

PEACH BOTTOM ATOMIC POWER STATION
Unit Numbers 2 and 3
Docket Numbers 50-277 and 50-278

SEMI-ANNUAL EFFLUENT RELEASE REPORT

NO. 31

JANUARY 1, 1991 THROUGH JUNE 30, 1991


Submitted to
The United States Nuclear Regulatory Commission
Pursuant to
Facility Operating Licenses DPR-44 and DPR-56

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PDR ADOCK 05000277
K PDR

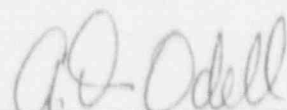
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Technical Concurrences: (for accuracy of information)



Sr. Engineer - Radwaste



Sr. Chemist

I. INTRODUCTION

In accordance with the Unique Reporting Requirements of Technical Specification 6.9.2h (2) applicable during the reporting period, this report summarizes the Effluent Release Data for Peach Bottom Atomic Power Station Units 2 and 3 for the period January 1 through June 30, 1991. The notations E and E- are used to denote positive and negative exponents to the base 10, respectively.

The release of radioactive materials during the reporting period was within the Technical Specification limits. The Off-Site Dose Calculation Manual (ODCM) was revised during the reporting period. Revisions made were:

1. The addition of a gradient factor in the maximum permissible release rate equation. This was necessitated by the installation of a new liquid radioactive waste diffuser in the discharge canal.
2. The renaming of an ODCM air particulate and air iodine location and the relocation of TLD sampling points.
3. Changes in the description of the recombiner hydrogen analyzers and the gases used in their calibration to reflect current usage.

A copy of the revised ODCM is attached to this report.

There were no known unplanned releases of liquid radioactive material.

EFFLUENT & WASTE DISPOSAL SEMI-ANNUAL REPORT (1/1/91 - 6/30/91)

Table 1A Page 1 of 1

Gaseous Effluents - Summation of All Releases

	Units	Quarter 1	Quarter 2	Est. Error Total %
A. Fission & activation gasses				
1. Total release	Ci	5.73E3	6.91E3	18.8E0
2. Average release rate for period	$\mu\text{Ci/sec}$	7.29E2	8.79E2	
3. Gamma Air Dose	Millirad	2.81E-2	4.37E-2	
Percent of Technical Specification	%	2.81E-1	4.37E-1	
4. Beta Air Dose	Millirad	4.30E-2	8.18E-2	
Percent of Technical Specification	%	2.15E-1	4.09E-1	
B. Iodines				
1. Total iodine-131	Ci	4.20E-3	9.21E-3	22.9E0
2. Average release rate for period	$\mu\text{Ci/sec}$	5.34E-4	1.17E-3	
3. Critical Organ dose	Millirem	2.19E-2	4.61E-2	
Percent of Technical Specification	%	1.46E-1	3.08E-1	
C. Particulates				
1. Particulates with half-lives greater than 8 days (includes Alpha and Strontium 89-90)	Ci	2.26E-3	2.94E-3	22.9E0
2. Average release rate for period	$\mu\text{Ci/sec}$	2.88E-4	3.74E-4	
3. Gross Alpha Radioactivity	Ci	2.20E-5	2.26E-5	
D. Tritium				
1. Total release	Ci	1.54E1	5.87E0	23.5E0
2. Average release rate for period	$\mu\text{Ci/sec}$	1.96E0	7.46E-1	

EFFLUENT & WASTE DISPOSAL SEMI-ANNUAL REPORT (1/1/91 - 6/30/91)

Table 1B Page 1 of 2

Gaseous Effluents For Release Point - Main Stack

Nuclides Released	Units	Continuous Mode		Batch Mode	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
1. Fission gasses					
Krypton - 85M	Ci	2.46E2	1.31E3	0.00 E0	0.00 E0
Krypton - 87	Ci	5.53E1	8.09E1	0.00 E0	0.00 E0
Krypton - 88	Ci	1.62E2	3.72E2	0.00 E0	0.00 E0
Xenon - 133	Ci	4.32E3	4.31E3	0.00 E0	0.00 E0
Xenon - 135	Ci	5.68E2	2.28E2	0.00 E0	0.00 E0
Xenon - 135M	Ci	2.11E1	6.81E1	0.00 E0	0.00 E0
Xenon - 138	Ci	8.72E0	2.15E0	0.00 E0	0.00 E0
Xenon - 133M	Ci	4.37E1	3.84E1	0.00 E0	0.00 E0
Xenon - 131M	Ci	0.00E0	1.84E2	0.00 E0	0.00 E0
Unidentified	Ci	1.41E1	1.03E2	0.00 E0	0.00 E0
Total for Period	Ci	5.44E3	6.70E3	0.00 E0	0.00 E0
2. Iodines					
Iodine - 131	Ci	1.08E-3	2.83E-3	0.00 E0	0.00 E0
Iodine - 133	Ci	8.32E-4	1.12E-2	0.00 E0	0.00 E0
Iodine - 135	Ci	0.00E0	1.01E-2	0.00 E0	0.00 E0
Total for Period	Ci	1.91E-3	2.41E-2	0.00 E0	0.00 E0
3. Particulates					
Strontium - 89	Ci	1.37E-4	2.67E-4	0.00 E0	0.00 E0
Strontium - 90	Ci	6.50E-7	4.50E-7	0.00 E0	0.00 E0
Strontium - 91	Ci	3.39E-4	2.72E-4	0.00 E0	0.00 E0
Cesium - 134	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0
Cesium - 137	Ci	6.10E-6	1.61E-5	0.00 E0	0.00 E0
Cesium - 138	Ci	1.81E-2	3.54E-2	0.00 E0	0.00 E0
Barium - 139	Ci	2.67E-3	2.51E-3	0.00 E0	0.00 E0
Barium - 140	Ci	8.60E-4	2.22E-4	0.00 E0	0.00 E0
Lanthanum - 140	Ci	2.01E-4	1.36E-4	0.00 E0	0.00 E0
Cobalt - 57	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0
Cobalt - 58	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0

EFFLUENT & WASTE DISPOSAL SEMI-ANNUAL REPORT (1/1/91 - 6/30/91)

Table 1B Page 2 of 2

Gaseous Effluents For Release Point - Main Stack

Nuclides Released	Units	Continuous Mode		Batch Mode	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
Cobalt - 60	Ci	0.00 E0	1.80E-6	0.00 E0	0.00 E0
Zinc - 65	Ci	0.00 E0	0.00E0	0.00 E0	0.00 E0
Yttrium - 91M	Ci	2.51E-3	2.03E-3	0.00 E0	0.00 E0
Iodine - 133	Ci	7.31E-5	8.81E-4	0.00 E0	0.00 E0
Copper - 64	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0
Rubidium - 88	Ci	2.23E-3	0.00 E0	0.00 E0	0.00 E0
Manganese - 54	Ci	0.00E0	0.00 E0	0.00 E0	0.00 E0
Strontium - 92	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0
Iodine - 132	Ci	0.00E0	9.90E-6	0.00 E0	0.00 E0
Iodine - 135	Ci	0.00E0	1.61E-4	0.00 E0	0.00 E0
Molybdeium - 99	Ci	0.00E0	5.70E-6	0.00 E0	0.00 E0
Technetium - 99m	Ci	2.80E-6	9.00E-6	0.00 E0	0.00 E0
Tellurium - 132	Ci	3.40E-6	1.25E-5	0.00 E0	0.00 E0
Total for Period	Ci	2.71E-2	4.20E-2	0.00 E0	0.00 E0

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Table 1C Page 1 of 2

Gaseous Effluents For Release Point - Unit 2 & Unit 3 Roof Vents

Nuclides Released	Units	Continuous Mode		Batch Mode	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
1. Fission gasses					
Krypton – 85M	Ci	2.25E0	3.84E–1	0.00 E0	0.00 E0
Krypton – 87	Ci	6.65E0	0.00E0	0.00 E0	0.00 E0
Krypton – 88	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0
Xenon – 133	Ci	8.60E1	1.95E1	0.00 E0	0.00 E0
Xenon – 135	Ci	1.20E2	9.21E1	0.00 E0	0.00 E0
Xenon – 135M	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0
Xenon – 138	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0
Unidentified	Ci	6.25E1	1.01E2	0.00 E0	0.00 E0
Total for Period	Ci	2.77E2	2.13E2	0.00 E0	0.00 E0
2. Iodines					
Iodine – 131	Ci	3.12E–3	6.37E–3	0.00 E0	0.00 E0
Iodine – 133	Ci	1.90E–3	1.20E–2	0.00 E0	0.00 E0
Iodine – 135	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0
Total for Period	Ci	5.02E–3	1.84E–2	0.00 E0	0.00 E0
3. Particulates					
Strontium – 89	Ci	7.08E–5	2.08E–3	0.00 E0	0.00 E0
Strontium – 90	Ci	1.62E–5	3.01E–5	0.00 E0	0.00 E0
Strontium – 91	Ci	3.86E–5	0.00 E0	0.00 E0	0.00 E0
Cesium – 134	Ci	0.00 E0	0.00 E0	0.00 E0	0.00 E0
Cesium – 137	Ci	6.89E–4	4.16E–5	0.00 E0	0.00 E0
Cesium – 138	Ci	2.24E–2	1.56E–2	0.00 E0	0.00 E0
Barium – 139	Ci	6.25E–3	2.30E–3	0.00 E0	0.00 E0
Barium – 140	Ci	2.73E–4	1.71E–4	0.00 E0	0.00 E0
Lanthanum – 140	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0
Cobalt – 57	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0
Cobalt – 58	Ci	0.00 E0	0.00E0	0.00 E0	0.00 E0
Cobalt – 60	Ci	1.33E–4	8.92E–5	0.00 E0	0.00 E0

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Table 1C Page 2 of 2

Gaseous Effluents For Release Point - Unit 2 & Unit 3 Roof Vents

Nuclides Released	Units	Continuous Mode		Batch Mode	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
Zinc - 65	Ci	0.00 E0	0.00E0	0.00 E0	0.00 E0
Yttrium - 91M	Ci	2.45E-4	3.23E-4	0.00 E0	0.00 E0
Iodine - 133	Ci	1.09E-3	2.98E-3	0.00 E0	0.00 E0
Copper - 64	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0
Rubidium - 88	Ci	2.43E-3	0.00E0	0.00 E0	0.00 E0
Manganese - 54	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0
Strontium - 92	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0
Molybdenum - 99	Ci	1.00E-4	2.84E-5	0.00 E0	0.00 E0
Technetium - 99m	Ci	1.11E-4	3.42E-5	0.00 E0	0.00 E0
Tellurium - 132	Ci	0.00E0	0.00E0	0.00 E0	0.00 E0
Cerium - 144	Ci	3.61E-5	0.00E0	0.00 E0	0.00 E0
Total for Period	Ci	3.39E-2	2.38E-2	0.00 E0	0.00 E0

EFFLUENT & WASTE DISPOSAL SEMI-ANNUAL REPORT (1/1/91 - 6/30/91)

Table 2A Page 1 of 1

Liquid Effluents - Summation of All Releases

	Units	Quarter 1	Quarter 2	Est. Error Total %
A. Fission & activation gasses				
1. Total release (not including tritium, gasses, alpha)	Ci	2.16E-2	6.40E-3	22.9E0
2. Average diluted concentration during period	μ Ci/ml	1.21E-9	1.42E-10	
3. Body Dose	Millirem	2.31E-3	7.15E-4	
Percent of Technical Specification	%	7.70E-2	2.38E-2	
4. Maximally Exposed Organ Dose	Millirem	6.66E-3	1.36E-3	
Percent of Technical Specification	%	6.66E-2	1.36E-2	
B. Tritium				
1. Total release	Ci	4.79E0	2.74E0	15.0E0
2. Average diluted concentration during period	μ Ci/ml	2.68E-7	6.09E-8	
C. Dissolved and entrained gasses				
1. Total release	Ci	2.38E-2	1.53E-2	22.9E0
2. Average diluted concentration during period	μ Ci/ml	1.33E-9	3.40E-10	
D. Gross alpha radioactivity				
1. Total release	Ci	4.10E-5	5.13E-5	22.9E0
2. Average diluted concentration during period	μ Ci/ml	2.29E-12	1.14E-12	
E. Volume of waste released (prior to dilution)	liters	2.65E6	3.89E6	12.7E0
F. Volume of dilution water used during period	liters	1.79E10	4.50E10	10.9E0

EFFLUENT & WASTE DISPOSAL SEMI-ANNUAL REPORT (1/1/91 - 6/30/91)

Table 2B Page 1 of 2
Liquid Effluents

Nuclides Released	Units	Continuous Mode		Batch Mode	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
Strontium - 89	Ci	0.00 E0	0.00 E0	1.32E-4	7.60E-5
Strontium - 90	Ci	0.00 E0	0.00 E0	7.26E-5	3.76E-5
Alpha	Ci	0.00 E0	0.00 E0	4.10E-5	5.13E-5
Tritium	Ci	0.00 E0	0.00 E0	4.79E0	2.74E0
Phosphorus - 32	Ci	0.00 E0	0.00 E0	5.30E-4	4.59E-4
Iron - 55	Ci	0.00 E0	0.00 E0	9.61E-4	2.00E-4
Xenon - 131M	Ci	0.00 E0	0.00 E0	0.00E0	2.53E-4
Xenon - 133	Ci	0.00 E0	0.00 E0	6.88E-3	7.08E-3
Xenon - 133M	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Xenon - 135	Ci	0.00 E0	0.00 E0	1.67E-2	7.91E-3
Krypton - 85M	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Krypton - 87	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Krypton - 88	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Xenon - 135M	Ci	0.00 E0	0.00 E0	1.90E-4	2.34E-5
Manganese - 54	Ci	0.00 E0	0.00 E0	2.65E-5	6.61E-5
Cesium - 134	Ci	0.00 E0	0.00 E0	2.80E-5	3.54E-5
Cesium - 137	Ci	0.00 E0	0.00 E0	1.10E-4	6.07E-5
Cesium - 138	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Zinc - 65	Ci	0.00 E0	0.00 E0	2.80E-3	1.14E-3
Sodium - 24	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Cobalt - 58	Ci	0.00 E0	0.00 E0	6.95E-5	5.17E-5
Silver - 110m	Ci	0.00 E0	0.00 E0	1.39E-3	7.90E-4
Antimony - 125	Ci	0.00 E0	0.00 E0	2.44E-4	0.00E0
Strontium - 92	Ci	0.00 E0	0.00 E0	4.42E-4	3.74E-5
Cobalt - 60	Ci	0.00 E0	0.00 E0	1.60E-3	7.70E-4
Iodine - 131	Ci	0.00 E0	0.00 E0	9.38E-4	1.28E-3
Iodine - 133	Ci	0.00 E0	0.00 E0	6.69E-4	2.75E-5
Molybdenum - 99	Ci	0.00 E0	0.00 E0	0.00E0	1.18E-5
Iodine - 135	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0

EFFLUENT & WASTE DISPOSAL SEMI-ANNUAL REPORT (1/1/91 - 6/30/91)

Table 2B Page 2 of 2
Liquid Effluents

Nuclides Released	Units	Continuous Mode		Batch Mode	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
Barium - 140	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Neptunium - 239	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Chromium - 51	Ci	0.00 E0	0.00 E0	4.66E-4	1.04E-3
Yttrium - 91M	Ci	0.00 E0	0.00 E0	2.50E-5	0.00 E0
Strontium - 91	Ci	0.00 E0	0.00 E0	0.00E0	0.00 E0
Antimony - 122	Ci	0.00 E0	0.00 E0	0.00E0	0.00 E0
Technetium - 99m	Ci	0.00 E0	0.00 E0	0.00E0	1.25E-5
Niobium - 95	Ci	0.00 E0	0.00 E0	1.29E-4	3.25E-5
Lanthanum - 140	Ci	0.00 E0	0.00 E0	1.09E-4	2.76E-4
Cadmium - 109	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Cesium - 136	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Antimony - 124	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Iron - 59	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Tellurium - 129M	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Tellurium - 131M	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Zirconium - 95	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Cerium - 141	Ci	0.00 E0	0.00 E0	0.00E0	0.00E0
Copper - 64	Ci	0.00 E0	0.00 E0	1.09E-2	0.00E0
Total for Period (above)	Ci	0.00 E0	0.00 E0	4.835E0	2.760E0

ATTACHMENT A SUPPLEMENT INFORMATION

Facility: Peach Bottom Units 2 & 3

Licenses: DPR-44
DPR-56

1. Regulatory Limits (Technical Specification Limits)

A. Noble Gases:

- | | | | | | |
|----|-------------|---------|--------------|---|---------------------------|
| 1. | ≤ 500 | mRem/Yr | - total body | - | *instantaneous* limits |
| | ≤ 3000 | mRem/Yr | - skin | | Tech. Spec. 3.8.C.1.a |
| 2. | ≤ 10 | mRad | - air gamma | - | quarterly air dose limits |
| | ≤ 20 | mRad | - air beta | | Tech. Spec. 3.8.C.2.a |
| 3. | ≤ 20 | mRad | - air gamma | - | yearly air dose limits |
| | ≤ 40 | mRad | - air beta | | Tech. Spec. 3.8.C.2.b |

B. Iodines, Tritium, Particulates with Half Life > 8 days:

- | | | | | | |
|----|-------------|---------|----------------------------------|---|------------------------|
| 1. | ≤ 1500 | mRem/Yr | - any organ
(inhalation path) | - | *instantaneous* limits |
| | | | | | Tech. Spec. 3.8.C.1.b |
| 2. | ≤ 15 | mRem | - any organ | - | quarterly dose limits |
| | | | | | Tech. Spec. 3.8.C.3.a |
| 3. | ≤ 30 | mRem | - any organ | - | yearly dose limits |
| | | | | | Tech. Spec. 3.8.C.3.b |

C. Liquid Effluents

- | | | | | | |
|----|---|------|--------------|---|------------------------|
| 1. | Concentration ≤ 10 CFR 20,
Appendix B, Table II, Col. 2 | | | - | *instantaneous* limits |
| | | | | | Tech. Spec. 3.8.B.1 |
| 2. | ≤ 3.0 | mRem | - total body | - | quarterly dose limits |
| | ≤ 10 | mRem | - any organ | | Tech. Spec. 3.8.B.2.a |
| 3. | ≤ 6.0 | mRem | - total body | - | yearly dose limits |
| | ≤ 20 | mRem | - any organ | | Tech. Spec. 3.8.B.2.b |

2. Maximum Permissible Concentrations:

MPCs are not used to calculate permissible release rates and concentrations for gaseous releases.

The MPCs specified in 10 CFR 20, Appendix B, Table II, Column 2, for identified nuclides are used to calculate permissible release rates and concentrations for liquid release per Peach Bottom Technical Specification 3.8.B.1.

3. Average Energy:

Not Applicable

ATTACHMENT A (continued)

4. Measurements and Approximations of Total Radioactivity:

A. Fission and Activation Gases:

The method used is the Nuclear Data 6700 Counting System
– Gas Marinelli –

B. Iodine:

The method used is the Nuclear Data 6700 Counting System
– Charcoal Cartridge –

C. Particulates:

The method used is the Nuclear Data 6700 Counting System
– Air Particulate Sample, (47 mm filter) –

D. Liquid Effluents:

The method used is the Nuclear Data 6700 Counting System and the Radwaste Liquid Discharge Pre-Release Method with a liter marinelli.

5. Batch Releases:

A. Liquid:

	<u>QTR 1</u>	<u>QTR 2</u>
Number of batch releases:	44	60
Total time for batch releases (minutes):	9381	13228
Maximum time period for batch release (minutes):	255	307
Average time period for batch release (minutes):	213	220
Minimum time period for batch release (minutes):	25	30
Dilution flow (liters/s):	1.79E10	4.5E10

B. Gaseous:

Not applicable.

6. Abnormal Releases:

A. Liquid:

None

B. Gaseous:

None

EFFLUENT & WASTE DISPOSAL SEMI-ANNUAL REPORT (1/1/91 - 6/30/91)

PEACH BOTTOM UNITS 2 & 3
JANUARY 1, 1991 TO JUNE 30, 1991
CLASSES OF SOLID RADIOACTIVE WASTE SHIPMENTS

Total # of Shipments	Waste Description (source of waste)	Container/Type	Individual Volume (cubic ft.)	Total Volume (cubic ft.)	Total Curie	Principal Radionuclides
Class A						
37	Dewatered Resin	HIC/Type A Cask	202.1	7477.7	4.57E+02	Zn-65, Co-60, Cs-137, I-131, La-140
39	DAW	Metal Drum/STC	variable	(*) 3913.2	8.48E+00	Co-60, Fe-55, Cs-137, Cs-134, Zn-65
29	DAW	Metal Drum/STC	variable	(**) 771.9	2.01E-01	Co-60, Cs-137, Fe-55, Cs-134, Zn-65
4	Filters	HIC/Type A Cask	205.8	823.2	4.93E+01	Co-60, Fe-55, Zn-65, Ni-63, Cs-137
Class B						
1	Dewatered Resin	HIC/Type B Cask	132.4	132.4	5.98E+02	Zn-65, Co-60, Cr-51, Cs-137, Cs-134
Class C						
1	Irradiated Metal	Steel Lincr/ Type B Cask	7.46	22.4	2.43E+04	Co-60, Fe-55, Mn-54, Ni-63, Cr-51
Totals	111			13140.78	2.45E+04	

NOTES:

- * - Indicates actual total PECO radwaste shipped from Quadrex, after volume reduction, to the burial site.
- ** - Indicates actual total PECO radwaste shipped from SEG, after volume reduction, to the burial site.