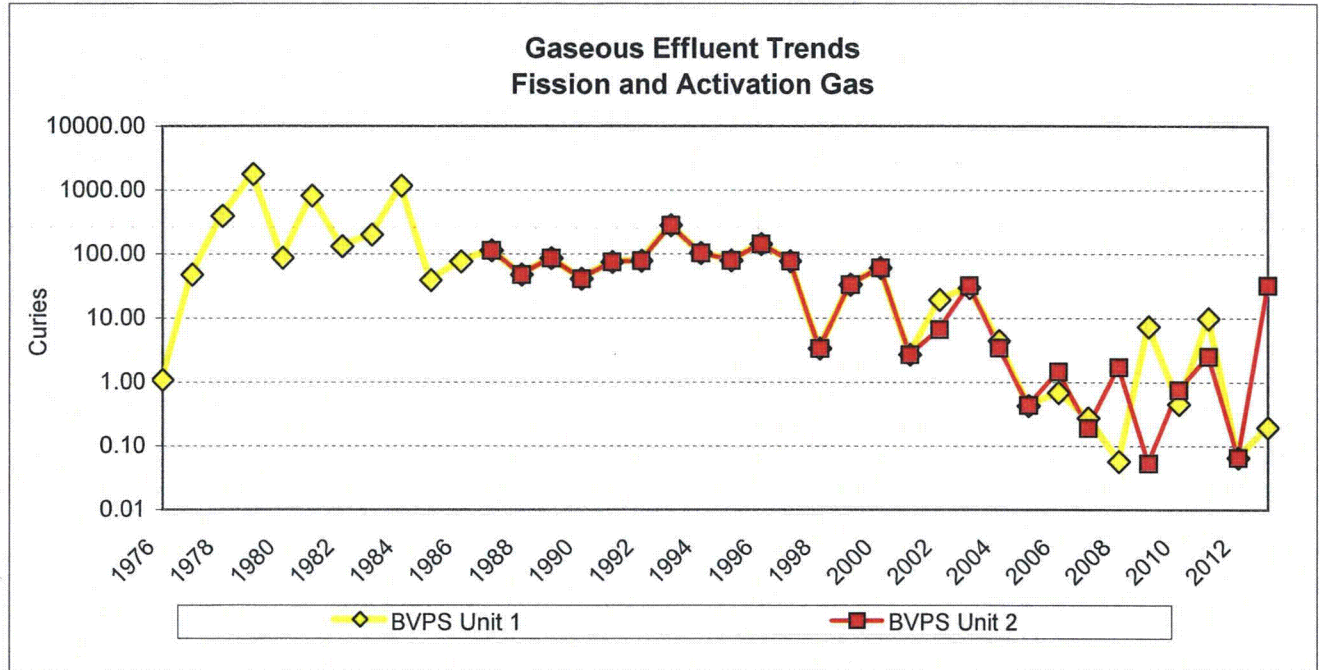


Radioactive Effluent Release Report

Calendar Year - 2013

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.

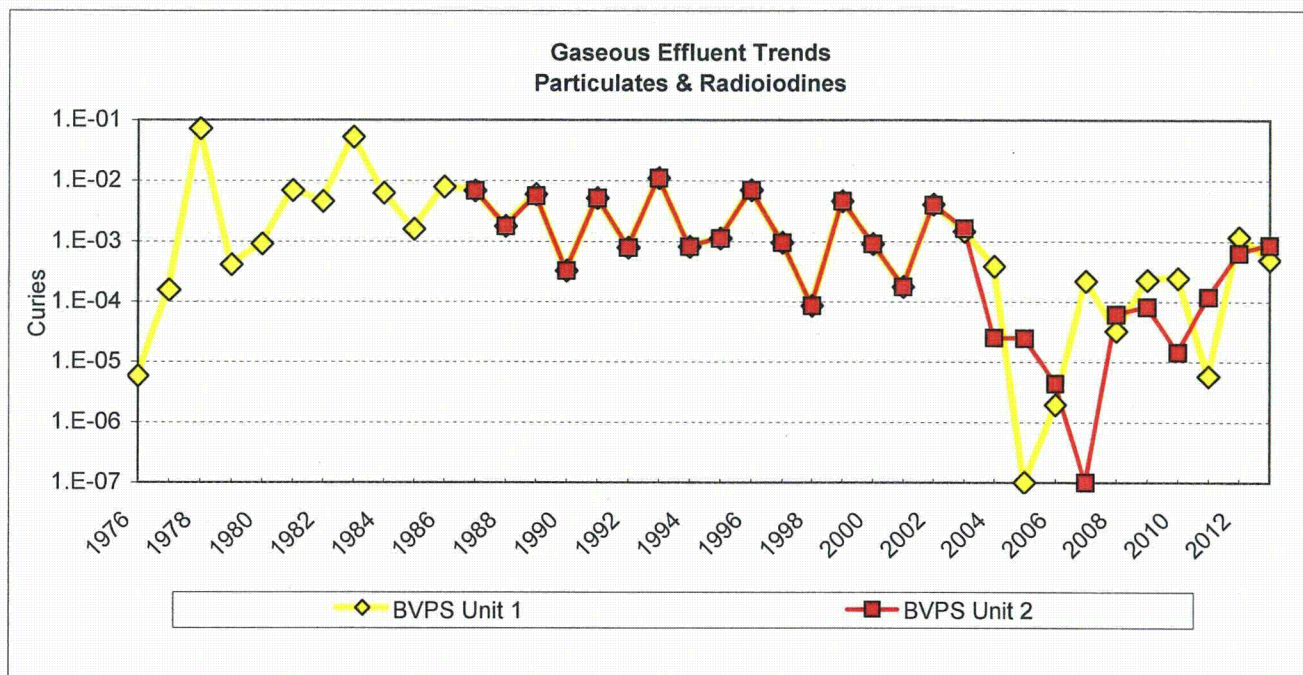


Radioactive Effluent Release Report

Calendar Year - 2013

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

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

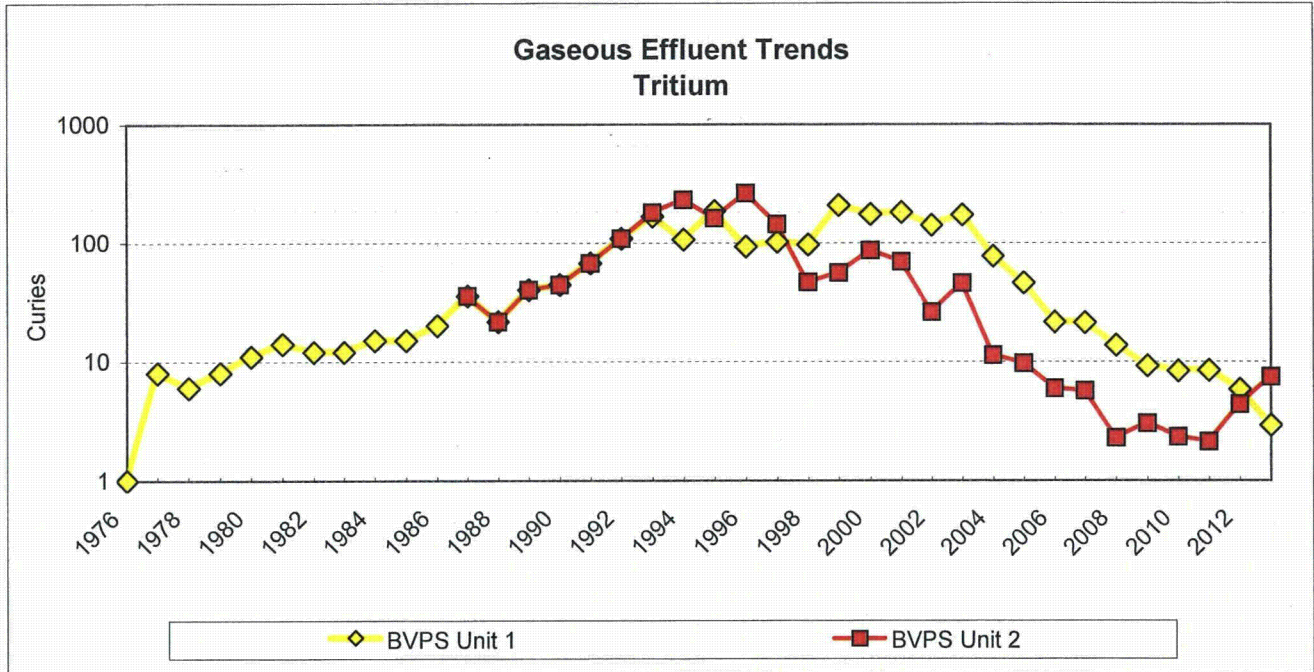


Radioactive Effluent Release Report

Calendar Year - 2013

Executive Summary - Trends of Gaseous Release Activity (Tritium)

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

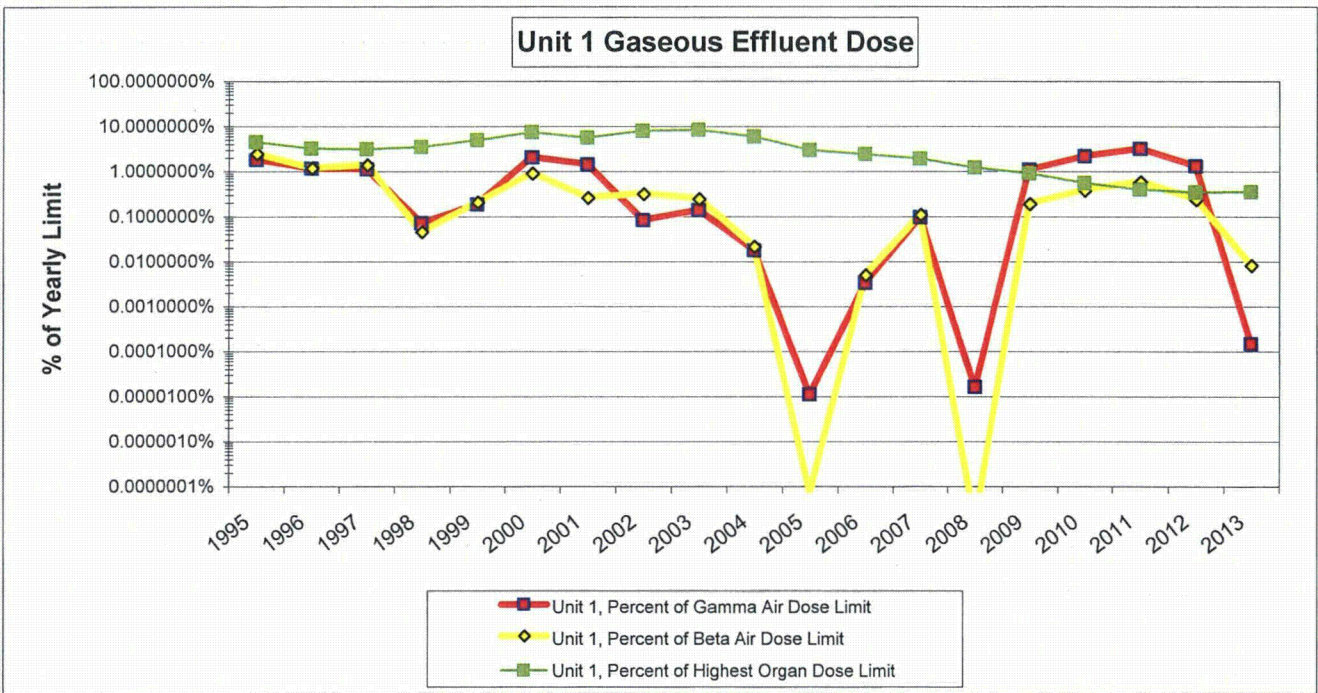


Radioactive Effluent Release Report

Calendar Year - 2013

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.**

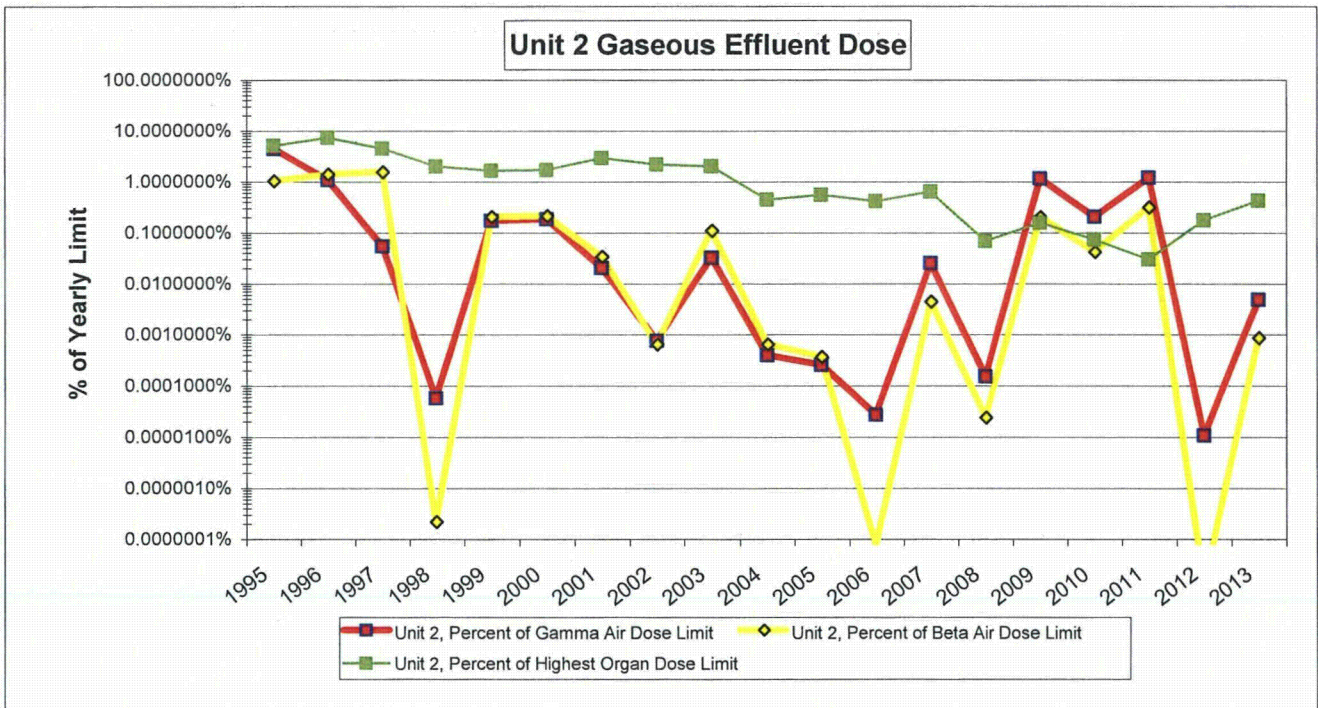


Radioactive Effluent Release Report

Calendar Year - 2013

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

Unit 2 Gaseous Release Offsite Dose Projections: The following graph provides a comparison of Unit 2 gaseous offsite dose projections that were calculated to the maximum individual per 10 CFR 50, Appendix I and the ODCM. The projections use ODCM default meteorological parameters for the atmospheric conditions surrounding the plant site, and were performed prior to release authorization. **The decrease in highest organ dose was due to efforts to reduce overall offsite dose. 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 - 2013

Results of Abnormal Releases

Abnormal Liquid Releases: There were two (2) abnormal releases in the reporting period 2013.

1) The first abnormal release occurred in January when a vent hose from the Unit 1 Charging Pump was aligned to drain to the Unit 1 steam generator sample panel which drains to the Unit 1 river water system. This drain path was not approved by chemistry prior to the start of draining. This release was captured in permit 1-JAN-13-03 (reference CR-2013-01129).

2) The second abnormal release occurred in June from Unit 2 when it was discovered that RCS sample water was being drained into the Laboratory cup sink which drained into the catch basins. This event was discovered when Co-58 was indentified in catch basin samples at Unit 2. Previously it was documented that material was deposited into the Catch Basins during movement of a radioactive shipment for disposal. Upon further investigation it was discovered that the Licensed Radioactive Material (LRM) was coming from the Laboratory cup sink and not from radioactive shipments (reference CR-2013-13220 and CR-2013-09691). Corrective actions included re-routing the Unit 2 Hot Laboratory cup sink drains to the Unit 2 Liquid Waste sytsem and removing the copper drain line from the Unit 2 Turbine Building, performing drawing reviews of every sink, shower, floor, sump, and sample panel within the Radioactive Control Area to verify potential pathways to the environment, and cleaning all contaminated components including drains, drain pipes, Oil Water Seperator 23 and Unit 2 Catch Basins. Corrections to previous reports and permits have been perform

Abnormal Gas Releases: None

Radioactive Effluent Release Report

Calendar Year - 2013

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

Summary of Onsite Spills (>100 gallons): None

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

Item 1 of 2 (Unit 2 Hot Water Heat System): During investigation of Cobalt-58 in the Catch Basin System, Condition Report 2013-09691, the failure modes analysis determined that the Unit 2 Hot Water Heating System was contaminated from its interaction with the Unit 1 / Unit 2 Nitrogen System. The Unit 2 Hot Water Heating System should be considered a potentially contaminated system. Reference Condition Report 2013-10965.

Item 2 of 2 (Unit 2 Turbine Building and Yard Drain System): Licensed Radioactive Material (Cobalt-58) was identified in the Unit 2 Building and Yard Drain System. The Cobalt-58 was identified during sampling of the Unit 2 Catch Basin System. The event resulted in a release of Licensed Radioactive Material (LRM) from the site boundary. The source of the radioisotopes found in the Unit 2 building and Yard Drain System was determined to be from cup sink drains in the Unit 2 Hot Laboratory which by original plant design were routed to the Unit 2 Turbine Building drains. 2WOS-OWS23, Unit 2 Manholes, Catch Basins, and Turbine Building Drains are to be considered potentially contaminated systems. Reference Condition Report 2013-09691.

Radioactive Effluent Release Report

Calendar Year - 2013

Results of Onsite Groundwater Monitoring Program

Summary of Onsite Groundwater Samples

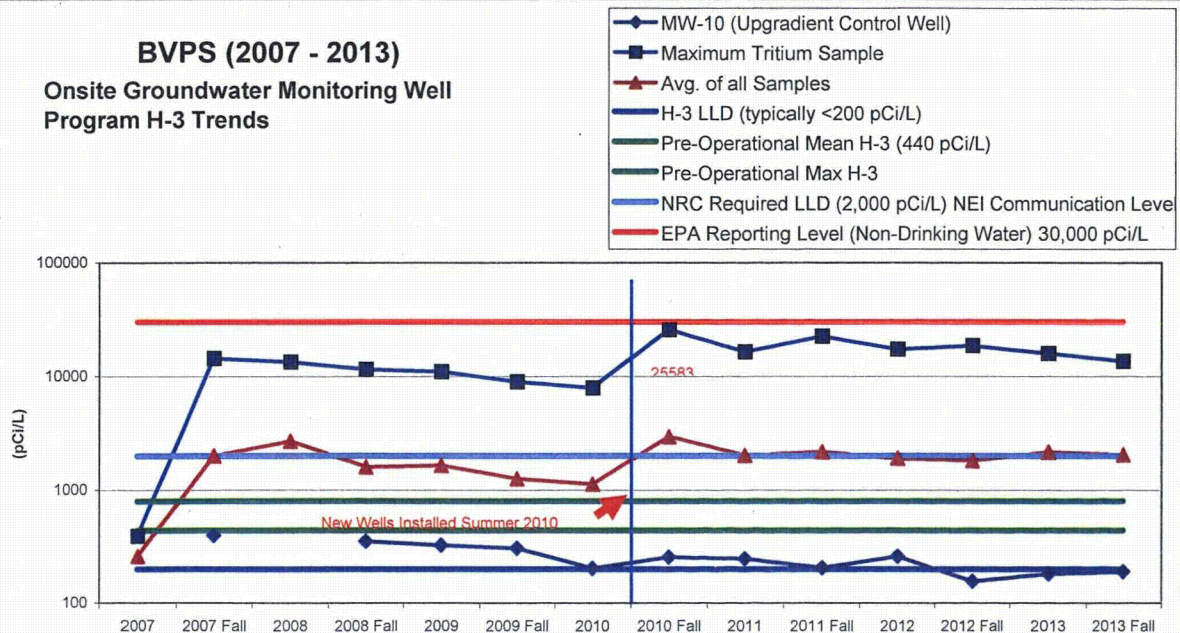
	2013 H-3 Maximum (pCi/L)	2013 H-3 Minimum (pCi/L)	2013 H-3 Average (pCi/L)	Typical H-3 LLD (pCi/L)	Required H-3 LLD (pCi/L)	Pre Operational Mean For H-3 (pCi/L)	Are Any H-3 Analyses Greater Than The Pre Operational Mean For H-3 ?	NEI and FENOC Communication Level For H-3 (pCi/L)	EPA Reporting Level For H-3 (pCi/L)
2nd Quarter	15842	144	2135	<200	<2000	440	Yes	2000	20000
3rd Quarter	13594	146	2024	<200	<2000	440	Yes	2000	20000

H-3 Summary: Twenty-four (24) on-site monitoring wells were sampled in the spring and twenty-three (23) on-site monitoring wells were sampled in the fall sampling periods in 2013. A single well (P-3) could not be sampled in the fall, after multiple attempts, due to access issues. Two (2) wells were officially retired within 2013, MW-4 and WW-S. MW-4 was retired and replaced with MW-21. This was done primarily for location reasons due to construction changes occurring on site. WW-S was damaged and could no longer be sampled. The impact to the monitoring program due to the loss of WW-S is negligible since the well was a previous potable water well that was no longer utilized and the sampling of the well was conducted simply due to availability. Surrounding wells MW-1, 2 and 3 provide the program sampling locations for the area. Three (3) new monitoring wells were installed in total, including the previously mention MW-21. In addition to MW-21, MW-20S and 20D were installed to monitor the remediation and attenuation of the previously identified highest H-3 plume on site passing MW-16. These new wells were installed at the furthest downstream viable location to monitor the plume migration.

An additional remediation well, EW-1 was installed in addition to remediation pumping equipment for H-3 plume recapture. The remediation system began operation in fall 2013 and is expected to remain in operation through 2014. Sixteen (16) wells returned results of less than the pre-operational mean (440 pCi/L) during all sample periods in 2013. One (1) well returned results >440 pCi/L, but <2000 pCi/L. Seven (7) wells returned results >2000 pCi/L. No wells exceeded 20,000 pCi/L with the highest concentration recorded as 15,842 pCi/L. Levels in all wells over 2,000 pCi/L are showing overall downward trends in concentration. The NEI/FENOC communication level was reached for MW-12S & MW-12D during 2007. Notification to local, state & federal agencies was performed on 10/08/07. Additional communication for new well results was performed on 09/08/10 for those new wells that exceeded 2000 pCi/L. The newly installed well MW-20D exceeded 2,000 pCi/L on its first sample, but this was expected since the well was installed to monitor the previously identified plume intercepting MW-16. No new tritium plumes were identified in 2013. No adverse effect to the offsite environment has been detected at this time, because all offsite groundwater, drinking water and surface water samples were <440 pCi/L. Mitigation activities (catch basin sleeving) to prevent tritiated condensate water from reaching the groundwater were completed 12/17/11. Remediation activities commenced in the fall of 2013.

Principal Gamma Emitter 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. Sr-90 analysis was conducted on the spring samples for 2013. All results returned less-than-detectable values for all wells.

BVPS (2007 - 2013)
 Onsite Groundwater Monitoring Well
 Program H-3 Trends



Radioactive Effluent Release Report

Calendar Year - 2013

Corrections to previous Radioactive Effluent Release Reports

Correction(s) to Previous Radioactive Effluent Release Reports:

There was one (1) correction to the previous Radioactive Effluent Release Reports.

Co-58 was identified in the Unit 2 Catch Basin systems in June 2013. The event resulted in an abnormal release of Licensed Radioactive Material (LRM) from the site boundary. See Page XV for additional details. An investigation was launched and determined the source of radioisotopes found was from the cup sink drains in the Unit 2 Hot Laboratory which are routed to the Unit 2 Turbine Building drains. The investigation found that a new Inductively Coupled Plasma (ICP) instrument was installed in September 2009 in the Unit 2 Hot Laboratory and the drains from the instrument were routed into the cup sink under the assumption that all drains from the hot lab went to the liquid waste system. Corrective actions from the investigation included creating abnormal release permits for all discharges associated with the event since the installation of the ICP in September 2009 (reference CA-2013-09691-12) and submitting corrections to the NRC for previous 2009, 2010, 2011, and 2012 ARERRS for the curie content of isotopes released and liquid dose assessment (reference CA-2013-09691-14).

The listed years reports were corrected and submitted with L-13-332: Radioactive Effluent Report Corrections dated October 16, 2013.

Radioactive Effluent Release Report

Calendar Year - 2013
 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		47	57	58	48	210
2. Total time period for batch releases	minutes	10595	13239	22705	17647	64186
3. Maximum time period for a batch release	minutes	3600	3246	4420	4231	4420
4. Average time period for batch releases	minutes	225	232	391	368	306
5. Minimum time period for a batch release	minutes	61	60	39	196	39
6. Average river flow during release periods	cuft/sec	63167	47400	19733	37233	41883
b. Gaseous Batch Releases						
1. Number of batch releases		16	24	14	16	70
2. Total time period for batch releases	minutes	782	28021	4881	8892	42576
3. Maximum time period for a batch release	minutes	197	8988	2490	4170	8988
4. Average time period for batch releases	minutes	49	1168	349	556	608
5. Minimum time period for a batch release	minutes	14	17	111	102	14
c. Abnormal Liquid Releases						
1. Number of releases		1	1	NONE	NONE	2
2. Total activity released	Curies	1.22E-05	2.10E-04	0.00E+00	0.00E+00	2.22E-04
d. Abnormal Gaseous Releases						
1. Number of releases		NONE	NONE	NONE	NONE	NONE
2. Total activity released	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Radioactive Effluent Release Report

Calendar Year - 2013

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	3.21E+01	3.49E-03	1.10E-01	6.38E-03	3.23E+01	26.5%
1a. Unit 1 Gases	Ci	1.38E-01	1.74E-03	5.48E-02	3.49E-04	1.95E-01	
1b. Unit 2 Gases	Ci	3.20E+01	1.74E-03	5.48E-02	6.03E-03	3.21E+01	
2. Average release rate for period	uCi/sec	4.08E+00	4.42E-04	1.39E-02	8.09E-04	1.02E+00	
3. Percent of applicable limit	%	N/A	N/A	N/A	N/A	N/A	
B. Iodines							
1. Site Total iodine - 131	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	28.3%
1a. Unit 1 iodine - 131	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1b. Unit 2 iodine - 131	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2. Average release rate for period	uCi/sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3. Percent of applicable limit	%	N/A	N/A	N/A	N/A	N/A	
C. Particulates							
1. Particulates with half-lives > 8 days	Ci	7.68E-07	6.50E-04	6.49E-04	4.88E-05	1.35E-03	30.0%
1a. Unit 1 Particulates	Ci	3.73E-07	1.15E-04	3.27E-04	4.70E-05	4.89E-04	
1b. Unit 2 Particulates	Ci	3.95E-07	5.35E-04	3.22E-04	1.85E-06	8.59E-04	
2. Average release rate for period	uCi/sec	9.74E-08	8.24E-05	8.24E-05	6.19E-06	4.28E-05	
3. Percent of applicable limit	%	N/A	N/A	N/A	N/A	N/A	
D. Gross Alpha							
1. Site Gross alpha radioactivity	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	30.0%
1a. Unit 1 Gross alpha	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1b. Unit 2 Gross alpha	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2. Average release rate for period	uCi/sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3. Percent of applicable limit	%	N/A	N/A	N/A	N/A	N/A	
E. Tritium							
1. Site Total release	Ci	1.55E+00	5.32E+00	9.04E-01	2.59E+00	1.04E+01	32.9%
1a. Unit 1 Tritium	Ci	8.44E-01	8.15E-01	5.86E-01	6.74E-01	2.92E+00	
1b. Unit 2 Tritium	Ci	7.09E-01	4.50E+00	3.18E-01	1.92E+00	7.45E+00	
2. Average release rate for period	uCi/sec	1.97E-01	6.74E-01	1.15E-01	3.29E-01	3.29E-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).

Radioactive Effluent Release Report

Calendar Year - 2013

Table 1B-EB

Gaseous Effluents - Elevated Batch Releases

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission gases						
argon-41	Ci	LLD	4.31E-04	2.15E-02	LLD	2.19E-02
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85m	Ci	LLD	LLD	5.14E-04	LLD	5.14E-04
krypton-87	Ci	LLD	LLD	LLD	LLD	LLD
krypton-88	Ci	LLD	LLD	LLD	LLD	LLD
xenon-131m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	LLD	2.99E-03	4.53E-02	6.98E-04	4.90E-02
xenon-133m	Ci	LLD	LLD	1.43E-04	LLD	1.43E-04
xenon-135	Ci	LLD	6.40E-05	1.74E-02	LLD	1.75E-02
xenon-135m	Ci	LLD	LLD	3.97E-04	LLD	3.97E-04
xenon-138	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	3.49E-03	8.53E-02	6.98E-04	8.94E-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	2.07E-04	LLD	LLD	2.07E-04
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	LLD	2.14E-05	6.44E-04	1.85E-06	6.67E-04
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	2.28E-04	6.44E-04	1.85E-06	8.74E-04

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

ND = None Detected

Radioactive Effluent Release Report

Calendar Year - 2013

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	2.44E-02	LLD	2.44E-02
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	2.44E-02	ND	2.44E-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
cerium-144	Ci	LLD	LLD	LLD	LLD	LLD
selenium-75	Ci	7.46E-07	1.11E-06	9.37E-07	1.85E-06	4.64E-06
carbon-14	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	7.46E-07	1.11E-06	9.37E-07	1.85E-06	4.64E-06

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

ND = None Detected

Beaver Valley Power Station - Unit 1

Enclosure 2, Page 5 of 21

Radioactive Effluent Release Report

Calendar Year - 2013

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	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	ND	ND	ND

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

ND = None Detected

Beaver Valley Power Station - Unit 1

Enclosure 2, Page 6 of 21

Radioactive Effluent Release Report

Calendar Year - 2013

Table 1C-GC1

Gaseous Effluents - Ground Level Continuous Releases (Unit 1)

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission gases						
argon-41	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85m	Ci	1.38E-01	LLD	LLD	LLD	1.38E-01
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	1.38E-01	ND	ND	ND	1.38E-01
2. Iodines						
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
iodine-133	Ci	LLD	LLD	LLD	LLD	LLD
iodine-135	Ci	LLD	LLD	LLD	LLD	LLD
Total for period	Ci	ND	ND	ND	ND	ND
3. Particulates						
chromium-51	Ci	LLD	LLD	LLD	LLD	LLD
manganese-54	Ci	LLD	LLD	LLD	LLD	LLD
iron-59	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-57	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-58	Ci	LLD	LLD	4.25E-06	3.68E-05	4.11E-05
cobalt-60	Ci	LLD	LLD	LLD	LLD	LLD
zinc-65	Ci	LLD	LLD	LLD	LLD	LLD
zirconium/niobium-95	Ci	LLD	LLD	LLD	8.30E-06	8.30E-06
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	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	4.25E-06	4.51E-05	4.94E-05

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

ND = None Detected

Beaver Valley Power Station - Unit 2

Enclosure 2, Page 7 of 21

Radioactive Effluent Release Report

Calendar Year - 2013

Table 1C-GB2

Gaseous Effluents - Ground Level Batch Releases (Unit 2)

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission gases						
argon-41	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85m	Ci	LLD	LLD	LLD	LLD	LLD
krypton-87	Ci	LLD	LLD	LLD	LLD	LLD
krypton-88	Ci	LLD	LLD	LLD	LLD	LLD
xenon-131m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-138	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	ND	ND	ND
2. Iodines						
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
iodine-133	Ci	LLD	LLD	LLD	LLD	LLD
iodine-135	Ci	LLD	LLD	LLD	LLD	LLD
Total for period	Ci	ND	ND	ND	ND	ND
3. Particulates						
beryllium-7	Ci	LLD	LLD	LLD	LLD	LLD
chromium-51	Ci	LLD	LLD	LLD	LLD	LLD
manganese-54	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-57	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-58	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-60	Ci	LLD	LLD	LLD	LLD	LLD
zinc-65	Ci	LLD	LLD	LLD	LLD	LLD
strontium-89	Ci	LLD	LLD	LLD	LLD	LLD
strontium-90	Ci	LLD	LLD	LLD	LLD	LLD
zirconium/niobium-97	Ci	LLD	LLD	LLD	LLD	LLD
cesium-134	Ci	LLD	LLD	LLD	LLD	LLD
cesium-137	Ci	LLD	LLD	LLD	LLD	LLD
barium/lanthanum-140	Ci	LLD	LLD	LLD	LLD	LLD
cerium-141	Ci	LLD	LLD	LLD	LLD	LLD
cerium-144	Ci	LLD	LLD	LLD	LLD	LLD
selenium-75	Ci	LLD	LLD	LLD	LLD	LLD
carbon-14	Ci	LLD	4.20E-04	LLD	LLD	4.20E-04
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	4.20E-04	ND	ND	4.20E-04

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

ND = None Detected

Beaver Valley Power Station - Unit 2**Enclosure 2, Page 8 of 21****Radioactive Effluent Release Report**

Calendar Year - 2013

Table 1C-GC2

Gaseous Effluents - Ground Level Continuous Releases (Unit 2)

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission gases						
argon-41	Ci	LLD	LLD	LLD	5.68E-03	5.68E-03
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85m	Ci	LLD	LLD	LLD	LLD	LLD
krypton-87	Ci	LLD	LLD	LLD	LLD	LLD
krypton-88	Ci	LLD	LLD	LLD	LLD	LLD
xenon-131m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-138	Ci	3.20E+01	LLD	LLD	LLD	3.20E+01
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	3.20E+01	ND	ND	5.68E-03	3.20E+01
2. Iodines						
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
iodine-133	Ci	LLD	LLD	LLD	LLD	LLD
iodine-135	Ci	LLD	LLD	LLD	LLD	LLD
Total for period	Ci	ND	ND	ND	ND	ND
3. Particulates						
chromium-51	Ci	LLD	LLD	LLD	LLD	LLD
manganese-54	Ci	LLD	LLD	LLD	LLD	LLD
iron-59	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-57	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-58	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-60	Ci	2.18E-08	1.01E-08	LLD	LLD	3.19E-08
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	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	2.18E-08	1.01E-08	ND	ND	3.19E-08

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

ND = None Detected

Beaver Valley Power Station - Units 1 & 2

Enclosure 2, Page 9 of 21

Radioactive Effluent Release Report

Calendar Year - 2013

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	1.63E-02	3.69E-02	5.28E-02	8.74E-02	1.93E-01	26.1%
2. Average diluted concentration	uCi/ml	2.00E-08	2.14E-08	1.26E-08	2.13E-08	1.78E-08	
3. Percent of applicable limit	%	6.50E-01	1.47E+00	2.11E+00	3.49E+00	1.93E+00	
B. Tritium							
1. Total release	Ci	2.78E+02	4.57E+02	5.80E+02	1.86E+02	1.50E+03	25.0%
2. Average diluted concentration	uCi/ml	3.42E-04	2.65E-04	1.38E-04	4.54E-05	1.38E-04	
3. Percent of applicable limit	%	3.42E+00	2.65E+00	1.38E+00	4.54E-01	1.38E+00	
C. Dissolved and entrained gases							
1. Total release	Ci	1.49E-07	3.45E-06	1.36E-04	ND	1.40E-04	27.0%
2. Average diluted concentration	uCi/ml	1.83E-13	2.00E-12	3.23E-11		1.29E-11	
3. Percent of applicable limit	%	9.17E-08	1.00E-06	1.62E-05		6.44E-06	
D. Gross alpha radioactivity (total release)							
	Ci	LLD	LLD	LLD	LLD	LLD	28.9%
E. Volume of waste released (prior to dilution)							
	liters	2.68E+06	2.98E+06	3.57E+06	1.19E+07	2.11E+07	11.2%
F. Volume of dilution water used							
	liters	8.10E+08	1.72E+09	4.20E+09	4.09E+09	1.08E+10	22.9%

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

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

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

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

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

Beaver Valley Power Station - Units 1 & 2

Enclosure 2, Page 10 of 21

Radioactive Effluent Release Report

Calendar Year - 2013

Table 2B-B

Liquid Effluents - Batch Releases

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission and activation products						
beryllium-7	Ci	3.07E-07	6.03E-06	LLD	LLD	6.34E-06
sodium-24	Ci	1.53E-05	LLD	LLD	4.50E-05	6.03E-05
chromium-51	Ci	4.21E-05	1.74E-04	8.93E-04	3.87E-03	4.98E-03
manganese-54	Ci	4.44E-05	2.25E-05	2.11E-05	4.44E-04	5.32E-04
iron-55	Ci	LLD	2.25E-02	1.86E-02	LLD	4.11E-02
iron-59	Ci	4.69E-06	4.50E-05	LLD	LLD	4.97E-05
cobalt-57	Ci	5.03E-05	6.16E-07	9.61E-07	1.21E-04	1.73E-04
cobalt-58	Ci	8.98E-03	7.57E-03	2.01E-03	3.44E-02	5.30E-02
cobalt-60	Ci	1.12E-03	9.17E-04	1.22E-03	8.13E-03	1.14E-02
zinc-65	Ci	2.13E-07	3.03E-06	LLD	3.62E-04	3.65E-04
strontium-89	Ci	LLD	LLD	LLD	LLD	LLD
strontium-90	Ci	LLD	LLD	LLD	LLD	LLD
zirconium/niobium-95	Ci	7.12E-05	6.47E-05	6.03E-05	2.12E-03	2.32E-03
zirconium/niobium-97	Ci	2.12E-08	9.02E-10	LLD	LLD	2.21E-08
molybdenum-99/technetium-99m	Ci	9.33E-08	LLD	LLD	LLD	9.33E-08
rhodium-105	Ci	LLD	LLD	LLD	6.01E-04	6.01E-04
tin-113	Ci	5.64E-08	1.71E-05	LLD	LLD	1.72E-05
tin-117m	Ci	LLD	1.38E-09	LLD	1.86E-04	1.86E-04
tin-125	Ci	LLD	LLD	4.69E-05	LLD	4.69E-05
silver-110m	Ci	2.78E-04	2.08E-04	4.25E-04	9.27E-06	9.20E-04
antimony-122	Ci	LLD	6.48E-05	LLD	LLD	6.48E-05
antimony-124	Ci	4.29E-04	1.28E-03	5.49E-04	2.04E-03	4.30E-03
antimony-125	Ci	4.79E-03	3.55E-03	2.86E-02	3.43E-02	7.12E-02
antimony-126	Ci	LLD	1.23E-05	LLD	LLD	1.23E-05
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
iodine-133	Ci	LLD	LLD	LLD	1.02E-05	1.02E-05
cesium-134	Ci	LLD	7.25E-05	LLD	LLD	7.25E-05
cesium-137	Ci	4.29E-04	3.60E-04	3.52E-04	7.18E-04	1.86E-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	1.63E-02	3.69E-02	5.28E-02	8.74E-02	1.93E-01

2. Dissolved and entrained gases						
Argon-41	Ci	3.37E-05	7.38E-06	LLD	LLD	4.11E-05
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	1.49E-07	3.45E-06	1.36E-04	LLD	1.40E-04
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	LLD	LLD	LLD	LLD
carbon-14	Ci	N/A	N/A	N/A	N/A	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	1.49E-07	3.45E-06	1.36E-04	ND	1.40E-04

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

Beaver Valley Power Station - Units 1 & 2

Radioactive Effluent Release Report

Calendar Year - 2013

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

Calendar Year - 2013

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	7.44E+00 m3	7.80E+00 m3	0.0% (1)
b. Volume Buried	1.47E+00 m3	8.18E+00 m3	0.0% (1)
c. Total Activity	1.32E+03 Ci	7.33E+00 Ci	30.0%
2. Estimate of Major Nuclide Composition by Type of Waste On This Table (2)	Percent (%)	Percent (%)	
H-3	0.00 %	0.00 %	
C-14	0.02 %	0.02 %	
Mn-54	0.29 %	0.19 %	
Fe-55	8.80 %	7.87 %	
Co-58	0.21 %	0.05 %	
Co-60	3.45 %	3.06 %	
Ni-59	0.57 %	0.58 %	
Ni-63	86.30 %	88.00 %	
Sb-125	0.00 %	0.15 %	
Cs-134	0.15 %	0.00 %	
Cs-137	0.02 %	0.01 %	
Ce-144/Pr-144	0.00 %	0.00 %	
Pu-238	0.00 %	0.00 %	
Pu-241	0.03 %	0.00 %	
3. Number of Shipments	3	3	
a. Type of Container Used	LSA	2	2
	Type A	0	0
	Type B	1	1
	Large Quantity	0	0
b. Solidification Agent Used	Cement	0	0
	Urea Formaldehyde	0	0
	None	0	0
c. Mode of Transport	Truck	3	3
	Rail	0	0
d. Final Destination	Erwin, TN	2	1
	Oak Ridge, TN	1	2
e. Waste Class per 10 CFR Part 61	Class A	2	0
	Class B	0	2
	Class C	1	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

Enclosure 2, Page 13 of 21

Radioactive Effluent Release Report

Calendar Year - 2013

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	3.16E+02 m3	5.26E+02 m3	0.0% (1)
b. Volume Buried	2.77E+01 m3	5.65E+01 m3	0.0% (1)
c. Total Activity	6.09E+01 Ci	2.12E-01 Ci	30.0%
2. Estimate of Major Nuclide Composition by Type of Waste On This Table (2)	Percent (%)	Percent (%)	
H-3	0.31 %	6.95 %	
C-14	0.11 %	0.23 %	
Cr-51	0.08 %	0.08 %	
Mn-54	1.99 %	1.12 %	
Fe-55	41.60 %	45.30 %	
Co-58	6.79 %	5.93 %	
Co-60	20.20 %	11.30 %	
Ni-59	0.00 %	0.00 %	
Ni-63	17.02 %	24.20 %	
Sr-90	0.02 %	0.00 %	
Nb-95	4.78 %	0.14 %	
Zn-65	0.09 %	0.01 %	
Zr-95	4.12 %	0.14 %	
Tc-99	0.06 %	0.00 %	
Ag-110m	0.00 %	0.00 %	
Sb-124	0.00 %	0.00 %	
Sb-125	1.64 %	1.27 %	
I-129	0.02 %	0.00 %	
Sn-113	0.32 %	0.01 %	
Cs-137	0.12 %	3.05 %	
Ce-144/Pr-144	0.11 %	0.00 %	
Pu-241	0.00 %	0.00 %	
3. Number of Shipments	7	9	
a. Type of Container Used	LSA	7	9
	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	7	9
	Rail	0	0
	Other	0	0
d. Final Destination	Oak Ridge, TN	2	9
	Wampum, PA	5	0
e. Waste Class per 10 CFR Part 61	Class A	7	9
	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

Radioactive Effluent Release Report

Calendar Year - 2013

Table 3C

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

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

(1) Since container volumes are provided by the burial site, a calculational error of zero is assumed.

(2) Percent values for any nuclide that are <0.01 % are not shown on this table. Data is available upon request.

Radioactive Effluent Release Report

Calendar Year - 2013

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	8.12E-08	1E-04	1.86E-08	5E-07	2.21E-13	1E-11
Ar-41	1.04E-07	1E-04	2.39E-08	5E-07	-----	----
Cr-51	4.60E-07	1E-04	1.15E-07	5E-07	5.14E-13	1E-11
Mn-54	6.71E-08	1E-04	1.58E-08	5E-07	1.19E-13	1E-11
Fe-55	-----	----	(1) 1.00E-06	1E-06	-----	----
Fe-59	1.20E-07	1E-04	2.77E-08	5E-07	2.29E-13	1E-11
Co-57	6.15E-08	1E-04	1.69E-08	5E-07	4.70E-14	1E-11
Co-58	1.08E-07	1E-04	2.53E-08	5E-07	1.26E-13	1E-11
Co-60	8.76E-08	1E-04	2.01E-08	5E-07	1.11E-13	1E-11
Zn-65	1.56E-07	1E-04	3.60E-08	5E-07	2.58E-13	1E-11
Se-75	-----	----	-----	-----	1.30E-13	1E-11
Kr-85	2.28E-05	1E-04	5.54E-06	1E-05	-----	----
Kr-85m	6.37E-08	1E-04	1.70E-08	1E-05	-----	----
Kr-87	1.45E-07	1E-04	3.58E-08	1E-05	-----	----
Kr-88	2.35E-07	1E-04	6.07E-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	9.59E-08	1E-04	2.19E-08	5E-07	1.47E-13	1E-11
Nb-95	7.25E-08	1E-04	1.71E-08	5E-07	9.60E-14	1E-11
Nb-97	5.71E-08	1E-04	1.36E-08	5E-07	1.15E-13	1E-11
Zr-95	1.06E-07	1E-04	2.50E-08	5E-07	2.42E-13	1E-11
Mo-99	4.93E-08	1E-04	1.32E-08	5E-07	4.57E-14	1E-11
Tc-99m	4.83E-08	1E-04	1.30E-08	5E-07	4.48E-14	1E-11
Ag-110m	4.80E-08	1E-04	1.14E-08	5E-07	1.19E-13	1E-11
Sb-124	7.87E-08	1E-04	1.89E-08	5E-07	7.96E-14	1E-11
Sb-125	2.17E-07	1E-04	5.32E-08	5E-07	2.07E-13	1E-11
I-131	5.22E-08	1E-04	1.29E-08	1E-06	9.86E-14	1E-12
I-133	6.28E-08	1E-04	1.52E-08	5E-07	9.19E-14	1E-10
I-135	2.70E-07	1E-04	6.20E-08	5E-07	4.68E-13	1E-11
Xe-131m	2.62E-06	1E-04	6.88E-07	1E-05	-----	----
Xe-133	1.22E-07	1E-04	3.90E-08	1E-05	-----	----
Xe-133m	5.43E-07	1E-04	1.38E-07	1E-05	-----	----
Xe-135	5.80E-08	1E-04	1.47E-08	1E-05	-----	----
Xe-135m	1.77E-07	1E-04	4.30E-08	1E-05	-----	----
Xe-137	8.34E-07	1E-04	2.04E-07	1E-05	-----	----
Xe-138	2.92E-07	1E-04	7.36E-08	1E-05	-----	----
Cs-134	8.30E-08	1E-04	1.99E-08	5E-07	8.00E-14	1E-11
Cs-137	5.35E-08	1E-04	1.28E-08	5E-07	9.91E-14	1E-11
Ba-139	3.14E-07	1E-04	8.24E-08	5E-07	3.33E-13	1E-11
Ba-140	1.99E-07	1E-04	4.81E-08	5E-07	2.31E-13	1E-11
La-140	1.67E-07	1E-04	3.78E-08	5E-07	2.67E-13	1E-11
Ce-141	9.28E-08	1E-04	2.48E-08	5E-07	1.07E-13	1E-11
Ce-144	4.48E-07	1E-04	1.21E-07	5E-07	3.64E-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 2/12/13. 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.

Beaver Valley Power Station - Unit 1

Enclosure 2, Page 16 of 21

Radioactive Effluent Release Report

Calendar Year - 2013

Table 5A

Assessment Of Radiation Doses

Batch Releases		Unit 1 Liquid Effluents									
		1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Calendar Year	
		Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit
ORGAN (1)	Bone	6.04E-03	0.1208	5.96E-03	0.1192	4.27E-03	0.0854	1.05E-02	0.2100	2.68E-02	0.2677
	Liver	1.59E-02	0.3180	1.80E-02	0.3600	1.56E-02	0.3120	2.57E-02	0.5140	7.52E-02	0.7520
	Total Body	1.31E-02	0.8733	1.53E-02	1.0200	1.36E-02	0.9067	2.06E-02	1.3733	6.26E-02	2.0867
	Thyroid	7.57E-03	0.1514	9.51E-03	0.1902	9.95E-03	0.1990	1.06E-02	0.2120	3.76E-02	0.3763
	Kidney	1.04E-02	0.2080	1.22E-02	0.2440	1.18E-02	0.2360	1.60E-02	0.3200	5.04E-02	0.5040
	Lung	8.51E-03	0.1702	1.06E-02	0.2120	1.07E-02	0.2140	1.21E-02	0.2420	4.19E-02	0.4191
	GI-LLI	8.61E-03	0.1722	1.04E-02	0.2080	1.05E-02	0.2100	1.49E-02	0.2980	4.44E-02	0.4441

Batch & Continuous Releases		Unit 1 Gaseous Effluents									
		1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Calendar Year	
		Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit
(2)	Gamma Air	1.41E-05	0.0003	1.81E-08	0.0000	3.99E-07	0.0000	1.73E-09	0.0000	1.45E-05	0.0001
(2)	Beta Air	1.60E-03	0.0160	5.23E-11	0.0000	1.25E-09	0.0000	8.14E-12	0.0000	1.60E-03	0.0080
ORGAN (3)	Bone	6.54E-09	0.0000	5.33E-07	0.0000	1.69E-08	0.0000	1.50E-05	0.0002	1.56E-05	0.0001
	Liver	1.21E-02	0.1613	1.71E-02	0.2280	1.15E-02	0.1533	1.05E-02	0.1400	5.12E-02	0.3413
	Total Body	1.21E-02	0.1613	1.71E-02	0.2280	1.15E-02	0.1533	1.05E-02	0.1400	5.12E-02	0.3413
	Thyroid	1.21E-02	0.1613	1.71E-02	0.2280	1.15E-02	0.1533	1.05E-02	0.1400	5.12E-02	0.3413
	Kidney	1.21E-02	0.1613	1.71E-02	0.2280	1.15E-02	0.1533	1.05E-02	0.1400	5.12E-02	0.3413
	Lung	1.21E-02	0.1613	1.71E-02	0.2280	1.15E-02	0.1533	1.05E-02	0.1400	5.12E-02	0.3413
	GI-LLI	1.21E-02	0.1613	1.71E-02	0.2280	1.15E-02	0.1533	1.05E-02	0.1400	5.12E-02	0.3413

(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 - 2013

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	6.04E-03	0.1208	5.96E-03	0.1192	4.27E-03	0.0854	1.05E-02	0.2100
Liver	1.59E-02		0.3180	1.80E-02	0.3600	1.56E-02	0.3120	2.57E-02	0.5140	7.52E-02	0.7520
Total Body	1.31E-02		0.8733	1.53E-02	1.0200	1.36E-02	0.9067	2.06E-02	1.3733	6.26E-02	2.0867
Thyroid	7.57E-03		0.1514	9.51E-03	0.1902	9.95E-03	0.1990	1.06E-02	0.2120	3.76E-02	0.3763
Kidney	1.04E-02		0.2080	1.22E-02	0.2440	1.18E-02	0.2360	1.60E-02	0.3200	5.04E-02	0.5040
Lung	8.51E-03		0.1702	1.06E-02	0.2120	1.07E-02	0.2140	1.21E-02	0.2420	4.19E-02	0.4191
	GI-LLI	8.61E-03	0.1722	1.04E-02	0.2080	1.05E-02	0.2100	1.49E-02	0.2980	4.44E-02	0.4441

		Unit 2 Gaseous Effluents									
		1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Calendar Year	
Batch & Continuous Releases		Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit
		(2)	Gamma Air	0.00E+00	0.0000	1.81E-08	0.0000	3.99E-07	0.0000	4.84E-04	0.0097
(2)	Beta Air	0.00E+00	0.0000	5.23E-11	0.0000	1.25E-09	0.0000	1.71E-04	0.0017	1.71E-04	0.0009
O R G A N (3)	Bone	1.17E-05	0.0002	2.09E-05	0.0003	1.69E-08	0.0000	3.74E-09	0.0000	3.26E-05	0.0002
	Liver	1.78E-02	0.2373	3.33E-02	0.4440	6.45E-03	0.0860	4.74E-03	0.0632	6.23E-02	0.4153
	Total Body	1.78E-02	0.2373	3.33E-02	0.4440	6.45E-03	0.0860	4.74E-03	0.0632	6.23E-02	0.4153
	Thyroid	1.78E-02	0.2373	3.33E-02	0.4440	6.45E-03	0.0860	4.74E-03	0.0632	6.23E-02	0.4153
	Kidney	1.78E-02	0.2373	3.33E-02	0.4440	6.45E-03	0.0860	4.74E-03	0.0632	6.23E-02	0.4153
	Lung	1.78E-02	0.2373	3.33E-02	0.4440	6.45E-03	0.0860	4.74E-03	0.0632	6.23E-02	0.4153
	GI-LLI	1.78E-02	0.2373	3.33E-02	0.4440	6.45E-03	0.0860	4.74E-03	0.0632	6.23E-02	0.4153

- (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 - 2013
Table 6

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

There were several Effluent Monitoring Instrumentations Channels that were not returned to operable status within 30 days.

1) Unit 1 Gaseous Waste System Process Ventilation Monitor, RM-1GW-109 - On 1/22/2013 RM-1GW-109 was removed from service due to elevated background not verified by redundant monitors. The thirty (30) day return to service criteria was exceeded due to the sample pump failing during maintenance activities. The monitor was returned to service on 2/25/2013 (reference CR-2013-01750).

2) Main Steam Discharge Radiation Monitor, 2MSS-RQ101A - On 6/28/2013 2MSS-RQ101A was removed from service for performance of 2MSP-43.34A, during which equipment problems were discovered that required resolution prior to returning monitor to service. The thirty (30) day return to service criteria was exceeded due to equipment problems and parts issues arising during maintenance activities. The monitor was returned to service on 08/10/2013. (reference CR-2013-11580).

3) Component Cooling / Recirc Spray Heat Exchanger River, RM-1RW-100 - On 10/3/2013, RM-1RW-100 was declared Non-Functional due to the low flow alarm being locked in and unable to be cleared (reference CR-2013-15688). The thirty (30) day return to service criteria was exceeded due to initial delays in planning the work order due caused by clarifications needed on the problem, description and possible scenarios. Monitor was returned to service on 11/5/2013 (reference CR-2013-17741).

4) Unit 1 Gaseous Waste System Process Ventilation Monitor, RM-1GW-109 - On 10/31/2013 RM-1GW-109 was removed from service because SOV-1RM-108 and 109 failed to operate and channel 8 was erratic. The thirty (30) day return to service criteria was exceeded due to extended investigation and repair to the monitor. Monitor was returned to service on 12/10/2013 (reference CR-2013-19058).

5) Unit 2 Main Steam Radiation Monitors, 2MSS-RQ101A/B/C - On 11/11/2013 2MSS-SOV120 was isolated which also isolated 2MSS-RQ101A/B/C, to repair leak-by. The thirty (30) day return to service criteria was exceeded due to additional valve repair noted during the initial repair efforts. The monitor was returned to service on 12/10/2013 (reference CR-2013-19685).

Radioactive Effluent Release Report

Calendar Year - 2013

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	5.36E-02	0.00E+00	5.36E-02	0.21%
Liver	2.64E-01	0.00E+00	2.64E-01	1.06%
Total Body	2.39E-01	0.00E+00	2.39E-01	0.95%
Thyroid	1.89E-01	0.00E+00	1.89E-01	0.25%
Kidney	2.14E-01	0.00E+00	2.14E-01	0.86%
Lung	1.97E-01	0.00E+00	1.97E-01	0.79%
GI-LLI	2.02E-01	0.00E+00	2.02E-01	0.81%

(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 **4.99 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 =	235 man-mrem (Total Body)
0-50 mile Average Population Dose from liquid and gaseous effluents =	0.0000589 man-mrem (Total Body)

Radioactive Effluent Release Report

Calendar Year - 2013

Table 8

Offsite Dose Calculation Manual Surveillance Deficiencies

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

1) In May 2013, discharges of the Unit 2 Cable Vault Sump began after the implementation of 1/2-ODC-2.01, ODCM: Liquid Effluents (rev 13) and ECP 13-0130. The following problems were noted with the first two discharges from the sump:

1. Composite samples taken May 30, 2013 were not retained for analysis of Tritium and hard to detect isotopes (monthly and quarterly requirements).

2. Sample taken for discharge on June 1, 2013 was not independently analyzed for gamma spectroscopy. [Note that analysis of the saved samples was performed upon discovery of this condition, almost seven days later. However, the timeliness of this analysis is in question.]

This condition(s) is documented in CR #2013-08883.

2) In June 2013, composite samples taken on June 22, 2013 and June 29, 2013 were not retained for analysis of Tritium and hard to detect isotopes (monthly and quarterly requirements). This condition is documented in CR #2013-11001.

3) The required 18 month surveillance to perform flow switch calibrations was not performed on RM-1GW-108B because of not incorporating the appropriate steps into the Maintenance Surveillance Test (1MSP-43.22) during Engineering Change Package ECP 11-0738. This caused RM-GW-108B to be outside of the 25% grace period on 3/18/13 and the radiation monitor to be outside of its required surveillance frequency, documented in CR # 2013-12572 and 2013-12456. Therefore RM-GW-108B should have been declared NON-FUNCTIONAL. However, as the condition was not detected until 8/14/13, the following batch gas permits were authorized to discharge through this pathway without independent monitoring as required by ODCM 1/2-ODC-3.03 Attachment F Control 3.3.3.10 Action 27:

UNIT 1:

5/4/13 - 1GW-TK-1C was discharged per RWDA-G-01836

5/9/13 - 1GW-TK-1B was discharged per RWDA-G-01840

6/11/13 - 1GW-TK-1C was discharged per RWDA-G-01841

UNIT 2:

4/19/13 - U2 Gaseous Waste discharge per RWDA-G-01835

5/30/13 - 2RCS Degas from 2FOAC9 per RWDA-G-01838

The following discharges were also performed during this period; however, RM-1GW-108B was NON-FUNCTIONAL and the appropriate samples were obtained:

6/17/13 - U2 Gaseous Waste Discharge -per RWDA-G-01843

6/15/13 - 1GW-TK-1C was discharged per RWDA-G-01842

Radioactive Effluent Release Report

Calendar Year - 2013
Table 9

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

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

Change (35) to the ODCM (Effective March 2013)

1) Procedure 1/2-ODC-1.01, "ODCM: Index, Matrix and History of ODCM Changes" (Rev 17)

Updated the History of ODCM changes to include this change.

2) Procedure 1/2-ODC-2.01, "ODCM: Liquid Effluents" (Rev 13)

Added descriptions of discharge points and employed ODCM controls were not previously implemented.

ENCLOSURE 2, ATTACHMENT 1

Beaver Valley Power Station - Units 1 & 2

Radioactive Effluent Release Report

Calendar Year - 2013

Attachment 1

Joint Frequency Distribution Tables

Attachment 1

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

Meteorological Data Recovery
The Meteorological Data Recovery for the calendar year met the minimum requirement of at least 90% (as specified in Section 5 of Revision 1 to Regulatory Guide 1.23, Meteorological Monitoring Programs for Nuclear Power Plants). The actual Meteorological Data Recovery is shown in the following table:
PERCENT RECOVERY OF INDIVIDUAL METEOROLOGICAL PARAMETERS
98.2% = Wind Speed 35'
98.2% = Wind Speed 150'
98.2% = Wind Speed 500'
98.2% = Wind Direction 35'
98.2% = Wind Direction 150'
98.2% = Wind Direction 500'
98.2% = Delta Temperature (150' - 35') 1P
96.9% = Delta Temperature (500' - 35') 2P
98.2% = Temperature 35'
98.1% = Precipitation
98.1% = Average Recovery of Individual Meteorological Parameters
PERCENT RECOVERY OF COMPOSITE VARIABLES
98.3% = Wind Speed 35', Wind Direction 35', Delta Temperature 1P
98.3% = Wind Speed 150', Wind Direction 150', Delta Temperature 1P
97.0% = Wind Speed 500', Wind Direction 500', Delta Temperature 2P
97.9% = 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 Ms. Rebecca Novak 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 – 2013

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 =

1/1/2013 00:00 - 12/31/2013 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	14	24	0	0	0	0	38
NNE	13	13	0	0	0	0	26
NE	27	14	0	0	0	0	41
ENE	30	23	0	0	0	0	53
E	26	37	0	0	0	0	63
ESE	23	36	0	0	0	0	59
SE	21	23	0	0	0	0	44
SSE	11	19	0	0	0	0	30
S	6	20	2	0	0	0	28
SSW	6	23	3	0	0	0	32
SW	8	23	16	2	0	0	49
WSW	4	61	11	0	0	0	76
W	5	90	22	0	0	0	117
WNW	10	60	9	0	0	0	79
NW	16	40	7	0	0	0	63
NNW	8	24	2	0	0	0	34
Total	228	530	72	2	0	0	832

Calm Hours not Included above for :

Total Period 56

Variable Direction Hours for:

Total Period 0

Invalid Hours for:

Total Period 164

Valid Hours for this Stability Class for:

Total Period 832

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 – 2013
 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 =	1/1/2013 00:00 - 12/31/2013 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	2	0	0	0	0	4	
NNE	4	2	0	0	0	0	6	
NE	4	0	0	0	0	0	4	
ENE	2	6	0	0	0	0	8	
E	5	2	0	0	0	0	7	
ESE	2	0	0	0	0	0	2	
SE	1	2	0	0	0	0	3	
SSE	1	2	0	0	0	0	3	
S	2	7	0	0	0	0	9	
SSW	4	9	1	0	0	0	14	
SW	3	17	6	0	0	0	26	
WSW	4	18	7	0	0	0	29	
W	7	26	12	0	0	0	45	
WNW	6	29	6	0	0	0	41	
NW	4	12	1	0	0	0	17	
NNW	6	6	0	0	0	0	12	
Total	57	140	33	0	0	0	230	
Calm Hours not Included above for :							Total Period	56
Variable Direction Hours for:							Total Period	0
Invalid Hours for:							Total Period	164
Valid Hours for this Stability Class for:							Total Period	230
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 – 2013
 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 =		1/1/2013 00:00 - 12/31/2013 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	2	9	0	0	0	0	11	
NNE	8	4	0	0	0	0	12	
NE	7	1	0	0	0	0	8	
ENE	7	3	0	0	0	0	10	
E	5	5	0	0	0	0	10	
ESE	4	0	0	0	0	0	4	
SE	1	0	0	0	0	0	1	
SSE	2	3	0	0	0	0	5	
S	6	4	0	0	0	0	10	
SSW	4	7	2	0	0	0	13	
SW	2	11	8	0	0	0	21	
WSW	1	15	10	0	0	0	26	
W	7	28	17	0	0	0	52	
WNW	6	27	3	0	0	0	36	
NW	1	19	2	0	0	0	22	
NNW	3	9	0	0	0	0	12	
Total	66	145	42	0	0	0	253	
Calm Hours not Included above for :							Total Period	56
Variable Direction Hours for:							Total Period	0
Invalid Hours for:							Total Period	164
Valid Hours for this Stability Class for:							Total Period	253
Total Hours for Period								8760

Beaver Valley Power Station – Units 1 & 2
Radioactive Effluent Release Report
 Calendar Year – 2013
 Attachment 1

Part 1: Joint Frequency Distribution Tables (35ft)
 Page 4 of 8

Hours at Each Wind Speed and Direction

Total Period							
Period of Record =		1/1/2013 00:00 - 12/31/2013 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	73	47	1	0	0	0	121
NNE	79	15	0	0	0	0	94
NE	73	9	0	0	0	0	82
ENE	75	47	0	0	0	0	122
E	46	21	0	0	0	0	67
ESE	24	4	0	0	0	0	28
SE	19	1	0	0	0	0	20
SSE	31	8	0	0	0	0	39
S	27	40	5	0	0	0	72
SSW	51	73	12	0	0	0	136
SW	63	206	93	8	0	0	370
WSW	71	282	118	11	0	0	482
W	73	289	126	4	0	0	492
WNW	94	243	26	0	0	0	363
NW	102	199	3	0	0	0	304
NNW	80	115	2	0	0	0	197
Total	981	1599	386	23	0	0	2989
Calm Hours not Included above for :		Total Period					56
Variable Direction Hours for:		Total Period					0
Invalid Hours for:		Total Period					164
Valid Hours for this Stability Class for:		Total Period					2989
Total Hours for Period							8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2013

Attachment 1

Part 1: Joint Frequency Distribution Tables (35ft)

Page 5 of 8

Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2013 00:00 - 12/31/2013 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	99	14	0	0	0	0	113
NNE	130	15	0	0	0	0	145
NE	191	17	0	0	0	0	208
ENE	204	46	0	0	0	0	250
E	162	19	1	0	0	0	182
ESE	127	1	0	0	0	0	128
SE	106	2	0	0	0	0	108
SSE	101	10	0	0	0	0	111
S	143	37	4	0	0	0	184
SSW	181	70	5	1	0	0	257
SW	117	135	35	7	0	0	294
WSW	67	116	28	2	0	0	213
W	59	56	17	1	0	0	133
WNW	44	24	2	0	0	0	70
NW	67	15	0	0	0	0	82
NNW	90	19	0	0	0	0	109
Total	1888	596	92	11	0	0	2587

Calm Hours not Included above for :	Total Period	56
Variable Direction Hours for:	Total Period	0
Invalid Hours for:	Total Period	164
Valid Hours for this Stability Class for:	Total Period	2587
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2013

Attachment 1

Part 1: Joint Frequency Distribution Tables (35ft)

Page 6 of 8

Hours at Each Wind Speed and Direction

		Total Period						
Period of Record =		1/1/2013 00:00 - 12/31/2013 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	16	0	0	0	0	0	16	
NNE	30	0	0	0	0	0	30	
NE	52	2	0	0	0	0	54	
ENE	76	1	0	0	0	0	77	
E	140	0	0	0	0	0	140	
ESE	169	0	0	0	0	0	169	
SE	213	2	0	0	0	0	215	
SSE	136	3	0	0	0	0	139	
S	114	13	0	0	0	0	127	
SSW	66	21	0	0	0	0	87	
SW	33	10	2	0	0	0	45	
WSW	13	3	0	0	0	0	16	
W	9	1	0	0	0	0	10	
WNW	15	0	0	0	0	0	15	
NW	12	1	0	0	0	0	13	
NNW	11	0	0	0	0	0	11	
Total	1105	57	2	0	0	0	1164	
Calm Hours not Included above for :							Total Period	56
Variable Direction Hours for:							Total Period	0
Invalid Hours for:							Total Period	164
Valid Hours for this Stability Class for:							Total Period	1164
Total Hours for Period								8760

Beaver Valley Power Station – Units 1 & 2
Radioactive Effluent Release Report
 Calendar Year – 2013
 Attachment 1

Part 1: Joint Frequency Distribution Tables (35ft)
 Page 7 of 8

Hours at Each Wind Speed and Direction

Total Period								
Period of Record =	1/1/2013 00:00 - 12/31/2013 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	3	1	0	0	0	0	4	
NNE	13	0	0	0	0	0	13	
NE	30	0	0	0	0	0	30	
ENE	41	0	0	0	0	0	41	
E	61	1	1	0	0	0	63	
ESE	98	0	0	0	0	0	98	
SE	91	0	0	0	0	0	91	
SSE	49	0	0	0	0	0	49	
S	29	2	0	0	0	0	31	
SSW	17	3	0	0	0	0	20	
SW	19	0	0	0	0	0	19	
WSW	6	0	0	0	0	0	6	
W	3	0	0	0	0	0	3	
WNW	7	0	0	0	0	0	7	
NW	7	0	0	0	0	0	7	
NNW	3	0	0	0	0	0	3	
Total	477	7	1	0	0	0	485	
Calm Hours not Included above for :							Total Period	56
Variable Direction Hours for:							Total Period	0
Invalid Hours for:							Total Period	164
Valid Hours for this Stability Class for:							Total Period	485
Total Hours for Period								8760

Beaver Valley Power Station – Units 1 & 2
Radioactive Effluent Release Report
 Calendar Year – 2013
 Attachment 1

Part 1: Joint Frequency Distribution Tables (35ft)
 Page 8 of 8

Hours at Each Wind Speed and Direction

Summary of All Stability Classes

Total Period

Period of Record = 1/1/2013 00:00 - 12/31/2013 23:00
 Elevation: Speed: SP35P Direction: DI35P Lapse: DT150-35

Delta Temperature

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	209	97	1	0	0	0	307
NNE	277	49	0	0	0	0	326
NE	384	43	0	0	0	0	427
ENE	435	126	0	0	0	0	561
E	445	85	2	0	0	0	532
ESE	447	41	0	0	0	0	488
SE	452	30	0	0	0	0	482
SSE	331	45	0	0	0	0	376
S	327	123	11	0	0	0	461
SSW	329	206	23	1	0	0	559
SW	245	402	160	17	0	0	824
WSW	166	495	174	13	0	0	848
W	163	490	194	5	0	0	852
WNW	182	383	46	0	0	0	611
NW	209	286	13	0	0	0	508
NNW	201	173	4	0	0	0	378
Total	4802	3074	628	36	0	0	8540

Calm Hours not Included above for :	Total Period	56
Variable Direction Hours for:	Total Period	0
Invalid Hours for:	Total Period	164
Valid Hours for this Stability Class for:	Total Period	8540
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 – 2013

Attachment 1

Part 2: Joint Frequency Distribution Tables (150ft)

Page 1 of 8

Hours at Each Wind Speed and Direction

Total Period

Period of Record =

1/1/2013 00:00 - 12/31/2013 23:00

Elevation: Speed: SP150P

Direction: DI150P

Lapse: DT150-35

Stability Class A

Delta Temperature

Extremely Unstable

Wind Speed (mph)

Wind Direction	1 - 4	4 - 8	8 - 13	13 - 19	19 - 25	≥ 25	Total
N	3	19	12	4	0	0	38
NNE	3	20	11	0	0	0	34
NE	3	22	17	1	0	0	43
ENE	1	29	24	0	0	0	54
E	1	44	17	1	0	0	63
ESE	1	25	22	3	0	0	51
SE	2	25	40	4	0	0	71
SSE	2	16	24	6	0	0	48
S	1	13	14	3	0	0	31
SSW	2	10	6	3	0	0	21
SW	3	7	11	5	1	0	27
WSW	3	11	27	4	1	0	46
W	4	51	57	32	1	0	145
WNW	2	33	37	33	0	0	105
NW	5	7	13	1	0	0	26
NNW	1	11	15	2	0	0	29
Total	37	343	347	102	3	0	832

Calm Hours not Included above for :

Total Period 57

Variable Direction Hours for:

Total Period 0

Invalid Hours for:

Total Period 164

Valid Hours for this Stability Class for:

Total Period 832

Total Hours for Period

8760

Beaver Valley Power Station – Units 1 & 2
Radioactive Effluent Release Report
 Calendar Year – 2013
 Attachment 1

Part 2: Joint Frequency Distribution Tables (150ft)
 Page 2 of 8

Hours at Each Wind Speed and Direction

Total Period								
Period of Record =	1/1/2013 00:00 - 12/31/2013 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	1	6	2	0	0	0	9	
NNE	0	0	2	1	0	0	3	
NE	1	5	2	0	0	0	8	
ENE	0	3	3	1	0	0	7	
E	0	6	3	0	0	0	9	
ESE	0	5	1	0	0	0	6	
SE	0	2	2	0	0	0	4	
SSE	0	4	4	0	0	0	8	
S	0	5	3	0	0	0	8	
SSW	0	4	7	1	0	0	12	
SW	1	7	7	0	0	0	15	
WSW	2	1	8	3	0	0	14	
W	4	21	18	19	4	0	66	
WNW	2	9	17	11	0	0	39	
NW	2	6	3	0	0	0	11	
NNW	1	7	3	0	0	0	11	
Total	14	91	85	36	4	0	230	
Calm Hours not Included above for :							Total Period	57
Variable Direction Hours for:							Total Period	0
Invalid Hours for:							Total Period	164
Valid Hours for this Stability Class for:							Total Period	230
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 – 2013

Attachment 1

Part 2: Joint Frequency Distribution Tables (150ft)

Page 3 of 8

Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2013 00:00 - 12/31/2013 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	0	4	2	1	0	0	7
NNE	1	7	3	1	0	0	12
NE	2	9	0	0	0	0	11
ENE	0	7	1	0	0	0	8
E	0	7	2	0	0	0	9
ESE	0	4	3	0	0	0	7
SE	2	4	3	0	0	0	9
SSE	0	2	1	0	0	0	3
S	0	10	2	2	0	0	14
SSW	1	2	4	1	0	0	8
SW	2	5	9	1	0	0	17
WSW	1	4	7	5	1	0	18
W	5	14	17	19	2	0	57
WNW	0	7	30	11	0	0	48
NW	1	3	9	0	0	0	13
NNW	4	4	4	0	0	0	12
Total	19	93	97	41	3	0	253

Calm Hours not Included above for : Total Period 57
 Variable Direction Hours for: Total Period 0
 Invalid Hours for: Total Period 164
 Valid Hours for this Stability Class for: Total Period 253
Total Hours for Period 8760

Beaver Valley Power Station – Units 1 & 2
Radioactive Effluent Release Report
 Calendar Year – 2013
 Attachment 1

Part 2: Joint Frequency Distribution Tables (150ft)
 Page 4 of 8

Hours at Each Wind Speed and Direction

Total Period								
Period of Record =	1/1/2013 00:00 - 12/31/2013 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	17	59	18	0	0	0	94	
NNE	32	67	18	2	0	0	119	
NE	26	45	6	1	0	0	78	
ENE	20	84	27	0	0	0	131	
E	13	37	15	1	0	0	66	
ESE	12	17	3	0	0	0	32	
SE	9	18	9	0	0	0	36	
SSE	13	26	11	0	0	0	50	
S	15	46	44	4	1	0	110	
SSW	24	47	47	10	0	0	128	
SW	12	57	122	33	4	0	228	
WSW	26	118	171	42	5	0	362	
W	40	135	264	195	42	3	679	
WNW	37	133	227	77	2	0	476	
NW	29	134	97	5	0	0	265	
NNW	26	71	35	1	0	0	133	
Total	351	1094	1114	371	54	3	2987	
Calm Hours not Included above for :							Total Period	57
Variable Direction Hours for:							Total Period	0
Invalid Hours for:							Total Period	164
Valid Hours for this Stability Class for:							Total Period	2987
Total Hours for Period								8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2013

Attachment 1

Part 2: Joint Frequency Distribution Tables (150ft)

Page 5 of 8

Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2013 00:00 - 12/31/2013 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	47	39	11	0	0	0	97
NNE	100	45	4	1	0	0	150
NE	106	69	5	2	0	0	182
ENE	107	144	29	1	0	0	281
E	58	95	19	3	0	0	175
ESE	32	42	9	1	0	0	84
SE	32	33	10	0	0	0	75
SSE	28	38	15	2	0	0	83
S	36	48	40	7	0	0	131
SSW	57	89	36	3	2	0	187
SW	98	99	85	21	1	0	304
WSW	61	106	80	13	1	0	261
W	52	72	65	25	6	2	222
WNW	33	84	39	3	1	0	160
NW	29	63	6	1	0	0	99
NNW	32	45	3	0	0	0	80
Total	908	1111	456	83	11	2	2571

Calm Hours not Included above for :	Total Period	57
Variable Direction Hours for:	Total Period	0
Invalid Hours for:	Total Period	164
Valid Hours for this Stability Class for:	Total Period	2571
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2013

Attachment 1

Part 2: Joint Frequency Distribution Tables (150ft)

Page 6 of 8

Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2013 00:00 - 12/31/2013 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	60	2	0	0	0	0	62
NNE	101	19	1	0	0	0	121
NE	145	74	0	0	0	0	219
ENE	74	60	2	0	0	0	136
E	31	18	0	0	0	0	49
ESE	18	10	0	0	0	0	28
SE	16	5	1	0	0	0	22
SSE	11	8	4	2	0	0	25
S	36	14	4	2	0	0	56
SSW	70	35	5	1	0	0	111
SW	85	43	20	0	0	0	148
WSW	53	29	9	0	0	0	91
W	33	11	0	0	0	0	44
WNW	20	5	0	0	0	0	25
NW	10	2	0	0	0	0	12
NNW	21	7	0	0	0	0	28
Total	784	342	46	5	0	0	1177

Calm Hours not Included above for :	Total Period	57
Variable Direction Hours for:	Total Period	0
Invalid Hours for:	Total Period	164
Valid Hours for this Stability Class for:	Total Period	1177
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2013

Attachment 1

Part 2: Joint Frequency Distribution Tables (150ft)

Page 7 of 8

Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2013 00:00 - 12/31/2013 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	13	0	0	0	0	0	13
NNE	38	16	0	0	0	0	54
NE	45	38	1	0	0	0	84
ENE	22	35	0	0	0	0	57
E	19	17	0	0	0	0	36
ESE	9	8	0	0	0	0	17
SE	10	11	0	0	0	0	21
SSE	7	10	0	0	0	0	17
S	8	12	1	0	0	0	21
SSW	34	28	2	0	0	0	64
SW	27	17	2	0	0	0	46
WSW	15	7	1	0	0	0	23
W	6	2	1	0	0	0	9
WNW	6	4	0	0	0	0	10
NW	8	3	0	0	0	0	11
NNW	5	1	0	0	0	0	6
Total	272	209	8	0	0	0	489

Calm Hours not Included above for :	Total Period	57
Variable Direction Hours for:	Total Period	0
Invalid Hours for:	Total Period	164
Valid Hours for this Stability Class for:	Total Period	489
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2013

Attachment 1

Part 2: Joint Frequency Distribution Tables (150ft)

Page 8 of 8

Hours at Each Wind Speed and Direction

Summary of All Stability Classes

Total Period

Period of Record =

1/1/2013 00:00 - 12/31/2013 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	141	129	45	5	0	0	320
NNE	275	174	39	5	0	0	493
NE	328	262	31	4	0	0	625
ENE	224	362	86	2	0	0	674
E	122	224	56	5	0	0	407
ESE	72	111	38	4	0	0	225
SE	71	98	65	4	0	0	238
SSE	61	104	59	10	0	0	234
S	96	148	108	18	1	0	371
SSW	188	215	107	19	2	0	531
SW	228	235	256	60	6	0	785
WSW	161	276	303	67	8	0	815
W	144	306	422	290	55	5	1222
WNW	100	275	350	135	3	0	863
NW	84	218	128	7	0	0	437
NNW	90	146	60	3	0	0	299
Total	2385	3283	2153	638	75	5	8539

Calm Hours not Included above for :

Total Period 57

Variable Direction Hours for:

Total Period 0

Invalid Hours for:

Total Period 164

Valid Hours for this Stability Class for:

Total Period 8539

Total Hours for Period

8760

Enclosure 2, Attachment 1 (Part 3 of 3)

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2013

Attachment 1

Part 3: Joint Frequency Distribution Tables (500ft)

Page 1 of 8

Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2013 00:00 - 12/31/2013 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	2	0	0	0	0	2
NNE	0	0	2	0	0	0	2
NE	0	0	0	0	0	0	0
ENE	0	4	5	0	0	0	9
E	0	0	2	2	0	0	4
ESE	0	1	7	6	0	0	14
SE	0	0	4	0	2	0	6
SSE	0	0	1	0	0	0	1
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	1	0	0	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Total	0	8	21	8	2	0	39

Calm Hours not Included above for :	Total Period	9
Variable Direction Hours for:	Total Period	0
Invalid Hours for:	Total Period	275
Valid Hours for this Stability Class for:	Total Period	39
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2
Radioactive Effluent Release Report
 Calendar Year – 2013
 Attachment 1

Part 3: Joint Frequency Distribution Tables (500ft)
 Page 2 of 8

Hours at Each Wind Speed and Direction

Total Period								
Period of Record =	1/1/2013 00:00 - 12/31/2013 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	0	1	2	0	0	0	3	
NNE	1	0	1	0	0	0	2	
NE	0	8	1	0	0	0	9	
ENE	0	4	7	1	0	0	12	
E	0	5	9	1	0	0	15	
ESE	0	6	15	4	0	0	25	
SE	0	0	11	3	1	0	15	
SSE	0	1	7	0	0	0	8	
S	0	1	3	1	0	0	5	
SSW	0	0	2	0	0	0	2	
SW	0	0	0	0	0	0	0	
WSW	0	1	5	0	0	0	6	
W	0	0	7	2	0	0	9	
WNW	0	2	4	3	2	0	11	
NW	0	1	1	1	0	0	3	
NNW	0	3	3	0	0	0	6	
Total	1	33	78	16	3	0	131	
Calm Hours not Included above for :							Total Period	9
Variable Direction Hours for:							Total Period	0
Invalid Hours for:							Total Period	275
Valid Hours for this Stability Class for:							Total Period	131
Total Hours for Period								8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2013

Attachment 1

Part 3: Joint Frequency Distribution Tables (500ft)

Page 3 of 8

Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2013 00:00 - 12/31/2013 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	2	11	1	0	0	15
NNE	1	2	0	2	0	0	5
NE	0	9	3	0	0	0	12
ENE	1	15	10	1	0	0	27
E	0	14	6	2	0	0	22
ESE	1	13	7	5	0	0	26
SE	0	6	14	2	1	0	23
SSE	1	5	10	0	0	0	16
S	0	3	11	3	0	0	17
SSW	0	2	6	4	0	0	12
SW	0	3	12	3	0	0	18
WSW	0	2	15	1	0	0	18
W	1	2	10	4	1	0	18
WNW	1	12	11	14	3	0	41
NW	0	4	8	2	0	0	14
NNW	1	7	12	6	0	0	26
Total	8	101	146	50	5	0	310

Calm Hours not Included above for :	Total Period	9
Variable Direction Hours for:	Total Period	0
Invalid Hours for:	Total Period	275
Valid Hours for this Stability Class for:	Total Period	310
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2013

Attachment 1

Part 3: Joint Frequency Distribution Tables (500ft)

Page 4 of 8

Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2013 00:00 - 12/31/2013 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	15	48	93	30	1	0	187
NNE	25	30	6	3	0	0	64
NE	16	60	8	1	0	0	85
ENE	19	64	52	12	0	0	147
E	32	66	88	27	5	0	218
ESE	18	72	73	40	4	0	207
SE	17	45	29	27	1	0	119
SSE	11	26	56	16	9	0	118
S	14	35	80	62	13	7	211
SSW	14	31	70	93	20	2	230
SW	22	31	159	252	79	10	553
WSW	14	63	195	248	58	13	591
W	28	86	261	350	164	50	939
WNW	8	64	252	195	61	17	597
NW	19	50	179	65	7	0	320
NNW	18	55	151	41	1	0	266
Total	290	826	1752	1462	423	99	4852

Calm Hours not Included above for :	Total Period	9
Variable Direction Hours for:	Total Period	0
Invalid Hours for:	Total Period	275
Valid Hours for this Stability Class for:	Total Period	4852
Total Hours for Period		8760

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2013

Attachment 1

Part 3: Joint Frequency Distribution Tables (500ft)

Page 5 of 8

Hours at Each Wind Speed and Direction

Total Period

Period of Record =

1/1/2013 00:00 - 12/31/2013 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	24	26	19	10	1	0	80
NNE	32	31	13	4	0	0	80
NE	46	51	21	3	0	0	121
ENE	41	67	31	8	0	0	147
E	36	69	48	2	0	0	155
ESE	34	47	75	39	0	0	195
SE	24	34	49	23	1	0	131
SSE	22	35	44	24	9	0	134
S	24	42	64	37	7	4	178
SSW	28	27	42	42	14	3	156
SW	39	52	94	128	54	0	367
WSW	48	68	60	16	4	2	198
W	32	87	63	27	0	1	210
WNW	21	53	22	5	0	0	101
NW	23	16	30	6	0	0	75
NNW	18	23	18	10	0	0	69
Total	492	728	693	384	90	10	2397

Calm Hours not Included above for :

Total Period 9

Variable Direction Hours for:

Total Period 0

Invalid Hours for:

Total Period 275

Valid Hours for this Stability Class for:

Total Period 2397

Total Hours for Period

8760

Beaver Valley Power Station – Units 1 & 2
Radioactive Effluent Release Report
 Calendar Year – 2013
 Attachment 1

Part 3: Joint Frequency Distribution Tables (500ft)
 Page 6 of 8

Hours at Each Wind Speed and Direction

		Total Period						
Period of Record =		1/1/2013 00:00 - 12/31/2013 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	14	10	4	0	0	0	28	
NNE	16	11	1	0	0	0	28	
NE	19	28	4	0	0	0	51	
ENE	21	18	9	1	0	0	49	
E	24	24	15	0	0	0	63	
ESE	14	13	28	5	0	0	60	
SE	7	17	22	4	0	0	50	
SSE	18	23	20	9	0	0	70	
S	11	30	12	8	1	0	62	
SSW	7	13	22	8	0	0	50	
SW	12	10	22	24	3	0	71	
WSW	17	13	11	0	0	0	41	
W	9	11	10	1	1	0	32	
WNW	5	12	3	0	0	0	20	
NW	8	0	1	0	0	0	9	
NNW	10	7	2	1	0	0	20	
Total	212	240	186	61	5	0	704	
Calm Hours not Included above for :		Total Period					9	
Variable Direction Hours for:		Total Period					0	
Invalid Hours for:		Total Period					275	
Valid Hours for this Stability Class for:		Total Period					704	
Total Hours for Period							8760	

Enclosure 2, Attachment 1 (Part 3 of 3)

Beaver Valley Power Station – Units 1 & 2
Radioactive Effluent Release Report
 Calendar Year – 2013
 Attachment 1

Part 3: Joint Frequency Distribution Tables (500ft)
 Page 7 of 8

Hours at Each Wind Speed and Direction

Total Period

Period of Record = 1/1/2013 00:00 - 12/31/2013 23:00
 Elevation: Speed: SP500P Direction: DI500P Lapse: DT500-35
 Stability Class G Delta Temperature Extremely Stable

<u>Wind Direction</u>	<u>Wind Speed (mph)</u>						<u>Total</u>
	<u>1 - 4</u>	<u>4 - 8</u>	<u>8 - 13</u>	<u>13 - 19</u>	<u>19 - 25</u>	<u>> 25</u>	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	1	3	1	0	0	5
S	0	0	5	5	0	0	10
SSW	0	2	6	4	0	0	12
SW	0	0	5	9	2	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	0	3	19	19	2	0	43

Calm Hours not Included above for :	Total Period	9
Variable Direction Hours for:	Total Period	0
Invalid Hours for:	Total Period	275
Valid Hours for this Stability Class for:	Total Period	43
Total Hours for Period		8760

Enclosure 2, Attachment 1 (Part 3 of 3)

Beaver Valley Power Station – Units 1 & 2
Radioactive Effluent Release Report
 Calendar Year – 2013
 Attachment 1

Part 3: Joint Frequency Distribution Tables (500ft)
 Page 8 of 8

Hours at Each Wind Speed and Direction

Summary of All Stability Classes

Total Period

Period of Record = 1/1/2013 00:00 - 12/31/2013 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	54	89	129	41	2	0	315
NNE	75	74	23	9	0	0	181
NE	81	156	37	4	0	0	278
ENE	82	172	114	23	0	0	391
E	92	178	168	34	5	0	477
ESE	67	152	205	99	4	0	527
SE	48	102	129	59	6	0	344
SSE	52	91	141	50	18	0	352
S	49	111	175	116	21	11	483
SSW	49	75	148	151	34	5	462
SW	73	96	292	416	138	10	1025
WSW	79	147	286	265	62	15	854
W	70	186	351	384	166	51	1208
WNW	35	144	292	217	66	17	771
NW	50	71	219	74	7	0	421
NNW	47	95	186	58	1	0	387
Total	1003	1939	2895	2000	530	109	8476

Calm Hours not Included above for :	Total Period	9
Variable Direction Hours for:	Total Period	0
Invalid Hours for:	Total Period	275
Valid Hours for this Stability Class for:	Total Period	8476
Total Hours for Period		8760

ENCLOSURE 2, ATTACHMENT 2

Beaver Valley Power Station - Units 1 & 2

Radioactive Effluent Release Report

Calendar Year - 2013

Attachment 2

Unit 1 and 2 Offsite Dose Calculation Manual Changes

Attachment 2

Attached is a complete copy of the ODCM that includes:

Change (35) of the ODCM (Effective: March 2013)

Attachment 2 Clarification

A complete copy of the ODCM has been provided to the following offices:

**United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001**

**United States Nuclear Regulatory Commission
Regional Administrator
2100 Renaissance Blvd., Suite 100
King of Prussia, PA 19406-2713**

For a complete copy of the ODCM, contact Rebecca Novak at 724-682-4255.

ENCLOSURE 2, ATTACHMENT 3

Enclosure 2, Attachment 3

Beaver Valley Power Station – Units 1 & 2

Radioactive Effluent Release Report

Calendar Year – 2013
Attachment 3

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

Carbon-14 Methodology

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

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

The year of 2013 was the second year of carbon-14 sampling (in the form of CO₂) at BVPS for gaseous effluent releases. The large disparity between data from Unit 1 and Unit 2 is believed to be caused by two factors. The first factor being the difference in dilution flow in the ventilations between the units. The second factor is Unit 1 had more gaseous discharges throughout 2013 due to a scheduled outage. Unit 2 had minimal gaseous releases throughout the year, resulting in lower calculated doses.

Dose Calculations for Unit 1								
Exposure Pathway	Infant		Child		Teen		Adult	
	Bone	Other*	Bone	Other*	Bone	Other*	Bone	Other*
Inhalation	1.2E-01	2.5E-02	1.7E-01	3.1E-02	1.2E-01	2.3E-02	8.3E-02	1.6E-02
Vegetation	-	-	9.8E-01	2.0E-01	4.1E-01	8.1E-02	2.5E-01	5.0E-02
Ingestion								
TOTAL	1.2E-01	2.5E-02	1.1E+00	2.3E-01	5.3E-01	1.0E-01	3.3E-01	6.6E-02

Dose Calculations for Unit 2								
Exposure Pathway	Infant		Child		Teen		Adult	
	Bone	Other*	Bone	Other*	Bone	Other*	Bone	Other*
Inhalation	1.8E-06	3.7E-07	2.4E-06	4.7E-07	1.8E-06	3.3E-07	1.2E-06	2.3E-07
Vegetation	-	-	6.8E-05	1.4E-05	2.8E-05	5.6E-06	1.7E-05	3.5E-06
Ingestion								
TOTAL	1.8E-06	3.7E-07	7.0E-05	1.4E-05	3.0E-05	5.9E-06	1.8E-05	3.7E-06

Dose Calculations for Total Site								
	Infant		Child		Teen		Adult	
	Bone	Other*	Bone	Other*	Bone	Other*	Bone	Other*
TOTAL	1.2E-01	2.5E-02	1.1E+00	2.3E-01	5.3E-01	1.0E-01	3.3E-01	6.6E-02