

PHILADELPHIA ELECTRIC COMPANY
PEACH BOTTOM ATOMIC POWER STATION
UNIT NOS. 2 AND 3
DOCKET NOS. 50-277 & 50-278

SEMI-ANNUAL EFFLUENT RELEASES REPORT
NO. 12
JULY 1, 1981 THROUGH DECEMBER 31, 1981

Submitted to
The United States Nuclear Regulatory Commission
Pursuant to
Facility Operating License No. DPR-44 & 56

Preparation Directed By:

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I. INTRODUCTION

SEMI-ANNUAL EFFLUENT REPORT

In accordance with the Unique Reporting Requirements of Technical Specification 6.9.3, this report summarizes the Effluent Release Data for Peach Bottom Atomic Power Station Units 2 and 3. This data covers the period July 1, 1981 through December 31, 1981. The notations E+ and E- are used to denote positive and negative exponents to the base 10.

TABLE A
PEACH BOTTOM UNITS 2 & 3 - LIQUID RADIOACTIVE RELEASE DATA 1981

	JULY	AUGUST	SEPT	OCTOBER	NOV.	DEC.	TOTAL	
Gross Activity ($\beta\gamma$) Total Curies Except Tritium & Noble Gases	3.33E-01	2.47E-01	6.12E-02	4.86E-01	2.52E-01	5.07E-01	1.89E+00	
Average μ Ci/ml Gross Activity (except Tritium at Point of Release)	2.51E-08	3.67E-08	6.86E-09	3.41E-08	2.13E-08	1.44E-08	(2) 2.10E-08	
Total Curies of Tritium	2.31E+00	1.95E+00	1.68E+00	1.86E+00	1.30E+00	2.78E+00	1.19E+01	
Average μ Ci/ml Tritium at Point of Release (1)	1.74E-07	2.89E-07	1.88E-07	1.31E-07	1.10E-07	7.90E-08	(2) 1.32E-07	
Total Curies, Alpha	$\leq 2.80E-06$	$\leq 1.40E-06$	$\leq 1.10E-06$	$\leq 6.62E-07$	$\leq 8.28E-07$	2.91E-06	9.70E-06	
Average μ Ci/ml Alpha at Point of Release	$\leq 2.11E-13$	$\leq 2.07E-13$	$\leq 1.23E-13$	$\leq 4.65E-14$	$\leq 7.07E-14$	8.27E-14	(2) 1.08E-13	
Total Curies of Dissolved Noble Gases (5)	1.07E-01	4.22E-02	2.99E-02	1.24E-01	4.62E-02	8.83E-02	4.38E-01	
Average μ Ci/ml of Noble Gases at Point of Release (5)	8.05E-09	6.25E-09	3.35E-09	8.71E-09	3.91E-09	2.51E-09	(2) 4.86E-09	
Maximum μ Ci/ml Released except Tritium - at Point of Release	5.59E-08	2.33E-06	1.80E-08	1.19E-07	4.49E-08	6.86E-08	(3) 2.33E-06	
Total Volume of Waste:	Gallons: Liters:	3.40E+05 3.18E+06	4.82E+05 1.82E+06	4.37E+05 1.65E+06	4.68E+05 1.77E+06	2.51E+05 9.48E+05	5.53E+05 2.09E+06	3.03E+06 1.15E+07
Total Volume bf Dilution:	Gallons: Liters:	3.51E+09 1.33E+10	1.78E+09 6.75E+09	2.36E+09 8.92E+09	3.76E+09 1.42E+10	3.12E+09 1.18E+10	9.30E+09 3.52E+10	2.38E+10 9.02E+10
(1) % of Tech. Spec. Curie Limit	5.0%	3.72%	0.92%	7.3%	3.78%	7.60%	(2) 4.73%	
(1) Based on Tech Spec. 3.8 p. 2								

(1) Based on Tech Spec. 3.8.B.2

(2) Average for 6 month period

(3) Maximum for 6 month period

(4) Based on a Strontium 90 Counting efficiency

(5) Based on a monthly analysis

TABLE B

PEACH BOTTOM UNITS 2 & 3 - ISOTOPIC ANALYSIS OF LIQUID RADIOACTIVE RELEASES (In Curies) (1)

ISOTOPE	JULY	AUG	SEPT	OCT	NOV	DEC	Ci Total
Strontium-89	2.34E-04	4.20E-04	*	*	7.68E-05	5.80E-04	1.31E-03
Strontium-90	2.63E-05	3.16E-05	*	9.58E-04	2.74E-05	4.98E-04	1.54E-03
Cesium-134	2.14E-02	2.29E-02	2.62E-03	1.39E-02	4.60E-03	1.36E-02	7.89E-02
Cesium-137	3.85E-02	3.80E-02	4.32E-03	2.42E-02	8.61E-03	2.57E-02	1.39E-01
Iodine-131	6.70E-04	9.65E-03	3.12E-04	1.77E-02	7.04E-03	1.56E-02	5.09E-02
Cobalt-58	1.31E-03	4.70E-03	3.61E-04	1.58E-03	2.99E-04	6.13E-04	8.87E-03
Cobalt-60	5.44E-02	1.93E-02	3.01E-03	1.49E-02	3.02E-03	6.48E-03	1.01E-01
Zinc-65	6.94E-02	5.67E-02	6.76E-03	5.57E-02	1.46E-02	2.77E-02	2.31E-01
Manganese-54	7.99E-04	6.49E-04	*	1.33E-04	*	2.40E-04	1.82E-03
Chromium-51	8.17E-03	2.40E-03	*	3.46E-03	*	6.47E-04	1.47E-02
Lanthanum-140	4.85E-04	4.07E-04	7.42E-04	9.69E-04	3.84E-04	9.08E-04	3.82E-03
Niobium-95	1.64E-04	7.67E-05	*	*	*	*	2.41E-04
Sodium-24	2.30E-02	4.36E-02	1.48E-02	1.54E-01	1.34E-01	2.70E-01	6.69E-01
Yttrium-91M	2.15E-03	9.67E-05	1.18E-04	2.37E-04	*	6.62E-05	2.62E-03
Xenon-135m	9.75E-04	4.64E-04	6.15E-04	1.21E-02	5.43E-03	1.36E-02	3.32E-02
Iodine-133	1.06E-03	1.67E-03	5.92E-04	3.27E-02	1.51E-02	3.00E-02	8.11E-02
Iodine-135	*	9.00E-04	*	5.98E-03	6.96E-03	8.93E-03	2.28E-02
Strontium-92	3.41E-04	4.00E-05	*	*	*	*	3.81E-04
Technetium-99M	5.25E-04	3.91E-04	1.12E-04	2.55E-03	2.81E-03	6.73E-04	7.06E-03
Xenon-133M	1.41E-04	*	6.15E-04	*	*	*	7.56E-04
Xenon-133	8.35E-02	2.90E-02	1.76E-02	6.29E-02	1.97E-02	4.85E-02	2.61E-01
Xenon-135	2.22E-02	1.28E-02	1.17E-02	4.90E-02	2.11E-02	2.65E-02	1.43E-01
Phosphorus-32	2.65E-04	9.54E-03	6.01E-05	4.31E-05	4.46E-03	2.03E-04	1.46E-02
Nickel-63	2.58E-04	2.15E-03	1.52E-04	3.01E-04	1.51E-04	5.63E-04	3.58E-03
Strontium-91	1.46E-03	*	*	*	*	*	1.46E-03
Silver-110M	2.62E-04	1.10E-04	*	*	*	*	3.72E-04
Iodine-132	*	3.26E-04	*	1.02E-03	3.91E-04	1.02E-03	2.70E-03
Barium-140	*	*	*	3.71E-04	*	*	3.71E-04
Neptunium-239	*	*	*	8.88E-04	6.39E-03	5.46E-03	1.27E-02
Tellurium-132	*	*	*	7.35E-05	7.54E-03	4.29E-04	8.04E-03
TOTAL (Curie)	3.32E-01	2.56E-01	6.45E-02	4.86E-01	2.62E-01	4.98E-01	1.90E+00

* Less than detectable activity.

(1) Based on analysis done on each batch

TABLE C
PEACH BOTTOM UNITS 2 AND 3
GASEOUS RADIOACTIVE RELEASE DATA 1981

	JULY	AUGUST	SEPT	OCTOBER	NOVEMBER	DECEMBER	TOTAL
Mixed Noble Gases Ci	1.27E+03	1.06E+03	8.40E+02	1.79E+03	1.70E+03	2.78E+03	9.43E+03
% of Tech. Spec. Limit (1)	2.54E-01	2.26E-01	1.81E-01	2.88E-01	3.03E-01	2.25E-01	(4) 2.46E-01
Iodine 131 Ci	2.64E-03	4.52E-03	2.00E-03	6.83E-03	4.64E-03	3.26E-03	2.59E-02
% of Tech. Spec. Limit (2)	1.96E-01	2.37E-01	7.69E-01	3.97E-01	3.70E-01	2.16E-01	(4) 3.64E-01
Particulates > 8 Day Half Life Ci	≤8.17E-04	≤1.82E-03	≤1.37E-04	≤8.02E-04	≤3.83E-04	≤4.92E-04	4.45E-03
Particulate Alpha Ci	≤1.40E-06	≤9.21E-07	5.66E-07	1.44E-06	≤7.99E-07	≤5.79E-07	5.71E-06
% of Tech. Spec. Limit (2)	≤5.94E-02	≤7.37E-03	≤2.29E-03	≤4.43E-02	≤1.22E-02	≤1.41E-02	(4) 1.40E-01
Tritium Ci (3)	1.96E+00	1.57E+00	1.57E+00	1.65E+00	1.32E+00	1.65E+00	9.72E+00
Max. Noble Gas Release Rate μ ci/sec Date:	2.31E+03 7/16/81	2.00E+04 8/18/81	1.46E+03 9/20/81	2.20E+04 10/15/81	3.01E+03 11/28/81	3.61E+03 12/10/81	(5) 2.20E+04 10/15/81
% of Tech. Spec. Limit for Maximum Noble Gas Release (1)	2.74E+01	1.02E+00	2.40E-01	6.60E+00	3.40E-01	3.99E+01	(5) 3.99E+01
Maximum % of Tech. Spec. Limit (1)	2.74E+01	2.44E+01	6.60E+00	5.01E+01	2.67E+01	3.99E+01	(5) 5.01E+01

(1) Basis: Tech. Spec. 3.8.C.1

(2) Basis: Tech. Spec. 3.8.C.2

(3) Quarterly analysis used for monthly estimation

(4) Average for 6 month period

(5) Maximum for 6 month period

TABLE D

PEACH BOTTOM UNITS 2 & 3 - ISOTOPIC ANALYSIS OF GASEOUS RADIOACTIVE EFFLUENTS (in Curies)

1981

ISOTOPE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	Ci Total
⁽²⁾ Nitrogen-13	*	*	*	*	*	195E+00	1.95E+00
Argon-41 ⁽²⁾	*	*	*	4.70E+00	*	*	4.70E+00
Xenon-138 ⁽²⁾	8.40E+00	*	*	2.21E+00	4.30E+00	6.50E+00	2.14E+01
Xenon-135m ⁽²⁾	4.30E+00	*	*	*	*	6.91E+00	1.12E+01
Xenon-133m ⁽²⁾	*	1.58E+01	1.05E+02	4.28E+01	4.22E+01	9.33E+01	2.99E+02
Krypton-87 ⁽²⁾	*	*	*	1.07E+00	*	4.39E+00	5.46E+00
Krypton-85m ⁽²⁾	4.60E+00	*	*	3.90E-01	3.80E-01	1.65E+01	2.19E+01
Xenon-133 ⁽²⁾	1.06E+03	1.03E+03	6.70E+02	1.66E+03	1.56E+03	2.85E+03	8.82E+03
Xenon-135 ⁽²⁾	1.60E+02	1.41E+01	5.23E+01	5.14E+01	7.41E+01	5.15E+02	8.67E+02
Krypton-88 ⁽²⁾	*	*	*	*	*	6.04E+00	6.04E+00
Total	1.24E+03	1.06E+03	8.27E+02	1.76E+03	1.68E+03	3.50E+03	1.01E+04
Iodine-131	2.64E-03	4.52E-03	2.00E-03	6.83E-03	4.64E-03	3.26E-03	2.39E-02
⁽¹⁾ Iodine-133	8.42E-02	6.74E-02	6.74E-02	7.29E-02	5.83E-02	7.29E-02	4.23E-01
⁽¹⁾ Iodine-135	4.02E-02	3.21E-02	3.21E-02	4.51E-02	3.61E-02	4.51E-02	2.31E-01
Total	1.27E-01	1.04E-01	1.02E-01	1.25E-01	9.90E-02	1.21E-01	6.78E-01
Strontium-89	9.76E-05	9.58E-05	≤6.61E-05	1.43E-04	1.33E-04	2.21E-04	7.57E-04
Strontium-90	≤5.99E-06	≤5.3E-06	≤4.95E-06	≤5.57E-06	1.54E-05	≤5.44E-06	≤4.27E-05
Cesium-134	6.72E-05	2.94E-04	2.30E-06	3.49E-06	*	*	3.67E-04
Cesium-137	1.16E-04	3.28E-04	3.60E-06	7.32E-06	8.76E-05	1.13E-06	5.43E-04
Lanthanum-140	2.07E-05	8.78E-05	2.56E-05	4.91E-05	1.05E-04	1.16E-04	4.04E-04
Cobalt-58	*	1.42E-04	*	3.65E-05	*	*	1.78E-04
Cobalt-60	3.14E-04	2.86E-04	7.00E-06	1.15E-04	*	4.68E-05	7.70E-04
Zinc-65	2.07E-04	3.27E-04	2.06E-05	1.84E-04	*	*	7.38E-04
Manganese-54		1.76E-05	*	*	*	*	1.76E-05
Strontium-91	*	2.16E-05	2.66E-05	5.85E-05	1.56E-04	1.51E-04	4.14E-04
Chromium-51	*	*	*	2.44E-04	*	7.41E-05	3.18E-04
Yttrium-91m	3.71E-05	*	1.94E-04	3.79E-04	9.06E-04	2.20E-03	3.72E-03
Sodium-24	*	*	*	2.10E-04	*	*	2.10E-03
Cesium-138	2.87E-03	1.54E-03	9.69E-04	2.22E-03	4.99E-03	5.55E-03	1.81E-02
Barium-140	2.36E-05	1.18E-04	3.20E-05	6.24E-05	1.47E-04	1.43E-04	5.26E-04
Cadmium-109	*	2.06E-04	*	*	*	*	2.06E-04
Rubidium-89	1.75E-04	*	*	*	*	*	1.75E-04
Technetium-99m	*	*	*	8.11E-05	*	*	8.11E-05
TOTAL	3.93E-03	3.47E-03	1.35E-03	3.80E-03	6.54E-03	8.51E-03	2.76E-02

* Less than minimum detectable

(1) Quarterly analysis used for monthly estimation

(2) Based on weekly grab sample.

TABLE E

PEACH BOTTOM UNITS 2 & 3 - SOLID RADIOACTIVE WASTE SHIPMENT

	JULY	AUGUST	SEPT	OCT	NOV	DEC	TOTAL
Number of shipments	31	36	33	19	27	29	175
Volume of waste (ft) ³	1.18E+04	1.52E+04	1.87E+04	3.44E+03	7.10E+03	5.41E+03	6.17E+04
Activity, Curies	3.51E+02	1.12E+03	2.85E+02	3.29E+02	5.11E+02	1.95E+02	2.79E+03
Shipping dates (# of shipments)	A6/30-(1)	A7/31(1)	A9/1(1)	A9/30(1)	A10/30(1)	A11/30(1)	
	A7/6-(1)	A8/3(1)	A9/2(1)	A10/1(1)	B10/30(1)	A12/2(2)	
	A7/7-(2)	A8/4(2)	A9/3(1)	A10/7(1)	B10/31(2)	A12/3(1)	
	A7/8-(1)	A8/5(1)	B9/4(1)	A10/8(1)	A11/2(1)	A12/4(1)	
A. Disposition-All waste shipped by Hittman Nuclear and Development Corporation in trucks to the Chem.Nuclear Corporation, Barnwell, South Carolina.	A7/9-(1)	A8/6(2)	B9/5(2)	A10/9(1)	A11/3(2)	A12/7(2)	
	A7/10-(1)	A8/7(2)	A9/8(1)	A10/13(1)	A11/4(2)	A12/9(2)	
	A7/13-(1)	A8/10(1)	A9/9(1)	A10/14(2)	A11/5(1)	A12/10(2)	
	A7/14-(2)	A8/11(2)	A9/10(1)	A10/16(1)	A11/6(2)	A12/11(1)	
	A7/15-(1)	A8/12(1)	A9/11(1)	A10/19(1)	A11/9(1)	B12/12(2)	
	B7/16-(1)	A8/13(1)	B9/11(1)	A10/20(1)	A11/10(1)	A12/14(2)	
	A7/16-(1)	A8/14(1)	A9/12(2)	A10/21(2)	A11/11(1)	A12/17(2)	
	A7/17-(1)	B8/14(1)	B9/14(2)	A10/22(1)	A11/12(1)	A12/18(1)	
B. Disposition-All waste shipped by Hittman Nuclear & Development Corporation on trucks to US Ecology, Inc., Richard, Washington	B7/18(2)	B8/15(2)	A9/15(1)	A10/26(1)	A11/13(1)	A12/21(2)	
	A7/20(1)	A8/17(1)	A9/16(1)	A10/27(1)	A11/16(1)	A12/22(2)	
	A7/21(2)	A8/18(1)	A9/17(1)	A10/28(2)	A11/17(1)	A12/23(2)	
	A7/22(1)	A8/19(1)	A9/18(1)	A10/29(1)	A11/18(1)	A12/28(1)	
	A7/23(2)	A8/20(1)	B9/18(1)		A11/19(2)	A12/29(1)	
	B7/24(1)	A8/21(1)	B9/19(2)		A11/20(1)	A12/30(2)	
	A7/24(2)	B8/21(1)	A9/21(1)		A11/23(1)		
Shipments are logged according to the month received at destination, which it was shipped.	B7/25(2)	B8/22(1)	A9/22(1)		A11/24(1)		
	A7/27(1)	A8/24(2)	A9/23(2)		A11/25(1)		
	A7/28(1)	A8/25(1)	A9/24(1)				
	A7/29(1)	A8/26(2)	A9/25(1)				
	A7/30(1)	A8/27(1)	B9/25(1)				
		A8/28(1)	B9/26(2)				
		B8/28(2)	A9/28(1)				
		B8/29(2)	A9/29(1)				