

**FLORIDA POWER & LIGHT COMPANY  
ST. LUCIE UNITS 1 AND 2  
ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT  
JANUARY 1, 2011 THROUGH DECEMBER 31, 2011**

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**1.0 PROGRAM DESCRIPTION**

**Regulatory Limits**

The ODCM Radiological Effluent Control limits applicable to the release of radioactive material in liquid and gaseous effluents are described in the following sections.

**Fission and Activation Gases (Noble Gases)**

The dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to less than or equal to 500 mrem/yr to the whole body and less than or equal to 3000 mrem/yr to the skin.

The air dose due to noble gases released in gaseous effluents, from each unit, to areas at and beyond the site boundary shall be limited to the following:

- a. During any calendar quarter: Less than or equal to 5 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation, and
- b. During any calendar year: Less than or equal to 10 mrad for gamma radiation and less than or equal to 20 mrad for beta radiation.

**Iodine-131, Iodine-133, Tritium, Carbon-14 and Radioactive Material in Particulate Form**

The dose rate due to iodine-131, iodine-133, tritium and all radionuclides in particulate form with half lives greater than 8 days, released in gaseous effluents from the site to areas at and beyond the site boundary, shall be limited to less than or equal to 1500.mrem/yr to any organ.

The dose to a MEMBER OF THE PUBLIC from iodine-131, iodine-133, tritium, carbon-14 and all radionuclides in particulate form with half lives greater than 8 days, in gaseous effluents released, from each unit, to areas at and beyond the site boundary, shall be limited to the following:

- a. During any calendar quarter: Less than or equal to 7.5 mrem to any organ, and
- b. During any calendar year: Less than or equal to 15 mrem to any organ.

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**Liquid Effluents**

The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to 10 times the concentrations specified in 10 CFR Part 20, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to  $2.0\text{E-}4$   $\mu\text{Ci/ml}$  total activity. The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released, from each unit, to unrestricted areas shall be limited:

- a. During any calendar quarter to less than or equal to 1.5 mrem to the whole body and to less than or equal to 5 mrem to any organ, and
- b. During any calendar year to less than or equal to 3 mrem to the whole body and to less than or equal to 10 mrem to any organ.

**Total Dose**

The annual (calendar year) dose or dose commitment to any MEMBER OF THE PUBLIC due to releases of radioactivity and to radiation from uranium fuel cycle sources shall be limited to less than or equal to 25 mrem to the whole body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrem.

**Effluent Concentration Limits**

**Gaseous Effluents**

For gaseous effluents, effluent concentration limits (ECL) values are not directly used in release rate calculations since the applicable limits are expressed in terms of dose rate at the site boundary.

**Liquid Effluents**

The values specified in 10 CFR Part 20, Appendix B, Table 2, Column 2 are used as the ECL for liquid radioactive effluents released to unrestricted areas. A value of  $2.0\text{E-}04$   $\mu\text{Ci/ml}$  is used as the ECL for dissolved and entrained noble gases in liquid effluents.

**Measurements and Approximations of Total Radioactivity**

Measurements of total radioactivity in liquid and gaseous radioactive effluents were accomplished in accordance with the sampling and analysis requirements of Tables 4.11-1 and 4.11-2, respectively, of the St. Lucie ODCM. Estimates of errors are in accordance with Methodology Section 4.4, of the ODCM.

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The estimate of errors associated with values reported are as follows:

<u>Error Topic</u>	<u>LIQUID</u>		<u>GASEOUS</u>	
	<u>Avg. %</u>	<u>Max. %</u>	<u>Avg. %</u>	<u>Max. %</u>
Release Point Mixing	2	5	NA	NA
Sampling	1	5	2	5
Sample Preparation	1	5	1	5
Sample Analysis	3	10	3	10
Release Volume	<u>2</u>	<u>5</u>	<u>4</u>	<u>15</u>
Total %	9	30	10	35

(above values are examples only)

The predictability of error for radioactive releases can only be applied to nuclides that are predominant in sample spectrums. Nuclides that are near background relative to the predominant nuclides in a given sample could easily have errors greater than the above listed maximums.

#### **Liquid Radioactive Effluents**

Each batch release was sampled and analyzed for gamma emitting radionuclides using gamma spectroscopy, prior to release. Composite samples were analyzed monthly and quarterly for tritium and gross alpha radioactivity in the onsite laboratory using liquid scintillation and air ion chamber counting techniques, respectively. Composite samples were analyzed quarterly for Sr-89, Sr-90, Fe-55 and C-14 by a contract laboratory. The results of the composite analyses from the previous month or quarter were used to estimate the quantities of these radionuclides in liquid effluents during the current month or quarter.

The total radioactivity in liquid effluent releases was determined from the measured and estimated concentrations of each radionuclide present and the total volume of the effluent released during periods of discharge.

#### **Gaseous Radioactive Effluents**

Each gaseous batch, the release was sampled and analyzed for radioactivity prior to release. For releases from Gas Decay Tanks, noble gas grab samples were analyzed for gamma emitting radionuclides using gamma spectroscopy. For releases from the Containment Buildings, samples were taken of noble gas and tritium grab samples, and analyzed for gamma emitting radionuclides prior to each release. The results of the analyses and the total volume of effluent released were used to determine the total amount of radioactivity released in the batch mode.

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**Gaseous Radioactive Effluents (continued)**

For continuous effluent release pathways, noble gas and tritium grab samples were collected and analyzed weekly for gamma emitting radionuclides by gamma spectroscopy and liquid scintillation counting techniques, respectively. Continuous release pathways were continuously sampled using radioiodine adsorbers and particulate filters. The radioiodine adsorbers and particulate filters were analyzed weekly for gamma emitting radionuclides using gamma spectroscopy. Results of the noble gas and tritium grab samples, radioiodine adsorber and particulate filter analyses from the current week and the average effluent flow rate for the previous week were used to determine the total amount of radioactivity released in the continuous mode. Monthly composites of particulate filters were analyzed for gross alpha activity, in the onsite laboratory using the air ion chamber counting technique. Quarterly composites of particulate filters were analyzed for Sr-89 and Sr-90 by a contract laboratory.

**Meteorological Monitoring Program**

In accordance with ODCM Administrative Control 3.11.2.6.b., a summary of hourly meteorological data, collected during 2011, is retained onsite. This data is available for review by the NRC upon request. During 2011, the goal of >90% joint data recovery was met.

**Carbon-14 Dose Estimation**

The estimate of carbon-14 (C-14) released from the St. Lucie Nuclear Plant was derived from the EPRI document, "Estimation of Carbon-14 in Nuclear Power Plant Gaseous Effluents", Report 1021106, issued December 2010.

The site specific source term values used in the St. Lucie calculations were taken from Section 4-28 of the report, and employed the proxy generation rate values for a Combustion Engineering reactor. The actual 2011 operating data for the units was employed for the calculations to derive the total curies released for each unit.

The total amount of C-14 released in 2011 for Unit 1 was 8.64 Ci, and the total amount of C-14 released in 2011 for Unit 2 was 6.48 Ci. The highest calculated dose is found to be "Bone Dose" to a "Child" through "Inhalation". The total combined dose, including C-14, through this pathway is 1.08-01 mrem/yr.

Additionally, a "Child" consuming vegetables from the garden located at 2.0 miles in the WSW direction from the plant would have received a total combined "Bone Dose", including C-14, of 1.08E-1 mrem/yr.

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**Carbon-14 Dose Estimation (continued)**

Using the same release values, the dose to a visitor on site (Adult Lifeguard) is found to be 2.61E-03 mrem/yr.

All C-14 dose calculations are based on Regulatory Guide 1.109 values.

This is a small fraction of the 1 mrem annual whole body dose received to the average US citizen from natural occurring Carbon-14, primarily generated through cosmogenesis in the terrestrial biosphere. (Reference National Council of Radiation Protection Report 45, Natural Background Radiation in the United States.)

**2.0 SUPPLEMENTAL INFORMATION**

**2.1 Abnormal Releases or Abnormal Discharges**

There were no abnormal releases or discharges from the site during the report period.

**2.2 Non-Routine Planned Discharges**

No non-routine planned discharges were made during the report period.

**2.3 Radioactive Waste Treatment System Changes**

No changes were made to the waste treatment system during the report period.

**2.4 Annual Land Use Census Changes**

There was one change to the Land Use Census during 2011. A new garden was identified at 2.0 miles WSW from the plant. This change was noted in the St. Lucie Corrective Action Program under AR 1688791.

**2.5 Effluent Monitoring System Inoperability**

The liquid radioactive waste discharge monitor was declared out of service for greater than 30 days. Although the radiation monitor was functional, the automatic flow isolation valve associated with the radiation monitor was out of service due to a failed valve actuator. A new valve actuator assembly was purchased, installed and the liquid radioactive waste discharge monitor was restored to service.

**2.6 Offsite Dose Calculation Manual Changes**

Two changes were made to the St. Lucie ODCM during the report period. The first change was to add C-14 dose factors to comply with Revision 2 of Regulatory Guide 1.21. The second change was administrative in nature and revised several procedure reference numbers that had recently changed.

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**2.7 Process Control Program Changes**

There were no changes to the Process Control Program during the report period.

**2.8 Corrections to Previous Reports**

None

**2.9 Other**

Four batch releases were made from the South Settling Basin to the Intake Canal during the year to lower the water level due to approaching severe weather. All four releases were analyzed according to the ODCM and site procedural requirements and were found to have no alpha, gamma, tritium or hard to detect isotopes. The releases are listed below:

<u>Release start date</u>	<u>Volume of release</u>
August 24	7.98E6 gallons
September 9	7.20E6 gallons
October 31	3.29E7 gallons
December 11	6.18E6 gallons

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**2.10 Groundwater Protection Program**

Well ID	H3 Jan 2011	H3 Feb 2011	H3 Mar 2011	H3 Apr 2011	H3 May 2011	H3 June 2011	H3 July 2011	H3 Aug 2011	H3 Sept 2011	H3 OCT 2011	H3 NOV 2011	H3 Dec 2011
Diesel Unit 1 & 2	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l
MW-3		386			498			174			381	
MW-4		526			9220		841	612			307	
MW-5		<MDC (215)			<MDC (253)			255			<MDC (218)	
MW-6	1020	817	745	680	700	881	971	1010	1090	1790	829	1090
MW-7		273			<MDC (247)			268			<MDC (226)	
MW-15		271			<MDC (253)			310			<MDC (218)	
MW-16		<MDC (249)			<MDC (252)			<MDC (193)			421	
MW-17	446	512	374	270	610	469	416	433		<MDC (26)	287	370
MW-18D	1580	1840	2000	1650	1350	1570	1350	1040		785	870	1020
MW-19		304			<MDC (253)			<MDC (275)			<MDC(224)	
MW-22D		262			<MDC (251)			234			375	
MW-26		<MDC (254)			<MDC (249)			<MDC (190)			460	
RW-2	2720	1900	3890	7930	7580	4490	2510	2190	2520	1740	1410	1440
RW-4		<MDC (190)			<MDC(256)			<MDC (234)			344	
RW-5		214			<MDC(260)			<MDC (232)			239	
MW-30		<MDC(251)			<MDC(260)			274			229	
MW-31		401			335			380			611	
MW-32		<MDC(250)			<MDC(243)			343			548	
MW-33	2640	3010	2840	2670	1950	2500	1800	2050	1280	<MDC(265)	670	1350

Well ID	H3 Jan 2011	H3 Feb 2011	H3 Mar 2011	H3 Apr 2011	H3 May 2011	H3 June 2011	H3 July 2011	H3 Aug 2011	H3 Sept 2011	H3 OCT 2011	H3 NOV 2011	H3 Dec 2011
TLO Wells	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l
Unit 1 - MW001	2710	1500	1650	1560	1460	1710	1590	1300	1040	740	296	190
Unit 1 - MW002	891	578	954	744	583	696	697	596	704	288	512	505
Unit 1 - MW003		416			357			424			290	
Unit 1 - MW004		360			377			462			970	
Unit 1-MW005	3110	1120	1620	3910	995	812	2600	3290	1320	2010	1270	1280
Unit 2 - MW001	6190	5530	5530	4600	1770	3230	5680	6770	2550	2200	296	976
Unit 2 - MW002	1100	793	752	975	503	393	297	177	500	884	526	699
Unit 2 - MW003	856	822	913	626	717	862	962	739	10300	657	907	699
Unit 2- MW004	1780	1360	1660	1930	1620	1730	1380	1770	1380	1180	1560	



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## 2.10 Groundwater Protection Program (continued)

Well ID	H3 Jan 2011	H3 Feb 2011	H3 Mar 2011	H3 Apr 2011	H3 May 2011	H3 June2011	H3 July 2011	H3 Aug 2011	H3 Sept 2011	H3 OCT 2011	H3 NOV 2011	H3 Dec 2011
Mixed Plume	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l
(S)-MW-1		<MDC (213)										
(S)-MW-3												
(S)-MW-4		536			545			361			538	
(S)-MW-5												
(S)-MW-6		394			363			465			<MDC(223)	
(S)-MW-7A		<MDC (217)										
(S)-MW-10												
(S)-MW-11		728			481			680			556	
(S)-MW-12												
(S)-MW-13D												
(S)-MW-14												
(S)-MW-15D		325			277			268			299	
(S)-MW-16		<MDC (228)			<MDC (255)			<MDC (189)			<MDC (225)	
(S)-MW-16i		229			<MDC(258)			304			375	
(S)-MW-17		223			<MDC(252)			277			<MDC(217)	
(S)-MW-18		<MDC (228)			<MDC(254)			<MDC (188)			<MDC (221)	
(S)-MW-19		<MDC (218)			<MDC(250)			<MDC(193)			<MDC(225)	

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**3.0 TABLES**

**3.1 Gaseous Effluents**

**3.2 Liquid Effluents**

**3.3 Solid Waste Storage and Shipments**

**3.4 Dose Assessments**

Dose to a Member of the Public from Activities Inside the Site Boundary  
Assessment of radiation dose from radioactive effluents to MEMBERS  
OF THE PUBLIC due to their activities inside the SITE BOUNDARY  
assumes the VISITOR to be a lifeguard at the Walton Rocks Beach  
recreation area. The visitor is assumed to be onsite for 6 hours per day for  
312 days per year at a distance of 1.6 kilometers in the South East Sector.  
The VISITOR received exposure from each of the two reactors on the site.  
Actual Met Data was used to calculate Visitor Dose for Calendar Year  
2011.

VISITOR DOSE RESULTS FOR CALENDAR YEAR 2011 were:

<b>Noble Gas Dose</b>	<b>mrad</b>
Gamma Air Dose	3.56E-03
Beta Air Dose	3.56E-03

<b>Gas, Particulate, Iodine, Carbon Dose</b>	<b>mrem</b>
Bone	2.58E-03
Liver	3.80E-03
Thyroid	4.85E-03
Kidney	8.64E-04
Lung	3.75E-03
GI-LLI	3.74E-03
Total Body	4.48E-03

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**L-2012-080**

**ENCLOSURE 1  
COMBINED ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT  
FOR THE PERIOD JANUARY 1, 2011 THROUGH DECEMBER 31, 2011  
(47 PAGES)**

**Table 5A and 5B - Regulatory Guide 1.21 (2011)**  
**Batch Release Summary**  
**Unit: Site**

<b>A. Liquid Releases</b>	<b>Units</b>	<b>1st Quarter</b>	<b>2nd Quarter</b>	<b>3rd Quarter</b>	<b>4th Quarter</b>	<b>Year Totals</b>
1. Number of batch releases	:	18	12	20	27	77
2. Total time period for Batch releases	( Minutes ):	9.85E+03	9.11E+03	4.20E+04	4.13E+04	1.02E+05
3. Maximum time period for a batch release	( Minutes ):	7.05E+02	1.15E+03	1.98E+04	2.05E+04	2.05E+04
4. Average time period for a batch release	( Minutes ):	5.47E+02	7.59E+02	2.10E+03	1.53E+03	1.33E+03
5. Minimum time period for a batch release	( Minutes ):	3.87E+02	4.92E+02	1.00E+02	5.00E+02	1.00E+02
6. Average stream flow during periods of release of liquid Effluent into a flowing stream	( LPM ) :	2.07E+06	3.15E+06	3.88E+06	2.09E+06	3.65E+06

**B. Gaseous Releases**

	<b>Units</b>	<b>1st Quarter</b>	<b>2nd Quarter</b>	<b>3rd Quarter</b>	<b>4th Quarter</b>	<b>Year Totals</b>
1. Number of batch releases	:	18	28	38	31	115
2. Total time period for batch releases	( Minutes ):	9.05E+03	1.06E+04	8.36E+03	5.90E+03	3.39E+04
3. Maximum time period for a batch release	( Minutes ):	1.24E+03	1.44E+03	6.00E+02	6.00E+02	1.44E+03
4. Average time period for a batch release	( Minutes ):	5.03E+02	3.78E+02	2.20E+02	1.90E+02	2.95E+02
5. Minimum time period for a batch release	( Minutes ):	2.10E+01	4.80E+01	3.00E+01	3.00E+01	2.10E+01

<b>END OF BATCH RELEASE SUMMARY REPORT</b>
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**Table 1A - Regulatory Guide ( 2011 )**  
**Gaseous Effluents - Summation Of All Releases**  
**Unit: Site**

Type of Effluent	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	% Est. Total Error
<b>A. Fission And Activation Gases</b>						
1. Total Release	Curies :	1.88E+01	2.01E+01	1.88E+00	7.32E+00	
2. Average Release rate for period	uCi/sec :	2.39E+00	2.54E+00	2.39E-01	9.29E-01	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>B. Radioiodines</b>						
1. Total Iodine-131	Curies :	2.17E-05	9.78E-07	1.14E-05	1.35E-06	
2. Average Release rate for period	uCi/sec :	2.75E-06	1.24E-07	1.45E-06	1.71E-07	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>C. Particulates</b>						
1. Particulates ( Half-Lives > 8 Days )	Curies :	8.23E-01	2.21E-05	1.55E-05	8.20E-06	
2. Average Release rate for period	uCi/sec :	1.04E-01	2.80E-06	1.97E-06	1.041E-06	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>D. Tritium</b>						
1. Total Release	Curies :	4.42E+01	5.41E-01	1.61E-01	5.28E-01	
2. Average Release rate for period	uCi/sec :	5.61E+00	6.86E-02	2.05E-02	6.70E-02	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>E. Gross Alpha</b>						
1. Total Release	Curies :	2.50E-07	1.32E-07	2.42E-07	1.77E-07	
2. Average Release rate for period	uCi/sec :	3.18E-08	1.68E-08	3.07E-08	2.25E-08	

**\* Applicable limits are expressed in terms of dose.**

**Table 1C\***  
**Annual Radioactive Effluent Release Report (2011)**  
**Gaseous Effluents - Ground Level Releases**  
**Reactor Unit: Site**

		Continuous Mode			
Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Fission Gases					
Kr-85m	Curies	0.00E+00	5.12E-02	2.10E-01	0.00E+00
Kr-87	Curies	1.24E-01	0.00E+00	0.00E+00	0.00E+00
Kr-88	Curies	0.00E+00	7.08E-01	7.23E-01	0.00E+00
Xe-131m	Curies	1.45E+01	1.53E+01	0.00E+00	0.00E+00
Xe-133m	Curies	2.80E+00	1.98E+00	3.95E-01	1.83E+00
Xe-135	Curies	2.82E-02	1.66E-01	0.00E+00	0.00E+00
Xe-138	Curies	4.86E-01	1.58E+00	0.00E+00	2.68E+00
Total For Period	Curies	1.79E+01	1.98E+01	1.33E+00	4.51E+00
Iodines					
I-131	Curies	2.17E-05	9.78E-07	1.14E-05	1.35E-06
I-133	Curies	0.00E+00	0.00E+00	2.07E-04	8.58E-06
Total For Period	Curies	2.17E-05	9.78E-07	2.19E-04	9.93E-06
Particulates					
C-14	Curies	8.23E-01	0.00E+00	0.00E+00	0.00E+00
Cr-51	Curies	0.00E+00	3.29E-06	0.00E+00	0.00E+00
Co-60	Curies	2.70E-05	1.38E-05	1.26E-05	3.13E-06
Cs-137	Curies	9.87E-07	2.64E-06	2.89E-06	5.07E-06
Ce-141	Curies	5.66E-07	0.00E+00	0.00E+00	0.00E+00
Ce-144	Curies	0.00E+00	2.31E-06	0.00E+00	0.00E+00
Total For Period	Curies	8.23E-01	2.21E-05	1.55E-05	8.20E-06
Tritium					
H-3	Curies	4.41E+01	0.00E+00	0.00E+00	0.00E+00

**Gross Alpha**

G-Alpha	Curies	2.50E-07	1.32E-07	2.42E-07	1.77E-07
<b>Total For Period</b>	<b>Curies</b>	<b>2.50E-07</b>	<b>1.32E-07</b>	<b>2.42E-07</b>	<b>1.77E-07</b>



**Table 1C\***  
**Annual Radioactive Effluent Release Report (2011)**  
**Gaseous Effluents - Ground Level Releases**  
**Reactor Unit: Site**

		Batch Mode			
Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Fission Gases					
Ar-41	Curies	5.54E-01	2.54E-01	4.45E-01	2.60E+00
Kr-85m	Curies	2.86E-04	2.61E-05	1.09E-03	1.25E-05
Kr-85	Curies	9.02E-03	1.97E-02	0.00E+00	0.00E+00
Kr-87	Curies	0.00E+00	3.56E-05	1.36E-04	0.00E+00
Kr-88	Curies	0.00E+00	0.00E+00	1.04E-03	9.71E-05
Kr-89	Curies	0.00E+00	0.00E+00	0.00E+00	1.24E-02
Xe-131m	Curies	1.07E-03	0.00E+00	0.00E+00	0.00E+00
Xe-133m	Curies	4.86E-03	0.00E+00	1.15E-03	1.75E-03
Xe-133	Curies	3.17E-01	8.11E-03	8.40E-02	1.88E-01
Xe-135m	Curies	0.00E+00	1.49E-03	3.95E-04	2.08E-04
Xe-135	Curies	2.99E-02	5.47E-05	1.84E-02	1.99E-03
Xe-137	Curies	0.00E+00	8.32E-03	4.82E-03	2.20E-03
Xe-138	Curies	0.00E+00	1.09E-04	0.00E+00	0.00E+00
Total For Period	Curies	9.16E-01	2.91E-01	5.56E-01	2.81E+00
Iodines					
No Nuclides Found		N/A	N/A	N/A	N/A
Particulates					
No Nuclides Found		N/A	N/A	N/A	N/A
Tritium					
		Batch Mode			
Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
H-3	Curies	1.59E-01	5.41E-01	1.61E-01	5.28E-01
Gross Alpha					
No Nuclides Found		N/A	N/A	N/A	N/A

\* Zeroes in this table indicate that no radioactivity was present at detectable levels.

<b>END OF ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT</b>
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**Table 1A - Regulatory Guide ( 2011 )**  
**Gaseous Effluents - Summation Of All Releases**  
**Unit: PSL1**

Type of Effluent	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	% Est. Total Error
<b>A. Fission And Activation Gases</b>						
1. Total Release	Curies :	1.06E+01	1.12E+01	5.92E-01	7.14E+00	
2. Average Release rate for period	uCi/sec :	1.35E+00	1.43E+00	7.51E-02	9.05E-01	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>B. Radioiodines</b>						
1. Total Iodine-131	Curies :	1.01E-05	8.51E-07	1.14E-05	1.35E-06	
2. Average Release rate for period	uCi/sec :	1.28E-06	1.08E-07	1.45E-06	1.71E-07	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>C. Particulates</b>						
1. Particulates ( Half-Lives > 8 Days )	Curies :	2.78E-05	1.64E-05	1.17E-05	4.80E-06	
2. Average Release rate for period	uCi/sec :	3.53E-06	2.07E-06	1.49E-06	6.088E-07	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>D. Tritium</b>						
1. Total Release	Curies :	2.68E+01	2.36E-01	1.09E-01	4.75E-01	
2. Average Release rate for period	uCi/sec :	3.40E+00	2.99E-02	1.38E-02	6.03E-02	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>E. Gross Alpha</b>						
1. Total Release	Curies :	1.44E-07	5.57E-08	1.45E-07	1.23E-07	
2. Average Release rate for period	uCi/sec :	1.83E-08	7.07E-09	1.84E-08	1.56E-08	

**\* Applicable limits are expressed in terms of dose.**

**Table 1C\***  
**Annual Radioactive Effluent Release Report (2011)**  
**Gaseous Effluents - Ground Level Releases**  
**Reactor Unit: PSL1**

		Continuous Mode			
Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Fission Gases					
Kr-87	Curies	1.24E-01	0.00E+00	0.00E+00	0.00E+00
Kr-88	Curies	0.00E+00	7.08E-01	0.00E+00	0.00E+00
Xe-131m	Curies	7.19E+00	7.18E+00	0.00E+00	0.00E+00
Xe-133m	Curies	2.60E+00	1.60E+00	3.95E-01	1.83E+00
Xe-138	Curies	4.86E-01	1.58E+00	0.00E+00	2.68E+00
Total For Period	Curies	1.04E+01	1.11E+01	3.95E-01	4.51E+00
Iodines					
I-131	Curies	1.01E-05	8.51E-07	1.14E-05	1.35E-06
I-133	Curies	0.00E+00	0.00E+00	2.07E-04	8.58E-06
Total For Period	Curies	1.01E-05	8.51E-07	2.19E-04	9.93E-06
Particulates					
Cr-51	Curies	0.00E+00	3.29E-06	0.00E+00	0.00E+00
Co-60	Curies	2.70E-05	8.79E-06	1.15E-05	2.82E-06
Cs-137	Curies	8.29E-07	2.54E-06	2.64E-07	1.98E-06
Ce-144	Curies	0.00E+00	1.73E-06	0.00E+00	0.00E+00
Total For Period	Curies	2.78E-05	1.64E-05	1.17E-05	4.80E-06
Tritium					
H-3	Curies	2.67E+01	0.00E+00	0.00E+00	0.00E+00
Gross Alpha					
G-Alpha	Curies	1.44E-07	5.57E-08	1.45E-07	1.23E-07
Total For Period	Curies	1.44E-07	5.57E-08	1.45E-07	1.23E-07

**Table 1C\***  
**Annual Radioactive Effluent Release Report (2011)**  
**Gaseous Effluents - Ground Level Releases**  
**Reactor Unit: PSL1**

		<b>Batch Mode</b>			
<b>Nuclides Released</b>	<b>Unit</b>	<b>1st Quarter</b>	<b>2nd Quarter</b>	<b>3rd Quarter</b>	<b>4th Quarter</b>
<b>Fission Gases</b>					
Ar-41	Curies	2.15E-01	1.64E-01	1.69E-01	2.46E+00
Kr-85m	Curies	0.00E+00	0.00E+00	0.00E+00	1.25E-05
Xe-133m	Curies	0.00E+00	0.00E+00	1.60E-04	1.39E-03
Xe-133	Curies	6.72E-03	5.10E-03	2.25E-02	1.63E-01
Xe-135m	Curies	0.00E+00	1.49E-03	3.95E-04	0.00E+00
Xe-135	Curies	1.67E-04	0.00E+00	2.45E-04	1.57E-03
Xe-137	Curies	0.00E+00	8.32E-03	4.82E-03	2.20E-03
<b>Total For Period</b>	<b>Curies</b>	<b>2.22E-01</b>	<b>1.79E-01</b>	<b>1.97E-01</b>	<b>2.63E+00</b>
<b>Iodines</b>					
No Nuclides Found		N/A	N/A	N/A	N/A
<b>Particulates</b>					
No Nuclides Found		N/A	N/A	N/A	N/A
<b>Tritium</b>					
		<b>Batch Mode</b>			
<b>Nuclides Released</b>	<b>Unit</b>	<b>1st Quarter</b>	<b>2nd Quarter</b>	<b>3rd Quarter</b>	<b>4th Quarter</b>
H-3	Curies	1.59E-01	2.36E-01	1.09E-01	4.75E-01
<b>Gross Alpha</b>					
No Nuclides Found		N/A	N/A	N/A	N/A

\* Zeroes in this table indicate that no radioactivity was present at detectable levels.

**END OF ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT**

**Table 1A - Regulatory Guide ( 2011 )**  
**Gaseous Effluents - Summation Of All Releases**  
**Unit: PSL2**

Type of Effluent	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	% Est. Total Error
<b>A. Fission And Activation Gases</b>						
1. Total Release	Curies :	8.21E+00	8.80E+00	1.29E+00	1.84E-01	
2. Average Release rate for period	uCi/sec :	1.04E+00	1.12E+00	1.64E-01	2.33E-02	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>B. Radioiodines</b>						
1. Total Iodine-131	Curies :	1.16E-05	1.27E-07	0.00E+00	0.00E+00	
2. Average Release rate for period	uCi/sec :	1.47E-06	1.62E-08	0.00E+00	0.00E+00	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>C. Particulates</b>						
1. Particulates ( Half-Lives > 8 Days )	Curies :	8.23E-01	5.72E-06	3.80E-06	3.40E-06	
2. Average Release rate for period	uCi/sec :	1.04E-01	7.26E-07	4.82E-07	4.317E-07	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>D. Tritium</b>						
1. Total Release	Curies :	1.74E+01	3.05E-01	5.24E-02	5.31E-02	
2. Average Release rate for period	uCi/sec :	2.21E+00	3.87E-02	6.64E-03	6.74E-03	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>E. Gross Alpha</b>						
1. Total Release	Curies :	1.06E-07	7.65E-08	9.71E-08	5.40E-08	
2. Average Release rate for period	uCi/sec :	1.35E-08	9.70E-09	1.23E-08	6.85E-09	

\* Applicable limits are expressed in terms of dose.

**Table 1C\***  
**Annual Radioactive Effluent Release Report (2011)**  
**Gaseous Effluents - Ground Level Releases**  
**Reactor Unit: PSL2**

		Continuous Mode			
Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
<b>Fission Gases</b>					
Kr-85m	Curies	0.00E+00	5.12E-02	2.10E-01	0.00E+00
Kr-88	Curies	0.00E+00	0.00E+00	7.23E-01	0.00E+00
Xe-131m	Curies	7.29E+00	8.10E+00	0.00E+00	0.00E+00
Xe-133m	Curies	2.02E-01	3.77E-01	0.00E+00	0.00E+00
Xe-135	Curies	2.82E-02	1.66E-01	0.00E+00	0.00E+00
<b>Total For Period</b>	<b>Curies</b>	<b>7.52E+00</b>	<b>8.69E+00</b>	<b>9.32E-01</b>	<b>0.00E+00</b>
<b>Iodines</b>					
I-131	Curies	1.16E-05	1.27E-07	0.00E+00	0.00E+00
<b>Total For Period</b>	<b>Curies</b>	<b>1.16E-05</b>	<b>1.27E-07</b>	<b>0.00E+00</b>	<b>0.00E+00</b>
<b>Particulates</b>					
C-14	Curies	8.23E-01	0.00E+00	0.00E+00	0.00E+00
Co-60	Curies	0.00E+00	5.06E-06	1.17E-06	3.10E-07
Cs-137	Curies	1.58E-07	9.30E-08	2.63E-06	3.09E-06
Ce-141	Curies	5.66E-07	0.00E+00	0.00E+00	0.00E+00
Ce-144	Curies	0.00E+00	5.71E-07	0.00E+00	0.00E+00
<b>Total For Period</b>	<b>Curies</b>	<b>8.23E-01</b>	<b>5.72E-06</b>	<b>3.80E-06</b>	<b>3.40E-06</b>
<b>Tritium</b>					
H-3	Curies	1.74E+01	0.00E+00	0.00E+00	0.00E+00
<b>Gross Alpha</b>					
G-Alpha	Curies	1.06E-07	7.65E-08	9.71E-08	5.40E-08
<b>Total For Period</b>	<b>Curies</b>	<b>1.06E-07</b>	<b>7.65E-08</b>	<b>9.71E-08</b>	<b>5.40E-08</b>

**Table 1C\***  
**Annual Radioactive Effluent Release Report (2011)**  
**Gaseous Effluents - Ground Level Releases**  
**Reactor Unit: PSL2**

		<b>Batch Mode</b>			
<b>Nuclides Released</b>	<b>Unit</b>	<b>1st Quarter</b>	<b>2nd Quarter</b>	<b>3rd Quarter</b>	<b>4th Quarter</b>
<b>Fission Gases</b>					
Ar-41	Curies	3.39E-01	8.99E-02	2.76E-01	1.45E-01
Kr-85m	Curies	2.86E-04	2.61E-05	1.09E-03	0.00E+00
Kr-85	Curies	9.02E-03	1.97E-02	0.00E+00	0.00E+00
Kr-87	Curies	0.00E+00	3.56E-05	1.36E-04	0.00E+00
Kr-88	Curies	0.00E+00	0.00E+00	1.04E-03	9.71E-05
Kr-89	Curies	0.00E+00	0.00E+00	0.00E+00	1.24E-02
Xe-131m	Curies	1.07E-03	0.00E+00	0.00E+00	0.00E+00
Xe-133m	Curies	4.86E-03	0.00E+00	9.87E-04	3.54E-04
Xe-133	Curies	3.10E-01	3.01E-03	6.15E-02	2.48E-02
Xe-135m	Curies	0.00E+00	0.00E+00	0.00E+00	2.08E-04
Xe-135	Curies	2.98E-02	5.47E-05	1.81E-02	4.22E-04
Xe-138	Curies	0.00E+00	1.09E-04	0.00E+00	0.00E+00
<b>Total For Period</b>	<b>Curies</b>	<b>6.94E-01</b>	<b>1.13E-01</b>	<b>3.59E-01</b>	<b>1.84E-01</b>
<b>Iodines</b>					
No Nuclides Found		N/A	N/A	N/A	N/A
<b>Particulates</b>					
No Nuclides Found		N/A	N/A	N/A	N/A
<b>Tritium</b>					
		<b>Batch Mode</b>			
<b>Nuclides Released</b>	<b>Unit</b>	<b>1st Quarter</b>	<b>2nd Quarter</b>	<b>3rd Quarter</b>	<b>4th Quarter</b>
H-3	Curies	0.00E+00	3.05E-01	5.24E-02	5.31E-02
<b>Gross Alpha</b>					
No Nuclides Found		N/A	N/A	N/A	N/A



\* Zeroes in this table indicate that no radioactivity was present at detectable levels.

**END OF ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT**

**Table 2A - Regulatory Guide 1.21 (2011)**  
**Liquid Effluents - Summation Of All Releases**  
**Unit: Site**

Type of Effluent	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	% Est. Total Error
<b>A. Fission And Activation Products</b>						
1. Total Release (not including tritium, gases, alpha)	Curies	1.43E-02	2.82E-02	4.13E-02	9.02E-02	
2. Average diluted concentration during period	uCi/ml	7.02E-10	9.83E-10	2.53E-10	1.04E-09	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>B. Tritium</b>						
1. Total Release	Curies	6.06E+01	4.22E+01	1.09E+02	6.57E+01	
2. Average diluted Concentration during period	uCi/ml	2.97E-06	1.47E-06	6.67E-07	7.61E-07	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>C. Dissolved and Entrained Gases</b>						
1. Total Release	Curies	9.04E-03	7.86E-05	7.68E-03	3.32E-02	
2. Average diluted Concentration during period	uCi/ml	4.44E-10	2.75E-12	4.71E-11	3.85E-10	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>D: Gross Alpha Radioactivity</b>						
1. Total Release		0.00E+00	0.00E+00	0.00E+00	0.00E+00	
<b>E: Waste Vol Release (Pre-Dilution)</b>						
	Liters	1.43E+06	1.04E+06	5.88E+07	1.50E+08	
<b>F. Volume of Dilution Water Used</b>						
	Liters	2.04E+10	2.86E+10	1.63E+11	8.64E+10	

\* Applicable limits are expressed in terms of dose.

**Table 2B - Regulatory Guide 1.21 (2011)**  
**Annual Radioactive Effluent Release Report**  
**Liquid Effluents**  
**Reactor Unit: Site**

Nuclides Released	Unit	Continuous Mode			
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Fission & Activation Products					
No Nuclides Found		N/A	N/A	N/A	N/A
<hr style="border-top: 1px dashed black;"/>					
Tritium					
No Nuclides Found		N/A	N/A	N/A	N/A
<hr style="border-top: 1px dashed black;"/>					
Dissolved And Entrained Gases					
No Nuclides Found		N/A	N/A	N/A	N/A

**If Not Detected, Nuclide is Not Reported**

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**Table 2B - Regulatory Guide 1.21 (2011)**  
**Annual Radioactive Effluent Release Report**  
**Liquid Effluents**  
**Reactor Unit: Site**

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<u>Nuclides Released</u>	<u>Unit</u>	<u>Batch Mode</u>			
		<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>

**Fission & Activation Products**

Sb-125	Curies	5.00E-04	5.18E-04	5.71E-04	9.14E-04
Cs-137	Curies	0.00E+00	4.91E-06	1.14E-05	1.47E-05
I-130	Curies	0.00E+00	2.84E-06	0.00E+00	0.00E+00
C-14	Curies	4.23E-03	5.07E-03	2.80E-02	7.02E-02
Ba-140	Curies	0.00E+00	9.06E-06	0.00E+00	1.90E-05
Cs-136	Curies	5.19E-06	5.10E-06	6.72E-06	0.00E+00
Ag-110m	Curies	5.99E-04	3.47E-04	5.37E-04	9.50E-04
Fe-59	Curies	9.50E-05	2.98E-04	9.01E-05	8.10E-05
Mn-54	Curies	1.04E-04	8.76E-05	2.17E-04	2.52E-04
Zr-97	Curies	1.78E-04	0.00E+00	1.63E-04	3.25E-04
Br-82	Curies	5.05E-06	4.38E-06	0.00E+00	0.00E+00
I-135	Curies	1.37E-05	0.00E+00	0.00E+00	0.00E+00
Co-58	Curies	4.97E-03	1.48E-03	1.93E-03	3.71E-03
La-140	Curies	0.00E+00	0.00E+00	9.91E-05	3.38E-05
Ru-103	Curies	0.00E+00	3.78E-06	0.00E+00	0.00E+00
Zn-65	Curies	5.45E-06	4.54E-06	0.00E+00	2.37E-05
Nb-97	Curies	8.43E-05	1.68E-04	6.46E-04	1.64E-03
Co-57	Curies	0.00E+00	6.24E-06	8.13E-06	2.64E-06
Co-60	Curies	7.16E-04	4.47E-04	1.66E-03	2.48E-03
Sb-124	Curies	5.73E-06	7.18E-06	0.00E+00	0.00E+00
Cs-138	Curies	9.67E-06	0.00E+00	8.68E-06	2.71E-05
Cr-51	Curies	4.38E-04	5.22E-04	1.48E-04	3.12E-04
Rb-88	Curies	0.00E+00	0.00E+00	0.00E+00	2.84E-04
Te-129	Curies	5.24E-05	0.00E+00	0.00E+00	0.00E+00
Ni-63	Curies	0.00E+00	0.00E+00	4.67E-04	8.90E-04
Sb-122	Curies	0.00E+00	0.00E+00	0.00E+00	5.76E-06
Sr-91	Curies	7.01E-06	1.76E-05	0.00E+00	0.00E+00
Nb-95	Curies	6.96E-05	1.96E-04	2.77E-04	2.30E-04
Fe-55	Curies	2.13E-03	1.87E-02	6.24E-03	7.49E-03
I-131	Curies	5.28E-06	0.00E+00	0.00E+00	0.00E+00
Zr-95	Curies	8.16E-05	1.48E-04	1.37E-04	5.49E-05
Te-129m	Curies	0.00E+00	1.04E-04	9.70E-05	2.69E-04
Sn-113	Curies	5.89E-06	2.01E-05	0.00E+00	9.67E-06
<b>Total For Period</b>	<b>Curies</b>	<b>1.43E-02</b>	<b>2.82E-02</b>	<b>4.13E-02</b>	<b>9.02E-02</b>

**Tritium**

H-3	Curies	6.06E+01	4.22E+01	1.09E+02	6.57E+01
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**Dissolved And Entrained Gases**

Xe-133	Curies	8.96E-03	7.86E-05	7.63E-03	2.07E-02
Kr-88	Curies	0.00E+00	0.00E+00	0.00E+00	9.09E-05
Kr-87	Curies	0.00E+00	0.00E+00	0.00E+00	8.13E-06
Xe-133m	Curies	7.44E-05	0.00E+00	2.72E-05	1.47E-04
Xe-135	Curies	3.43E-06	0.00E+00	1.39E-05	1.33E-03
Ar-41	Curies	0.00E+00	0.00E+00	4.05E-06	1.09E-02
Kr-85m	Curies	0.00E+00	0.00E+00	0.00E+00	6.05E-05
<b>Total For Period</b>	<b>Curies</b>	<b>9.04E-03</b>	<b>7.86E-05</b>	<b>7.68E-03</b>	<b>3.32E-02</b>

**If Not Detected, Nuclide is Not Reported**

\* Zeroes in this table indicate that no radioactivity was present at detectable levels.  
See Table 2-7 for typical minimum detectable concentrations.

<b>END OF ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT</b>
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**Table 2A - Regulatory Guide 1.21 (2011)**  
**Liquid Effluents - Summation Of All Releases**  
**Unit: PSL1**

Type of Effluent	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	% Est. Total Error
<b>A. Fission And Activation Products</b>						
1. Total Release (not including tritium, gases, alpha)	Curies	7.15E-03	1.41E-02	2.06E-02	4.51E-02	
2. Average diluted concentration during period	uCi/ml	7.02E-10	9.83E-10	2.53E-10	1.04E-09	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>B. Tritium</b>						
1. Total Release	Curies	3.03E+01	2.11E+01	5.44E+01	3.29E+01	
2. Average diluted Concentration during period	uCi/ml	2.97E-06	1.47E-06	6.67E-07	7.61E-07	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>C. Dissolved and Entrained Gases</b>						
1. Total Release	Curies	4.52E-03	3.93E-05	3.84E-03	1.66E-02	
2. Average diluted Concentration during period	uCi/ml	4.44E-10	2.75E-12	4.71E-11	3.85E-10	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>D: Gross Alpha Radioactivity</b>						
1. Total Release		0.00E+00	0.00E+00	0.00E+00	0.00E+00	
<b>E: Waste Vol Release (Pre-Dilution)</b>						
	Liters	7.14E+05	5.19E+05	2.94E+07	7.51E+07	
<b>F. Volume of Dilution Water Used</b>						
	Liters	1.02E+10	1.43E+10	8.16E+10	4.32E+10	

\* Applicable limits are expressed in terms of dose.

**Table 2B - Regulatory Guide 1.21 (2011)**  
**Annual Radioactive Effluent Release Report**  
**Liquid Effluents**  
**Reactor Unit: PSL1**

		Continuous Mode			
<u>Nuclides Released</u>	<u>Unit</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
<u>Fission &amp; Activation Products</u>					
No Nuclides Found		N/A	N/A	N/A	N/A
<hr style="border-top: 1px dashed black;"/>					
<u>Tritium</u>					
No Nuclides Found		N/A	N/A	N/A	N/A
<hr style="border-top: 1px dashed black;"/>					
<u>Dissolved And Entrained Gases</u>					
No Nuclides Found		N/A	N/A	N/A	N/A

**If Not Detected, Nuclide is Not Reported**



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**Table 2B - Regulatory Guide 1.21 (2011)**  
**Annual Radioactive Effluent Release Report**  
**Liquid Effluents**  
**Reactor Unit: PSL1**

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<b>Nuclides Released</b>	<b>Unit</b>	<b>Batch Mode</b>			
		<b>1st Quarter</b>	<b>2nd Quarter</b>	<b>3rd Quarter</b>	<b>4th Quarter</b>

**Fission & Activation Products**

Cs-138	Curies	4.83E-06	0.00E+00	4.34E-06	1.36E-05
Ba-140	Curies	0.00E+00	4.53E-06	0.00E+00	9.52E-06
Te-129m	Curies	0.00E+00	5.22E-05	4.85E-05	1.34E-04
I-135	Curies	6.86E-06	0.00E+00	0.00E+00	0.00E+00
Fe-59	Curies	4.75E-05	1.49E-04	4.50E-05	4.05E-05
Sb-125	Curies	2.50E-04	2.59E-04	2.86E-04	4.57E-04
Sr-91	Curies	3.51E-06	8.81E-06	0.00E+00	0.00E+00
Co-60	Curies	3.58E-04	2.24E-04	8.32E-04	1.24E-03
Nb-95	Curies	3.48E-05	9.82E-05	1.38E-04	1.15E-04
Zr-95	Curies	4.08E-05	7.40E-05	6.85E-05	2.74E-05
Co-57	Curies	0.00E+00	3.12E-06	4.07E-06	1.32E-06
Nb-97	Curies	4.22E-05	8.42E-05	3.23E-04	8.22E-04
Ag-110m	Curies	2.99E-04	1.74E-04	2.68E-04	4.75E-04
Cs-137	Curies	0.00E+00	2.46E-06	5.71E-06	7.37E-06
Cs-136	Curies	2.59E-06	2.55E-06	3.36E-06	0.00E+00
Zr-97	Curies	8.90E-05	0.00E+00	8.17E-05	1.62E-04
Te-129	Curies	2.62E-05	0.00E+00	0.00E+00	0.00E+00
Cr-51	Curies	2.19E-04	2.61E-04	7.42E-05	1.56E-04
La-140	Curies	0.00E+00	0.00E+00	4.96E-05	1.69E-05
Sb-122	Curies	0.00E+00	0.00E+00	0.00E+00	2.88E-06
C-14	Curies	2.11E-03	2.53E-03	1.40E-02	3.51E-02
Zn-65	Curies	2.73E-06	2.27E-06	0.00E+00	1.18E-05
Fe-55	Curies	1.06E-03	9.35E-03	3.12E-03	3.75E-03
I-130	Curies	0.00E+00	1.42E-06	0.00E+00	0.00E+00
Mn-54	Curies	5.20E-05	4.38E-05	1.09E-04	1.26E-04
Co-58	Curies	2.48E-03	7.40E-04	9.66E-04	1.85E-03
Sn-113	Curies	2.95E-06	1.00E-05	0.00E+00	4.83E-06
Rb-88	Curies	0.00E+00	0.00E+00	0.00E+00	1.42E-04
Sb-124	Curies	2.87E-06	3.59E-06	0.00E+00	0.00E+00
Ru-103	Curies	0.00E+00	1.89E-06	0.00E+00	0.00E+00
Br-82	Curies	2.53E-06	2.19E-06	0.00E+00	0.00E+00
Ni-63	Curies	0.00E+00	0.00E+00	2.33E-04	4.45E-04
I-131	Curies	2.64E-06	0.00E+00	0.00E+00	0.00E+00
<b>Total For Period</b>	<b>Curies</b>	<b>7.15E-03</b>	<b>1.41E-02</b>	<b>2.06E-02</b>	<b>4.51E-02</b>

**Tritium**

H-3	Curies	3.03E+01	2.11E+01	5.44E+01	3.29E+01
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**Dissolved And Entrained Gases**

Kr-88	Curies	0.00E+00	0.00E+00	0.00E+00	4.55E-05
Xe-135	Curies	1.71E-06	0.00E+00	6.97E-06	6.63E-04
Kr-87	Curies	0.00E+00	0.00E+00	0.00E+00	4.06E-06
Xe-133	Curies	4.48E-03	3.93E-05	3.82E-03	1.03E-02
Kr-85m	Curies	0.00E+00	0.00E+00	0.00E+00	3.03E-05
Ar-41	Curies	0.00E+00	0.00E+00	2.03E-06	5.46E-03
Xe-133m	Curies	3.72E-05	0.00E+00	1.36E-05	7.33E-05
<b>Total For Period</b>	<b>Curies</b>	<b>4.52E-03</b>	<b>3.93E-05</b>	<b>3.84E-03</b>	<b>1.66E-02</b>

**If Not Detected, Nuclide is Not Reported**

\* Zeroes in this table indicate that no radioactivity was present at detectable levels.  
See Table 2-7 for typical minimum detectable concentrations.

<b>END OF ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT</b>
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**Table 2A - Regulatory Guide 1.21 (2011)**  
**Liquid Effluents - Summation Of All Releases**  
**Unit: PSL2**

Type of Effluent	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	% Est. Total Error
<b>A. Fission And Activation Products</b>						
1. Total Release (not including tritium, gases, alpha)	Curies	7.15E-03	1.41E-02	2.06E-02	4.51E-02	
2. Average diluted concentration during period	uCi/ml	7.02E-10	9.83E-10	2.53E-10	1.04E-09	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>B. Tritium</b>						
1. Total Release	Curies	3.03E+01	2.11E+01	5.44E+01	3.29E+01	
2. Average diluted Concentration during period	uCi/ml	2.97E-06	1.47E-06	6.67E-07	7.61E-07	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>C. Dissolved and Entrained Gases</b>						
1. Total Release	Curies	4.52E-03	3.93E-05	3.84E-03	1.66E-02	
2. Average diluted Concentration during period	uCi/ml	4.44E-10	2.75E-12	4.71E-11	3.85E-10	
3. Percent of Applicable Limit	%	*	*	*	*	
<b>D: Gross Alpha Radioactivity</b>						
1. Total Release		0.00E+00	0.00E+00	0.00E+00	0.00E+00	
<b>E: Waste Vol Release (Pre-Dilution)</b>						
	Liters	7.14E+05	5.19E+05	2.94E+07	7.51E+07	
<b>F. Volume of Dilution Water Used</b>						
	Liters	1.02E+10	1.43E+10	8.16E+10	4.32E+10	

\* Applicable limits are expressed in terms of dose.

**Table 2B - Regulatory Guide 1.21 (2011)**  
**Annual Radioactive Effluent Release Report**  
**Liquid Effluents**  
**Reactor Unit: PSL2**

		Continuous Mode			
<u>Nuclides Released</u>	<u>Unit</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
<u>Fission &amp; Activation Products</u>					
No Nuclides Found		N/A	N/A	N/A	N/A
<hr style="border-top: 1px dashed #000;"/>					
<u>Tritium</u>					
No Nuclides Found		N/A	N/A	N/A	N/A
<hr style="border-top: 1px dashed #000;"/>					
<u>Dissolved And Entrained Gases</u>					
No Nuclides Found		N/A	N/A	N/A	N/A

**If Not Detected, Nuclide is Not Reported**

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**Table 2B - Regulatory Guide 1.21 (2011)**  
**Annual Radioactive Effluent Release Report**  
**Liquid Effluents**  
**Reactor Unit: PSL2**

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<b>Nuclides Released</b>	<b>Unit</b>	<b>Batch Mode</b>			
		<b>1st Quarter</b>	<b>2nd Quarter</b>	<b>3rd Quarter</b>	<b>4th Quarter</b>

**Fission & Activation Products**

Ba-140	Curies	0.00E+00	4.53E-06	0.00E+00	9.52E-06
Nb-95	Curies	3.48E-05	9.82E-05	1.38E-04	1.15E-04
Sr-91	Curies	3.51E-06	8.81E-06	0.00E+00	0.00E+00
Br-82	Curies	2.53E-06	2.19E-06	0.00E+00	0.00E+00
Ru-103	Curies	0.00E+00	1.89E-06	0.00E+00	0.00E+00
Cs-136	Curies	2.59E-06	2.55E-06	3.36E-06	0.00E+00
Sb-122	Curies	0.00E+00	0.00E+00	0.00E+00	2.88E-06
Cr-51	Curies	2.19E-04	2.61E-04	7.42E-05	1.56E-04
Sb-125	Curies	2.50E-04	2.59E-04	2.86E-04	4.57E-04
Te-129m	Curies	0.00E+00	5.22E-05	4.85E-05	1.34E-04
Fe-55	Curies	1.06E-03	9.35E-03	3.12E-03	3.75E-03
La-140	Curies	0.00E+00	0.00E+00	4.96E-05	1.69E-05
Fe-59	Curies	4.75E-05	1.49E-04	4.50E-05	4.05E-05
Co-60	Curies	3.58E-04	2.24E-04	8.32E-04	1.24E-03
Ni-63	Curies	0.00E+00	0.00E+00	2.33E-04	4.45E-04
Cs-137	Curies	0.00E+00	2.46E-06	5.71E-06	7.37E-06
Zn-65	Curies	2.73E-06	2.27E-06	0.00E+00	1.18E-05
Te-129	Curies	2.62E-05	0.00E+00	0.00E+00	0.00E+00
I-135	Curies	6.86E-06	0.00E+00	0.00E+00	0.00E+00
I-131	Curies	2.64E-06	0.00E+00	0.00E+00	0.00E+00
Sn-113	Curies	2.95E-06	1.00E-05	0.00E+00	4.83E-06
Mn-54	Curies	5.20E-05	4.38E-05	1.09E-04	1.26E-04
Rb-88	Curies	0.00E+00	0.00E+00	0.00E+00	1.42E-04
Nb-97	Curies	4.22E-05	8.42E-05	3.23E-04	8.22E-04
Zr-95	Curies	4.08E-05	7.40E-05	6.85E-05	2.74E-05
I-130	Curies	0.00E+00	1.42E-06	0.00E+00	0.00E+00
Co-58	Curies	2.48E-03	7.40E-04	9.66E-04	1.85E-03
Ag-110m	Curies	2.99E-04	1.74E-04	2.68E-04	4.75E-04
Cs-138	Curies	4.83E-06	0.00E+00	4.34E-06	1.36E-05
Zr-97	Curies	8.90E-05	0.00E+00	8.17E-05	1.62E-04
C-14	Curies	2.11E-03	2.53E-03	1.40E-02	3.51E-02
Co-57	Curies	0.00E+00	3.12E-06	4.07E-06	1.32E-06
Sb-124	Curies	2.87E-06	3.59E-06	0.00E+00	0.00E+00
<b>Total For Period</b>	<b>Curies</b>	<b>7.15E-03</b>	<b>1.41E-02</b>	<b>2.06E-02</b>	<b>4.51E-02</b>

**Tritium**

H-3	Curies	3.03E+01	2.11E+01	5.44E+01	3.29E+01
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**Dissolved And Entrained Gases**

Xe-133	Curies	4.48E-03	3.93E-05	3.82E-03	1.03E-02
Kr-85m	Curies	0.00E+00	0.00E+00	0.00E+00	3.03E-05
Xe-133m	Curies	3.72E-05	0.00E+00	1.36E-05	7.33E-05
Xe-135	Curies	1.71E-06	0.00E+00	6.97E-06	6.63E-04
Ar-41	Curies	0.00E+00	0.00E+00	2.03E-06	5.46E-03
Kr-87	Curies	0.00E+00	0.00E+00	0.00E+00	4.06E-06
Kr-88	Curies	0.00E+00	0.00E+00	0.00E+00	4.55E-05
<b>Total For Period</b>	<b>Curies</b>	<b>4.52E-03</b>	<b>3.93E-05</b>	<b>3.84E-03</b>	<b>1.66E-02</b>

**If Not Detected, Nuclide is Not Reported**

\* Zeroes in this table indicate that no radioactivity was present at detectable levels.  
See Table 2-7 for typical minimum detectable concentrations.

<b>END OF ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT</b>
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**Table A-2B, Liquid Effluents - Continuous Mode**

**Unit: Site**

**Starting: 1-Jan-2011 Ending: 31-Dec-2011**

<b>Nuclides Released</b>	<b>Units</b>	<b>1ST Quarter</b>	<b>2ND Quarter</b>	<b>3RD Quarter</b>	<b>4TH Quarter</b>	<b>Total</b>
<b>A. Particulates and Iodines</b>						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>B. Dissolved and Entrained Gase</b>						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>C. Tritium</b>						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>D. Gross Alpha Activity</b>						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

If Not Detected, Nuclide is Not Reported. Zeroes in this table indicates that no radioactivity was present at detectable levels.

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**Table 6A and 6B - Regulatory Guide 1.21  
Annual Liquid Effluents - Abnormal Release Summary**

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**No Data Found for Selected Search Criteria**

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# NRC Regulatory Guide 1.21 Reports

Page 1

Report Date : 2/17/2012

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream  
During Period From 01/01/2011 to 12/31/2011 Percent Cutoff: 1

Waste Stream : Resins, Filters, and Evap Bottoms

Waste Class	Volume		Curies Shipped	% Error (Ci)
	Ft^3	M^3		
A	3.39E+02	9.60E+00	2.12E+01	+/- 25%
B	2.67E+02	7.56E+00	8.65E+01	+/- 25%
C	0.00E+00	0.00E+00	0.00E+00	+/- 25%
All	6.06E+02	1.72E+01	1.08E+02	+/- 25%

Waste Stream : Dry Active Waste  
DAW 20' Sealand      DAW 40' Sealand      DAW 8-120 Liner

Waste Class	Volume		Curies Shipped	%Error (Ci)
	Ft^3	M^3		
A	4.07E+04	1.15E+03	1.61E+01	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	4.07E+04	1.15E+03	1.61E+01	+/-25%

Waste Stream : Irradiated Components

Waste Class	Volume		Curies Shipped	% Error (Ci)
	Ft^3	M^3		
A	0.00E+00	0.00E+00	0.00E+00	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	0.00E+00	0.00E+00	0.00E+00	+/-25%

## NRC Regulatory Guide 1.21 Reports

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Report Date : 2/17/2012

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream  
During Period From 01/01/2011 to 12/31/2011 Percent Cutoff: 1

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Waste Stream : Other Waste  
Combined Packages Oil 07-01

Waste Class	Volume		Curies Shipped	% Error (Ci)
	Ft^3	M^3		
A	5.49E+03	1.55E+02	2.27E+00	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	5.49E+03	1.55E+02	2.27E+00	+/-25%

Waste Stream : Sum of All 4 Categories  
Combined Packages DAW 20' Sealand DAW 40' Sealand Oil 07-01  
DAW 8-120 Liner

Waste Class	Volume		Curies Shipped	% Error (Ci)
	Ft^3	M^3		
A	4.66E+04	1.32E+03	3.96E+01	+/-25%
B	2.67E+02	7.56E+00	8.65E+01	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	4.68E+04	1.33E+03	1.26E+02	+/-25%

-Combined Waste Type Shipment, Major Volume Waste Type Shown

## NRC Regulatory Guide 1.21 Reports

Page 1

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream  
During Period From 01/01/2011 to 12/31/2011

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Number of Shipments	Mode of Transportation	Destination
25	Hittman Transport (TN)	EnergySolutions Bear Creek
4	Hittman Transport (SC)	EnergySolutions LLC.
1	Hittman Transport (TN)	EnergySolutions LLC.
2	Hittman Transport (SC)	Studsvik Processing Facility LLC - Erwin

# NRC Regulatory Guide 1.21 Reports

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Report Date : 2/17/2012

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream  
During Period From 01/01/2011 to 12/31/2011 Percent Cutoff: 1

Resins, Filters, and Evap Bottom		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
H-3	4.109%	8.72E-01
C-14	4.000%	8.49E-01
Cr-51	1.404%	2.98E-01
Mn-54	1.690%	3.59E-01
Fe-55	17.859%	3.79E+00
Co-58	39.157%	8.31E+00
Co-60	9.829%	2.09E+00
Ni-63	16.492%	3.50E+00
Sb-125	2.563%	5.44E-01
Resins, Filters, and Evap Bottom		
Waste Class B		
Nuclide Name	Percent Abundance	Curies
H-3	2.646%	2.29E+00
Mn-54	4.836%	4.18E+00
Fe-55	14.337%	1.24E+01
Co-58	6.813%	5.89E+00
Co-60	11.586%	1.00E+01
Ni-63	43.009%	3.72E+01
Cs-137	13.299%	1.15E+01
Resins, Filters, and Evap Bottom		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
H-3	2.934%	3.16E+00
C-14	1.423%	1.53E+00
Mn-54	4.216%	4.54E+00
Fe-55	15.031%	1.62E+01
Co-58	13.186%	1.42E+01
Co-60	11.240%	1.21E+01
Ni-63	37.785%	4.07E+01
Cs-137	10.748%	1.16E+01
Dry Active Waste		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
H-3	1.614%	2.60E-01
Cr-51	2.338%	3.77E-01
Mn-54	1.617%	2.61E-01
Fe-55	35.046%	5.66E+00
Co-58	19.183%	3.10E+00
Co-60	10.756%	1.74E+00
Ni-63	12.754%	2.06E+00
Zr-95	2.101%	3.39E-01
Nb-95	3.568%	5.76E-01
Sn-113	1.176%	1.90E-01
Sb-125	1.434%	2.31E-01

# NRC Regulatory Guide 1.21 Reports

Page 2

Report Date : 2/17/2012

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream  
During Period From 01/01/2011 to 12/31/2011 Percent Cutoff: 1

Cs-137	2.845%	4.59E-01
Ce-144	3.789%	6.11E-01
Dry Active Waste		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
H-3	1.614%	2.60E-01
Cr-51	2.338%	3.77E-01
Mn-54	1.617%	2.61E-01
Fe-55	35.046%	5.66E+00
Co-58	19.183%	3.10E+00
Co-60	10.756%	1.74E+00
Ni-63	12.754%	2.06E+00
Zr-95	2.101%	3.39E-01
Nb-95	3.568%	5.76E-01
Sn-113	1.176%	1.90E-01
Sb-125	1.434%	2.31E-01
Cs-137	2.845%	4.59E-01
Ce-144	3.789%	6.11E-01
Other Waste		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
H-3	16.734%	3.80E-01
C-14	9.782%	2.22E-01
Fe-55	27.002%	6.13E-01
Co-58	9.417%	2.14E-01
Co-60	6.348%	1.44E-01
Ni-63	23.105%	5.25E-01
Ag-110m	1.055%	2.40E-02
Sb-125	2.639%	5.99E-02
Cs-137	1.480%	3.36E-02
Other Waste		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
H-3	16.734%	3.80E-01
C-14	9.782%	2.22E-01
Fe-55	27.002%	6.13E-01
Co-58	9.417%	2.14E-01
Co-60	6.348%	1.44E-01
Ni-63	23.105%	5.25E-01
Ag-110m	1.055%	2.40E-02
Sb-125	2.639%	5.99E-02
Cs-137	1.480%	3.36E-02
Sum of All 4 Categories		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
H-3	3.816%	1.51E+00
C-14	2.703%	1.07E+00

# NRC Regulatory Guide 1.21 Reports

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Report Date : 2/17/2012

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream  
During Period From 01/01/2011 to 12/31/2011 Percent Cutoff: 1

Cr-51	1.704%	6.75E-01
Mn-54	1.598%	6.33E-01
Fe-55	25.381%	1.01E+01
Co-58	29.320%	1.16E+01
Co-60	10.007%	3.97E+00
Ni-63	15.349%	6.08E+00
Nb-95	1.774%	7.03E-01
Sb-125	2.108%	8.35E-01
Cs-137	1.431%	5.67E-01
Ce-144	1.699%	6.73E-01
Sum of All 4 Categories		
Waste Class B		
Nuclide Name	Percent Abundance	Curies
H-3	2.646%	2.29E+00
Mn-54	4.836%	4.18E+00
Fe-55	14.337%	1.24E+01
Co-58	6.813%	5.89E+00
Co-60	11.586%	1.00E+01
Ni-63	43.009%	3.72E+01
Cs-137	13.299%	1.15E+01
Sum of All 4 Categories		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
H-3	3.013%	3.80E+00
C-14	1.391%	1.75E+00
Mn-54	3.819%	4.82E+00
Fe-55	17.807%	2.25E+01
Co-58	13.886%	1.75E+01
Co-60	11.090%	1.40E+01
Ni-63	34.318%	4.33E+01
Cs-137	9.570%	1.21E+01



## NRC Regulatory Guide 1.21 Reports

Page 1

Report Date : 2/17/2012

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream  
During Period From 01/01/2011 to 12/31/2011

Manifest Number	Date Shipped	Waste Volume Used	Burial volume Used
FPL/PSL 11-147	12/8/2011	Yes	
FPL/PSL 11-146	11/9/2011	Yes	
FPL/PSL 11-138	10/20/2011	Yes	
FPL/PSL 11-124	7/27/2011	Yes	
FPL/PSL 11-123	7/22/2011	Yes	
FPL/PSL 11-122	7/19/2011	Yes	
FPL/PSL 11-119	6/30/2011	Yes	
FPL/PSL 11-116	6/22/2011	Yes	
FPL/PSL 11-115	6/17/2011	Yes	
FPL/PSL 11-114	6/16/2011	Yes	
FPL/PSL 11-113	6/9/2011	Yes	
FPL/PSL 11-111	6/6/2011	Yes	
FPL/PSL 11-110	6/2/2011	Yes	
FPL/PSL 11-109	6/1/2011	Yes	
FPL/PSL 11-106	5/26/2011	Yes	
FPL/PSL 11-105	5/26/2011	Yes	
FPL/PSL 11-102	5/12/2011	Yes	
FPL/PSL 11-101	5/11/2011	Yes	
FPL/PSL 11-100	5/10/2011	Yes	
FPL/PSL 11-85	4/7/2011	Yes	
FPL/PSL 11-68	3/17/2011	Yes	
FPL/PSL 11-61	3/3/2011	Yes	
FPL/PSL 11-54	2/23/2011	Yes	
FPL/PSL 11-55	2/22/2011	Yes	
FPL/PSL 11-48	2/15/2011	Yes	
FPL/PSL 11-40	2/14/2011	Yes	
FPL/PSL 11-26	2/7/2011	Yes	
FPL/PSL 11-25	1/27/2011	Yes	
FPL/PSL 11-22	1/24/2011	Yes	
PSL/FPL-11-13	1/19/2011	Yes	
FPL/PSL 11-6	1/7/2011	Yes	
FPL/PSL-11-163	1/5/2011	Yes	

Period: Ann, 2011

Site/Unit/Discharge Point: Site

**Site Boundary NNG Doserate Summary - Note: All Doses in mRem/yr**

Receptor	Agegroup	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-Lli	Skin
WNW Site Boundary - I	Infant	1.573E-05	1.573E-05	1.573E-05	1.573E-05	1.573E-05	1.573E-05	1.573E-05	0.000E+00
NW Site Boundary - In	Infant	6.510E-03	9.302E-03	9.170E-03	1.164E-02	2.042E-03	9.178E-03	9.159E-03	0.000E+00
Maximum Doserate by Organ:		6.510E-03	9.302E-03	9.170E-03	1.164E-02	2.042E-03	9.178E-03	9.159E-03	0.000E+00

Maximum Organ Doserate (mRem/yr): 1.164E-02

Maximum Total Body Doserate (mRem/yr): 9.170E-03

**Site Boundary NG Doserate Summary**

Gas Receptor Location	Gamma (mRad/yr)	Beta (mRad/yr)	Total Body (mRem/yr)	Skin (mRem/yr)
WNW Site Boundary	1.103E-03	1.103E-03	1.034E-03	1.784E-03
NW Site Boundary	1.280E-03	1.280E-03	1.200E-03	2.071E-03

Period: Ann, 2011

Site/Unit/Discharge Point: Site

**Maximum Individual NNG Dose Summary - Note: All Doses in mRem**

Receptor	Agegroup	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-Lli	Skin
SE Nearest Res - Adult	Adult	1.170E-04	1.170E-04	1.168E-04	1.365E-04	1.169E-04	1.234E-04	1.171E-04	0.000E+00
SE Nearest Res - Child	Child	1.170E-04	1.170E-04	1.168E-04	1.474E-04	1.168E-04	1.246E-04	1.168E-04	0.000E+00
SE Nearest Res - Infant	Infant	1.169E-04	1.170E-04	1.167E-04	1.450E-04	1.167E-04	1.232E-04	1.167E-04	0.000E+00
SE Nearest Res - Teenager	Teenager	1.169E-04	1.170E-04	1.168E-04	1.415E-04	1.169E-04	1.264E-04	1.170E-04	0.000E+00
SE Visitor - Adult	Adult	5.432E-05	5.431E-05	5.425E-05	6.285E-05	5.429E-05	5.713E-05	5.435E-05	0.000E+00
SSW Near Garden - Adult	Adult	9.060E-06	9.059E-06	9.049E-06	1.040E-05	9.054E-06	9.501E-06	9.065E-06	0.000E+00
SSW Near Garden - Child	Child	9.060E-06	9.059E-06	9.045E-06	1.115E-05	9.046E-06	9.583E-06	9.048E-06	0.000E+00
SSW Near Garden - Teenager	Teenager	9.054E-06	9.059E-06	9.046E-06	1.074E-05	9.054E-06	9.708E-06	9.062E-06	0.000E+00
WSW Near Milk - Adult	Adult	2.515E-05	2.672E-05	2.468E-05	1.211E-04	2.331E-05	2.233E-05	2.117E-05	0.000E+00
WSW Near Milk - Child	Child	3.851E-05	3.801E-05	2.399E-05	3.194E-04	2.346E-05	2.375E-05	2.114E-05	0.000E+00
WSW Near Milk - Infant	Infant	5.770E-05	6.227E-05	2.443E-05	7.350E-04	2.345E-05	2.640E-05	2.114E-05	0.000E+00
WSW Near Milk - Teenager	Teenager	7.474E-06	1.013E-05	3.775E-06	1.524E-04	3.175E-06	2.450E-06	9.531E-07	0.000E+00
Maximum Dose by Organ:		1.170E-04	1.170E-04	1.168E-04	7.350E-04	1.169E-04	1.264E-04	1.171E-04	0.000E+00

Maximum Organ Dose (mRem): 7.350E-04

Maximum Total Body Dose (mRem): 1.168E-04

**Maximum Individual NG Dose Summary**

Gas Receptor Location	Gamma (mRad)	Beta (mRad)	Total Body (mRem)	Skin (mRem)
WSW Near Milk 3.43 mi 248 deg	3.352E-04	2.620E-04	3.143E-04	5.422E-04
SE Visitor	1.078E-03	8.426E-04	1.011E-03	1.743E-03
SE Nearest Res 1.52 mi 142 deg	2.489E-03	1.946E-03	2.334E-03	4.027E-03
SSW Near Gard 4.4 mi 207 deg	1.888E-04	1.476E-04	1.771E-04	3.055E-04

Period: Ann, 2011

Site/Unit/Discharge Point: PSL1

**Site Boundary NNG Doserate Summary - Note: All Doses in mRem/yr**

<u>Receptor</u>	<u>Agegroup</u>	<u>Bone</u>	<u>Liver</u>	<u>Total Body</u>	<u>Thyroid</u>	<u>Kidney</u>	<u>Lung</u>	<u>GI-Lli</u>	<u>Skin</u>
WNW Site Boundary - I	Infant	2.955E-05	2.955E-05	2.955E-05	2.955E-05	2.955E-05	2.955E-05	2.955E-05	0.000E+00
NW Site Boundary - In	Infant	2.723E-04	3.970E-03	3.829E-03	7.578E-03	1.749E-03	3.838E-03	3.815E-03	0.000E+00
Maximum Doserate by Organ:		2.723E-04	3.970E-03	3.829E-03	7.578E-03	1.749E-03	3.838E-03	3.815E-03	0.000E+00

Maximum Organ Doserate (mRem/yr): 7.578E-03

Maximum Total Body Doserate (mRem/yr): 3.829E-03

**Site Boundary NG Doserate Summary**

<u>Gas Receptor Location</u>	<u>Gamma (mRad/yr)</u>	<u>Beta (mRad/yr)</u>	<u>Total Body (mRem/yr)</u>	<u>Skin (mRem/yr)</u>
NW Site Boundary	2.212E-03	2.212E-03	2.086E-03	3.545E-03
WNW Site Boundary	1.906E-03	1.906E-03	1.797E-03	3.054E-03

Period: Ann, 2011

Site/Unit/Discharge Point: PSL1

**Maximum Individual NNG Dose Summary - Note: All Doses in mRem**

Receptor	Agegroup	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-Lli	Skin
SE Nearest Res - Adult	Adult	9.923E-05	9.923E-05	9.912E-05	1.163E-04	9.921E-05	1.049E-04	9.936E-05	0.000E+00
SE Nearest Res - Child	Child	9.922E-05	9.922E-05	9.909E-05	1.264E-04	9.911E-05	1.060E-04	9.915E-05	0.000E+00
SE Nearest Res - Infant	Infant	9.918E-05	9.921E-05	9.907E-05	1.243E-04	9.906E-05	1.047E-04	9.907E-05	0.000E+00
SE Nearest Res - Teenager	Teenager	9.917E-05	9.922E-05	9.910E-05	1.208E-04	9.921E-05	1.076E-04	9.932E-05	0.000E+00
SE Visitor - Adult	Adult	4.608E-05	4.608E-05	4.603E-05	5.351E-05	4.607E-05	4.857E-05	4.613E-05	0.000E+00
SSW Near Garden - Adult	Adult	7.686E-06	7.685E-06	7.678E-06	8.853E-06	7.684E-06	8.076E-06	7.694E-06	0.000E+00
SSW Near Garden - Child	Child	7.685E-06	7.685E-06	7.676E-06	9.546E-06	7.677E-06	8.147E-06	7.680E-06	0.000E+00
SSW Near Garden - Teenager	Teenager	7.681E-06	7.685E-06	7.676E-06	9.165E-06	7.684E-06	8.257E-06	7.691E-06	0.000E+00
WSW Near Milk - Adult	Adult	1.985E-05	2.063E-05	1.960E-05	8.716E-05	1.902E-05	1.875E-05	1.792E-05	0.000E+00
WSW Near Milk - Child	Child	2.646E-05	2.624E-05	1.937E-05	2.257E-04	1.910E-05	1.949E-05	1.790E-05	0.000E+00
WSW Near Milk - Infant	Infant	3.597E-05	3.828E-05	1.971E-05	5.144E-04	1.909E-05	2.071E-05	1.790E-05	0.000E+00
WSW Near Milk - Teenager	Teenager	3.705E-06	5.053E-06	1.942E-06	1.058E-04	1.698E-06	1.651E-06	7.743E-07	0.000E+00
Maximum Dose by Organ:		9.923E-05	9.923E-05	9.912E-05	5.144E-04	9.921E-05	1.076E-04	9.936E-05	0.000E+00

Maximum Organ Dose (mRem): 5.144E-04

Maximum Total Body Dose (mRem): 9.912E-05

**Maximum Individual NG Dose Summary**

Gas Receptor Location	Gamma (mRad)	Beta (mRad)	Total Body (mRem)	Skin (mRem)
SSW Near Gard 4.4 mi 207 deg	1.500E-04	1.055E-04	1.415E-04	2.405E-04
SE Nearest Res 1.52 mi 142 deg	1.978E-03	1.391E-03	1.865E-03	3.170E-03
WSW Near Milk 3.43 mi 248 deg	2.663E-04	1.873E-04	2.511E-04	4.268E-04
SE Visitor	8.563E-04	6.023E-04	8.074E-04	1.372E-03

Period: Ann, 2011

Site/Unit/Discharge Point: PSL2

**Site Boundary NNG Doserate Summary - Note: All Doses in mRem/yr**

<u>Receptor</u>	<u>Agegroup</u>	<u>Bone</u>	<u>Liver</u>	<u>Total Body</u>	<u>Thyroid</u>	<u>Kidney</u>	<u>Lung</u>	<u>GI-Lli</u>	<u>Skin</u>
WNW Site Boundary - I	Infant	3.965E-06	3.965E-06	3.965E-06	3.965E-06	3.965E-06	3.965E-06	3.965E-06	0.000E+00
NW Site Boundary - In	Infant	1.182E-02	1.384E-02	1.371E-02	1.511E-02	2.291E-03	1.372E-02	1.371E-02	0.000E+00
Maximum Doserate by Organ:		1.182E-02	1.384E-02	1.371E-02	1.511E-02	2.291E-03	1.372E-02	1.371E-02	0.000E+00

Maximum Organ Doserate (mRem/yr): 1.511E-02

Maximum Total Body Doserate (mRem/yr): 1.371E-02

**Site Boundary NG Doserate Summary**

<u>Gas Receptor Location</u>	<u>Gamma (mRad/yr)</u>	<u>Beta (mRad/yr)</u>	<u>Total Body (mRem/yr)</u>	<u>Skin (mRem/yr)</u>
NW Site Boundary	4.869E-04	4.869E-04	4.468E-04	8.157E-04
WNW Site Boundary	4.194E-04	4.194E-04	3.849E-04	7.026E-04

Period: Ann, 2011

Site/Unit/Discharge Point: PSL2

**Maximum Individual NNG Dose Summary - Note: All Doses in mRem**

Receptor	Agegroup	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-Lli	Skin
SE Nearest Res - Adult	Adult	1.775E-05	1.774E-05	1.771E-05	2.027E-05	1.770E-05	1.848E-05	1.770E-05	0.000E+00
SE Nearest Res - Child	Child	1.776E-05	1.775E-05	1.767E-05	2.104E-05	1.767E-05	1.865E-05	1.767E-05	0.000E+00
SE Nearest Res - Infant	Infant	1.774E-05	1.774E-05	1.766E-05	2.075E-05	1.766E-05	1.849E-05	1.766E-05	0.000E+00
SE Nearest Res - Teenager	Teenager	1.773E-05	1.775E-05	1.769E-05	2.071E-05	1.770E-05	1.887E-05	1.769E-05	0.000E+00
SE Visitor - Adult	Adult	8.239E-06	8.238E-06	8.221E-06	9.340E-06	8.217E-06	8.560E-06	8.217E-06	0.000E+00
SSW Near Garden - Adult	Adult	1.374E-06	1.374E-06	1.371E-06	1.547E-06	1.371E-06	1.424E-06	1.371E-06	0.000E+00
SSW Near Garden - Child	Child	1.375E-06	1.374E-06	1.369E-06	1.600E-06	1.369E-06	1.436E-06	1.368E-06	0.000E+00
SSW Near Garden - Teenager	Teenager	1.373E-06	1.374E-06	1.370E-06	1.577E-06	1.371E-06	1.451E-06	1.370E-06	0.000E+00
WSW Near Milk - Adult	Adult	5.306E-06	6.089E-06	5.075E-06	3.393E-05	4.285E-06	3.580E-06	3.249E-06	0.000E+00
WSW Near Milk - Child	Child	1.205E-05	1.178E-05	4.614E-06	9.366E-05	4.357E-06	4.260E-06	3.240E-06	0.000E+00
WSW Near Milk - Infant	Infant	2.173E-05	2.398E-05	4.715E-06	2.205E-04	4.355E-06	5.695E-06	3.242E-06	0.000E+00
WSW Near Milk - Teenager	Teenager	3.768E-06	5.077E-06	1.833E-06	4.660E-05	1.477E-06	7.990E-07	1.788E-07	0.000E+00
Maximum Dose by Organ:		2.173E-05	2.398E-05	1.771E-05	2.205E-04	1.770E-05	1.887E-05	1.770E-05	0.000E+00

Maximum Organ Dose (mRem): 2.205E-04

Maximum Total Body Dose (mRem): 1.771E-05

**Maximum Individual NG Dose Summary**

Gas Receptor Location	Gamma (mRad)	Beta (mRad)	Total Body (mRem)	Skin (mRem)
WSW Near Milk 3.43 mi 248 deg	6.889E-05	7.474E-05	6.322E-05	1.154E-04
SE Visitor	2.215E-04	2.403E-04	2.033E-04	3.711E-04
SE Nearest Res 1.52 mi 142 deg	5.116E-04	5.550E-04	4.694E-04	8.570E-04
SSW Near Gard 4.4 mi 207 deg	3.881E-05	4.211E-05	3.561E-05	6.501E-05

Period: Ann, 2011

Site/Unit/Discharge Point: Site

**Liquid Dose Summary - Note: All Doses in mRem**

<u>Receptor</u>	<u>Agegroup</u>	<u>Bone</u>	<u>Liver</u>	<u>Total Body</u>	<u>Thyroid</u>	<u>Kidney</u>	<u>Lung</u>	<u>GI-Lli</u>	<u>Skin</u>
Liquid Recptor - Child	Child	3.003E-02	1.068E-01	3.500E-02	8.364E-03	2.524E-03	1.217E-01	6.432E-02	0.000E+00
Liquid Receptor - Teenager	Teenager	5.679E-02	2.300E-01	6.638E-02	6.786E-03	5.823E-03	2.632E-01	1.369E-01	0.000E+00
Maximum Dose by Organ:		5.679E-02	2.300E-01	6.638E-02	8.364E-03	5.823E-03	2.632E-01	1.369E-01	0.000E+00

Maximum Organ Dose (mRem): 2.632E-01

Maximum Total Body Dose (mRem): 6.638E-02



Period: Ann, 2011

Site/Unit/Discharge Point: PSL1

**Liquid Dose Summary - Note: All Doses in mRem**

<u>Receptor</u>	<u>Agegroup</u>	<u>Bone</u>	<u>Liver</u>	<u>Total Body</u>	<u>Thyroid</u>	<u>Kidney</u>	<u>Lung</u>	<u>GI-Lli</u>	<u>Skin</u>
Liquid Recptor - Child	Child	1.502E-02	5.340E-02	1.750E-02	4.182E-03	1.262E-03	6.085E-02	3.216E-02	0.000E+00
Liquid Receptor - Teenager	Teenager	2.839E-02	1.150E-01	3.319E-02	3.393E-03	2.912E-03	1.316E-01	6.843E-02	0.000E+00
Maximum Dose by Organ:		2.839E-02	1.150E-01	3.319E-02	4.182E-03	2.912E-03	1.316E-01	6.843E-02	0.000E+00

Maximum Organ Dose (mRem): 1.316E-01

Maximum Total Body Dose (mRem): 3.319E-02

Period: Ann, 2011

Site/Unit/Discharge Point: PSL2

**Liquid Dose Summary - Note: All Doses in mRem**

<u>Receptor</u>	<u>Agegroup</u>	<u>Bone</u>	<u>Liver</u>	<u>Total Body</u>	<u>Thyroid</u>	<u>Kidney</u>	<u>Lung</u>	<u>GI-LI</u>	<u>Skin</u>
Liquid Recptor - Child	Child	1.502E-02	5.340E-02	1.750E-02	4.182E-03	1.262E-03	6.085E-02	3.216E-02	0.000E+00
Liquid Receptor - Teenager	Teenager	2.839E-02	1.150E-01	3.319E-02	3.393E-03	2.912E-03	1.316E-01	6.843E-02	0.000E+00

Maximum Dose by Organ:	2.839E-02	1.150E-01	3.319E-02	4.182E-03	2.912E-03	1.316E-01	6.843E-02	0.000E+00
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Maximum Organ Dose (mRem): 1.316E-01

Maximum Total Body Dose (mRem): 3.319E-02