FENOC
FirstEnergy Nuclear Operating Company

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May 1, 2006
L-06-079

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

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
Annual Radioactive Effluent Release Report for 2005, and
Annual Radiological Environmental Operating Report for 2005

In accordance with Beaver Valley Nuclear Power Station Units No. 1 and 2 (BVPS) Technical Specifications, FirstEnergy Nuclear Operating Company (FENOC) hereby submits the BVPS Annual Radiological Environmental Operating Report and Annual Radiological Effluent Release Report for 2005. These reports are provided in a single enclosure, introduced by an Executive Summary that addresses implementation of the Radioactive Effluent Control Program and Radiological Environmental Monitoring Program at BVPS in 2005. The program results demonstrate the proficiency of radioactive effluent control at BVPS, and that the operations of Unit 1 and Unit 2 did not adversely affect the surrounding environment.

The 2005 Annual Radioactive Effluent Release Report (ARERR) for BVPS Units 1 and Unit 2 is submitted in accordance with the requirements of Unit 1 and Unit 2 Technical Specification 6.9.3. The report contains the information required by NRC Regulatory Guide 1.21, along with site specific information required by Unit 1 and Unit 2 Offsite Dose Calculation Manual procedure 1/2-ODC-3.03, Attachment U, Report 6.9.3. The report format incorporates the following considerations.

- The ARERR is considered a single submittal for the two-unit site.
- The ARERR combines those sections that are common to both units at the site. Therefore, since Unit 1 and Unit 2 have shared radwaste systems for elevated level gaseous effluents and shared radwaste systems for all liquid effluents, then the ARERR combines those sections.

IE48
IE25

- The ARERR segregates those sections that are specific to each unit. Therefore, since Unit 1 and Unit 2 have independent radwaste systems for ground level gaseous effluents, then the ARERR segregates those sections.

The 2005 Annual Radiological Environmental Operating Report (AREOR) for BVPS Units 1 and 2 is submitted in accordance with Unit 1 and Unit 2 Technical Specification 6.9.2. The report also contains site-specific information required by Unit 1 and Unit 2 Offsite Dose Calculation Manual Procedure 1/2-ODC-3.03, Attachment T, Report 6.9.2.

No new regulatory commitments are contained in this submittal. If there are any questions or if additional information is required, please contact Mr. Gregory A. Dunn, Manager – FENOC Fleet Licensing, at (330) 315-7243.

Sincerely,

Richard L. Ward

for James H. Lash

Enclosure

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B. F. Jones Memorial Library
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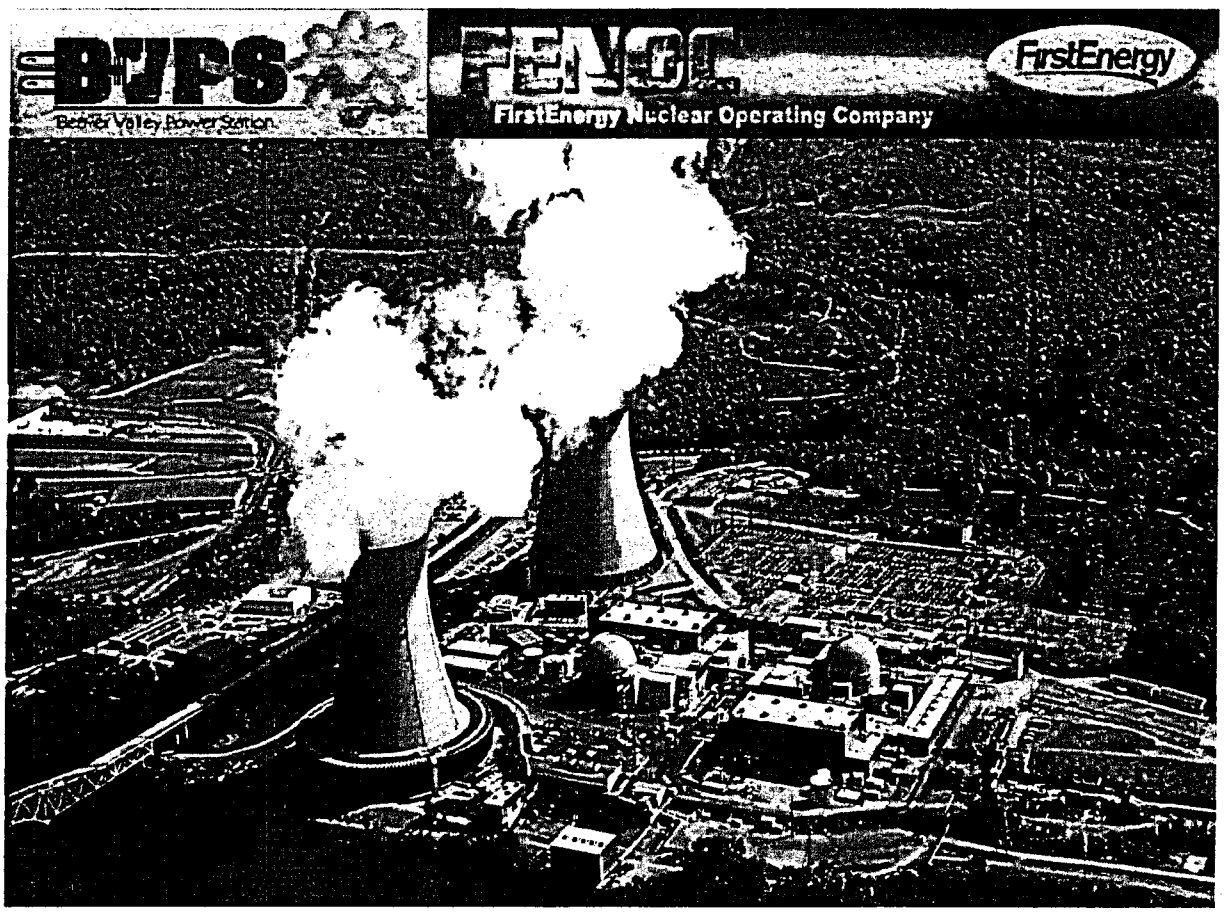
bc: (with Enclosures)
BVPS Chemistry Environmental Supervisor
BVPS Chemistry RETS Administrator (10 copies)
BVPS Chemistry REMP Administrator (15 copies)
BVPS Chemistry Manager
BVPS Regulatory Compliance (2 copies)
BVPS Quality Services Unit
D. W. Jenkins
J. J. Hagan
Perry NPP RETS Administrator
Perry NPP REMP Administrator
Davis-Besse RETS Administrator
Davis-Besse REMP Administrator
BVPS Document Control RTL A9.690E
BVRC - *Keywords: Annual Radioactive Effluent Release Report, Annual Environmental Report*

References:
BVBP-SITE-0016 Report #31
BVBP-SITE-0016 Report #38

RTL# A9.690E

FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION



2005 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

AND

2005 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

UNITS NO. 1 AND 2

LICENSES DPR-66 AND NPF-73

Executive Summary for Year 2005 Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports

I. Overall Summary of BVPS Effluent and Environmental Programs:

Report Submittal: The attached documents represent a combined submittal comprised of the Annual Radioactive Effluent Release Report (ARERR), and the Annual Radiological Environmental Operating Report (AREOR). The ARERR (also referred to as the Annual RETS Report) is provided as Enclosure 2. The AREOR (also referred to as the Annual REMP Report) is provided as Enclosure 3.

This report is comprised of results from the RETS and REMP programs that are described in the BVPS Unit 1 and Unit 2 Offsite Dose Calculation Manual (ODCM) and are summarized as follows:

- RETS Program and Report Results: The Controls for the Radiological Effluent Technical Specification (RETS) Program are outlined in ODCM procedure 1/2-ODC-3.03, *Controls for RETS and REMP Programs*. The RETS Controls were followed throughout the report period. Adherence to the RETS Controls (e.g.; sampling, analysis and offsite dose projection requirements), along with adherence to more restrictive Administrative Controls delineated in site implementing procedures, demonstrate the proficiency of radioactive effluent control at BVPS. Also, results of the sample analyses, coupled with the offsite dose projections demonstrate that BVPS operations should not produce any adverse affect on the surrounding environment.

- REMP Program and Report Results: The Controls for the Radiological Environmental Monitoring Program (REMP) are outlined in ODCM procedure 1/2-ODC-3.03, *Controls for RETS and REMP Programs*. The REMP Controls were followed throughout the report period. Adherence to the REMP Controls (e.g.; sampling and analysis requirements) demonstrated the proficiency of radiological environmental monitoring. Also, results of the various environmental sample media validate the offsite dose projections made in accordance with the RETS Controls. In summary, the results demonstrate that BVPS operations did not adversely affect the surrounding environment.

Executive Summary for Year 2005 Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports

II: Detailed Summary of Enclosure 2 - Annual RETS Report (ARERR) for 2005:

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

- BVPS Unit 1 Technical Specifications, Administrative Control 6.9.3
- BVPS Unit 2 Technical Specifications, Administrative Control 6.9.3
- 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*"
- 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"*
- BVPS Condition Report No. CR05-03558-02: Provide description of Abnormal Liquid Release in the ARERR for 2005

Executive Summary for Year 2005 Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports

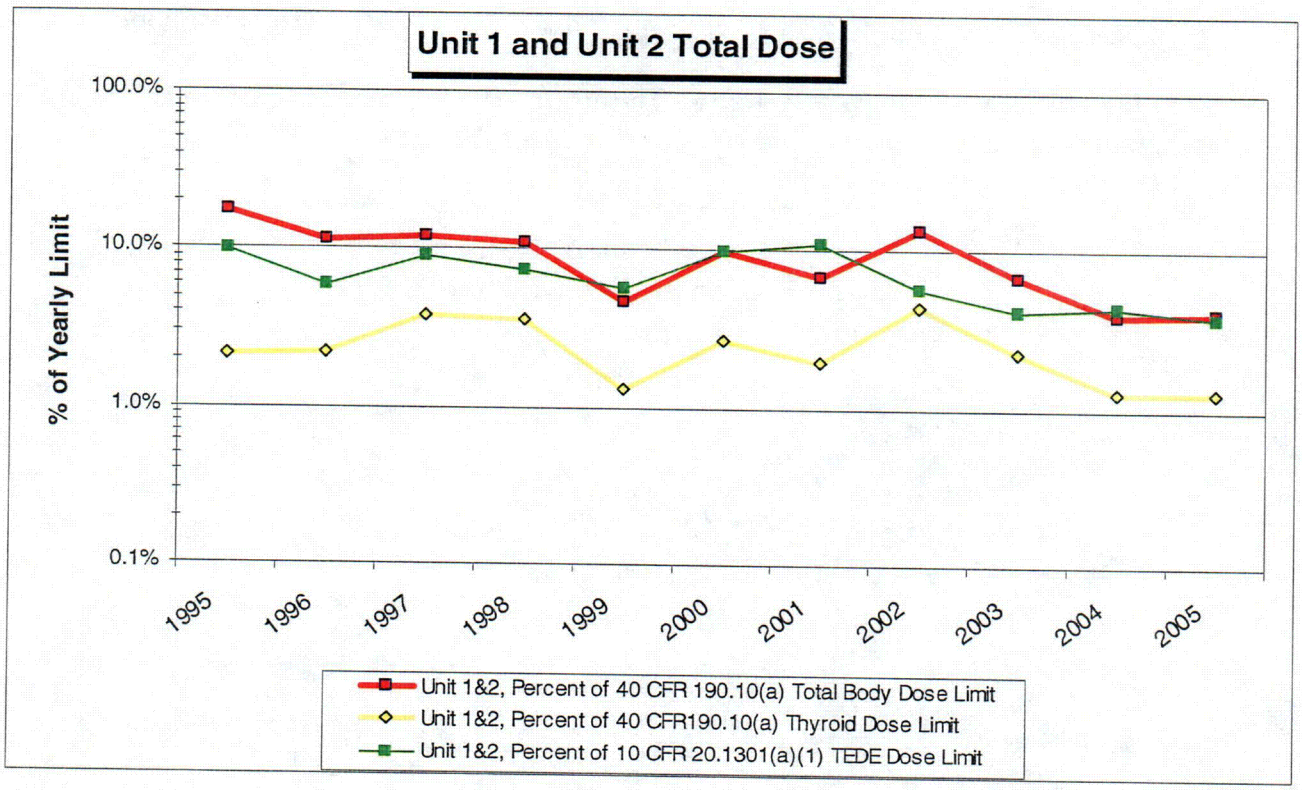
Summary of the BVPS RETS Program for Liquid and Gaseous Effluent Control

- **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 20.1302 and 40 CFR Part 190. The graph reflects the results of the efforts to stabilize and reduce offsite dose.

40 CFR 190.10(a)
1.000 mrem = Total Body Dose, or
4.01% of the 25 mrem annual limit

40 CFR 190.10(a)
0.967 mrem = Thyroid Dose, or
1.29% of the 75 mrem annual limit

10 CFR 20.1302
3.85 mrem = Total Effective Dose Equivalent, or
3.85% of the 100 mrem annual limit



C01

Executive Summary for Year 2005 Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports

- **Trends of Offsite Dose:** The graphs on the following pages provide a comparison of ODCM dose projections for the last several years to show compliance with Members of the Public dose limits from 10 CFR Part 50.

- **Total 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 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:

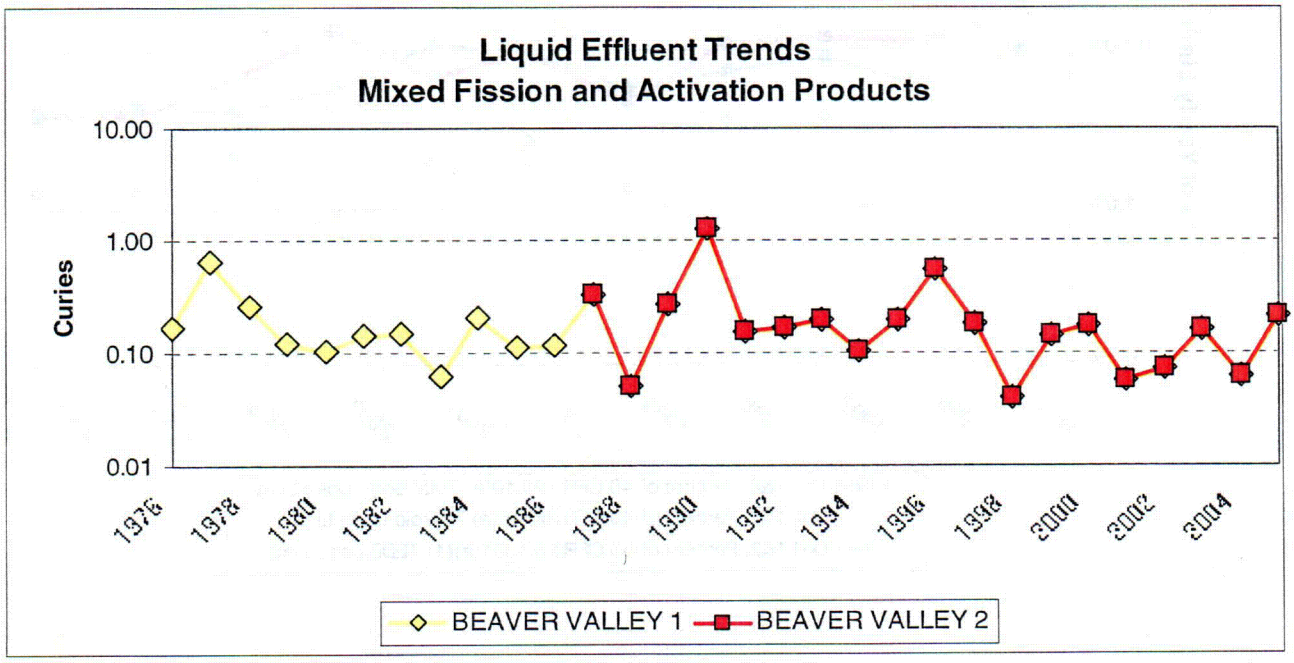
  1238 man-mrem =BVPS Total Population Dose for the year

  0.0003096 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.

- **Liquid Release Volume:** Unit 1 and Unit 2 discharged 6,650,000 liters of liquid waste.

- **Liquid Release Activity (Excluding Tritium):** The total mixed fission and activation product (particulate) radioactivity discharged from the site was 0.424 Curies.



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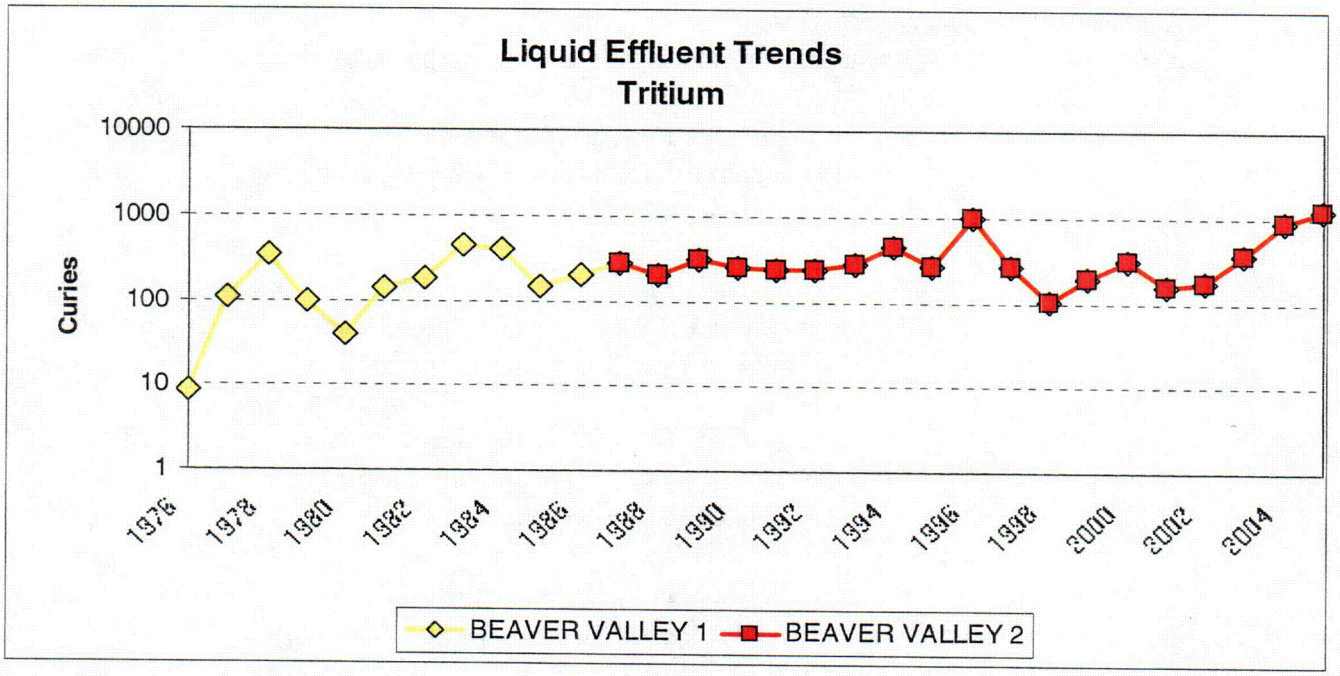
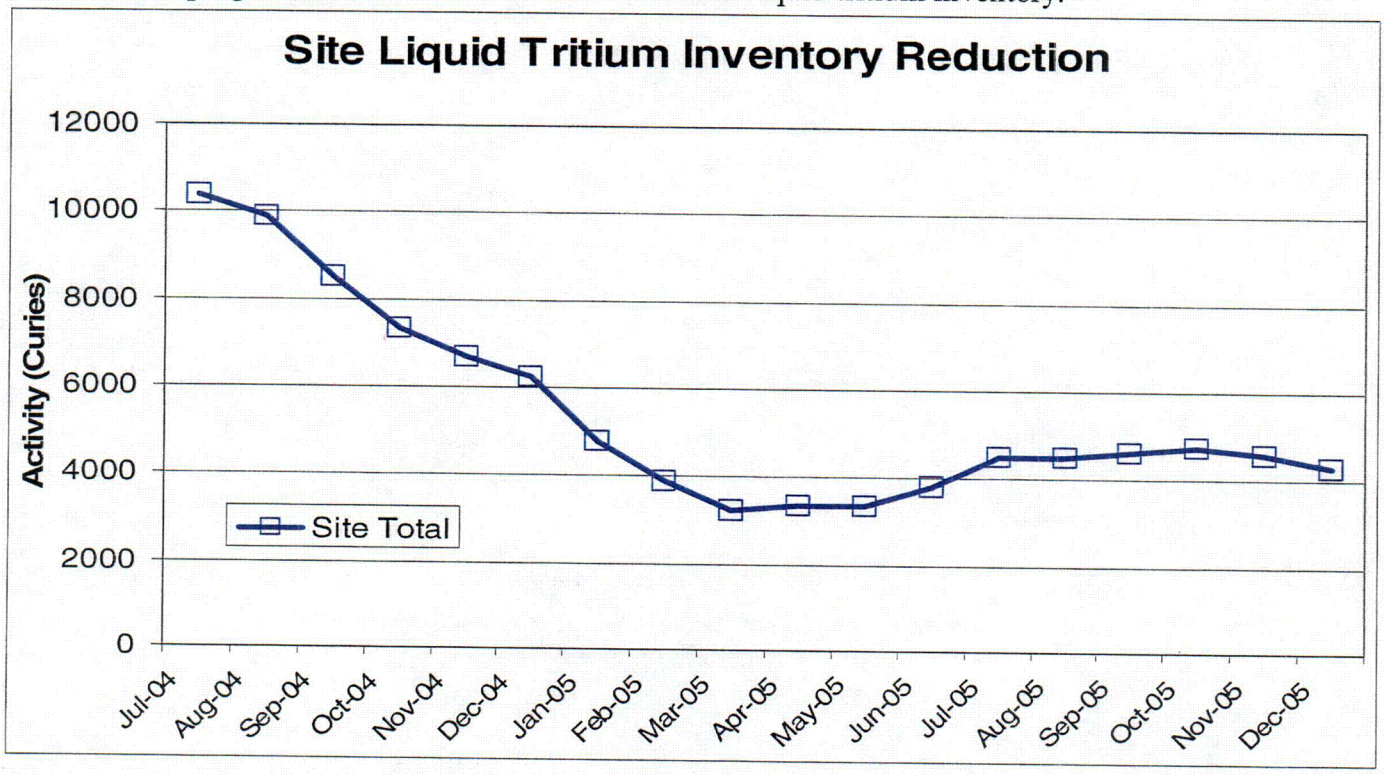
Executive Summary for Year 2005 Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports

- **Liquid Release Tritium Activity:** The total tritium radioactivity discharged from the site was 2450 Curies.



- **Liquid Tritium Inventory Reduction:** In July 2004, the site initiated an Action Plan to reduce the site liquid tritium inventory. This effort will ensure future offsite dose (due to evaporation of tritiated water from the spent fuel pools) is reduced. The following graph shows progress made toward the reduction of site liquid tritium inventory.



C03

Executive Summary for Year 2005 Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports

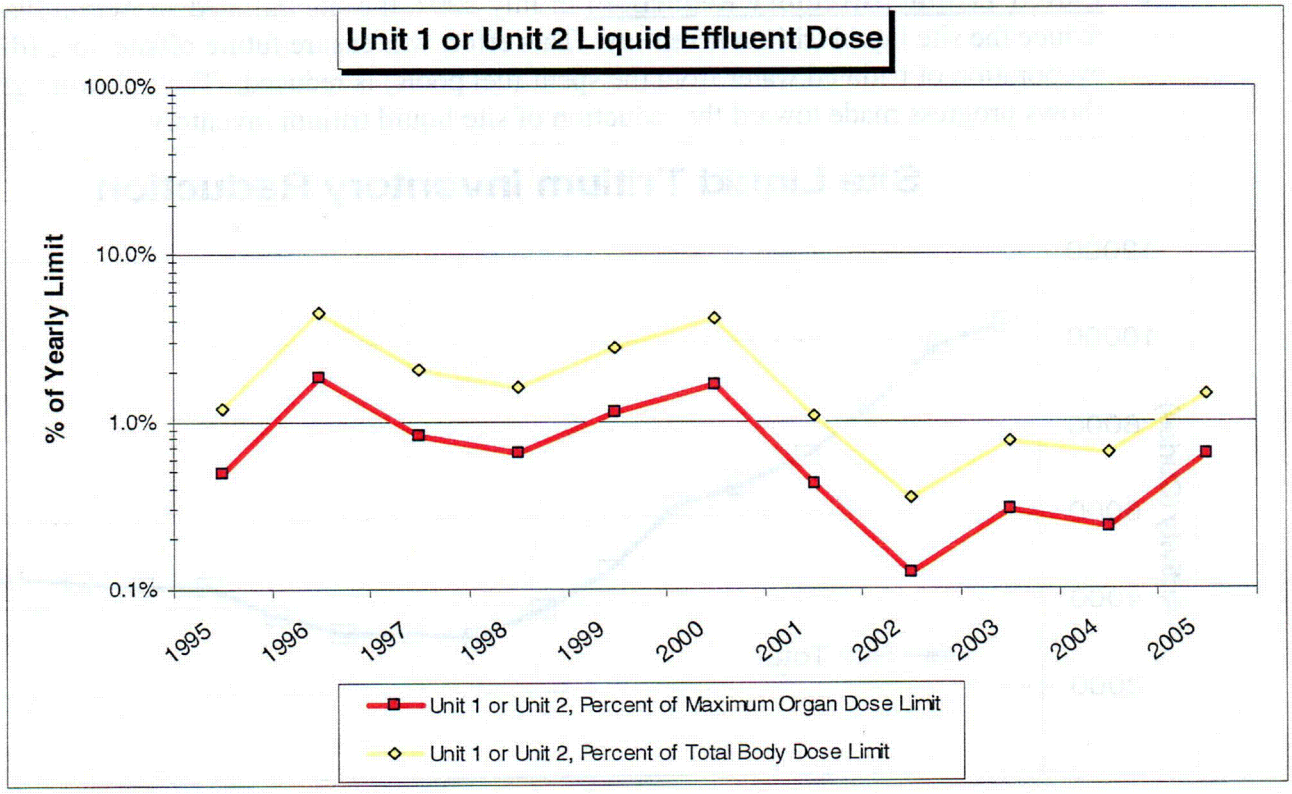
- **Liquid Release Offsite Dose Projections:** The following offsite dose projections were calculated to the maximum individual per 10 CFR 50, Appendix I and the ODCM. The projections use ODCM default flow rates for the receiving water (Ohio River). The projections were performed prior to release authorization, and are summarized as follows:

10 CFR Part 50, Appendix I
0.0438 mrem = Unit 1 Total Body Dose, or
1.460% of the 3 mrem annual limit

10 CFR Part 50, Appendix I
0.0620 mrem = Unit 1 Highest Organ Dose, or
0.6196% of the 10 mrem annual limit

10 CFR Part 50, Appendix I
0.0438 mrem = Unit 2 Total Body Dose, or
1.460% of the 3 mrem annual limit

10 CFR Part 50, Appendix I
0.0620 mrem = Unit 2 Highest Organ Dose, or
0.6196% of the 10 mrem annual limit



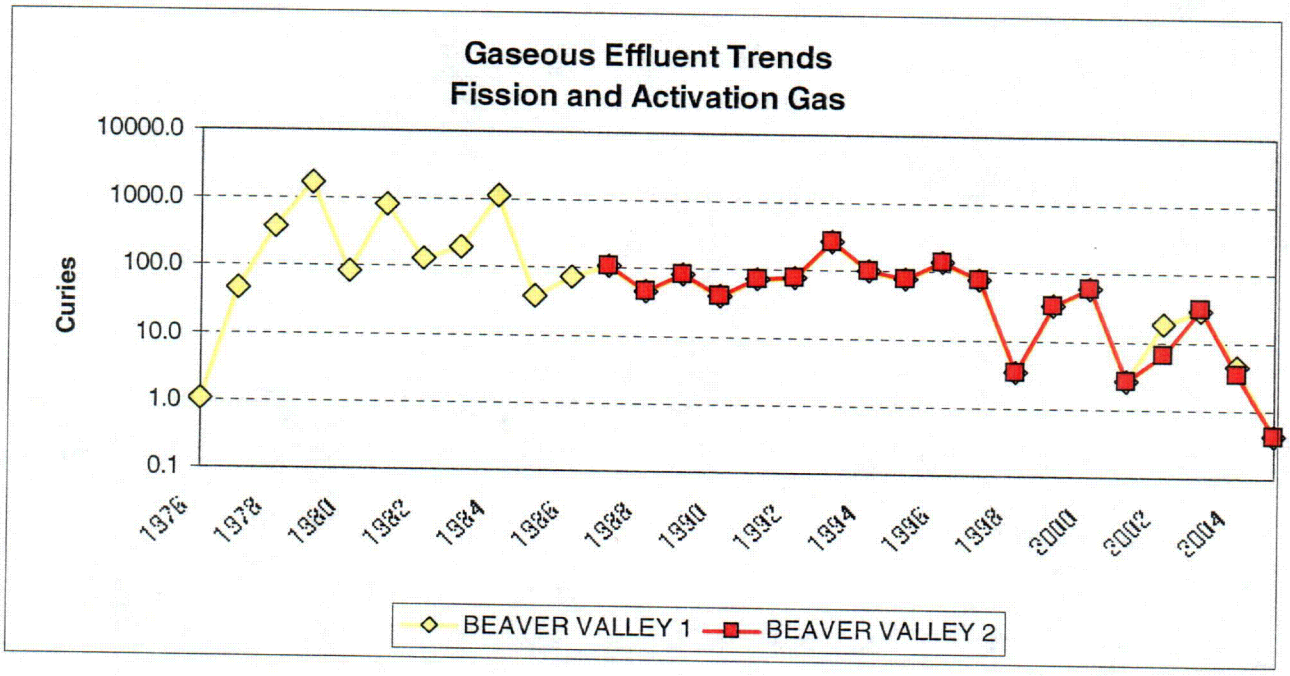
C04

Executive Summary for Year 2005 Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports

- **Liquid Radwaste Treatment Sytstem:** The BVPS site operates with the concept of a shared Liquid Radwaste Treatment System, even though each Unit has its own system of ion-exchange vessels. Using this concept allowed either Unit to process liquid waste at the Unit of origin, or at the other Unit. Typically, when Unit 1 or Unit 2 high level liquid waste was processed (e.g.; coolant recovery waste) it was performed at Unit 1, because that system has an additional carbon pre-conditioning filter (50 cubic feet).

- **Abnormal Liquid Releases:** There was 1 abnormal liquid release during the report period. In accordance with Technical Specification 6.9.3, ODCM procedure 1/2-ODC-3.03, Attachment U Control 6.9.3, and procedure 1/2-ENV-01.05, the Unplanned Release of 326 micro Curies of Fission Action Products from the Unit 1 Sewage Treatment Plant to the Ohio River was an Abnormal Release. This unplanned release was quantified via RWDA-L-5026, and consisted of Manganese-54 = 10 micro Curies, Cobalt-58 = 219 micro Curies, Cobalt-60 = 53 micro Curies and Zirconium/Niobium-95 = 44 micro Curies. The Offsite Dose consequence for this release was negligible in comparison to ODCM Limits. The Total Body Dose was 0.00248 mrem, and the Highest Organ (Liver) Dose was 0.0442 mrem. This condition and associated Corrective Actions are documented in Condition Report CR05-03558.

- **Gaseous Release Activity:** The total radioactivity discharged from all site gaseous releases was 0.857 Curies of fission and activation gases, no detectable Iodine-131, 0.0000246 Curies of particulates with half-lives >8 days, no detectable gross alpha, and 55.6 Curies of tritium.



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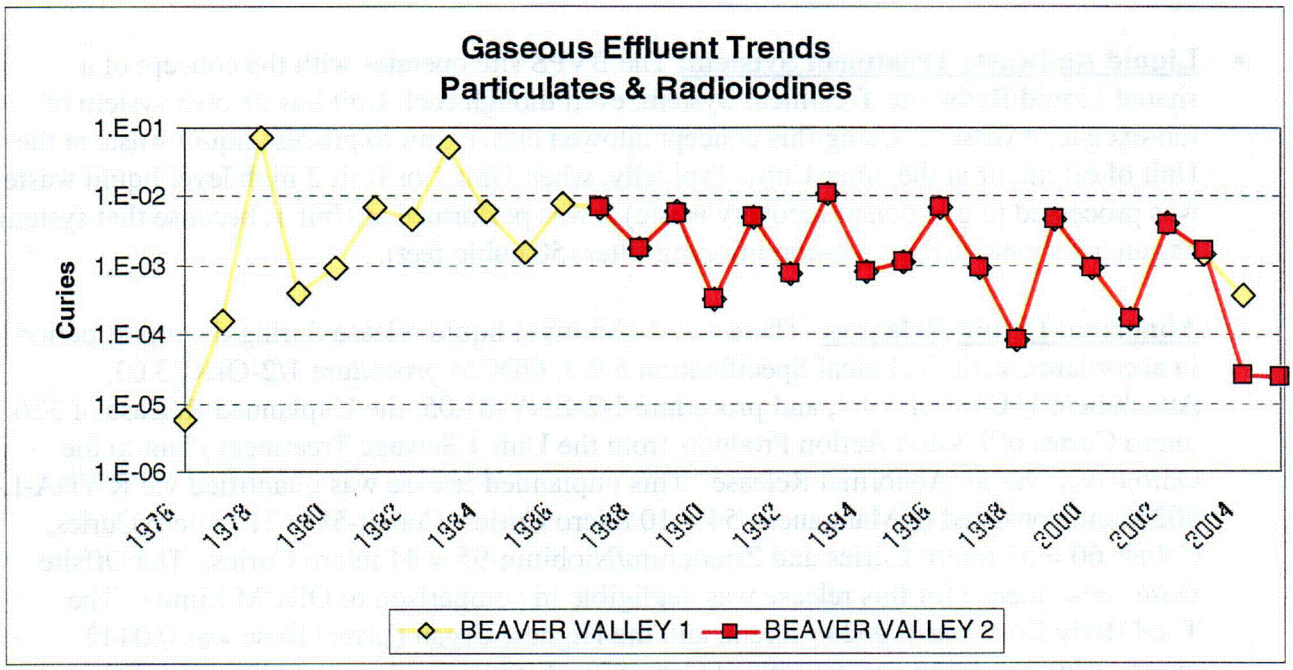
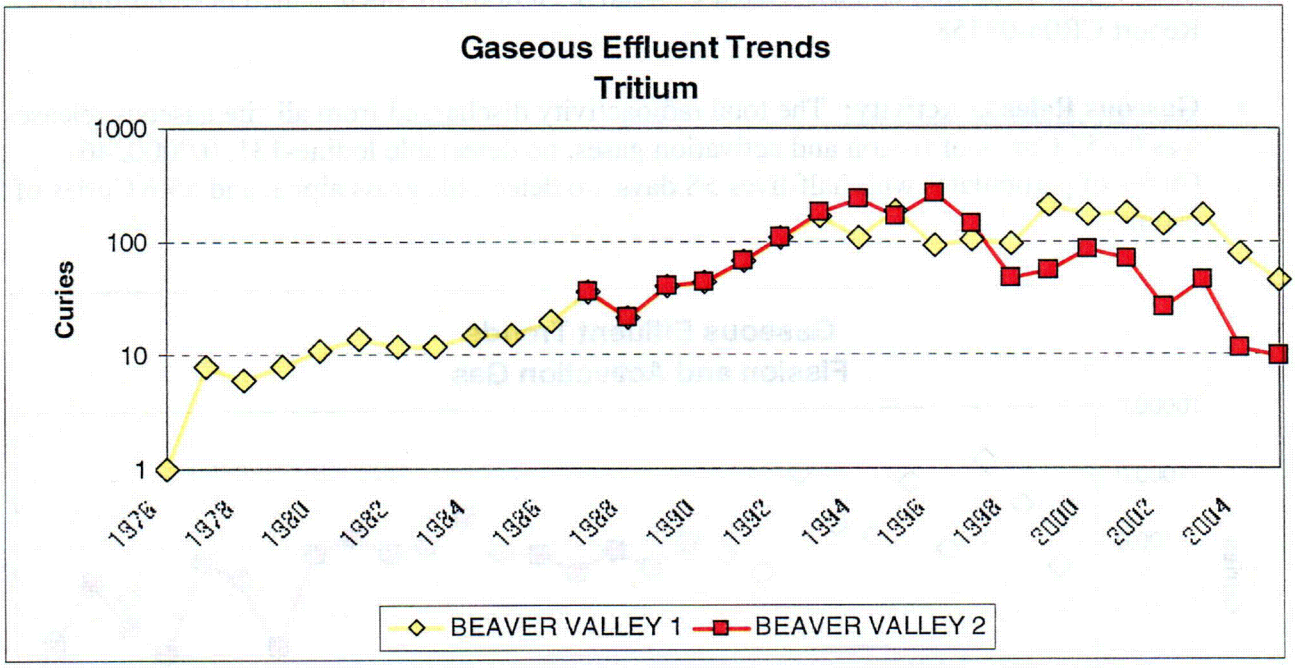
Executive Summary for Year 2005 Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports





- **Gaseous Radwaste Treatment System:** The BVPS site operates with the concept of a shared Gaseous Radwaste Treatment System, even though each Unit has its own system of charcoal delay beds and storage/decay tanks. Using this concept allowed either Unit to process gaseous waste at the Unit of origin, or at the other Unit. Typically, when Unit 1 or Unit 2 went to a shutdown condition, the gaseous waste was sent for storage and decay at Unit 2 because that system has 4 additional storage tanks.

C06

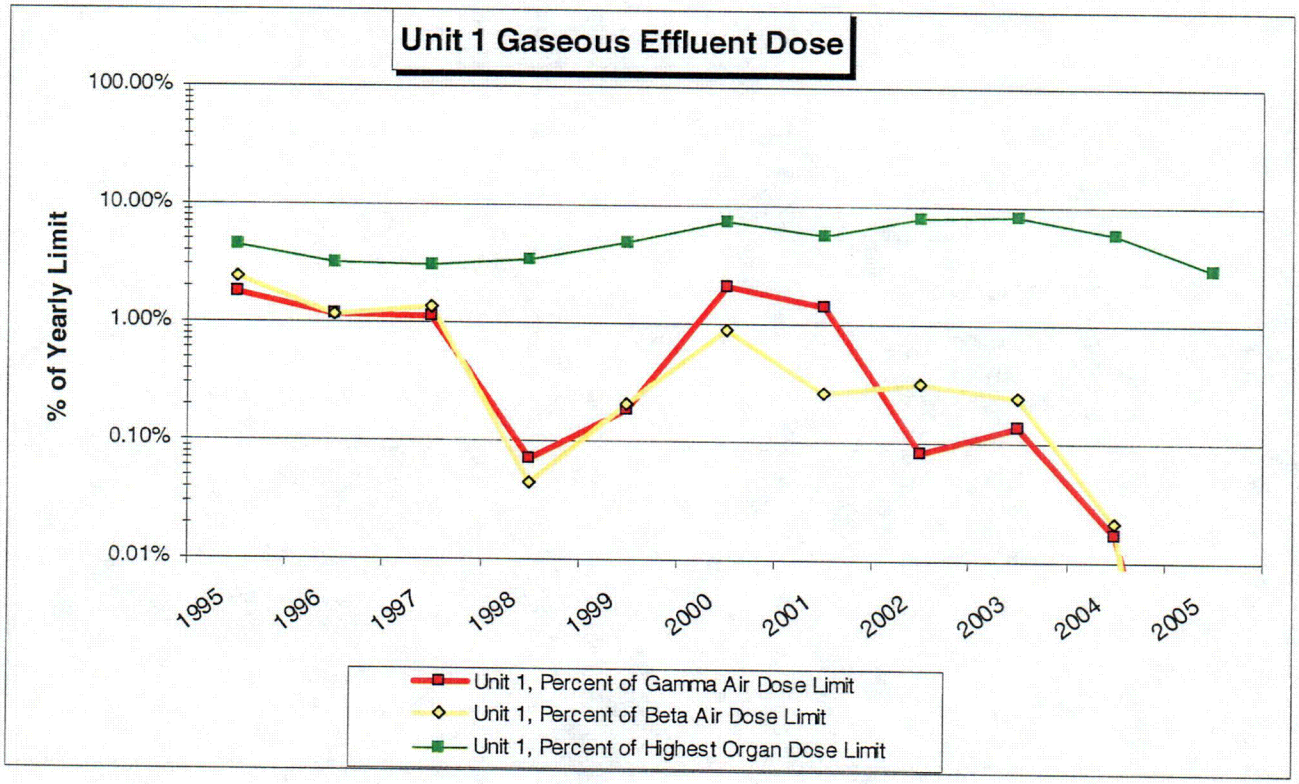
Executive Summary for Year 2005 Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports

- **Unit 1 Gaseous Release Offsite Dose Projections:** The following offsite dose projections 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. The offsite dose projections during the report period were performed prior to release authorization, and are summarized as follows:

10 CFR Part 50, Appendix I
<0.00001 mrad = Unit 1 Gamma Air Dose, or
<0.0001% of the 10 mrad annual limit

10 CFR Part 50, Appendix I
<0.00001 mrad = Unit 1 Beta Air Dose, or
<0.0001% of the 20 mrad annual limit

10 CFR Part 50, Appendix I
0.443 mrem = Unit 1 Highest Organ Dose, or
2.9507% of the 15 mrem annual limit



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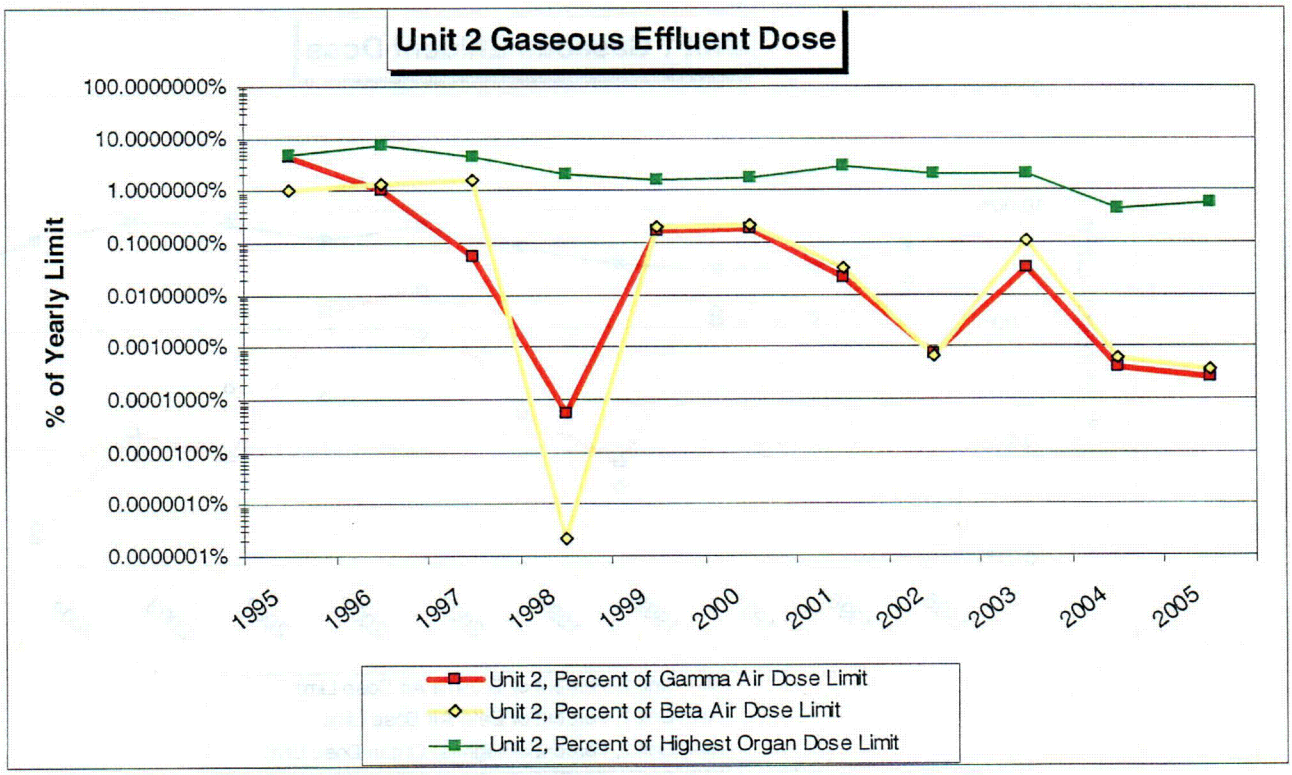
Executive Summary for Year 2005 Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports

- **Unit 2 Gaseous Release Offsite Dose Projections:** The following offsite dose projections 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. The offsite dose projections during the report period were performed prior to release authorization, and are summarized as follows:

10 CFR Part 50, Appendix I
0.000025 mrad = Unit 2 Gamma Air Dose, or
0.0003% of the 10 mrad annual limit

10 CFR Part 50, Appendix I
0.000073 mrad = Unit 2 Beta Air Dose, or
0.0004% of the 20 mrad annual limit

10 CFR Part 50, Appendix I
0.0812 mrem = Unit 2 Highest Organ Dose, or
0.5413% of the 15 mrem annual limit



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Executive Summary for Year 2005 Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports

- **Abnormal Gaseous Releases:** There were no abnormal gaseous releases during the report period.

- **Effluent Monitoring Channels Inoperable >30 Days:** There were no Effluent Monitoring Instrumentation Channels not returned to Operable status within 30 days during this report period.

- **ODCM Surveillance Deficiencies:** There were no ODCM Surveillance Deficiencies during the report period. This is regarding all ODCM required Surveillances for monitoring, sampling & analysis and offsite dose projection

- **ODCM Changes:** There were no changes made to the ODCM during the report period.

Executive Summary for Year 2005 Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports

III. Detailed Summary of Enclosure 3 - Annual REMP Report (AREOR) for 2005:

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

- Unit 1 Technical Specifications, Administrative Control 6.9.2
- Unit 2 Technical Specifications, Administrative Control 6.9.2
- 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"*
- ODCM procedure 1/2-ODC-3.03, Attachment T, Control 6.9.2, *"Controls for RETS and REMP Programs"*
- BVPS procedure 1/2-ENV-01.05, *"Compliance with Regulatory Guide 1.21 and Technical Specifications"*
- BVPS procedure 1/2-ENV-02.01, *"Description of Overall Radiological Environmental Monitoring Program"*
- BVPS Condition Report No. CR05-05888-01: Provide information in AREOR to indicate that REMP air particulate and radioiodine sample stations were upgraded from 8 ampere trip circuits to 15 ampere trip circuits.
- BVPS Condition Report No. CR05-07299-01: Provide results of the 2005 Land Use Census in the AREOR for 2005
- BVPS Condition Report No. CR06-00050-01: Provide reasons for missing environmental sample results in the AREOR for 2005

Summary of the BVPS REMP Program for Determination of Environmental Impact

- **Sample Media and Analyses:** Results for precipitation, ground water, sediment, food, fish, TLDs, feed crop, food crop, air particulate and air radioiodine media remained consistent with previous years data. Minor increases and decreases were noted. All positive results attributable to the BVPS operation were consistent with station data of authorized radioactive discharges and were within limits permitted by the NRC license and the ODCM. Other radioactivity detected was attributable to naturally occurring radionuclides, previous nuclear weapons tests, other man-made sources, and to the normal statistical fluctuation for activities near the Lower Limit of Detection (LLD). With exception to identification of Cobalt-58 and Cobalt-60 in the sediment at the outfall facility, the pre-operational values were not exceeded during the report period.

Executive Summary for Year 2005 Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports

- **Missing Environmental Sample Results:** The ten air particulate filters for the week of 10/03/05 through 10/10/05 were misplaced by the contractor laboratory prior to analysis for gross beta. The gross beta data results for this week were determined by assuming an average from the previous and the following weeks. This condition and associated Corrective Actions are documented in Condition Report No. CR05-00050-01.

- **Upgrading Trip Circuits for Air Particulate and Radioiodine Sample Stations:** During the report period, the ten air particulate and radioiodine sample stations were upgraded from 8 ampere trip circuits to 15 ampere trip circuits. This condition and associated Corrective Actions are documented in Condition Report No. CR05-05888-01.

- **Population Dose - Liquid Releases:** The calculated 0-50 mile population dose from liquid releases was 942 man-mrem. This population dose compares favorably to the 1704 man-mrem dose for the previous year.

- **Population Dose - Gaseous Releases:** The calculated 0-50 mile population dose from gaseous releases was 296 man-mrem. This population dose compares favorably to the 316 man-mrem dose for the previous year.

- **Land Use Census Results:** Highlights from the most recent Land Use Census are documented in Condition Report No. CR05-07299-01, and shown as follows:

  1) The nearest resident has not changed since the previous census. The location is at 211 Ferry Hill Road, Shippingport, PA (0.406 miles NE).

  2) The nearest garden >500 square feet has changed since the previous census. The previous location was at 158 Morrow Drive, Shippingport, PA (1.028 miles ENE). The current location is at 238 State Route 168, Hookstown, PA (0.760 miles SSW).

  3) The nearest dairy cow milked has not changed since the previous census. The location is still at **Searight Dairy**, 948 McCleary Road, RD 1, Hookstown, PA (2.097 miles SSW).

  4) The nearest doe goat milked has not changed since the previous census. The location is still at **Moore Farm**, 982 State Route 168, Hookstown, PA (2.120 miles SW). This is not the nearest location, but it is the nearest location providing samples.

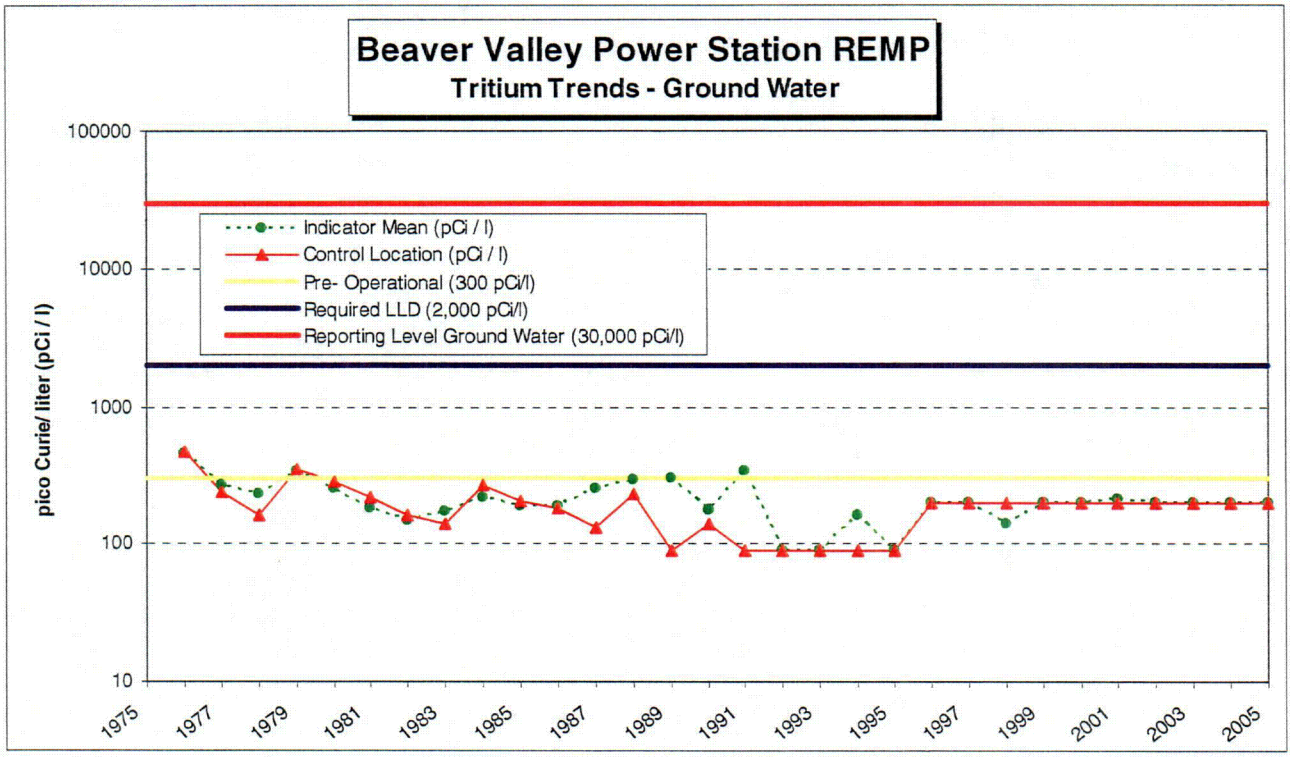
  5) The nearest beef cattle location has not changed since the previous census. The location is still at 105 Shippingport Road, Shippingport, PA (1.405 miles ENE).

  6) Using the results of the 2005 Land Use Census, the 2006 dairy cow sampling locations will remain at the same locations used in 2005. The locations are; **Searight Dairy**, 948 McCleary Road, RD1, Hookstown, PA (2.097 miles SSW), **Halstead Dairy**, 104 Tellish Drive, Hookstown, PA (5.079 miles SSW), **Brunton Dairy**, 3681 Ridge Road, Aliquippa, PA (6.158 miles SE), and **Weindsheimer Dairy**, RD 1 Burgettstown, PA (10.476 miles SSW).

  7) Using the results of the 2005 Land Use Census, the 2006 doe goat sampling locations will also remain at the same locations used in 2005. The locations are; **Moore Farm**, 982 State Route 168, Hookstown, PA (2.120 miles SW), and **Collins Farm**, 289 Calhoun Road, Aliquippa, PA (3.547 miles, SE).

Executive Summary for Year 2005 Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports

- **Groundwater Monitoring:** A total of six (6) offsite ground water samples were collected and analyzed for Tritium and by gamma spectrometry during the report period. The samples were collected on a semi-annual basis from three (3) locations within four (4) miles of the site. The locations included one (1) well in Shippingport, PA, one (1) well in Hookstown, PA, and one (1) well in Georgetown, PA. No gamma-emitting radionuclides were detected in the analyses. Also all tritium results were less than LLD. The following graph shows that offsite groundwater tritium is less than the pre-operational value.



- **Split Sample Program (Inter-laboratory Comparison, Part 1 of 2):** BVPS shared split sample data with the Pennsylvania Department of Environmental Protection (PADEP) in support of the nuclear power plant monitoring program. The shared media and number of locations are typically comprised of; milk (1), surface water (3), sediment (1), fish (1), food crops (2), co-located air particulate/air iodine (4), and TLD (24). SINCE the split sample program is coordinated by the state, THEN the results are not provided with this report.

- **Spike Sample Program (Inter-laboratory Comparison, Part 2 of 2):** Spiked samples were provided by an independent laboratory and then analyzed by the REMP contractor laboratory. The samples were provided throughout the report period and included water samples, milk samples, filter paper samples and charcoal cartridge samples. All 104 analyses performed by the contactor laboratory on the spiked samples met the NRC comparison criteria.

C09

Annual Radioactive Effluent Release Report (Annual RETS 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

Annual
Radioactive Effluent Release Report
Calendar Year - 2005

Beaver Valley Power Station - Units 1 & 2

Annual Radioactive Effluent Release Report

Calendar Year - 2005

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

Beaver Valley Power Station - Units 1 & 2

Annual Radioactive Effluent Release Report

Calendar Year - 2005

Supplemental Information Page

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

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

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

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

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

5. Batch & Abnormal Release Information	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
a. Liquid Batch Releases						
1. Number of batch releases		33	27	24	20	104
2. Total time period for batch releases	minutes	16998	32914	20499	4867	75278
3. Maximum time period for a batch release	minutes	1089	14520	1103	1020	14520
4. Average time period for batch releases	minutes	515	1219	854	243	724
5. Minimum time period for a batch release	minutes	75	240	80	5	5
6. Average river flow during release periods	cuft/sec	87133	37500	9533	30400	41142
b. Gaseous Batch Releases						
1. Number of batch releases		10	17	10	8	45
2. Total time period for batch releases	minutes	1414	101412	374	258	103458
3. Maximum time period for a batch release	minutes	740	6240	167	167	6240
4. Average time period for batch releases	minutes	141	5965	37	32	2299
5. Minimum time period for a batch release	minutes	96	1	46	91	1
c. Abnormal Liquid Releases						
1. Number of releases		NONE	1	NONE	NONE	1
2. Total activity released	Curies	0.00E+00	3.26E-04	0.00E+00	0.00E+00	3.26E-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

Beaver Valley Power Station - Units 1 & 2

Annual Radioactive Effluent Release Report

Calendar Year - 2005

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	4.96E-02	8.05E-01	0.00E+00	2.04E-03	8.57E-01	26.5%
1a. Unit 1 Gases	Ci	2.48E-02	3.98E-01	0.00E+00	1.02E-03	4.24E-01	
1b. Unit 2 Gases	Ci	2.48E-02	4.07E-01	0.00E+00	1.02E-03	4.33E-01	
2. Average release rate for period	uCi/sec	6.29E-03	1.02E-01	0.00E+00	2.59E-04	2.72E-02	
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	0.00E+00	2.46E-05	0.00E+00	0.00E+00	2.46E-05	30.0%
1a. Unit 1 Particulates	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1b. Unit 2 Particulates	Ci	0.00E+00	2.46E-05	0.00E+00	0.00E+00	2.46E-05	
2. Average release rate for period	uCi/sec	0.00E+00	3.12E-06	0.00E+00	0.00E+00	7.79E-07	
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	2.01E+01	1.24E+01	1.05E+01	1.26E+01	5.56E+01	32.9%
1a. Unit 1 Tritium	Ci	1.68E+01	9.65E+00	8.55E+00	1.09E+01	4.59E+01	
1b. Unit 2 Tritium	Ci	3.26E+00	2.76E+00	1.95E+00	1.70E+00	9.67E+00	
2. Average release rate for period	uCi/sec	2.55E+00	1.57E+00	1.33E+00	1.60E+00	1.76E+00	
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).

Beaver Valley Power Station - Units 1 & 2

Annual Radioactive Effluent Release Report

Calendar Year - 2005

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	LLD	LLD	LLD	LLD
krypton-85	Ci	3.28E-02	4.00E-01	LLD	LLD	4.33E-01
krypton-85m	Ci	LLD	1.32E-04	LLD	LLD	1.32E-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	3.42E-01	LLD	LLD	3.42E-01
xenon-133m	Ci	LLD	7.55E-03	LLD	LLD	7.55E-03
xenon-135	Ci	LLD	1.04E-02	LLD	LLD	1.04E-02
xenon-135m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-138	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	3.28E-02	7.60E-01	ND	ND	7.93E-01
2. Iodines						
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
iodine-133	Ci	LLD	LLD	LLD	LLD	LLD
iodine-135	Ci	LLD	LLD	LLD	LLD	LLD
Total for period	Ci	ND	ND	ND	ND	ND
3. Particulates						
chromium-51	Ci	LLD	LLD	LLD	LLD	LLD
manganese-54	Ci	LLD	LLD	LLD	LLD	LLD
iron-59	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-57	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-58	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-60	Ci	LLD	LLD	LLD	LLD	LLD
zinc-65	Ci	LLD	LLD	LLD	LLD	LLD
strontium-89	Ci	LLD	LLD	LLD	LLD	LLD
strontium-90	Ci	LLD	LLD	LLD	LLD	LLD
molybdenum-99	Ci	LLD	LLD	LLD	LLD	LLD
cesium-134	Ci	LLD	LLD	LLD	LLD	LLD
cesium-137	Ci	LLD	LLD	LLD	LLD	LLD
barium/lanthanum-140	Ci	LLD	LLD	LLD	LLD	LLD
cerium-141	Ci	LLD	LLD	LLD	LLD	LLD
cerium-144	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 - Units 1 & 2

Annual Radioactive Effluent Release Report

Calendar Year - 2005

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	1.68E-02	3.55E-02	LLD	2.04E-03	5.43E-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	1.68E-02	3.55E-02	ND	2.04E-03	5.43E-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
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

Annual Radioactive Effluent Release Report

Calendar Year - 2005

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
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

Annual Radioactive Effluent Release Report

Calendar Year - 2005

Table 1C-GC1

Gaseous Effluents - Ground Level Continuous Releases (Unit 1)

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission gases						
argon-41	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85m	Ci	LLD	LLD	LLD	LLD	LLD
krypton-87	Ci	LLD	LLD	LLD	LLD	LLD
krypton-88	Ci	LLD	LLD	LLD	LLD	LLD
xenon-131m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-138	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	ND	ND	ND	ND
2. Iodines						
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
iodine-133	Ci	LLD	LLD	LLD	LLD	LLD
iodine-135	Ci	LLD	LLD	LLD	LLD	LLD
Total for period	Ci	ND	ND	ND	ND	ND
3. Particulates						
chromium-51	Ci	LLD	LLD	LLD	LLD	LLD
manganese-54	Ci	LLD	LLD	LLD	LLD	LLD
iron-59	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-57	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-58	Ci	LLD	LLD	LLD	LLD	LLD
cobalt-60	Ci	LLD	LLD	LLD	LLD	LLD
zinc-65	Ci	LLD	LLD	LLD	LLD	LLD
zirconium/niobium-95	Ci	LLD	LLD	LLD	LLD	LLD
zirconium/niobium-97	Ci	LLD	LLD	LLD	LLD	LLD
molybdenum-99	Ci	LLD	LLD	LLD	LLD	LLD
cesium-134	Ci	LLD	LLD	LLD	LLD	LLD
cesium-137	Ci	LLD	LLD	LLD	LLD	LLD
barium/lanthanum-140	Ci	LLD	LLD	LLD	LLD	LLD
cerium-141	Ci	LLD	LLD	LLD	LLD	LLD
cerium-144	Ci	LLD	LLD	LLD	LLD	LLD
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 2

Annual Radioactive Effluent Release Report

Calendar Year - 2005

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	9.17E-06	LLD	LLD	9.17E-06
cobalt-60	Ci	LLD	6.11E-07	LLD	LLD	6.11E-07
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	6.11E-07	LLD	LLD	6.11E-07
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	ND	1.04E-05	ND	ND	1.04E-05

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

ND = None Detected

Beaver Valley Power Station - Unit 2

Annual Radioactive Effluent Release Report

Calendar Year - 2005

Table 1C-GC2

Gaseous Effluents - Ground Level Continuous Releases (Unit 2)

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission gases						
argon-41	Ci	LLD	LLD	LLD	LLD	LLD
krypton-85	Ci	LLD	1.19E-06	LLD	LLD	1.19E-06
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	9.65E-03	LLD	LLD	9.65E-03
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-138	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	9.65E-03	ND	ND	9.65E-03
2. Iodines						
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
iodine-133	Ci	LLD	LLD	LLD	LLD	LLD
iodine-135	Ci	LLD	LLD	LLD	LLD	LLD
Total for period	Ci	ND	ND	ND	ND	ND
3. Particulates						
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	7.57E-06	LLD	LLD	7.57E-06
cobalt-60	Ci	LLD	6.59E-06	LLD	LLD	6.59E-06
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
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	1.42E-05	ND	ND	1.42E-05

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

ND = None Detected

Beaver Valley Power Station - Units 1 & 2

Annual Radioactive Effluent Release Report

Calendar Year - 2005

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 & alph	Ci	2.26E-01	1.32E-01	3.76E-02	2.83E-02	4.24E-01	26.1%
2. Average diluted concentration	uCi/ml	1.84E-07	8.04E-08	2.75E-08	8.09E-08	9.24E-08	
3. Percent of applicable limit	%	9.04E+00	5.29E+00	1.50E+00	1.13E+00	4.24E+00	
B. Tritium							
1. Total release	Ci	1.51E+03	5.43E+02	2.38E+02	1.58E+02	2.45E+03	25.0%
2. Average diluted concentration	uCi/ml	1.23E-03	3.30E-04	1.74E-04	4.53E-04	5.34E-04	
3. Percent of applicable limit	%	1.23E+01	3.30E+00	1.74E+00	4.53E+00	5.34E+00	
C. Dissolved and entrained gases							
1. Total release	Ci	ND	4.50E-03	ND	ND	4.50E-03	27.0%
2. Average diluted concentration	uCi/ml		2.74E-09			9.80E-10	
3. Percent of applicable limit	%		1.37E-03			4.90E-04	
D. Gross alpha radioactivity (total release)	Ci	LLD	LLD	LLD	LLD	LLD	28.9%
E. Volume of waste released (prior to dilution)	liters	2.14E+06	2.52E+06	1.24E+06	7.48E+05	6.65E+06	11.2%
F. Volume of dilution water used	liters	1.23E+09	1.64E+09	1.37E+09	3.49E+08	4.58E+09	22.9%

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

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

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

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

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

Beaver Valley Power Station - Units 1 & 2

Annual Radioactive Effluent Release Report

Calendar Year - 2005

Table 2B-B

Liquid Effluents - Batch Releases

Nuclides released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Calendar Year
1. Fission and activation products						
beryllium-7	Ci	LLD	LLD	LLD	LLD	LLD
sodium-24	Ci	LLD	LLD	LLD	LLD	LLD
chromium-51	Ci	3.21E-03	5.68E-04	LLD	LLD	3.78E-03
manganese-54	Ci	9.12E-04	4.12E-04	1.73E-06	LLD	1.33E-03
iron-55	Ci	6.87E-02	1.99E-02	9.16E-03	7.43E-03	1.05E-01
iron-59	Ci	7.67E-04	1.00E-03	9.12E-05	LLD	1.86E-03
cobalt-57	Ci	1.17E-05	1.24E-04	3.54E-05	1.46E-04	3.17E-04
cobalt-58	Ci	2.63E-02	5.22E-02	1.03E-02	1.47E-02	1.04E-01
cobalt-60	Ci	1.02E-02	7.21E-03	1.72E-03	2.20E-03	2.13E-02
zinc-65	Ci	6.81E-03	2.72E-03	2.07E-04	4.24E-04	1.02E-02
strontium-89	Ci	LLD	LLD	LLD	LLD	LLD
strontium-90	Ci	LLD	LLD	LLD	LLD	LLD
zirconium/niobium-95	Ci	1.45E-03	6.53E-04	6.18E-05	4.01E-05	2.20E-03
zirconium/niobium-97	Ci	1.59E-06	LLD	1.28E-05	8.95E-05	1.04E-04
molybdenum-99/technetium-99m	Ci	LLD	LLD	LLD	LLD	LLD
tin-113	Ci	LLD	LLD	LLD	LLD	LLD
silver-110m	Ci	1.63E-02	7.65E-03	1.16E-03	2.16E-04	2.53E-02
antimony-122	Ci	LLD	LLD	LLD	LLD	LLD
antimony-124	Ci	1.47E-02	4.02E-03	6.20E-04	LLD	1.93E-02
antimony-125	Ci	7.67E-02	3.58E-02	1.42E-02	2.91E-03	1.30E-01
iodine-131	Ci	LLD	LLD	LLD	LLD	LLD
cesium-134	Ci	2.03E-06	LLD	1.67E-06	1.16E-06	4.86E-06
cesium-137	Ci	2.75E-05	LLD	2.32E-05	1.25E-04	1.76E-04
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	2.26E-01	1.32E-01	3.76E-02	2.83E-02	4.24E-01

2. Dissolved and entrained gases						
krypton-85	Ci	LLD	LLD	LLD	LLD	LLD
xenon-133	Ci	LLD	4.50E-03	LLD	LLD	4.50E-03
xenon-133m	Ci	LLD	LLD	LLD	LLD	LLD
xenon-135	Ci	LLD	LLD	LLD	LLD	LLD
unidentified	Ci	NONE	NONE	NONE	NONE	NONE
Total for period	Ci	ND	4.50E-03	ND	ND	4.50E-03

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

Beaver Valley Power Station - Units 1 & 2

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Table 2B-C

Liquid Effluents - Continuous Releases

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

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Table 3A

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

A. Solid Waste Shipped Offsite For Burial Or Disposal (Not Irradiated fuel)				
1. Type of Waste (Spent resins, Filter Sludges, Evaporator Bottoms, Oil)		1st Half	2nd Half	Estimated Total Error
a. Volume Shipped		4.36E+01 m3	3.63E+01 m3	0.0% (1)
b. Volume Buried		0.00E+00 m3	0.00E+00 m3	0.0% (1)
c. Total Activity		6.71E+01 Ci	1.72E+02 Ci	30.0%
2. Estimate of Major Nuclide Composition by Type of Waste On This Table (2)		Percent (%)	Percent (%)	
H-3		2.72 %	0.58 %	
Be-7		0.00 %	0.09 %	
C-14		0.22 %	0.38 %	
Cr-51		0.10 %	0.01 %	
Mn-54		1.56 %	2.58 %	
Fe-55		9.71 %	13.90 %	
Fe-59		0.01 %	0.00 %	
Co-57		0.20 %	0.57 %	
Co-58		9.55 %	27.40 %	
Co-60		14.80 %	12.90 %	
Ni-59		0.18 %	0.17 %	
Ni-63		25.50 %	21.40 %	
Zn-65		1.95 %	2.79 %	
Sr-90		0.08 %	0.06 %	
Nb-95		0.10 %	0.69 %	
Zr-95		0.09 %	0.20 %	
Tc-99		0.04 %	0.00 %	
Ru-106		0.05 %	0.00 %	
Ag-110m		1.33 %	0.68 %	
Sn-113		0.01 %	0.07 %	
Sb-124		0.02 %	0.00 %	
Sb-125		2.68 %	2.58 %	
Cs-134		13.10 %	5.42 %	
Cs-137		16.00 %	7.64 %	
Pu-241		0.04 %	0.01 %	
3. Number of Shipments		9	6	
a. Type of Container Used	LSA	8	4	
	Type A	0	0	
	Type B	1	2	
	Large Quantity	0	0	
b. Solidification Agent Used	Cement	0	0	
	Urea Formaldehyde	0	0	
	None	9	6	
c. Mode of Transport	Truck	9	6	
	Rail	0	0	
d. Final Destination	Erwin, TN	5	4	
	Oak Ridge, TN	4	2	
e. Waste Class per 10 CFR Part 61	Class A	7	4	
	Class B	1	2	
	Class C	1	0	
	> Class C	0	0	

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

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

Beaver Valley Power Station - Units 1 & 2

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Table 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		5.69E+02 m3	1.99E+02 m3	0.0% (1)
b. Volume Buried		3.23E+01 m3	1.36E+01 m3	0.0% (1)
c. Total Activity		2.13E-01 Ci	2.64E-02 Ci	30.0%
2. Estimate of Major Nuclide Composition by Type of Waste On This Table (2)		Percent (%)	Percent (%)	
H-3		0.76 %	1.02 %	
C-14		0.23 %	0.29 %	
Cr-51		4.38 %	0.27 %	
Mn-54		1.76 %	2.55 %	
Fe-55		13.20 %	17.70 %	
Fe-59		0.75 %	0.23 %	
Co-57		0.03 %	0.24 %	
Co-58		24.80 %	42.60 %	
Co-60		8.38 %	10.70 %	
Ni-59		0.13 %	0.17 %	
Ni-63		7.35 %	9.38 %	
Zn-65		5.28 %	2.67 %	
Sr-90		0.09 %	0.01 %	
Nb-95		3.03 %	4.31 %	
Zr-95		2.27 %	2.36 %	
Mo-99		0.06 %	0.00 %	
Tc-99		0.06 %	0.01 %	
Ag-110m		0.03 %	0.03 %	
Sn-113		0.07 %	0.14 %	
Sn-117m		0.05 %	0.00 %	
Sb-125		0.03 %	0.57 %	
I-129		0.04 %	0.01 %	
Cs-134		2.62 %	0.63 %	
Cs-137		24.20 %	3.56 %	
Ce-144/Pr-144		0.13 %	0.00 %	
Pu-241		0.11 %	0.14 %	
3. Number of Shipments		12	5	
a. Type of Container Used	LSA	12	5	
	Type A	0	0	
	Type B	0	0	
	Large Quantity	0	0	
b. Solidification Agent Used	Cement	0	0	
	Urea Formaldehyde	0	0	
	None	12	5	
c. Mode of Transport	Truck	12	5	
	Rail	0	0	
	Other	0	0	
d. Final Destination	Oak Ridge, TN	12	5	
	Wampum, PA	0	0	
e. Waste Class per 10 CFR Part 61	Class A	12	5	
	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.

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Table 3C

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

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

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

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

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Table 4

Lower Limits Of Detectability (LLD)

Nuclide	RWDA-G 1000 cc Gas Grab Sample (3) Calculated LLD (uCi/cc)	RWDA-G 1000 cc Gas Grab Sample ODCM Required LLD (uCi/cc)	RWDA-L 1000 ml Liquid Grab Sample (3) Calculated LLD (uCi/ml)	RWDA-L 1000 ml Liquid Grab Sample ODCM Required LLD (uCi/ml)	Filter Paper / Charcoal Continuous Effluent Sample (3) Calculated (2) LLD (uCi/cc)	Filter Paper / Charcoal Continuous Effluent Sample ODCM Required LLD (uCi/cc)
H-3	(4) 1.00E-06	1E-06	1.00E-06	1E-05	—	—
Na-24	2.64E-08	1E-04	6.20E-09	5E-07	2.16E-13	1E-11
Ar-41	1.09E-07	1E-04	2.66E-08	5E-07	—	—
Cr-51	5.88E-07	1E-04	1.67E-07	5E-07	8.71E-13	1E-11
Mn-54	5.02E-08	1E-04	1.26E-08	5E-07	1.63E-13	1E-11
Fe-55	—	—	(1) 1.00E-06	1E-06	—	—
Fe-59	2.60E-07	1E-04	4.94E-08	5E-07	3.78E-13	1E-11
Co-57	3.90E-08	1E-04	1.39E-08	5E-07	5.72E-14	1E-11
Co-58	9.80E-08	1E-04	2.46E-08	5E-07	1.59E-13	1E-11
Co-60	6.95E-08	1E-04	1.71E-08	5E-07	1.88E-13	1E-11
Zn-65	2.30E-07	1E-04	5.68E-08	5E-07	2.18E-13	1E-11
Kr-85	2.97E-05	1E-04	7.62E-06	1E-05	—	—
Kr-85m	5.68E-08	1E-04	1.69E-08	1E-05	—	—
Kr-87	1.13E-07	1E-04	3.08E-08	1E-05	—	—
Kr-88	1.76E-07	1E-04	5.47E-08	1E-05	—	—
Sr-89	—	—	(1) 5.00E-08	5E-08	(1) 1.00E-13	1E-11
Sr-90	—	—	(1) 5.00E-08	5E-08	(1) 1.00E-14	1E-11
Sr-92	1.28E-07	1E-04	3.11E-08	5E-07	2.42E-13	1E-11
Nb-95	1.30E-07	1E-04	3.29E-08	5E-07	1.22E-13	1E-11
Nb-97	8.02E-08	1E-04	2.05E-08	5E-07	1.08E-13	1E-11
Zr-95	1.42E-07	1E-04	3.60E-08	5E-07	1.64E-13	1E-11
Mo-99	4.69E-08	1E-04	1.59E-08	5E-07	4.73E-14	1E-11
Tc-99m	4.57E-08	1E-04	1.55E-08	5E-07	4.61E-14	1E-11
Ag-110m	8.34E-08	1E-04	2.13E-08	5E-07	1.10E-13	1E-11
Sb-124	3.66E-08	1E-04	9.46E-09	5E-07	1.18E-13	1E-11
Sb-126	2.64E-07	1E-04	7.12E-08	5E-07	1.55E-13	1E-11
I-131	6.12E-08	1E-04	1.70E-08	1E-06	1.05E-13	1E-12
I-133	8.84E-08	1E-04	2.32E-08	5E-07	8.93E-14	1E-10
I-135	2.60E-07	1E-04	6.37E-08	5E-07	1.64E-13	1E-11
Xe-131m	2.28E-06	1E-04	7.44E-07	1E-05	—	—
Xe-133	1.25E-07	1E-04	5.30E-08	1E-05	—	—
Xe-133m	4.77E-07	1E-04	1.44E-07	1E-05	—	—
Xe-135	6.65E-08	1E-04	1.60E-08	1E-05	—	—
Xe-135m	8.64E-08	1E-04	2.24E-08	1E-05	—	—
Xe-137	2.64E-07	1E-04	6.61E-08	1E-05	—	—
Xe-138	1.68E-07	1E-04	4.97E-08	1E-05	—	—
Cs-134	3.69E-08	1E-04	9.52E-09	5E-07	1.54E-13	1E-11
Cs-137	9.30E-08	1E-04	2.38E-08	5E-07	1.51E-13	1E-11
Ba-139	2.16E-07	1E-04	7.03E-08	5E-07	2.76E-13	1E-11
Ba-140	2.53E-07	1E-04	6.63E-08	5E-07	6.28E-13	1E-11
La-140	1.38E-07	1E-04	3.34E-08	5E-07	1.65E-13	1E-11
Ce-141	6.88E-08	1E-04	2.32E-08	5E-07	1.10E-13	1E-11
Ce-144	3.61E-07	1E-04	1.31E-07	5E-07	5.35E-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 11/21/05. 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

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Table 5A

Assessment Of Radiation Doses

		Unit 1 Liquid Effluents									
		1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Calendar Year	
	Batch Releases	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit
	Bone	7.13E-03	0.1426	2.88E-03	0.0576	1.27E-03	0.0254	2.91E-03	0.0582	1.42E-02	0.1419
O	Liver	2.93E-02	0.5860	2.23E-02	0.4460	4.39E-03	0.0878	5.97E-03	0.1194	6.20E-02	0.6196
R	Total Body	1.82E-02	1.2133	1.81E-02	1.2067	3.39E-03	0.2260	4.12E-03	0.2747	4.38E-02	1.4603
G	Thyroid	8.37E-03	0.1674	1.42E-02	0.2840	2.47E-03	0.0494	1.35E-03	0.0270	2.64E-02	0.2639
A	Kidney	2.17E-02	0.4340	1.92E-02	0.3840	3.14E-03	0.0628	3.27E-03	0.0654	4.73E-02	0.4731
N	Lung	8.67E-03	0.1734	1.44E-02	0.2880	2.78E-03	0.0556	1.82E-03	0.0364	2.77E-02	0.2767
(1)	GI-LLI	2.67E-02	0.5340	2.44E-02	0.4880	4.64E-03	0.0928	4.00E-03	0.0800	5.97E-02	0.5974

		Unit 1 Gaseous Effluents									
		1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Calendar Year	
	Batch & Continuous Releases	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit
(2)	Gamma Air	1.22E-09	0.0000	1.09E-06	0.0000	0.00E+00	0.0000	0.00E+00	0.0000	1.09E-06	0.0000
(2)	Beta Air	7.09E-10	0.0000	1.40E-08	0.0000	0.00E+00	0.0000	0.00E+00	0.0000	1.47E-08	0.0000
	Bone	0.00E+00	0.0000	0.00E+00	0.0000	0.00E+00	0.0000	0.00E+00	0.0000	0.00E+00	0.0000
O	Liver	1.22E-01	1.6267	1.38E-01	1.8400	9.94E-02	1.3253	8.32E-02	1.1093	4.43E-01	2.9507
R	Total Body	1.22E-01	1.6267	1.38E-01	1.8400	9.94E-02	1.3253	8.32E-02	1.1093	4.43E-01	2.9507
G	Thyroid	1.22E-01	1.6267	1.38E-01	1.8400	9.94E-02	1.3253	8.32E-02	1.1093	4.43E-01	2.9507
A	Kidney	1.22E-01	1.6267	1.38E-01	1.8400	9.94E-02	1.3253	8.32E-02	1.1093	4.43E-01	2.9507
N	Lung	1.22E-01	1.6267	1.38E-01	1.8400	9.94E-02	1.3253	8.32E-02	1.1093	4.43E-01	2.9507
(3)	GI-LLI	1.22E-01	1.6267	1.38E-01	1.8400	9.94E-02	1.3253	8.32E-02	1.1093	4.43E-01	2.9507

(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).

Beaver Valley Power Station - Unit 2

Annual Radioactive Effluent Release Report

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Table 5B

Assessment Of Radiation Doses

		Unit 2 Liquid Effluents									
		1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Calendar Year	
	Batch Releases	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit
	Bone	7.13E-03	0.1426	2.88E-03	0.0576	1.27E-03	0.0254	2.91E-03	0.0582	1.42E-02	0.1419
O	Liver	2.93E-02	0.5860	2.23E-02	0.4460	4.39E-03	0.0878	5.97E-03	0.1194	6.20E-02	0.6196
R	Total Body	1.82E-02	1.2133	1.81E-02	1.2067	3.39E-03	0.2260	4.12E-03	0.2747	4.38E-02	1.4603
G	Thyroid	8.37E-03	0.1674	1.42E-02	0.2840	2.47E-03	0.0494	1.35E-03	0.0270	2.64E-02	0.2639
A	Kidney	2.17E-02	0.4340	1.92E-02	0.3840	3.14E-03	0.0628	3.27E-03	0.0654	4.73E-02	0.4731
N	Lung	8.67E-03	0.1734	1.44E-02	0.2880	2.78E-03	0.0556	1.82E-03	0.0364	2.77E-02	0.2767
(1)	GI-LLI	2.67E-02	0.5340	2.44E-02	0.4880	4.64E-03	0.0928	4.00E-03	0.0800	5.97E-02	0.5974

		Unit 2 Gaseous Effluents									
		1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Calendar Year	
	Batch & Continuous Releases	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit	Dose	% of ODCM Limit
(2)	Gamma Air	1.22E-09	0.0000	2.53E-05	0.0005	0.00E+00	0.0000	0.00E+00	0.0000	2.53E-05	0.0003
(2)	Beta Air	7.09E-10	0.0000	7.26E-05	0.0007	0.00E+00	0.0000	0.00E+00	0.0000	7.26E-05	0.0004
	Bone	0.00E+00	0.0000	1.74E-04	0.0023	0.00E+00	0.0000	0.00E+00	0.0000	1.74E-04	0.0012
O	Liver	5.63E-03	0.0751	3.11E-02	0.4147	3.54E-02	0.4720	8.97E-03	0.1196	8.11E-02	0.5407
R	Total Body	5.63E-03	0.0751	3.11E-02	0.4147	3.54E-02	0.4720	8.97E-03	0.1196	8.11E-02	0.5407
G	Thyroid	5.63E-03	0.0751	3.11E-02	0.4147	3.54E-02	0.4720	8.97E-03	0.1196	8.11E-02	0.5407
A	Kidney	5.63E-03	0.0751	3.11E-02	0.4147	3.54E-02	0.4720	8.97E-03	0.1196	8.11E-02	0.5407
N	Lung	5.63E-03	0.0751	3.12E-02	0.4160	3.54E-02	0.4720	8.97E-03	0.1196	8.12E-02	0.5413
(3)	GI-LLI	5.63E-03	0.0751	3.11E-02	0.4147	3.54E-02	0.4720	8.97E-03	0.1196	8.11E-02	0.5407

(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).

Beaver Valley Power Station - Units 1 & 2

Annual Radioactive Effluent Release Report

Calendar Year - 2005

Table 6

Effluent Monitoring Instrumentation Channels Not Returned To Operable Status Within 30 Days
All Effluent Monitoring Instrumentation Channels (as required by procedure 1/2-ODC-3.03 of the Offsite Dose Calculation Manual) were returned to Operable Status within 30 days during this report period.

Annual Radioactive Effluent Release Report

Table 7
Total Dose Commitments, Total Effective Dose Equivalents and Population Doses

Total Dose Commitment From All Facility Releases To Members of the Public 40 CFR 190.10(a) Environmental Doses				
Organ	(1) Effluent Dose (mrem)	(2) Direct Radiation Dose (mrem)	Total Dose (mrem)	% of ODCM or 40 CFR 190 Limit
Bone	2.86E-02	5.00E-01	5.29E-01	2.11%
Liver	5.38E-01	5.00E-01	1.04E+00	4.15%
Total Body	5.02E-01	5.00E-01	1.00E+00	4.01%
Thyroid	4.67E-01	5.00E-01	9.67E-01	1.29%
Kidney	5.09E-01	5.00E-01	1.01E+00	4.04%
Lung	4.69E-01	5.00E-01	9.69E-01	3.88%
GI-LLI	5.33E-01	5.00E-01	1.03E+00	4.13%

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

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

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

Pursuant to 10 CFR 20.1301(a)(1), the Total Effective Dose Equivalent from licensed operation to the maximum individual during the report period, is 3.85 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 =	1238	man-mrem (Total Body)
0-50 mile Average Individual Dose from liquid and gaseous effluents =	0.0003096	mrem (Total Body)

Beaver Valley Power Station - Units 1 & 2

Annual Radioactive Effluent Release Report

Calendar Year - 2005

Table 8

Offsite Dose Calculation Manual Surveillance Deficiencies

There were no ODCM related Surveillances Deficiencies

(as required by procedure 1/2-ODC-3.03 of the Offsite Dose Calculation Manual)

during this report period.

This is regarding all required ODCM Surveillances associated with

monitoring, sampling & analysis and offsite dose projection.

Annual Radioactive Effluent Release Report

Calendar Year - 2005

Table 9

Unit 1 and 2 Offsite Dose Calculation Manual Changes (Description)
There were no changes made to the Unit 1 and 2 Offsite Dose Calculation Manual during this report period.

Beaver Valley Power Station - Units 1 & 2

Annual Radioactive Effluent Release Report

Calendar Year - 2005
Attachment 1
Joint Frequency Distribution Tables

Attachment 1
An annual summary of hourly meteorological data, in the form of joint frequency distribution, is provided for the calendar year as specified in the ODCM.

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 Gaseous Releases for the calendar year were determined to be within design objectives. where as, the ODCM Dose and 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 Mr. Anthony T. Lonnett at 724-682-7523.

Beaver Valley Power Station – Units 1 & 2

Annual Radioactive Effluent Release Report

Calendar Year – 2005

Attachment 1

Part 1: Joint Frequency Distribution Tables (35ft)

□PROGRAM: MIDJF VERSION: 5.5 PAGE 1 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:11

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SP 35P DIRECTION:DI 35P LAPSE:DT150-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	14	32	1	0	0	0	47
NNE	19	16	0	0	0	0	35
NE	22	21	0	0	0	0	43
ENE	17	48	1	0	0	0	66
E	15	20	0	0	0	0	35
ESE	18	22	1	0	0	0	41
SE	17	12	0	0	0	0	29
SSE	7	16	0	0	0	0	23
S	7	19	0	0	0	0	26
SSW	9	49	0	0	0	0	58
SW	10	28	12	0	0	0	50
WSW	7	53	14	0	0	0	74
W	9	85	9	0	0	0	103
WNW	13	60	8	0	0	0	81
NW	18	35	6	0	0	0	59
NNW	16	35	2	0	0	0	53
TOTAL	218	551	54	0	0	0	823

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 2 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:11

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SP 35P DIRECTION:DI 35P LAPSE:DT150-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	6	6	0	0	0	0	12
NNE	8	6	0	0	0	0	14
NE	4	4	0	0	0	0	8
ENE	3	2	0	0	0	0	5
E	6	5	0	0	0	0	11
ESE	3	1	0	0	0	0	4
SE	3	0	0	0	0	0	3
SSE	3	1	0	0	0	0	4
S	1	5	0	0	0	0	6
SSW	0	11	1	0	0	0	12
SW	5	11	5	0	0	0	21
WSW	2	14	3	1	0	0	20
W	7	26	4	0	0	0	37
WNW	4	18	0	0	0	0	22
NW	5	7	2	0	0	0	14
NNW	6	8	0	0	0	0	14
TOTAL	66	125	15	1	0	0	207

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

Beaver Valley Power Station – Units 1 & 2

Annual Radioactive Effluent Release Report

Calendar Year – 2005

Attachment 1

Part 1: Joint Frequency Distribution Tables (35ft)

□PROGRAM: MIDJF VERSION: 5.5 PAGE 3 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:11

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SP 35P DIRECTION:DI 35P LAPSE:DT150-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	7	9	1	0	0	0	17
NNE	7	4	0	0	0	0	11
NE	11	4	0	0	0	0	15
ENE	5	3	0	0	0	0	8
E	5	1	0	0	0	0	6
ESE	1	0	0	0	0	0	1
SE	3	3	0	0	0	0	6
SSE	4	2	0	0	0	0	6
S	1	4	1	0	0	0	6
SSW	1	12	1	0	0	0	14
SW	2	16	7	0	0	0	25
WSW	3	20	6	0	0	0	29
W	7	23	11	0	0	0	41
WNW	7	16	3	0	0	0	26
NW	7	9	1	0	0	0	17
NNW	7	13	1	0	0	0	21
TOTAL	78	139	32	0	0	0	249

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 4 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:11

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SP 35P DIRECTION:DI 35P LAPSE:DT150-

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	83	97	0	0	0	0	180
NNE	99	31	0	0	0	0	130
NE	131	16	0	0	0	0	147
ENE	96	44	0	0	0	0	140
E	50	11	0	0	0	0	61
ESE	35	1	0	0	0	0	36
SE	39	1	0	0	0	0	40
SSE	29	21	0	0	0	0	50
S	29	31	1	0	0	0	61
SSW	47	66	12	1	0	0	126
SW	58	177	106	9	0	0	350
WSW	73	233	95	9	0	0	410
W	71	314	85	0	0	0	470
WNW	78	215	21	0	0	0	314
NW	95	212	14	0	0	0	321
NNW	92	121	6	0	0	0	219
TOTAL	1105	1591	340	19	0	0	3055

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 5 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:11

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SP 35P DIRECTION:DI 35P LAPSE:DT150-

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	90	14	0	0	0	0	104
NNE	104	4	0	0	0	0	108
NE	161	11	0	0	0	0	172
ENE	197	66	0	0	0	0	263
E	191	20	0	0	0	0	211
ESE	147	4	0	0	0	0	151
SE	138	3	0	0	0	0	141
SSE	95	14	0	0	0	0	109
S	158	29	4	0	0	0	191
SSW	139	79	12	0	0	0	230
SW	87	98	35	3	0	0	223
WSW	65	59	26	0	0	0	150
W	56	54	16	0	0	0	126
WNW	66	29	5	0	0	0	100
NW	77	45	1	0	0	0	123
NNW	74	22	1	0	0	0	97
TOTAL	1845	551	100	3	0	0	2499

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 6 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:11

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SP 35P DIRECTION:DI 35P LAPSE:DT150-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	10	1	0	0	0	0	11
NNE	15	2	0	0	0	0	17
NE	34	0	0	0	0	0	34
ENE	37	0	0	0	0	0	37
E	127	0	0	0	0	0	127
ESE	238	0	0	0	0	0	238
SE	260	0	0	0	0	0	261
SSE	194	2	0	0	0	0	197
S	120	4	0	0	0	0	124
SSW	58	15	0	0	0	0	73
SW	34	7	4	0	0	0	45
WSW	16	3	0	0	0	0	19
W	6	0	0	0	0	0	6
WNW	7	0	0	0	0	0	7
NW	18	0	0	0	0	0	18
NNW	7	1	0	0	0	0	8
TOTAL	1181	35	4	0	0	0	1222

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 7 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:11

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SP 35P DIRECTION:DI 35P LAPSE:DT150-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	5	2	0	0	0	0	7
NNE	9	2	0	0	0	0	11
NE	18	0	0	0	0	0	18
ENE	20	0	0	0	0	0	20
E	40	0	0	0	0	0	40
ESE	140	0	0	0	0	0	140
SE	167	0	0	0	0	0	167
SSE	108	0	0	0	0	0	108
S	62	3	0	0	0	0	65
SSW	27	2	0	0	0	0	29
SW	21	0	0	0	0	0	21
WSW	8	0	0	0	0	0	8
W	6	1	0	0	0	0	7
WNW	0	0	0	0	0	0	0
NW	9	0	0	0	0	0	9
NNW	5	0	0	0	0	0	5
TOTAL	645	10	0	0	0	0	655

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 8 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:11

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SP 35P DIRECTION:DI 35P LAPSE:DT150-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	215	161	2	0	0	0	378
NNE	261	65	0	0	0	0	326
NE	381	56	0	0	0	0	437
ENE	375	163	1	0	0	0	539
E	434	57	0	0	0	0	491
ESE	582	28	1	0	0	0	611
SE	627	19	0	0	0	0	647
SSE	440	56	0	0	0	0	497
S	378	95	6	0	0	0	479
SSW	281	234	26	1	0	0	542
SW	217	337	169	12	0	0	735
WSW	174	382	144	10	0	0	710
W	162	503	125	0	0	0	790
WNW	175	338	37	0	0	0	550
NW	229	308	24	0	0	0	561
NNW	207	200	10	0	0	0	417
TOTAL	5138	3002	545	23	0	0	8710

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 1 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:12

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SP150P DIRECTION:DI150P LAPSE:DT150-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	28	18	1	0	0	48
NNE	4	35	13	2	0	0	54
NE	0	17	11	0	0	0	28
ENE	0	23	36	5	0	0	64
E	0	35	16	2	0	0	53
ESE	1	27	11	0	0	0	39
SE	0	30	18	0	0	0	48
SSE	0	18	20	3	0	0	41
S	1	13	29	0	0	0	43
SSW	4	11	15	0	0	0	30
SW	1	15	9	3	0	0	28
WSW	2	17	19	6	0	0	44
W	0	42	58	15	1	0	116
WNW	6	29	49	26	1	0	111
NW	5	12	13	5	0	0	35
NNW	8	18	12	2	1	0	41
TOTAL	33	370	347	70	3	0	823

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 2 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:12

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SP150P DIRECTION:DI150P LAPSE:DT150-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	7	5	0	0	0	13
NNE	1	8	5	0	0	0	14
NE	2	5	1	0	0	0	8
ENE	0	3	1	0	0	0	4
E	1	10	4	0	0	0	15
ESE	0	4	2	0	0	0	6
SE	0	5	1	0	0	0	6
SSE	0	4	0	0	0	0	4
S	1	2	8	0	0	0	11
SSW	0	4	6	0	0	0	10
SW	2	2	6	0	0	0	10
WSW	3	3	7	2	0	0	15
W	1	20	9	6	1	0	37
WNW	0	16	12	3	0	0	31
NW	0	9	4	2	0	0	15
NNW	2	4	2	0	0	0	8
TOTAL	14	106	73	13	1	0	207

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 3 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:12

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SP150P DIRECTION:DI150P LAPSE:DT150-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	8	5	1	0	0	16
NNE	2	10	6	1	0	0	19
NE	1	6	1	0	0	0	8
ENE	0	11	4	0	0	0	15
E	0	4	4	0	0	0	8
ESE	0	3	0	0	0	0	3
SE	1	3	2	0	0	0	6
SSE	0	8	1	0	0	0	9
S	1	11	3	1	0	0	16
SSW	0	3	5	0	0	0	8
SW	1	6	5	1	0	0	13
WSW	3	7	10	4	0	0	24
W	4	10	17	16	1	0	48
WNW	3	8	11	11	0	0	33
NW	3	1	5	0	0	0	9
NNW	4	6	4	0	0	0	14
TOTAL	25	105	83	35	1	0	249

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 4 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:12

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SP150P DIRECTION:DI150P LAPSE:DT150-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	33	93	60	3	0	0	189
NNE	40	84	35	2	0	0	161
NE	27	59	7	0	0	0	93
ENE	20	100	43	2	0	0	165
E	11	42	18	0	0	0	71
ESE	10	25	6	0	0	0	41
SE	8	27	5	0	0	0	40
SSE	6	35	14	0	0	0	55
S	13	40	40	0	1	0	94
SSW	15	43	40	3	2	0	103
SW	16	45	128	24	2	0	215
WSW	30	73	111	40	3	0	257
W	42	128	286	167	26	2	651
WNW	32	119	225	74	7	0	457
NW	35	123	100	9	0	0	267
NNW	41	107	45	3	0	0	196
TOTAL	379	1143	1163	327	41	2	3055

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 5 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:12

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SP150P DIRECTION:DI150P LAPSE:DT150-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	68	40	7	0	0	0	115
NNE	94	35	9	0	0	0	138
NE	121	78	4	0	0	0	203
ENE	104	191	108	5	0	0	408
E	54	73	22	0	0	0	149
ESE	35	38	14	0	0	0	87
SE	26	29	7	0	0	0	62
SSE	22	37	23	0	0	0	82
S	50	44	26	10	0	0	130
SSW	50	77	42	4	0	0	173
SW	56	74	83	9	0	0	222
WSW	61	57	32	20	1	0	171
W	35	79	55	28	3	0	200
WNW	24	93	56	19	1	0	193
NW	27	56	14	0	0	0	97
NNW	26	31	11	1	0	0	69
TOTAL	853	1032	513	96	5	0	2499

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 6 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:12

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SP150P DIRECTION:DI150P LAPSE:DT150-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	75	7	2	0	0	0	84
NNE	123	23	1	0	0	0	147
NE	153	64	0	0	0	0	217
ENE	66	47	9	0	0	0	122
E	36	10	0	0	0	0	46
ESE	19	5	0	0	0	0	24
SE	14	8	0	0	0	0	22
SSE	14	14	4	0	0	0	32
S	36	15	1	0	0	0	52
SSW	82	40	5	0	0	0	127
SW	95	53	12	1	0	0	161
WSW	41	31	1	0	0	0	73
W	19	12	4	0	0	0	35
WNW	16	14	0	0	0	0	30
NW	17	5	0	0	0	0	22
NNW	22	6	0	0	0	0	28
TOTAL	828	354	39	1	0	0	1222

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 7 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:12

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SP150P DIRECTION:DI150P LAPSE:DT150-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	26	3	0	0	0	0	29
NNE	43	21	0	0	0	0	64
NE	61	29	0	0	0	0	90
ENE	35	24	2	0	0	0	61
E	7	15	0	0	0	0	22
ESE	16	7	0	0	0	0	23
SE	8	6	0	0	0	0	14
SSE	6	7	1	0	0	0	14
S	15	24	3	0	0	0	42
SSW	37	45	3	0	0	0	85
SW	59	35	3	0	0	0	97
WSW	19	12	2	0	0	0	33
W	16	7	1	0	0	0	24
WNW	16	5	0	0	0	0	21
NW	11	5	0	0	0	0	16
NNW	15	5	0	0	0	0	20
TOTAL	390	250	15	0	0	0	655

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 8 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:13

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SP150P DIRECTION:DI150P LAPSE:DT150-

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	206	186	97	5	0	0	494
NNE	307	216	69	5	0	0	597
NE	365	258	24	0	0	0	647
ENE	225	399	203	12	0	0	839
E	109	189	64	2	0	0	364
ESE	81	109	33	0	0	0	223
SE	57	108	33	0	0	0	198
SSE	48	123	63	3	0	0	237
S	117	149	110	11	1	0	388
SSW	188	223	116	7	2	0	536
SW	230	230	246	38	2	0	746
WSW	159	200	182	72	4	0	617
W	117	298	430	232	32	2	1111
WNW	97	284	353	133	9	0	876
NW	98	211	136	16	0	0	461
NNW	118	177	74	6	1	0	376
TOTAL	2522	3360	2233	542	51	2	8710

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 50
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 1 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:14

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SP500P DIRECTION:DI500P LAPSE:DT500-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0	1	0	0	1
NNE	0	0	1	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	0	0	2	0	0	2
E	0	0	0	0	0	0	0
ESE	0	0	1	0	0	0	1
SE	0	0	0	1	0	0	1
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	1	0	0	0	1
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
TOTAL	0	0	3	4	0	0	7

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 315
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 2 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:14

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SP500P DIRECTION:DI500P LAPSE:DT500-

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0	0	0	0	0
NNE	0	0	4	0	0	0	4
NE	0	1	2	3	0	0	6
ENE	0	1	6	7	0	0	14
E	0	1	3	2	0	0	6
ESE	0	4	8	1	0	0	13
SE	0	0	9	0	0	0	9
SSE	0	0	2	0	0	0	2
S	0	0	2	0	0	0	2
SSW	0	0	1	0	0	0	1
SW	0	0	0	0	0	0	0
WSW	0	0	1	0	0	0	1
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	1	0	1
NNW	0	1	0	0	0	0	1
TOTAL	0	8	38	13	1	0	60

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 315
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 3 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:14

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SP500P DIRECTION:DI500P LAPSE:DT500-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	3	4	2	0	0	9
NNE	0	2	3	0	0	0	5
NE	0	3	8	1	0	0	12
ENE	0	4	8	1	0	0	13
E	0	4	4	2	0	0	10
ESE	0	6	6	0	0	0	12
SE	0	6	10	2	0	0	18
SSE	0	1	4	2	0	0	7
S	0	1	6	2	0	0	9
SSW	1	0	1	1	0	0	3
SW	0	0	0	0	0	0	0
WSW	1	0	0	0	0	0	1
W	0	3	0	2	0	0	5
WNW	0	0	1	1	1	0	3
NW	0	1	2	0	2	0	5
NNW	0	1	2	1	1	0	5
TOTAL	2	35	59	17	4	0	117

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 315
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 4 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:14

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SP500P DIRECTION:DI500P LAPSE:DT500-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	17	60	148	60	0	0	285
NNE	17	66	49	25	2	0	159
NE	27	78	26	5	0	0	136
ENE	21	63	106	48	5	0	243
E	20	81	103	40	2	0	246
ESE	19	47	85	20	2	0	173
SE	20	39	49	29	9	0	146
SSE	13	29	53	11	3	0	109
S	12	32	84	45	14	3	190
SSW	9	40	100	73	22	4	248
SW	18	54	120	188	56	8	444
WSW	27	60	128	148	30	5	398
W	18	96	236	307	151	32	840
WNW	13	75	257	270	60	19	694
NW	18	68	155	60	7	1	309
NNW	18	74	129	56	6	1	284
TOTAL	287	962	1828	1385	369	73	4904

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 315
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 5 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:14

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SP500P DIRECTION:DI500P LAPSE:DT500-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	18	15	23	12	0	0	68
NNE	28	21	9	8	0	0	66
NE	45	38	15	7	0	0	105
ENE	44	58	46	26	2	0	176
E	42	62	31	13	2	0	150
ESE	40	60	26	11	0	0	137
SE	31	55	33	21	3	0	143
SSE	24	36	19	19	2	0	100
S	25	21	39	46	14	0	145
SSW	41	22	26	38	9	0	136
SW	50	35	43	64	34	2	228
WSW	27	61	42	17	7	2	156
W	46	86	104	34	7	1	278
WNW	20	55	60	16	6	0	157
NW	32	23	24	11	0	0	90
NNW	23	16	19	5	0	0	64
TOTAL	536	664	559	348	86	5	2199

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 315
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 6 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:14

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SP500P DIRECTION:DI500P LAPSE:DT500-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	11	17	6	3	0	0	37
NNE	14	7	2	0	0	0	23
NE	18	26	8	2	0	0	54
ENE	19	40	13	3	0	0	75
E	21	53	10	0	0	0	84
ESE	31	37	7	3	0	0	78
SE	23	39	20	5	1	0	88
SSE	22	38	21	4	0	0	85
S	17	28	25	11	1	0	82
SSW	12	16	10	12	2	0	52
SW	26	33	25	22	8	1	115
WSW	29	23	5	0	0	0	57
W	32	23	17	8	0	0	80
WNW	16	29	15	0	0	0	60
NW	20	20	4	0	0	0	44
NNW	7	6	6	2	0	0	21
TOTAL	318	435	194	75	12	1	1035

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 315
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 7 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:14

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SP500P DIRECTION:DI500P LAPSE:DT500-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1	0	0	0	0	1
NNE	1	0	0	0	0	0	1
NE	0	1	0	0	0	0	1
ENE	0	1	0	0	0	0	1
E	1	4	0	0	0	0	5
ESE	3	6	1	0	0	0	10
SE	2	7	7	2	0	0	18
SSE	2	8	5	0	0	0	15
S	2	4	6	3	0	0	15
SSW	1	3	7	11	1	0	23
SW	1	12	4	6	0	0	23
WSW	1	5	0	0	0	0	6
W	1	1	0	0	0	0	2
WNW	0	1	0	0	0	0	1
NW	0	0	0	0	0	0	0
NNW	1	0	0	0	0	0	1
TOTAL	16	54	30	22	1	0	123

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 315
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

□PROGRAM: MIDJF VERSION: 5.5 PAGE 8 OF 8
SITE: BEAVER VALLEY UNIT: ONE 02/23/06 11:14

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 05010101-05123124
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SP500P DIRECTION:DI500P LAPSE:DT500-

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	46	96	181	78	0	0	401
NNE	60	96	68	33	2	0	259
NE	90	147	59	18	0	0	314
ENE	84	167	179	87	7	0	524
E	84	205	151	57	4	0	501
ESE	93	160	134	35	2	0	424
SE	76	146	128	60	13	0	423
SSE	61	112	104	36	5	0	318
S	56	86	162	107	29	3	443
SSW	64	81	146	135	34	4	464
SW	95	134	192	280	98	11	810
WSW	85	149	176	165	37	7	619
W	97	209	357	351	158	33	1205
WNW	49	160	333	287	67	19	915
NW	70	112	185	71	10	1	449
NNW	49	98	156	64	7	1	376
TOTAL	1159	2158	2711	1864	473	79	8445

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 315
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

FirstEnergy Nuclear Operating Company
FENOC

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

Annual
Radiological Environmental Operating Report
Calendar Year - 2005

EXECUTIVE SUMMARY

This document provides a detailed report of the Beaver Valley Power Station (BVPS) Radiological Environmental Monitoring Program (REMP). During the report period, samples of air, water, shoreline sediment, milk, fish, food crops, feed crops, vegetation, and direct radiation (in the vicinity of the BVPS site) have been measured, analyzed, evaluated, and summarized. The results of the REMP are intended to verify that BVPS effluent releases, performed in accordance with the BVPS Radiological Effluent Technical Specification (RETS) program, do not impact the environment with measurable concentration of radioactive materials and/or levels of radiation that are higher than expected.

Pre-operational REMP (1974 – 1975):

A pre-operational REMP program was performed during the period 1974 through 1975. At that time, samples were collected and analyzed to determine the amount of radioactivity present in the environment prior to BVPS operation. The resulting values are considered a "baseline" to which current sample analyses can be compared. A summary of the pre-operational data is summarized in Table 2-3 of this report.

Operational REMP (1976 – Present):

The operational REMP program was initiated during calendar year 1976 and continued through the report period. During the past thirty (30) years, radiation and radioactivity in the environment was monitored within a 10-mile radius of the site. A description of the operational REMP program is outlined in Table 2-1 of this report. In general, two (2) types of samples were collected during the report period, and are described as follows:

- **Control Samples:** These samples are collected from areas that are beyond measurable influence of BVPS operation, and are used as reference data. Normal background radiation levels, or radiation present due to causes other than BVPS operation, can thus be compared to the environment surrounding the BVPS site. During the report period, three-hundred-fifty-six (356) analyses were performed on samples from the control locations. In addition, eight (8) analyses were completed for TLD's at the control location. Results of the analyses from the control locations are summarized in Table 2-2 of this report.

- **Indicator Samples:** Indicator samples are collected to determine the radiological impact of BVPS operation in the environment. These samples are collected from various locations near the BVPS site. At a minimum, the samples are collected from areas where the BVPS contribution would indicate the most significant radiological impact. During the report period, one-thousand-five-hundred-ninety-four (1594) analyses were performed on samples collected from more than ninety (90) indicator locations. In addition, four-hundred-ninety-two (492) analyses were completed for TLD's at the indicator locations. Results of the analyses from the indicator locations are also summarized in Table 2-2 of this report.

Current analysis results from the indicator samples are compared to both current control sample values and the pre-operational baseline to determine if changes in radioactivity levels are attributable to station operations.

Special Report Requirements:

A Special Report shall be submitted to the Nuclear Regulatory Commission when the level of radioactivity in an environmental sampling medium exceeds the limits specified in Offsite Dose Calculation Manual (ODCM) procedure 1/2-ODC-3.03, Attachment Q Table 3.12-2.

A Special Report shall also be submitted when the results of the following calculation are ≥ 1.0. This calculation is performed when more than one radionuclide is detected in the sampling medium:

$$\frac{\text{Concentration (1)}}{\text{Limit Level (1)}} + \frac{\text{Concentration (2)}}{\text{Limit Level (2)}} + \cdots \geq 1.0$$

Summary:

Based on the analytical results of environmental samples, the reporting levels were not exceeded during the report period.

Positive results attributable to the BVPS operation were consistent with station data of authorized radioactive discharges and were within limits permitted by the NRC license and the ODCM. Other radioactivity detected was attributable to naturally occurring radionuclides, previous nuclear weapons tests, other man-made sources, and to the normal statistical fluctuation for activities near the Lower Limit of Detection (LLD).

During the report period, the radioactive effluent releases from the BVPS site did not exceed the limits identified in the BVPS Operating License Technical Specifications, and/or the ODCM.

The National Academy of Sciences 1990 BEIR Report shows that the typical dose to an individual from background (natural radiation exposure including radon) is an estimated average of 296 mrem per year. During the report period, the average individual population dose (for 4 million people) from BVPS operation was much less than <1 mrem. Therefore, the average individual population dose was not affected from BVPS operation.

Analytical results are divided into the following exposure pathways:

- **Airborne Exposure Pathway:** The airborne exposure pathway includes airborne radioiodine and airborne particulates. The results during this report period were similar to previous years. There was no notable increase in natural products and no detectable fission products or other radionuclides in the airborne particulate media during the year.

- **Direct Exposure Pathway:** This pathway measures environmental radiation doses by use of Thermo-Luminescent Dosimeters (TLDs). The results of TLD processing have indicated a stable trend and compare well with previous years.

- **Ingestion Exposure Pathway:** This pathway includes milk, fish, and food products (leafy vegetable) samples.

For milk samples, Strontium-90 (attributable to past atmospheric weapons testing, was detected at levels similar to the past five years). The gamma spectrometry analyses only indicated positive results for naturally occurring Potassium-40 at average environmental levels. No other radionuclides were identified.

The fish samples indicated below LLD levels in each of the sample analyses.

Vegetation samples indicated naturally occurring Potassium-40 at average environmental levels.

- Waterborne Exposure Pathway: This pathway includes drinking water, ground (well) water, surface (river) water, and river sediment.

  Water samples were analyzed for tritium and gamma-emitting radionuclides. Tritium was identified in some of the water samples, but the values were consistent with tritium at the control location. Gamma spectrometry analysis of water samples indicated no radionuclides above detection capabilities. Iodine-131 analysis showed several positive analyses, but the values were consistent with Iodine-131 at the upstream control location.

  Sediment samples were collected from upstream of the site, at the discharge point of BVPS liquid effluent releases, and downstream of the site. Analysis of samples indicated naturally occurring radionuclides Potassium-40, Thallium-208, Bismuth-214, Lead-210, Lead-214, Radium-226, and Actinium-228 in all results. The analyses also indicated Cesium-137, but the values were consistent with Cesium-137 at the control location. The Cesium-137 is most likely due from previous nuclear weapons tests. Cobalt-58 and Cobalt-60 were identified in some of the samples that were obtained at the shore line of the main outfall facility. This is not unusual, because the BVPS site discharges Cobalt-58 and Cobalt-60 in liquid waste effluents. However, the activity detected at this sample location is consistent with discharge data of authorized liquid effluent releases. All liquid effluent releases during the report period did not exceed the release concentration limits set forth in the ODCM.

  Other Exposure Pathways: In addition to the required samples collected from the above exposure pathways, precipitation, and feed crops were also collected. Results were consistent with previous years and no degrading trends were identified.

The BVPS operational REMP program was followed throughout the report period. The results demonstrate the adequacy of radioactive effluent control at the BVPS, and that plant operation did not adversely affect the surrounding environment.

It should be noted that the REMP program includes sampling sites in addition to the required sites set forth in the ODCM. These include five (5) air sampling sites, one (1) surface water site, three (3) ground water sites, three (3) precipitation sites, two (2) sediment sites, one (1) local large dairy, and one (1) milk animal feed site.

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SECTION 1 - INTRODUCTION

A. Scope and Objectives of the Program

The environmental program consists of environmental monitoring for radioactivity in the vicinity of the Beaver Valley Power Station. Environmental sampling and analyses included air, water, milk, vegetation, river sediments, fish, and ambient radiation levels in areas surrounding the site. The results of these media are assessed to determine impacts of the plant operation on the environment. The Annual Radiological Environmental Report for the Beaver Valley Power Station summarizes the radiological environmental monitoring program conducted by the FirstEnergy Nuclear Operating Company during the report period.

B. Description of the Beaver Valley Site

The Beaver Valley Power Station is located on the south bank of the Ohio River in the Borough of Shippingport, Beaver County, Pennsylvania, on a 501 acre tract of land. The site is approximately one mile from Midland, Pennsylvania; five miles from East Liverpool, Ohio; and twenty-five miles from Pittsburgh, Pennsylvania. Figure 1-1 shows the site location in relation to the principal population centers. Population density in the immediate vicinity of the site is relatively low. The population within a five mile radius of the plant is approximately 15,493 and the only area within the radius of concentrated population is the Borough of Midland, Pennsylvania, with a population of approximately 3,321.

The site lies in a valley along the Ohio River. It extends from the river (elevation 665 feet above sea level) to a ridge along the border south of the Beaver Valley Power Station at an elevation of 1,078 feet. Plant grade level is approximately 735 feet above sea level.

The Beaver Valley Power Station is on the Ohio River at river mile 34.8, at a location on the New Cumberland Pool that is 3.3 river miles downstream from Montgomery Lock and Dam, and 19.4 miles upstream from New Cumberland Lock and Dam. The Pennsylvania-Ohio-West Virginia border is located 5.2 river miles downstream from the site. The river flow is regulated by a series of dams and reservoirs on the Beaver, Allegheny, Monongahela and Ohio Rivers and their tributaries. During the report period, the flow ranged from 7,900 cubic feet per second (minimum monthly average) to 131,400 cubic feet per second (maximum monthly average). The mean flow during the report period was 41,142 cubic feet per second).

Water temperature of the Ohio River typically varies from 34° Fahrenheit to 75° Fahrenheit. The minimum temperatures occur in January and/or February and maximum temperatures in July and/or August. Water quality in the Ohio River at the site location is affected primarily by the water quality of the Allegheny, Monongahela and Beaver rivers.

The climate of the area may be classified as humid continental. Total annual precipitation during the report period was 53.02 inches. Yearly temperatures varied from a low of 1.9° Fahrenheit to a high of 87.6° Fahrenheit with an annual average temperature of 51.2° Fahrenheit. The predominant wind direction is typically from the southwest in summer and from the west southwest in winter.

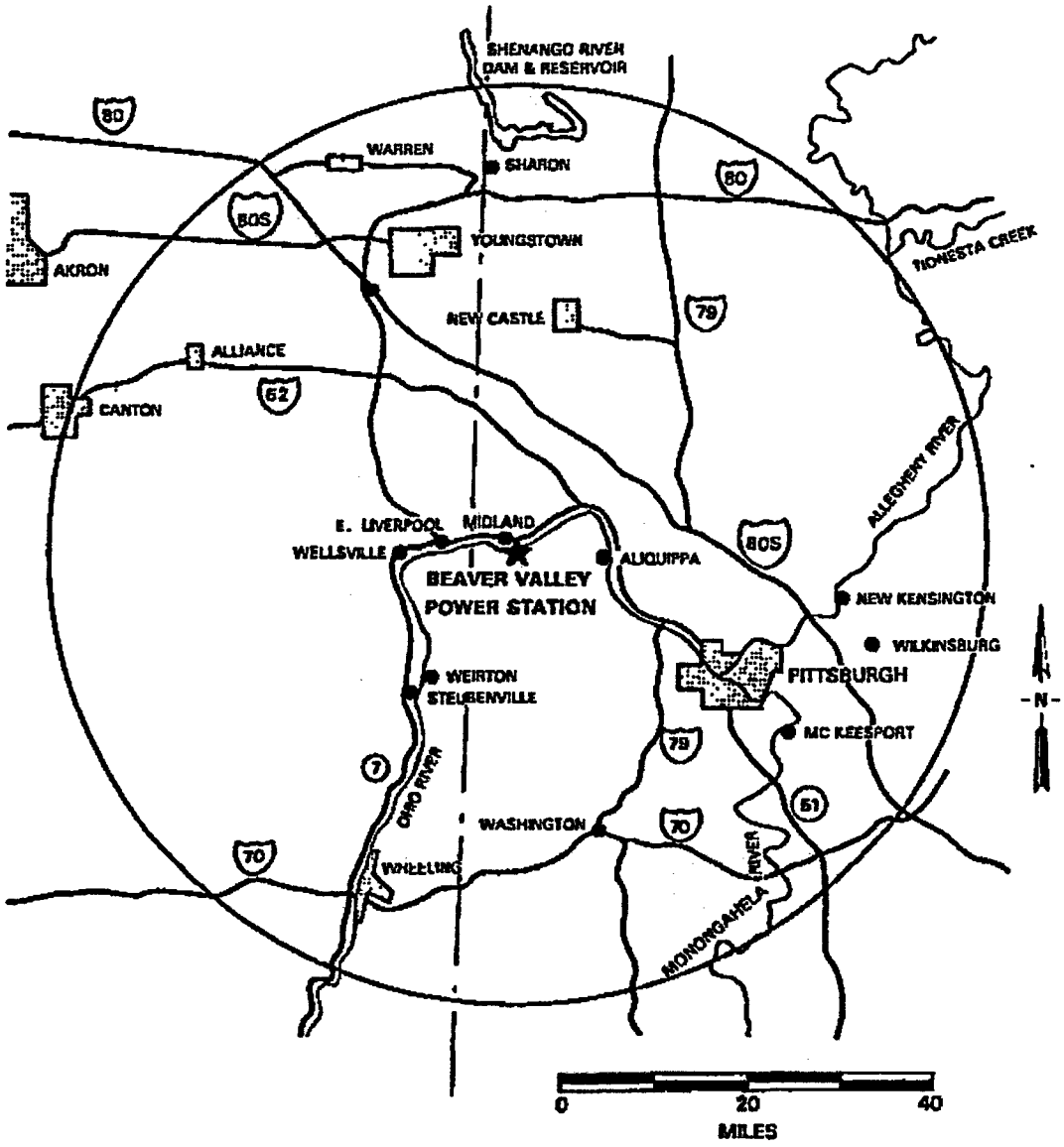
The basic features of the Beaver Valley Power Station Units 1 and 2 are tabulated below:

	Beaver Valley Unit 1	Beaver Valley Unit 2
Licensed Power Level	2685 – megawatts thermal	2685 – megawatts thermal
Type of Power	PWR	PWR
No. of Reactor Coolant Loops	3	3
No. of Steam Generators & Type	3 - Vertical	3 - Vertical
Steam Used by Main Turbine	Saturated	Saturated

The units utilize two separate systems (primary and secondary) for transferring heat from the source (the reactor) to the receiving component (turbine-generator). Because the two systems are isolated from each other, primary and secondary waters do not mix; therefore, radioactivity in the primary system water is normally isolated from the secondary system. Reactor coolant in the primary system is pumped through the reactor core and steam generators by means of reactor coolant pumps. Heat is given up from the primary system to the secondary system in the steam generators, where steam is formed and delivered to the main unit turbine, which drives the electrical generator. The steam is condensed after passing through the turbine, and returned to the steam generators to begin another steam/water cycle.

Figure 1-1

Geographical Map and Principal Communities in 50-mile Radius of the Beaver Valley Power Station



SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

A. Environmental Radioactivity Monitoring Program

1. Program Description

The program consists of monitoring water, air, soil, river bottoms, vegetation and food crops, cows milk, ambient radiation levels in areas surrounding the site, and aquatic life as summarized in Table 2-1. Further description of each portion of the program (Sampling Methods, Sample Analysis, Discussion and Results) are included in Sections 2-B through 2-I of this report.

2-B - Air Monitoring

2-C - Monitoring of Sediments and Soils

2-D - Monitoring of Feed Crops and Food Products

2-E - Monitoring of Local Cow and Goat Milk

2-F - Environmental Radiation Monitoring

2-G - Monitoring of Fish

2-H - Monitoring of Surface Water, Drinking Water, Ground Water and Precipitation

2-I - Estimates of Radiation Dose to Man

Table 2-1

Operational Radiological Environmental Monitoring Program

Section	Type of Sample	Sample Point	Sample Point Description	Sample Frequency	Sample Preparation / Analysis Frequency	Analysis
1	Air Particulate & Radionuclide	13	Hookstown, PA (Old Meyer Farm)	Continuous Sampling with Sample Collection at least weekly	Weekly - Air Particulate Weekly – Charcoal Quarterly Composite (c)	Gross Beta (b) Iodine-131 Gamma Scan
		27	Aliquippa, PA (Brunton Farm)			
		28	Sherman Farm			
		29B	Beaver, Pa (Friendship Ridge)			
		30	Shippingport, PA (Cook's Ferry Substation)			
		32	Midland, PA (North Substation)			
		46.1	Industry, PA (McKeel's Service - Rt. 68)			
		47	East Liverpool, OH (Water Department)			
		48	Weirton, WV (Water Tower - Collier Way)			
		51	Aliquippa, PA (Sheffield Substation)			
2	Direct Radiation	10	Shippingport, PA (Post Office)	Continuous (TLD)	Quarterly (l)	Gamma Dose
		13	Hookstown, PA (Old Meyer Farm)			
		14	Hookstown, PA			
		15	Georgetown, PA (Post Office)			
		27	Aliquippa, PA (Brunton Farm)			
		28	Sherman Farm			
		29B	Beaver, PA (Friendship Ridge)			
		30	Shippingport, PA (Cook's Ferry Substation)			
		32	Midland, PA (North Substation)			
		33-44	BVPS Site Perimeter Locations			
		45	Raccoon Township, PA (Christian House Baptist Chapel - Rt. 18)			
		45.1	Raccoon Township, PA (Kennedy's Corner)			
		46	Industry, PA (Midway Drive)			
		46.1	Industry, PA (McKeel's Service - Rt. 68)			
		47	East Liverpool, OH (Water Department)			
		48	Weirton, WV (Water Tower - Collier Way)			
		51	Aliquippa, PA (Sheffield Substation)			
		52-55	BVPS Site Perimeter Locations			
		59	236 Green Hill Road			
		60	Georgetown, PA (444 Hill Road)			
		70	Industry, PA (236 Engle Road)			
		71	Brighton Township, PA (First Western Bank)			
		72	Ohioview, PA (Luthern Church – Rear)			
		73	618 Squirrel Run Road			
		74	Monaca, PA (37 Poplar Avenue – CCBC)			
		75	Aliquippa, PA (117 Holt Road)			
		76	Raccoon Township, PA (Elementary School)			
		77	Aliquippa, PA (3614 Green Garden Road)			
		78	Raccoon Township, PA (Municipal Building)			
		79	106 Rt. 151 - Ted McWilliams Auto Body			
		80	Raccoon Township, PA (Park Office -Rt. 18)			
		81	Millcreek United Presby, Church			
		82	2697 Rt. 18			
		83	735 Mill Creek Road			
		84	Hancock County, WV (Senior Center)			
		85	2048 Rt. 30			
		86	East Liverpool, OH (1090 Ohio Avenue)			
		87	50103 Calcutta Smith's Ferry Road			
		88	Midland, PA (110 Summit Road)			
		89	Ohioville, PA (488 Smith Ferry Road)			
		90	Midland, PA (6286 Tuscarawras Road)			
		91	Pine Grove Road & Doyle Road			
		92	Georgetown, PA (Georgetown Road Substation)			
		93	104 Linden - Sunrise Hills			
		94	Hookstown, PA (832 McCLeary Road)			
		95	Hookstown, PA (McCleary & Pole Cat Hollow Roads)			
		111-112	BVPS Site Perimeter Locations			

Beaver Valley Power Station
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Table 2-1

Operational Radiological Environmental Monitoring Program

Section	Type of Sample	Sample Point	Sample Point Description	Sample Frequency	Sample Preparation / Analysis Frequency	Analysis
3	Surface Water	49 (a)	Industry, PA (Upstream of Montgomery Dam)	Weekly Grab Sample (h)	Weekly Sample from Site49 only	Iodine-131
		2.1	Midland, PA (ATI Allegheny Ludlam)	Weekly Intermittent Composite Sample (h)	Monthly Composite of Weekly Sample (c)	Gamma Scan
		5	East Liverpool, OH (Water Department)	Daily Grab Sample Collected Weekly (h)	Quarterly Composite (c)	Tritium (H-3)
4	Groundwater	11	Shippingport, PA (Upstream)	Semi-Annual	Semi-Annual	Gamma Scan Tritium (H-3)
		14a	Hookstown, PA (Downstream)			
		15b	Georgetown, PA (Downstream)			
5	Drinking Water	4	Midland, PA (Water Department)	Intermittent (d) Sample Collected Weekly	Weekly Composite of Daily sample (d)	Iodine-131
		5	East Liverpool, OH (Water Department)		Monthly Composite (d)	Gamma Scan
					Quarterly Composite (d)	Tritium (H-3)
6	Shoreline Sediment	2A	BVPS Outfall Vicinity	Semi-Annual	Semi-Annual	Gamma Scan
		49a (a)	Industry, PA (Upstream of Montgomery Dam)			
		50	New Cumberland, WV (Upstream of Dam)			
7	Milk	25	Hookstown, PA (Searight Farm)	Weekly (e)	Weekly Samples from Searight only	Weekly Iodine-131 from Searight only
		27 (k)	Aliquippa, PA (Brunton Farm)	Biweekly (f) When animals are on pasture; monthly at other times	All other samples & analyses are Biweekly during grazing, but Monthly during other times	Gamma Scan Iodine-131 Strontium-89 Strontium-90
		69 (k)	Aliquippa, PA (Collins Farm)			
		96 (a)	Burgettstown, PA (Windshelmer Farm)			
		113 (k)	Hookstown, PA (Halstead Farm)			
		114 (k)	Hookstown, PA (Moore Farm)			
8	Fish	2A	BVPS Outfall Vicinity	Semi-Annual	Composite of edible parts by species (g)	Gamma Scan on edible parts
		49a	Industry, PA (Upstream of Montgomery Dam)			
9	Food Products	10a	Shippingport, PA	Annual at Harvest If available	Composite of each sample species	Gamma Scan Iodine-131 on green leafy vegetables
		15a	Georgetown, PA			
		46a	Industry, PA			
		48a	Weirton, WV			
10	Feedstuff & Summer Forage	25	Hookstown, PA (Searight Farm)	Monthly	Monthly	Gamma Scan
11	Soil	13	Hookstown, PA (Old Meyer Farm)	Every Three (3) Years (1997, 2000, 2003)	12 Core Samples 3" Deep (2" diameter at each location approx. 10' radius)	Gamma Scan
		22	South of BVPS, Transmission Lines			
		27	Aliquippa, PA (Brunton Farm)			
		29A	Beaver, PA (Nicol Farm)			
		30a	Shippingport, PA (Cook's Ferry Substation)			
		32a	Midland, PA (North Substation)			
		46b	Industry, PA (Willows Inn - Rt. 68)			
		47a	East Liverpool, OH (Water Department)			
		48A	Weirton WV (Water Tower - East Belleview Drive)			
		51a	Aliquippa, PA (Sheffield Substation)			
12	Precipitation	30	Shippingport, PA (Cook's Ferry Substation)	Weekly grab samples when available	Quarterly Composite (c)	Gamma Scan
		47	East Liverpool, OH (Water Department)			Tritium (H-3)
		48	Weirton WV (Water Tower–Collier Way)			

Table 2-1

Operational Radiological Environmental Monitoring Program

Notes for Table 2-1

(a) Control Sample Station: These Locations which are presumed to be outside the influence of plant effluents.

(b) Particulate Samples are not counted within 24 hours after filter change. Perform Gamma isotopic analysis on each sample when gross beta is greater than 10 times the yearly mean of control samples.

(c) Long-term composite samples are obtained from short-term composite samples at the specified locations.

(d) Composite samples are collected at intervals not exceeding 2 hours.

(e) Weekly milk sample from the Searight Dairy is analyzed for Iodine-131 only.

(f) Milk samples are collected bi-weekly when animals are grazing. The milk samples are collected monthly at other times.

(g) The fish samples contain whatever species are available.
IF adequate sample size is available, THEN the sample is separated according to species, and compositing will provide one sample of each species.
IF adequate sample size is not available, THEN separation by species is not practical. Therefore edible parts of all fish in the sample are mixed to provide one sample.

(h) Composite samples are obtained by collecting an aliquot at intervals not exceeding 2 hours at location 2.1. The water treatment plant operator at location 5 obtains the weekly grab sample from the daily composite grab samples. For location 49, the weekly grab sample is obtained by a field technician.

(i) Two (2) TLDs are collected quarterly from each monitoring location.

(k) Offsite Dose Calculation Manual procedure 1/2-ODC-3.03, Attachment Q, Table 3.12-1 requires three (3) dairies to be selected on basis of highest potential thyroid dose using milch census data. See Section 2-E of this report (Monitoring of Local Cows Milk) for specific locations sampled.

2. Summary of Results

All results of this monitoring program are summarized in Table 2-2. This table is prepared in the format specified by the NRC via the Branch Technical Position in NUREG-1301, and in accordance with Beaver Valley Power Station Offsite Dose Calculation Manual. Summaries of results of analysis of each media are discussed in Sections 2-B through 2-H and an assessment of radiation doses are given in Section 2-I. Table 2-3 summarizes Beaver Valley Power Station pre-operational ranges for the various sampling media during the years 1974 and 1975. Comparisons of pre-operational data with operational data indicate the ranges of values are generally in good agreement for both periods of time.

Activity detected was attributed to naturally occurring radionuclides, BVPS effluents, previous nuclear weapons tests or to the normal statistical fluctuation for activities near the Lower Limit of Detection (LLD).

The conclusion from all program data is that the operation of the Beaver Valley Power Station has resulted in no significant changes to the environment.

3. Quality Control Program

The Quality Control Program implemented by the Beaver Valley Power Station to assure reliable performance by the contractor and the supporting QC data are presented and discussed in Section 4 of this report.

4. Program Changes

The following changes were implemented in the 2005 sampling program.

During the period December 2004 through January 2005, the Global Positioning Satellite (GPS) system was used to obtain latitude, longitude, and elevation data at all sampling locations of the Beaver Valley Power Station Radiological Environmental Monitoring Program. This information was also obtained for the locations identified in the 2005 Annual Land Use Census. The GPS data was then transferred to a computerized topographic mapping program in order to obtain compass directions, sectors, and distances. This served as a verification of currently used data. No significant differences were found, however accuracy was improved. The reference point for the "old" location data was the center of the Unit 1 Reactor Containment Building. The reference point for the GPS data used the midpoint between the Unit 1 and Unit 2 Reactor Containment Buildings.

Table 2-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility: Beaver Valley Power Station Unit 1 and Unit 2
Docket No.: 50-334 / 50-413
Location of Facility: Beaver County, Pennsylvania
Reporting Period: Calendar Year - 2005

Medium: Air Particulate and Radioiodine
Unit of Measurement: (pico Curies / cubic meter)

Type and Total Number of Analysis Performed	Lower Limit of Detection LLD [a]	All Indicator Locations Mean (fraction) [b] Range [b]	Locations with Highest Annual Mean Name Distance and Direction	Mean (fraction) [b] Range [b]	Control Location Name Distance and Direction	Mean (fraction) [b] Range [b]	Number of Nonroutine Reported Measurements [c]
Gross Beta 520	0.004	0.027 (468 / 468) 0.012 - 0.074	No. 30 Shippingport, PA Cooks Ferry Substation 0.50 miles ENE	0.029 (52 / 52) 0.012 - 0.074	No. 48 Weirton, WV Water Tower Collier Way 16.30 miles SSW	0.029 (52 / 52) 0.012 - 0.054	NA
I-131 520	< 40	LLD (0 / 468)		LLD (0 / 468)		LLD (0 / 52)	0
Gamma 40							
Be-7	NA	0.071 (36 / 36) 0.047 - 0.09	No. 51 Aliquippa, PA Sheffield Substation 8.00 miles E	0.074 (4 / 4) 0.061 - 0.082	No. 48 Weirton, WV Water Tower Collier Way 16.30 miles SSW	0.072 (4 / 4) 0.061 - 0.08	NA
Co-60	0.0003	LLD (0 / 36)		LLD (0 / 36)		LLD (0 / 4)	NA
Cs-134	0.0004	LLD (0 / 36)		LLD (0 / 36)		LLD (0 / 4)	0
Cs-137	0.0004	LLD (0 / 36)		LLD (0 / 36)		LLD (0 / 4)	0
Ba-La-140	0.0005	LLD (0 / 36)		LLD (0 / 36)		LLD (0 / 4)	NA

[a] Nominal Lower Limit of Detection

[b] Mean and range based upon detectable measurements only.
Fraction of detectabel measurements at specified locations is indicated in parentheses (fraction)

[c] Nonroutine Reported Measurements (Reference: ODCM procedure 1/2-ODC-3.03, Attachment Q, Control 3.12.1)

NA = Not Applicable (Naturally Occurring Radionuclides Not required by ODCM)

Beaver Valley Power Station
2005 Annual Radiological Environmental Operating Report

Table 2-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility: Beaver Valley Power Station Unit 1 and Unit 2
Docket No.: 50-334 / 50-413
Location of Facility: Beaver County, Pennsylvania
Reporting Period: Calendar Year - 2005

Medium: Drinking Water
Unit of Measurement: (pico Curies / liter)

Type and Total Number of Analysis Performed	Lower Limit of Detection LLD [a]	All Indicator Locations Mean (fraction) [b] Range [b]	Locations with Highest Annual Mean Name Distance and Direction	Mean (fraction) [b] Range [b]	Control Location Name Distance and Direction	Mean (fraction) [b] Range [b]	Number of Nonroutine Reported Measurements [c]
I-131 156	0.5	0.643 (65 / 104) 0.3 - 1.2	No. 4 Midland, PA Water Department 1.3 miles NW	0.847 (30 / 52) 0.3 - 1.2	No. 49 Industry, PA Upstream of Montgomery Dam 5.0 miles NE	0.885 (41 / 52) 0.3 - 2.3	0
H-3 12	200	233 (1 / 8) 233 - 233	No. 5 East Liverpool, OH Water Department 4.9 miles WNW	233 (1 / 4) 233 - 233	No. 49 Upstream Montgomery Dam 5.0 miles NE	199 (1 / 4) 199 - 199	0
Gamma 36							
Mn-54	5	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	0
Fe-59	10	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	0
Co-58	5	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	0
Co-60	5	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	0
Zn-65	10	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	0
Zr-Nb-95	5	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	0
Cs-134	5	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	0
Cs-137	5	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	0
Ba-La-140	15	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	0

[a] Nominal Lower Limmit of Detection

[b] Mean and range based upon detectable measurements only.
Fraction of detectabel measurements at specified locations is indicated in parentheses (fraction)

[c] Nonroutine Reported Measurements (Reference: ODCM procedure 1/2-ODC-3.03, Attachment Q, Control 3.12.1)

NA = Not Applicable (Naturally Occurring Radionuclides Not required by ODCM)

Table 2-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility: Beaver Valley Power Station Unit 1 and Unit 2
Docket No.: 50-334 / 50-413
Location of Facility: Beaver County, Pennsylvania
Reporting Period: Calendar Year - 2005

Medium: Surface Water
Unit of Measurement: (pico Curies / liter)

Type and Total Number of Analysis Performed	Lower Limit of Detection LLD [a]	All Indicator Locations Mean (fraction) [b] Range [b]	Locations with Highest Annual Mean Name Distance and Direction	Mean (fraction) [b] Range [b]	Control Location Name Distance and Direction	Mean (fraction) [b] Range [b]	Number of Nonroutine Reported Measurements [c]
I-131 52	0.5	0.885 (41 / 52) 0.3 - 2.3	No. 49 Industry, PA Upstream of Montgomery Dam 5.0 miles NE	0.885 (41 / 52) 0.3 - 2.3	No. 49 Industry, PA Upstream of Montgomery Dam 5.0 miles NE	0.885 (41 / 52) 0.3 - 2.3	0
H-3 12	200	LLD (0 / 8)	No. 49 Industry, PA Upstream of Montgomery Dam 5.0 miles NE	199 (1 / 4) 199 - 199	No. 49 Industry, PA Upstream of Montgomery Dam 5.0 miles NE	199 (1 / 4) 199 - 199	0
Gamma 36							
Mn-54	5	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	NA
Fe-59	10	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	NA
Co-58	5	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	NA
Co-60	5	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	NA
Zn-65	10	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	NA
Zr-Nb-95	5	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	NA
Cs-134	5	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	NA
Cs-137	5	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	NA
Ba-La-140	15	LLD (0 / 24)		LLD (0 / 24)		LLD (0 / 12)	NA

[a] Nominal Lower Limit of Detection

[b] Mean and range based upon detectable measurements only.
Fraction of detectabel measurements at specified locations is indicated in parentheses (fraction)

[c] Nonroutine Reported Measurements (Reference: ODCM procedure 1/2-ODC-3.03, Attachment Q, Control 3.12.1)

NA = Not Applicable (Naturally Occurring Radionuclides Not required by ODCM)

Table 2-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility: Beaver Valley Power Station Unit 1 and Unit 2
Docket No.: 50-334 / 50-412
Location of Facility: Beaver County, Pennsylvania
Reporting Period: Calendar Year - 2005

Medium: Ground Water
Unit of Measurement: (pico Curies / liter)

Type and Total Number of Analysis Performed	Lower Limit of Detection LLD [a]	All Indicator Locations Mean (fraction) [b] Range [b]	Locations with Highest Annual Mean Name Distance and Direction	Mean (fraction) [b] Range [b]	Control Location Name Distance and Direction	Mean (fraction) [b] Range [b]	Number of Nonroutine Reported Measurements [c]
H-3 6	200	LLD (0 / 4)		LLD (0 / 4)	No. 11 Shippingport, PA Upstream 0.8 miles NE	LLD (0 / 2)	0
Gamma 6					No. 11 Shippingport, PA Upstream 0.8 miles NE		
Mn-54	5	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	0
Fe-59	10	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	0
Co-58	5	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	0
Co-60	5	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	0
Zn-65	10	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	0
Zr-Nb-95	5	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	0
Cs-134	5	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	0
Cs-137	5	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	0
Ba-La-140	15	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	0

[a] Nominal Lower Limit of Detection

[b] Mean and range based upon detectable measurements only.
Fraction of detectabel measurements at specified locations is indicated in parentheses (fraction)

[c] Nonroutine Reported Measurements (Reference: ODCM procedure 1/2-ODC-3.03, Attachment Q, Control 3.12.1)

NA = Not Applicable (Naturally Occurring Radionuclides Not required by ODCM)

Table 2-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility: Beaver Valley Power Station Unit 1 and Unit 2
Docket No.: 50-334 / 50-412
Location of Facility: Beaver County, Pennsylvania
Reporting Period: Calendar Year - 2005

Medium: Precipitation Water
Unit of Measurement: (pico Curies / liter)

Type and Total Number of Analysis Performed	Lower Limit of Detection LLD [a]	All Indicator Locations Mean (fraction) [b] Range [b]	Locations with Highest Annual Mean Name Distance and Direction	Mean (fraction) [b] Range [b]	Control Location Name Distance and Direction	Mean (fraction) [b] Range [b]	Number of Nonroutine Reported Measurements [c]
H-3 12	200	411.25 (3 / 8) 242 - 490	No. 47 East Liverpool, OH Water Department 4.9 miles WNW	490.00 (1 / 4) 490 - 490	No. 48 Weirton, WV Water Tower Collier Way 16.30 miles SSW	LLD (0 / 4)	0
Gamma 12							
Mn-54	5	LLD (0 / 8)		LLD (0 / 8)		LLD (0 / 4)	NA
Fe-59	10	LLD (0 / 8)		LLD (0 / 8)		LLD (0 / 4)	NA
Co-58	5	LLD (0 / 8)		LLD (0 / 8)		LLD (0 / 4)	NA
Co-60	5	LLD (0 / 8)		LLD (0 / 8)		LLD (0 / 4)	NA
Zn-65	10	LLD (0 / 8)		LLD (0 / 8)		LLD (0 / 4)	NA
Zr-Nb-95	5	LLD (0 / 8)		LLD (0 / 8)		LLD (0 / 4)	NA
Cs-134	5	LLD (0 / 8)		LLD (0 / 8)		LLD (0 / 4)	NA
Cs-137	5	LLD (0 / 8)		LLD (0 / 8)		LLD (0 / 4)	NA
Ba-La-140	15	LLD (0 / 8)		LLD (0 / 8)		LLD (0 / 4)	NA

[a] Nominal Lower Limit of Detection

[b] Mean and range based upon detectable measurements only.
Fraction of detectabel measurements at specified locations is indicated in parentheses (fraction)

[c] Nonroutine Reported Measurements (Reference: ODCM procedure 1/2-ODC-3.03, Attachment Q, Control 3.12.1)

NA = Not Applicable (Naturally Occurring Radionuclides Not required by ODCM)

Table 2-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility: Beaver Valley Power Station Unit 1 and Unit 2
Docket No.: 50-334 / 50-412
Location of Facility: Beaver County, Pennsylvania
Reporting Period: Calendar Year - 2005

Medium: Milk
Unit of Measurement: (pico Curies / liter)

Type and Total Number of Analysis Performed	Lower Limit of Detection LLD [a]	All Indicator Locations Mean (fraction) [b] Range [b]	Locations with Highest Annual Mean Name Distance and Direction	Mean (fraction) [b] Range [b]	Control Location Name Distance and Direction	Mean (fraction) [b] Range [b]	Number of Nonroutine Reported Measurements [c]
I-131 148	0.5	LLD (0 / 128)		LLD (0 / 128)	No. 96 Burgettstown, PA Windsheimer Farm 10.40 miles SSW	LLD (0 / 20)	0
Sr-89 116	2.0	LLD (0 / 96)		LLD (0 / 96)	No. 96 Burgettstown, PA Windsheimer Farm 10.40 miles SSW	LLD (0 / 20)	NA
Sr-90 116	0.7	1.67 (91 / 96) 0.6 - 5	No. 114 Hookstown, PA Moore Farm 2.12 miles SW	2.30 (19 / 19) 1.3 - 5	No. 96 Burgettstown, PA Windsheimer Farm 10.40 miles SSW	1.09 (19 / 20) 0.6 - 2.1	NA
Gamma 116							
K-40	NA	1436.3 (96 / 96) 1147 - 1914	No. 114 Hookstown, PA Moore Farm 2.12 miles SW	1486.9 (19 / 19) 1258 - 1721	No. 96 Burgettstown, PA Windsheimer Farm 10.40 miles SSW	1389.3 (20 / 20) 1297 - 1537	NA
Mn-54	5	LLD (0 / 96)		LLD (0 / 96)		LLD (0 / 20)	NA
Fe-59	10	LLD (0 / 96)		LLD (0 / 96)		LLD (0 / 20)	NA
Co-58	5	LLD (0 / 96)		LLD (0 / 96)		LLD (0 / 20)	NA
Co-60	5	LLD (0 / 96)		LLD (0 / 96)		LLD (0 / 20)	NA
Zn-65	10	LLD (0 / 96)		LLD (0 / 96)		LLD (0 / 20)	NA
Zr-Nb-95	5	LLD (0 / 96)		LLD (0 / 96)		LLD (0 / 20)	NA
Cs-134	5	LLD (0 / 96)		LLD (0 / 96)		LLD (0 / 20)	0
Cs-137	5	LLD (0 / 96)		LLD (0 / 96)		LLD (0 / 20)	0
Ba-La-140	15	LLD (0 / 96)		LLD (0 / 96)		LLD (0 / 20)	0

[a] Nominal Lower Limit of Detection

[b] Mean and range based upon detectable measurements only.
Fraction of detectabel measurements at specified locations is indicated in parentheses (fraction)

[c] Nonroutine Reported Measurements (Reference: ODCM procedure 1/2-ODC-3.03, Attachment Q, Control 3.12.1)

NA = Not Applicable (Naturally Occurring Radionuclides Not required by ODCM)

Table 2-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility: Beaver Valley Power Station Unit 1 and Unit 2
Docket No.: 50-334 / 50-412
Location of Facility: Beaver County, Pennsylvania
Reporting Period: Calendar Year - 2005

Medium: Fish
Unit of Measurement: (pico Curies / gram) Wet

Type and Total Number of Analysis Performed	Lower Limit of Detection LLD [a]	All Indicator Locations Mean (fraction) [b] Range [b]	Locations with Highest Annual Mean Name Distance and Direction	Mean (fraction) [b] Range [b]	Control Location Name Distance and Direction	Mean (fraction) [b] Range [b]	Number of Nonroutine Reported Measurements [c]
Gamma S							
Mn-54	0.05	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 4)	0
Fe-59	0.10	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 4)	0
Co-58	0.05	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 4)	0
Co-60	0.05	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 4)	0
Zn-65	0.10	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 4)	0
Zr-Nb-95	0.03	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 4)	0
Ce-134	0.05	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 4)	0
Ce-137	0.05	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 4)	0
Ba-La-140	0.07	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 4)	0

[a] Nominal Lower Limit of Detection

[b] Mean and range based upon detectable measurements only.
Fraction of detectabel measurements at specified locations is indicated in parentheses (fraction)

[c] Nonroutine Reported Measurements (Reference: ODCM procedure 1/2-ODC-3.03, Attachment Q, Control 3.12.1)

NA = Not Applicable (Naturally Occurring Radionuclides Not required by ODCM)

Table 2-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility: Beaver Valley Power Station Unit 1 and Unit 2
Docket No.: 50-334 / 50-413
Location of Facility: Beaver County, Pennsylvania
Reporting Period: Calendar Year - 2005

Medium: Foodcrops
Unit of Measurement: (pico Curies / gram) Wet

Type and Total Number of Analysis Performed	Lower Limit of Detection LLD [a]	All Indicator Locations Mean (fraction) [b] Range [b]	Locations with Highest Annual Mean Name Distance and Direction	Mean (fraction) [b] Range [b]	Control Location Name Distance and Direction	Mean (fraction) [b] Range [b]	Number of Nonroutine Reported Measurements [c]
I-131 4	0.06	LLD (0 / 3)		LLD (0 / 3)		LLD (0 / 1)	0
Gamma 4							
K-40	NA	2.09 (3 / 3) 1.39 - 2.99	No. 46 Industry, PA 15052 2.5 miles NE	2.99 (1 / 1) 2.99 - 2.99	No. 48a Weirton, WV Weirton Area 16.30 miles SSW	2.29 (1 / 1) 2.29 - 2.29	NA
Mn-54	0.05	LLD (0 / 3)		LLD (0 / 3)		LLD (0 / 1)	NA
Fe-59	0.10	LLD (0 / 3)		LLD (0 / 3)		LLD (0 / 1)	NA
Co-58	0.05	LLD (0 / 3)		LLD (0 / 3)		LLD (0 / 1)	NA
Co-60	0.05	LLD (0 / 3)		LLD (0 / 3)		LLD (0 / 1)	NA
Zn-65	0.10	LLD (0 / 3)		LLD (0 / 3)		LLD (0 / 1)	NA
Zr-Nb-95	0.03	LLD (0 / 3)		LLD (0 / 3)		LLD (0 / 1)	NA
Cs-134	0.05	LLD (0 / 3)		LLD (0 / 3)		LLD (0 / 1)	0
Cs-137	0.05	LLD (0 / 3)		LLD (0 / 3)		LLD (0 / 1)	0
Ba-La-140	0.07	LLD (0 / 3)		LLD (0 / 3)		LLD (0 / 1)	NA

[a] Nominal Lower Limit of Detection

[b] Mean and range based upon detectable measurements only.
Fraction of detectabel measurements at specified locations is indicated in parentheses (fraction)

[c] Nonroutine Reported Measurements (Reference: ODCM procedure 1/2-ODC-3.03, Attachment Q, Control 3.12.1)

NA = Not Applicable (Naturally Occurring Radionuclides Not required by ODCM)

Table 2-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility: Beaver Valley Power Station Unit 1 and Unit 2
Docket No.: 50-334 / 50-412
Location of Facility: Beaver County, Pennsylvania
Reporting Period: Calendar Year - 2005

Medium: Feedstuff
Unit of Measurement: *(pico Curies / gram) Wet*

Type and Total Number of Analysis Performed	Lower Limit of Detection LLD [a]	All Indicator Locations Mean (fraction) [b] Range [b]	Locations with Highest Annual Mean Name Distance and Direction	Mean (fraction) [b] Range [b]	Control Location Name Distance and Direction	Mean (fraction) [b] Range [b]	Number of Nonroutine Reported Measurements [c]
Gamma 12							
Be-7	NA	1.17 (6 / 12) 0.3 - 2.75	No. 25 Searight Farm Hookstown, PA 948 McCleary Road 2.1 miles SSW	1.17 (6 / 12) 0.3 - 2.75	No. 25 Searight Farm Hookstown, PA 948 McCleary Road 2.1 miles SSW	1.17 (6 / 12) 0.3 - 2.75	NA
K-40	NA	9.23 (12 / 12) 0.92 - 13.93	No. 25 Searight Farm Hookstown, PA 948 McCleary Road 2.1 miles SSW	9.23 (12 / 12) 0.92 - 13.93	No. 25 Searight Farm Hookstown, PA 948 McCleary Road 2.1 miles SSW	9.23 (12 / 12) 0.92 - 13.93	NA
Mn-54	0.05	LLD (0 / 12)		LLD (0 / 12)		LLD (0 / 12)	NA
Fe-59	0.10	LLD (0 / 12)		LLD (0 / 12)		LLD (0 / 12)	NA
Co-58	0.05	LLD (0 / 12)		LLD (0 / 12)		LLD (0 / 12)	NA
Co-60	0.05	LLD (0 / 12)		LLD (0 / 12)		LLD (0 / 12)	NA
Zn-65	0.10	LLD (0 / 12)		LLD (0 / 12)		LLD (0 / 12)	NA
Zr-Nb-95	0.03	LLD (0 / 12)		LLD (0 / 12)		LLD (0 / 12)	NA
Cs-134	0.05	LLD (0 / 12)		LLD (0 / 12)		LLD (0 / 12)	NA
Cs-137	0.05	LLD (0 / 12)		LLD (0 / 12)		LLD (0 / 12)	NA
Ba-La-140	0.07	LLD (0 / 12)		LLD (0 / 12)		LLD (0 / 12)	NA

[a] Nominal Lower Limit of Detection

[b] Mean and range based upon detectable measurements only.
Fraction of detectabel measurements at specified locations is indicated in parentheses (fraction)

[c] *Nonroutine Reported Measurements (Reference: ODCM procedure 1/2-ODC-3.03, Attachment Q, Control 3.12.1)*

NA = Not Applicable (Naturally Occurring Radionuclides Not required by ODCM)

Table 2-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility: Beaver Valley Power Station Unit 1 and Unit 2
Docket No.: 50-334 / 50-413
Location of Facility: Beaver County, Pennsylvania
Reporting Period: Calendar Year - 2005

Medium: Sediment (page 1 of 2)
Unit of Measurement: (pico Curies / gram) Dry

Type and Total Number of Analysis Performed	Lower Limit of Detection LLD [a]	All Indicator Locations Mean (fraction) [b] Range [b]	Locations with Highest Annual Mean Name Distance and Direction	Mean (fraction) [b] Range [b]	Control Location Name Distance and Direction	Mean (fraction) [b] Range [b]	Number of Nonroutine Reported Measurements [c]
Gamma 6							
K-40	NA	11.7 (4 / 4) 10.16 - 12.89	No. 50 New Cumberland, WV Upstream of Dam 11.8 miles WSW	12.48 (2 / 2) 12.06 - 12.89	No. 49a Industry, PA Upstream of Montgomery Dam 5 miles NE	12 (2 / 2) 8.78 - 15.21	NA
Mn-54	0.05	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	NA
Fe-59	0.10	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	NA
Co-58	0.05	0.32 (2 / 4) 0.11 - 0.53	No. 2A BVPS OutFall Vicinity 0.2 miles W	0.32 (2 / 2) 0.11 - 0.53	No. 49a Industry, PA Upstream of Montgomery Dam 5 miles NE	LLD (0 / 2)	NA
Co-60	0.05	0.235 (2 / 4) 0.11 - 0.36	No. 2A BVPS OutFall Vicinity 0.2 miles W	0.235 (2 / 2) 0.11 - 0.36	No. 49a Industry, PA Upstream of Montgomery Dam 5 miles NE	LLD (0 / 2)	NA
Zn-65	0.10	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	NA
Zr-95	0.03	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	NA
Nb-95	0.03	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	NA
Cs-134	0.05	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	NA
Cs-137	0.05	0.101 (3 / 4) 0.053 - 0.13	No. 50 New Cumberland, WV Upstream of Dam 11.8 miles WSW	0.13 (1 / 2) 0.13 - 0.13	No. 49a Industry, PA Upstream of Montgomery Dam 5 miles NE	0.0754 (2 / 2) 0.06 - 0.091	NA
Ba-La-140	0.07	LLD (0 / 4)		LLD (0 / 4)		LLD (0 / 2)	NA
Tl-208	NA	0.36 (4 / 4) 0.34 - 0.39	No. 50 New Cumberland, WV Upstream of Dam 11.8 miles WSW	0.365 (2 / 2) 0.34 - 0.39	No. 49a Industry, PA Upstream of Montgomery Dam 5 miles NE	0.325 (2 / 2) 0.26 - 0.39	
Bi-214	NA	0.863 (4 / 4) 0.81 - 0.92	No. 50 New Cumberland, WV Upstream of Dam 11.8 miles WSW	0.865 (2 / 2) 0.81 - 0.92	No. 49a Industry, PA Upstream of Montgomery Dam 5 miles NE	0.745 (2 / 2) 0.57 - 0.92	NA
Pb-212	NA	1.253 (4 / 4) 1.01 - 1.43	No. 50 New Cumberland, WV Upstream of Dam 11.8 miles WSW	1.29 (2 / 2) 1.15 - 1.43	No. 49a Industry, PA Upstream of Montgomery Dam 5 miles NE	0.965 (2 / 2) 0.92 - 1.01	NA

Table 2-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility: Beaver Valley Power Station Unit 1 and Unit 2
Docket No.: 50-334 / 50-413
Location of Facility: Beaver County, Pennsylvania
Reporting Period: Calendar Year - 2005

Medium: Sediment (page 2 of 2)
Unit of Measurement: (pico Curies / gram) Dry

Type and Total Number of Analysis Performed	Lower Limit of Detection LLD [a]	All Indicator Locations Mean (fraction) [b] Range [b]	Locations with Highest Annual Mean Name Distance and Direction	Mean (fraction) [b] Range [b]	Control Location Name Distance and Direction	Mean (fraction) [b] Range [b]	Number of Nonroutine Reported Measurements [c]
Pb-214	NA	0.987 (4 / 4) 0.93 - 1.09	No. 50 New Cumberland, WV Upstream of Dam 11.8 miles WSW	1.02 (2 / 2) 0.95 - 1.09	No. 49a Industry, PA Upstream of Montgomery Dam 5 miles NE	0.81 (2 / 2) 0.68 - 0.94	NA
Ra-226	NA	2.22 (4 / 4) 1.96 - 2.69	No. 50 New Cumberland, WV Upstream of Dam 11.8 miles WSW	2.39 (2 / 2) 2.09 - 2.69	No. 49a Industry, PA Upstream of Montgomery Dam 5 miles NE	1.5 (1 / 2) 1.5 - 1.5	NA
Ac-228	NA	1.2 (4 / 4) 0.978 - 1.37	No. 50 New Cumberland, WV Upstream of Dam 11.8 miles WSW	1.225 (2 / 2) 1.22 - 1.23	No. 49a Industry, PA Upstream of Montgomery Dam 5 miles NE	1.11 (1 / 2) 0.95 - 1.27	NA

[a] Nominal Lower Limit of Detection

[b] Mean and range based upon detectable measurements only.
Fraction of detectabel measurements at specified locations is indicated in parentheses (fraction)

[c] *Nonroutine Reported Measurements* (Reference: ODCM procedure 1/2-ODC-3.03, Attachment Q, Control 3.12.1)

NA = Not Applicable (Naturally Occurring Radionuclides Not required by ODCM)

Table 2-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility: Beaver Valley Power Station Unit 1 and Unit 2
Docket No.: 50-334 / 50-413
Location of Facility: Beaver County, Pennsylvania
Reporting Period: Calendar Year - 2006

Medium: Soil
Unit of Measurement: (pico Curies / gram) Dry

Type and Total Number of Analysis Performed	Lower Limit of Detection LLD [a]	All Indicator Locations Mean (fraction) [b] Range [b]	Locations with Highest Annual Mean Name Distance and Direction	Mean (fraction) [b] Range [b]	Control Location Name Distance and Direction	Mean (fraction) [b] Range [b]	Number of Nonroutine Reported Measurements [c]
Gamma							
Note: Soil Sampling performed every three (3) years. Sampling was performed in 2003, and is next due in 2006.							
K-40							
Mn-54							
Fe-59							
Co-58							
Co-60							
Zn-65							
Zr-95							
Nb-95							
Cs-134							
Cs-137							
Ba-La-140							
Tl-208							
Tl-208							
Bi-214							
Pb-212							
Pb-214							
Ra-226							
Ac-228							

[a] Nominal Lower Limit of Detection

[b] Mean and range based upon detectable measurements only.
Fraction of detectabel measurements at specified locations is indicated in parentheses (fraction)

[c] Nonroutine Reported Measurements (Reference: ODCM procedure 1/2-ODC-3.03, Attachment Q, Control 3.12.1)

NA = Not Applicable (Naturally Occurring Radionuclides Not required by ODCM)

Table 2-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility: Beaver Valley Power Station Unit 1 and Unit 2
Docket No.: 50-334 / 50-412
Location of Facility: Beaver County, Pennsylvania
Reporting Period: Calendar Year - 2006

Medium: External Radiation
Unit of Measurement: (mR / Quarter)

Type and Total Number of Analysis Performed	Lower Limit of Detection LLD [a]	All Indicator Locations Mean (fraction) [b] Range [b]	Locations with Highest Annual Mean Name Distance and Direction	Mean (fraction) [b] Range [b]	Control Location Name Distance and Direction	Mean (fraction) [b] Range [b]	Number of Nonroutine Reported Measurements [c]
Gamma 500	4.6	18.4 (492 - 492) 11.7 - 24.7	No. 112 BVPS Site Perimeter Location	22.4 (8 / 8) 21.1 - 24.7	No. 48 Weirton, WV Water Tower Collier Way 16.30 miles SSW	19.4 (8 / 8) 19.0 - 20.1	NA

[a] Nominal Lower Limit of Detection

[b] Mean and range based upon detectable measurements only.
Fraction of detectabel measurements at specified locations is indicated in parentheses (fraction)

[c] Nonroutine Reported Measurements (Reference: ODCM procedure 1/2-ODC-3.03, Attachment Q, Control 3.12.1)

NA = Not Applicable (Naturally Occurring Radionuclides Not required by ODCM)

Table 2-3

Pre-Operational Environmental Radiological Monitoring Program Summary

Name of Facility: Beaver Valley Power Station **Docket No.:** 50-334

Location of Facility: Beaver County, Pennsylvania **Reporting Period:** Calendar years 1974 - 1975

Medium or Pathway Sampled (Unit of Measurement)	Analysis and Total Number of Analysis Performed		Lower Limit of Detection (LLD)	All Indicator Locations Mean, (f) Range		
Sediments (pico Curie /gram) dry	Gross Alpha	(0)	–		–	
	Gross Beta	(33)	1	18	(33/33)	5 - 30
	Sr-90	(0)	–		–	
	U-234, 235, 238	(0)	–		–	
	Gamma	(33)	–	13	(33/33)	2 - 30
	K-40		1.5	13	(33/33)	2 - 30
	Cs-137		0.1	0.4	(21/33)	0.1 - 0.6
	Zr/Nb-95		0.05	0.8	(12/33)	0.2 - 3.2
	Ce-144		0.3	0.5	(3/33)	0.4 - 0.7
	Ru-106(a)		0.3	1.5	(3/33)	1.3 - 1.8
	Others		–		< LLD	
Foodstuff (pico Curie /gram) dry	Gamma	(8)	–		–	
	K-40		1	33	(8/8)	10 - 53
	Cs-137		0.1	0.2	(1/8)	–
	Zr/Nb-95		0.05	0.2	(1/8)	–
	Ru-106(a)		0.3	0.8	(1/8)	–
	Others		–		< LLD	
Feedstuff (pico Curie /gram) dry	Gross Beta	(80)	0.05	19	(80/80)	8 - 50
	Sr-89	(81)	0.025	0.2	(33/81)	0.04 - 0.93
	Sr-90	(81)	0.005	0.4	(78/81)	0.02 - 0.81
	Gamma	(81)	–		–	
	K-40		1	19	(75/81)	5 - 46
	Cs-137		0.1	0.5	(6/81)	0.2 - 1.6
	Ce-144		0.3	1.5	(5/81)	0.9 - 2.6
	Zr/Nb-95		0.05	0.8	(13/81)	0.2 - 1.8
	Ru-106(a)		0.3	1.4	(12/81)	0.6 - 2.3
	Others		–		< LLD	
Soil - Template Samples - (pico Curie /gram) dry	Gross Alpha	(0)	–		–	
	Gross Beta	(64)	1	22	(64/64)	14 - 32
	Sr-89	(64)	0.25	0.4	(1/64)	–
	Sr-90	(64)	0.05	0.3	(48/64)	0.1 - 1.3
	U-234, 235, 238	(0)	–		–	
	Gamma	(64)	–		–	
	K-40		1.5	13	(63/64)	5 - 24
	Cs-137		0.1	1.5	(56/64)	0.1 - 6.8
	Ce-144		0.3	1.1	(7/64)	0.2 - 3
	Zr/Nb-95		0.05	0.3	(13/64)	0.1 - 2
	Ru-106(a)		0.3	1.1	(3/64)	0.5 - 2
	Others		–		< LLD	

(f) Fraction of detectable measurements at specified location.

Table 2-3 (Continued)

Pre-Operational Environmental Radiological Monitoring Program Summary

Name of Facility: Beaver Valley Power Station **Docket No.:** 50-334

Location of Facility: Beaver County, Pennsylvania **Reporting Period:** Calendar years 1974 - 1975

Medium or Pathway Sampled (Unit of Measurement)	Analysis and Total Number of Analysis Performed		Lower Limit of Detection (LLD)	All Indicator Locations Mean, (f) Range		
Soil - Core Samples - (pico Curie /gram) dry	Gross Alpha	(0)	–		–	
	Gross Beta	(8)	1	21	(8/8)	16 - 28
	Sr-89	(8)	0.25		< LLD	
	Sr-90	(8)	0.05	0.2	(5/8)	0.08 - 0.5
	Gamma	(8)	–		–	
	K-40		1.5	13	(8/8)	7 - 20
	Cs-137		0.1	1.2	(7/8)	0.2 - 2.4
	Co-60		0.1	0.2	(1/8)	–
	Others		–		< LLD	
Surface Water (pico Curie / liter)	Gross Alpha	(40)	0.3	0.75	(5/40)	0.6 - 1.1
	Gross Beta	(120)	0.6	4.4	(120/120)	2.5 - 11.4
	Gamma	(1)	10 - 60		< LLD	
	Tritium	(121)	100	300	(120/121)	180 - 800
	Sr-89	(0)	–		–	
	Sr-90	(0)	–		–	
	C-14	(0)	–		–	
Drinking Water (pico Curie / liter)	I-131	(0)	–		–	
	Gross Alpha	(50)	0.3	0.6	(4/50)	0.4 - 0.8
	Gross Beta	(208)	0.6	3.8	(208/208)	2.3 - 6.4
	Gamma	(0)	–		–	
	Tritium	(211)	100	310	(211/211)	130 - 1000
	C-14	(0)	–		–	
	Sr-89	(0)	–		–	
	Sr-90	(0)	–		–	
Ground Water (pico Curie / liter)	Gross Alpha	(19)	0.3		< LLD	
	Gross Beta	(76)	0.6	2.9	(73/75)(b)	1.3 - 8.0
	Tritium	(81)	100	440	(77/81)	80 - 800
	Gamma	(1)	10 - 60		< LLD	
Air Particulates and Gaseous (pico Curie /cubic meter)	Gross Alpha	(188)	0.001	0.003	(35/188)	0.002 - 0.004
	Gross Beta	(927)	0.006	0.07	(927/927)	0.02 - 0.32
	Sr-89	(0)	–		–	
	Sr-90	(0)	–		–	
	I-131	(816)	0.04	0.08	(2/816)	0.07 - 0.08
	Gamma	(197)	–		–	
	Zr/Nb-95		0.005	0.04	(122/197)	0.01 - 0.16
	Ru-106		0.010	0.04	(50/197)	0.02 - 0.09
	Ce-141		0.010	0.02	(3/197)	0.01 - 0.04
	Ce-144		0.010	0.02	(44/197)	0.01 - 0.04
	Others				< LLD	

(f) Fraction of detectable measurements at specified location.

Table 2-3 (Continued)

Pre-Operational Environmental Radiological Monitoring Program Summary

Name of Facility: Beaver Valley Power Station **Docket No.:** 50-334

Location of Facility: Beaver County, Pennsylvania **Reporting Period:** Calendar years 1974 - 1975

Medium or Pathway Sampled (Unit of Measurement)	Analysis and Total Number of Analysis Performed		Lower Limit of Detection (LLD)	All Indicator Locations Mean, (f) Range		
Milk (pico Curie / liter)	I-131	(91)	0.25	0.6	(4/91)	0.3 - 0.8
	Sr-89	(134)	5	7	(4/134)	6 - 11
	Sr-90	(134)	1	5.3	(132/134)	1.5 - 12.8
	Gamma	(134)	--			
	Cs-137		10	13	--	11 - 16
	Others				(19/134) < LLD	
External Radiation (milli Roentgen / day)	γ - Monthly	(599)	0.5 mR*	0.20	(599/599)	0.08 - 0.51
	γ - Quarterly	(195)	0.5 mR*	0.20		0.11 - 0.38
	γ - Annual	(48)	0.5 mR*	0.19	(195/195) (48/48)	0.11 - 0.30
Fish (pico Curie / gram) wet	Gross Beta	(17)	0.01	1.9	(15/17)	1.0 - 3.2
	Sr-90	(17)	0.005	0.14	(17/17)	0.02 - 0.50
	Gamma	(17)	0.5			
	K-40		--	2.4	(17/17)	1.0 - 3.7
	Others		--		< LLD	

* LLD in units of mR - Lower end of useful integrated exposure detectability range for a passive radiation detector (TLD).

(a) May include Ru-106, Ru-103, Be-7.

(b) One outlier not included in mean. (Water taken from dried-up spring with high sediment and potassium content. Not considered typical groundwater sample).

(f) Fraction of detectable measurements at specified location.

B. Air Monitoring

1. Characterization of Air and Meteorology

The air in the vicinity of the site contains pollutants typical for an industrial area. Air flow is generally from the southwest in summer and from the northwest in the winter.

2. Air Sampling Program and Analytical Techniques

a. Program

The air is sampled for gaseous radioiodine and radioactive particulates at each of ten (10) offsite air sampling stations. The locations of these stations are listed in Table 2-1 and shown on a map in Figure 2-1.

Samples are collected at each of these stations by continuously drawing two cubic feet per minute of atmosphere air through a glass fiber filter paper and a charcoal cartridge. The glass fiber filter paper is used for collection of airborne particulates, while the charcoal cartridge is used for collection of radioiodine. Samples are collected for analysis on a weekly basis.

The charcoal cartridge is used in the weekly analysis of airborne Iodine-131. The glass fiber filter papers are analyzed each week for gross beta, then composited by station each quarter for gamma spectrometry analysis. In order to reduce interference from short-lived naturally occurring radioactivity (e.g.; radon and thoron), the glass fiber filter papers are decayed prior to performing beta analysis in a low background counting system.

b. Procedures

Gross Beta Analysis of Filter Paper: Analysis is performed by placing the glass fiber filter paper from the weekly air sample in a 2 inch planchet and analyzing it in a low background, gas flow proportional counter.

Gamma Emitter Analysis of Filter Paper: Analysis is performed by stacking all of the glass fiber filter papers collected from each monitoring station during the quarter and scanning this composite on a high resolution germanium gamma spectrometer.

Iodine-131 Analysis of Charcoal Cartridge: Analysis is performed by a gamma scan of each charcoal cartridge.

3. Results and Conclusions

A summary of data is presented in Table 2-2.

a. Airborne Radioactive Particulates

A total of five-hundred-twenty (520) weekly samples from ten (10) locations were analyzed for gross beta. Results were comparable to previous years. Figure 2-2 indicates the weekly average concentration of gross beta in air particulates.

The weekly air particulate samples were composited into forty (40) quarterly samples which were analyzed by gamma spectrometry. Naturally occurring Beryllium-7 was identified in forty of forty (40 of 40) samples. No other radionuclides were detected. A summary of the analysis results during the report period are listed in Table 2-2. A trend graph of analyses (including the pre-operational period through the report period) is shown on Figure 2-2.

The ten air particulate filters for the week of 10/03/05 through 10/10/05 were misplaced by the contractor laboratory prior to analysis for gross beta. The gross beta data results for this week were determined by assuming an average from the previous and the following weeks. This condition and associated Corrective Actions are documented in Condition Report No. CR05-00050-01.

Based on the analytical results, the operation of Beaver Valley Power Station did not contribute any measurable increase in air particulate radioactivity during the report period.

b. Airborne Radioiodine

A total of five-hundred-twenty (520) weekly charcoal filter samples were analyzed for Iodine-131. No detectable concentrations were present at any locations.

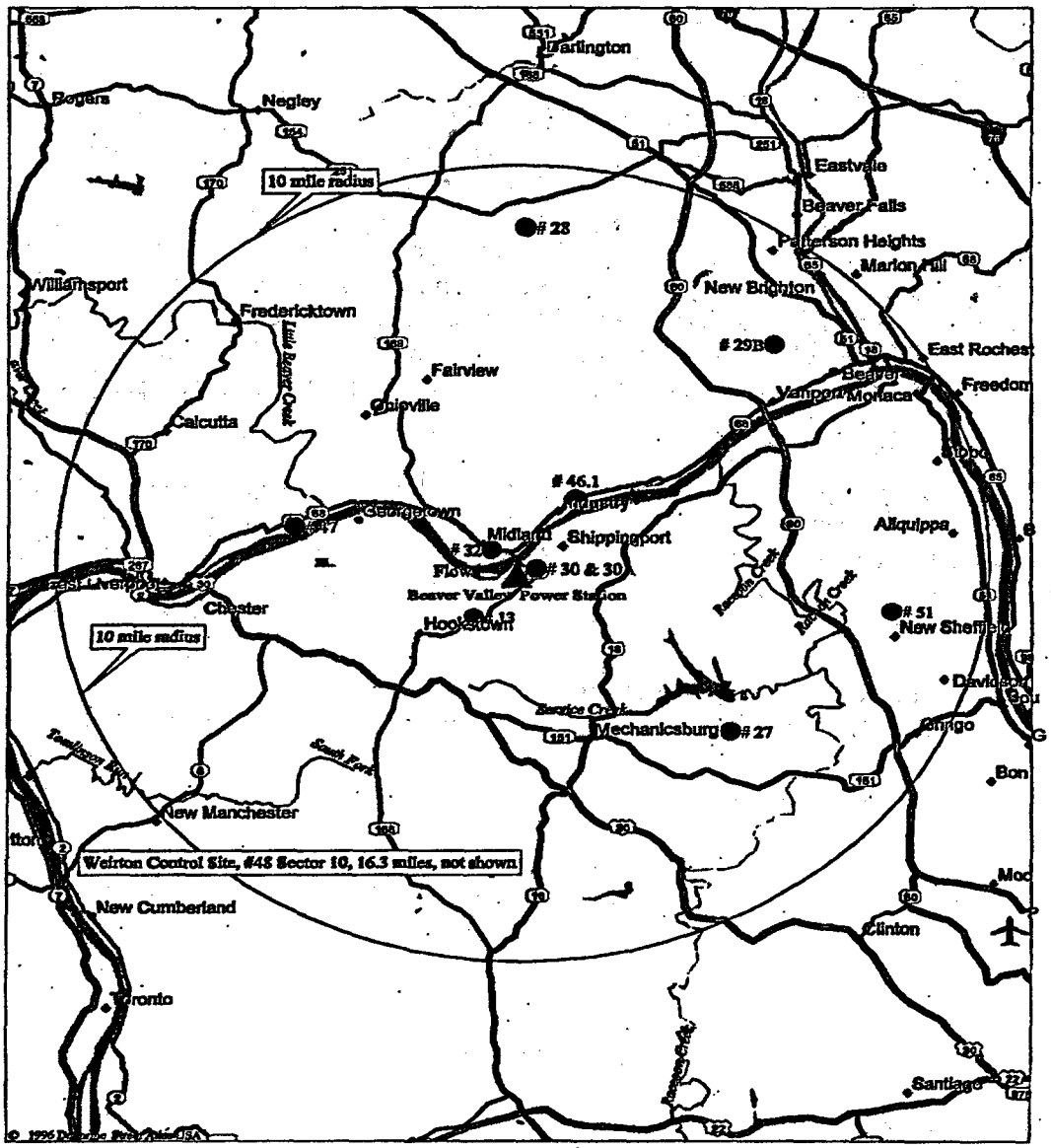
Based on analytical results, the operation of Beaver Valley Power Station did not contribute any measurable increase in airborne radioiodine during the report period.

c. Upgrade of Trip Circuits on Sample Stations

During the report period, the ten air particulate and radioiodine sample stations were upgraded from 8 ampere trip circuits to 15 ampere trip circuits. This condition and associated Corrective Actions are documented in Condition Report No. CR05-05888-01.

Figure 2-1

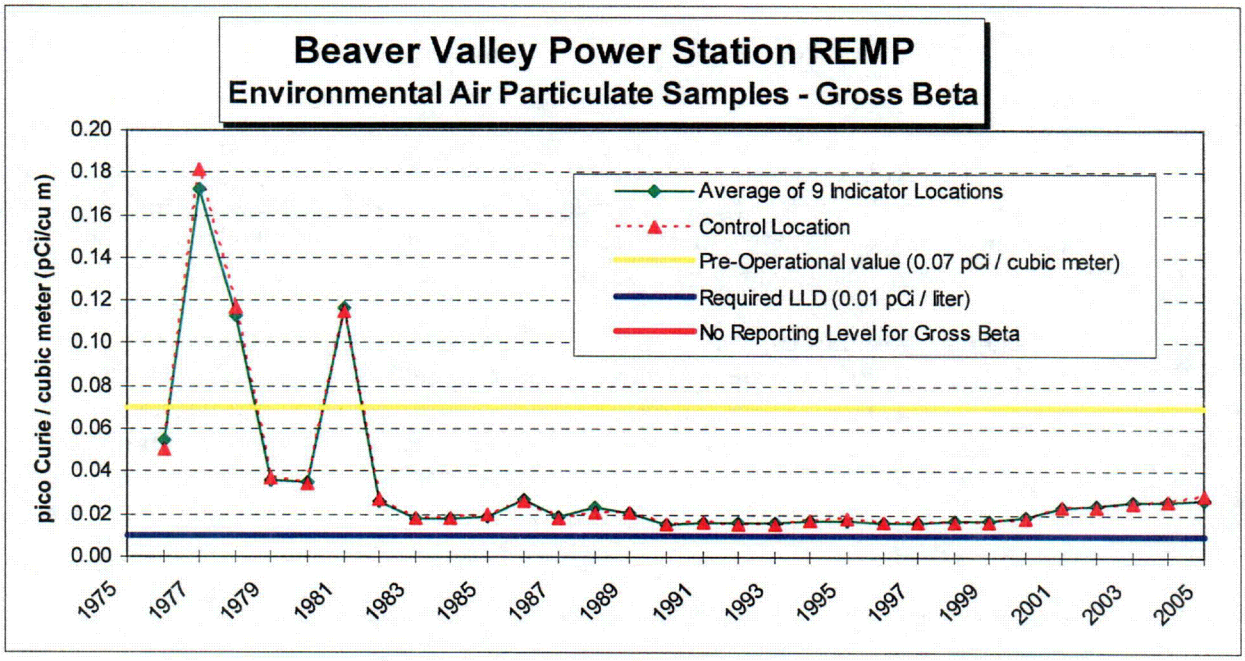
Environmental Monitoring Locations - Air Sampling Stations



Sample Type	Site No.	Sector	Distance (miles)	Sample Point Description
Air Particulate & Radiolodine	13	11	1.4	Hookstown, PA (Old Meyer Farm)
	27	7	6.1	Aliquippa, Pa (Brunton Farm)
	28	1	8.6	Sherman Farm
	29B	3	8.0	Beaver, PA (Friendship Ridge)
	30	4	0.5	Shippingport, PA (Cook's Ferry Substation)
	32	15	0.8	Midland, PA (North Substation - Rt. 68)
	46.1	3	2.3	Industry, PA (McKeels Service - Rt. 68)
	47	14	4.9	East Liverpool, OH (Water Department)
	48	10	16.3	Weirton, WV (Water Tower, Collier Way)
	51	5	8.0	Aliquippa, PA (Sheffield Substation)

Figure 2-2

Graph of Annual Average Concentration: Gross Beta in Air Particulates



C10

C. Monitoring of Sediments and Soils

1. Characterization of Stream Sediments and Soils

The stream sediments consist largely of sand and silt. Soil samples may vary from sand and silt to a heavy clay with variable amounts of organic material.

2. Sampling Program and Analytical Techniques

a. Program

River bottom sediments were collected semi-annually above the Montgomery Dam, in the vicinities of the Beaver Valley discharge and above the New Cumberland Dam. A Ponar or Eckman dredge is used to collect the sample. The sampling locations are also listed in Table 2-1 and are shown in Figure 2-3.

Soil samples are collected every three years. They were collected at each of ten (10) locations during 2003 and are not due to be collected until 2006. At each location, 12 core samples (3" diameter by 2" deep) are gathered at prescribed points on a 10 foot radius circle. Each location is permanently marked with reference pins. Each set of samples is systematically selected by moving along the radius in such a manner as to assure representative undisturbed samples. Sampling locations are listed in Table 2-1 and are shown in Figure 2-3.

Bottom sediments and soils are analyzed for gamma-emitting radionuclides.

b. Analytical Procedures

Gamma Emitter Analysis of Sediment or Soil: Analysis is performed in a 300 ml plastic bottle, which is analyzed by gamma spectrometry.

3. Results and Conclusions

A summary of the analysis results during the report period are listed in Table 2-2. A trend graph of analyses (including the pre-operational period through the report period) is shown on Figure 2-4 and Figure 2-5.

a. Sediment

A total of six (6) samples were analyzed by gamma spectrometry. Naturally occurring Potassium-40 was detected in six of six (6 of 6) samples. Naturally occurring Radium-226 was detected in five of six (5 of 6) samples. Other naturally occurring radionuclides were also identified in most of the samples.

Cesium-137 was identified in five of six (5 of 6) river sediment samples. SINCE Cesium-137 was identified in both upstream and downstream samples, THEN it was not due to plant effluent releases (i.e.; from previous nuclear weapons tests).

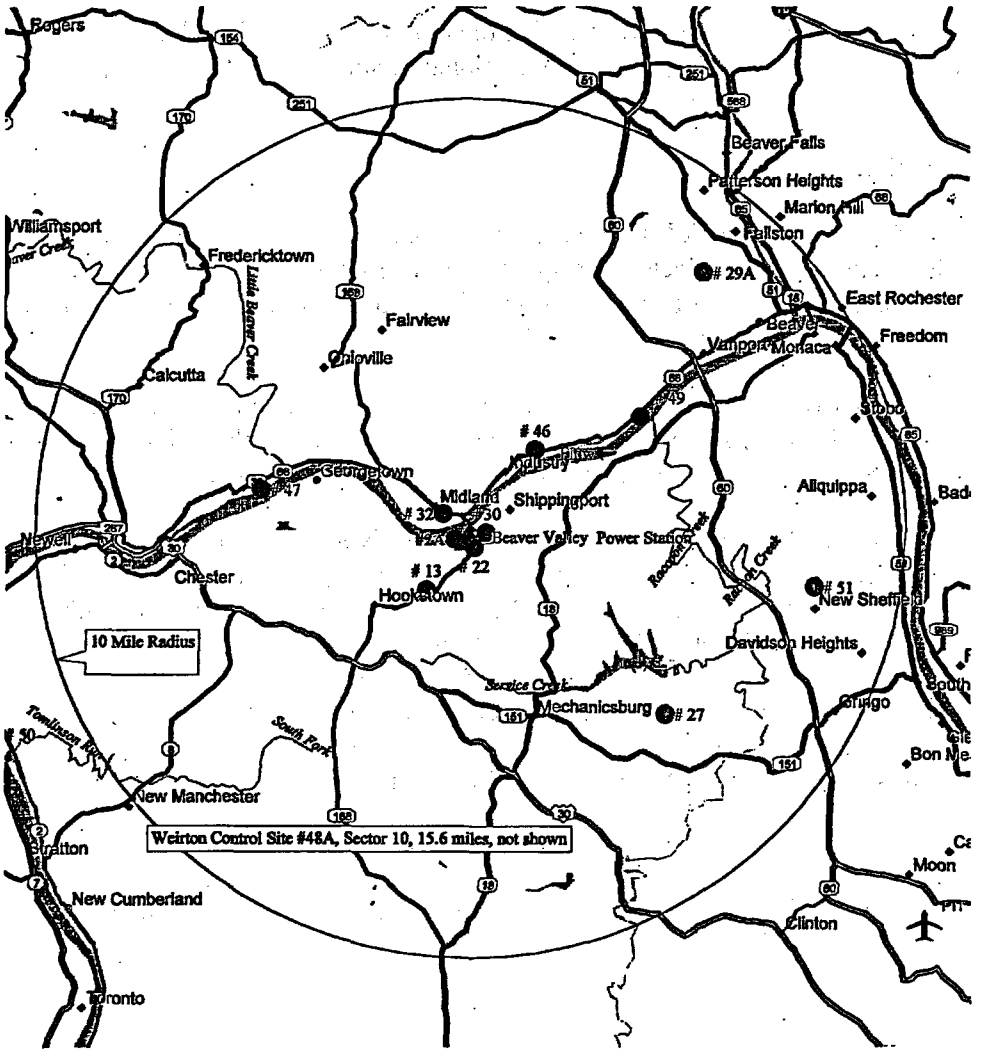
Cobalt-58 was identified in two of six (2 of 6) river sediment samples. Cobalt-60 was also identified in two of six (2 of 6) river sediment samples. The samples that indicated Cobalt-58 and Cobalt-60 were obtained at the shore line of the main outfall facility. Identification of Cobalt-58 and Cobalt-60 at this location is not unusual, because the plant discharges Cobalt-58 and Cobalt-60 in liquid waste effluents. Specifically, the activity detected at this sample location is consistent with discharge data of authorized liquid effluent releases. All liquid effluent releases during the report period did not exceed the release concentration limits set forth in the Offsite Dose Calculation Manual.

b. Soil

Soil is sampled every three years and was sampled in 2003. Soil sampling will be performed during calendar year 2006.

Figure 2-3

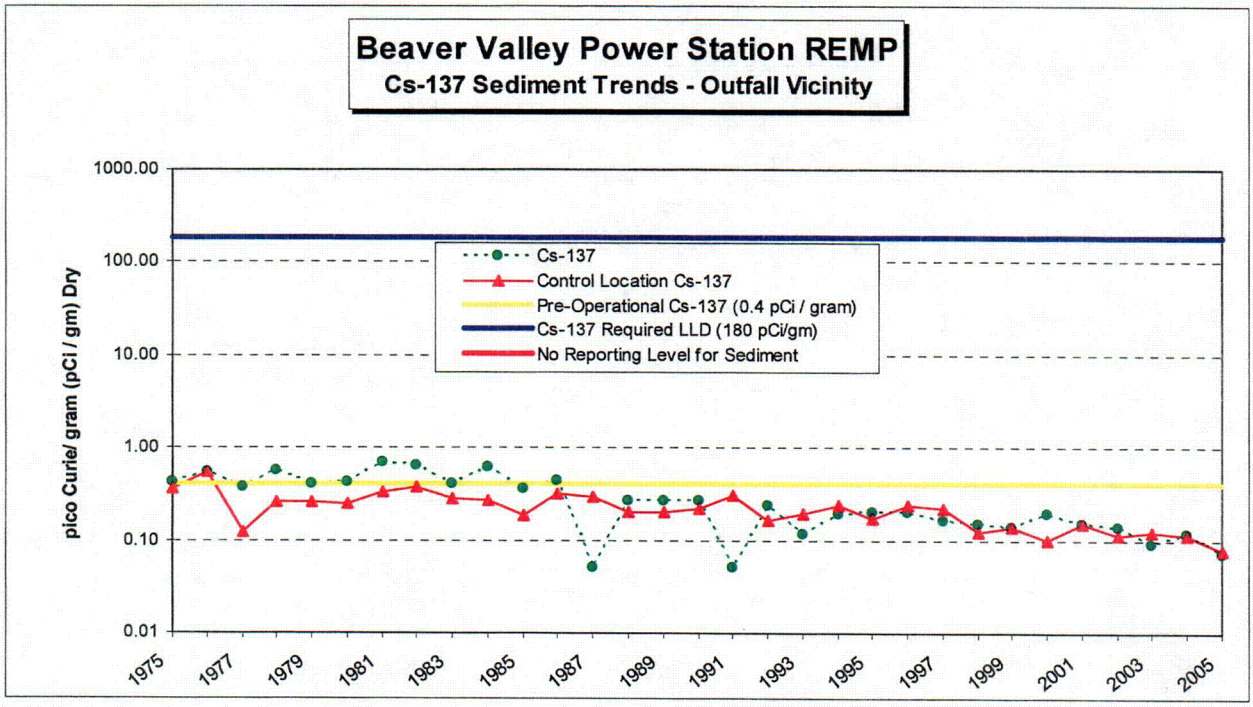
Environmental Monitoring Locations - Shoreline Sediments and Soil

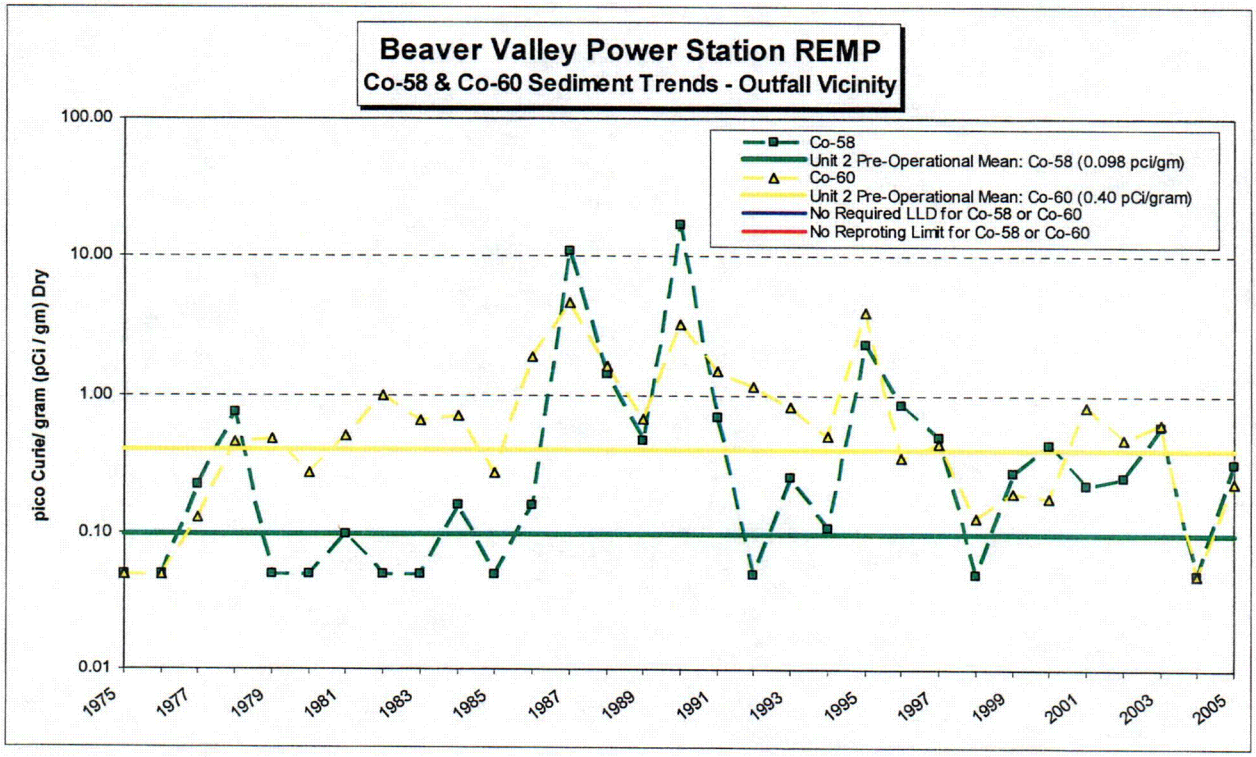


Sample Type	Site No.	Sector	Distance (miles)	Sample Point Description
Soil	13	11	1.4	Hookstown, PA (Old Meyer Farm)
	22	8	0.3	South of BVPS, Transmission Lines
	27	7	6.1	Aliquippa, PA (Brunton Farm)
	29A	3	8.3	Beaver, PA (Nicol Farm)
	30a	4	0.5	Shippingport, PA (Cook's Ferry Substation)
	32a	15	0.8	Midland, PA (North Substation)
	46b	3	2.5	Industry, PA (Willows Inn – Rt. 68)
	47a	14	4.9	East Liverpool, OH (Water Department)
	48A	10	16.3	Weirton Water, WV (Tower, Collier Way)
	51a	5	8.0	Aliquippa, PA (Sheffield Substation)
Sediment	2A	13	0.2	BVPS Outfall Vicinity
	49a	3	5.0	Industry, PA (Upstream Montgomery Dam)
	50	12	11.8	New Cumberland, WV (Upstream of Dam

Figure 2-4

Graph of Annual Average Concentration: Cesium-137, Cobalt-58 & Cobalt-60 in Sediment

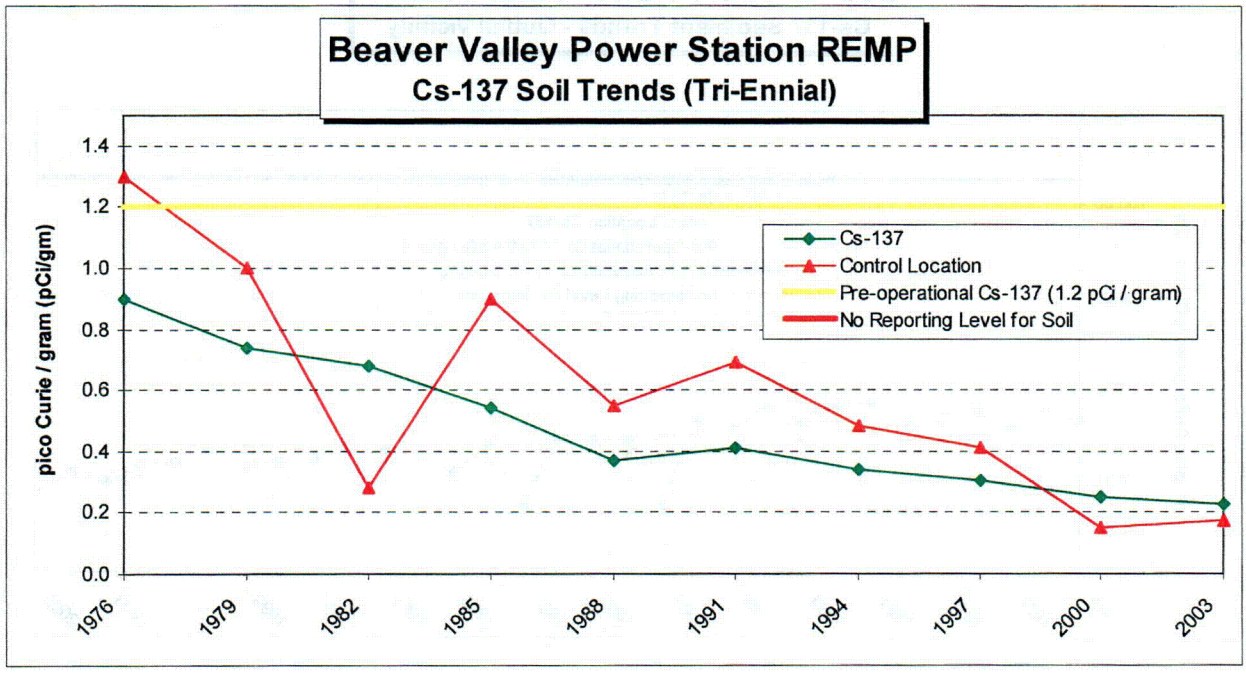




C11

Figure 2-5

Graph of Annual Average Concentration: Cesium-137 in Soil



C12

D. Monitoring of Feed Crops and Food Products

1. Characterization of Farm Products

According to the 2002 Census of Agriculture [1], there were 645 farms in Beaver County. Total market value of production (Crops and Livestock) was $10,828,000.00. Some of the principal sources of revenue (>$100,000.00) are as follows:

Milk and Other Dairy Products from Cows	$4,719,000.00
Cattle and Calves	$1,387,000.00
Nursery, Greenhouse, Floriculture and Sod	$1,129,000.00
Other Crops and Hay	$893,000.00
Vegetables, Melons, Potatoes and Sweet Potatoes	$843,000.00
Grains, Oil Seeds, Dry Beans and Dry Peas	$567,000.00
Poultry and Eggs	$523,000.00
Cut Christmas Trees, and Short Rotation Woody Crops	$285,000.00
Fruits, Tree Nuts and Berries	$198,000.00
Other Animals and Other Animal Products	$85,000.00
Horses, Ponies, Mules, Burros, and Donkeys	$81,000.00
Sheep, Goats and their Products	$60,000.00
Hogs & Pigs	Undisclosed Amount
Aquaculture	Undisclosed Amount

2. Sampling Program and Analytical Techniques

a. Program

Representative samples of Feed Crops (cattle feed) are collected monthly from the nearest dairy farm (Searight Dairy). See Figure 2-6. Each sample is analyzed by gamma spectrometry.

Food products (vegetables) are collected at garden locations during the growing season. Leafy vegetables, (e.g.; cabbage) are obtained from Shippingport, Georgetown, and Industry, Pennsylvania. Samples are also obtained from the control location in Weirton, West Virginia. All samples are analyzed for gamma emitters by gamma spectrometry. Samples are also analyzed by radiochemical analysis for Iodine-131.

[1] **http://www.nass.usda.gov/census/census02/profiles/pa/cp42007.PDF**

b. Procedures

Gamma Emitter Analysis of Feed: Analysis is performed by scanning a dried, homogenized sample with a gamma spectrometry system. A high resolution germanium detector is utilized with this system. Food samples are loaded into tare weight 300 or 150 ml plastic bottles or 1-liter Marinelli containers, weighed and the net weight of the sample is determined prior to scanning for gamma emitters.

Iodine-131 Analysis of Food Crops: Analysis is performed by radiochemistry. A stable iodide carrier is added to a chopped sample, which is then leached with a sodium hydroxide solution, evaporated to dryness and fused in a muffle furnace. The melt is dissolved in water, filtered and treated with sodium hypochlorite. The iodate is then reduced to iodine with hydroxylamine hydrochloride and is extracted into toluene. It is then back-extracted as iodide into sodium bisulfite solution and is precipitated as palladium iodide. The precipitate is weighed for chemical yield and is mounted on a nylon planchet for low level beta counting.

3. Results and Conclusions

A summary of the analysis results during the report period are listed in Table 2-2. A trend graph of analyses (including the pre-operational period through the report period) is shown on Figure 2-7.

a. Feed

A total of twelve (12) samples were analyzed by gamma spectrometry. Naturally occurring Potassium-40 was identified in twelve of twelve (12 of 12) samples. Naturally occurring Beryllium-7 was found in (6 of 12) samples.

b. Food

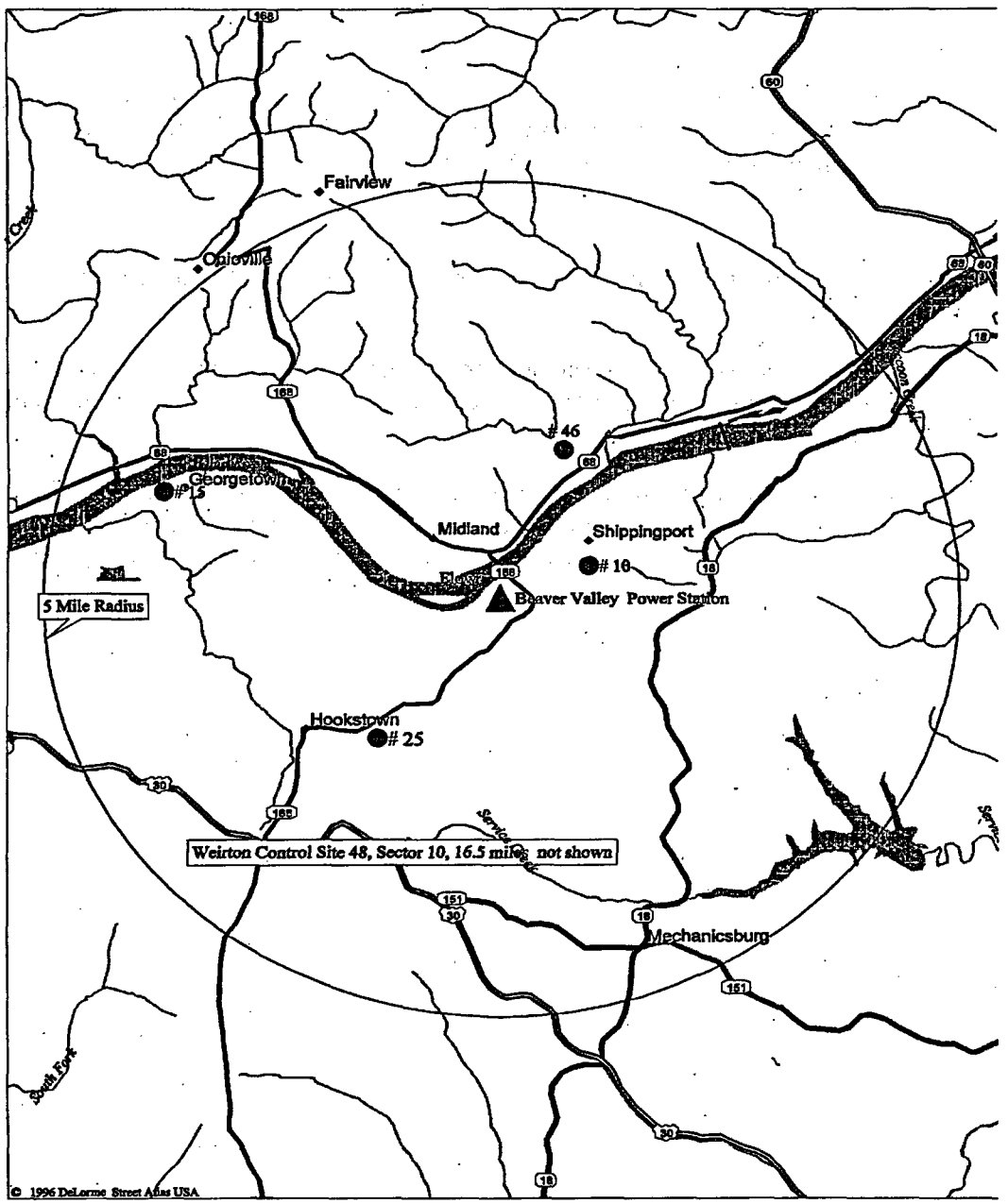
A total of four (4) samples were analyzed for Iodine-131. No detectable concentrations were present.

A total of four (4) samples were analyzed by gamma spectrometry. Naturally occurring Potassium-40 was present in four of four (4 of 4) samples. No other radionuclides were identified.

c. The data from food and feed analyses were consistent with previous data. Based on the analytical results, the operation of the Beaver Valley Power Station did not contribute any measurable increase in radioactivity in the foods and feeds in the vicinity of the site during the report period.

Figure 2-6

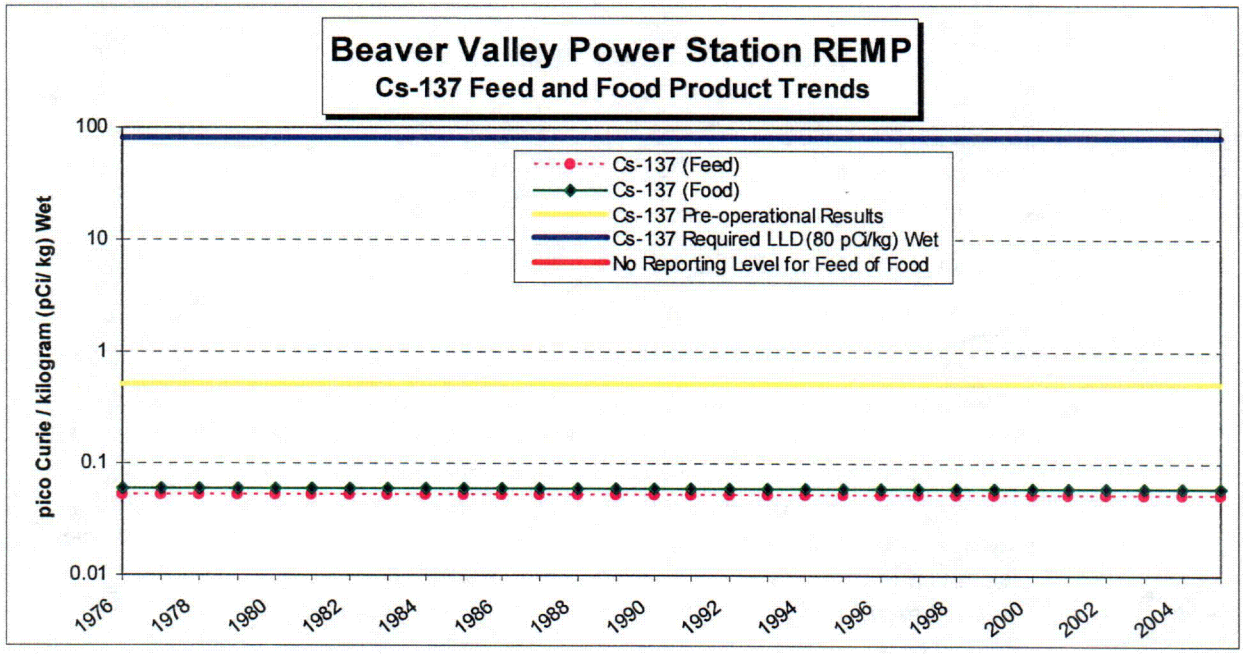
Environmental Monitoring Locations – Feed Crop and Food Product



Sample Type	Site No.	Sector	Distance (miles)	Sample Point Description
Feed	25	10	2.1	Hookstown, PA (Searight Farm)
Food	10a	3	1.0	Shippingport, PA
	15a	14	3.7	Georgetown, PA
	46a	3	2.5	Industry, PA
	48a	10	16.3	Weirton, WV

Figure 2-7

Graph of Annual Average Concentration: Cesium-137 in Feed and Food



C13

E. Monitoring of Local Cow and Goat Milk

1. Description - Milch Animal Locations

Samples of fresh milk are obtained from milch animals at locations and frequencies noted in Table 2-1. The milk is analyzed for its radioiodine content, gamma emitters, strontium-89 and strontium-90.

Detailed field surveys are performed during the grazing season to locate and enumerate milch animals within a five (5) mile radius of the site. Survey data for the most recent survey conducted is shown in Section 3, Land Use Census.

2. Sampling Program and Analytical Techniques

a. Program

Milk was collected from two (2) reference dairy farms within a 10-mile radius of the BVPS site (Searight Farm and Brunton Farm), and from one (1) control location outside of the 10-mile radius (Windsheimer Farm). Additional dairies, which represent the highest potential milk pathway for radioiodine based on milch animal surveys and meteorological data, were selected and sampled. These dairies are subject to change based upon availability of milk or when more recent data (milch animal census) indicate other locations are more appropriate. The location of each is shown in Figure 2-8 and described below.

Site	Dairy	Approximate Number of Animals being Milked	Direction and Distance from Midpoint of Unit 1 Reactor	Collection Period
25	Searight	40 Cows	2.097 miles SSW	Jan. - Dec.
27	Brunton	93 Cows	6.158 miles SE	Jan. - Dec.
69*	Collins	4 Goats	3.547 miles SE	Mar. - Oct.
96	Windsheimer	72 Cows	10.476 miles SSW	Jan. - Dec.
113*	Halstead	64 Cows	5.097 miles SSW	Aug. - Dec.
114	Moore	9 Goats	2.120 miles SW	Mar. - Dec.
* Highest potential pathway dairies				

The sample from the Searight Farm is collected and analyzed weekly for Iodine-131 using a method that ensures a high sensitivity. Samples from each of the other selected dairies are collected monthly when cows are indoors, and bi-weekly when cows are grazing. The monthly and/or bi-weekly sample is analyzed for Strontium-89, Strontium-90, gamma emitters (including Cesium-137) by high resolution germanium gamma spectrometry and Iodine-131 high sensitivity analysis.

b. Procedure

Iodine-131 Analysis of Milk: The milk samples are chemically prepared, and then analyzed with a low-level beta counting system.

Gamma Emitter Analysis of Milk: This is determined by gamma spectrometry analysis of a 1 liter Marinelli container of milk.

Strontium-90 Analysis of Milk: The milk samples are prepared by adding a stable strontium carrier and evaporating to dryness, then ashing in a muffle furnace, followed by precipitating phosphates. Strontium is purified in all samples by the Argonne method using 3 grams of extraction material in a chromatographic column. Stable yttrium carrier is added and the sample is allowed to stand for a minimum of 5 days for the in-growth of yttrium-90 (Y-90). Yttrium is then precipitated as hydroxide, is dissolved and re-precipitated as oxalate. The yttrium oxalate is mounted on a nylon planchet and is counted in a low-level beta counter to infer Strontium-90 activity.

Strontium-89 Analysis of Milk: The Strontium-89 activity is determined by precipitating strontium carbonate ($SrCO_3$) from the sample after yttrium separation. This precipitate is mounted on a nylon planchet, and is covered with an 80 mg/cm^2 aluminum absorber for low level beta counting. Chemical yields of strontium and yttrium are determined by gravimetric means.

3. Results and Conclusions

A summary of the analysis results during the report period are listed in Table 2-2. A trend graph of analyses (including the pre-operational period through the report period) is shown on Figure 2-9.

a. A total of one-hundred-sixteen (116) samples were analyzed for Strontium-89 and Strontium-90. Strontium-90 was detected in one-hundred-ten (110) samples at levels attributable to previous nuclear weapons tests and are within the normally expected range.

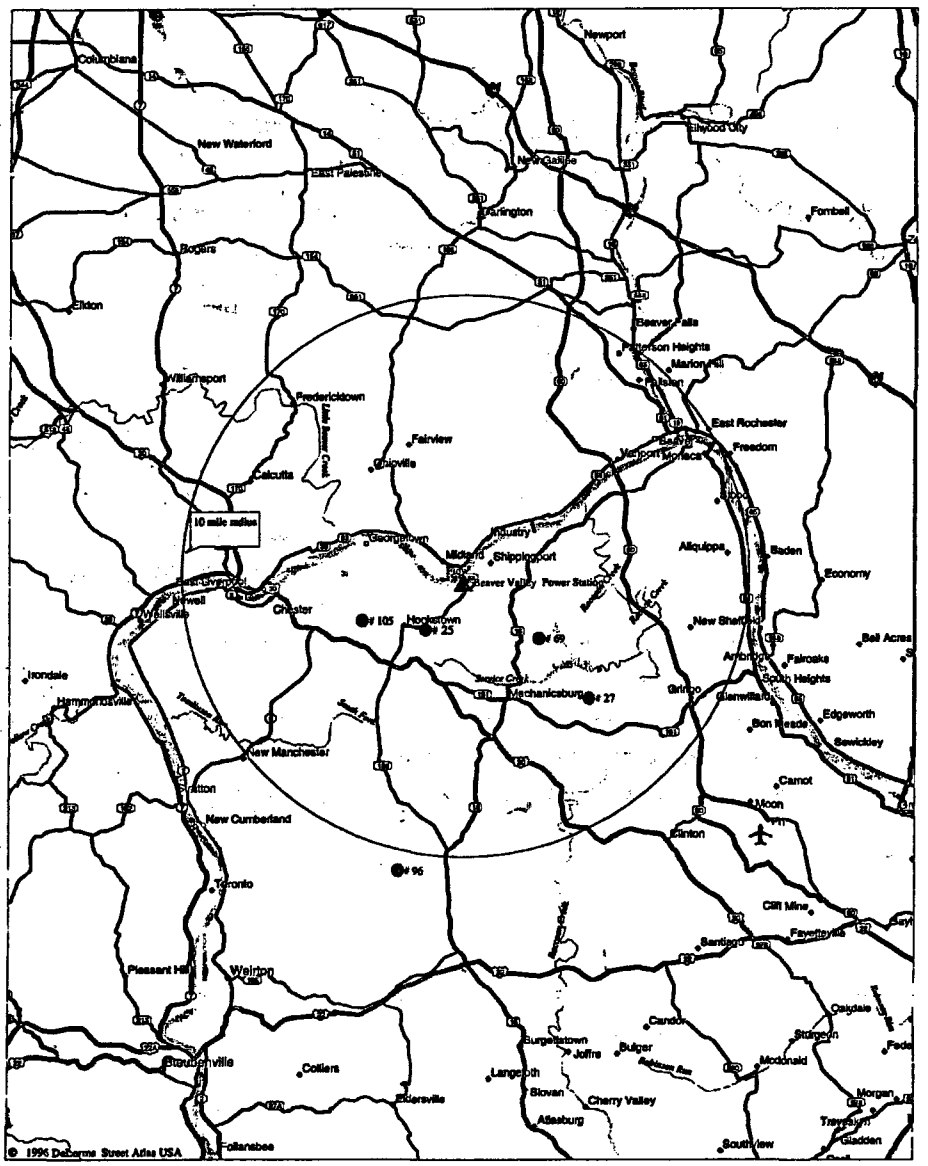
b. A total of one one-hundred-sixteen (116) samples were analyzed by gamma spectrometry. Naturally occurring Potassium-40 was present in all samples. No other radionuclides were identified.

c. A total of one-hundred forty-eight (148) samples were analyzed for Iodine-131 during the report period. All analyses were less than the 0.5 pico Curie / liter LLD value.

d. Based on all the analytical results and the above investigation, the operation of the Beaver Valley Power Station did not contribute any measurable increase in radioactivity in the milk in the vicinity of the site during the report period.

Figure 2-8

Environmental Monitoring Locations - Milk

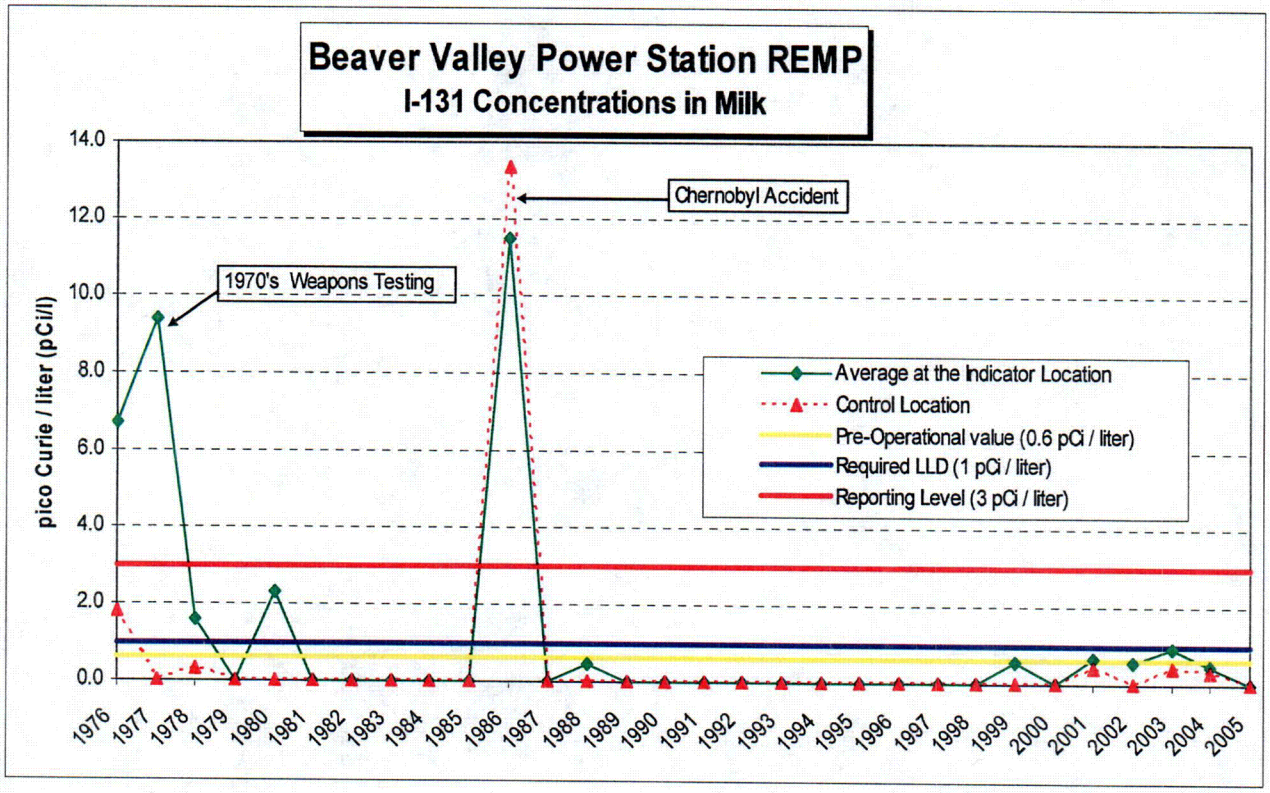


Sample Type	Site No.	Sector	Distance (miles)	Sample Point Description
Milk	25	10	2.1	Hookstown, PA (Searight Farm)
	27	7	6.2	Aliquippa, PA (Brunton Farm)
	69*	7	3.5	Aliquippa, PA (Collins Farm)
	96	10	10.5	Burgettstown, PA (Windsheimer Farm)
	113*	10	5.1	Hookstown, PA (Halstead Farm)
	114*	11	2.1	Hookstown, PA (Moore Farm)

* Dairies selected based on highest deposition factors.

Figure 2-9

Graph of Annual Average Concentration: Iodine-131 in Milk



C14

F. Environmental Radiation Monitoring

1. Description of Regional Background Radiation and Sources

The terrain in the vicinity of the Beaver Valley Power Station generally consists of rough hills with altitude variations of 300-400 feet. Most of the land is wooded.

The principal geologic features of the region are nearly flat-laying sedimentary beds of the Pennsylvania Age. Beds of limestone alternate with sandstone and shale with abundant interbedded coal layers. Pleistocene glacial deposits partially cover the older sedimentary deposits in the northwest. Most of the region is underlain by shale, sandstone, and some coal beds of the Conemaugh Formation. Outcrops of sandstone, shale, and limestone of the Allegheny Formation exist within the Ohio River Valley and along major tributary streams.

Based on surveys reported in previous annual reports, exposure rates ranged from 6-12 μR/hr.

2. Locations and Analytical Procedures

Ambient external radiation levels around the site were measured using thermoluminescent dosimeters (TLDs).

During the report period, there were a total of forty-four (44) offsite environmental TLD locations. The locations of the TLDs are shown in Figure 2-10.

An additional nineteen (19) TLDs were located at selected areas around the fenced perimeter of BVPS. These TLDs (Site No. 33-44, 52-56B, 111 and 112) are not plotted on Figure 2-10.

The TLDs were annealed at the Contractor Central Laboratory shortly before placing the TLDs in their field locations. The radiation dose accumulated in-transit between the Central Laboratory, the field location, and the Central Laboratory was corrected by transit controls maintained in lead shields at both the Central Laboratory and the field office. All dosimeters were exposed in the field in a special environmental holder.

3. Results and Conclusions

A summary of the TLD results during the report period are listed in Table 2-2. A trend graph of analyses (including the pre-operational period through the report period) is shown on Figure 2-11.

The annual exposure rate of all offsite TLDs averaged 8.4 mR/quarter (0.202 mR/day) during the report period. As in previous years, there was some variation among locations and seasons as would be expected. During the report period, ionizing radiation dose determinations from TLDs averaged 73.6 mR for the year. This is comparable to previous years. There was no evidence of anomalies that could be attributed to the operation of the Beaver Valley Power Station. The TLDs confirm that changes from natural radiation levels, if any, are negligible.

Figure 2-10

Environmental Monitoring Locations - TLDs

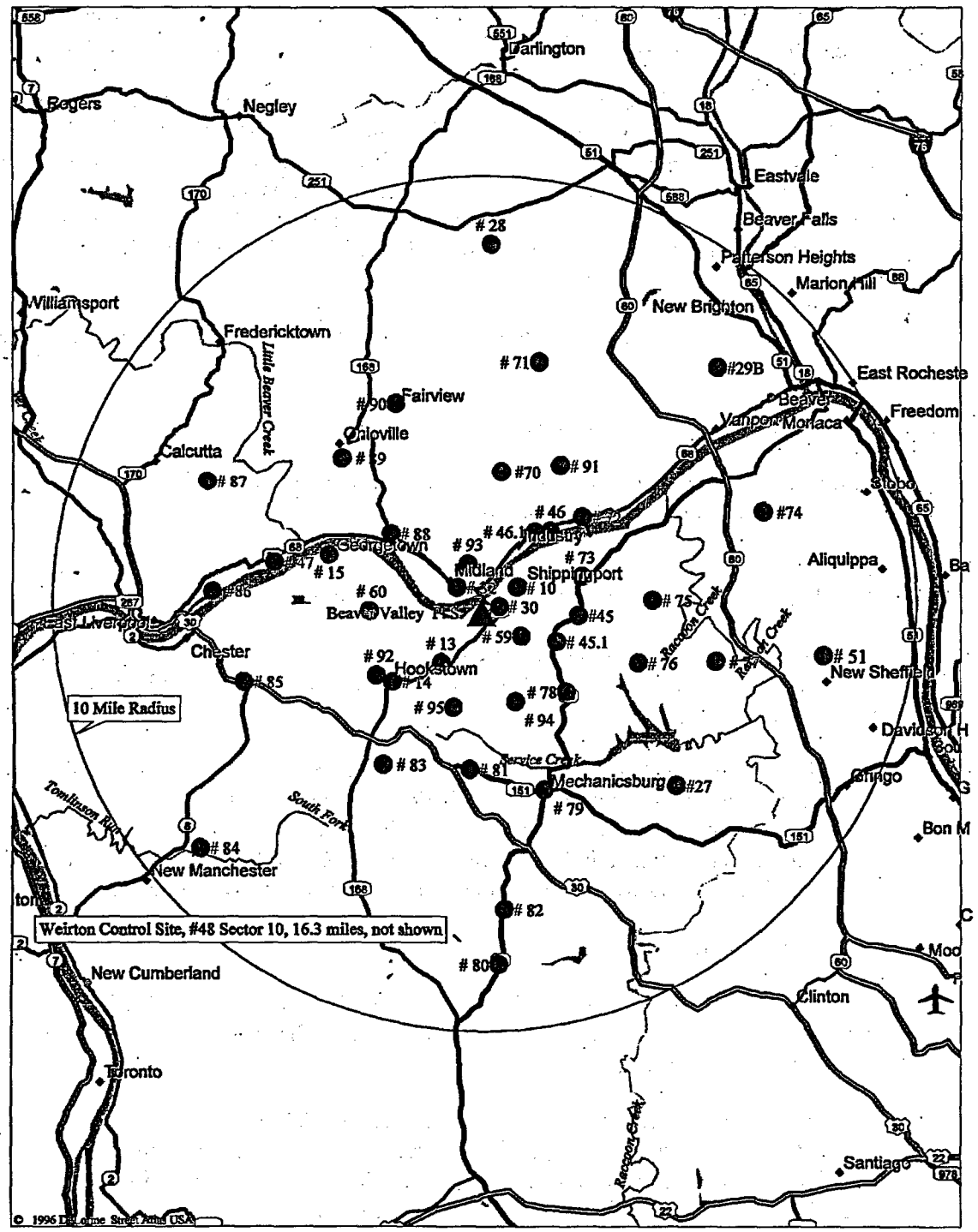


Figure 2-10 (Continued)

TLD Locations

SOUTHEAST QUADRANT

Site No.	Sector	Distance (miles)	Location
27	7	6.1	Aliquippa, PA (Brunton Farm)
45.1	6	1.9	Raccoon Township, PA (Kennedy's Corners)
51	5	8.0	Aliquippa, PA (Sheffield Substation)
59	6	1.0	236 Green Hill Rd.
76	5	4.1	Raccoon Township, PA (Elementary School)
77	6	5.6	Aliquippa, PA (3614 Green Garden Rd.)
78	7	2.7	Raccoon Township, PA (Municipal Bldg)
79	8	4.4	106 Rt. 151 – Ted McWilliams Auto Body
80	9	8.2	Raccoon Township, PA (Park Office, Rt. 18)
82	9	6.9	2697 Rt. 18
94	10	2.3	Hookstown, PA (832 McCleary Rd.)

NORTHWEST QUADRANT

Site No.	Sector	Distance (miles)	Location
15	14	3.7	Georgetown, PA (Post Office)
32	15	0.8	Midland, PA (North Substation)
47	14	4.9	East Liverpool, OH (Water Department)
60	13	2.5	Georgetown, PA (444 Hill Rd.)
86	13	6.2	East Liverpool, OH (1090 Ohio Avenue)
87	14	7.0	50103 Calcutta Smith's Ferry Rd.
88	15	2.8	Midland, PA (110 Summit Roud)
89	15	4.8	Ohioville, PA (488 Smith Ferry Road)
90	16	5.2	Midland, PA (6286 Tuscarawras Road)
93	16	1.1	Midland, PA (104 Linden - Sunrise Hills)

NORTHEAST QUADRANT

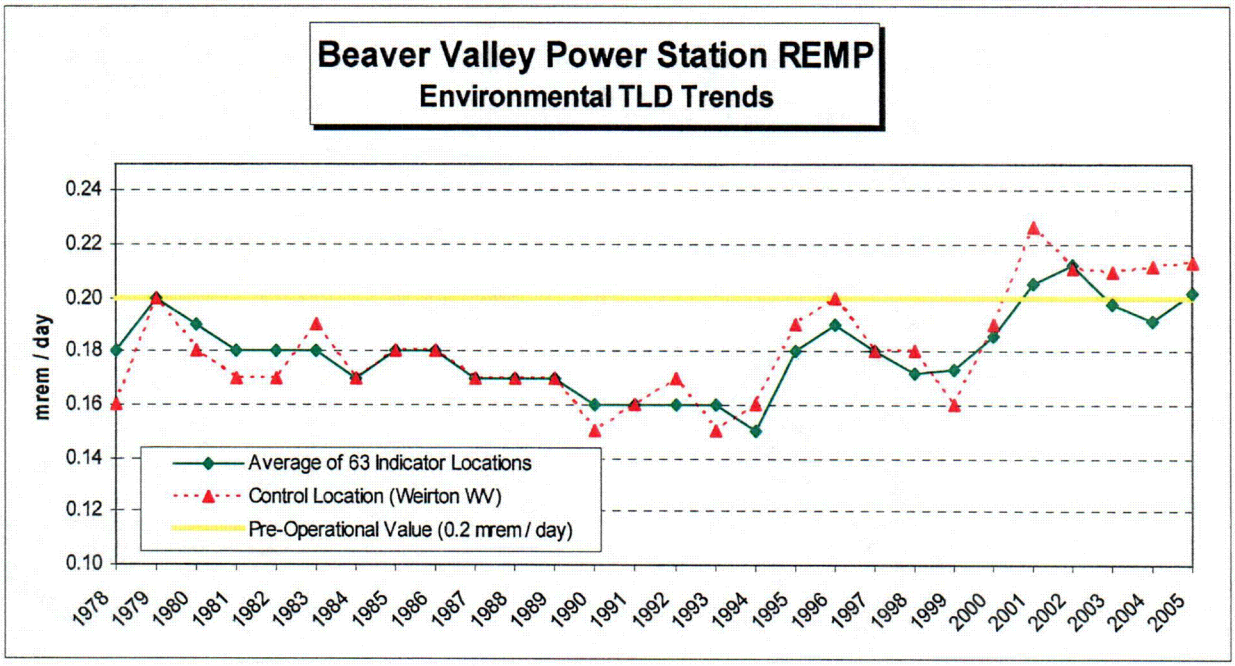
Site No.	Sector	Distance (miles)	Location
10	3	1.0	Shippingport, PA (Post Office)
28	1	8.60	Sherman Farm
29B	3	8.0	Beaver, PA (Friendship Ridge)
30	4	0.5	Shippingport, PA (Cook's Ferry S.S.)
45	5	2.2	Raccoon Township, PA (Christian House Baptist Chapel – Rt. 18)
46	3	2.5	Industry, PA (Midway Drive)
46.1	3	2.3	Industry, PA (McKeel's Service – Rt. 68)
70	1	3.4	Industry, PA (236 Engle Rd.)
71	2	6.0	Brighton Township (First Western Bank)
72	3	3.3	Ohioview, PA (Luthern Church – Rear)
73	4	2.5	618 Squirrel Run Rd.
74	4	7.0	Monaca, PA (137 Poplar Ave. – CCBC)
75	6	3.8	Aliquippa, PA (117 Holt Road)
91	2	3.9	Pine Grove Rd. & Doyle Rd.

SOUTHWEST QUADRANT

Site No.	Sector	Distance (miles)	Location
13	11	1.4	Hookstown. PA (Old Meyer Farm)
14	11	2.5	Hookstown, PA
48	10	16.3	Weirton, WV (Water Tower, Collier Way)
81	9	3.6	Millcreek United Presby. Church
83	10	4.2	735 Mill Creek Road
84	11	8.3	Hancock County, WV (Senior Center)
85	12	5.7	2048 Rt. 30
92	12	2.8	Georgetown, PA (Georgetown Road Substation)
95	8	2.2	Hookstown, PA (McCleary & Pole Cat Hollow Rds.)

Figure 2-11

Graph of Annual Average Exposure: Direct Radiation in Environment



C15

G. Monitoring of Fish

1. Description

During the report period, fish collected for the radiological monitoring program included channel catfish, bullhead catfish, and freshwater drum.

2. Sampling Program and Analytical Techniques

a. Program

Fish samples are collected semi-annually in the New Cumberland pool of the Ohio River at the Beaver Valley effluent discharge point and upstream of the Montgomery Dam. The edible portion of each different species caught is analyzed by gamma spectroscopy. Fish sampling locations are shown in Figure 2-12.

b. Procedure

A sample is prepared in a standard tare weight 300 ml plastic bottle and scanned for gamma emitting nuclides with gamma spectrometry system which utilizes a high resolution germanium detector.

3. Results and Conclusions

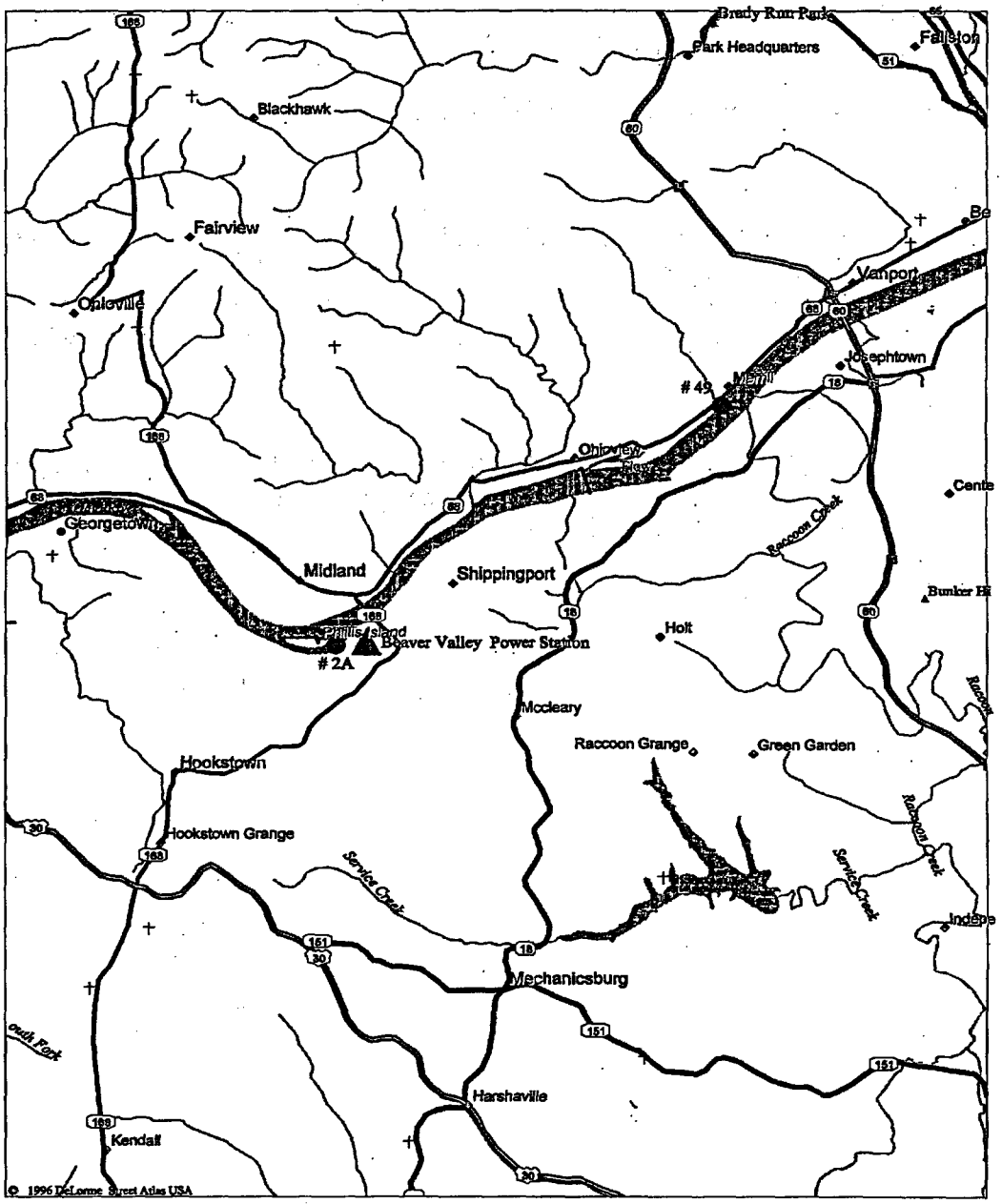
A summary of the analysis results during the report period are listed in Table 2-2. A trend graph of analyses (including the pre-operational period through the report period) is shown on Figure 2-13.

A total of eight (8) samples were analyzed by gamma spectroscopy. No gamma emitting radionuclides were detected.

Based on the analytical results, the operation of the Beaver Valley Power Station did not contribute any measurable increase in radioactivity in the Ohio River fish population during the report period.

Figure 2-12

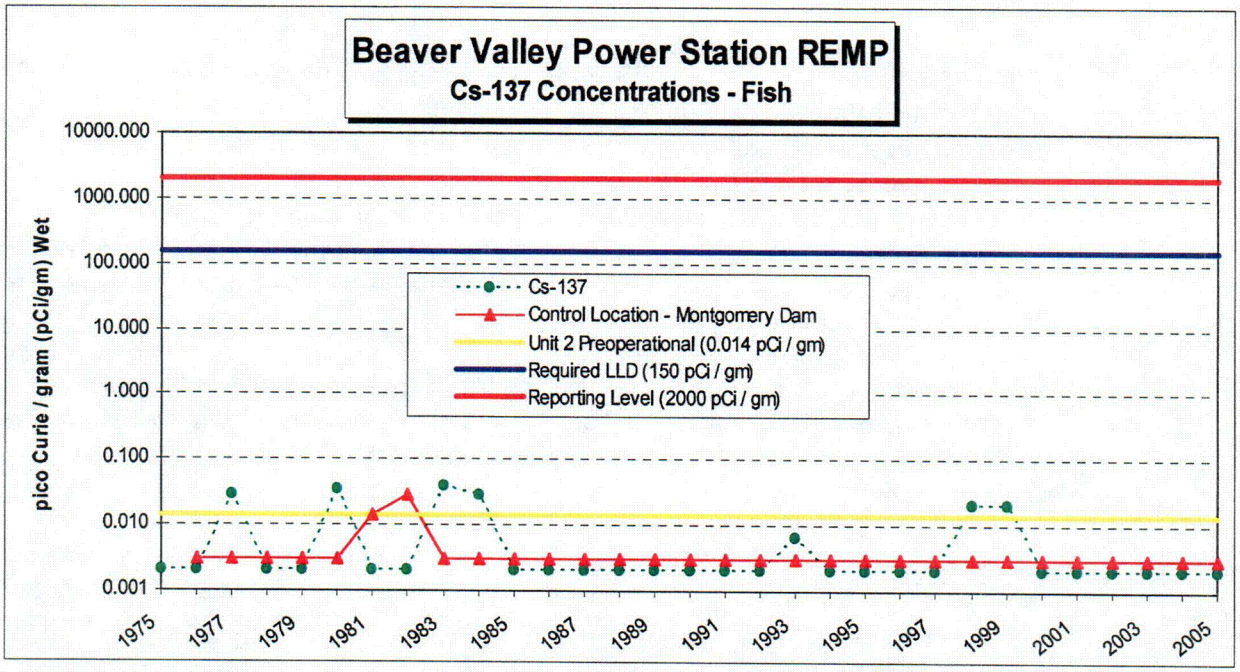
Environmental Monitoring Locations - Fish



Sample Type	Site No.	Sector	Distance (miles)	Sample Point Description
Fish	2A	13	0.2	BVPS Outfall Vicinity
	49a	3	5.0	Industry, PA (Upstream Montgomery Dam)

Figure 2-13

Graph of Annual Average Concentration: Cesium-137 in Fish



C16

H. Monitoring of Surface, Drinking, Ground Waters and Precipitation

1. Description of Water Sources

The Ohio River is the main body of water in the area. It is used by the Beaver Valley Power Station for plant make-up, for the cooling tower and for receiving plant liquid effluents.

Ohio River water is a source of water for some towns both upstream and downstream of the Beaver Valley Power Station site. It is used by several municipalities and industries downstream of the site. The nearest user of the Ohio River as a potable water source is Midland Borough Municipal Water Authority. The intake of the treatment plant is approximately 1.5 miles downstream and on the opposite side of the river. The next downstream user is East Liverpool, Ohio which is approximately 6 miles downstream. The heavy industries in Midland, as well as others downstream use river water for cooling purposes.

Groundwater occurs in large volumes in the gravel terraces which lie along the river, and diminishes considerably in the bedrock underlying the site. Normal well yields in the bedrock are less than 10 gallons per minute (gpm) with occasional wells yielding up to 60 gpm.

In general, the BVPS site experiences cool winters and moderately warm summers with ample annual precipitation evenly distributed throughout the year. The average annual precipitation for the area is 37.85 inches based on 1971 to 2000 data collected at the Pittsburgh International Airport.

2. Sampling and Analytical Techniques

a. Surface (Raw River) Water

The sampling program of river water includes three (3) sampling points along the Ohio River. Raw water samples are collected daily at the East Liverpool (Ohio) Water Treatment Plant [River Mile 41.2], and the made into weekly composite sample. One automatic river water sampler is located at the ATI-Allegheny Ludlam (formerly J&L Steel) river water intake [River Mile 36.2]. The automatic sampler takes a 20-40 ml sample every 15 minutes and samples are collected on a weekly basis. A weekly grab sample is taken upstream of the Montgomery Dam [River Mile 29.6]. The weekly grab sample and automatic water sample are then made into a monthly composite sample from each location. In addition, a quarterly composite sample is prepared for each sample point.

The weekly grab samples upstream of the Montgomery Dam are analyzed for Iodine-131.

The monthly composites are analyzed for gamma emitters. The quarterly composites are analyzed for tritium.

Locations of each sample point are shown in Figure 2-14.

b. Drinking Water (Public Supplies)

Drinking water (i.e.; treated water) is collected at both the Midland, PA and East Liverpool, OH Water Treating Plants. An automatic sampler at each location collects 20-40 ml every 20 minutes, and then made into a weekly composite sample. The weekly composite sample from each location is analyzed for Iodine-131.

Monthly composites are made from the weekly samples, and are analyzed by gamma spectrometry. Quarterly composites are analyzed for tritium. Locations of each sample point are shown in Figure 2-14.

c. Groundwater

Semi-annual grab samples were collected from three (3) locations within four (4) miles of the site (see Figure 2-14). These locations are:

One (1) well in Shippingport, PA

One (1) well in Hookstown, PA

One (1) well in Georgetown, PA

Each ground water sample is analyzed for tritium and by gamma spectrometry.

d. Precipitation

Precipitation is collected at Shippingport, PA, East Liverpool, OH, and Weirton, WV. Precipitation, when available, is collected each week and then made into quarterly composite samples. The quarterly composites are analyzed for tritium and gamma emitters. Locations of each sample point are shown in Figure 2-14.

e. Procedures

Gamma Analysis of Groundwater: The analysis is performed on water samples by placing one liter of the sample into a Marinelli container and analyzing the sample on a high resolution germanium gamma spectrometry system.

Tritium Analysis of Groundwater: The tritium is determined in water samples by liquid scintillation analysis.

Iodine-131 Analysis of Groundwater: The sample is chemically prepared, and analyzed with a low-level beta counting system.

3. Results and Conclusions

A summary of the analysis results of water samples (surface water, drinking water, ground water and precipitation) during the report period are listed in Table 2-2. A trend graph of analyses (including the pre-operational period through the report period) is shown on Figure 2-15.

a. Surface Water

A total of twelve (12) samples were analyzed quarterly for Hydrogen-3 (Tritium). One of twelve (1 of 12) results was positive. The positive value was below the required LLD for tritium in water. That sample was obtained from the Control location, which is five (5) miles upstream of the BVPS outfall facility. The Control location is not influenced by BVPS operation.

A total of thirty-six (36) samples were analyzed by gamma spectrometry. No radionuclides were detected.

A total of fifty-two (52) samples were analyzed for Iodine-131 using radiochemical methods. Positive indications were detected in forty-one of fifty-two (41 of 52) weekly samples. The results were similar to previous years, (current years range = 0.3 to 2.3 pico Curie / liter). The positive results were detected at the Control location, which is five (5) miles upstream (not influenced by BVPS operation). Identification of Iodine-131 during the report period was most likely due to medical diagnostic and treatment procedures. (Reference CR05-05057-01).

b. Drinking Water

A total of twelve (12) samples were analyzed for Tritium. Two of twelve (2 of 12) results were positive. The highest positive value (233 pico Curies / liter) was well below the required LLD (2,000 pico Curies / liter). One (1) of the positive samples was obtained from the Control location, which is five (5) miles upstream of the BVPS outfall facility. The Control location is not influenced by BVPS operation. The other positive sample was obtained from a downstream location, and that value was similar to the upstream value.

A total of thirty-six (36) samples were analyzed by gamma spectrometry. No gamma-emitting radionuclides were detected.

A total of one hundred-fifty-six (156) samples were analyzed for Iodine-131 using radiochemical methods. Positive indications were detected in ninety-six of one-hundred-fifty six (96 of 156) samples. All of the positive values were below the required LLD (1 pico Curie / liter). The positive results were detected at a downstream location and at the Control location, which is five (5) miles upstream (not influenced by BVPS operation). As previously indicated, identification was not due to BVPS discharges and was most likely due to medical diagnostic and treatment procedures.

c. Groundwater

A total of six (6) samples were each analyzed for Tritium and by gamma spectrometry. No gamma-emitting radionuclides were detected. All six (6) tritium results were less than LLD.

d. Precipitation

A total of twelve (12) samples were analyzed for Tritium and by gamma spectrometry. Three of twelve (3 of 12) positive tritium results detected were within normal levels. No gamma emitting radionuclides were detected.

e. Deviations from required sampling schedule and analysis

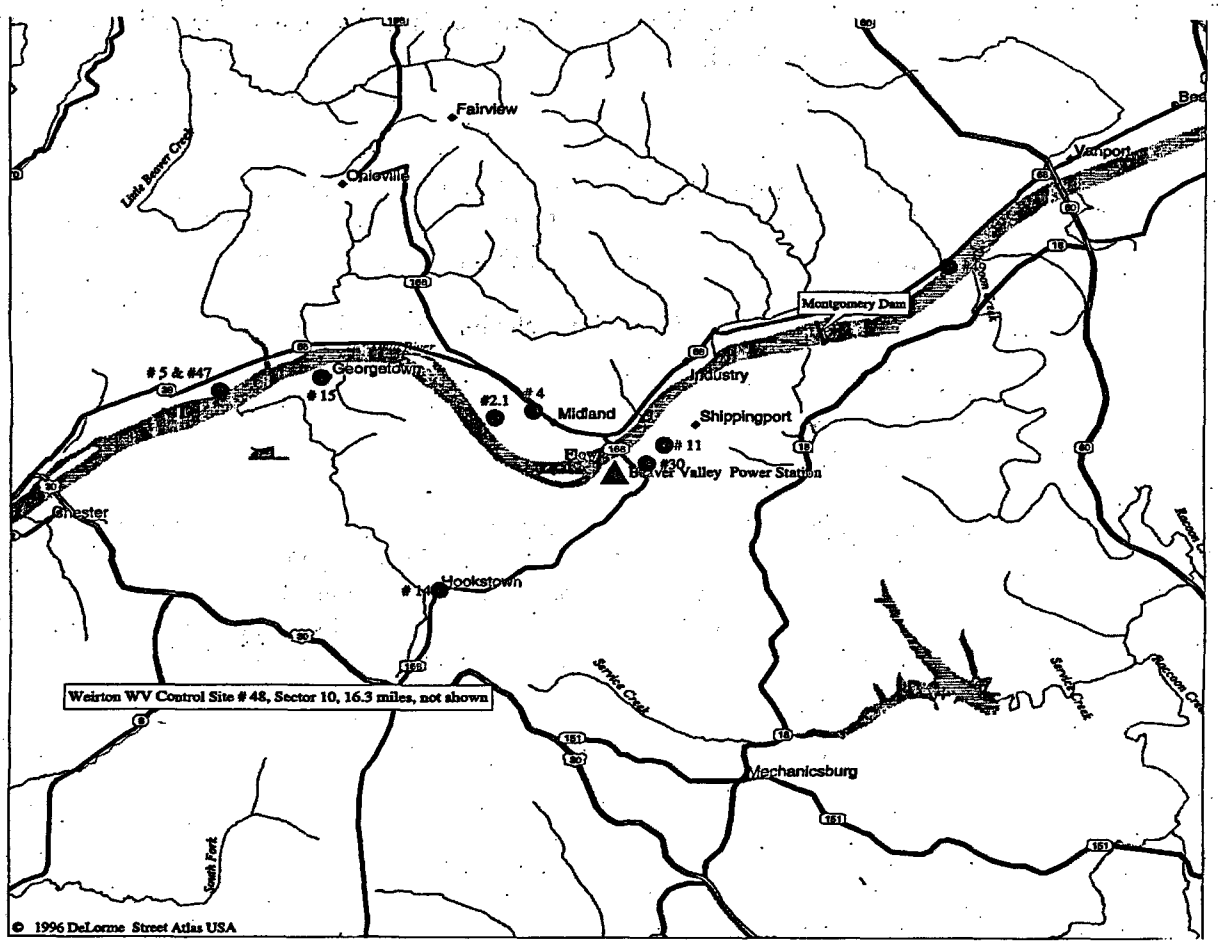
None

f. Summary

The data from water analyses demonstrates that the Beaver Valley Power Station did not contribute a significant increase of radioactivity in the local river, in the drinking water, in the well water, or in the precipitation. The analytical results confirm that the station assessments, prior to authorizing radioactive discharges, are adequate and that the environmental monitoring program is sufficiently sensitive.

Figure 2-14

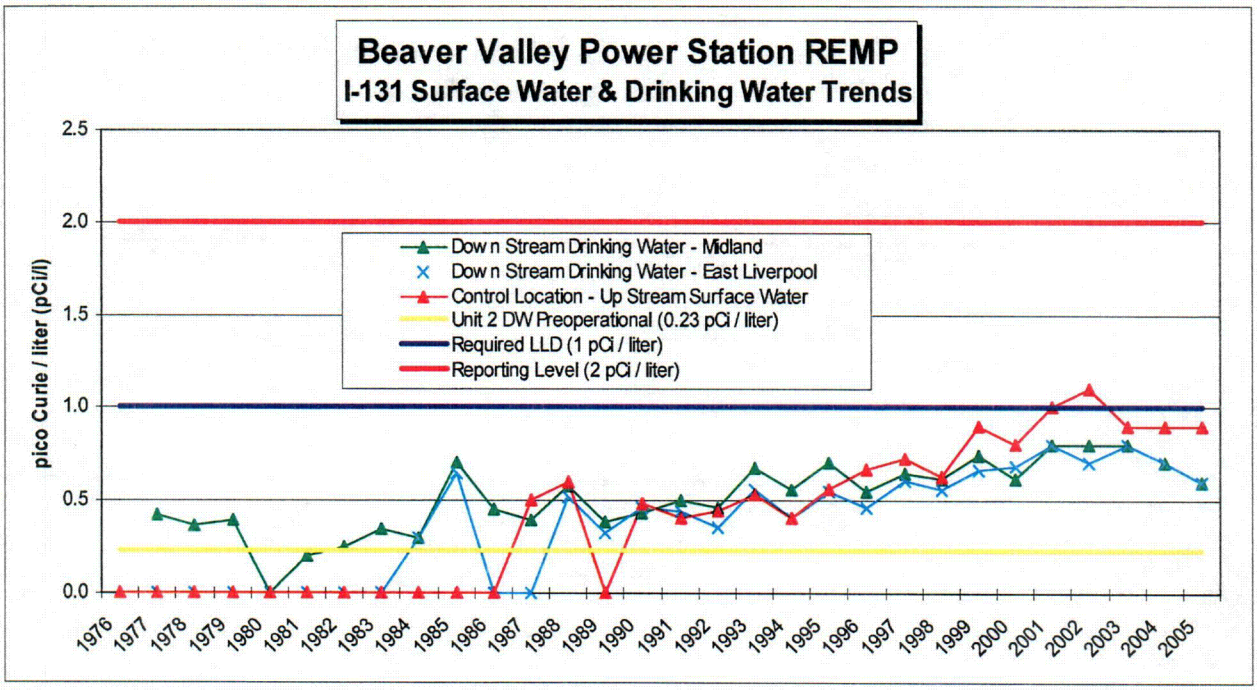
Environmental Monitoring Locations - Ground Water, Surface Water, Drinking Water and Precipitation



Sample Type	Site No.	Sector	Distance (miles)	Sample Point Description
Drinking Water	4	15	1.3	Midland, PA (Water Departmen)
	5	14	4.9	East Liverpool, OH (Water Department)
Surface Water	2.1	14	1.5	Midland, PA (ATI Allegheny Ludlam)
	5	14	4.9	East Liverpool, OH (Water Department)
	49a	3	5.0	Industry, PA (Upstream Montgomery Dam)
Ground Water	11	3	0.8	Shippingport, PA
	14a	11	2.5	Hookstown, PA
	15a	14	3.7	Georgetown, PA
Precipitation	30	4	0.5	Shippingport, PA (Cook's Ferry Substation)
	47	14	4.9	East Liverpool, OH (Water Department)
	48	10	16.3	Weirton WV (Water Tower, Collier Way)

Figure 2-15

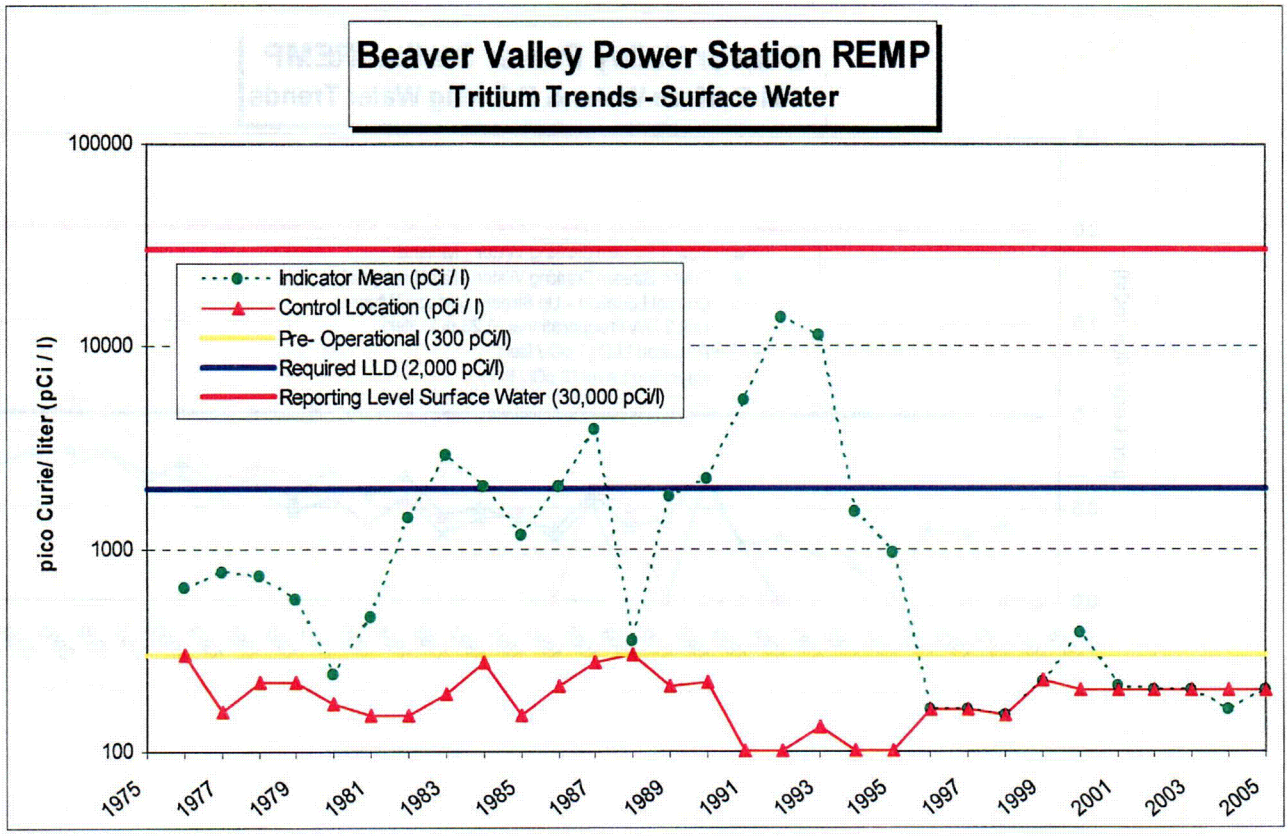
Graph of Annual Average Concentration: Iodine-131 in Surface Water & Drinking Water



C17

Figure 2-16

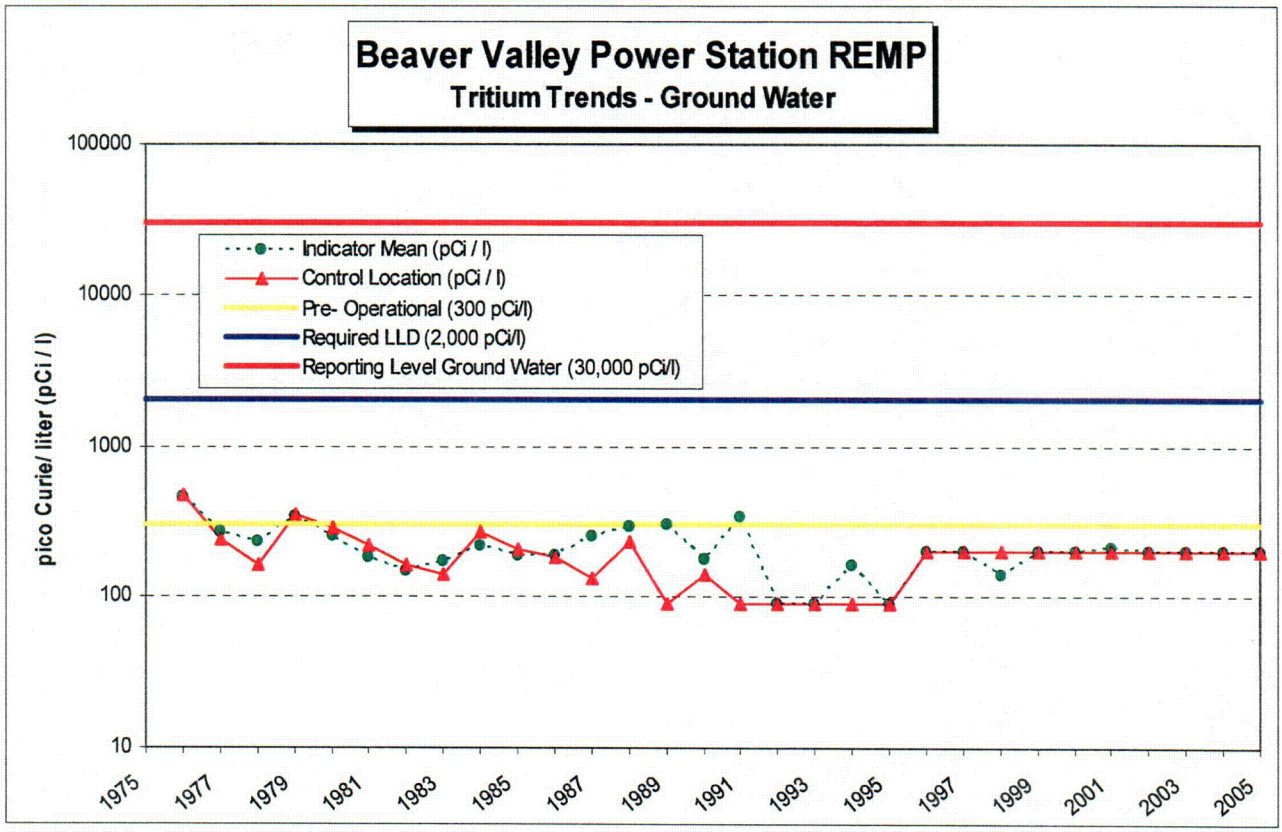
Graph of Annual Average Concentration: Tritium in Surface Water



C18

Figure 2-17

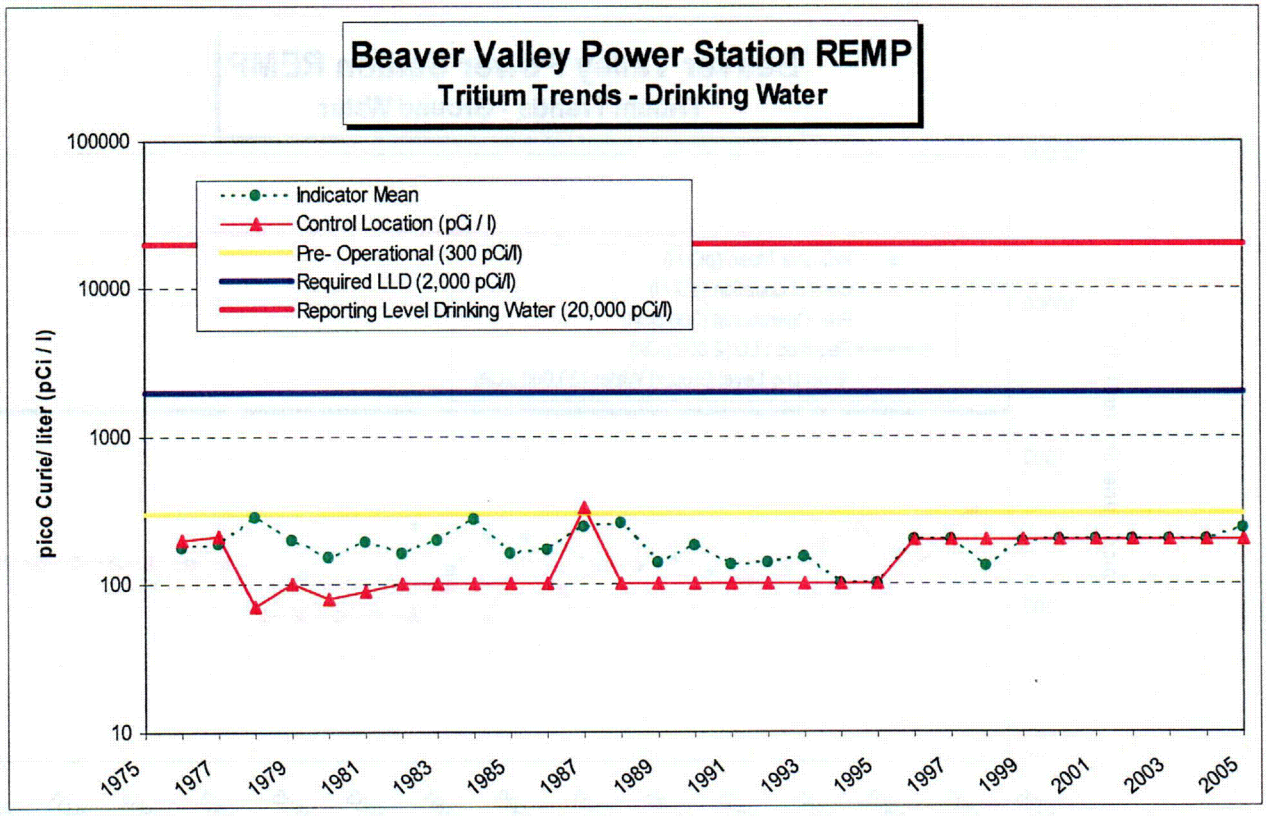
Graph of Annual Average Concentration: Tritium in Ground Water



C19

Figure 2-18

Graph of Annual Average Concentration: Tritium in Drinking Water



C20

I. Estimates of Radiation Dose to Man

1. Pathways to Man - Calculational Models

The radiation doses to man as a result of Beaver Valley operations were calculated for both gaseous and liquid effluent pathways using computer codes for the ARERAS/MIDAS computer system. These computer codes are equivalent to NRC computer codes XOQDOQ2, GASPAR, and LADTAP. Dose factors listed in the Offsite Dose Calculation Manual are used to calculate doses from radioactive noble gases in discharge plumes. Beaver Valley effluent data, based on sample analysis were used as the radionuclide activity input.

All liquid and gaseous effluent radionuclides listed in the Annual Radioactive Effluent Release Report were input as source terms to the computer codes.

All batch and continuous gaseous effluent releases were included in the dose assessment calculations. The release activities are based on laboratory analysis. Meteorological data collected by the Beaver Valley Power Station Meteorology System was also used as input to the computer codes. Except when more recent or specific data was available, the usage factors were obtained from the BVPS Final Environmental Statements or Regulatory Guide 1.109. The airborne effluent pathways evaluated provided population doses out to 50 miles.

All radioactive liquid effluents are released by batch mode after analysis by gamma spectrometry. Each batch is diluted by cooling tower blowdown water prior to discharge into the Ohio River via the main outfall (River Mile 35.0). The actual data from these analyses are tabulated and used as the radionuclide source term input to the computer code. Except when more recent or specific data was available, the usage factors were obtained from the BVPS Final Environmental Statements or Regulatory Guide 1.109. The liquid effluent pathways evaluated provided population doses out to 50 miles.

2. Results of Calculated Population Dose to Man - Liquid Effluent Releases

During the report period, the calculated dose to the entire population (~4 million people) within 50 miles of the plant is presented in Table 2-4 for BVPS liquid effluent releases. Also shown in this table is a comparison to natural radiation exposure.

3. Results of Calculated Population Dose to Man – Gaseous Effluent Releases

During the report period, the calculated dose to the entire population (~4 million people) within 50 miles of the plant is presented in Table 2-5 for BVPS airborne effluent releases. Also shown in this table is a comparison to natural radiation exposure. The doses include the contribution of all pathways.

4. Conclusions

Based upon the estimated dose to individuals from the natural background radiation exposure in Tables 2-4 and 2-5, the incremental increase in total body dose to the 50-mile population (approximately 4 million people), from the operation of Beaver Valley Power Station - Unit 1 and 2, is less than 0.00003% of the annual background dose.

The calculated doses to the public from the operation of Beaver Valley Power Station - Unit 1 and 2, are below BVPS annual limits and resulted in only a small incremental dose to that which area residents already received as a result of natural background. The doses constituted no meaningful risk to the public.

Table 2-4

**Comparison of Natural Radiation Exposure Versus
Calculated Population Dose to Man - Liquid Effluent Releases**

TYPICAL DOSE TO INDIVIDUALS FROM NATURAL RADIATION EXPOSURE [a]		
Ambient Gamma Radiation	=	58 millirem / year
Radionuclides in Body	=	40 millirem / year
Global Fallout	=	< 1 millirem / year
Radon	=	198 millirem / year
Average Individual	=	**296 millirem / year**
(Total from all sources shown above)		

(a) National Academy of Sciences, "The Effects on Populations of Exposure to Low Levels of Ionizing Radiation," BEIR Report, 1990

0-50 mile Population Dose from BVPS Liquid Effluent Releases		
	Man-millirem	**Largest Isotope Contributor**
Total Dose	**942**	**Tritium**
Average Dose (per Individual)	**0.0002355**	**Tritium**

Comparison of Individual Dose BVPS Liquid Effluent Releases Versus Natural Background Radiation	
	millirem
BVPS Liquid Effluent Release Dose	**0.0002355**
Natural Radiation Exposure	**296**

Table 2-5

Comparison of Natural Background Exposure Versus Calculated Population Dose to Man – Gaseous Effluent Releases

TYPICAL DOSE TO INDIVIDUALS FROM NATURAL RADIATION EXPOSURE [a]		
Ambient Gamma Radiation	=	58 millirem / year
Radionuclides in Body	=	40 millirem / year
Global Fallout	=	< 1 millirem / year
Radon	=	198 millirem / year
Average Individual	=	**296 millirem / year**
(Total from all sources shown above)		

(b) National Academy of Sciences, "The Effects on Populations of Exposure to Low Levels of Ionizing Radiation," BEIR Report, 1990

0-50 mile Population Dose from BVPS Gaseous Effluent Releases		
	Man-millirem	**Largest Isotope Contributor**
Total	**296**	**Tritium**
Average (per Individual)	**0.0000741**	**Tritium**

Comparison of Individual Dose BVPS Gaseous Effluent Releases Versus Natural Background Radiation	
	millirem
BVPS Gaseous Effluent Release Dose	**0.0000741**
Natural Radiation Exposure	**296**

SECTION 3 - LAND USE CENSUS

A Land Use Census was conducted August 1 through October 1, 2005 to comply with:

- Unit 1 and Unit 2 Technical Specification 6.8.6b, Item 1
- Offsite Dose Calculation Manual procedure 1/2-ODC-3.03, *"Controls for RETS and REMP Programs"*, Attachment R, Control 3.12.2, and Surveillance Requirement 4.12.2.1
- BVPS REMP procedure 1/2-ENV-04.02, *"Milch Animal Sampling Location Determination & ODCM Procedure 1/2-ODC-3.03, Control 3.12.2 Action Statements a and b Compliance Determination"*

The Land Use census indicates that no changes were required in the current sampling locations, and no changes were required to the methodology used for determination of offsite dose from plant releases. A numerical summary of the Land Use Census results are provided in Table 3-1. The following information is also provided to clarify the Land Use Census results as documented in Condition Report No. CR05-07299:

- **Nearest Resident:**
  The current location has not changed since the previous census.
  The current location is at 211 Ferry Hill Road, Shippingport, PA (0.406 miles NE).
- **Nearest Garden >500 sqft:**
  The current location has changed since the previous census.
  The previous location was at 158 Morrow Drive, Shippingport, PA (1.028 miles ENE).
  The current location is at 238 State Route 168, Hookstown, PA (0.760 miles SSW).
- **Nearest Dairy Cow Milked:**
  The current location has not changed since the previous census.
  The current location is at Searight Dairy, 948 McCleary Road, RD 1, Hookstown, PA (2.097 miles SSW).
- **Nearest Doe Goat Milked:**
  The current location has not changed since the previous census.
  The current location is at 982 State Route 168, Hookstown, PA (2.120 miles SW).
  NOTE: this is not the nearest location, but it is the nearest location providing samples.
- **Nearest Beef Cattle:**
  The current location has not changed since the previous census.
  The current location is at 105 Shippingport Road, Shippingport, PA (1.405 miles ENE).

- **Projection for 2006 Dairy Cow Sampling Locations:**
  Using a linear regression analysis of deposition parameters (D/Q), Dairy Cow sampling locations were determined to remain at the same locations used in 2005:
  - **Searight Dairy**, 948 McCleary Road, RD1, Hookstown, PA (2.097 miles SSW)
  - **Halstead Dairy**, 104 Tellish Drive, Hookstown, PA (5.079 miles SSW)
  - **Brunton Dairy**, 3681 Ridge Road, Aliquippa, PA (6.158 miles SE)
  - **Weindsheimer Dairy**, RD 1 Burgettstown, PA (10.476 miles SSW).

- **Projection for 2006 Doe Goat Sampling Locations:**
  The linear regression analysis also indicated that the Doe Goat sampling locations will remain at the same locations used in 2005:
  - **Moore Farm**, 982 State Route 168, Hookstown, PA (2.120 miles SW)
  - **Collins Farm**, 289 Calhoun Road, Aliquippa, PA (3.547 miles, SE).

Table 3-1

Location of Nearest Residents, Gardens, Dairy Cows, Doe Goats and Beef Cattle

SECTOR	RESIDENTS	GARDENS	DAIRY COWS	DOE GOATS	BEEF CATTLE
	0 to 5 miles (miles)	0 to 5 miles (miles)	0 to 5 miles (miles)	0 to 5 miles (miles)	0 to 5 miles (miles)
N	1.584	2.899	None	None	3.461
NNE	1.661	None	None	None	3.110
NE	**0.406**	2.711	None	None	4.869
ENE	0.598	1.028	None	None	**1.405**
E	0.429	1.979	None	3.402	2.620
ESE	0.476	1.713	None	4.285	2.952
SE	1.583	1.802	None	2.293	1.974
SSE	1.102	2.127	None	None	4.573
S	1.399	2.276	3.851	None	2.337
SSW	0.760	**0.760**	**2.097**	**1.818**	1.832
SW	1.453	1.453	None	2.120	1.452
WSW	1.394	2.832	None	3.849	1.544
W	2.204	None	2.701	None	3.176
WNW	2.742	None	None	None	None
NW	0.885	1.033	None	5.125	4.277
NNW	0.902	1.353	2.442	None	2.416

NOTE: Distances shown in Bold print are the nearest location for that receptor

SECTION 4 - SPLIT SAMPLE AND SPIKE SAMPLE INTER-LABORATORY COMPARISON PROGRAM

A. Split Sample Program (Inter-Laboratory Comparison, Part 1 of 2): BVPS participates in a split sample program with the Pennsylvania Department of Environmental Protection (PADEP) in support of their nuclear power plant monitoring program.

- BVPS provided split samples to PADEP throughout the report period. The shared media and number of locations were typically comprised of; milk (1), surface water (3), sediment (1), fish (1), and food crops (2).
- PADEP has co-located continuous air particulate & air iodine sample stations with four (4) of the BVPS locations.
- PADEP has co-located TLDs with twenty-four (24) of the BVPS TLDs.

B. Spike Sample Program (Inter-Laboratory Comparison, Part 2 of 2): BVPS participates in a spike sample program with an Independent Laboratory. This program is used to independently verify sample analyses performed by the BVPS Contractor Laboratory.

The NRC criteria listed in NRC Inspection Procedure 84750, 12/4/90, Inspection Guidance 84750-03 is used as the acceptance criteria for comparisons of results of spiked samples between the Contractor Lab and the Independent Lab. These comparisons are performed by dividing the comparison standard (Independent Lab result) by its associated uncertainty to obtain the resolution. The comparison standard value is multiplied by the ratio values obtained from the following table to find the acceptance band for the result to be compared. However, in such cases where the counting precision of the standard yields a resolution of less than 4, a valid comparison is not practical, and therefore, not performed.

Resolution	Ratio
< 4	--
4 - 7	0.50 - 2.00
8 - 15	0.60 - 1.66
16 - 50	0.75 - 1.33
51 - 200	0.80 - 1.25
> 200	0.85 - 1.18

Participation in an Inter-Laboratory Comparison Program is required by BVPS Unit 1 and 2 Technical Specification 6.8.6b, Item 3. For the report period, the requirement was met by the Contractor Lab analyzing NIST traceable spiked samples supplied by an Independent Lab.

During the report period, BVPS used (Environmental, Inc., Midwest Laboratory – Northbrook, IL) as the Contractor Laboratory, and (Analytics – Atlanta, GA) as the Independent Laboratory.

The spiked samples included air particulate filter papers, charcoal cartridges, water samples, and milk samples. The samples were submitted by the Independent Laboratory to the Contractor Laboratory for analysis. The "spiked to" values were used for calculating comparison Acceptance Criteria.

- **Spiked Milk & Water Samples:** The spiked sample results for each calendar quarter are reported in Table 4-1 through Table 4-4, respectively. The following summary is provided:
  - A total of forty-eight (48) gamma spectrometry radionuclide analyses were performed by the Contractor Laboratory on four (4) milk samples.
  - A total of forty-eight (48) gamma spectrometry radionuclide analyses were performed by the Contractor Laboratory on four (4) water samples.
  - A total of four (4) tritium analyses were performed by the Contractor Laboratory on four (4) water samples.
  - Comparison of results of the spiked milk and water samples showed acceptable agreement. All one-hundred (100) analyses performed by the Contractor Laboratory were within the Acceptance Criteria.
- **Spiked Filter Paper and Charcoal Cartridge Samples:** The spiked sample results for each calendar quarter are also reported in Table 4-1 through Table 4-4, respectively. The following summary is provided:
  - Gross Beta (Cesium-137) analyses were performed by the Contractor Laboratory on two (2) filter paper samples.
  - Iodine-131 analyses were performed by the Contractor Laboratory on two (2) charcoal cartridge samples.
  - Comparison of results of the spiked filter paper and charcoal cartridge samples showed acceptable results. All four (4) analyses performed by the Contractor Laboratory were within the Acceptance Criteria.

B. Conclusions

- **Results of Split Sample Program:**

  SINCE the split sample program is coordinated by the state, THEN the results are not provided with this report.

- **Results of Spike Sample Program:**

  Based on the Inter-Laboratory comparison data, BVPS considers all analyses provided throughout the report period by the Contractor Laboratory to be acceptable with respect to both accuracy and measurement. A comparison of the data is provided in the following tables.

Table 4-1

Inter-Laboratory Comparison Program
Spiked Samples – 1st Quarter

Sample Date	Sample Type and Identification No.	Sample Analyses	Percent Difference Between Contractor Lab Activity and Independent Lab Calculated Activity (Contr. Lab – Ind. Lab) / Ind. Lab
04/14/2005	**Water** Ind Lab: E4560-93 Con. Lab: SPW-1852	Sr-89	-6.16%
		Sr-90	12.86%
		I-131	-1.72%
		Ce-141	-5.08%
		Cr-51	-6.65%
		Cs-134	-9.01%
		Cs-137	-0.40%
		Co-58	-2.94%
		Mn-54	-0.55%
		Fe-59	3.43%
		Zn-65	-0.40%
		Co-60	-2.46%
04/14/2005	**Water** Ind. Lab: E4559-93 Con. Lab: SPW-1848	H-3	7.38%
04/14/2005	**Milk** Ind. Lab: E4561-93 Con. Lab: SPMI-1849	Sr-89	-0.54%
		Sr-90	15.56%
		I-131	-2.32%
		Ce-141	4.87%
		Cr-51	14.16%
		Cs-134	-6.16%
		Cs-137	-0.08%
		Co-58	-2.22%
		Mn-54	0.36%
		Fe-59	6.42%
		Zn-65	1.18%
		Co-60	-5.23%
04/14/2005	**Filter Paper** Ind. Lab: E4562-93 Con. Lab: SPAP-1850	Cs-137 (Gross Beta)	11.21%
04/14/2005	**Charcoal Cartridge** Ind. Lab: E4563-93 Con. Lab: SPCH-1851	I-131	-4.50%

Table 4-2

Inter-Laboratory Comparison Program
Spiked Samples – 2nd Quarter

Sample Date	Sample Type and Identification No.	Sample Analyses	Percent Difference Between Contractor Lab Activity and Independent Lab Calculated Activity (Contr. Lab – Ind. Lab) / Ind. Lab
06/09/2005	**Water** Ind. Lab: E4595-93 Con. Lab: SPW-3168	Sr-89	-0.11%
		Sr-90	-5.83%
		I-131	2.02%
		Ce-141	2.67%
		Cr-51	2.76%
		Cs-134	-6.44%
		Cs-137	9.51%
		Co-58	1.67%
		Mn-54	-0.96%
		Fe-59	-0.71%
		Zn-65	3.02%
		Co-60	-4.11%
06/09/2005	**Water** Ind. Lab: E4594-93 Con. Lab: SPW-3166	H-3	-0.74%
06/09/2005	**Milk** Ind. Lab: E4596-93 Con. Lab: SPMI-3167	Sr-89	-0.80%
		Sr-90	11.82%
		I-131	-1.49%
		Ce-141	0.65%
		Cr-51	-4.06%
		Cs-134	-7.58%
		Cs-137	130.26%
		Co-58	26.00%
		Mn-54	-1.04%
		Fe-59	0.16%
		Zn-65	2.97%
		Co-60	-3.72%

Table 4-3

Inter-Laboratory Comparison Program
Spiked Samples – 3rd Quarter

Sample Date	Sample Type and Identification No.	Sample Analyses	Percent Difference Between Contractor Lab Activity and Independent Lab Calculated Activity (Contr. Lab – Ind. Lab) / Ind. Lab
09/15/2005	**Water** Ind. Lab: E4722-93 Con. Lab: SPW-5160	Sr-89	-1.12%
		Sr-90	8.18%
		I-131	0.77%
		Ce-141	0.53%
		Cr-51	-1.32%
		Cs-134	-6.62%
		Cs-137	0.68%
		Co-58	-6.49%
		Mn-54	5.86%
		Fe-59	4.19%
		Zn-65	2.08%
		Co-60	-2.82%
09/15/2005	**Water** Ind. Lab: E4721-93 Con. Lab: SPW-5156	H-3	5.78%
09/15/2005	**Milk** Ind. Lab: E4723-93 Con. Lab: SPMI-5157	Sr-89	-9.32%
		Sr-90	5.83%
		I-131	-3.83%
		Ce-141	-1.76%
		Cr-51	-7.87%
		Cs-134	-6.64%
		Cs-137	-0.15%
		Co-58	-1.43%
		Mn-54	3.15%
		Fe-59	8.03%
		Zn-65	2.11%
		Co-60	-4.19%
09/15/2005	**Filter Paper** Ind. Lab: E4724-93 Con. Lab: SPAP-5158	Cs-137 (Gross Beta)	16.55%
09/15/2005	**Charcoal Cartridge** Ind. Lab: E4725-93 Con. Lab: SPCH-5159	I-131	-5.94%

Table 4-4

Inter-Laboratory Comparison Program
Spiked Samples – 4th Quarter

Sample Date	Sample Type and Identification No.	Sample Analyses	Percent Difference Between Contractor Lab Activity and Independent Lab Calculated Activity (Contr. Lab – Ind. Lab) / Ind. Lab
12/08/2005	**Water** Ind. Lab: E4847-93 Con. Lab: SPW-6886	Sr-89	0.11%
		Sr-90	-2.86%
		I-131	1.70%
		Ce-141	-1.88%
		Cr-51	0.42%
		Cs-134	-6.72%
		Cs-137	2.01%
		Co-58	-2.98%
		Mn-54	4.73%
		Fe-59	-0.33%
		Zn-65	1.06%
		Co-60	0.99%
12/08/2005	**Water** Ind. Lab: E4846-93 Con. Lab: SPW-6884	H-3	-1.24%
12/08/2005	**Milk** Ind. Lab: E4848-93 Con. Lab: SPMI-6885	Sr-89	-16.17%
		Sr-90	4.00%
		I-131	-5.87%
		Ce-141	-3.35%
		Cr-51	-0.21%
		Cs-134	-7.13%
		Cs-137	-2.06%
		Co-58	-0.90%
		Mn-54	2.11%
		Fe-59	4.39%
		Zn-65	4.55%
		Co-60	-3.24%