

Beaver Valley Power Station - Units 1 & 2

2006 Annual Radiological Environmental Operating 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

EXECUTIVE SUMMARY and INDEX

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-one (31)** 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-thirteen (313)** analyses were performed on samples from the control locations. In addition, **eight (8)** analyses were completed for TLD's at the control locations. 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-three-hundred-ninety-two (1392)** analyses were performed on samples collected from more than **ninety (90)** indicator locations. In addition, **five-hundred-three (503)** 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.

EXECUTIVE SUMMARY and INDEX

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:

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

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.

EXECUTIVE SUMMARY and INDEX

- **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-212, 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 also 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.

EXECUTIVE SUMMARY and INDEX

EXECUTIVE SUMMARY ii

SECTION 1 – INTRODUCTION

A. Scope and Objectives of the Program1-1
B. Description of the Beaver Valley Site1-1

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

A. Environmental Radioactivity Monitoring Program 2-1
 1. Program Description 2-1
 2. Summary of Results 2-5
 3. Quality Control Program 2-5
 4. Program Changes 2-5
B. Air Monitoring 2-23
 1. Characterization of Air and Meteorology 2-23
 2. Air Sampling Program and Analytical Techniques 2-23
 3. Results and Conclusions 2-24
C. Monitoring of Sediments and Soil 2-27
 1. Characterization of Stream Sediments and Soils 2-27
 2. Sampling Program and Analytical Techniques 2-27
 3. Results and Conclusions 2-28
D. Monitoring of Feedcrops and Food Products 2-33
 1. Characterization of Farm Products 2-33
 2. Sampling Program and Analytical Techniques 2-33
 3. Results and Conclusions 2-35
E. Monitoring of Local Cow and Goat Milk 2-38
 1. Description – Milch Animal Locations 2-38
 2. Sampling Program and Analytical Techniques 2-38
 3. Results and Conclusions 2-40
F. Environmental Radiation Monitoring 2-44
 1. Description of Regional Background Radiation and Sources 2-44
 2. Locations and Analytical Techniques 2-44
 3. Results and Conclusions 2-44
G. Monitoring of Fish 2-49
 1. Description 2-49
 2. Sampling Program and Analytical Techniques 2-49
 3. Results and Conclusions 2-49

EXECUTIVE SUMMARY and INDEX

TABLE OF CONTENTS (Continued)

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM (continued)

| | | |
|----|---|------|
| H. | Monitoring of Surface, Drinking, Ground Waters and Precipitation | 2-52 |
| 1. | Description of Water Sources | 2-52 |
| 2. | Sampling and Analytical Techniques | 2-52 |
| 3. | Results and Conclusions | 2-54 |
| I. | Estimates of Radiation Dose to Man | 2-61 |
| 1. | Pathways to Man – Calculational Models | 2-61 |
| 2. | Results of Calculated Population Dose to Man – Liquid Effluent Releases | 2-61 |
| 3. | Results of Calculated Population Dose to Man – Gaseous Effluent Releases | 2-61 |
| 4. | Conclusions | 2-62 |

SECTION 3 – LAND USE CENSUS 3-1

**SECTION 4 – SPLIT SAMPLE AND SPIKE SAMPLE,
INTER-LABORATORY COMPARISON PROGRAM** 4-1

| | | |
|----|---|-----|
| A. | Split Sample Program (Inter-Laboratory Comparison, Part 1 of 2) | 4-1 |
| B. | Spike Sample Program (Inter-Laboratory Comparison, Part 2 of 2) | 4-1 |
| C. | Conclusions | 4-3 |

EXECUTIVE SUMMARY and INDEX

LIST OF TABLES

| | |
|--|------|
| Table 2-1, Operational Radiological Environmental Monitoring Program | 2-2 |
| Table 2-2, Environmental Monitoring Program Results | 2-6 |
| Table 2-3, Pre-Operational Environmental Radiological Monitoring Program Summary | 2-20 |
| Table 2-4, Comparison of Natural Background Exposure Versus Calculated Population Dose to Man – Liquid Effluent Releases | 2-63 |
| Table 2-5, Comparison of Natural Background Exposure Versus Calculated Population Dose to Man – Gaseous Effluent Releases | 2-64 |
| Table 3-1, Location of Nearest Residents, Gardens, Dairy Cows, Doe Goats and Beef Cattle . | 3-3 |
| Table 4-1, Inter-Laboratory Comparison Program, Spiked Samples - 1 st Quarter | 4-4 |
| Table 4-2, Inter-Laboratory Comparison Program, Spiked Samples – 2 nd Quarter | 4-5 |
| Table 4-3, Inter-Laboratory Comparison Program, Spiked Samples – 3 rd Quarter | 4-6 |
| Table 4-4, Inter-Laboratory Comparison Program, Spiked Samples – 4 th Quarter | 4-7 |

EXECUTIVE SUMMARY and INDEX

LIST OF FIGURES

Figure 1-1, Geographical Map and Principal Communities in 50-mile Radius of the
Beaver Valley Power Station 1-3

Figure 2-1, Environmental Monitoring Locations - Air Sampling Stations 2-25

Figure 2-2, Graph of Annual Average Concentration: Gross Beta in Air Particulates 2-26

Figure 2-3, Environmental Monitoring Locations - Shoreline Sediments and Soil 2-30

Figure 2-4, Graph of Annual Average Concentration: Cesium-137, Cobalt-58 & 60
In Sediment 2-31

Figure 2-5, Graph of Annual Average Concentration: Cesium-137 in Soil 2-32

Figure 2-6, Environmental Monitoring Locations – Feed Crop and Food Product 2-36

Figure 2-7, Graph of Annual Average Concentration: Cesium-137 in Feed and Food 2-37

Figure 2-8, Environmental Monitoring Locations - Milk 2-42

Figure 2-9, Graph of Annual Average Concentration: Iodine-131 in Milk 2-43

Figure 2-10, Environmental Monitoring Locations – TLDs 2-46

Figure 2-11, Graph of Annual Average Exposure: Direct Radiation in Environment 2-48

Figure 2-12, Environmental Monitoring Locations - Fish 2-50

Figure 2-13, Graph of Annual Average Concentration: Cesium-137 in Fish2-51

Figure 2-14, Environmental Monitoring Locations – Ground Water, Surface Water,
Drinking Water and Precipitation 2-56

Figure 2-15, Graph of Annual Average Concentration: Iodine-131 in Surface Water,
and Drinking Water 2-57

Figure 2-16, Graph of Annual Average Concentration: Tritium in Surface Water..... 2-58

Figure 2-17, Graph of Annual Average Concentration: Tritium in Ground Water..... 2-59

Figure 2-18, Graph of Annual Average Concentration: Tritium in Drinking Water.....2-60

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 Ohio River flow (as obtained from the Corps of Engineers – Water Resources Engineering) at the Wheeling Dam ranged from 17,600 cubic feet per second (minimum monthly average) to 77,500 cubic feet per second (maximum monthly average). The mean flow during the report period was 42,192 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. The National Climate Data Center (<http://climvis.ncdc.noaa.gov/cgi-bin/cag3/state-map-display.pl>) indicates the total annual precipitation during the report period was 47.66 inches, and the average mean temperature during the report period was 50.7° Fahrenheit. The predominant wind direction is typically from the southwest in summer and from the west southwest in winter.

SECTION 1 - INTRODUCTION

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

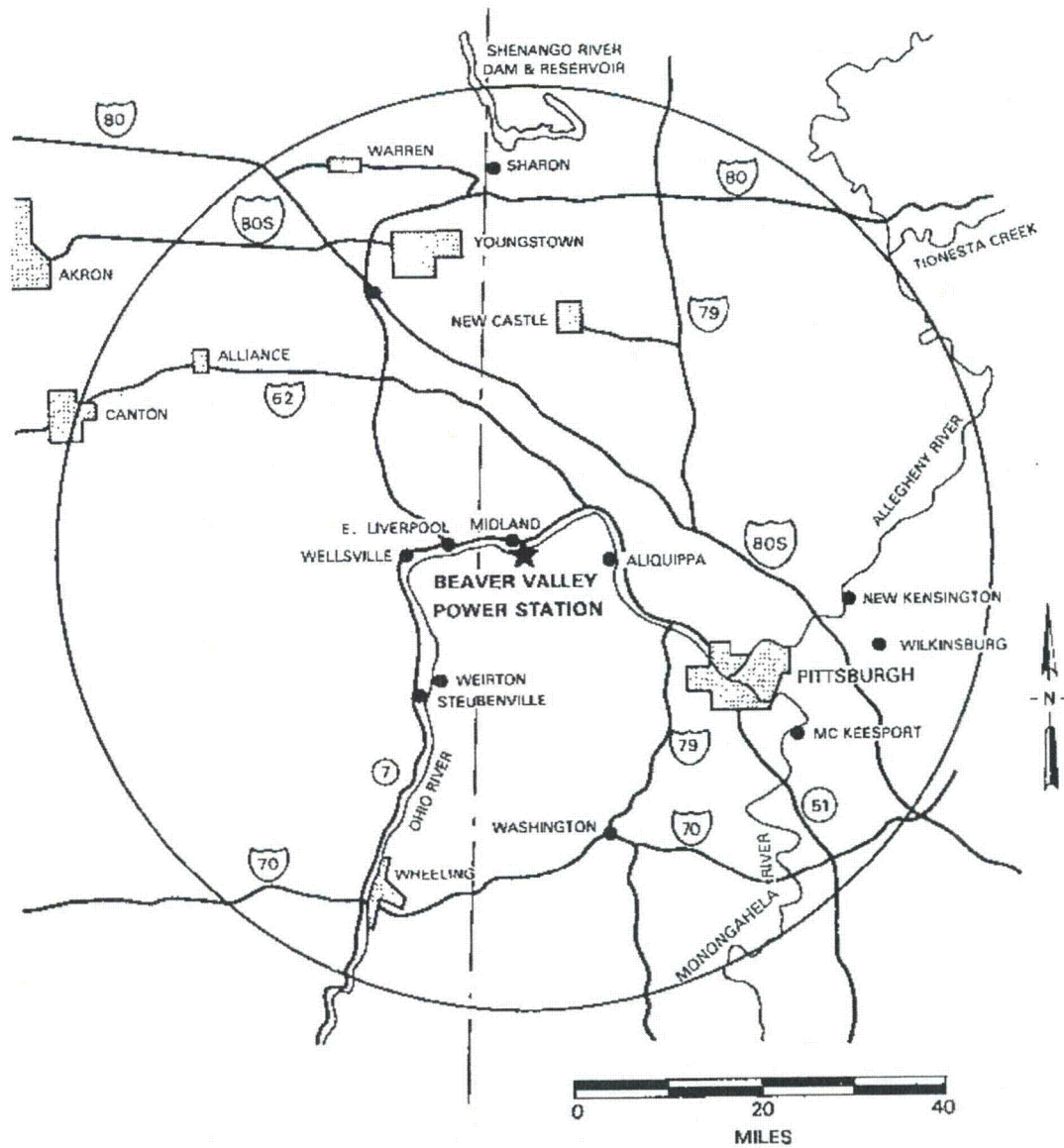
| | <u>Beaver Valley Unit 1</u> | <u>Beaver Valley Unit 2</u> |
|--------------------------------|-----------------------------|-----------------------------|
| Licensed Power Level | 2900 – megawatts thermal | 2900 – megawatts thermal |
| Type of Power | PWR | PWR |
| No. of Reactor Coolant Loops | 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.

SECTION 1 - INTRODUCTION

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

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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 | Gross Beta (b) |
| | | 27 | Aliquippa, PA (Brunton Farm) | | | |
| | | 28 | Sherman Farm | | Weekly – Charcoal | Gamma Scan |
| | | 29B | Beaver, Pa (Friendship Ridge) | | | |
| | | 30 | Shippingport, PA (Cook's Ferry Substation) | | | |
| | | 32 | Midland, PA (North Substation) | | | |
| | | 46.1 | Industry, PA (McKee'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 (f) | 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 (McKee'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 Tuscarawas 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 | | | | | |

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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) Quarterly Composite (d) | Gamma Scan 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, WW (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 (Windsheimer 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, WW | | | |
| 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 WW (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 Tritium (H-3) |
| | | 47 | East Liverpool, OH (Water Department) | | | |
| | | 48 | Weirton WW (Water Tower-Collier Way) | | | |

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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

There were no changes of significance to the sampling program during the report period. The only change of note was relocation of the soil sample Control location. Specifically, due to construction at the previous location, it was moved to the Collier Way Water Tower, which is also the current Control location for the air particulate sampler. Moving the Control location for soil samples does not adversely impact the accuracy or reliability of sample collection.

SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

Table 2-2

RADIOLOGICAL ENVIRONMENTAL 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: 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 Location Mean (fraction) ^(b) Range ^(b) | Locations with Highest Annual Mean | | Control Location | | Number of Nonroutine Reported Measurements ^(c) |
|---|---|--|---|---|---|---|---|
| | | | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | |
| Gross Beta 520 | 0.004 | 0.027 (468 / 468) 0.01 - 0.093 | No. 51 Alliquippa, PA Sheffield Substation 8.00 miles E | 0.03 (52 / 52) 0.012 - 0.093 | No. 48 Weirton, WV Water Tower Collier Way 16.40 miles SSW | 0.028 (52 / 52) 0.011 - 0.053 | 0 |
| I-131 520 | < 0.04 | LLD (0 / 468) | | LLD (0 / 468) | | LLD (0 / 52) | 0 |
| Gamma 40 | | | | | | | |
| Be-7 | NA | 0.077 (36 / 36) 0.053 - 0.106 | No. 27 Alliquippa, PA Brunton Farm 6.14 Miles SE | 0.084 (4 / 4) 0.06 - 0.106 | No. 48 Weirton, WV Water Tower Collier Way 16.40 miles SSW | 0.076 (4 / 4) 0.065 - 0.102 | NA |
| Co-60 | 0.0003 | LLD (0 / 36) | | LLD (0 / 36) | | LLD (0 / 4) | 0 |
| 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) | 0 |

^a Nominal Lower Limit of Detection

^b Mean and range based upon detectable measurements only.

Fraction of detectable 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)

SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

Table 2-2

RADIOLOGICAL ENVIRONMENTAL 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: Drinking Water

Unit of Measurement: (pico Curies / liter)

| Type and Total Number of Analysis Performed | Lower Limit of Detection LLD ^(a) | All Indicator Location Mean (fraction) ^(b) Range ^(b) | Locations with Highest Annual Mean | | Control Location | | Number of Nonroutine Reported Measurements ^(c) |
|---|---|--|--|---|---|---|---|
| | | | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | |
| I-131 154 | 0.5 | 0.625 (49 / 102) 0.3 - 1.2 | No. 5 East Liverpool, OH Water Department 4.90 miles WNW | 0.670 (23 / 52) 0.3 - 1.2 | No. 49 Industry, PA Upstream of Montgomery Dam 4.92 miles NE | 0.819 (37 / 52) 0.3 - 2.1 | 0 |
| H-3 12 | 200 | LLD (0 / 8) | | LLD (0 / 4) | | LLD (0 / 4) | 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 Limit of Detection

^b Mean and range based upon detectable measurements only.

Fraction of detectable 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)

SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

Table 2-2

RADIOLOGICAL ENVIRONMENTAL 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: Surface Water

Unit of Measurement: (pico Curies / liter)

| Type and Total Number of Analysis Performed | Lower Limit of Detection LLD ^(a) | All Indicator Location Mean (fraction) ^(b) Range ^(b) | Locations with Highest Annual Mean | | Control Location | | Number of Nonroutine Reported Measurements ^(c) |
|---|---|--|------------------------------------|---|--|---|---|
| | | | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | |
| I-131 52 | 0.5 | | | | No. 49 Industry, PA Upstream of Montgomery Dam 4.9 miles NE | 0.819 (37 / 52) 0.3 - 2.1 | 0 |
| H-3 12 | 200 | LLD (0 / 8) | | LLD (0 / 4) | | LLD (0 / 4) | 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 Limit of Detection

^b Mean and range based upon detectable measurements only.

Fraction of detectable 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)

SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

Table 2-2

RADIOLOGICAL ENVIRONMENTAL 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: Ground Water

Unit of Measurement: (pico Curies / liter)

| Type and Total Number of Analysis Performed | Lower Limit of Detection LLD ^(a) | All Indicator Location Mean (fraction) ^(b) Range ^(b) | Locations with Highest Annual Mean | | Control Location | | Number of Nonroutine Reported Measurements ^(c) |
|---|---|--|------------------------------------|---|--|---|---|
| | | | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | |
| H-3 6 | 200 | LLD (0 / 4) | | LLD (0 / 4) | No. 11 Shippingport, PA Upstream 0.94 miles NE | LLD (0 / 2) | 0 |
| Gamma 6 | | | | | No. 11 Shippingport, PA Upstream 0.94 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 detectable 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)

SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

Table 2-2

RADIOLOGICAL ENVIRONMENTAL 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: **Precipitation Water**

Unit of Measurement: **(pico Curies / liter)**

| Type and Total Number of Analysis Performed | Lower Limit of Detection LLD ^(a) | All Indicator Location Mean (fraction) ^(b) Range ^(b) | Locations with Highest Annual Mean | | Control Location | | Number of Nonroutine Reported Measurements ^(c) |
|---|---|--|--|---|---|---|---|
| | | | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | |
| H-3 12 | 200 | 239 (3 / 8) 197 - 286 | No. 30 Shippingport, PA Cook's Ferry Substation 0.43 miles ENE | 239 (3 / 4) 197 - 286 | No. 48 Weirton, WV Water Tower Collier Way 16.40 miles SSW | LLD (0 / 4) | 0 |
| Gamma 12 | | | | | | | |
| Mn-54 | 5 | LLD (0 / 8) | | LLD (0 / 8) | | LLD (0 / 4) | 0 |
| Fe-59 | 10 | LLD (0 / 8) | | LLD (0 / 8) | | LLD (0 / 4) | 0 |
| Co-58 | 5 | LLD (0 / 8) | | LLD (0 / 8) | | LLD (0 / 4) | 0 |
| Co-60 | 5 | LLD (0 / 8) | | LLD (0 / 8) | | LLD (0 / 4) | 0 |
| Zn-65 | 10 | LLD (0 / 8) | | LLD (0 / 8) | | LLD (0 / 4) | 0 |
| Zr-Nb-95 | 5 | LLD (0 / 8) | | LLD (0 / 8) | | LLD (0 / 4) | 0 |
| Cs-134 | 5 | LLD (0 / 8) | | LLD (0 / 8) | | LLD (0 / 4) | 0 |
| Cs-137 | 5 | LLD (0 / 8) | | LLD (0 / 8) | | LLD (0 / 4) | 0 |
| Ba-La-140 | 15 | LLD (0 / 8) | | LLD (0 / 8) | | LLD (0 / 4) | 0 |

^a Nominal Lower Limit of Detection

^b Mean and range based upon detectable measurements only.

Fraction of detectable 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)

SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

Table 2-2

RADIOLOGICAL ENVIRONMENTAL 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: Milk

Unit of Measurement: (pico Curies / liter)

| Type and Total Number of Analysis Performed | Lower Limit of Detection LLD ^(a) | All Indicator Location Mean (fraction) ^(b) Range ^(b) | Locations with Highest Annual Mean | | Control Location | | Number of Nonroutine Reported Measurements ^(c) |
|---|---|--|---|---|--|---|---|
| | | | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | |
| I-131 139 | 0.5 | LLD (0 / 118) | | LLD (0 / 118) | No. 96 Burgettstown, PA Windsheimer Farm 10.48 miles SSW | LLD (0 / 21) | 0 |
| Sr-89 108 | 2.0 | LLD (0 / 87) | | LLD (0 / 87) | No. 96 Burgettstown, PA Windsheimer Farm 10.48 miles SSW | LLD (0 / 21) | 0 |
| Sr-90 108 | 0.7 | 1.73 (82 / 87) 0.6 - 4.4 | No. 69 Alliquippa, PA Collings Farm 3.55 miles SE | 2.85 (12 / 12) 1.8 - 4.4 | No. 96 Burgettstown, PA Windsheimer Farm 10.48 miles SSW | 1.16 (21 / 21) 0.6 - 2.7 | 0 |
| Gamma 108 | | | | | | | |
| K-40 | NA | 1428 (87 / 87) 995 - 2013 | No. 114 Hookstown, PA Moore Farm 2.12 miles SW | 1615 (12 / 12) 1325 - 2013 | No. 96 Burgettstown, PA Windsheimer Farm 10.48 miles SSW | 1374 (21 / 21) 1261 - 1528 | NA |
| Mn-54 | 5 | LLD (0 / 87) | | LLD (0 / 87) | | LLD (0 / 21) | 0 |
| Fe-59 | 10 | LLD (0 / 87) | | LLD (0 / 87) | | LLD (0 / 21) | 0 |
| Co-58 | 5 | LLD (0 / 87) | | LLD (0 / 87) | | LLD (0 / 21) | 0 |
| Co-60 | 5 | LLD (0 / 87) | | LLD (0 / 87) | | LLD (0 / 21) | 0 |
| Zn-65 | 10 | LLD (0 / 87) | | LLD (0 / 87) | | LLD (0 / 21) | 0 |
| Zr-Nb-95 | 5 | LLD (0 / 87) | | LLD (0 / 87) | | LLD (0 / 21) | 0 |
| Cs-134 | 5 | LLD (0 / 87) | | LLD (0 / 87) | | LLD (0 / 21) | 0 |
| Cs-137 | 5 | LLD (0 / 87) | | LLD (0 / 87) | | LLD (0 / 21) | 0 |
| Ba-La-140 | 15 | LLD (0 / 87) | | LLD (0 / 87) | | LLD (0 / 21) | 0 |

^a Nominal Lower Limit of Detection

^b Mean and range based upon detectable measurements only.

Fraction of detectable 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)

SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

Table 2-2

RADIOLOGICAL ENVIRONMENTAL 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: Fish

Unit of Measurement: (pico Curies / gram) Wet

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

^a Nominal Lower Limit of Detection

^b Mean and range based upon detectable measurements only.

Fraction of detectable 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)

SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

Table 2-2

RADIOLOGICAL ENVIRONMENTAL 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: Foodcrops

Unit of Measurement: (pico Curies / gram) Wet

| Type and Total Number of Analysis Performed | Lower Limit of Detection LLD ^(a) | All Indicator Location Mean (fraction) ^(b) Range ^(b) | Locations with Highest Annual Mean | | Control Location | | Number of Nonroutine Reported Measurements ^(c) |
|---|---|--|---|---|--|---|---|
| | | | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | |
| I-131 4 | 0.06 | LLD (0 / 3) | | LLD (0 / 3) | | LLD (0 / 1) | 0 |
| Gamma 4 | | | | | | | |
| K-40 | NA | 2.14 (3 / 3) 2.08 - 2.18 | No. 15 Hookstown, PA 321 Third Street 3.7 miles WSW | 2.18 (1 / 1) 2.18 - 2.18 | No. 48a Weirton, WV Weirton Area 16.54 miles SSW | 1.70 (1 / 1) 1.70 - 1.70 | NA |
| Mn-54 | 0.05 | LLD (0 / 3) | | LLD (0 / 3) | | LLD (0 / 1) | 0 |
| Fe-59 | 0.10 | LLD (0 / 3) | | LLD (0 / 3) | | LLD (0 / 1) | 0 |
| Co-58 | 0.05 | LLD (0 / 3) | | LLD (0 / 3) | | LLD (0 / 1) | 0 |
| Co-60 | 0.05 | LLD (0 / 3) | | LLD (0 / 3) | | LLD (0 / 1) | 0 |
| Zn-65 | 0.10 | LLD (0 / 3) | | LLD (0 / 3) | | LLD (0 / 1) | 0 |
| Zr-Nb-95 | 0.03 | LLD (0 / 3) | | LLD (0 / 3) | | LLD (0 / 1) | 0 |
| 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) | 0 |

^a Nominal Lower Limit of Detection

^b Mean and range based upon detectable measurements only.

Fraction of detectable 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)

SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

Table 2-2

RADIOLOGICAL ENVIRONMENTAL 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: Feedstuff

Unit of Measurement: (pico Curies / gram) Wet

| Type and Total Number of Analysis Performed | Lower Limit of Detection LLD ^(a) | All Indicator Location Mean (fraction) ^(b) Range ^(b) | Locations with Highest Annual Mean | | Control Location | | Number of Nonroutine Reported Measurements ^(c) |
|---|---|--|---|---|---|---|---|
| | | | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | |
| Gamma 12 | | | | | | | |
| Be-7 | NA | 2.05 (7 / 12) 0.48 - 4.65 | No. 25 Searight Farm 948 McCleary Road Hookstown, PA 2.1 miles SSW | 2.05 (7 / 12) 0.48 - 4.65 | No. 25 Searight Farm 948 McCleary Road Hookstown, PA 2.1 miles SSW | 2.05 (7 / 12) 0.48 - 4.65 | NA |
| K-40 | NA | 8.94 (12 / 12) 0.27 - 20.16 | No. 25 Searight Farm 948 McCleary Road Hookstown, PA 2.1 miles SSW | 8.94 (12 / 12) 0.27 - 20.16 | No. 25 Searight Farm 948 McCleary Road Hookstown, PA 2.1 miles SSW | 8.94 (12 / 12) 0.27 - 20.16 | NA |
| Mn-54 | 0.05 | LLD (0 / 12) | | LLD (0 / 12) | | LLD (0 / 12) | 0 |
| Fe-59 | 0.10 | LLD (0 / 12) | | LLD (0 / 12) | | LLD (0 / 12) | 0 |
| Co-58 | 0.05 | LLD (0 / 12) | | LLD (0 / 12) | | LLD (0 / 12) | 0 |
| Co-60 | 0.05 | LLD (0 / 12) | | LLD (0 / 12) | | LLD (0 / 12) | 0 |
| Zn-65 | 0.10 | LLD (0 / 12) | | LLD (0 / 12) | | LLD (0 / 12) | 0 |
| Zr-Nb-95 | 0.03 | LLD (0 / 12) | | LLD (0 / 12) | | LLD (0 / 12) | 0 |
| Cs-134 | 0.05 | LLD (0 / 12) | | LLD (0 / 12) | | LLD (0 / 12) | 0 |
| Cs-137 | 0.05 | LLD (0 / 12) | | LLD (0 / 12) | | LLD (0 / 12) | 0 |
| Ba-La-140 | 0.07 | LLD (0 / 12) | | LLD (0 / 12) | | LLD (0 / 12) | 0 |
| Ru-103 | 0.04 | LLD (0 / 12) | | LLD (0 / 12) | | LLD (0 / 12) | 0 |

^a Nominal Lower Limit of Detection

^b Mean and range based upon detectable measurements only.

Fraction of detectable 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)

SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

Table 2-2

RADIOLOGICAL ENVIRONMENTAL 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: 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 Location Mean (fraction) ^(b) Range ^(b) | Locations with Highest Annual Mean | | Control Location | | Number of Nonroutine Reported Measurements ^(c) |
|---|---|--|--|---|--|---|---|
| | | | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | |
| Gamma 6 | | | | | | | |
| K-40 | NA | 10.84 (4 / 4) 10.02 - 12.01 | No. 2A BVPS Outfall Vicinity 0.31 miles WSW | 11.13 (2 / 2) 10.25 - 12.01 | No. 49a Industry, PA Upstream of Montgomery Dam 4.93 miles NE | 9.81 (2 / 2) 8.62 - 10.99 | NA |
| Mn-54 | 0.05 | LLD (0 / 4) | | LLD (0 / 4) | | LLD (0 / 2) | 0 |
| Fe-59 | 0.10 | LLD (0 / 4) | | LLD (0 / 4) | | LLD (0 / 2) | 0 |
| Co-58 | 0.05 | 0.22 (1 / 4) 0.22 - 0.22 | No. 2A BVPS Outfall Vicinity 0.31 miles WSW | 0.22 (1 / 2) 0.22 - 0.22 | No. 49a Industry, PA Upstream of Montgomery Dam 4.93 miles NE | LLD (0 / 2) | 0 |
| Co-60 | 0.05 | 0.51 (1 / 4) 0.51 - 0.51 | No. 2A BVPS Outfall Vicinity 0.31 miles WSW | 0.51 (1 / 2) 0.51 - 0.51 | No. 49a Industry, PA Upstream of Montgomery Dam 4.93 miles NE | LLD (0 / 2) | 0 |
| Zn-65 | 0.10 | LLD (0 / 4) | | LLD (0 / 4) | | LLD (0 / 2) | 0 |
| Zr-95 | 0.03 | LLD (0 / 4) | | LLD (0 / 4) | | LLD (0 / 2) | 0 |
| Nb-95 | 0.03 | LLD (0 / 4) | | LLD (0 / 4) | | LLD (0 / 2) | 0 |
| Cs-134 | 0.05 | LLD (0 / 4) | | LLD (0 / 4) | | LLD (0 / 2) | 0 |
| Cs-137 | 0.05 | 0.08 (3 / 4) 0.08 - 0.09 | No. 2A BVPS Outfall Vicinity 0.31 miles WSW | 0.08 (2 / 2) 0.08 - 0.09 | No. 49a Industry, PA Upstream of Montgomery Dam 4.93 miles NE | 0.07 (2 / 2) 0.06 - 0.09 | 0 |
| | | | No. 50 New Cumberland, WV Upstream of Dam 11.77 miles WSW | 0.08 (1 / 2) 0.08 - 0.08 | | | |
| Ba-La-140 | 0.07 | LLD (0 / 4) | | LLD (0 / 4) | | LLD (0 / 2) | 0 |
| Tl-208 | NA | 0.37 (4 / 4) 0.33 - 0.39 | No. 2A BVPS Outfall Vicinity 0.31 miles WSW | 0.39 (2 / 2) 0.38 - 0.39 | No. 49a Industry, PA Upstream of Montgomery Dam 4.93 miles NE | 0.31 (2 / 2) 0.28 - 0.34 | NA |

SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

Table 2-2

RADIOLOGICAL ENVIRONMENTAL 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: 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 Location Mean (fraction) ^(b) Range ^(b) | Locations with Highest Annual Mean | | Control Location | | Number of Nonroutine Reported Measurements ^(c) |
|---|---|--|--|---|--|---|---|
| | | | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | |
| Bi-214 | NA | 0.903 (4 / 4) 0.74 - 0.99 | No. 50 New Cumberland, WV Upstream of Dam 11.77 miles WSW | 0.94 (2 / 2) 0.89 - 0.99 | No. 49a Industry, PA Upstream of Montgomery Dam 4.93 miles NE | 0.84 (2 / 2) 0.80 - 0.88 | NA |
| Pb-212 | NA | 1.09 (4 / 4) 1.03 - 1.19 | No. 50 New Cumberland, WV Upstream of Dam 11.77 miles WSW | 1.11 (2 / 2) 1.03 - 1.19 | No. 49a Industry, PA Upstream of Montgomery Dam 5 miles NE | 0.91 (2 / 2) 0.76 - 1.05 | NA |
| Pb-214 | NA | 1.028 (4 / 4) 0.86 - 1.12 | No. 50 New Cumberland, WV Upstream of Dam 11.77 miles WSW | 1.07 (2 / 2) 1.04 - 1.09 | No. 49a Industry, PA Upstream of Montgomery Dam 5 miles NE | 0.95 (2 / 2) 0.85 - 1.05 | NA |
| Ra-226 | NA | 2.01 (4 / 4) 1.93 - 2.06 | No. 2A BVPS Outfall Vicinity 0.31 miles WSW | 2.04 (2 / 2) 2.02 - 2.06 | No. 49a Industry, PA Upstream of Montgomery Dam 5 miles NE | 1.95 (2 / 2) 1.64 - 2.26 | NA |
| Ac-228 | NA | 1.16 (4 / 4) 0.98 - 1.34 | No. 2A BVPS Outfall Vicinity 0.31 miles WSW | 1.24 (2 / 2) 1.13 - 1.34 | No. 49a Industry, PA Upstream of Montgomery Dam 5 miles NE | 1.02 (2 / 2) 0.88 - 1.15 | NA |

^a Nominal Lower Limit of Detection

^b Mean and range based upon detectable measurements only.

Fraction of detectable 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)

SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

Table 2-2

RADIOLOGICAL ENVIRONMENTAL 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 (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 Location Mean (fraction) ^(b) Range ^(b) | Locations with Highest Annual Mean | | Control Location | | Number of Nonroutine Reported Measurements ^(c) |
|---|---|--|--|---|---|---|---|
| | | | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | |
| Gamma 10 | | | | | | | |
| K-40 | | 12.54 (9 / 9) 9.75 - 16.14 | No. 29A Beaver, PA Nichol Farm 8.09 miles NE | 16.14 (1 / 1) 16.14 - 16.14 | No. 48 Weirton, WV Water Tower Collier Way 16.40 miles SSW | 14.20 (1 / 1) 14.20 - 14.2 | N/A |
| Mn-54 | | LLD (0 / 9) | | LLD (0 / 1) | | LLD (0 / 1) | 0 |
| Fe-59 | | LLD (0 / 9) | | LLD (0 / 1) | | LLD (0 / 1) | 0 |
| Co-58 | | LLD (0 / 9) | | LLD (0 / 1) | | LLD (0 / 1) | 0 |
| Co-60 | | LLD (0 / 9) | | LLD (0 / 1) | | LLD (0 / 1) | 0 |
| Zn-65 | | LLD (0 / 9) | | LLD (0 / 1) | | LLD (0 / 1) | 0 |
| Zr-95 | | LLD (0 / 9) | | LLD (0 / 1) | | LLD (0 / 1) | 0 |
| Nb-95 | | LLD (0 / 9) | | LLD (0 / 1) | | LLD (0 / 1) | 0 |
| Cs-134 | | LLD (0 / 9) | | LLD (0 / 1) | | LLD (0 / 1) | 0 |
| Cs-137 | | 0.20 (9 / 9) 0.13 - 0.27 | No. 13 Hookstown, PA Old Meyer Farm 1.49 miles SW | 0.27 (1 / 1) 0.27 - 0.27 | No. 48 Weirton, WV Water Tower Collier Way 16.40 miles SSW | 0.28 (1 / 1) 0.28 - 0.28 | 0 |
| | | | No. 46b Industry, PA Willows Inn, Route 68 2.66 miles NE | 0.27 (1 / 1) 0.27 - 0.27 | | | |

SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

Table 2-2

RADIOLOGICAL ENVIRONMENTAL 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

Name of Facility: Beaver Valley Power Station Unit 1 and Unit 2

Medium: Soil (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 Location Mean (fraction) ^(b) Range ^(b) | Locations with Highest Annual Mean | | Control Location | | Number of Nonroutine Reported Measurements ^(c) |
|---|---|--|--|---|---|---|---|
| | | | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | |
| Ba-La-140 | | LLD (0 / 9) | | LLD (0 / 1) | | LLD (0 / 1) | 0 |
| Tl-208 | | 0.36 (9 / 9) 0.24 - 0.47 | No. 29A Beaver, PA Nichol Farm 8.09 miles NE | 0.47 (1 / 1) 0.47 - 0.47 | No. 48 Weirton, WV Water Tower Collier Way 16.40 miles SSW | 0.38 (1 / 1) 0.38 - 0.38 | |
| Bi-214 | | 0.86 (9 / 9) 0.51 - 1.31 | No. 29A Beaver, PA Nichol Farm 8.09 miles NE | 1.31 (1 / 1) 1.31 - 1.31 | No. 48 Weirton, WV Water Tower Collier Way 16.40 miles SSW | 1.10 (1 / 1) 1.10 - 1.10 | N/A |
| Pb-212 | | 1.19 (9 / 9) 0.78 - 1.61 | No. 51a Alliquippa, PA Sheffield Substation 7.99 miles E | 1.61 (1 / 1) 1.61 - 1.61 | No. 48 Weirton, WV Water Tower Collier Way 16.40 miles SSW | 1.16 (1 / 1) 1.16 - 1.16 | N/A |
| Pb-214 | | 0.98 (9 / 9) 0.72 - 1.45 | No. 29A Beaver, PA Nichol Farm 8.09 miles NE | 1.45 (1 / 1) 1.45 - 1.45 | No. 48 Weirton, WV Water Tower Collier Way 16.40 miles SSW | 1.26 (1 / 1) 1.26 - 1.26 | N/A |
| Ra-226 | | 2.20 (9 / 9) 1.61 - 3.02 | No. 29A Beaver, PA Nichol Farm 8.09 miles NE | 3.02 (1 / 1) 3.02 - 3.02 | No. 48 Weirton, WV Water Tower Collier Way 16.40 miles SSW | 2.83 (1 / 1) 2.83 - 2.83 | N/A |
| Ac-228 | | 1.12 (9 / 9) 0.79 - 1.53 | No. 22 South of BVPS Transmission Line 0.3 miles SSE | 1.53 (1 / 1) 1.53 - 1.53 | No. 48 Weirton, WV Water Tower Collier Way 16.40 miles SSW | 1.30 (1 / 1) 1.30 - 1.30 | N/A |

^a Nominal Lower Limit of Detection

^b Mean and range based upon detectable measurements only.

Fraction of detectable 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)

SECTION 2 - ENVIRONMENTAL MONITORING PROGRAM

Table 2-2

RADIOLOGICAL ENVIRONMENTAL 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: External Radiation

Unit of Measurement: (mR / Quarter)

| Type and Total Number of Analysis Performed | Lower Limit of Detection LLD ^(a) | All Indicator Location Mean (fraction) ^(b) Range ^(b) | Locations with Highest Annual Mean | | Control Location | | Number of Nonroutine Reported Measurements ^(c) |
|---|---|--|--|---|---|---|---|
| | | | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | Name Distance and Direction | Mean (fraction) ^(b) Range ^(b) | |
| Gamma 511 | 4.6 | 18.1 (492 - 492) 12.9 - 23.1 | No. 112 BVPS Site Perimeter Location | 22.3 (8 / 8) 21.6 - 23.1 | No. 48 Weirton, WV Water Tower Collier Way 16.40 miles SSW | 19.4 (8 / 8) 18.8 - 20.5 | 0 |

^a Nominal Lower Limit of Detection

^b Mean and range based upon detectable measurements only.

Fraction of detectable 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)

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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) | -- | -- |
| 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.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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 (134) | 10 | 13 | (19/134) | 11 - 16 |
| | Others | | < 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 | (195/195) | 0.11 - 0.38 |
| | γ - Annual (48) | 0.5 mR* | 0.19 | (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 (17) | -- | 2.4 | (17/17) | 1.0 - 3.7 |
| | Others | -- | | < LLD | |
| <p>* LLD in units of mR - Lower end of useful integrated exposure detectability range for a passive radiation detector (TLD).</p> <p>(a) May include Ru-106, Ru-103, Be-7.</p> <p>(b) One outlier not included in mean. (Water taken from dried-up spring with high sediment and potassium content. Not considered typical groundwater sample).</p> <p>(f) Fraction of detectable measurements at specified location.</p> | | | | | |

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

3. Results and Conclusions

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

a. Airborne Radioactive Particulates

Gross Beta: 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.

Gamma Spectrometry: 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 thirty-six of thirty-six (36 of 36) indicator samples, and four of four (4 of 4) control 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.

Deviations from Required Sampling and Analysis Schedule: There were no deviations from the required airborne particulate sampling and analysis schedule during the report period.

Summary: 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

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

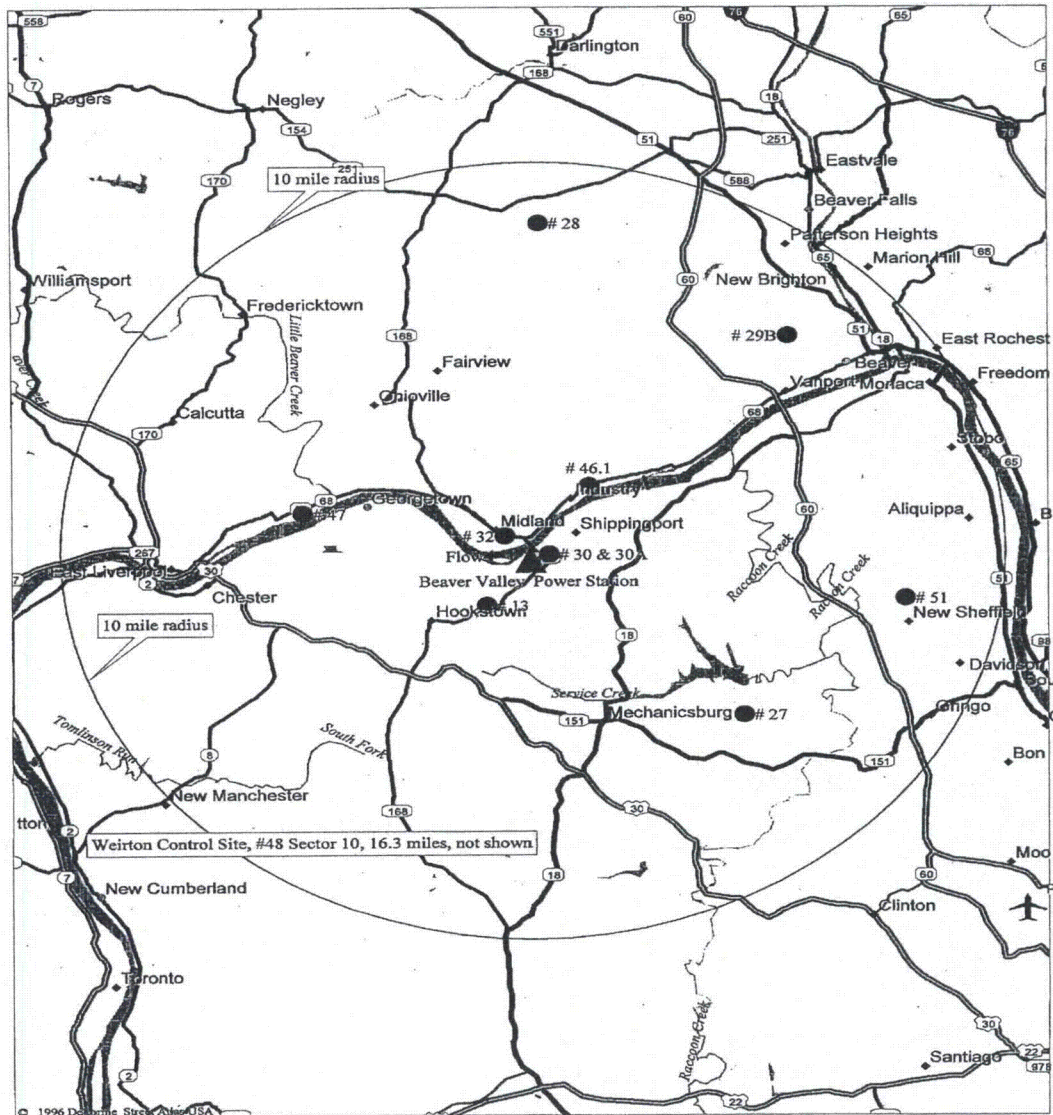
Deviations from Required Sampling and Analysis Schedule: There were no deviations from the required airborne radioiodine sampling and analysis schedule during the report period.

Summary: Based on analytical results, the operation of BVPS did not contribute any measurable increase in airborne radioiodine during the report period.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-1

Environmental Monitoring Locations - Air Sampling Stations

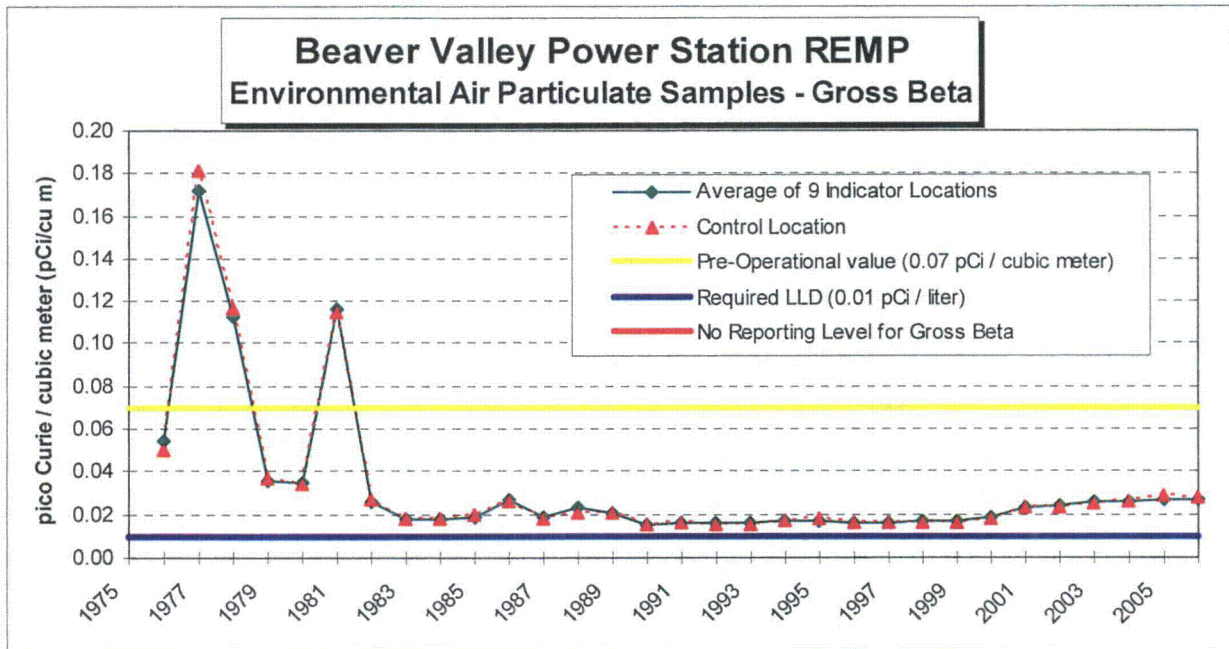


| Sample Type | Site No. | Sector | Distance (miles) | Sample Point Description |
|-------------------------------|----------|--------|------------------|--|
| Air Particulate & Radioiodine | 13 | 11-SW | 1.49 | Hookstown, PA (Old Meyer Farm) |
| | 27 | 7-SE | 6.16 | Aliquippa, Pa (Brunton Farm) |
| | 28 | 1-N | 8.60 | Sherman Farm |
| | 29B | 3-NE | 7.97 | Beaver, PA (Friendship Ridge) |
| | 30 | 4-ENE | 0.43 | Shippingport, PA (Cook's Ferry Substation) |
| | 32 | 15-NW | 0.75 | Midland, PA (North Substation - Rt. 68) |
| | 46.1 | 3-NE | 2.28 | Industry, PA (McKeels Service - Rt. 68) |
| | 47 | 14-WNW | 4.88 | East Liverpool, OH (Water Department) |
| | 48 | 10-SSW | 16.40 | Weirton, WV (Water Tower, Collier Way) |
| | 51 | 5-E | 8.00 | Aliquippa, PA (Sheffield Substation) |

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-2

Graph of Annual Average Concentration: Gross Beta in Air Particulates



SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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 2006 and are not due to be collected again until 2009. At each location, twelve (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.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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

Gamma Spectrometry: A total of six (6) sediment samples were analyzed by gamma spectrometry during the report period. Naturally occurring Potassium-40, Thallium-208, Lead-212, Lead-214, Bismuth-214, Ra-226 and Ac-228, was detected in four of four (4 of 4) indicator samples and two of two (2 of 2) control samples.

Cesium-137: This radionuclide was identified in three of four (3 of 4) indicator samples and two of two (2 of 2) control samples. The results were similar to previous years (current years range = 0.08 to 0.09 pico Curie / gram), and less than the pre-operational level of 0.4 pico Curie / gram. Also, SINCE Cesium-137 was identified at the indicator locations (downstream) and at the control location (upstream), THEN it was not due to plant effluent releases and is most likely residual contamination due from previous nuclear weapons tests.

Cobalt-58: Radionuclide Cobalt-58 was identified in one of four (1 of 4) indicator samples and zero of two (0 of 2) control samples. The samples that indicated Cobalt-58 were obtained at the shore line of the main outfall facility. The results were similar to previous years (current years range = 0.22 to 0.22 pico Curie / gram), even though this data is greater than the pre-operational level of 0.098 pico Curie / gram.

Cobalt-60: Radionuclide Cobalt-60 was identified in one of four (1 of 4) indicator samples and zero of two (0 of 2) control samples. The samples that indicated Cobalt-60 were obtained at the shore line of the main outfall facility. The results were similar to previous years (current years range = 0.51 to 0.51 pico Curie / gram), even though this data is slightly greater than the pre-operational level of 0.4 pico Curie / gram

Deviations from Required Sampling and Analysis Schedule: There were no deviations from the required sediment sampling and analysis schedule during the report period.

Summary: The identification of Cobalt-58 and Cobalt-60 at the shore line of the main outfall facility is not unusual, because the plant discharges these radionuclides in liquid waste effluents. The analyses are consistent with discharge data of authorized liquid effluent releases, and all liquid effluent releases during the report period did not exceed the release limits set forth in the Offsite Dose Calculation Manual.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

b. Soil

Gamma Spectrometry: A total of ten (10) soil samples were analyzed by gamma spectrometry. Naturally occurring Potassium-40, Thallium-208, Lead-212, Lead-214, Bismuth-214, Ra-226 and Ac-228, was detected in nine of nine (9 of 9) indicator samples and one of one (1 of 1) control samples.

Cesium-137: This radionuclide was identified in nine of nine (9 of 9) indicator samples and one of one (1 of 1) control samples. The results were similar to previous years (current years range = 0.13 to 0.27 pico Curie / gram), and less than the pre-operational level of 1.2 pico Curie / gram.

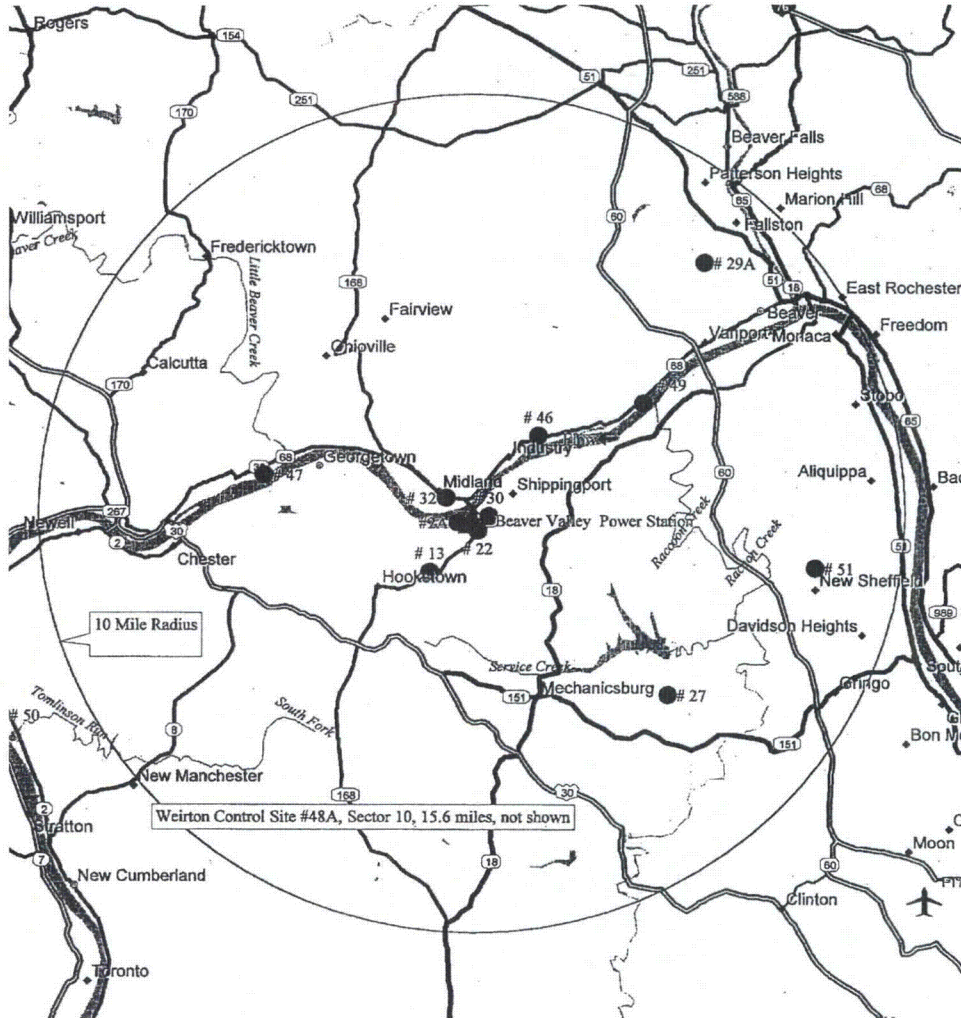
c. Deviations from Required Sampling and Analysis Schedule: There were no deviations from the required soil sampling and analysis schedule during the report period. However, the sample site for the Control location was re-located during the report period. Specifically, due to construction at the previous location, the sample site was moved to the Collier Way Water Tower, which is also the current Control location for the air particulate sampler. Moving the Control location for soil samples does not adversely impact the accuracy or reliability of sample collection.

d. Summary: SINCE Cesium-137 was identified at the indicator locations and at the control location, THEN it was not due to plant effluent releases, and is most likely residual contamination due from previous nuclear weapons tests.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-3

Environmental Monitoring Locations - Shoreline Sediments and Soil

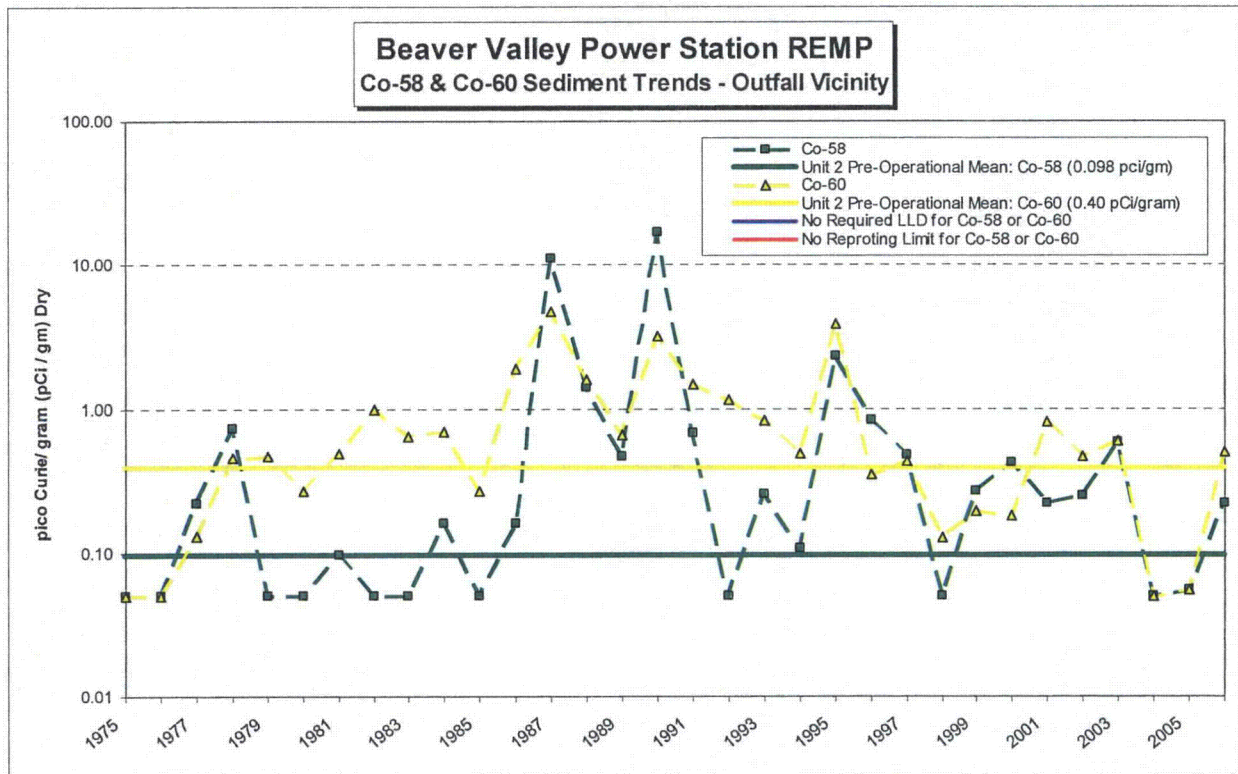
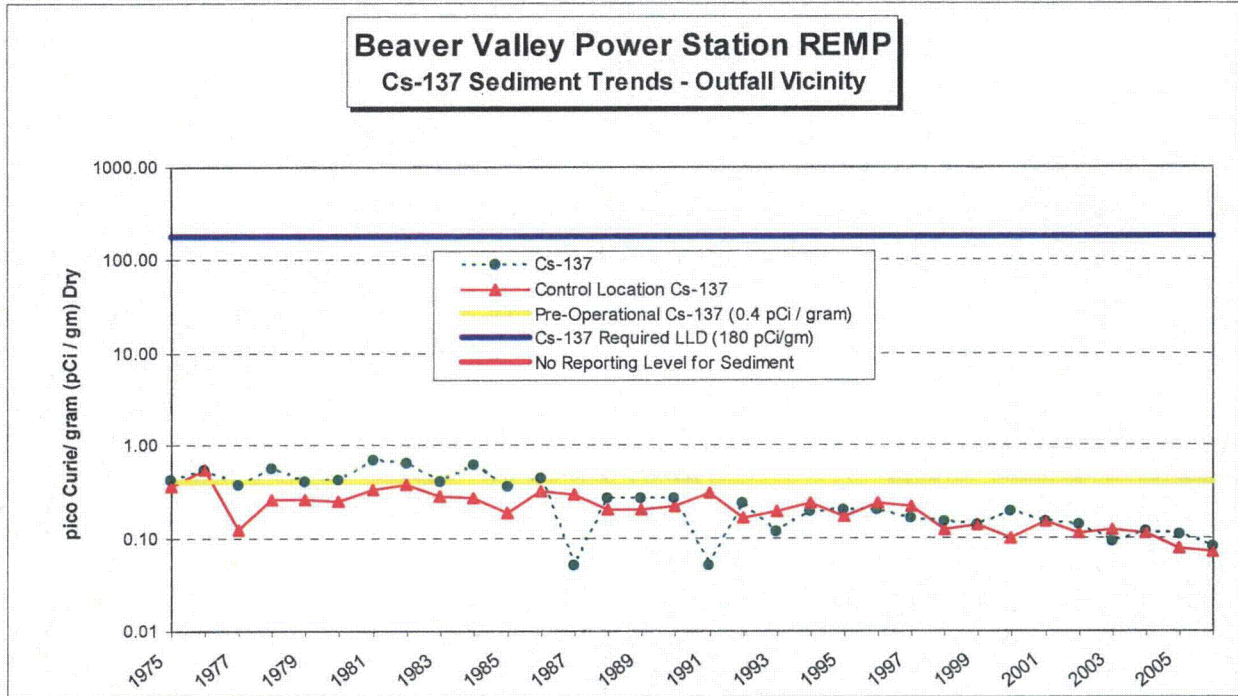


| Sample Type | Site No. | Sector | Distance (miles) | Sample Point Description |
|-------------|----------|--------|------------------|---|
| Soil | 13 | 11-SSW | 1.49 | Hookstown, PA (Old Meyer Farm) |
| | 22 | 8-SSE | 0.28 | South of BVPS, Transmission Lines |
| | 27 | 7-SE | 6.19 | Aliquippa, PA (Brunton Farm) |
| | 29A | 3-NE | 8.09 | Beaver, PA (Nicol Farm) |
| | 30a | 4-ENE | 0.43 | Shippingport, PA (Cooks Ferry Substation) |
| | 32a | 15-NW | 0.74 | Midland, PA (North Substation) |
| | 46b | 3-NE | 2.66 | Industry, PA (Willows Inn – Rt. 68) |
| | 47a | 14-WNW | 4.89 | East Liverpool, OH (Water Department) |
| | 48a | 10-SSW | 15.56 | Weirton, WV (Collier Way Water Tower) |
| | 51a | 5-E | 7.99 | Aliquippa, PA (Sheffield Substation) |
| Sediment | 2A | 13-W | 0.31 | BVPS Outfall Vicinity |
| | 49a | 3-NE | 4.93 | Industry, PA (Upstream Montgomery Dam) |
| | 50 | 12-WSW | 11.77 | New Cumberland, WV (Upstream of Dam) |

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-4

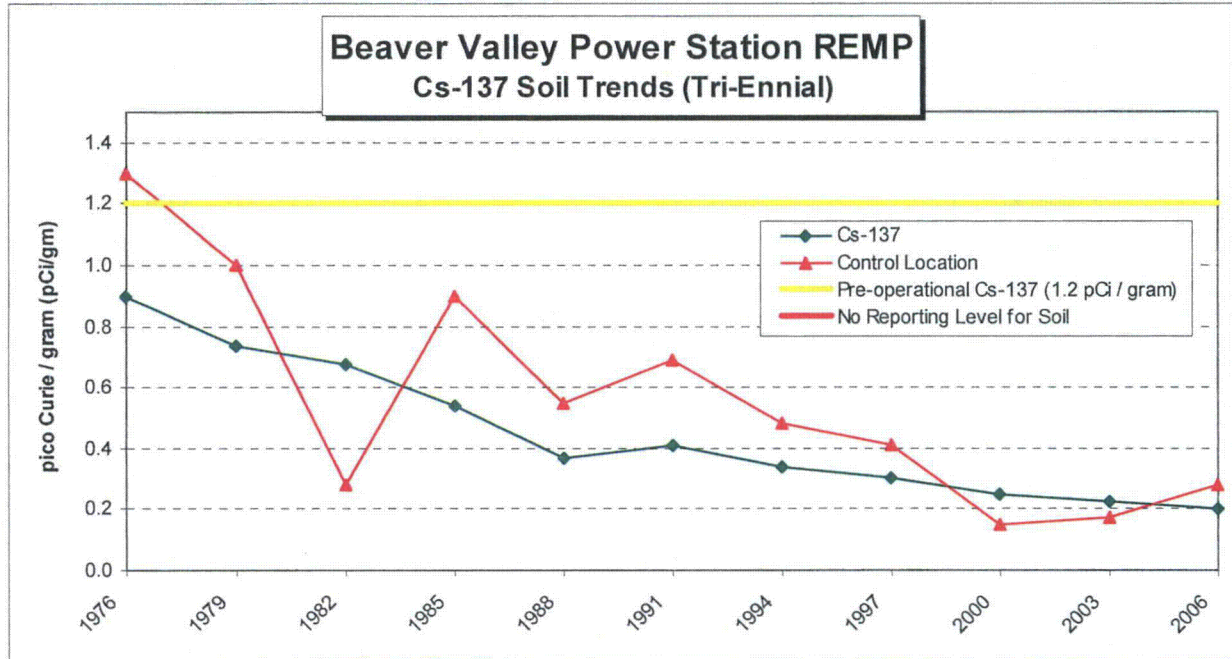
Graph of Annual Average Concentration: Cesium-137, Cobalt-58 & Cobalt-60 in Sediment



SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-5

Graph of Annual Average Concentration: Cesium-137 in Soil



SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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 (>\$50,000.00) 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>

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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

Gamma Spectrometry: 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 **seven of twelve (7 of 12) samples**.

Deviations from Required Sampling and Analysis Schedule: There were no deviations from the required feedstuff sampling and analysis schedule during the report period.

Summary: The data from the feedstuff analyses was consistent with previous data. Based on the analytical results, the operation of BVPS did not contribute any measurable increase in radioactivity in the feedstuff in the vicinity of the site during the report period

b. Food

Iodine-131: A total of **four (4) samples** were analyzed for Iodine-131. No detectable concentrations were present in the three (3) indicator samples or the one (1) control sample.

Gamma Spectrometry: A total of four **(4) samples** were analyzed by gamma spectrometry. Naturally occurring Potassium-40 was identified in **three of three (3 of 3) indicator samples and one of one (1 of 1) control** samples. No other radionuclides were identified.

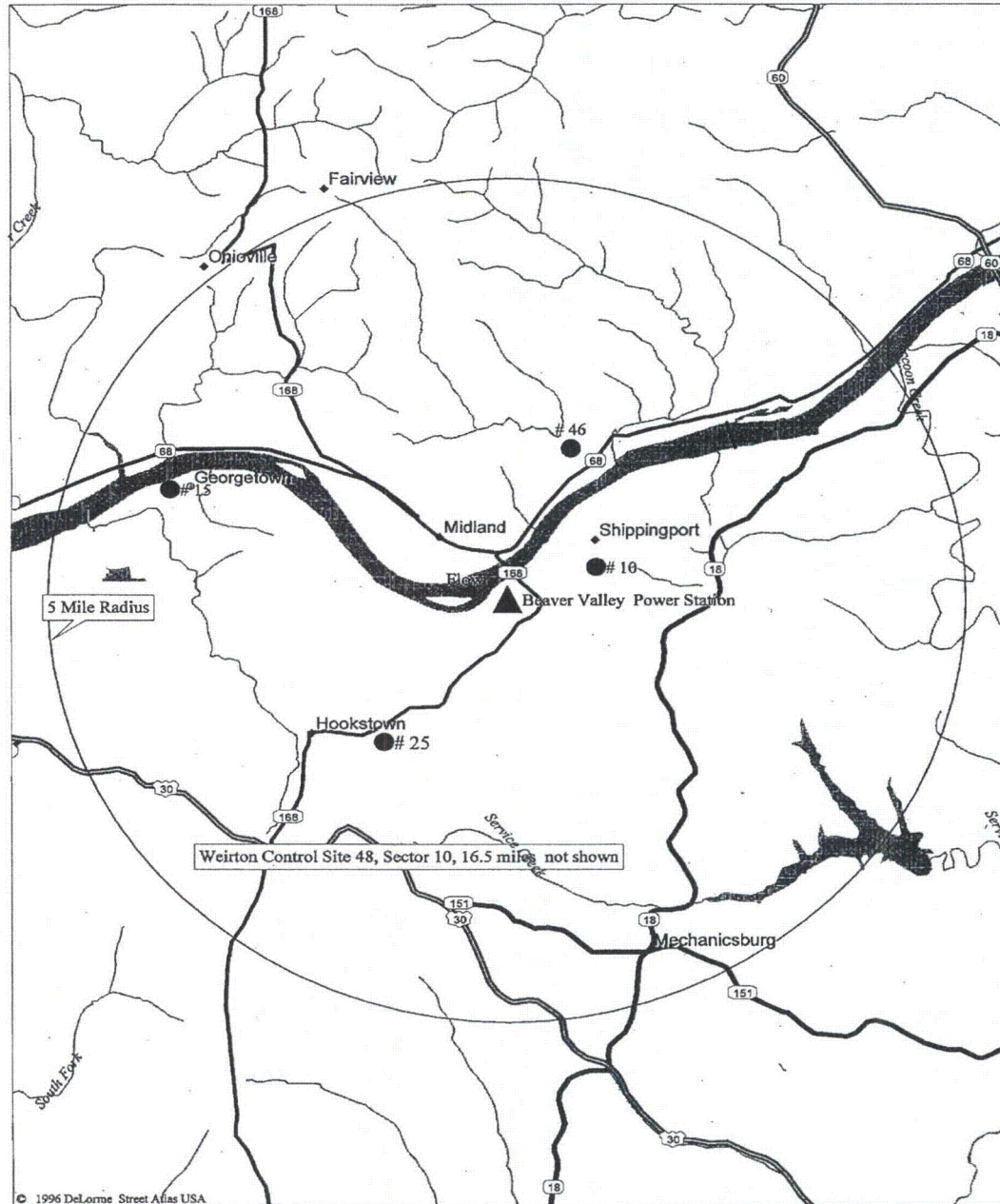
Deviations from Required Sampling and Analysis Schedule: There were no deviations from the required foodstuff sampling and analysis schedule during the report period.

Summary: The data from the foodstuff analyses was consistent with previous data. Based on the analytical results, the operation of BVPS did not contribute any measurable increase in radioactivity in the foodstuff in the vicinity of the site during the report period.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-6

Environmental Monitoring Locations – Feed Crop and Food Product

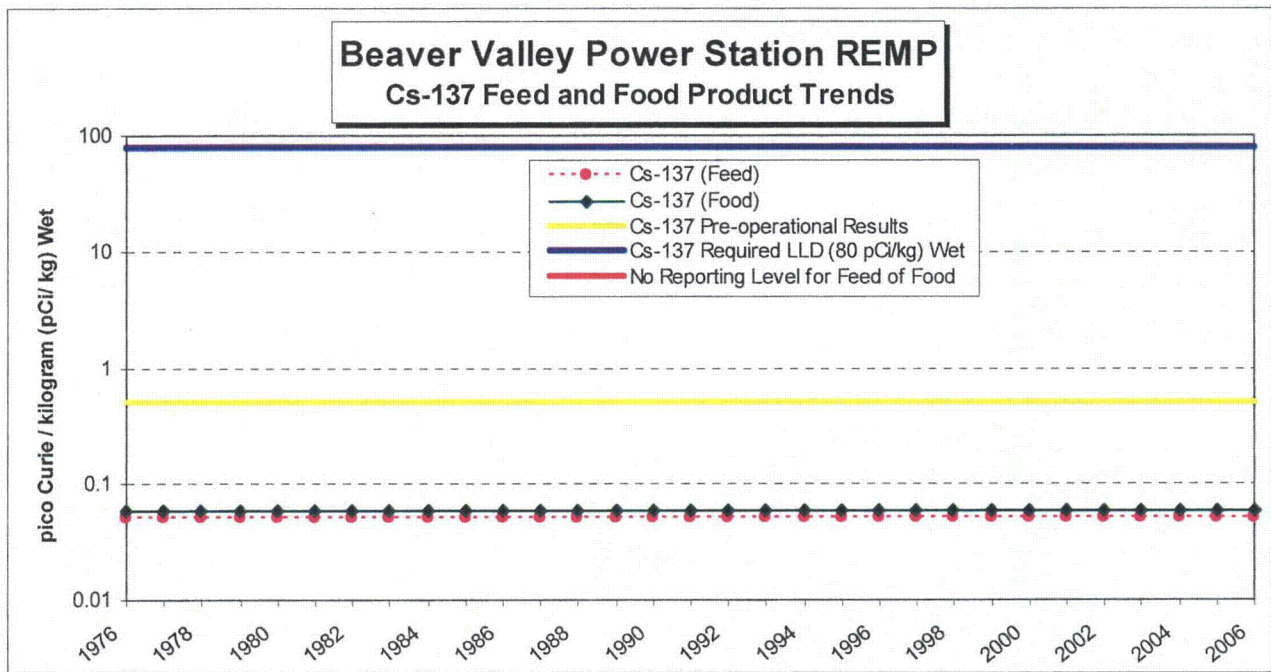


| Sample Type | Site No. | Sector | Distance (miles) | Sample Point Description |
|-------------|----------|--------|------------------|-------------------------------|
| Feed | 25 | 10-SSW | 2.10 | Hookstown, PA (Searight Farm) |
| Food | 10a | 4-ENE | 1.02 | Shippingport, PA |
| | 15a | 14-WNW | 3.55 | Georgetown, PA |
| | 46a | 3-NE | 3.39 | Industry, PA |
| | 48a | 10-SSW | 16.54 | Weirton, WV |

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-7

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



SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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

Cow milk was collected from the **two (2)** reference dairy farms within a 10-mile radius of the BVPS. These milk samples were obtained at the **Searight Dairy Farm (2.097 miles SSW)** and the **Brunton Dairy Farm (6.158 miles SE)**.

Cow milk and goat milk were collected from **three (3)** other dairy farms within a 10-mile radius of the BVPS site. These milk samples were obtained at the **Moore Farm (2.120 miles SW)**, the **Collins Dairy Farm (3.547 miles SE)** and the **Halstead Dairy Farm (5.097 miles SSW)**, and were selected based on milch animal surveys and evaluations of meteorological data (i.e.; deposition parameters). They were added to the sampling program to ensure the highest potential milk pathway for radioiodine uptake is evaluated. The dairies are subject to change based upon availability of milk or when more recent data (milch animal census, and/or change in meteorological conditions) indicate other locations are more appropriate.

Cow milk was also collected from the one (1) control location dairy farm outside of the 10-mile radius. These milk samples were obtained at the **Windsheimer Dairy Farm (10.476 miles SSW)**.

The milk sample from the **Searight Dairy 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, principle gamma emitters (including Cesium-137 by high resolution germanium gamma spectrometry), and Iodine-131 high sensitivity analysis

The location of each is shown in Figure 2-8 and described below.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

| Site | Dairy | Approximate Number of Animals being Milked | Distance and Direction from Midpoint between Unit 1 and Unit 2 Reactor | Collection Period |
|--|---|---|---|--------------------------------------|
| 25* | Searight Dairy 948 McCleary Road Hookstown, PA | 46 Cows | 2.097 miles SSW | January thru December |
| 27 | Brunton Dairy 3681 Ridge Road Aliquippa, PA | 88 Cows | 6.158 miles SE | January thru December |
| 69 | Collins Dairy 289 Calhoun Road Aliquippa, PA | 4 Goats | 3.547 miles SE | January, and June thru October |
| 96 | Windsheimer Dairy RD #11 Burgettstown, PA | 74 Cows | 10.476 miles SSW | January thru December |
| 113 | Halstead Dairy 104 Tellish Drive Hookstown, PA | 64 Cows | 5.097 miles SSW | January thru December |
| 114* | Moore Farm 982 State Route 168 Hookstown, PA | 10 Goats | 2.120 miles SW | April thru September |
| * Highest potential pathway dairies based on evaluation of deposition parameters | | | | |

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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. Strontium-89: A total of **one-hundred-eight (108)** milk samples were analyzed for Strontium-89 during the report period. **Strontium-89 was not detected in any of the eighty seven (87) indicator samples, nor was it detected in any of the twenty-one (21) control samples.**
- b. Strontium-90: A total of **one-hundred-eight (108)** milk samples were analyzed for Strontium-90 during the report period. **Strontium-90 was detected in eighty-two of eighty-seven (82 of 87) indicator samples and twenty-one of twenty-one (21 of 21) control samples.** The levels detected were attributable to previous nuclear weapons tests and are within the normally expected range.
- c. Gamma Spectrometry: A total of **one one-hundred-eight (108) milk** samples were analyzed by gamma spectrometry during the report period. Naturally occurring Potassium-40 was present in **eighty-seven of eighty-seven (87 of 87) indicator samples and twenty-one of twenty-one (21 of 21) control samples.** No other gamma-emitting radionuclides were identified during analysis.

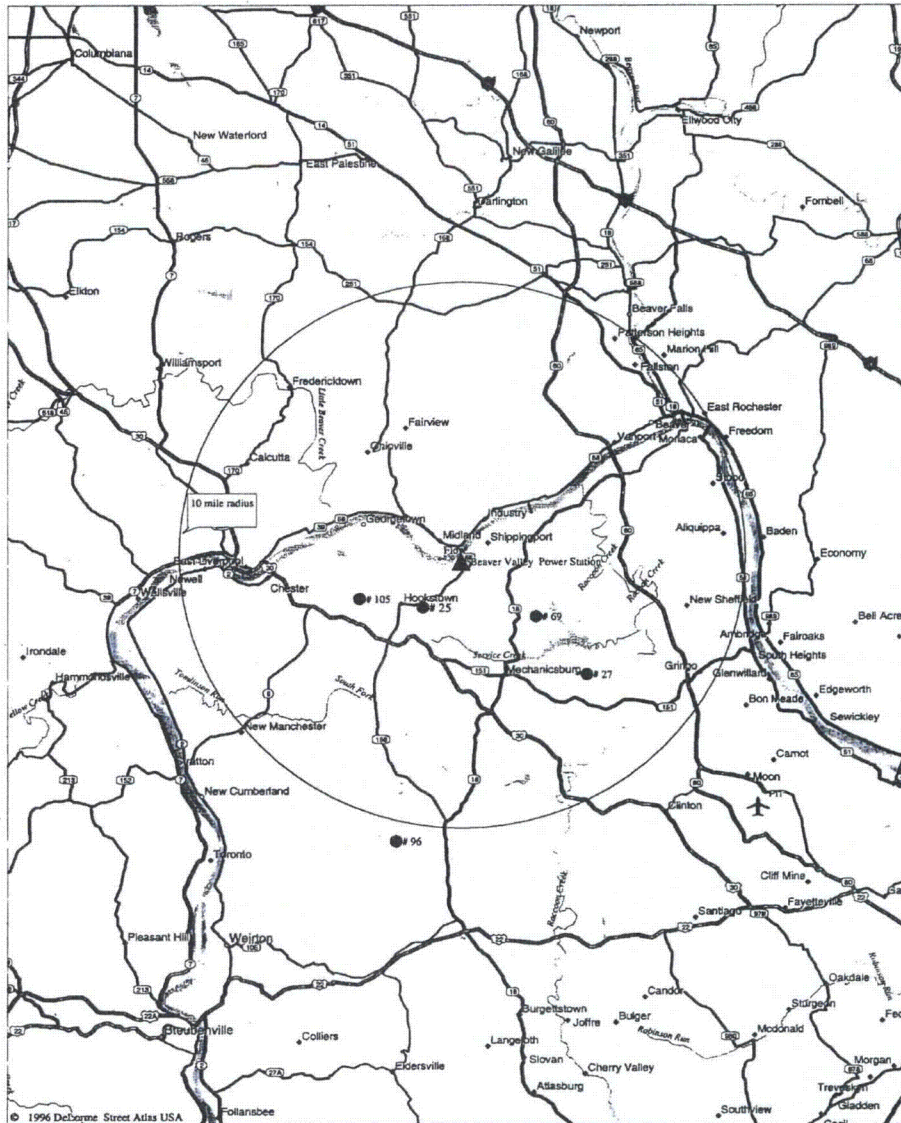
SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

- d. Iodine-131: A total of **one-hundred-thirty-nine (139)** milk samples were analyzed for Iodine-131 during the report period. **Iodine-131 was not detected in any of the one-hundred-eighteen (118) indicator samples, nor was it detected in any of the twenty one (21) control samples.** All analyses were less than the 0.5 pico Curie / liter LLD value.
- e. Deviations from Required Sampling and Analysis: The Bi-weekly Doe Goat milk sampling was interrupted during the report period. Specifically, the Doe Goats ceased production of milk during the winter months but was re-established in the spring and summer months (after breeding was completed). Although the Doe Goats could not be sampled during that period, the minimum Bi-weekly milk sampling requirements were still met. SINCE only four (4) Bi-weekly Dairy Cow locations (or Doe Goat locations) are required to be sampled, THEN the minimum requirements were met with the four (4) Dairy Cow milk samples. This condition and Associated Corrective Actions are documented in Condition Report No. CR06-01028-01, CR06-9984 and SAP Order 200197646-0170.
- f. Summary: Based on all the analytical results and the comparison to pre-operational levels, the operation of BVPS did not contribute any measurable increase in radioactivity in the milk in the vicinity of the site during the report period.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-8

Environmental Monitoring Locations - Milk



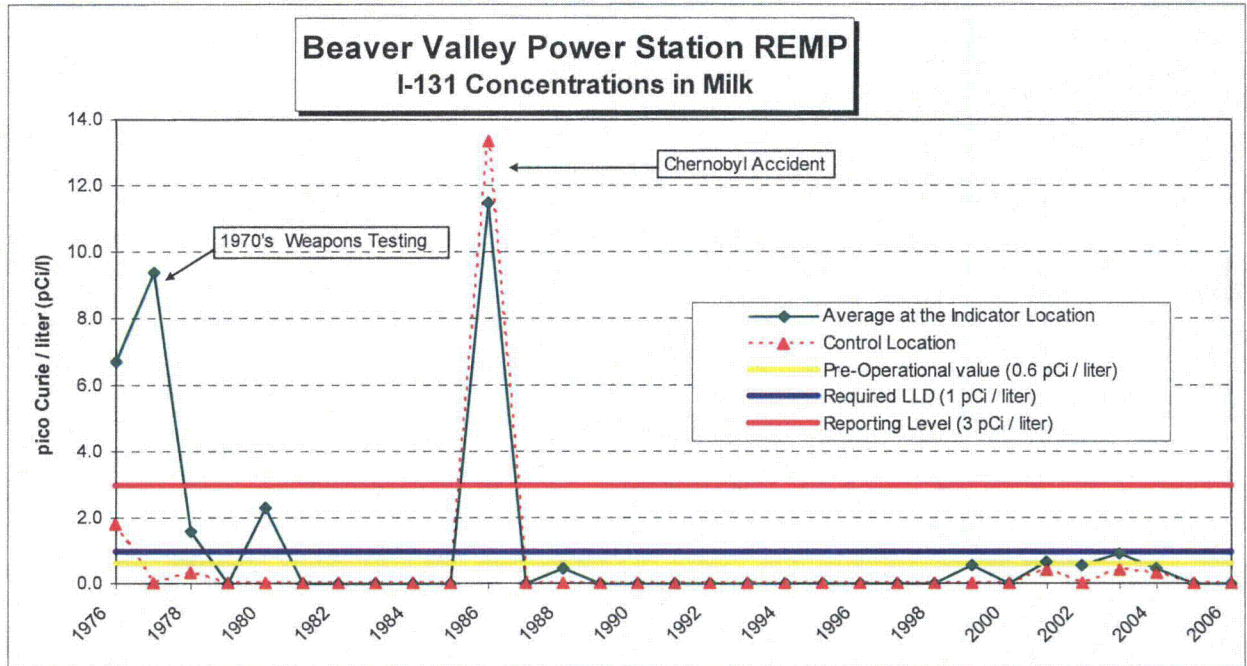
| Sample Type | Site No. | Sector | Distance (miles) | Sample Point Description |
|-------------|----------|--------|------------------|-------------------------------------|
| Milk | 25* | 10-SSW | 2.097 | Hookstown, PA (Searight Farm) |
| | 27 | 7-SE | 6.158 | Aliquippa, PA (Brunton Farm) |
| | 69 | 7-SE | 3.547 | Aliquippa, PA (Collins Farm) |
| | 96 | 10-SSW | 10.476 | Burgettstown, PA (Windsheimer Farm) |
| | 113 | 10-SSW | 5.079 | Hookstown, PA (Halstead Farm) |
| | 114* | 11-SW | 2.120 | Hookstown, PA (Moore Farm) |

* Dairies selected based on evaluation of deposition parameters

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-9

Graph of Annual Average Concentration: Iodine-131 in Milk



SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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 $\mu\text{R/hr}$.

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 sixty-three (63) environmental TLD locations. This is comprised of forty-four (44) offsite locations, along with nineteen (19) fence perimeter locations. The offsite TLD locations are plotted on Figure 2-10, but the fence perimeter locations are not plotted due to the large scale of the figure.

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 for a calendar quarter, in a specific holder that contains two (2) TLDs at each location.

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.

TLD Analysis: During the report period, the average quarterly external exposure rate (as measured from TLD) was **18.1 mR at the sixty-three (63) indicator locations, and 19.4 mR at the Control location.** This external exposure rate is comparable to previous years. As expected, there was some variation in external exposure rate among locations and seasons.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

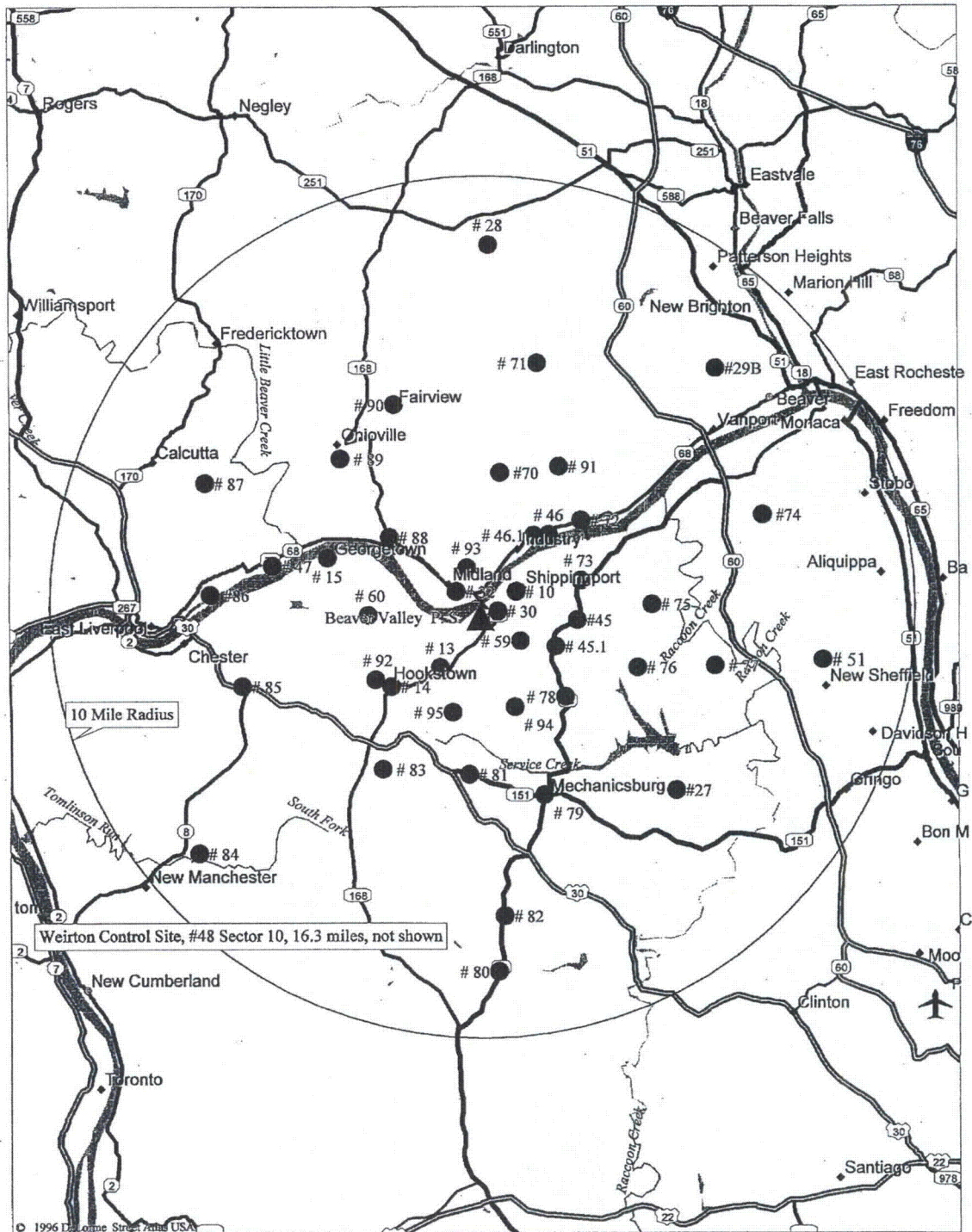
Deviations from Required Sampling and Analysis Schedule: There were no deviations from the required sampling schedule (i.e.; TLD placement) and analysis schedule (i.e.; TLD processing) during the report period.

Summary: The quarterly TLD external exposure rates are comparable to those of previous years. There was no evidence of anomalies that could be attributed to the operation of BVPS. It should also be noted that the average external exposure rate at the indicator locations was less than average external exposure rate at the Control location. Based on all the analytical results and the comparison to pre-operational levels, the operation of BVPS did not contribute any measurable increase in external exposure in the vicinity of the site during the report period. The TLD exposure rates also confirm that changes from natural radiation levels, if any, are negligible.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-10

Environmental Monitoring Locations - TLDs



SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-10 (Continued)

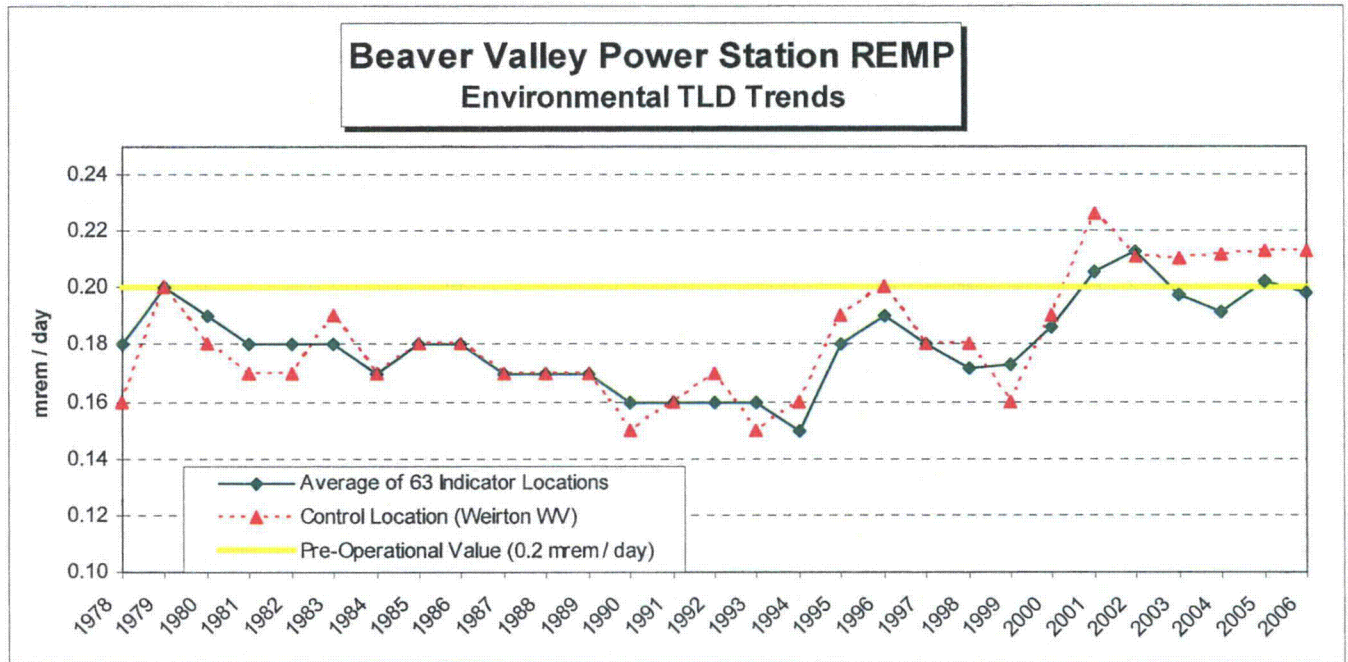
TLD Locations

| SOUTHEAST QUADRANT | | | | | | | |
|---------------------------|---------------|------------------|--|----------|--------|------------------|---|
| Site No. | Sector | Distance (miles) | Location | Site No. | Sector | Distance (miles) | Location |
| 27 | 7-SE | 6.14 | Brunton Dairy Farm Aliquippa, PA | 78 | 7-SE | 2.72 | Raccoon Twsp Municipal Building Raccoon Township, PA |
| 45.1 | 6-ESE | 1.92 | Kennedy's Corners Raccoon Township, PA | 79 | 8-SSE | 4.46 | 106 State Route 151 Ted McWilliams Auto Body |
| 51 | 5-E | 8.00 | Sheffield Substation Aliquippa, PA | 80 | 9-S | 8.27 | Park Office, State Route 18 Raccoon Township, PA |
| 59 | 6-ESE | 0.99 | 236 Green Hill Road Aliquippa, PA | 82 | 9-S | 6.99 | 2697 State Route 18 Aliquippa, PA |
| 76 | 6-ESE | 3.80 | Raccoon Elementary School Raccoon Township, PA | 94 | 8-SSE | 2.25 | McCleary & Pole Cat Hollow Road Hookstown, PA |
| 77 | 6-ESE | 5.52 | 3614 Green Garden Road Aliquippa, PA | | | | |
| NORTHWEST QUADRANT | | | | | | | |
| Site No. | Sector | Distance (miles) | Location | Site No. | Sector | Distance (miles) | Location |
| 15 | 14-WNW | 3.75 | Post Office Georgetown, PA | 87 | 14-WNW | 7.04 | 50103 Calcutta Smith's Ferry Road |
| 32 | 15-NW | 0.75 | North Substation Midland, PA | 88 | 15-NW | 2.74 | 110 Summit Road Midland, PA |
| 47 | 14-WNW | 4.88 | Water Department East Liverpool, OH | 89 | 15-NW | 4.72 | 488 Smith's Ferry Road Ohioville, PA |
| 60 | 13-W | 2.51 | 444 Hill Road Georgetown, PA | 90 | 16-NNW | 5.20 | 6286 Tuscarawas Road Midland, PA |
| 86 | 13-W | 6.18 | 1090 Ohio Avenue East Liverpool, OH | 93 | 16-NNW | 1.10 | 104 Linden - Sunrise Hills Midland, PA |
| NORTHEAST QUADRANT | | | | | | | |
| Site No. | Sector | Distance (miles) | Location | Site No. | Sector | Distance (miles) | Location |
| 10 | 3-NE 4-ENE | 0.94 | Post Office Shippingport, PA | 70 | 1-N | 3.36 | 236 Engle Road Industry, PA |
| 28 | 1-N | 8.60 | Sherman Farm Beaver Falls, PA | 71 | 2-NNE | 6.01 | First Western Bank Brighton Township, PA |
| 29B | 3-NE | 7.97 | Friendship Ridge Beaver, PA | 72 | 3-NE | 3.25 | Ohioview Lutheran Church – Rear Industry, PA |
| 30 | 4-ENE | 0.43 | Cook's Ferry Substation Shippingport, PA | 73 | 4-ENE | 2.48 | 618 Squirrel Run Road Industry, PA |
| 45 | 5-E | 2.19 | Christian House Baptist Chapel, State Rte 18 Raccoon Township, PA | 74 | 4-ENE | 6.92 | 137 Poplar Avenue (CCBC) Monaca, PA |
| 46 | 3-NE | 2.49 | Midway Drive Industry, PA | 75 | 5-E | 4.08 | 117 Holt Road Aliquippa, PA |
| 46.1 | 2-NNE 3-NE | 2.28 | McKeel's Service, State Route 68 Industry, PA | 91 | 2-NNE | 3.89 | Pine Grove Road & Doyle Road |
| SOUTHWEST QUADRANT | | | | | | | |
| Site No. | Sector | Distance (miles) | Location | Site No. | Sector | Distance (miles) | Location |
| 13 | 11-SW | 1.49 | Old Meyer Farm Hookstown, PA | 84 | 11-SW | 8.35 | Senior Center Hancock County, WV |
| 14 | 11-SW | 2.53 | Hookstown, PA | 85 | 12-WSW | 5.73 | 2048 State Route 30 |
| 48 | 10-SSW | 16.40 | Collier Way Water Tower Weirton, WV | 92 | 12-WSW | 2.81 | Georgetown Road Substation Georgetown, PA |
| 81 | 9-S | 3.69 | Millcreek United Presbyterian Church | 95 | 10-SSW | 2.37 | 832 McCleary Road Hookstown, PA |
| 83 | 10-SSW | 4.26 | 735 Mill Creek Road | | | | |

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-11

Graph of Annual Average Exposure: Direct Radiation in Environment



SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

G. Monitoring of Fish

1. Description

During the report period, fish collected for the radiological monitoring program included **carp, channel catfish, brown bullhead, freshwater drum and red horse.**

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.

Gamma Spectrometry: A total of **twelve (12)** fish samples were analyzed by gamma spectrometry during the report period. Gamma emitting radionuclides **were not detected in any of the six (6) indicator samples, nor were they detected in any of the six (6) control samples.**

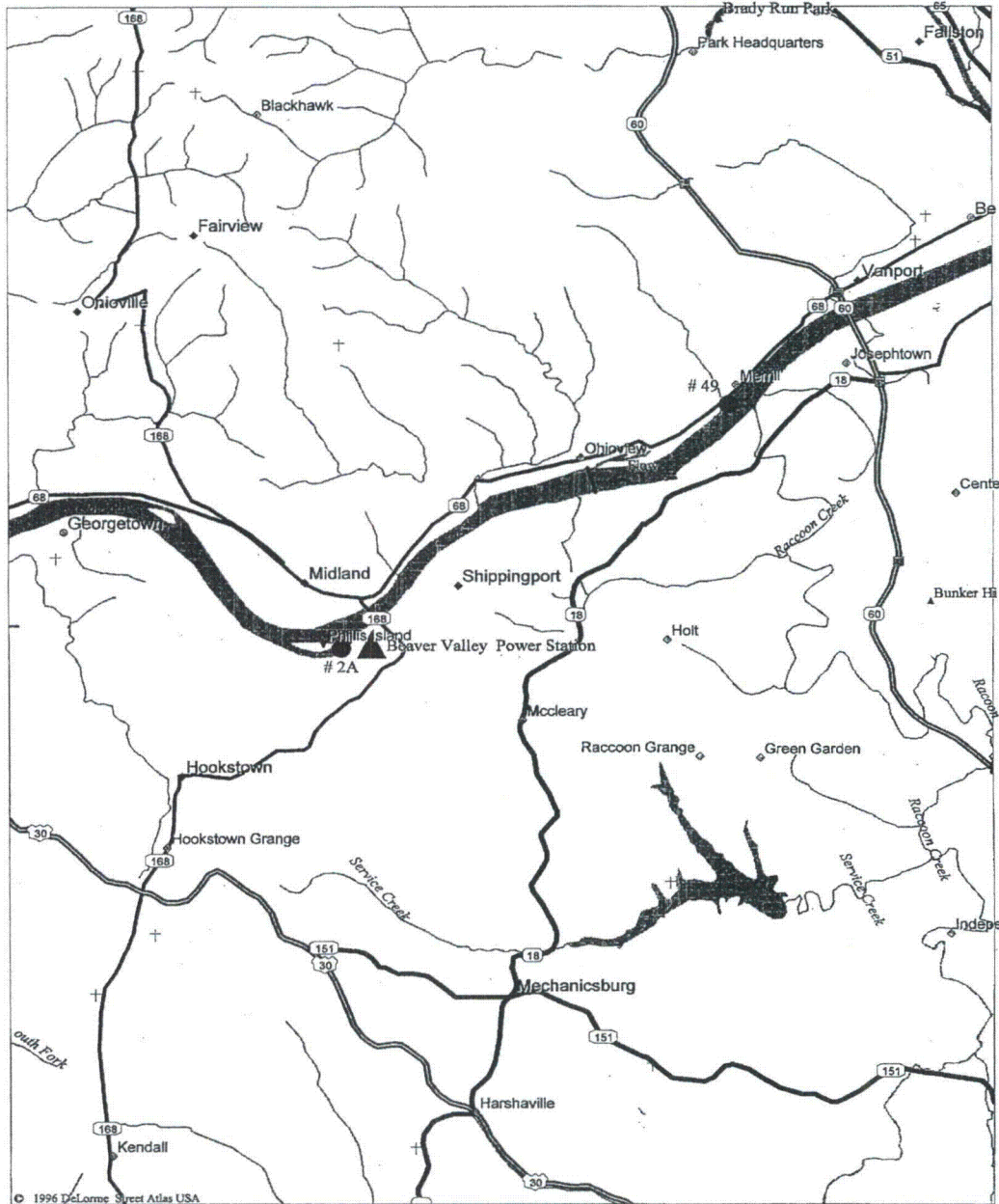
Deviations from Required Sampling and Analysis Schedule: There were no deviations from the required fish sampling and analysis schedule during the report period.

Summary: Based on the analytical results, the operation of BVPS did not contribute any measurable increase in radioactivity in the Ohio River fish population during the report period.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-12

Environmental Monitoring Locations - Fish

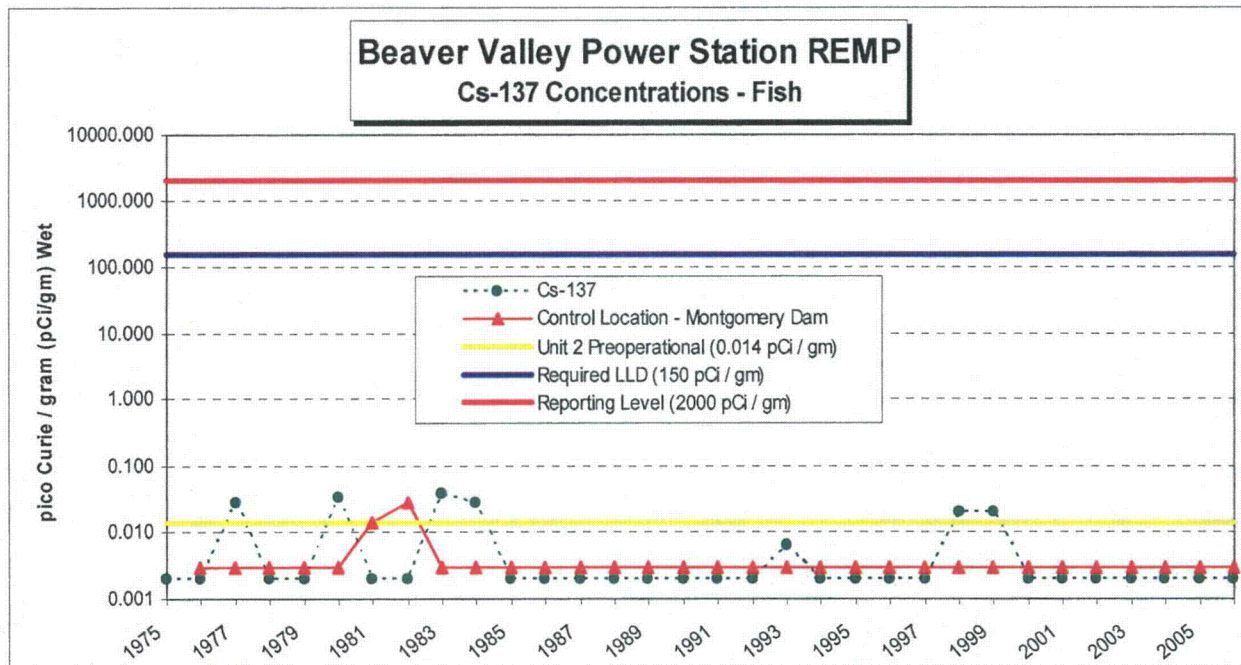


| Sample Type | Site No. | Sector | Distance (miles) | Sample Point Description |
|-------------|----------|--------|------------------|--|
| Fish | 2A | 13 | 0.2 | BVPS Outfall Vicinity |
| | 49a | 3 | 5.0 | Industry, PA (Upstream Montgomery Dam) |

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-13

Graph of Annual Average Concentration: Cesium-137 in Fish



SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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 National Climate Data Center (<http://climvis.ncdc.noaa.gov/cgi-bin/cag3/state-map-display.pl>) indicates the total annual precipitation during the report period was 47.66 inches.

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 Ludlum (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.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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

Tritium: A total of **twelve (12)** surface water samples were analyzed for Hydrogen-3 (Tritium) during the report period. Tritium was **not detected in any of the eight (8) indicator samples, nor was it detected in any of the four (4) control samples.**

Gamma Spectrometry: A total of **thirty-six (36)** surface water samples were analyzed by gamma spectrometry during the report period. Gamma emitting radionuclides were **not detected in any of the twenty-four (24) indicator samples, nor were they detected in any of the twelve (12) control samples.**

Iodine-131: A total of **fifty-two (52)** surface water control samples were analyzed for Iodine-131 using radiochemical methods during the report period. Iodine-131 was detected in **thirty-seven of fifty-two (37 of 52)** weekly control samples, of which two (2) analyses exceeded the reporting level of 2 pico Curie / liter. The results were similar to previous years, (current years range = **0.3 to 2.1** 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: CR07-12344 and SAP Order 200197646-0190.**)

b. Drinking Water

Tritium: A total of **twelve (12)** drinking water samples were analyzed for Tritium during the report period. Tritium was **not detected in any of the eight (8) indicator samples, nor was it detected in any of the four (4) control samples.**

Gamma Spectrometry: A total of **thirty-six (36)** drinking water samples were analyzed by gamma spectrometry during the report period. Gamma emitting radionuclides were **not detected in any of the twenty-four (24) indicator samples, nor were they detected in any of the twelve (12) control samples.**

Iodine-131: A total of **one hundred-fifty-six (154)** drinking water samples were analyzed for Iodine-131 (using radiochemical methods) during the report period. Iodine-131 was detected in **forty-nine of one-hundred-two (49 of 102) indicator samples and thirty-seven of fifty-two (37 of 52) control samples.** SINCE all of the positive results at the downstream location did not exceed the positive results from the upstream surface water Control location, THEN the positive results were not influenced by BVPS operation, and were most likely due to medical diagnostic and treatment procedures.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

c. Groundwater

Tritium: A total of **six (6)** groundwater samples were analyzed for Tritium during the report period. Tritium was **not detected in any of the four (4) indicator samples, nor was it detected in any of the two (2) control samples.**

Gamma Spectrometry: A total of **six (6)** groundwater samples were analyzed by gamma spectrometry during the report period. Gamma emitting radionuclides were **not detected in any of the (4) indicator samples, nor were they detected in any of the two (2) control samples.**

d. Precipitation

Tritium: A total of **twelve (12)** precipitation samples were analyzed for Tritium during the report period. Tritium was **detected in three of eight (3 of 8) indicator samples, but was not detected in any of the four (4) control samples.** The positive results are consistent with previous years data (current range = 197 – 286 pico Curie / liter, with an LLD of 200 pico Curie / liter), which is less than the pre-operational level of 300 pico Curie / liter. Identification of Tritium at this location is not unusual, because the plant discharges tritium in gaseous waste effluents. Specifically, the tritium activity is consistent with discharge data of authorized gaseous effluent releases. All gaseous effluent releases during the report period did not exceed the release limits set forth in the Offsite Dose Calculation Manual.

Gamma Spectrometry: A total of **twelve (12)** precipitation samples were analyzed by gamma spectrometry during the report period. Gamma emitting radionuclides were **not detected in any of the eight (8) indicator samples, nor were they detected in any of the four (4) control samples.**

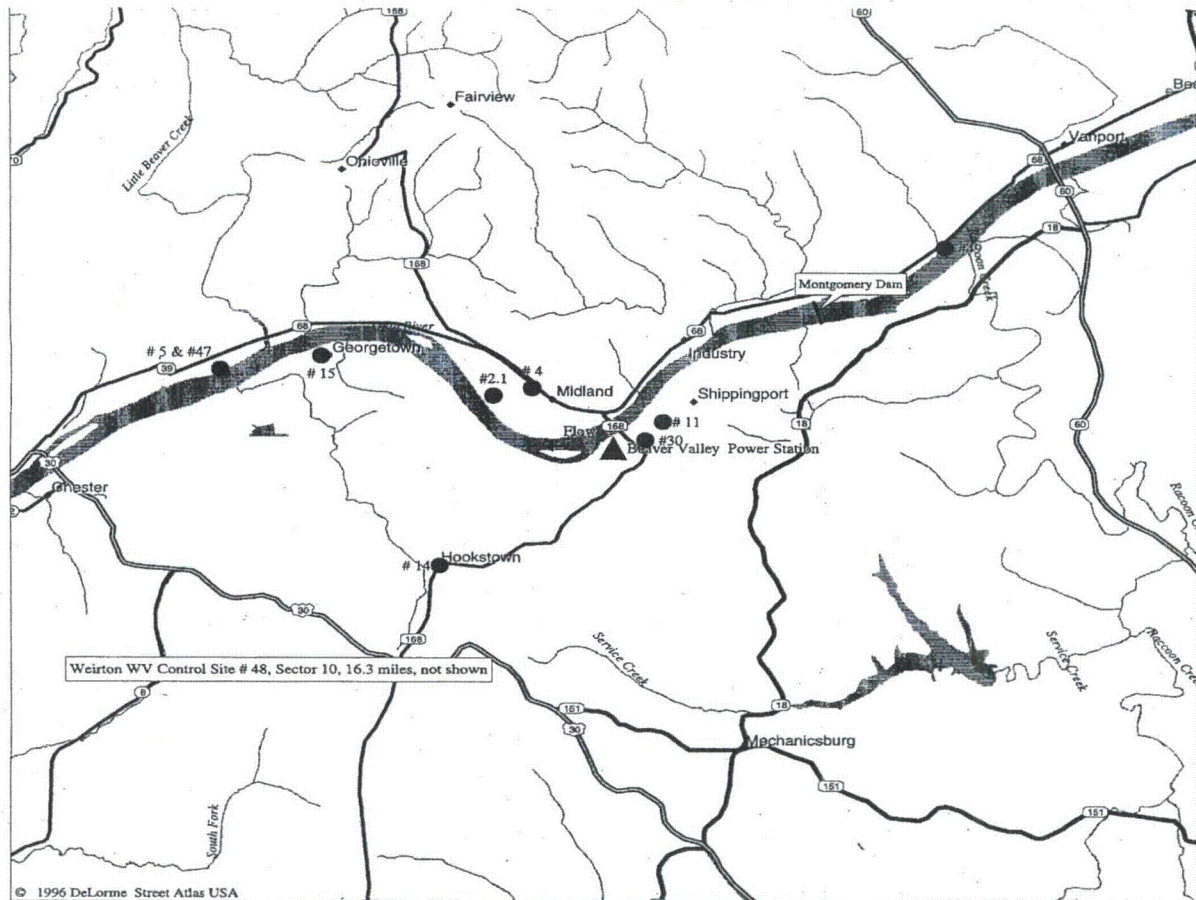
e. Deviations from Required Sampling and Analysis Schedule: During November 2006, the automatic drinking water sampling station at Midland, PA (Site No. 4) was found to have an unusually low volume in the collection vessel on two (2) separate occasions. The sampling apparatus was repaired, but **SINCE** the sampling volume was not adequate for the period October 31, 2006 thru November 14, 2006, **THEN** the analyses from these samples were not considered valid. Therefore, the Iodine-131 analysis data for this period was adjusted to represent an average of the previous week and the following week analysis. This condition and associated Corrective Actions are described in Condition Report CR06-9951, and SAP Order 200197646-0160.

f. Summary: Data from the water sample analyses demonstrate that BVPS 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.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-14

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

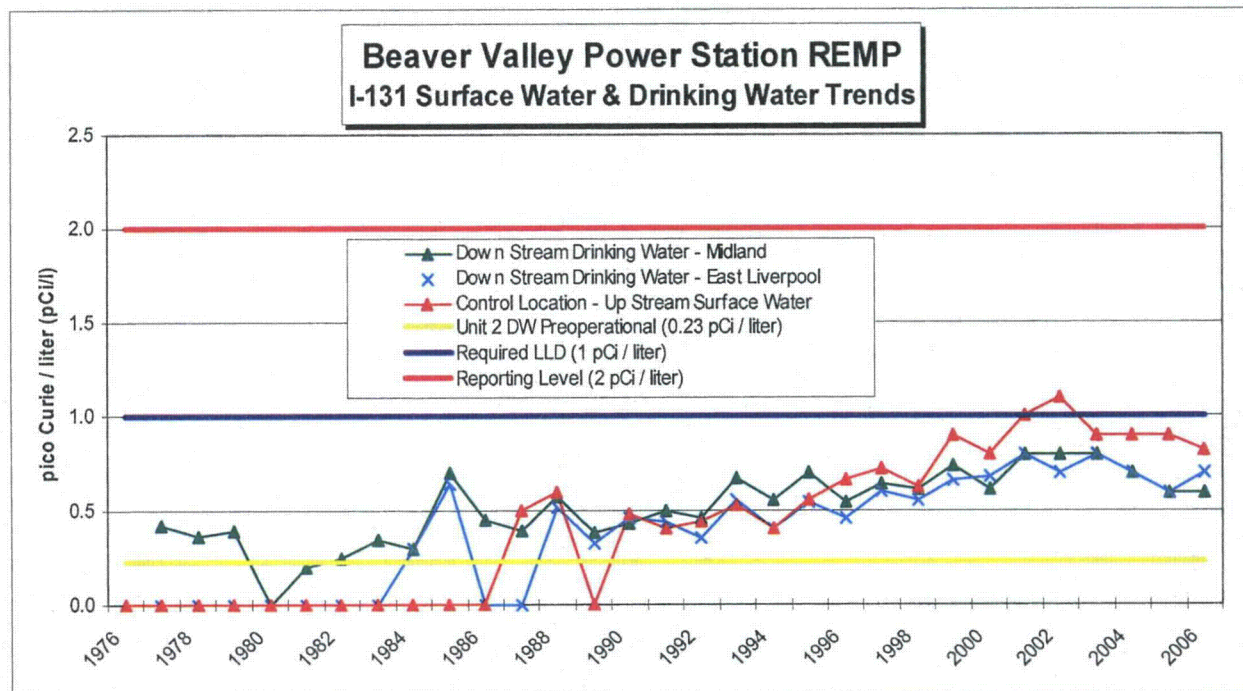


| Sample Type | Site No. | Sector | Distance (miles) | Sample Point Description |
|----------------|----------|--------|------------------|--|
| Drinking Water | 4 | 15 | 1.3 | Midland, PA (Water Departmen) |
| | 5 | 14 | 4.9 | East Liverpool, OH (Water Department) |
| Surface Water | 2.1 | 14 | 1.5 | 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 WW (Water Tower, Collier Way) |

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-15

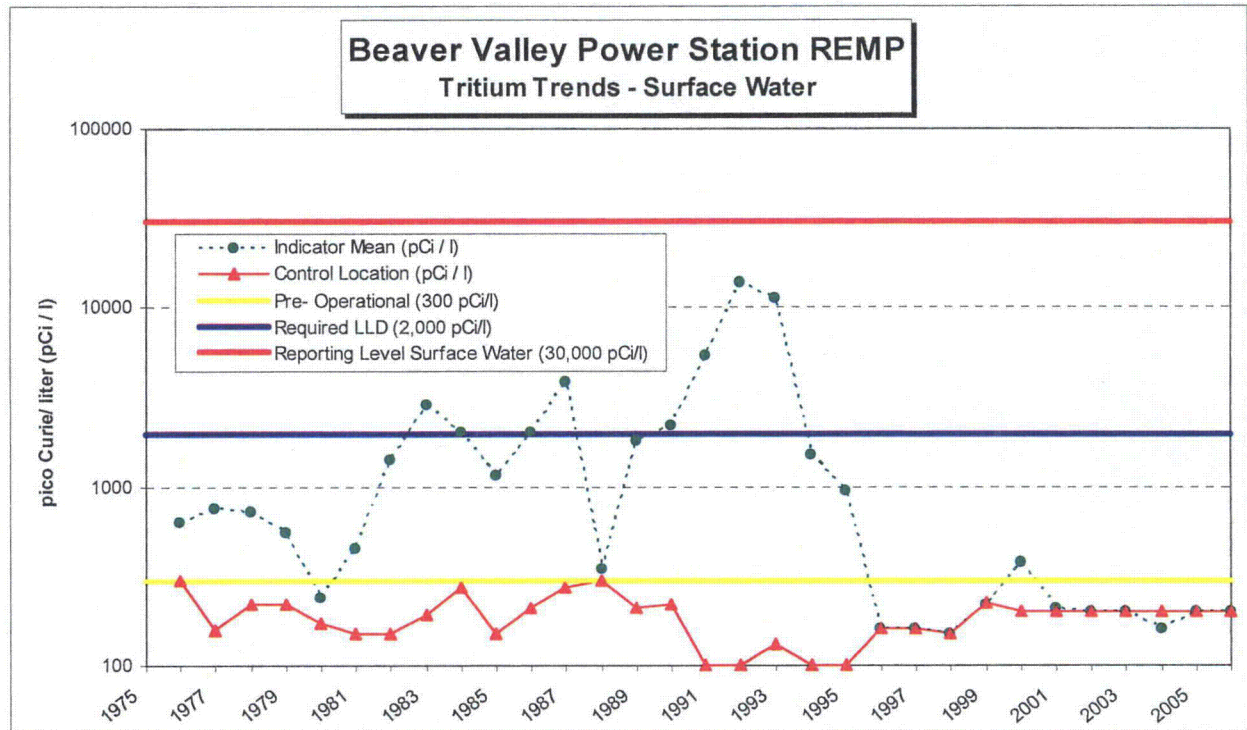
Graph of Annual Average Concentration: Iodine-131 in Surface Water & Drinking Water



SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-16

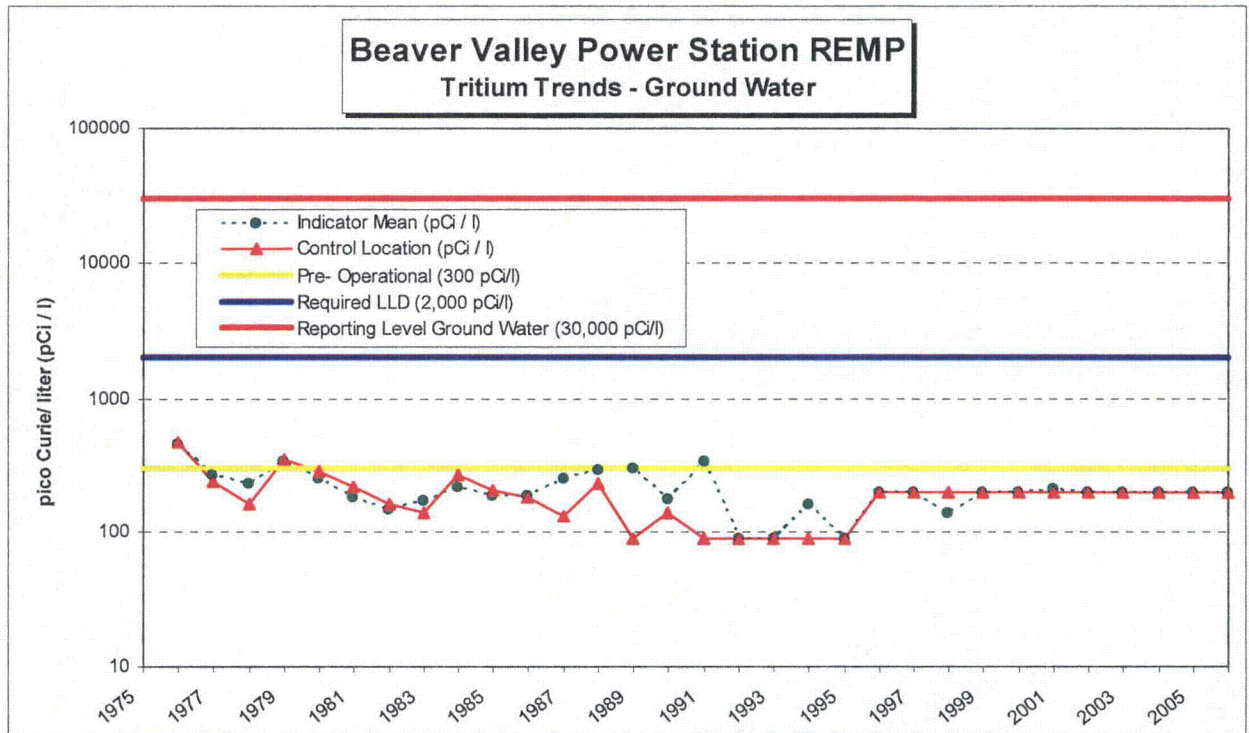
Graph of Annual Average Concentration: Tritium in Surface Water



SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-17

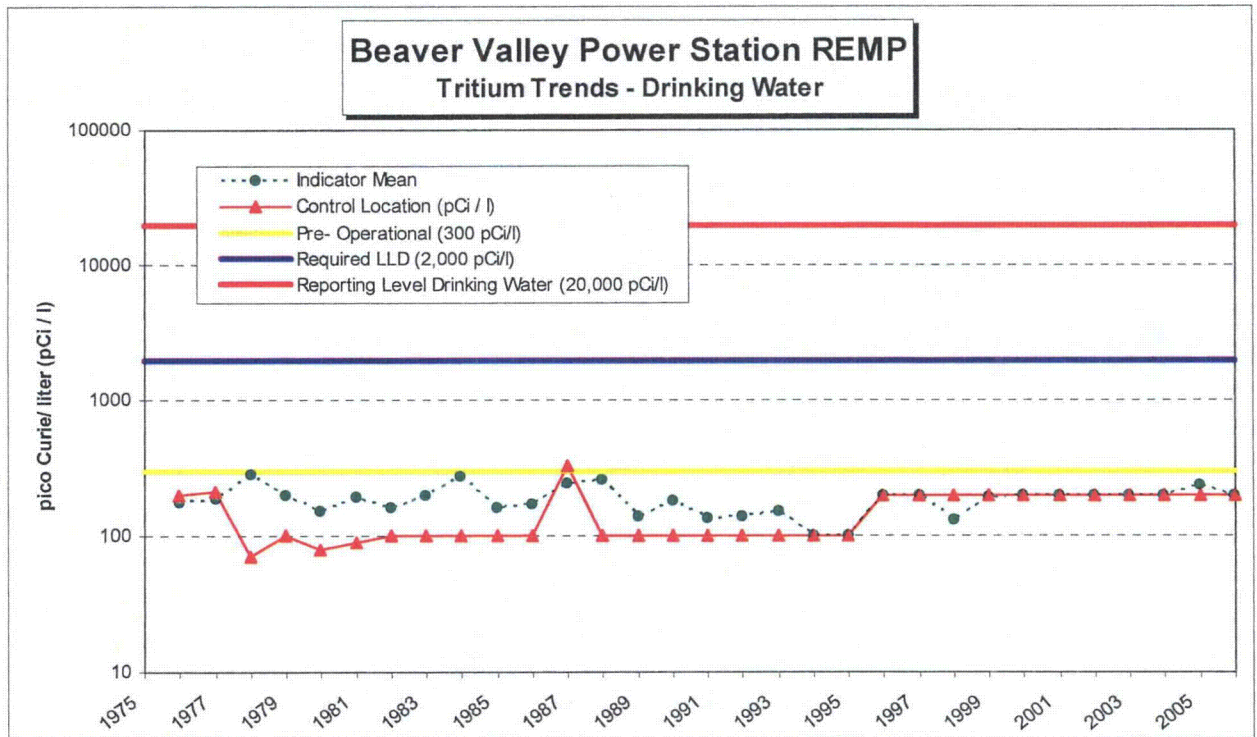
Graph of Annual Average Concentration: Tritium in Ground Water



SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Figure 2-18

Graph of Annual Average Concentration: Tritium in Drinking Water



SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

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 **0.00006%** 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.

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Table 2-4

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

| <u>TYPICAL DOSE TO INDIVIDUALS</u> | |
|--|------------------------------|
| <u>FROM NATURAL RADIATION EXPOSURE</u> ^(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 | 552 | Tritium |
| Average Dose (per Individual) | 0.0001380 | Tritium |

| Comparison of Individual Dose BVPS Liquid Effluent Releases Versus Natural Background Radiation | |
|--|------------------|
| | millirem |
| BVPS Liquid Effluent Release Dose | 0.0001380 |
| Natural Radiation Exposure | 296 |

SECTION 2 – ENVIRONMENTAL MONITORING PROGRAM

Table 2-5

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

| <u>TYPICAL DOSE TO INDIVIDUALS</u> | | |
|---|---|----------------------------|
| <u>FROM NATURAL RADIATION EXPOSURE</u> ^(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 | 103 | Tritium |
| Average (per Individual) | 0.0000258 | Tritium |

| Comparison of Individual Dose BVPS Gaseous Effluent Releases Versus Natural Background Radiation | |
|---|------------------|
| | millirem |
| BVPS Gaseous Effluent Release Dose | 0.0000258 |
| Natural Radiation Exposure | 296 |

SECTION 3 – LAND USE CENSUS

A Land Use Census was conducted August 31 through September 22, 2006 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 as documented in letter NPD3NRE:0381, dated September 26, 2006:

- **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 not changed since the previous census.
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).

SECTION 3 – LAND USE CENSUS

- **Projection for 2007 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 2006:

- **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)
- **Windsheimer Dairy**, RD 1 Burgettstown, PA (10.476 miles SSW).

- **Projection for 2007 Doe Goat Sampling Locations:**

The linear regression analysis also indicated that the Doe Goat sampling locations will remain at the same locations used in 2006:

- **Moore Farm**, 982 State Route 168, Hookstown, PA (2.120 miles SW)
- **Collins Farm**, 289 Calhoun Road, Aliquippa, PA (3.547 miles, SE).

SECTION 3 – LAND USE CENSUS

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 | 3.547 | 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 PROGRAM 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.

- **Acceptance Criteria 1:** The NRC criteria listed in NRC Inspection Procedure 84750, 12/4/90, Inspection Guidance 84750-03 is used as 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.

| NRC Criteria | |
|--------------|-------------|
| 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 |

- **Acceptance Criteria 2:** BVPS also has self imposed acceptance criteria. That criteria requires the percent difference between the Contractor Lab Activity and the Independent Lab Calculated Activity to agree by $\pm 20\%$.

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

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 (i.e.; the BVPS criteria) 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)** chemical analyses for I-131 were performed by the Contractor Laboratory on **four (4)** milk samples.
 - A total of **four (4)** chemical analyses for I-131 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 with the NRC acceptance criteria. All **one-hundred-eight (108)** analyses met the NRC acceptance criteria
 - Comparison of results of the spiked milk and water samples showed acceptable agreement with BVPS acceptance criteria. All but **one (1) of the one-hundred-eight (108)** analyses met the BVPS acceptance criteria.

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

- **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 agreement with the NRC acceptance criteria. **All four (4) analyses performed by the Contractor Laboratory met the NRC acceptance criteria.**
 - Comparison of results of the spiked filter paper and charcoal cartridge samples showed acceptable agreement with the BVPS acceptance criteria. **All four (4) analyses performed by the Contractor Laboratory met the BVPS acceptance criteria**

C. Conclusions

- **Results of Split Sample Program:**

The split sample program is coordinated by the state, and 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, to the BVPS Acceptance Criteria, is provided in the following tables.

**SECTION 4 - SPLIT SAMPLE PROGRAM and SPIKE SAMPLE
 INTER-LABORATORY COMPARISON PROGRAM**

**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 |
|-------------|--|------------------------|--|
| 03/23/2006 | Water Ind. Lab: E4947-93 Con. Lab: SPW-1566 | Sr-89 | -7.68% |
| | | Sr-90 | 1.82% |
| | | I-131 (Chemical) | -2.84% |
| | | I-131 | 3.13% |
| | | Ce-141 | 2.99% |
| | | Cr-51 | 3.76% |
| | | Cs-134 | -6.73% |
| | | Cs-137 | 1.76% |
| | | Co-58 | 0.68% |
| | | Mn-54 | 2.82% |
| | | Fe-59 | 8.33% |
| | | Zn-65 | 0.34% |
| Co-60 | -1.96% | | |
| 03/23/2006 | Water Ind. Lab: E4946-93 Con. Lab: SPW-1567 | H-3 | 8.55% |
| 03/23/2006 | Milk Ind. Lab: E4948-93 Con. Lab: SPMI-1568 | Sr-89 | -11.82% |
| | | Sr-90 | -4.55% |
| | | I-131 (Chemical) | -7.05% |
| | | I-131 | -4.23% |
| | | Ce-141 | 2.31% |
| | | Cr-51 | -4.04% |
| | | Cs-134 | -11.07% |
| | | Cs-137 | -1.24% |
| | | Co-58 | -5.62% |
| | | Mn-54 | 1.51% |
| | | Fe-59 | -0.11% |
| | | Zn-65 | -2.16% |
| Co-60 | -7.11% | | |
| 03/23/2006 | Filter Paper Ind. Lab: E4949-93 Con. Lab: SPAP-1569 | Cs-137 (Gross Beta) | 15.83% |
| 03/23/2006 | Charcoal Cartridge Ind. Lab: E4950-93 Con. Lab: SPCH-1570 | I-131 | -11.65% |

**SECTION 4 - SPLIT SAMPLE PROGRAM and SPIKE SAMPLE
 INTER-LABORATORY COMPARISON PROGRAM**

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 |
|-------------|--|------------------|--|
| 06/08/2006 | Water Ind. Lab: E5011-93 Con. Lab: SPW-3846 | Sr-89 | -3.05% |
| | | Sr-90 | -18.00% |
| | | I-131 (Chemical) | -2.13% |
| | | I-131 | -0.80% |
| | | Ce-141 | 4.70% |
| | | Cr-51 | 2.38% |
| | | Cs-134 | -3.11% |
| | | Cs-137 | 2.63% |
| | | Co-58 | 6.17% |
| | | Mn-54 | 3.53% |
| | | Fe-59 | 7.63% |
| | | Zn-65 | 6.33% |
| Co-60 | 0.38% | | |
| 06/08/2006 | Water Ind. Lab: E5010-93 Con. Lab: SPW-3847 | H-3 | -9.53% |
| 06/08/2006 | Milk Ind. Lab: E5012-93 Con. Lab: SPMI-3848 | Sr-89 | -8.68% |
| | | Sr-90 | -19.00% |
| | | I-131 (Chemical) | 4.60% |
| | | I-131 | -2.86% |
| | | Ce-141 | -2.45% |
| | | Cr-51 | -7.57% |
| | | Cs-134 | -11.65% |
| | | Cs-137 | 0.26% |
| | | Co-58 | -0.80% |
| | | Mn-54 | 2.53% |
| | | Fe-59 | 6.60% |
| | | Zn-65 | -0.59% |
| Co-60 | -3.02% | | |

**SECTION 4 - SPLIT SAMPLE PROGRAM and SPIKE SAMPLE
 INTER-LABORATORY COMPARISON PROGRAM**

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 |
|-------------|--|------------------------|--|
| 09/14/2006 | Water Ind. Lab: E5086-93 Con. Lab: SPW-6271 | Sr-89 | -9.33% |
| | | Sr-90 | 0.77% |
| | | I-131 (Chemical) | 18.5% |
| | | I-131 | 1.00% |
| | | Ce-141 | 3.52% |
| | | Cr-51 | -3.23% |
| | | Cs-134 | -8.16% |
| | | Cs-137 | 1.56% |
| | | Co-58 | -0.63% |
| | | Mn-54 | 4.35% |
| | | Fe-59 | 6.67% |
| | | Zn-65 | 1.55% |
| Co-60 | -2.92% | | |
| 09/14/2006 | Water Ind. Lab: E5085-93 Con. Lab: SPW-6270 | H-3 | -2.91% |
| 09/14/2006 | Milk Ind. Lab: E5087-93 Con. Lab: SPMI-6272 | Sr-89 | -9.55% |
| | | Sr-90 | -7.50% |
| | | I-131 (Chemical) | 21.76% |
| | | I-131 | 8.51% |
| | | Ce-141 | -1.63% |
| | | Cr-51 | -5.82% |
| | | Cs-134 | -7.18% |
| | | Cs-137 | -1.20% |
| | | Co-58 | -0.46% |
| | | Mn-54 | 0.09% |
| | | Fe-59 | 7.73% |
| | | Zn-65 | 2.41% |
| Co-60 | -3.21% | | |
| 09/14/2006 | Filter Paper Ind. Lab: E5088-93 Con. Lab: SPAP-6273 | Cs-137 (Gross Beta) | 8.28% |
| 09/14/2006 | Charcoal Cartridge Ind. Lab: E5089-93 Con. Lab: SPCH-6274 | I-131 | -6.63% |

**SECTION 4 - SPLIT SAMPLE PROGRAM and SPIKE SAMPLE
 INTER-LABORATORY COMPARISON PROGRAM**

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 |
|-------------|--|------------------|--|
| 12/07/2006 | Water Ind. Lab: E5167-93 Con. Lab: SPW-8748 | Sr-89 | -4.11% |
| | | Sr-90 | -1.67% |
| | | I-131 (Chemical) | 7.43% |
| | | I-131 | 0.43% |
| | | Ce-141 | -0.28% |
| | | Cr-51 | -0.69% |
| | | Cs-134 | -9.72% |
| | | Cs-137 | 1.83% |
| | | Co-58 | 2.35% |
| | | Mn-54 | 3.61% |
| | | Fe-59 | 9.09% |
| | | Zn-65 | 5.35% |
| Co-60 | -1.54% | | |
| 12/07/2006 | Water Ind. Lab: E5166-93 Con. Lab: SPW-8747 | H-3 | -1.92% |
| 12/07/2006 | Milk Ind. Lab: E5168-93 Con. Lab: SPMI-8751 | Sr-89 | -12.22% |
| | | Sr-90 | 5.00% |
| | | I-131 (Chemical) | 13.94% |
| | | I-131 | 1.83% |
| | | Ce-141 | -1.60% |
| | | Cr-51 | -0.39% |
| | | Cs-134 | -13.74% |
| | | Cs-137 | 0.80% |
| | | Co-58 | -0.48% |
| | | Mn-54 | 5.14% |
| | | Fe-59 | 8.13% |
| | | Zn-65 | 4.45% |
| Co-60 | -2.67% | | |