

ATTACHMENT 1

**Big Rock Point
Dockets 50-155 and 72-043**

April 27, 2006

BIG ROCK POINT ANNUAL RADIOLOGICAL EFFLUENT RELEASE REPORT

January 1, 2005 - December 31, 2005

90 pages

BIG ROCK POINT ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

January 1, 2005 to December 31, 2005

This report provides information relating to radioactive effluent releases and solid radioactive waste disposal at Big Rock Point for the year 2005. The report format is detailed in Big Rock Point Offsite Dose Calculation Manual, Section III. Effluent releases from Big Rock Point are controlled by the Defueled Technical Specifications and the Offsite Dose Calculation Manual (ODCM) requirements.

The Big Rock Point Nuclear Plant ceased power operations in August 1997 and has been actively decommissioning since plant shutdown. During 2005 site decommissioning activities consisted of continued building and structure demolition, including the dismantlement and demolition of the Containment building during the fourth quarter. Monitoring for ground-level gaseous particulate effluent releases continues for decommissioning work activities with the potential for generating airborne effluents. Liquid effluent monitoring is no longer conducted as all licensed discharges of radioactive liquids have ceased; however, precautionary monitoring of detained surface water and ground water from dewatering operations is conducted for decommissioning activities open to the environment.

Due to the decay time since ceasing plant operations and with all spent fuel in sealed canisters, short-lived radionuclides, including iodines and nobles gases, are neither expected nor reported.

1. Supplemental Information

A. Releases

Information relating to releases of gaseous and liquid effluents is provided in Table 1 (Enclosure A). There were no liquid effluent releases in 2005. However, precautionary monitoring of detained surface water from dewatering activities is performed to support decommissioning activities; corresponding data for precautionary monitoring is included in this report.

B. Abnormal Releases

There were no abnormal releases from Big Rock Point during 2005.

C. Lower Limits of Detection (LLDs) for gaseous and liquid effluents are provided in Enclosure E.

D. Radioactive Effluent Monitoring Instrumentation

Big Rock Point Offsite Dose Calculation Manual, Section I currently specifies required actions when less than the minimum number of radioactive effluent monitoring instrument channels are operable. The ODCM also specifies these actions be taken when installed effluent monitoring systems are removed from service for decommissioning.

All plant-installed liquid and gaseous radioactive effluent monitoring instrument channels have been permanently removed and dismantled. Alternate ground-level airborne measurement equipment is being utilized to monitor gaseous radioactive effluents in accordance with the ODCM and site procedures. Although no radioactive liquids are released from the site, precautionary sampling of surface water is conducted routinely.

2. Gaseous Effluents

Table 2 (Enclosure B) lists and summarizes all gaseous radioactive effluents released during the reporting period. The unidentified beta was 0.05% of the total release (particulates and tritium).

Gaseous effluents did not result in any air dose at the site boundary in 2005, as noble gases are no longer present or released from the site during decommissioning activities. Dose attributed to gaseous effluent releases were calculated as ground-level releases utilizing the GASPARG computer code and calculational parameters defined in the ODCM. The sum of net unidentified beta and identified Sr-90 were conservatively input as Sr-90 for this dose analyses. Overall, gaseous radioactivity released in 2005 (Particulates and Tritium) due to dismantlement activities was approximately equivalent to 2004, with no noble gases or iodines released. Whole body and organ doses for 2005 were also comparable to those calculated in 2004.

3. Liquid Effluents

Table 3 (Enclosure C) lists and summarizes precautionary sampling of detained surface and groundwater prior to release. Only tritium was detected in any of the composite samples collected during detained water release activities. Total liquid effluent tritium released in 2005 was 1.05E-03 Ci, consistent with the total 2004 tritium release of 2.84E-03 Ci.

4. Solid Waste

Table 4 (Enclosure D) summarizes the quantity, classification, activity, and radionuclide content for solid radioactive waste shipped offsite for disposal during 2005. Radioactive waste shipments were made either to the Barnwell Waste Management Facility in Barnwell, South Carolina, or Envirocare of Utah via a radwaste processing facility. The total volume of material shipped during 2005 was greater than 2004 shipment volume due primarily to shipment of large quantities of activated and contaminated concrete from the Containment building interior concrete demolition. The total activity of shipments in 2005 was 151.0 Ci, greater than the 2004 total activity of 32.0 Ci.

5. Summary of Radiological Impact on Man

The ODCM, Section III, Item 1.6 specifies that the Annual Effluent Release Report shall provide potential dose calculations based on measured effluent to liquid and gaseous pathways if estimates of dose exceed 1 millirem to an organ or total body of any individual or more than 1 person-rem to the population within 50 miles. During the year 2005 no quarterly or annual dose calculations exceeded 1 millirem or 1 person-rem from releases to either liquid or gaseous pathways. Although not required, potential doses to individuals and populations were calculated using *NRCDose* Version 2.3.2 computer code, *LADTAPII* and *GASPARII* modules. The quarterly values for curies released were input for each nuclide and results are summarized as follows:

- A. The maximum total body dose to an individual in unrestricted water-related exposure pathways attributable only to tritium was:

First Quarter	0.00E+00	millirem
Second Quarter	0.00E+00	millirem
Third Quarter	1.75E-07	millirem (adult)
Fourth Quarter	1.31E-07	millirem (adult)

The maximum organ doses attributable to liquid effluents were:

First Quarter	0.00E+00	millirem
Second Quarter	0.00E+00	millirem
Third Quarter	1.75E-07	millirem (adult, all organs)
Fourth Quarter	1.31E-07	millirem (adult, all organs)

- B. The offsite air dose at the site boundary (0.57 mi E) due to noble gases was:

0.00 millirad beta and 0.00 millirad gamma for all four quarters (no noble gasses released).

- C. The most restrictive organ dose to an individual in an unrestricted area (based on identified critical receptors) from gaseous effluent releases (tritium and particulate) were*:

First Quarter	1.29E-03 millirem (child bone)
Second Quarter	4.95E-03 millirem (child bone)
Third Quarter	3.07E-03 millirem (child bone)
Fourth Quarter	5.29E-04 millirem (child bone)

- D. Integrated total body doses to the general population and average doses to individuals within the population from liquid effluent release pathways to a distance of 50 miles from the site boundary were:

First Quarter	0.00E-00 person-Rem,	0.00E-00 mrem average
Second Quarter	0.00E-00 person-Rem,	0.00E-00 mrem average
Third Quarter	3.04E-07 person-Rem,	1.56E-09 mrem average
Fourth Quarter	3.38E-07 person-Rem,	1.14E-09 mrem average

- E. Integrated total body dose to the general population and average doses to individuals within the population from gaseous effluent release pathways to a distance of 50 miles from the site boundary were*:

First Quarter	1.15E-04 person-Rem,	5.90E-07 mrem average
Second Quarter	2.06E-04 person-Rem,	1.06E-06 mrem average
Third Quarter	8.10E-05 person-Rem,	4.16E-07 mrem average
Fourth Quarter	8.55E-06 person-Rem,	4.39E-08 mrem average

6. Offsite Dose Calculation Manual (ODCM)

The ODCM (Volume 25 – Part A) describes the radiological release requirements for the Big Rock site. The ODCM was revised in 2005 to reflect the current decommissioning state of the plant site. A current revision of the Big Rock Point ODCM is provided in Enclosure F.

* Gaseous effluent doses calculated obtained in accordance with the ODCM methodology for ground-level releases.

7. Process Control Program (PCP)

The Process Control Program (Volume 25 – Part B) describes solid waste processing and disposal methods utilized at the Big Rock Point site. The PCP was not revised during 2005. A copy of the current PCP is provided in Enclosure F.

Enclosure A
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RADIOACTIVE EFFLUENT RELEASE REPORT
LIQUID RELEASES SUMMARY

January - December 2005

TABLE 1
BATCH RELEASES
January 1, 2005 to December 31, 2005

A. GASEOUS - Continuous release only; no batch releases.

B. LIQUID *	Units	1ST QTR	2ND QTR	3RD QTR	4TH QTR
Number of Releases		0	0	1	1
Total Release Time	Minutes	0	0	1380	1440
Maximum Release Time	Minutes	0	0	--	--
Average Release Time	Minutes	0	0	--	--
Minimum Release Time	Minutes	0	0	--	--

* Liquid monitoring consisted of precautionary monitoring of detained surface and groundwater prior to release.

Enclosure B
3 Pages

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RADIOACTIVE EFFLUENT RELEASE REPORT
GASEOUS EFFLUENTS - SUMMATION OF RELEASES

January - December 2005

TABLE 2
GASEOUS EFFLUENT RELEASES
January 1, 2005 to December 31, 2005

A. FISSION AND ACTIVATION GASES	Units	1ST QTR	2ND QTR	3RD QTR	4TH QTR	Est Total Error %
1. Total release	Ci	0.00	0.00	0.00	0.00	N/A
2. Average release rate for period	μCi/sec	N/A	N/A	N/A	N/A	
3. Percent of annual avg EC	%	N/A	N/A	N/A	N/A	

B. IODINES	Units	1ST QTR	2ND QTR	3RD QTR	4TH QTR	Est Total Error %
1. Total Iodine	Ci	0.00	0.00	0.00	0.00	N/A
2. Average release rate for period	μCi/sec	N/A	N/A	N/A	N/A	
3. Percent of annual avg EC	%	N/A	N/A	N/A	N/A	

C. PARTICULATES	Units	1ST QTR	2ND QTR	3RD QTR	4TH QTR	Est Total Error %
1. Particulates with half-life >8 day	Ci	1.64E-04	3.26E-04	1.36E-04	8.39E-06	10.3
2. Average release rate for period	μCi/sec	2.10E-05	4.15E-05	1.71E-05	1.06E-06	
3. Percent of annual avg EC	%	4.37E-06	1.12E-05	5.91E-06	9.68E-07	
4. Gross alpha radioactivity	Ci	1.77E-06	5.88E-06	4.06E-06	1.63E-06	

D. TRITIUM	Units	1ST QTR	2ND QTR	3RD QTR	4TH QTR	Est Total Error %
1. Total Release	Ci	7.35E-02	7.42E-02	7.51E-02	7.51E-02	
2. Average release rate for period	μCi/sec	9.44E-03	9.44E-03	9.44E-03	9.44E-03	
3. Percent of annual avg EC	%	7.65E-07	7.65E-07	7.65E-07	7.65E-07	

E. WHOLE BODY DOSE	Units	1ST QTR	2ND QTR	3RD QTR	4TH QTR	Est Total Error %
1. Beta Air dose at Site Boundary due to Noble Gases (ODCM Section I, 1.3.1 a (1) (2))	mrads	0.00	0.00	0.00	0.00	
2. Percent limit	%	N/A	N/A	N/A	N/A	
3. Gamma Air dose at Site Boundary due to Noble Gas (ODCM Section I, 1.3.1 a (1) (2))	mrads	0.00	0.00	0.00	0.00	
4. Percent limit	%	N/A	N/A	N/A	N/A	

F. ORGAN DOSE (ODCM Section I, 1.3.b (1) (2))	Units	1ST QTR	2ND QTR	3RD QTR	4TH QTR	Est Total Error %
1. Maximum organ dose to public based on Critical Receptors (child bone)	mrem	1.29E-03	4.95E-03	3.07E-03	5.29E-04	
2. Percent of limit (7.5 mrem/quarter)	%	0.02	0.07	0.04	0.01	

TABLE 2
GASEOUS EFFLUENT RELEASES
January 1, 2005 to December 31, 2005

1. FISSION GASES	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Krypton-85m	Ci	0.00	0.00	0.00	0.00
Krypton-87	Ci	0.00	0.00	0.00	0.00
Krypton-88	Ci	0.00	0.00	0.00	0.00
Xenon-133	Ci	0.00	0.00	0.00	0.00
Xenon-133m	Ci	0.00	0.00	0.00	0.00
Xenon-135	Ci	0.00	0.00	0.00	0.00
Xenon-135m	Ci	0.00	0.00	0.00	0.00
Xenon-138	Ci	0.00	0.00	0.00	0.00
Total for Period	Ci	0.00	0.00	0.00	0.00

2. IODINES					
Iodine-131	Ci	0.00	0.00	0.00	0.00
Iodine-132	Ci	0.00	0.00	0.00	0.00
Iodine-133	Ci	0.00	0.00	0.00	0.00
Iodine-134	Ci	0.00	0.00	0.00	0.00
Iodine-135	Ci	0.00	0.00	0.00	0.00
Total for Period	Ci	0.00	0.00	0.00	0.00

TABLE 2
GASEOUS EFFLUENT RELEASES
January 1, 2005 to December 31, 2005

3. PARTICULATES*	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Chromium-51	Ci	<LLD	<LLD	<LLD	<LLD
Manganese-54	Ci	<LLD	<LLD	<LLD	<LLD
Cobalt-58	Ci	<LLD	<LLD	<LLD	<LLD
Iron-59	Ci	<LLD	<LLD	<LLD	<LLD
Cobalt-60	Ci	8.17E-05	1.29E-04	3.60E-05	1.73E-06
Zinc-65	Ci	<LLD	<LLD	<LLD	<LLD
Silver-110m	Ci	<LLD	<LLD	<LLD	<LLD
Cesium-134	Ci	<LLD	<LLD	<LLD	<LLD
Cesium-137	Ci	5.62E-05	1.41E-04	6.94E-05	1.05E-06
Barium-140	Ci	<LLD	<LLD	<LLD	<LLD
Europium-152	Ci	1.51E-05	1.33E-05	2.33E-06	1.88E-07
Strontium-89	Ci	<LLD	<LLD	<LLD	<LLD
Strontium-90	Ci	1.74E-07	1.27E-06	3.07E-07	<LLD
Net unidentified beta	Ci	1.05E-05	4.14E-05	2.76E-05	5.42E-06
Total	Ci	1.64E-04	3.26E-04	1.36E-04	8.39E-06

* Particulates with half-life > 8 days

Enclosure C
2 Pages

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RADIOACTIVE EFFLUENT RELEASE REPORT
LIQUID EFFLUENTS - SUMMATION OF RELEASES

January - December 2005

TABLE 3
LIQUID EFFLUENT RELEASES*
January 1, 2005 to December 31, 2005

A.	FISSION AND ACTIVATION PRODUCTS	Units	1ST QTR	2ND QTR	3RDQTR Continuous	4TH QTR Continuous	Est Total Error %
	1. Total release (not including tritium, gases, alpha)	Ci	0.00E+00	0.00E+00	<LLD	<LLD	N/A
	2. Average diluted concentration during period	µCi/ml	N/A	N/A	N/A	N/A	
	3. Percent of EC	%	N/A	N/A	N/A	N/A	
B.	TRITIUM	Ci	0.00E+00	0.00E+00	6.04E-04	4.49E-04	1.5%
	1. Total release						
	2. Average diluted concentration during period	µCi/ml	N/A	N/A	2.03E-08	1.51E-08	
	3. Percent of EC	%	N/A	N/A	2.03E-03	1.51E-03	
C.	DISSOLVED AND ENTRAINED GASES	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A
	1. Total release						
	2. Average diluted concentration during period	µCi/ml	N/A	N/A	N/A	N/A	
	3. Percent of EC	%	N/A	N/A	N/A	N/A	
D.	GROSS ALPHA RADIOACTIVITY	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
E.	VOLUME OF WASTE RELEASED (Prior to dilution)	Liters	0.00E+00	0.00E+00	1.57E+05	1.64E+05	
F.	VOLUME OF DILUTION WATER USED DURING PERIOD	Liters	0.00E+00	0.00E+00	2.97E+07	2.97E+07	
G.	MAXIMUM DOSE COMMITMENT WHOLEBODY	mrem	0.00E+00	0.00E+00	1.75E-07	1.31E-07	
	Percent of ODCM Section I, 2.3.1 a (1.5 mrem)	%	0	0	< 0.01	< 0.01	
H.	MAXIMUM DOSE COMMITMENT - ORGAN	mrem	0.00E+00	0.00E+00	1.75E-07	1.31E-07	
	Percent of ODCM Section I, 2.3.1 b (5.0 mrem)	%	0	0	< 0.01	< 0.01	

TABLE 3
LIQUID EFFLUENT RELEASES*
January 1, 2005 to December 31, 2005

1. NUCLIDES RELEASED	Units	1st Quarter	2 nd Quarter	3rd Quarter	4th Quarter
Chromium-51	Ci	--	--	<LLD	<LLD
Manganese 54	Ci	--	--	<LLD	<LLD
Cobalt-58	Ci	--	--	<LLD	<LLD
Iron-59	Ci	--	--	<LLD	<LLD
Cobalt-60	Ci	--	--	<LLD	<LLD
Zinc-65	Ci	--	--	<LLD	<LLD
Strontium-89	Ci	--	--	<LLD	<LLD
Strontium-90	Ci	--	--	<LLD	<LLD
Molybdenum-99	Ci	--	--	<LLD	<LLD
Silver-110m	Ci	--	--	<LLD	<LLD
Iodine-131	Ci	--	--	<LLD	<LLD
Cesium-134	Ci	--	--	<LLD	<LLD
Cesium-137	Ci	--	--	<LLD	<LLD
Antimony-125	Ci	--	--	<LLD	<LLD
Tin-113	Ci	--	--	<LLD	<LLD
Net Unidentified Beta**	Ci	--	--	N/A	N/A
Fission & Activation Product Total	Ci	--	--	<LLD	<LLD
Xenon-133	Ci	--	--	<LLD	<LLD
Tritium	Ci	--	--	6.04E-04	4.49E-04
Grand Total	Ci	--	--	6.04E-04	4.49E-04

* Liquid monitoring consisted of precautionary monitoring of detained surface and groundwater prior to release.

** Beta analysis not performed in the absence of any identified gamma emitting nuclides.

Enclosure D
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RADIOACTIVE EFFLUENT RELEASE REPORT
SOLID WASTE

January - December 2005

TABLE 4
SOLID WASTE SHIPMENT SUMMARY
January 1, 2005 to December 31, 2005

<u>Waste Class</u>	<u>Source of Waste</u>	<u>Solidification Agent</u>	<u>Container Type</u>	<u>Volume (Cu. Ft.)</u>	<u>Total Curies*</u>	<u>Principal Radionuclides*</u>
AU	Metal, concrete and DAW from plant demolition	None	Metal Box and Exempt Packaging	314,954	1.51E+02	Co-60, Fe-55, Mn-54, Ni-63, Am-241, Pu-241, H-3, Cs-137, Eu-152, Eu-154
TOTALS				314,954	1.51E+02	

* Gamma isotopes are measured quantities, all others are estimated from scaling factors.

Enclosure E
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**RADIOACTIVE EFFLUENT RELEASE REPORT
LOWER LIMIT OF DETECTION FOR BIG ROCK EFFLUENTS**

January - December 2005

TABLE 5
LOWER LIMITS OF DETECTION

Gaseous Effluents

<u>Nuclide</u>	<u>LLD (μCi/cc)*</u>
Mn-54	6 E-14
Co-58	5 E-14
Fe-59	2 E-13
Co-60	9 E-14
Zn-65	2 E-14
Nb-95	6 E-14
Zr-95	8 E-14
Ag-110m	5 E-14
Sb-125	2 E-14
Cs-134	5 E-14
Cs-137	6 E-14
Ce-144	3 E-13
Am-241	2 E-13

Liquid Effluents

<u>Nuclide</u>	<u>LLD (μCi/cc)*</u>
Mn-54	1 E-07
Co-58	2 E-07
Fe-59	1 E-07
Co-60	3 E-07
Zn-65	3 E-07
Nb-95	1 E-07
Nb-95	1 E-07
Nb-95	1 E-07
Zr-95	3 E-07
Ag-110m	2 E-07
Sb-125	2 E-07
Cs-134	2 E-07
Cs-137	2 E-07
Ce-144	5 E-07
Am-241	4 E-07

* Based on gamma isotopic analysis for a typical AMS filter and typical liquid release.