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10CFR 50.36(a)(2)
10CFR 72.44(d)(3)

April 23, 2002

U.S. Nuclear Regulatory Commission
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Peach Bottom Atomic Power Station Unit Nos. 2 and 3
& Independent Spent Fuel Storage Installation (ISFSI)
Facility Operating License Nos. DPR-44 and DPR-56
NRC Docket Nos. 50-277 and 50-278 & ISFSI Docket 72-29

Subject: Radioactive Effluent Release Report No. 44
January 1, 2001 through December 31, 2001

Enclosed are two copies of the Radioactive Effluent Release Report No. 44, January 1, 2001 through December 31, 2001 for Peach Bottom Atomic Power Station Unit Nos. 2 and 3.

This report is being submitted in compliance with 10CFR 50.36(a)(2) and the Technical Specifications of Operating Licenses DPR-44 and DPR-56, and to fulfill the requirements of Regulatory Guide 10.1. Additionally, this report is submitted to satisfy the annual effluent reporting requirements of 10CFR 72.44(d)(3).

Revisions were made to the Process Control Program (PCP) during this report period. A copy of the revised PCP is included.

Sincerely,

John Doering, Jr.
Vice President,
Peach Bottom Atomic Power Station

JD/GLJ/IWS:tlm

CCN-02-14034
Enclosure

cc: H. J. Miller, Administrator, Region I, USNRC
J. Jang, Region I, USNRC
A. C. McMurtray, USNRC Senior Resident Inspector, PBAPS
Senior Project Manager, USNRC

IE48

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

RADIOACTIVE EFFLUENT RELEASE REPORT

NO. 44

JANUARY 1, 2001 THROUGH DECEMBER 31, 2001

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

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Technical Concurrences: (for accuracy of information)

Jan Sedd

Chemistry / Radwaste Manager

1. INTRODUCTION

In accordance with the Reporting Requirements of Technical Specification 5.6.3 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, 2001 through December 31, 2001. 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 Offsite Dose Calculation Manual Specification limits.

There were two unplanned releases of liquid radioactive material.

There was no burning of contaminated oil in 2001 and therefore no radioactive gaseous effluent from the auxiliary boiler stack.

There were no gaseous or liquid radioactive releases from the Independent Spent Fuel Storage Installation, NRC Docket No. 72-29 (ISFSI).

The station Process Control Program was revised 6/20/01 when RW-C-100, "Solid Radwaste System Process Control Program (PCP)", was superseded by the Exelon Procedure RW-AA-100, "Process Control Program for Radioactive Wastes". All the regulatory and Technical Specification requirements of RW-C-100 were included in RW-AA-100. The level of detail in the plant system descriptions of RW-C-100 was not carried over to RW-AA-100. The inclusion of such detail in the PCP is not a regulatory requirement. RW-AA-100 was further revised 10/16/01. This revision was administrative only, with no effect on the Process Control Program.

EFFLUENT & WASTE DISPOSAL ANNUAL REPORT (1/01/01 - 12/31/01)

Table 1A Page 1 of 2
Gaseous Effluents - Summation of All Releases

	UNITS	QUARTER 1	QUARTER 2	EST. ERROR TOTAL %
A. Fission & activation gases				
1. Total release	Ci	9.40E1	9.03E1	18.8
2. Average release rate for period	μCi/sec	1.20E1	1.15E1	18.8
3. Gamma air dose	Millirad	1.77E-2	1.97E-2	18.8
Percent of Technical Specification limit	%	1.77E-1	1.97E-1	18.8
4. Beta air dose	Millirad	1.24E-2	1.36E-2	18.8
Percent of Technical Specification limit	%	6.20E-2	6.80E-2	18.8
B. Iodines				
1. Total iodine-131	Ci	6.37E-5	6.58E-5	22.9
2. Average release rate for period	μCi/sec	8.10E-6	8.37E-6	22.9
3. Critical organ dose	Millirem	3.47E-4	3.59E-4	22.9
Percent of Technical Specification limit	%	2.31E-3	2.39E-3	22.9
C. Particulates				
1. Particulates with half-lives greater than 8 days (includes Alpha and Strontium 89,90)	Ci	1.19E-4	9.92E-5	22.9
2. Average release rate for period	μCi/sec	1.51E-5	1.26E-5	22.9
3. Gross alpha radioactivity	Ci	3.63E-6	3.27E-6	22.9
D. Tritium				
1. Total release	Ci	0	2.53E0	23.5
2. Average release rate for period	μCi/sec	0	3.22E-1	23.5

EFFLUENT & WASTE DISPOSAL ANNUAL REPORT (1/01/01 - 12/31/01)

Table 1A Page 2 of 2
Gaseous Effluents - Summation of All Releases

	UNITS	QUARTER 3	QUARTER 4	EST. ERROR TOTAL %
A. Fission & activation gases				
1. Total release	Ci	9.02E1	1.53E2	18.8
2. Average release rate for period	μCi/sec	1.15E1	1.95E1	18.8
3. Gamma air dose	Millirad	1.97E-2	3.28E-2	18.8
Percent of Technical Specification limit	%	1.97E-1	3.28E-1	18.8
4. Beta air dose	Millirad	1.36E-2	2.26E-2	18.8
Percent of Technical Specification limit	%	6.80E-2	1.13E-1	18.8
B. Iodines				
1. Total iodine-131	Ci	1.31E-4	5.56E-5	22.9
2. Average release rate for period	μCi/sec	1.67E-5	7.08E-6	22.9
3. Critical organ dose	Millirem	8.22E-4	2.42E-4	22.9
Percent of Technical Specification limit	%	5.48E-3	1.61E-3	22.9
C. Particulates				
1. Particulates with half-lives greater than 8 days (includes Alpha and Strontium 89,90)	Ci	1.24E-4	6.93E-5	22.9
2. Average release rate for period	μCi/sec	1.58E-5	8.81E-6	22.9
3. Gross alpha radioactivity	Ci	4.62E-6	5.37E-6	22.9
D. Tritium				
1. Total release	Ci	0	0	23.5
2. Average release rate for period	μCi/sec	0	0	23.5

EFFLUENT & WASTE DISPOSAL ANNUAL REPORT (1/01/01 - 12/31/01)

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 gases					
Krypton - 85M	Ci	0	0	0	0
Krypton - 87	Ci	0	0	0	0
Krypton - 88	Ci	0	0	0	0
Xenon - 133	Ci	0	0	0	0
Xenon - 135	Ci	8.68E-1	1.83E0	0	0
Xenon - 135M	Ci	0	0	0	0
Xenon - 138	Ci	2.11E0	0	0	0
Unidentified	Ci	2.43E1	1.23E1	0	0
Total for Period	Ci	2.72E1	1.41E1	0	0
2. Iodines					
Iodine - 131	Ci	4.28E-5	4.58E-5	0	0
Iodine - 133	Ci	3.91E-5	5.67E-5	0	0
Iodine - 135	Ci	0	0	0	0
Total for Period	Ci	8.20E-5	1.03E-4	0	0
3. Particulates					
Strontium - 89	Ci	4.16E-5	3.37E-5	0	0
Strontium - 90	Ci	0	8.00E-8	0	0
Cobalt - 60	Ci	0	2.80E-7	0	0
Tellurium -123M	Ci	1.89E-5	0	0	0
Cesium – 137	Ci	3.30E-7	0	0	0
Barium – 140	Ci	2.80E-5	2.49E-5	0	0
Neodymium – 147	Ci	0	2.00E-7	0	0
TOTAL FOR PERIOD	Ci	8.89E-5	5.92E-5	0	0

EFFLUENT & WASTE DISPOSAL ANNUAL REPORT (1/01/01 - 12/31/01)

Table 1B Page 2 of 2

Gaseous Effluents for Release Point - Main Stack

Nuclides Released	Units	Continuous Mode		Batch Mode	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
1. Fission gases					
Krypton - 85M	Ci	0	4.74E0	0	0
Krypton – 87	Ci	0	0	0	0
Krypton – 88	Ci	0	1.62E0	0	0
Xenon – 133	Ci	1.03E0	7.06E0	0	0
Xenon – 135	Ci	1.08E0	3.36E0	0	0
Xenon - 135M	Ci	0	0	0	0
Xenon – 138	Ci	0	0	0	0
Xenon - 133M	Ci	0	0	0	0
Unidentified	Ci	1.19E1	9.52E0	0	0
Total for Period	Ci	1.40E1	2.63E1	0	0
2. Iodines					
Iodine - 131	Ci	5.67E-5	5.56E-5	0	0
Iodine - 133	Ci	5.38E-5	5.23E-5	0	0
Iodine - 135	Ci	0	0	0	0
Total for Period	Ci	1.10E-4	1.08E-4	0	0
3. Particulates					
Strontium - 89	Ci	3.00E-5	3.06E-5	0	0
Strontium - 90	Ci	6.00E-8	1.00E-7	0	0
Cobalt - 60	Ci	6.50E-7	1.08E-6	0	0
Cesium - 137	Ci	0	4.20E-7	0	0
Barium - 140	Ci	3.45E-6	2.16E-5	0	0
TOTAL FOR PERIOD	Ci	3.42E-5	5.38E-5	0	0

EFFLUENT & WASTE DISPOSAL ANNUAL REPORT (1/01/01 - 12/31/01)

Table 1C Page 1 of 2

Gaseous Effluents for Release Point - Unit 2 & Unit 3 Roof Vents & Aux Boiler Stacks

Nuclides Released	Units	Continuous Mode		Batch Mode	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
1. Fission gases					
Krypton - 85M	Ci	0	0	0	0
Krypton - 87	Ci	0	0	0	0
Krypton - 88	Ci	0	0	0	0
Xenon - 133	Ci	0	0	0	0
Xenon - 135	Ci	0	0	0	0
Xenon - 135M	Ci	0	0	0	0
Xenon - 138	Ci	0	0	0	0
Unidentified	Ci	6.68E1	7.62E1	0	0
Total for Period	Ci	6.68E1	7.62E1	0	0
2. Iodines					
Iodine - 131	Ci	2.08E-5	1.99E-5	0	0
Iodine - 133	Ci	0	0	0	0
Iodine - 135	Ci	0	0	0	0
Total for Period	Ci	2.08E-5	1.99E-5	0	0
3. Particulates					
Strontium - 89	Ci	3.57E-6	1.16E-5	0	0
Strontium - 90	Ci	1.77E-6	0	0	0
Cobalt - 60	Ci	2.07E-5	2.51E-5	0	0
Cesium - 137	Ci	0	0	0	0
TOTAL FOR PERIOD	Ci	2.61E-5	3.68E-5	0	0

Table 1C Page 2 of 2
Gaseous Effluents for Release Point - Unit 2 & Unit 3 Roof Vents & Aux Boiler Stacks

Nuclides Released	Units	Continuous Mode		Batch Mode	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
1. Fission gases					
Krypton - 85M	Ci	0	0	0	0
Krypton - 87	Ci	0	0	0	0
Krypton - 88	Ci	0	0	0	0
Xenon - 133	Ci	0	0	0	0
Xenon - 135	Ci	0	0	0	0
Xenon - 135M	Ci	0	0	0	0
Xenon - 138	Ci	0	0	0	0
Unidentified	Ci	7.62E1	1.27E2	0	0
Total for Period	Ci	7.62E1	1.27E2	0	0
2. Iodines					
Iodine - 131	Ci	7.43E-5	0	0	0
Iodine - 133	Ci	0	0	0	0
Iodine - 135	Ci	0	0	0	0
Total for Period	Ci	7.43E-5	0	0	0
3. Particulates					
Strontium - 89	Ci	1.10E-5	1.00E-6	0	0
Strontium - 90	Ci	2.70E-7	0	0	0
Manganese – 54	Ci	9.84E-6	0	0	0
Cobalt – 60	Ci	6.45E-5	0	0	0
Cesium - 137	Ci	0	9.07E-6	0	0
TOTAL FOR PERIOD	Ci	8.57E-5	1.01E-5	0	0

Table 2A Page 1 of 2
Liquid Effluents - Summation of All Releases

	Units	Quarter 1	Quarter 2	Est. Error Total %
A. Fission & activation products				
1. Total release (not including tritium, gases, alpha)	Ci	1.00E-3	1.05E-2	22.9
2. Average diluted concentration during period	μCi/ml	7.91E-11	3.10E-11	22.9
3. Total Body Dose	Millirem	2.93E-4	2.25E-4	22.9
Percent of Technical Specification limit	%	9.77E-3	7.50E-3	22.9
4. Maximally Exposed Organ Dose	Millirem	3.84E-4	4.53E-4	22.9
Percent of Technical Specification limit	%	3.84E-3	4.53E-3	22.9
B. Tritium				
1. Total release	Ci	1.53E1	4.10E0	15.0
2. Average diluted concentration during period	μCi/ml	1.20E-6	1.21E-8	15.0
C. Dissolved and entrained gases				
1. Total release	Ci	0	1.23E-5	22.9
2. Average diluted concentration during period	μCi/ml	0	3.64E-14	22.9
D. Gross alpha radioactivity				
1. Total release	Ci	0	9.90E-6	22.9
2. Average diluted concentration during period	μCi/ml	0	2.93E-14	22.9
E. Volume of waste released (prior to dilution)	liters	9.05E5	2.96E5	12.7
F. Volume of dilution water used during period	liters	1.27E10	3.38E11	10.9

Table 2A Page 2 of 2
Liquid Effluents - Summation of All Releases

	Units	Quarter 3	Quarter 4	Est. Error Total %
A. Fission & activation products				
1. Total release (not including tritium, gases, alpha)	Ci	2.18E-2	2.11E-2	22.9
2. Average diluted concentration during period	μCi/ml	3.51E-11	3.55E-11	22.9
3. Total Body Dose	Millirem	3.53E-4	3.99E-4	22.9
Percent of Technical Specification limit	%	1.18E-2	1.33E-2	22.9
4. Maximally Exposed Organ Dose	Millirem	1.02E-3	1.04E-3	22.9
Percent of Technical Specification limit	%	1.02E-2	1.04E-2	22.9
B. Tritium				
1. Total release	Ci	5.86E0	1.01E1	15.0
2. Average diluted concentration during period	μCi/ml	9.44E-9	1.70E-8	15.0
C. Dissolved and entrained gases				
1. Total release	Ci	0	0	22.9
2. Average diluted concentration during period	μCi/ml	0	0	22.9
D. Gross alpha radioactivity				
1. Total release	Ci	1.99E-5	1.99E-5	22.9
2. Average diluted concentration during period	μCi/ml	3.20E-14	3.35E-14	22.9
E. Volume of waste released (prior to dilution)	liters	4.86E5	9.09E5	12.7
F. Volume of dilution water used during period	liters	6.21E11	5.94E11	10.9

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	5.50E-7	0	0
Strontium - 90	Ci	0	7.15E-8	7.01E-6	0
Alpha	Ci	0	9.90E-6	0	0
Tritium	Ci	0	1.11E-1	1.53E1	3.99E0
Phosphorus - 32	Ci	0	0	0	0
Iron - 55	Ci	0	2.78E-4	0	0
Xenon - 133	Ci	0	0	0	1.23E-5
Xenon - 135	Ci	0	0	0	0
Sodium - 24	Ci	0	1.54E-6	0	0
Manganese - 54	Ci	0	3.76E-3	2.12E-4	1.16E-5
Manganese - 56	Ci	0	0	0	0
Cobalt - 58	Ci	0	3.23E-4	3.44E-6	0
Iron - 59	Ci	0	6.81E-4	0	0
Cobalt – 60	Ci	0	4.68E-3	4.79E-4	5.18E-5
Zinc – 65	Ci	0	5.96E-4	7.76E-5	0
Silver – 110M	Ci	0	0	1.98E-4	1.82E-5
Cesium – 134	Ci	0	0	0	7.16E-6
Cesium - 137	Ci	0	1.97E-5	2.82E-5	4.09E-5
TOTAL FOR PERIOD	Ci	0	1.21E-1	1.53E1	3.99E0

Table 2B Page 2 of 2
Liquid Effluents

Nuclides Released	Units	Continuous Mode		Batch Mode	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
Strontium - 89	Ci	1.10E-6	1.10E-6	0	0
Strontium - 90	Ci	1.44E-7	1.44E-7	0	0
Alpha	Ci	1.99E-5	1.99E-5	0	0
Tritium	Ci	2.23E-1	2.23E-1	5.64E0	9.86E0
Phosphorus - 32	Ci	0	0	0	0
Iron - 55	Ci	5.59E-4	5.59E-4	2.76E-6	0
Xenon - 133	Ci	0	0	0	0
Xenon - 135	Ci	0	0	0	0
Sodium - 24	Ci	3.09E-6	3.09E-6	0	0
Chromium - 51	Ci	0	0	1.34E-4	0
Manganese - 54	Ci	7.55E-3	7.55E-3	2.74E-4	5.98E-5
Manganese - 56	Ci	0	0	0	2.23E-7
Cobalt - 58	Ci	6.48E-4	6.48E-4	2.41E-5	0
Iron - 59	Ci	1.37E-3	1.37E-3	0	0
Cobalt - 60	Ci	9.40E-3	9.40E-3	3.95E-4	9.48E-5
Zinc - 65	Ci	1.20E-3	1.20E-3	0	9.69E-7
Strontium - 92	Ci	0	0	0	1.32E-5
Silver -110M	Ci	0	0	1.83E-4	1.51E-4
Cesium - 137	Ci	3.96E-5	3.96E-5	7.91E-6	2.20E-5
TOTAL FOR PERIOD	Ci	2.44E-1	2.44E-1	5.64E0	9.86E0

EFFLUENT & WASTE DISPOSAL ANNUAL REPORT (1/01/01-12/31/01)
PEACH BOTTOM UNITS 2 & 3

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 Curies	Principal Radionuclides
CLASS A						
6	Dewatered Resin	HIC/Type A Cask	195.7	1174.2	1.40E+02	Co-60, Zn-65, Mn-54, Cs-137, Fe-55
2	Thermally Processed Resin (1)	HIC/Type A Cask	variable	23.5	1.17E+00	Co-60, Zn-65, Mn-54, Ag-110m, Cs-137
1	DAW (2)	Metal Box/STC	variable	97.6	2.04E-02	Co-60, Zn-65, Cs-137, Mn-54, H-3
1	Thermal Process Residue (2)	Metal Box/STC	variable	91.3	2.58E-01	Zn-65, Co-60, Cs-137, Mn-54, Fe-55
18	DAW (3)	Metal Box/STC	variable	154.2	2.92E-01	Co-60, Mn-54, Zn-65, Cs-137, Fe-55
(*)	Dewatered Filters (3)	Metal Box/STC	variable	150.9	7.22E-01	Co-60, Cs-137, Zn-65, Mn-54, Ni-63
(*)	Incinerator Ash (3)	Metal Box/STC	variable	7.9	3.73E-02	Co-60, Mn-54, Cs-137, Zn-65, Fe-55
53	DAW (4)	Metal Box/STC	variable	2480.6	2.90E-01	Co-60, Fe-55, Cs-137, Zn-65, Mn-54
CLASS B						
1	DAW / Dewatered Filters	HIC/Type A Cask	202.1	202.1	9.49E+00	Co-60, Cs-137, Zn-65, Fe-55, H-3
16	Thermally Processed Resin (1)	HIC/Type A Cask	variable	132.9	5.09E+01	Co-60, Cs-137. Zn-65, Mn-54, Fe-55
CLASS C						
1	Thermally Processed Resin (1)	HIC/Type B Cask	variable	11.7	3.50E+00	Co-60, Zn-65, Mn-54, Cs-137, Ni-63
4	Irradiated Hardware	HIC/Type B Cask	57.4	229.6	8.88E+04	Co-60, Fe-55, Ni-63, Ta-182, Mn-54
TOTALS 103				4756.5	8.90E+04	

NOTES:
(1) - Indicates actual total Peach Bottom Atomic Power Station (PBAPS) waste shipped from Studsvik to burial after processing.
(2) - Indicates actual total PBAPS waste shipped from Allied Technology Group (ATG) to burial after processing.
(3) - Indicates actual total PBAPS waste shipped from Duratek (formerly GTS/Duratek) to burial after processing.
(4) - Indicates actual total PBAPS waste shipped from American Ecology Recycle Center (AERC) to burial after processing.
(*) - Shipment total included with DAW from Duratek as these shipments contained comingled waste streams.

ATTACHMENT A
SUPPLEMENT INFORMATION

Facility: Peach Bottom Units 2 & 3

Licenses: DPR-44
DPR-56

1. Regulatory Limits (Offsite Dose Calculation Manual Specification Limits)

A. Noble Gases:

1.	≤500	mRem/Yr	- total body	-	"instantaneous" limits
	≤3000	mRem/Yr	- skin		ODCMS 3.8.C.1.a
2.	≤10	mRad	- air gamma	-	quarterly air dose limits
	≤20	mRad	- air beta		ODCMS 3.8.C.2.a and b
3.	≤20	mRad	- air gamma	-	yearly air dose limits
	≤40	mRad	- air beta		ODCMS 3.8.C.2.c and d

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

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

C. Liquid Effluents

1.	Concentration ≤ 10 times 10 CFR 20, Appendix B, Table 2, Col. 2			-	"instantaneous" limits ODCMS 3.8.B.1
2.	≤3.0	mRem	- total body	-	quarterly dose limits
	≤10	mRem	- any organ		ODCMS 3.8.B.2.a
3.	≤6.0	mRem	- total body	-	yearly dose limits
	≤20	mRem	- any organ		ODCMS 3.8.B.2.b

D. 40 CFR 190 and 10 CFR 72.104

≤25	mRem	- total body	-	yearly dose limits
≤75	mRem	- thyroid		ODCMS 3.8.D.1
≤25	mRem	- any other organ		

2. Maximum Permissible Concentrations:
Effluent Concentrations are not used to calculate permissible release rates and concentrations for gaseous releases.

The Effluent Concentrations specified in 10 CFR 20, Appendix B, Table 2, Column 2 times 10, for identified nuclides, are used to calculate permissible release rates and concentrations for liquid release per Peach Bottom Offsite Dose Calculation Manual Specification 3.8.B.1.

3. Average Energy:

Not Applicable

4. Measurements and Approximations of Total Radioactivity:

A. Fission and Activation Gases:

The method used is the Canberra Genie-ESP Counting System
- Gas Marinelli -

B. Iodine:

The method used is the Canberra Genie-ESP Counting System
- Charcoal Cartridge -

C. Particulates:

The method used is the Canberra Genie-ESP Counting System
- Air Particulate Sample, (37mm and 47mm) -

D. Liquid Effluents:

The method used is the Canberra Genie-ESP Counting System and the Radwaste Liquid Discharge Pre-Release Method with a one liter marinelli or one liter bottle.

5. Batch Releases:

A. Liquid:

	QTR 1	QRT 2	QTR 3	QTR 4
Number of batch releases:	19	7	13	23
Total Time for batch releases (minutes)	4152	1328	2469	4070
Maximum time period for batch release (minutes):	340	273	350	295
Average time period for batch release (minutes):	218.53	189.71	189.92	176.96
Minimum time period for batch release (minutes):	70	80	60	60
Dilution volume (liters):	1.27E10	6.79E9	9.98E9	1.96E10

B. Gaseous:

Not Applicable

6. Abnormal Releases:

A. Liquid:

1. Event description – On 5/16/01 routine sampling of the high pressure service water (HPSW) effluent to the discharge canal detected low level radioactive contamination. Subsequent investigation determined that a trace amount of condensate stay-full or primary coolant water was leaking through the Unit 2 "C" Residual Heat Removal (RHR) heat exchanger into the "A" loop of the HPSW system.

   It was estimated that the contaminated water released 7.01E-4 mrem total body dose to the discharge canal from 5/16/01 to 12/31/01. This dose contribution was well below the limits specified in the ODCM.

   Analysis of Release - Representative samples were analyzed for all the parameters of a radioactive effluent release. The dose contributions and isotope quantities from this continuous release were added to this Radioactive Effluent Release Report for the applicable reporting periods.

2. Event description – On 10/16/01, low level radioactive contamination was detected in the Guard House wetwell when a representative sample was analyzed prior to pumping the wetwell for a required pump repair. The contaminated raw sewage was processed through the Sewage Treatment Plant and released to the discharge canal.

   It was estimated that the contaminated water released 1.26E-8 mrem total body dose to the discharge canal. This dose contribution was well below the limits specified in the ODCM.

   Analysis of Release – The representative sample was analyzed for all the parameters of a radioactive effluent release. The dose contributions and isotope quantities from this continuous release were added to this Radioactive Effluent Release Report for the applicable reporting period.

3. Event description – On 11/6/01, low level radioactive contamination was detected in a thin layer of silt on the floor of the Emergency Cooling Tower (ECT). Although samples are analyzed to ensure that no detectable radioactive contamination is present whenever water inventory from the ECT is released to the discharge canal, the contaminated silt could potentially be released at undetectable concentration levels. Consequently, it will be assumed that the entire Curie inventory of the contaminated silt was released to the discharge canal during the first release of ECT inventory following the discovery of the radioactive contamination. This discharge occurred on 2/13/02. The dose contribution was well below the limits specified in the ODCM and will be reported in the 2002 Radioactive Effluent Release Report

B. Gaseous:

1. Event Description - During 2001 several potential unmonitored release paths were discovered in the turbine building, radwaste building and reactor buildings. These release points were due, in part, to the aging of caulking at concrete-to-metal interfaces.

   As each release point was discovered, the direction of the air flow was determined. If flow was out of the structure, a continuous air sample was obtained. No detectable activity was measured at any of the release points.

2. Event Description – The Main Stack flow monitor was declared inoperable on 11/13/00 when incorrect wiring between the flow elements and the flow transmitters was discovered. Repair was completed and the monitor declared operable on 6/1/01.

   Flows were estimated at least every four hours in accordance with ODCMS 3.8.C.4.C.

7. Minimum Detectable Concentrations:

A. Liquid:

If a radionuclide was not detected, zero activity was reported for that isotope. A zero activity indicates that no activity was positively detected in any sample when samples were analyzed with techniques which achieved the required Lower Limits of Detection (LLD) as specified in Offsite Dose Calculation Manual Specification Table 4.8.B.1 Radioactive Liquid Waste Sampling and Analysis. In all cases, these LLDs were less than the values required by Offsite Dose Calculation Manual Specifications.

B. Gaseous:

If a radionuclide was not detected, zero activity was reported for that isotope. A zero activity indicates that no activity was positively detected in any sample when samples were analyzed with techniques which achieved the required Lower Limits of Detection (LLD) as specified in Offsite Dose Calculation Manual Specification Table 4.8.C.1 Radioactive Gaseous Waste Sampling and Analysis from Main Stack and Vent Stack. In all cases, these LLDs were less than the values required by Offsite Dose Calculation Manual Specifications.

Exelon Nuclear

PROCESS CONTROL PROGRAM FOR RADIOACTIVE WASTES

1. PURPOSE

1.1. The purpose of the Process Control Program (PCP) is to:

1.1.1. Establish the process and boundary conditions for the preparation of specific procedures for processing, sampling, analysis, packaging, storage, and shipment of solid radwaste in accordance with local, state, and federal requirements. **(CM-1)**

1.1.2. Establish parameters which will provide reasonable assurance that all Low Level Radioactive Wastes (LLRW), processed by the in-plant waste process systems on-site OR by on-site vendor supplied waste processing systems, meet the acceptance criteria to a Licensed Burial Facility, as required by 10CFR Part 20, 10CFR Part 61, 10CFR Part 71, 49CFR Parts 171-172, "Technical Position on Waste Form (Revision 1)" [1/91], "Low-Level Waste Licensing Branch Technical Position on Radioactive Waste Classification" [5/83], and the Station Technical Specifications, as applicable.

1.1.3. Provide reasonable assurance that waste placed in "on-site storage" meets the requirements as addressed within the Safety Analysis Reports for the low level radwaste storage facilities for dry and/or processed wet waste.

2. TERMS AND DEFINITIONS

2.1. **Process Control Program (PCP):** The program which contains the current formulas, sampling, analysis, tests, and determinations to be made to ensure that processing and packaging of solid radioactive waste based on demonstrated processing of actual or simulated wet solid wastes will be accomplished in such a way as to assure the waste meets the stabilization criteria specified in 10CFR Parts 20, 61 and 71, state regulations, and burial site requirements.

2.2. **Solidification:** Liquid waste processed to either an unstable or stable form per 10CFR61 requirements. Waste solidified does not have to meet the 300-year free standing monolith criteria. Approved formulas, samples and tests do not have to meet NRC approval for wastes solidified in a container meeting stability (e.g. High Integrity Container).

2.3. **Stabilization:** Liquid waste processed to a "stable state" per 10CFR61 Requirements. Established formulas, samples, and tests shall be approved by the NRC in order to meet solidification "stabilization" criteria. This processing method is currently not available, because the NRC recognizes that waste packed in a High Integrity Container meets the 300-year stabilization criteria. In the event that this processing method becomes an acceptable method, then the NRC shall approve the stabilization formulas, samples, tests, etc.

2.4. **Solidification Media:** An approved media (e.g. Barnwell - vinyl ester styrene, cement, bitumen) when waste containing greater than 5-year half lives is solidified in a container when the activity is greater than 1 micro curie/cc. Waste solidified in a HIC is approved by the commission meeting the 10CFR61 stabilization criteria, including 1% free standing liquids by volume when the waste is packaged to a "stable" form and $\leq$ 0.5% when waste is packaged to an "unstable" form. The formulas, sampling, analysis, and test do not require NRC approval, because the HIC meets the stability criteria.

2.4.1. Solidification to an unstable or stable state are performed by vendors, when applicable. Liquid waste solidified to meet stabilization criteria (10CFR61 and 01-91 Branch Technical Requirements) must have documentation available that shows that the process is approved by the NRC or disposal facility.

2.5. **Dewatering:** The removal of liquids from liquid waste streams to produce a waste form that meets the requirements of 10CFR Part 61 and applicable burial site criteria, $\leq$0.5% by volume when the waste is packaged to an "unstable" state, or $\leq$1% by volume when the waste is packaged to a "stable" form.

2.6. **High Integrity Container (HIC):** A disposable container that is approved to the container's Certificate of Compliance 10CFR Part 61 Requirements for meeting stability. The use of HIC's is an alternative to solidification or encapsulation in a steel container to meet burial stability. HIC's are used to package dewatered liquid wastes, (e.g. filter cartridges, filter media, resin, sludges, etc), or dry active waste.

2.7. **Encapsulation:** The process of placing a component (e.g. cartridge filters or mechanical components) into a special purpose disposable container and then completely surrounding the waste material with an approved stabilization media, such as cement.

2.8. **Liquid Waste Processing Systems:** In-plant or vendor supplied processing systems consisting of equipment utilized for evaporation, filtration, demineralization, dewatering, solidification, or reverse osmosis (RO) for the treatment of liquid wastes (such as Floor Drains, Chemical Drains and Equipment Drain inputs).

2.9. **Incineration, RVR, and/or Glass Vitrification of Liquid or Solid:** Dry or wet waste processed via incineration and/or thermal processing where by the volume reduced by thermal means meets 10CFR61 requirements.

2.10. **Compaction:** When dry wastes such as paper, wood, plastic, cardboard, incinerator ash, and etc. are volume reduced through the use of a compactor.

2.11. **Waste Streams:** Consist of but are not limited to

- Filter media (powdered, bead resin and fiber),
- Filter cartridges,
- Pre-coat body feed material,
- Contaminated charcoal,
- Fuel pool activated hardware,
- Fuel Pool Crud

- Sump and tank sludges,
- High activity filter cartridges,
- Concentrated liquids,
- Contaminated waste oil,
- Dried sewage or wastewater plant waste,
- Dry Active Waste (DAW): Waste such as filters, air filters, low activity cartridge filters, paper, wood, glass, plastic, cardboard, hoses, cloth, and metals, etc, which have become contaminated as a consequence of normal operating, housekeeping and maintenance activities.
- Other radioactive waste generated from cleanup of inadvertent contamination.

3. RESPONSIBILITIES

3.1. Implementation of this Process Control Program (PCP) is described in procedures at each station.

4. MAIN BODY

4.1. Process Control Program Requirements

4.1.1. A change to this PCP (Radioactive Waste Treatment Systems) may be made provided that the change is reported as part of the annual radioactive effluent release report, Regulatory Guide 1.21, and is approved by the Plant Operations Review Committee (PORC).

4.1.2. Changes become effective upon acceptance per station requirements.

4.1.3. Records of reviews performed shall be retained for the duration of the unit operating license. This documentation shall contain:

1. Sufficient information to support the change together with the appropriate analyses or evaluations justifying the change, and

2. A determination which documents that the change will maintain the overall conformance of waste products to Federal (10CFR61 and the Branch Technical Position), State, or other applicable requirements, including applicable burial site criteria.

4.1.4. A solidification media, approved by the burial site, **MAY BE REQUIRED when** liquid radwaste is solidified to a stable/unstable state.

4.1.5. **When** processing liquid radwaste to meet solidification stability using a vendor supplied solidification system:

1. **If** the vendor has its own Quality Assurance (QA) Program, **then** the vendor **SHALL ADHERE** to its own QA Program and **SHALL HAVE SUBMITTED** its process system topical report to the NRC or agreement state.

2. **If** the vendor **DOES NOT HAVE** its own Quality Assurance Program, **then** the vendor **SHALL ADHERE** to an approved Quality Assurance Topical Report standard belonging to the Station or to another vendor.

4.1.6. The vendor processing system(s) is/are controlled per the following:

1. A commercial vendor supplied processing system(s) **MAY BE USED** for the processing of LLRW streams.

2. All vendors used to process liquid LLRW at the sites **MUST MEET** applicable QA Topical Report Augmented Quality Requirements and **SHALL BE APPROVED** by station radwaste management.

4.1.7. Vendor processing system(s) operated at the site **WILL BE OPERATED and CONTROLLED** in accordance with vendor approved procedures or station procedures based upon vendor approved documents.

4.1.8. All waste streams processed for burial or long term on-site storage **SHALL MEET** the waste classification and characteristics specified in 10CFR Part 61.55, Part 61.56, the 5-83 Branch Technical Position for waste classification, and the applicable burial site acceptance criteria (for any burial site operating at the time the waste was processed).

4.2. General Waste Processing Requirements

4.2.1. On-site resin processing involves tank mixing and settling, transferring to the station or vendor processing system via resin water slurry or vacuuming into approved waste containers, and, when applicable, dewatering for burial.

4.2.2. Vendor resin beds **MAY BE USED** for decontamination of plant systems, such as, Spent Fuel Pool, RWCU (reactor water cleanup), and SDC (Shut Down Cooling). These resins **ARE then PROCESSED** via the station or vendor processing system.

4.2.3. Various drains and sump discharges **WILL BE COLLECTED** in tanks or suitable containers for processing treatment. Water from these tanks **MAY BE SENT** through a filter, demineralizer, concentrator or vendor supplied processing systems.

4.2.4. Process waste (e.g. filter media, sludges, resin, etc) **WILL BE** periodically **DISCHARGED** to the station or vendor processing system for onsite waste treatment **or PACKAGED** in containers for shipment to offsite vendor for volume reduction processing.

4.2.5. Process water (e.g. chemical, floor, equipment drain, etc.) **MAY BE SENT** to either the site waste process systems or vendor waste processing systems for further filtration, demineralization for plant re-use, or discharge.

4.2.6. All dewatering and solidification/stabilization **WILL BE PERFORMED** by either utility site personnel or by on-site vendors **or WILL BE PACKAGED and SHIPPED** to an off-site vendor low-level radwaste processing facility.

4.2.7. Dry Active Waste (DAW) **WILL BE HANDLED and PROCESSED** per the following:

1. DAW **WILL BE COLLECTED and SURVEYED and MAY BE SORTED** for compactable and non-compactable wastes.

2. DAW **MAY BE PACKAGED** in containers to facilitate on-site pre-compaction and/or off-site super-compaction, incineration, or offsite volume reduction processes.

3. DAW items **MAY BE SURVEYED** for release onsite or offsite when applicable.

4. Contaminated filter cartridges **WILL BE PLACED** into a HIC **or WILL BE ENCAPSULATED** in an in-situ liner for disposal **or SHIPPED** to an offsite waste processor in drums, boxes or steel liners per the vendor site criteria for processing and disposal.

4.2.8. Filtering devices using pre-coat media **MAY BE USED** for the removal of suspended solids from liquid waste streams. The pre-coat material or cartridges from these devices **MAY BE** routinely **REMOVED** from the filter vessel and discharged to a Filter Sludge Tank or Liner/HIC. Periodically, the filter sludge **MAY BE DISCHARGED** to the vendor processing system for waste treatment onsite **or PACKAGED** in containers for shipment to offsite vendor for volume reduction processing.

4.2.9. Activated hardware stored in the Spent Fuel Pools **WILL BE PROCESSED** periodically using remote handling equipment **and MAY then BE PUT** into a container for shipment or storage

4.2.10. High Integrity Containers (HIC):

1. Vendors who supply HIC's to the station **MUST PROVIDE** a copy of the HIC Certificate of Compliance, which details specific limitations on use of the HIC.

2. Vendors who supply HIC's to the station **MUST PROVIDE** a handling procedure, which establishes guidelines for the utilization of the HIC. These guidelines serve to protect the integrity of the HIC and ensure the HIC is handled in accordance with the requirements of the Certificate of Compliance.

4.2.11. Lubricants and oils contaminated as a consequence of normal operating and maintenance activities **MAY BE PROCESSED** on-site (by incineration, for oils meeting 10CFR20.2004 and applicable state requirements, or by an approved vendor process) **or SHIPPED** offsite (for incineration or other acceptable processing method).

4.2.12. Former in-plant systems GE or Stock Drum Transfer Cart and Drum Storage Areas **MAY BE USED** for higher dose DAW storage at Clinton, Quad Cities, Braidwood and Byron.

4.2.13 Certain waste, including flowable solids from holding pond, oily waste separator, cooling tower basin and emergency spray pond, may be disposed of onsite under the provisions of 0CFR20.2002 permit. Specific requirements associated with the disposal shall be incorporated into station implementing procedures. **(CM-2)**

4.3. Burial Site Requirements

4.3.1. Waste sent directly to burial **WILL COMPLY** with the applicable parts of 49CFR, 10CFR61, and 10CFR71, and the acceptance criteria for the applicable burial site.

4.3.2. Wastes containing freestanding liquids **SHALL BE CONTROLLED** within limits defined in the applicable burial site criteria. The amount (or maximum level) of freestanding liquid in any container of processed wet waste **SHALL BE DETERMINED** through techniques defined in station or vendor procedures.

4.3.3. Waste **WILL NOT BE** capable of detonation or explosive decomposition/reaction.

4.3.4. Non-gaseous waste **WILL BE CONTROLLED** such that no waste container contains, or is capable of generating, toxic gases, vapors or fumes harmful to people.

4.3.5. Waste **WILL BE** non-flammable.

4.3.6. Waste containing hazardous, biological, pathogenic, or infectious material **WILL BE TREATED** using vendor process/policy to reduce the potential hazard from non-radiological materials.

4.4. Shipping and Inspection Requirements

4.4.1. All shipping/storage containers **WILL BE INSPECTED**, as required by station procedures, for compliance with applicable requirements (Department Of Transportation (DOT), Nuclear Regulatory Commission (NRC), station, on-site storage, and/or burial site requirements) prior to use.

4.4.2. Containers of solidified liquid waste **WILL BE INSPECTED** for solidification quality and/or dewatering requirements per the burial site, offsite vendor acceptance, or station acceptance criteria, as applicable.

4.4.3. Shipments sent to an off site processor **WILL BE INSPECTED** to ensure that the applicable processor's waste acceptance criteria are being met.

4.5. Inspection and Corrective Action

4.5.1. Inspection results that indicate non-compliance with applicable NRC, State, vendor, or site requirements **WILL BE IDENTIFIED and TRACKED** through the Corrective Action Program.

4.5.2. Administrative controls for preventing unsatisfactory waste forms from being released for shipment are described in applicable station procedures. **If** the provisions of the Process Control Program are not satisfied, **then SUSPEND** shipments of defectively packaged radioactive waste from the site. **(CM-1)**

4.5.3. **If** freestanding water or solidification not meeting program requirements is observed, **then** samples of the particular series of batches **WILL BE TAKEN** to determine the cause. Additional samples **WILL BE TAKEN**, as warranted, to ensure that no freestanding water is present and solidification requirements are maintained.

4.6. Procedure and Process Reviews

4.6.1. The Exelon Nuclear Process Control Program and changes to it (other than editorial changes) **SHALL BE APPROVED** in accordance with the Quality Assurance Program and the Technical Specifications or Technical Reference Manual (TRMs) or Operation Requirements Manual (ORM), as applicable, for the respective station.

4.6.2. The station or vendor's implementing processing procedures for the purpose of this Process Control Program **SHALL BE REVIEWED and APPROVED** in accordance with the plant specific Technical Specifications (either CTS or ITS, as applicable). These include the following, when applicable:

1. procedures for set-up and operation of dewatering equipment (e.g., set-up and operation of RDS 1000 Unit).

2. solidification procedures affecting waste stabilization for waste processed in a steel container. (This processing method is not currently in use due to waste loading and volume reduction.)

3. High Integrity Container handling procedure.

4. operating waste sampling equipment for solidification and dewatering processes.

4.6.3. All other vendor waste processing procedures **SHALL BE** technically **REVIEWED**, as appropriate.

4.6.4. Station processes, including procedures related to waste manifests, shipment inspections, and container activity determination, **ARE CONTROLLED** by each station.

1. Site waste processing **IS CONTROLLED** by site operating procedures.

2. Liquid processed by vendor equipment **WILL BE DONE** in accordance with vendor procedures.

4.7. Waste Types, Point of Generation, and Processing Method

Methods of processing and individual vendors **MAY CHANGE** due to changing financial and regulatory options. The table below is a representative sample. It is not intended be all encompassing.

Waste Stream	POINTS OF GENERATION	AVAILABLE WASTE PROCESSING METHODS
Bead Resin	Systems - Fuel Pool, Condensate, Reactor Water Cleanup, Blowdown, Equipment Drain, Chemical and Volume Control Systems, Floor Drain, Maximum Recycle, Blowdown, Boric Acid Recycling System, Vendor Supplied Processing Systems, and Portable Demin System	Dewatering, solidification to an unstable/stable state Thermal Processing Free Release to a Land Fill
Powdered Resin	Systems - (Condensate System, Floor Drain/Equipment Drain filtration, Fuel Pool)	Dewatering, solidification to an unstable/stable state Thermal Processing
Concentrated Waste	Waste generated from Site Evaporators resulting typically from the Floor Drain and Equipment Drain Systems	Solidification to an unstable/stable state Thermal Processing
Sludge	Sedimentation resulting from various sumps, condensers, tanks, cooling tower, emergency spray pond, holding pond, and oily waste separators..	Dewatering, solidification to an unstable/stable state Thermal Processing Evaporation on-site or at an offsite processor On-site disposal per 10CFR20.2002 permit

Waste Stream	POINTS OF GENERATION	AVAILABLE WASTE PROCESSING METHODS
Filter cartridges	Systems - Floor/Equipment Drains, Fuel Pool; cartridge filters are typically generated from clean up activities within the fuel pool, torus, etc.	Dewatering, solidification to an unstable/stable state Processed by a vendor for volume reduction
Dry Active Waste	Paper, wood, plastic, rubber, glass, metal, and etc. resulting from daily plant activities.	Decon/Sorting for Free Release, Compaction/Super-compaction Thermal Processing by Incineration or glass vitrification Sorting for Free Release Metal melting to an ingot
Contaminated Oil	Oil contaminated with radioactive materials from any in-plant system.	Solidification unstable state Thermal Processing by Incineration Free Release for recycling
Drying Bed Sludge	Sewage Treatment and Waste Water Treatment Facilities	Free release to a landfill or burial
Metals	See DAW	See DAW
Irradiated Hardware	Fuel Pool, Reactor Components	Volume Reduction for packaging efficiencies

5. **DOCUMENTATION** - None

6. **REFERENCES**

6.1. Technical Specifications:

6.1.1. The details contained in Current Tech Specs (CTS) or Improved Technical Specifications (ITS), as applicable, in regard to the Process Control Program (PCP), are to be relocated to the UFSAR. Some facilities such as Clinton have elected to relocate these details into the Operational Requirements Manual (ORM). The PCP implements the requirements of 10 CFR 20, 10CFR 61, and 10CFR 71. Compliance with these regulations is required by the Facility Operating Licenses. Relocation of the description of the PCP from the CTS or ITS does not affect the safe operation of the facility. Therefore, the relocation details are not required to be in the CTS or the ITS to provide adequate protection of the public health and safety. Changes to the UFSAR and ORM are controlled by the provisions of 10CFR 50.59.

6.2. Source Documents:

6.2.1. Code Of Federal Regulations: 10 CFR Part 20, Part 61, Part 71, 49 CFR Parts 171-172

6.2.2. Low Level Waste Licensing Branch Technical Position On Radioactive Waste Classification, May 1983

6.2.3. Technical Position on Waste Form (Revision 1), January 1991

6.2.4. Branch Technical Position on Concentration Averaging and Encapsulation, January 1995

6.2.5. Regulatory Guide 1.21

6.2.6. I.E. Circular 80.18, 10CFR 50.59 Safety Evaluation for Changes to Radioactive Waste Treatment Systems

6.2.7. Quality Assurance Program

6.3. Station Commitments:

6.3.1. Peach Bottom

CM-1, T03819, Letter from G.A. Hunger, Jr., dated Sept. 29,94, transmitting TSCR 93-16 (Improved Technical Specifications).

6.3.2. Limerick

CM-2, 10CFR20.2002 permit granted to Limerick via letter dated July 10, 1976.

7. **ATTACHMENTS** - None

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

RADIOACTIVE EFFLUENT RELEASE REPORT

NO. 44

JANUARY 1, 2001 THROUGH DECEMBER 31, 2001

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

TABLE OF CONTENTS

Technical Concurrences: (for accuracy of information)

Jan Sodd

Chemistry / Radwaste Manager

1. INTRODUCTION

In accordance with the Reporting Requirements of Technical Specification 5.6.3 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, 2001 through December 31, 2001. 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 Offsite Dose Calculation Manual Specification limits.

There were two unplanned releases of liquid radioactive material.

There was no burning of contaminated oil in 2001 and therefore no radioactive gaseous effluent from the auxiliary boiler stack.

There were no gaseous or liquid radioactive releases from the Independent Spent Fuel Storage Installation, NRC Docket No. 72-29 (ISFSI).

The station Process Control Program was revised 6/20/01 when RW-C-100, "Solid Radwaste System Process Control Program (PCP)", was superseded by the Exelon Procedure RW-AA-100, "Process Control Program for Radioactive Wastes". All the regulatory and Technical Specification requirements of RW-C-100 were included in RW-AA-100. The level of detail in the plant system descriptions of RW-C-100 was not carried over to RW-AA-100. The inclusion of such detail in the PCP is not a regulatory requirement. RW-AA-100 was further revised 10/16/01. This revision was administrative only, with no effect on the Process Control Program.

EFFLUENT & WASTE DISPOSAL ANNUAL REPORT (1/01/01 - 12/31/01)

Table 1A Page 1 of 2
Gaseous Effluents - Summation of All Releases

	UNITS	QUARTER 1	QUARTER 2	EST. ERROR TOTAL %
A. Fission & activation gases				
1. Total release	Ci	9.40E1	9.03E1	18.8
2. Average release rate for period	μCi/sec	1.20E1	1.15E1	18.8
3. Gamma air dose	Millirad	1.77E-2	1.97E-2	18.8
Percent of Technical Specification limit	%	1.77E-1	1.97E-1	18.8
4. Beta air dose	Millirad	1.24E-2	1.36E-2	18.8
Percent of Technical Specification limit	%	6.20E-2	6.80E-2	18.8
B. Iodines				
1. Total iodine-131	Ci	6.37E-5	6.58E-5	22.9
2. Average release rate for period	μCi/sec	8.10E-6	8.37E-6	22.9
3. Critical organ dose	Millirem	3.47E-4	3.59E-4	22.9
Percent of Technical Specification limit	%	2.31E-3	2.39E-3	22.9
C. Particulates				
1. Particulates with half-lives greater than 8 days (includes Alpha and Strontium 89,90)	Ci	1.19E-4	9.92E-5	22.9
2. Average release rate for period	μCi/sec	1.51E-5	1.26E-5	22.9
3. Gross alpha radioactivity	Ci	3.63E-6	3.27E-6	22.9
D. Tritium				
1. Total release	Ci	0	2.53E0	23.5
2. Average release rate for period	μCi/sec	0	3.22E-1	23.5

EFFLUENT & WASTE DISPOSAL ANNUAL REPORT (1/01/01 - 12/31/01)

Table 1A Page 2 of 2
Gaseous Effluents - Summation of All Releases

	UNITS	QUARTER 3	QUARTER 4	EST. ERROR TOTAL %
A. Fission & activation gases				
1. Total release	Ci	9.02E1	1.53E2	18.8
2. Average release rate for period	μCi/sec	1.15E1	1.95E1	18.8
3. Gamma air dose	Millirad	1.97E-2	3.28E-2	18.8
Percent of Technical Specification limit	%	1.97E-1	3.28E-1	18.8
4. Beta air dose	Millirad	1.36E-2	2.26E-2	18.8
Percent of Technical Specification limit	%	6.80E-2	1.13E-1	18.8
B. Iodines				
1. Total iodine-131	Ci	1.31E-4	5.56E-5	22.9
2. Average release rate for period	μCi/sec	1.67E-5	7.08E-6	22.9
3. Critical organ dose	Millirem	8.22E-4	2.42E-4	22.9
Percent of Technical Specification limit	%	5.48E-3	1.61E-3	22.9
C. Particulates				
1. Particulates with half-lives greater than 8 days (includes Alpha and Strontium 89,90)	Ci	1.24E-4	6.93E-5	22.9
2. Average release rate for period	μCi/sec	1.58E-5	8.81E-6	22.9
3. Gross alpha radioactivity	Ci	4.62E-6	5.37E-6	22.9
D. Tritium				
1. Total release	Ci	0	0	23.5
2. Average release rate for period	μCi/sec	0	0	23.5

EFFLUENT & WASTE DISPOSAL ANNUAL REPORT (1/01/01 - 12/31/01)

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 gases					
Krypton - 85M	Ci	0	0	0	0
Krypton - 87	Ci	0	0	0	0
Krypton - 88	Ci	0	0	0	0
Xenon - 133	Ci	0	0	0	0
Xenon - 135	Ci	8.68E-1	1.83E0	0	0
Xenon - 135M	Ci	0	0	0	0
Xenon - 138	Ci	2.11E0	0	0	0
Unidentified	Ci	2.43E1	1.23E1	0	0
Total for Period	Ci	2.72E1	1.41E1	0	0
2. Iodines					
Iodine - 131	Ci	4.28E-5	4.58E-5	0	0
Iodine - 133	Ci	3.91E-5	5.67E-5	0	0
Iodine - 135	Ci	0	0	0	0
Total for Period	Ci	8.20E-5	1.03E-4	0	0
3. Particulates					
Strontium - 89	Ci	4.16E-5	3.37E-5	0	0
Strontium - 90	Ci	0	8.00E-8	0	0
Cobalt - 60	Ci	0	2.80E-7	0	0
Tellurium -123M	Ci	1.89E-5	0	0	0
Cesium – 137	Ci	3.30E-7	0	0	0
Barium – 140	Ci	2.80E-5	2.49E-5	0	0
Neodymium – 147	Ci	0	2.00E-7	0	0
TOTAL FOR PERIOD	Ci	8.89E-5	5.92E-5	0	0

EFFLUENT & WASTE DISPOSAL ANNUAL REPORT (1/01/01 - 12/31/01)

Table 1B Page 2 of 2

Gaseous Effluents for Release Point - Main Stack

Nuclides Released	Units	Continuous Mode		Batch Mode	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
1. Fission gases					
Krypton - 85M	Ci	0	4.74E0	0	0
Krypton – 87	Ci	0	0	0	0
Krypton – 88	Ci	0	1.62E0	0	0
Xenon – 133	Ci	1.03E0	7.06E0	0	0
Xenon – 135	Ci	1.08E0	3.36E0	0	0
Xenon - 135M	Ci	0	0	0	0
Xenon – 138	Ci	0	0	0	0
Xenon - 133M	Ci	0	0	0	0
Unidentified	Ci	1.19E1	9.52E0	0	0
Total for Period	Ci	1.40E1	2.63E1	0	0
2. Iodines					
Iodine - 131	Ci	5.67E-5	5.56E-5	0	0
Iodine - 133	Ci	5.38E-5	5.23E-5	0	0
Iodine - 135	Ci	0	0	0	0
Total for Period	Ci	1.10E-4	1.08E-4	0	0
3. Particulates					
Strontium - 89	Ci	3.00E-5	3.06E-5	0	0
Strontium - 90	Ci	6.00E-8	1.00E-7	0	0
Cobalt - 60	Ci	6.50E-7	1.08E-6	0	0
Cesium - 137	Ci	0	4.20E-7	0	0
Barium - 140	Ci	3.45E-6	2.16E-5	0	0
TOTAL FOR PERIOD	Ci	3.42E-5	5.38E-5	0	0

EFFLUENT & WASTE DISPOSAL ANNUAL REPORT (1/01/01 - 12/31/01)

Table 1C Page 1 of 2

Gaseous Effluents for Release Point - Unit 2 & Unit 3 Roof Vents & Aux Boiler Stacks

Nuclides Released	Units	Continuous Mode		Batch Mode	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
1. Fission gases					
Krypton - 85M	Ci	0	0	0	0
Krypton - 87	Ci	0	0	0	0
Krypton - 88	Ci	0	0	0	0
Xenon - 133	Ci	0	0	0	0
Xenon - 135	Ci	0	0	0	0
Xenon - 135M	Ci	0	0	0	0
Xenon - 138	Ci	0	0	0	0
Unidentified	Ci	6.68E1	7.62E1	0	0
Total for Period	Ci	6.68E1	7.62E1	0	0
2. Iodines					
Iodine - 131	Ci	2.08E-5	1.99E-5	0	0
Iodine - 133	Ci	0	0	0	0
Iodine - 135	Ci	0	0	0	0
Total for Period	Ci	2.08E-5	1.99E-5	0	0
3. Particulates					
Strontium - 89	Ci	3.57E-6	1.16E-5	0	0
Strontium - 90	Ci	1.77E-6	0	0	0
Cobalt - 60	Ci	2.07E-5	2.51E-5	0	0
Cesium - 137	Ci	0	0	0	0
TOTAL FOR PERIOD	Ci	2.61E-5	3.68E-5	0	0

Table 1C Page 2 of 2

Gaseous Effluents for Release Point - Unit 2 & Unit 3 Roof Vents & Aux Boiler Stacks

Nuclides Released	Units	Continuous Mode		Batch Mode	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
1. Fission gases					
Krypton - 85M	Ci	0	0	0	0
Krypton - 87	Ci	0	0	0	0
Krypton - 88	Ci	0	0	0	0
Xenon - 133	Ci	0	0	0	0
Xenon - 135	Ci	0	0	0	0
Xenon - 135M	Ci	0	0	0	0
Xenon - 138	Ci	0	0	0	0
Unidentified	Ci	7.62E1	1.27E2	0	0
Total for Period	Ci	7.62E1	1.27E2	0	0
2. Iodines					
Iodine - 131	Ci	7.43E-5	0	0	0
Iodine - 133	Ci	0	0	0	0
Iodine - 135	Ci	0	0	0	0
Total for Period	Ci	7.43E-5	0	0	0
3. Particulates					
Strontium - 89	Ci	1.10E-5	1.00E-6	0	0
Strontium - 90	Ci	2.70E-7	0	0	0
Manganese – 54	Ci	9.84E-6	0	0	0
Cobalt – 60	Ci	6.45E-5	0	0	0
Cesium - 137	Ci	0	9.07E-6	0	0
TOTAL FOR PERIOD	Ci	8.57E-5	1.01E-5	0	0

Table 2A Page 1 of 2
Liquid Effluents - Summation of All Releases

	Units	Quarter 1	Quarter 2	Est. Error Total %
A. Fission & activation products				
1. Total release (not including tritium, gases, alpha)	Ci	1.00E-3	1.05E-2	22.9
2. Average diluted concentration during period	μCi/ml	7.91E-11	3.10E-11	22.9
3. Total Body Dose	Millirem	2.93E-4	2.25E-4	22.9
Percent of Technical Specification limit	%	9.77E-3	7.50E-3	22.9
4. Maximally Exposed Organ Dose	Millirem	3.84E-4	4.53E-4	22.9
Percent of Technical Specification limit	%	3.84E-3	4.53E-3	22.9
B. Tritium				
1. Total release	Ci	1.53E1	4.10E0	15.0
2. Average diluted concentration during period	μCi/ml	1.20E-6	1.21E-8	15.0
C. Dissolved and entrained gases				
1. Total release	Ci	0	1.23E-5	22.9
2. Average diluted concentration during period	μCi/ml	0	3.64E-14	22.9
D. Gross alpha radioactivity				
1. Total release	Ci	0	9.90E-6	22.9
2. Average diluted concentration during period	μCi/ml	0	2.93E-14	22.9
E. Volume of waste released (prior to dilution)	liters	9.05E5	2.96E5	12.7
F. Volume of dilution water used during period	liters	1.27E10	3.38E11	10.9

Table 2A Page 2 of 2
Liquid Effluents - Summation of All Releases

	Units	Quarter 3	Quarter 4	Est. Error Total %
A. Fission & activation products				
1. Total release (not including tritium, gases, alpha)	Ci	2.18E-2	2.11E-2	22.9
2. Average diluted concentration during period	μCi/ml	3.51E-11	3.55E-11	22.9
3. Total Body Dose	Millirem	3.53E-4	3.99E-4	22.9
Percent of Technical Specification limit	%	1.18E-2	1.33E-2	22.9
4. Maximally Exposed Organ Dose	Millirem	1.02E-3	1.04E-3	22.9
Percent of Technical Specification limit	%	1.02E-2	1.04E-2	22.9
B. Tritium				
1. Total release	Ci	5.86E0	1.01E1	15.0
2. Average diluted concentration during period	μCi/ml	9.44E-9	1.70E-8	15.0
C. Dissolved and entrained gases				
1. Total release	Ci	0	0	22.9
2. Average diluted concentration during period	μCi/ml	0	0	22.9
D. Gross alpha radioactivity				
1. Total release	Ci	1.99E-5	1.99E-5	22.9
2. Average diluted concentration during period	μCi/ml	3.20E-14	3.35E-14	22.9
E. Volume of waste released (prior to dilution)	liters	4.86E5	9.09E5	12.7
F. Volume of dilution water used during period	liters	6.21E11	5.94E11	10.9

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	5.50E-7	0	0
Strontium - 90	Ci	0	7.15E-8	7.01E-6	0
Alpha	Ci	0	9.90E-6	0	0
Tritium	Ci	0	1.11E-1	1.53E1	3.99E0
Phosphorus - 32	Ci	0	0	0	0
Iron - 55	Ci	0	2.78E-4	0	0
Xenon - 133	Ci	0	0	0	1.23E-5
Xenon - 135	Ci	0	0	0	0
Sodium - 24	Ci	0	1.54E-6	0	0
Manganese - 54	Ci	0	3.76E-3	2.12E-4	1.16E-5
Manganese - 56	Ci	0	0	0	0
Cobalt - 58	Ci	0	3.23E-4	3.44E-6	0
Iron - 59	Ci	0	6.81E-4	0	0
Cobalt – 60	Ci	0	4.68E-3	4.79E-4	5.18E-5
Zinc – 65	Ci	0	5.96E-4	7.76E-5	0
Silver – 110M	Ci	0	0	1.98E-4	1.82E-5
Cesium – 134	Ci	0	0	0	7.16E-6
Cesium - 137	Ci	0	1.97E-5	2.82E-5	4.09E-5
TOTAL FOR PERIOD	Ci	0	1.21E-1	1.53E1	3.99E0

Table 2B Page 2 of 2
Liquid Effluents

Nuclides Released	Units	Continuous Mode		Batch Mode	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
Strontium - 89	Ci	1.10E-6	1.10E-6	0	0
Strontium - 90	Ci	1.44E-7	1.44E-7	0	0
Alpha	Ci	1.99E-5	1.99E-5	0	0
Tritium	Ci	2.23E-1	2.23E-1	5.64E0	9.86E0
Phosphorus - 32	Ci	0	0	0	0
Iron - 55	Ci	5.59E-4	5.59E-4	2.76E-6	0
Xenon - 133	Ci	0	0	0	0
Xenon - 135	Ci	0	0	0	0
Sodium - 24	Ci	3.09E-6	3.09E-6	0	0
Chromium - 51	Ci	0	0	1.34E-4	0
Manganese - 54	Ci	7.55E-3	7.55E-3	2.74E-4	5.98E-5
Manganese - 56	Ci	0	0	0	2.23E-7
Cobalt - 58	Ci	6.48E-4	6.48E-4	2.41E-5	0
Iron - 59	Ci	1.37E-3	1.37E-3	0	0
Cobalt - 60	Ci	9.40E-3	9.40E-3	3.95E-4	9.48E-5
Zinc - 65	Ci	1.20E-3	1.20E-3	0	9.69E-7
Strontium - 92	Ci	0	0	0	1.32E-5
Silver -110M	Ci	0	0	1.83E-4	1.51E-4
Cesium - 137	Ci	3.96E-5	3.96E-5	7.91E-6	2.20E-5
TOTAL FOR PERIOD	Ci	2.44E-1	2.44E-1	5.64E0	9.86E0

EFFLUENT & WASTE DISPOSAL ANNUAL REPORT (1/01/01-12/31/01)
PEACH BOTTOM UNITS 2 & 3

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 Curies	Principal Radionuclides
CLASS A						
6	Dewatered Resin	HIC/Type A Cask	195.7	1174.2	1.40E+02	Co-60, Zn-65, Mn-54, Cs-137, Fe-55
2	Thermally Processed Resin (1)	HIC/Type A Cask	variable	23.5	1.17E+00	Co-60, Zn-65, Mn-54, Ag-110m, Cs-137
1	DAW (2)	Metal Box/STC	variable	97.6	2.04E-02	Co-60, Zn-65, Cs-137, Mn-54, H-3
1	Thermal Process Residue (2)	Metal Box/STC	variable	91.3	2.58E-01	Zn-65, Co-60, Cs-137, Mn-54, Fe-55
18	DAW (3)	Metal Box/STC	variable	154.2	2.92E-01	Co-60, Mn-54, Zn-65, Cs-137, Fe-55
(*)	Dewatered Filters (3)	Metal Box/STC	variable	150.9	7.22E-01	Co-60, Cs-137, Zn-65, Mn-54, Ni-63
(*)	Incinerator Ash (3)	Metal Box/STC	variable	7.9	3.73E-02	Co-60, Mn-54, Cs-137, Zn-65, Fe-55
53	DAW (4)	Metal Box/STC	variable	2480.6	2.90E-01	Co-60, Fe-55, Cs-137, Zn-65, Mn-54
CLASS B						
1	DAW / Dewatered Filters	HIC/Type A Cask	202.1	202.1	9.49E+00	Co-60, Cs-137, Zn-65, Fe-55, H-3
16	Thermally Processed Resin (1)	HIC/Type A Cask	variable	132.9	5.09E+01	Co-60, Cs-137. Zn-65, Mn-54, Fe-55
CLASS C						
1	Thermally Processed Resin (1)	HIC/Type B Cask	variable	11.7	3.50E+00	Co-60, Zn-65, Mn-54, Cs-137, Ni-63
4	Irradiated Hardware	HIC/Type B Cask	57.4	229.6	8.88E+04	Co-60, Fe-55, Ni-63, Ta-182, Mn-54
TOTALS 103				4756.5	8.90E+04	

NOTES:
(1) - Indicates actual total Peach Bottom Atomic Power Station (PBAPS) waste shipped from Studsvik to burial after processing.
(2) - Indicates actual total PBAPS waste shipped from Allied Technology Group (ATG) to burial after processing.
(3) - Indicates actual total PBAPS waste shipped from Duratek (formerly GTS/Duratek) to burial after processing.
(4) - Indicates actual total PBAPS waste shipped from American Ecology Recycle Center (AERC) to burial after processing.
(*) - Shipment total included with DAW from Duratek as these shipments contained comingled waste streams.

ATTACHMENT A
SUPPLEMENT INFORMATION

Facility: Peach Bottom Units 2 & 3

Licenses: DPR-44
DPR-56

1. Regulatory Limits (Offsite Dose Calculation Manual Specification Limits)

A. Noble Gases:

1.	≤500 ≤3000	mRem/Yr mRem/Yr	- total body - skin	-	"instantaneous" limits ODCMS 3.8.C.1.a
2.	≤10 ≤20	mRad mRad	- air gamma - air beta	-	quarterly air dose limits ODCMS 3.8.C.2.a and b
3.	≤20 ≤40	mRad mRad	- air gamma - air beta	-	yearly air dose limits ODCMS 3.8.C.2.c and d

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

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

C. Liquid Effluents

1.	Concentration ≤ 10 times 10 CFR 20, Appendix B, Table 2, Col. 2			-	"instantaneous" limits ODCMS 3.8.B.1
2.	≤3.0 ≤10	mRem mRem	- total body - any organ	-	quarterly dose limits ODCMS 3.8.B.2.a
3.	≤6.0 ≤20	mRem mRem	- total body - any organ	-	yearly dose limits ODCMS 3.8.B.2.b

D. 40 CFR 190 and 10 CFR 72.104

≤25 ≤75 ≤25	mRem mRem mRem	- total body - thyroid - any other organ	-	yearly dose limits ODCMS 3.8.D.1

2. Maximum Permissible Concentrations:
Effluent Concentrations are not used to calculate permissible release rates and concentrations for gaseous releases.

The Effluent Concentrations specified in 10 CFR 20, Appendix B, Table 2, Column 2 times 10, for identified nuclides, are used to calculate permissible release rates and concentrations for liquid release per Peach Bottom Offsite Dose Calculation Manual Specification 3.8.B.1.

3. Average Energy:

Not Applicable

4. Measurements and Approximations of Total Radioactivity:

A. Fission and Activation Gases:

The method used is the Canberra Genie-ESP Counting System
- Gas Marinelli -

B. Iodine:

The method used is the Canberra Genie-ESP Counting System
- Charcoal Cartridge -

C. Particulates:

The method used is the Canberra Genie-ESP Counting System
- Air Particulate Sample, (37mm and 47mm) -

D. Liquid Effluents:

The method used is the Canberra Genie-ESP Counting System and the Radwaste Liquid Discharge Pre-Release Method with a one liter marinelli or one liter bottle.

5. Batch Releases:

A. Liquid:

	QTR 1	QRT 2	QTR 3	QTR 4
Number of batch releases:	19	7	13	23
Total Time for batch releases (minutes)	4152	1328	2469	4070
Maximum time period for batch release (minutes):	340	273	350	295
Average time period for batch release (minutes):	218.53	189.71	189.92	176.96
Minimum time period for batch release (minutes):	70	80	60	60
Dilution volume (liters):	1.27E10	6.79E9	9.98E9	1.96E10

B. Gaseous:

Not Applicable

6. Abnormal Releases:

A. Liquid:

1. Event description – On 5/16/01 routine sampling of the high pressure service water (HPSW) effluent to the discharge canal detected low level radioactive contamination. Subsequent investigation determined that a trace amount of condensate stay-full or primary coolant water was leaking through the Unit 2 "C" Residual Heat Removal (RHR) heat exchanger into the "A" loop of the HPSW system.

   It was estimated that the contaminated water released 7.01E-4 mrem total body dose to the discharge canal from 5/16/01 to 12/31/01. This dose contribution was well below the limits specified in the ODCM.

   Analysis of Release - Representative samples were analyzed for all the parameters of a radioactive effluent release. The dose contributions and isotope quantities from this continuous release were added to this Radioactive Effluent Release Report for the applicable reporting periods.

2. Event description – On 10/16/01, low level radioactive contamination was detected in the Guard House wetwell when a representative sample was analyzed prior to pumping the wetwell for a required pump repair. The contaminated raw sewage was processed through the Sewage Treatment Plant and released to the discharge canal.

   It was estimated that the contaminated water released 1.26E-8 mrem total body dose to the discharge canal. This dose contribution was well below the limits specified in the ODCM.

   Analysis of Release – The representative sample was analyzed for all the parameters of a radioactive effluent release. The dose contributions and isotope quantities from this continuous release were added to this Radioactive Effluent Release Report for the applicable reporting period.

3. Event description – On 11/6/01, low level radioactive contamination was detected in a thin layer of silt on the floor of the Emergency Cooling Tower (ECT). Although samples are analyzed to ensure that no detectable radioactive contamination is present whenever water inventory from the ECT is released to the discharge canal, the contaminated silt could potentially be released at undetectable concentration levels. Consequently, it will be assumed that the entire Curie inventory of the contaminated silt was released to the discharge canal during the first release of ECT inventory following the discovery of the radioactive contamination. This discharge occurred on 2/13/02. The dose contribution was well below the limits specified in the ODCM and will be reported in the 2002 Radioactive Effluent Release Report

B. Gaseous:

1. Event Description - During 2001 several potential unmonitored release paths were discovered in the turbine building, radwaste building and reactor buildings. These release points were due, in part, to the aging of caulking at concrete-to-metal interfaces.

   As each release point was discovered, the direction of the air flow was determined. If flow was out of the structure, a continuous air sample was obtained. No detectable activity was measured at any of the release points.

2. Event Description – The Main Stack flow monitor was declared inoperable on 11/13/00 when incorrect wiring between the flow elements and the flow transmitters was discovered. Repair was completed and the monitor declared operable on 6/1/01.

   Flows were estimated at least every four hours in accordance with ODCMS 3.8.C.4.C.

7. Minimum Detectable Concentrations:

A. Liquid:

If a radionuclide was not detected, zero activity was reported for that isotope. A zero activity indicates that no activity was positively detected in any sample when samples were analyzed with techniques which achieved the required Lower Limits of Detection (LLD) as specified in Offsite Dose Calculation Manual Specification Table 4.8.B.1 Radioactive Liquid Waste Sampling and Analysis. In all cases, these LLDs were less than the values required by Offsite Dose Calculation Manual Specifications.

B. Gaseous:

If a radionuclide was not detected, zero activity was reported for that isotope. A zero activity indicates that no activity was positively detected in any sample when samples were analyzed with techniques which achieved the required Lower Limits of Detection (LLD) as specified in Offsite Dose Calculation Manual Specification Table 4.8.C.1 Radioactive Gaseous Waste Sampling and Analysis from Main Stack and Vent Stack. In all cases, these LLDs were less than the values required by Offsite Dose Calculation Manual Specifications.

Exelon Nuclear

PROCESS CONTROL PROGRAM FOR RADIOACTIVE WASTES

1. PURPOSE

1.1. The purpose of the Process Control Program (PCP) is to:

1.1.1. Establish the process and boundary conditions for the preparation of specific procedures for processing, sampling, analysis, packaging, storage, and shipment of solid radwaste in accordance with local, state, and federal requirements. **(CM-1)**

1.1.2. Establish parameters which will provide reasonable assurance that all Low Level Radioactive Wastes (LLRW), processed by the in-plant waste process systems on-site OR by on-site vendor supplied waste processing systems, meet the acceptance criteria to a Licensed Burial Facility, as required by 10CFR Part 20, 10CFR Part 61, 10CFR Part 71, 49CFR Parts 171-172, "Technical Position on Waste Form (Revision 1)" [1/91], "Low-Level Waste Licensing Branch Technical Position on Radioactive Waste Classification" [5/83], and the Station Technical Specifications, as applicable.

1.1.3. Provide reasonable assurance that waste placed in "on-site storage" meets the requirements as addressed within the Safety Analysis Reports for the low level radwaste storage facilities for dry and/or processed wet waste.

2. TERMS AND DEFINITIONS

2.1. **Process Control Program (PCP)**: The program which contains the current formulas, sampling, analysis, tests, and determinations to be made to ensure that processing and packaging of solid radioactive waste based on demonstrated processing of actual or simulated wet solid wastes will be accomplished in such a way as to assure the waste meets the stabilization criteria specified in 10CFR Parts 20, 61 and 71, state regulations, and burial site requirements.

2.2. **Solidification:** Liquid waste processed to either an unstable or stable form per 10CFR61 requirements. Waste solidified does not have to meet the 300-year free standing monolith criteria. Approved formulas, samples and tests do not have to meet NRC approval for wastes solidified in a container meeting stability (e.g. High Integrity Container).

2.3. **Stabilization:** Liquid waste processed to a "stable state" per 10CFR61 Requirements. Established formulas, samples, and tests shall be approved by the NRC in order to meet solidification "stabilization" criteria. This processing method is currently not available, because the NRC recognizes that waste packed in a High Integrity Container meets the 300-year stabilization criteria. In the event that this processing method becomes an acceptable method, then the NRC shall approve the stabilization formulas, samples, tests, etc.

2.4. **Solidification Media:** An approved media (e.g. Barnwell - vinyl ester styrene, cement, bitumen) when waste containing greater than 5-year half lives is solidified in a container when the activity is greater than 1 micro curie/cc. Waste solidified in a HIC is approved by the commission meeting the 10CFR61 stabilization criteria, including 1% free standing liquids by volume when the waste is packaged to a "stable" form and $\leq$ 0.5% when waste is packaged to an "unstable" form. The formulas, sampling, analysis, and test do not require NRC approval, because the HIC meets the stability criteria.

2.4.1. Solidification to an unstable or stable state are performed by vendors, when applicable. Liquid waste solidified to meet stabilization criteria (10CFR61 and 01-91 Branch Technical Requirements) must have documentation available that shows that the process is approved by the NRC or disposal facility.

2.5. **Dewatering:** The removal of liquids from liquid waste streams to produce a waste form that meets the requirements of 10CFR Part 61 and applicable burial site criteria, $\leq$0.5% by volume when the waste is packaged to an "unstable" state, or $\leq$1% by volume when the waste is packaged to a "stable" form.

2.6. **High Integrity Container (HIC):** A disposable container that is approved to the container's Certificate of Compliance 10CFR Part 61 Requirements for meeting stability. The use of HIC's is an alternative to solidification or encapsulation in a steel container to meet burial stability. HIC's are used to package dewatered liquid wastes, (e.g. filter cartridges, filter media, resin, sludges, etc), or dry active waste.

2.7. **Encapsulation:** The process of placing a component (e.g. cartridge filters or mechanical components) into a special purpose disposable container and then completely surrounding the waste material with an approved stabilization media, such as cement.

2.8. **Liquid Waste Processing Systems:** In-plant or vendor supplied processing systems consisting of equipment utilized for evaporation, filtration, demineralization, dewatering, solidification, or reverse osmosis (RO) for the treatment of liquid wastes (such as Floor Drains, Chemical Drains and Equipment Drain inputs).

2.9. **Incineration, RVR, and/or Glass Vitrification of Liquid or Solid:** Dry or wet waste processed via incineration and/or thermal processing where by the volume reduced by thermal means meets 10CFR61 requirements.

2.10. **Compaction:** When dry wastes such as paper, wood, plastic, cardboard, incinerator ash, and etc. are volume reduced through the use of a compactor.

2.11. **Waste Streams:** Consist of but are not limited to

- Filter media (powdered, bead resin and fiber),
- Filter cartridges,
- Pre-coat body feed material,
- Contaminated charcoal,
- Fuel pool activated hardware,
- Fuel Pool Crud

- Sump and tank sludges,
- High activity filter cartridges,
- Concentrated liquids,
- Contaminated waste oil,
- Dried sewage or wastewater plant waste,
- Dry Active Waste (DAW): Waste such as filters, air filters, low activity cartridge filters, paper, wood, glass, plastic, cardboard, hoses, cloth, and metals, etc, which have become contaminated as a consequence of normal operating, housekeeping and maintenance activities.
- Other radioactive waste generated from cleanup of inadvertent contamination.

3. RESPONSIBILITIES

3.1. Implementation of this Process Control Program (PCP) is described in procedures at each station.

4. MAIN BODY

4.1. Process Control Program Requirements

4.1.1. A change to this PCP (Radioactive Waste Treatment Systems) may be made provided that the change is reported as part of the annual radioactive effluent release report, Regulatory Guide 1.21, and is approved by the Plant Operations Review Committee (PORC).

4.1.2. Changes become effective upon acceptance per station requirements.

4.1.3. Records of reviews performed shall be retained for the duration of the unit operating license. This documentation shall contain:

1. Sufficient information to support the change together with the appropriate analyses or evaluations justifying the change, and

2. A determination which documents that the change will maintain the overall conformance of waste products to Federal (10CFR61 and the Branch Technical Position), State, or other applicable requirements, including applicable burial site criteria.

4.1.4. A solidification media, approved by the burial site, **MAY BE REQUIRED when** liquid radwaste is solidified to a stable/unstable state.

4.1.5. **When** processing liquid radwaste to meet solidification stability using a vendor supplied solidification system:

1. **If** the vendor has its own Quality Assurance (QA) Program, **then** the vendor **SHALL ADHERE** to its own QA Program and **SHALL HAVE SUBMITTED** its process system topical report to the NRC or agreement state.

2. **If** the vendor **DOES NOT HAVE** its own Quality Assurance Program, **then** the vendor **SHALL ADHERE** to an approved Quality Assurance Topical Report standard belonging to the Station or to another vendor.

4.1.6. The vendor processing system(s) is/are controlled per the following:

1. A commercial vendor supplied processing system(s) **MAY BE USED** for the processing of LLRW streams.

2. All vendors used to process liquid LLRW at the sites **MUST MEET** applicable QA Topical Report Augmented Quality Requirements and **SHALL BE APPROVED** by station radwaste management.

4.1.7. Vendor processing system(s) operated at the site **WILL BE OPERATED and CONTROLLED** in accordance with vendor approved procedures or station procedures based upon vendor approved documents.

4.1.8. All waste streams processed for burial or long term on-site storage **SHALL MEET** the waste classification and characteristics specified in 10CFR Part 61.55, Part 61.56, the 5-83 Branch Technical Position for waste classification, and the applicable burial site acceptance criteria (for any burial site operating at the time the waste was processed).

4.2. General Waste Processing Requirements

4.2.1. On-site resin processing involves tank mixing and settling, transferring to the station or vendor processing system via resin water slurry or vacuuming into approved waste containers, and, when applicable, dewatering for burial.

4.2.2. Vendor resin beds **MAY BE USED** for decontamination of plant systems, such as, Spent Fuel Pool, RWCU (reactor water cleanup), and SDC (Shut Down Cooling). These resins **ARE then PROCESSED** via the station or vendor processing system.

4.2.3. Various drains and sump discharges **WILL BE COLLECTED** in tanks or suitable containers for processing treatment. Water from these tanks **MAY BE SENT** through a filter, demineralizer, concentrator or vendor supplied processing systems.

4.2.4. Process waste (e.g. filter media, sludges, resin, etc) **WILL BE** periodically **DISCHARGED** to the station or vendor processing system for onsite waste treatment **or PACKAGED** in containers for shipment to offsite vendor for volume reduction processing.

4.2.5. Process water (e.g. chemical, floor, equipment drain, etc.) **MAY BE SENT** to either the site waste process systems or vendor waste processing systems for further filtration, demineralization for plant re-use, or discharge.

4.2.6. All dewatering and solidification/stabilization **WILL BE PERFORMED** by either utility site personnel or by on-site vendors **or WILL BE PACKAGED and SHIPPED** to an off-site vendor low-level radwaste processing facility.

4.2.7. Dry Active Waste (DAW) **WILL BE HANDLED and PROCESSED** per the following:

1. DAW **WILL BE COLLECTED and SURVEYED and MAY BE SORTED** for compactable and non-compactable wastes.

2. DAW **MAY BE PACKAGED** in containers to facilitate on-site pre-compaction and/or off-site super-compaction, incineration, or offsite volume reduction processes.

3. DAW items **MAY BE SURVEYED** for release onsite or offsite when applicable.

4. Contaminated filter cartridges **WILL BE PLACED** into a HIC **or WILL BE ENCAPSULATED** in an in-situ liner for disposal **or SHIPPED** to an offsite waste processor in drums, boxes or steel liners per the vendor site criteria for processing and disposal.

4.2.8. Filtering devices using pre-coat media **MAY BE USED** for the removal of suspended solids from liquid waste streams. The pre-coat material or cartridges from these devices **MAY BE** routinely **REMOVED** from the filter vessel and discharged to a Filter Sludge Tank or Liner/HIC. Periodically, the filter sludge **MAY BE DISCHARGED** to the vendor processing system for waste treatment onsite **or PACKAGED** in containers for shipment to offsite vendor for volume reduction processing.

4.2.9. Activated hardware stored in the Spent Fuel Pools **WILL BE PROCESSED** periodically using remote handling equipment **and MAY then BE PUT** into a container for shipment or storage

4.2.10. High Integrity Containers (HIC):

1. Vendors who supply HIC's to the station **MUST PROVIDE** a copy of the HIC Certificate of Compliance, which details specific limitations on use of the HIC.

2. Vendors who supply HIC's to the station **MUST PROVIDE** a handling procedure, which establishes guidelines for the utilization of the HIC. These guidelines serve to protect the integrity of the HIC and ensure the HIC is handled in accordance with the requirements of the Certificate of Compliance.

4.2.11. Lubricants and oils contaminated as a consequence of normal operating and maintenance activities **MAY BE PROCESSED** on-site (by incineration, for oils meeting 10CFR20.2004 and applicable state requirements, or by an approved vendor process) **or SHIPPED** offsite (for incineration or other acceptable processing method).

4.2.12. Former in-plant systems GE or Stock Drum Transfer Cart and Drum Storage Areas **MAY BE USED** for higher dose DAW storage at Clinton, Quad Cities, Braidwood and Byron.

4.2.13 Certain waste, including flowable solids from holding pond, oily waste separator, cooling tower basin and emergency spray pond, may be disposed of onsite under the provisions of 0CFR20.2002 permit. Specific requirements associated with the disposal shall be incorporated into station implementing procedures. **(CM-2)**

4.3. Burial Site Requirements

4.3.1. Waste sent directly to burial **WILL COMPLY** with the applicable parts of 49CFR, 10CFR61, and 10CFR71, and the acceptance criteria for the applicable burial site.

4.3.2. Wastes containing freestanding liquids **SHALL BE CONTROLLED** within limits defined in the applicable burial site criteria. The amount (or maximum level) of freestanding liquid in any container of processed wet waste **SHALL BE DETERMINED** through techniques defined in station or vendor procedures.

4.3.3. Waste **WILL NOT BE** capable of detonation or explosive decomposition/reaction.

4.3.4. Non-gaseous waste **WILL BE CONTROLLED** such that no waste container contains, or is capable of generating, toxic gases, vapors or fumes harmful to people.

4.3.5. Waste **WILL BE** non-flammable.

4.3.6. Waste containing hazardous, biological, pathogenic, or infectious material **WILL BE TREATED** using vendor process/policy to reduce the potential hazard from non-radiological materials.

4.4. Shipping and Inspection Requirements

4.4.1. All shipping/storage containers **WILL BE INSPECTED**, as required by station procedures, for compliance with applicable requirements (Department Of Transportation (DOT), Nuclear Regulatory Commission (NRC), station, on-site storage, and/or burial site requirements) prior to use.

4.4.2. Containers of solidified liquid waste **WILL BE INSPECTED** for solidification quality and/or dewatering requirements per the burial site, offsite vendor acceptance, or station acceptance criteria, as applicable.

4.4.3. Shipments sent to an off site processor **WILL BE INSPECTED** to ensure that the applicable processor's waste acceptance criteria are being met.

4.5. Inspection and Corrective Action

4.5.1. Inspection results that indicate non-compliance with applicable NRC, State, vendor, or site requirements **WILL BE IDENTIFIED and TRACKED** through the Corrective Action Program.

4.5.2. Administrative controls for preventing unsatisfactory waste forms from being released for shipment are described in applicable station procedures. **If** the provisions of the Process Control Program are not satisfied, **then SUSPEND** shipments of defectively packaged radioactive waste from the site. **(CM-1)**

4.5.3. **If** freestanding water or solidification not meeting program requirements is observed, **then** samples of the particular series of batches **WILL BE TAKEN** to determine the cause. Additional samples **WILL BE TAKEN**, as warranted, to ensure that no freestanding water is present and solidification requirements are maintained.

4.6. Procedure and Process Reviews

4.6.1. The Exelon Nuclear Process Control Program and changes to it (other than editorial changes) **SHALL BE APPROVED** in accordance with the Quality Assurance Program and the Technical Specifications or Technical Reference Manual (TRMs) or Operation Requirements Manual (ORM), as applicable, for the respective station.

4.6.2. The station or vendor's implementing processing procedures for the purpose of this Process Control Program **SHALL BE REVIEWED and APPROVED** in accordance with the plant specific Technical Specifications (either CTS or ITS, as applicable). These include the following, when applicable:

1. procedures for set-up and operation of dewatering equipment (e.g., set-up and operation of RDS 1000 Unit).

2. solidification procedures affecting waste stabilization for waste processed in a steel container. (This processing method is not currently in use due to waste loading and volume reduction.)

3. High Integrity Container handling procedure.

4. operating waste sampling equipment for solidification and dewatering processes.

4.6.3. All other vendor waste processing procedures **SHALL BE** technically **REVIEWED**, as appropriate.

4.6.4. Station processes, including procedures related to waste manifests, shipment inspections, and container activity determination, **ARE CONTROLLED** by each station.

1. Site waste processing **IS CONTROLLED** by site operating procedures.

2. Liquid processed by vendor equipment **WILL BE DONE** in accordance with vendor procedures.

4.7. Waste Types, Point of Generation, and Processing Method

Methods of processing and individual vendors **MAY CHANGE** due to changing financial and regulatory options. The table below is a representative sample. It is not intended be all encompassing.

Waste Stream	POINTS OF GENERATION	AVAILABLE WASTE PROCESSING METHODS
Bead Resin	Systems - Fuel Pool, Condensate, Reactor Water Cleanup, Blowdown, Equipment Drain, Chemical and Volume Control Systems, Floor Drain, Maximum Recycle, Blowdown, Boric Acid Recycling System, Vendor Supplied Processing Systems, and Portable Demin System	Dewatering, solidification to an unstable/stable state Thermal Processing Free Release to a Land Fill
Powdered Resin	Systems - (Condensate System, Floor Drain/Equipment Drain filtration, Fuel Pool)	Dewatering, solidification to an unstable/stable state Thermal Processing
Concentrated Waste	Waste generated from Site Evaporators resulting typically from the Floor Drain and Equipment Drain Systems	Solidification to an unstable/stable state Thermal Processing
Sludge	Sedimentation resulting from various sumps, condensers, tanks, cooling tower, emergency spray pond, holding pond, and oily waste separators..	Dewatering, solidification to an unstable/stable state Thermal Processing Evaporation on-site or at an offsite processor On-site disposal per 10CFR20.2002 permit

Waste Stream	POINTS OF GENERATION	AVAILABLE WASTE PROCESSING METHODS
Filter cartridges	Systems - Floor/Equipment Drains, Fuel Pool; cartridge filters are typically generated from clean up activities within the fuel pool, torus, etc.	Dewatering, solidification to an unstable/stable state Processed by a vendor for volume reduction
Dry Active Waste	Paper, wood, plastic, rubber, glass, metal, and etc. resulting from daily plant activities.	Decon/Sorting for Free Release, Compaction/Super-compaction Thermal Processing by Incineration or glass vitrification Sorting for Free Release Metal melting to an ingot
Contaminated Oil	Oil contaminated with radioactive materials from any in-plant system.	Solidification unstable state Thermal Processing by Incineration Free Release for recycling
Drying Bed Sludge	Sewage Treatment and Waste Water Treatment Facilities	Free release to a landfill or burial
Metals	See DAW	See DAW
Irradiated Hardware	Fuel Pool, Reactor Components	Volume Reduction for packaging efficiencies

5. **DOCUMENTATION** - None

6. **REFERENCES**

6.1. Technical Specifications:

6.1.1. The details contained in Current Tech Specs (CTS) or Improved Technical Specifications (ITS), as applicable, in regard to the Process Control Program (PCP), are to be relocated to the UFSAR. Some facilities such as Clinton have elected to relocate these details into the Operational Requirements Manual (ORM). The PCP implements the requirements of 10 CFR 20, 10CFR 61, and 10CFR 71. Compliance with these regulations is required by the Facility Operating Licenses. Relocation of the description of the PCP from the CTS or ITS does not affect the safe operation of the facility. Therefore, the relocation details are not required to be in the CTS or the ITS to provide adequate protection of the public health and safety. Changes to the UFSAR and ORM are controlled by the provisions of 10CFR 50.59.

6.2. Source Documents:

6.2.1. Code Of Federal Regulations: 10 CFR Part 20, Part 61, Part 71, 49 CFR Parts 171-172

6.2.2. Low Level Waste Licensing Branch Technical Position On Radioactive Waste Classification, May 1983

6.2.3. Technical Position on Waste Form (Revision 1), January 1991

6.2.4. Branch Technical Position on Concentration Averaging and Encapsulation, January 1995

6.2.5. Regulatory Guide 1.21

6.2.6. I.E. Circular 80.18, 10CFR 50.59 Safety Evaluation for Changes to Radioactive Waste Treatment Systems

6.2.7. Quality Assurance Program

6.3. Station Commitments:

6.3.1. Peach Bottom

CM-1, T03819, Letter from G.A. Hunger, Jr., dated Sept. 29,94, transmitting TSCR 93-16 (Improved Technical Specifications).

6.3.2. Limerick

CM-2, 10CFR20.2002 permit granted to Limerick via letter dated July 10, 1976.

7. **ATTACHMENTS** - None