



February 29, 2016

L-2016-037
10 CFR 50.36
10 CFR 50.36a

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555


Re: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
2015 Annual Radioactive Effluent Release Report

Pursuant to 10 CFR 50.36a(a)(2) and Technical Specification (TS) 6.9.1.7, enclosed is the 2015 Annual Radioactive Effluent Release Report for St. Lucie Units 1 and 2. The report provides information for the 12-month period beginning January 1, 2015 and ending December 31, 2015.

Enclosure 1 includes the Combined Annual Radioactive Effluent Release Report.
Enclosure 2 is a copy of C-200, *Offsite Dose Calculation Manual (ODCM), Revision 45*.
Enclosure 3 is a copy of the marked up pages from Revisions 43 and 44 of the ODCM.
Enclosure 4 is a copy of 0520025, *Process Control Program (PCP), Revision 16*.
Enclosure 5 is a copy of the marked up pages from Revisions 14 and 15 of the PCP.

Please contact us with any questions regarding this submittal.

Sincerely,

 SCISCENTE FOR ESK

Eric S. Katzman
Licensing Manager
St. Lucie Plant

ESK/tlt

Enclosures

IE48
NRR

ENCLOSURE 1

COMBINED ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
(64 PAGES)

**FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNITS 1 AND 2
ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
JANUARY 1, 2015 THROUGH DECEMBER 31, 2015**

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1.0 PROGRAM DESCRIPTION

Regulatory Limits

The Offsite Dose Calculation Manual (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.

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 $2.0E-4$ $\mu\text{Ci/ml}$ 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 mrems 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 2.0E-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 4.0.4, of the ODCM.

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 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, Ni-63 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, 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 reactor 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.

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. The particulate filters were analyzed weekly 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 2015, is retained onsite. This data is available for review by the NRC upon request. During 2015, the goal of >90% joint data recovery was met. Actual meteorological data collected during the year was used for the offsite dose calculations in this report.

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 the PWR Section, Page 4-28 of the report, and employed the proxy generation rate values for a Combustion Engineering reactor. The actual 2015 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 2015 for Unit 1 was 10.37 Ci, and the total amount of C-14 released in 2015 for Unit 2 was 9.47 Ci.

The highest calculated dose exposure pathway from C-14 is "Bone Dose" to a "Child" from consumption of garden produce. A "Child" consuming vegetables and produce from the garden located at 2.0 miles in the West direction from the plant would have received a total combined "Bone Dose", from C-14, of $1.51\text{E-}1$ mrem/yr.

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 Walton Rocks Beach Recreation Area located 1 mile southeast of the site. Dose to the visitor on site for calendar year 2015 is found to be $1.13\text{E-}01$ mrem/yr, Total Body dose. See Table 3.4, Dose Assessments, for more detail.

This is a fraction of the 1 mrem annual whole body dose received by 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.)

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

2.0 SUPPLEMENTAL INFORMATION

2.1 Abnormal Releases or Abnormal Discharges

There were two abnormal (unplanned) releases or discharges from the site during the report period.

- Event #1 - One abnormal (unplanned) gas decay tank discharge from the site occurred on April 17, 2015. Operations entered 1-AOP-06.04, Uncontrolled Release of Radioactive Gas, due to loss of 25 psig in a 12 hour period from the 1B Gas Decay Tank (GDT). Waste Gas System Leak Search identified a leak on V06824 on the 1B GDT Outlet Valve. Chemistry sampled the 1B GDT and commenced a release of the remaining contents of the 1B GDT in accordance with 1-NOP-06.20 and Permit G-15-155-B.

The 1B GDT Unplanned Release was accounted for using a separate Abnormal Gas Decay Release Permit, G-15-194B. AR #2041288 was generated to document the unplanned GDT release to the auxiliary building which was monitored by an operable plant vent radiation monitor on the plant vent stack. Valve V06824 was repaired, passed post maintenance testing, and subsequently returned to service. No additional leaks have been identified since its return to service.

Release Estimates Are As Follows:

Nuclide	uCi/cc concentration	uCi released
Xe-131m	1.98E-06	28.4
Xe-133	7.86E-05	1127

Maximum Infant Dose for NW Site Boundary:

Total Body (mRem)	Skin (mRem)	Gamma Air (mRad)	Beta Air (mRad)
1.70E-08	4.07E-08	2.05E-08	6.17E-08

- Event #2 - From June 11, 2015 at 14:15 to June 13, 2015 at 09:26, HVS-7, HVE-15, AND HVE-17 Fuel Handling Building (FHB) Ventilation Fans were in-service without an administratively operable process radiation monitor.

On June 13, 2015 at 09:26, ODCM Section 3.3.3.10 Table 3.3-13, Fuel Storage Area Ventilation System Action 47 was identified as not being met with FHB ventilation fans, HVE-15, HVS-7, and HVE-17, in operation. FHB Vent Radiation Monitor (RM-26-12) had been previously declared inoperable as per 2-NOP-25.08, FHB Ventilation System, when HVS-6 and HVE-16A and B were removed from service for scheduled maintenance. Only HVE-15, HVS-7, and HVE-17 and not HVE-6 fans had been started and placed in-service on 6/11/15. RM-26-12 was in

service and functioning during this period, but was declared inoperable. AR #2054024 was generated and the FHB Fans were immediately secured in accordance with procedural guidance.

RM-26-12 had been returned to service by Operations on June 11, 2015 at 11:58 following a satisfactory monthly functional. On June 11, 2015 at 16:05, RM-26-12 was sampled by Chemistry as per weekly ODCM continuous gas permit requirements and showed no gas activity. Technical Specifications were not impacted with no recently irradiated fuel in the spent fuel pool. Chemistry was notified of the issue and fleet procedure LI-AA-102-1001, Regulatory Reporting, was referenced for reportability requirements. Licensing determined there was no reportability requirement listed for this event. Chemistry commenced 8 hour compensatory grab samples as required whenever HVE-15 and/or HVE-17 exhaust fans were placed in-service. ODCM Action 51 for continuously collecting particulate and iodine was met during this period.

On June 24, 2015, AR #2056460 was generated "No Apparent Reason for U2 FHB Effluent Monitor Declared OOS". A corrective action was generated for Operations to delete the incorrect notes and clarify procedural guidance in 1-NOP-25.08 and 2-NOP-25.08. Procedure changes AR #2059204 and AR #2059205 were implemented and incorporated improved procedural guidance that both Unit 1 and 2 Fuel Handling Building Radiation Monitors are not out of service when FHB Ventilation (HVE-16) exhaust fans are stopped and started.

2.2 Non-Routine Planned Discharges

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

2.3 Radioactive Waste Treatment System Changes

One change was made to the waste treatment system during the report period:

- A new vendor supplied and supported waste processing modification was completed and placed in-service in March 2015 for improved waste water processing. The new Diversified Technologies (DTS) vendor waste processing skid was placed in-service to reduce waste resin costs, effluent release quantities, and operator burdens. The new processing skid has reduced particulate and iodine isotopic release quantities in the last three quarters of 2015 by 50%.

2.4 Annual Land Use Census Changes

There were no changes to the Land Use Census during the report period.

2.5 Effluent Monitoring System Inoperability

There were four instances of effluent monitors out of service for greater than 30 days during the report period.

- Unit 1 Fuel Handling Building (FHB) Radiation Monitor (RM-26-4) was out of service for greater than thirty days from Oct 6, 2014 to March 25, 2015 - RM-26-4 was originally removed from service on Oct 6, 2014 at 07:45 for replacement with a new Mirion MGPI radiation monitor as per EC 277010. Applicability to the minimum channel operability requirement of the ODCM applied only at times while making releases via this pathway. A locally operable, alternate radiation monitor complying with ODCM and technical specification requirements was placed in-service when fuel handling building ventilation was placed in-service and releases via this pathway were in-progress. The new radiation monitor RM-26-4 was declared operable and placed in-service on March 25, 2015 at 11:15.
- U2 Fuel Handling Building Radiation Monitor (RM-26-12) was out of service administratively for greater than 30 days from June 11, 2015 at 14:15 until July 18, 2015 at 15:30 when HVS-6 and HVE-16 fans (Spent Fuel Pool Supply and Exhaust Fans) were out of service for maintenance. As described in Event #2 in Section 2.1, Abnormal Releases or Abnormal Discharges, a procedure change was completed which clarified administrative procedural guidance that both Unit 1 and 2 Fuel Handling Building Radiation Monitors are not out of service when FHB Ventilation (HVE-16) fans are stopped. RM-26-12 was returned to service on July 18, 2015 when maintenance was complete and ventilation fans were returned to service.
- Unit 1 Plant Vent Radiation Monitor (RM-26-1) was out of service for greater than thirty days - RM-26-1 was originally removed from service on May 18, 2015 at 02:25 for replacement with a new Mirion MGPI radiation monitor as per EC 277011. A locally operable, alternate radiation monitor complying with ODCM and technical specification requirements was placed in-service to monitor plant stack releases via this pathway. The new radiation monitor RSC 26-1 was declared operable and placed in-service on July 2, 2015 at 23:45.
- Unit 2 Fuel Handling Building Radiation Monitor (RM-26-12) was out of service for greater than thirty days - RM-26-12 was originally removed from service on Nov 2, 2015 for replacement with a new like for like General Atomic radiation monitor as per EC 278372. Applicability to the minimum channel operability requirement of the ODCM applies only at times while making releases via this pathway. A locally operable, alternate radiation monitor complying with ODCM and technical specification requirements was placed in-service when fuel handling building ventilation was placed in-service and releases via this pathway were in-progress. The new radiation monitor RM-26-12 was declared operable and placed in-service on Dec 31, 2015 at 10:58.

2.6 Offsite Dose Calculation Manual Changes

Two revision changes were made to the St. Lucie Site ODCM during the report period.

- A revision was completed in June, 2015 to incorporate changes documented in EC 277011 for replacement of Unit 1 Plant Vent Radiation Monitor. Incorporated changes to document that the new Unit 1 Plant Vent Mirion MGPI Radiation Monitor does not have a particulate, iodine, or mid range gas detector channel. Incorporated changes to radiation monitor channel identification.
- A revision was completed in August, 2015 to incorporate improved gaseous effluent monitoring guidance for the Unit 1 and 2 containment equipment hatch as a potential effluent release pathway when open during outages.

2.7 Process Control Program Changes

Two revision changes were made to the St. Lucie Site Process Control Program during the report period.

- A revision was completed to update references that have been superseded or no longer used.
- A revision was completed to remove procedures listed in Step 3.2.1B and Step 3.2.1C in a previous revision, since they are no longer used here a PSL. They are used as reference material only and identified in Step 6.2 and 6.3.

2.8 Corrections to Previous Reports

There were no corrections to previous reports during the report period.

2.9 Other

Eleven batch releases were made from the South Settling Basin to the Intake Canal during the report period to lower the water level from periods of higher than normal rainfall. All releases were analyzed according to the ODCM and site procedural requirements and were found to have no detectable gamma, tritium, alpha or hard to detect isotopes. The releases are listed below:

<u>Release Start Date</u>	<u>Volume of release</u>
3/2/15	4.11E6 gallons
3/27/15	1.70E6 gallons
4/21/15	1.97E6 gallons
4/28/15	4.55E6 gallons
8/2/15	5.77E6 gallons
8/14/15	2.19E6 gallons
8/29/15	5.75E3 gallons
9/16/15	1.40E7 gallons
10/24/15	2.52E6 gallons
12/6/15	3.09E6 gallons
12/18/15	3.75E5 gallons

2.10 Groundwater Protection Program

- No limits were exceeded for the analyzed St. Lucie Nuclear Site Groundwater Protection Program for the report period.
- St. Lucie Nuclear Site Groundwater Protection Program results for the report period are contained in the following tables.

2015 St. Lucie Nuclear Plant Groundwater Protection Program Tritium Results

Sentinel Well ID	H3 Jan 2015	H3 Feb 2015	H3 Mar 2015	H3 Apr 2015	H3 May 2015	H3 June 2015	H3 July 2015	H3 Aug 2015	H3 Sept 2015	H3 OCT 2015	H3 NOV 2015	H3 Dec 2015
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	601	619	578	649	537	510	625	244	481	435	464	430
MW-4		493			520			<MDA			369	
MW-5		<MDA			<MDA			<MDA			<MDA	
MW-6		1020		1690	1110	938	910	422			1070	
MW-7		<MDA			302			<MDA			<MDA	
MW-15		374			302			<MDA			441	
MW-16		<MDA		493	382	<MDA	<MDA	<MDA			234	
MW-17		338			1350			1620			1430	1780
MW-18D		830			1030			1910			1520	1670
MW-19		<MDA			<MDA			<MDA			<MDA	
MW-22D		<MDA			<MDA			<MDA			<MDA	
MW-26		<MDA			<MDA			<MDA			<MDA	
RW-2		288			362			473			406	
RW-4		<MDA			<MDA			<MDA			<MDA	
RW-5		<MDA			<MDA			<MDA			<MDA	
MW-30		228			<MDA			<MDA			<MDA	
MW-31		316			368			378			316	
MW-32		674			1670			1560			2690	1860
MW-33		927		1100	1060	1180	1150	1070			792	

Monitor Well ID	H3 Jan 2015	H3 Feb 2015	H3 Mar 2015	H3 Apr 2015	H3 May 2015	H3 June 2015	H3 July 2015	H3 Aug 2015	H3 Sept 2015	H3 OCT 2015	H3 NOV 2015	H3 Dec 2015
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		<MDA			<MDA			<MDA			<MDA	
Unit 1-MW002		<MDA			<MDA			<MDA			<MDA	
Unit 1-MW003		303			487			<MDA			<MDA	
Unit 1-MW004		357			<MDA			<MDA			<MDA	
Unit 1-MW005		2120			491			855			543	
Unit 2-MW001		1010			470			<MDA			<MDA	
Unit 2-MW002	797	2570	2900	2830	1560	1800	4060	3320	4320	1550	<MDA	721
Unit 2-MW003		425			<MDA			463			669	
Unit 2-MW004		774			712			612			605	

2015 St. Lucie Nuclear Plant Groundwater Protection Program Tritium Results

Monitor Well ID	H3 Jan 2015	H3 Feb 2015	H3 Mar 2015	H3 Apr 2015	H3 May 2015	H3 June 2015	H3 July 2015	H3 Aug 2015	H3 Sept 2015	H3 OCT 2015	H3 NOV 2015	H3 Dec 2015
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		328			326			215			213	
(S)-MW-2	Inactive Well											
(S)-MW-3	Inactive Well											
(S)-MW-4		334			325			394			378	
(S)-MW-5	Inactive Well											
(S)-MW-6		378			285			244			333	
(S)-MW-7A		<MDA			<MDA			<MDA			<MDA	
(S)-MW-10	Inactive Well											
(S)-MW-11		406			401			353			359	
(S)-MW-13D	Inactive Well											
(S)-MW-14	Inactive Well											
(S)-MW-15D		<MDA			<MDA			<MDA			<MDA	
(S)-MW-16		<MDA			<MDA			<MDA			<MDA	
(S)-MW-16i		266			<MDA			1020			658	
(S)-MW-17		<MDA			<MDA			699			532	329
(S)-MW-18		<MDA			<MDA			<MDA			<MDA	
(S)-MW-19		<MDA			<MDA			<MDA			<MDA	

Monitor Well ID	H3 Jan 2015	H3 Feb 2015	H3 Mar 2015	H3 Apr 2015	H3 May 2015	H3 June 2015	H3 July 2015	H3 Aug 2015	H3 Sept 2015	H3 OCT 2015	H3 NOV 2015	H3 Dec 2015
Neutralization Basin	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l
PSLED-2		<MDA			<MDA							
NB-MW-1		<MDA			<MDA							
NB-MW-2		<MDA			<MDA							

3.0 TABLES

3.1 Gaseous Effluents and Liquid Effluents

3.2 Solid Waste Storage and Shipments

3.3 Dose Assessments

3.4 Visitor Dose

TABLE 3.1

GASEOUS EFFLUENTS AND LIQUID EFFLUENTS
(25 PAGES)

Reg. Guide 1.21, Table 5A and 5B - Liquid and Gas Batch Release Summary

Unit: Site

Starting: 1-Jan-2015 Ending: 31-Dec-2015

A. Liquid Batch Release Totals	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year Totals
1. Number of Batch Releases		28	29	25	16	98
2. Total duration of batch releases	min	1.48E+04	1.80E+04	2.42E+04	1.79E+04	7.50E+04
3. Maximum batch release duration	min	1.86E+03	2.22E+03	5.81E+03	7.56E+03	7.56E+03
4. Average batch release duration	min	5.29E+02	6.22E+02	9.68E+02	1.12E+03	7.65E+02
5. Minimum batch release duration	min	2.45E+02	1.75E+02	1.30E+02	2.82E+02	1.30E+02
B. Gas Batch Release Totals	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year Totals
1. Number of Batch Releases		76	75	69	50	270
2. Total duration of batch releases	min	1.77E+04	1.43E+04	1.72E+04	1.19E+04	6.10E+04
3. Maximum batch release duration	min	6.60E+02	5.82E+02	7.20E+02	4.90E+02	7.20E+02
4. Average batch release duration	min	2.33E+02	1.90E+02	2.49E+02	2.37E+02	2.26E+02
5. Minimum batch release duration	min	1.50E+01	4.00E+01	2.00E+01	1.50E+01	1.50E+01

Reg. Guide 1.21, Table 6A and 6B - Liquid and Gas Abnormal Release Summary

Unit: Site

Starting: 1-Jan-2015 Ending: 31-Dec-2015

A. Liquid Abnormal Release Totals	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year Totals
1. Number of Abnormal Releases		0	0	0	0	0
2. Total Activity of abnormal releases	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B. Gas Abnormal Release Totals	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year Totals
1. Number of Abnormal Releases		0	1	0	0	1
2. Total Activity of abnormal releases	Ci	0.00E+00	2.42E-03	0.00E+00	0.00E+00	2.42E-03

Reg. Guide 1.21, Table 1A, Gaseous Effluents - Summation of All Releases

Unit: Site

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Total Release	Units	1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual	Uncertainty
A. Fission and Activation Gases							
1. Total Release	Ci	2.86E+00	3.54E+00	1.28E+01	2.09E+00	2.13E+01	
2. Average Release Rate for Period	uCi/s	3.68E-01	4.50E-01	1.61E+00	2.63E-01	6.75E-01	
3. Percent of Limit	%						
B. Iodines and Halogens							
1. Total Release	Ci	7.41E-06	3.36E-05	1.59E-04	9.64E-06	2.10E-04	
2. Average Release Rate for Period	uCi/s	9.53E-07	4.27E-06	2.00E-05	1.21E-06	6.64E-06	
3. Percent of Limit	%						
C. Particulates							
1. Total Release	Ci	6.50E-06	3.00E-05	0.00E+00	5.23E-06	4.17E-05	
2. Average Release Rate for Period	uCi/s	8.36E-07	3.81E-06	0.00E+00	6.58E-07	1.32E-06	
3. Percent of Limit	%						
D. Tritium							
1. Total Release	Ci	1.84E+01	1.78E+01	1.73E+01	5.13E+01	1.05E+02	
2. Average Release Rate for Period	uCi/s	2.36E+00	2.27E+00	2.17E+00	6.45E+00	3.32E+00	
3. Percent of Limit	%						
E. Gross Alpha							
1. Total Release	Ci	3.35E-08	6.31E-08	4.35E-08	5.78E-08	1.98E-07	
F. Carbon-14							
1. Total Release	Ci	5.21E+00	4.65E+00	4.99E+00	4.99E+00	1.98E+01	
2. Average Release Rate for Period	uCi/s	6.70E-01	5.92E-01	6.28E-01	6.28E-01	6.29E-01	
3. Percent of Limit	%						

Reg. Guide 1.21, Table 1B, Gaseous Effluents - Ground Level Release - Continuous Mode

Unit: Site

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Nuclides Released	Units	Continuous Mode				
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
A. Fission and Activation Gases						
Kr-85m	Ci	2.01E-01	0.00E+00	0.00E+00	0.00E+00	2.01E-01
Kr-88	Ci	0.00E+00	0.00E+00	0.00E+00	9.90E-01	9.90E-01
Xe-133	Ci	0.00E+00	0.00E+00	5.65E+00	0.00E+00	5.65E+00
Total For Period	Ci	2.01E-01	0.00E+00	5.65E+00	9.90E-01	6.84E+00
B. Iodines and Halogens						
I-131	Ci	7.41E-06	1.34E-06	9.46E-05	9.64E-06	1.13E-04
I-133	Ci	0.00E+00	3.23E-05	6.43E-05	0.00E+00	9.65E-05
Total For Period	Ci	7.41E-06	3.36E-05	1.59E-04	9.64E-06	2.10E-04
C. Particulates						
Mn-54	Ci	0.00E+00	2.83E-07	0.00E+00	0.00E+00	2.83E-07
Co-58	Ci	1.61E-06	2.97E-05	0.00E+00	0.00E+00	3.13E-05
Co-60	Ci	2.98E-06	0.00E+00	0.00E+00	0.00E+00	2.98E-06
Zr-95	Ci	0.00E+00	0.00E+00	0.00E+00	2.01E-06	2.01E-06
Nb-95	Ci	0.00E+00	0.00E+00	0.00E+00	3.22E-06	3.22E-06
Cs-137	Ci	1.90E-06	0.00E+00	0.00E+00	0.00E+00	1.90E-06
Total For Period	Ci	6.50E-06	3.00E-05	0.00E+00	5.23E-06	4.17E-05
D. Tritium						
H-3	Ci	1.70E+01	1.75E+01	1.26E+01	5.10E+01	9.81E+01

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

Reg. Guide 1.21, Table 1B, Gaseous Effluents - Ground Level Release - Continuous Mode

Unit: Site

Starting: 1-Jan-2015 Ending: 31-Dec-2015

<u>Nuclides Released</u>	<u>Units</u>	<u>Continuous Mode</u>				
		<u>1ST Quarter</u>	<u>2ND Quarter</u>	<u>3RD Quarter</u>	<u>4TH Quarter</u>	<u>Annual</u>
<u>E. Gross Alpha</u>						
G-Alpha	Ci	3.35E-08	6.31E-08	4.35E-08	5.78E-08	1.98E-07
<u>F. Carbon-14</u>						
C-14	Ci	5.21E+00	4.65E+00	4.99E+00	4.99E+00	1.98E+01

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

Reg. Guide 1.21, Table 1B, Gaseous Effluents - Ground Level Release - Batch Mode

Unit: Site

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Nuclides Released	Units	Batch Mode				
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
A. Fission and Activation Gases						
Ar-41	Ci	2.30E+00	5.31E-01	2.12E+00	3.27E-01	5.28E+00
Kr-85m	Ci	3.73E-05	7.43E-06	0.00E+00	2.60E-04	3.05E-04
Kr-85	Ci	2.40E-02	3.13E-01	1.90E-01	1.83E-01	7.10E-01
Kr-87	Ci	3.35E-05	1.32E-04	0.00E+00	0.00E+00	1.66E-04
Kr-88	Ci	0.00E+00	0.00E+00	0.00E+00	2.22E-04	2.22E-04
Xe-127	Ci	0.00E+00	6.89E-05	0.00E+00	0.00E+00	6.89E-05
Xe-131m	Ci	0.00E+00	2.58E-02	1.65E-02	1.53E-02	5.77E-02
Xe-135	Ci	2.48E-03	3.26E-03	5.73E-02	8.42E-03	7.15E-02
Xe-133m	Ci	1.79E-03	1.46E-02	1.26E-03	7.30E-04	1.84E-02
Xe-133	Ci	3.31E-01	2.65E+00	4.75E+00	5.61E-01	8.29E+00
Xe-137	Ci	0.00E+00	4.58E-03	0.00E+00	0.00E+00	4.58E-03
Xe-135m	Ci	3.88E-04	2.66E-04	1.97E-04	1.20E-04	9.72E-04
Xe-138	Ci	4.28E-04	0.00E+00	0.00E+00	0.00E+00	4.28E-04
Total For Period	Ci	2.66E+00	3.54E+00	7.14E+00	1.10E+00	1.44E+01
B. Iodines and Halogens						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C. Particulates						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D. Tritium						
H-3	Ci	1.42E+00	2.92E-01	4.65E+00	2.72E-01	6.63E+00

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

Reg. Guide 1.21, Table 1B, Gaseous Effluents - Ground Level Release - Batch Mode

Unit: Site

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Nuclides Released	Units	Batch Mode				Annual
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	
E. Gross Alpha						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
F. Carbon-14						
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.

Reg. Guide 1.21, Table 1A, Gaseous Effluents - Summation of All Releases

Unit: PSL1

Starting: 1-Jan-2015 Ending: 31-Dec-2015

<u>Total Release</u>	<u>Units</u>	<u>1ST Quarter</u>	<u>2ND Quarter</u>	<u>3RD Quarter</u>	<u>4TH Quarter</u>	<u>Annual</u>	<u>Uncertainty</u>
A. Fission and Activation Gases							
1. Total Release	Ci	2.38E+00	1.50E-01	2.58E-01	2.35E-01	3.02E+00	
2. Average Release Rate for Period	uCi/s	3.06E-01	1.91E-02	3.24E-02	2.95E-02	9.59E-02	
3. Percent of Limit	%						
B. Iodines and Halogens							
1. Total Release	Ci	6.80E-06	1.34E-06	0.00E+00	5.18E-07	8.66E-06	
2. Average Release Rate for Period	uCi/s	8.74E-07	1.71E-07	0.00E+00	6.52E-08	2.75E-07	
3. Percent of Limit	%						
C. Particulates							
1. Total Release	Ci	1.84E-06	1.76E-05	0.00E+00	0.00E+00	1.94E-05	
2. Average Release Rate for Period	uCi/s	2.36E-07	2.24E-06	0.00E+00	0.00E+00	6.16E-07	
3. Percent of Limit	%						
D. Tritium							
1. Total Release	Ci	6.70E+00	9.13E+00	1.45E-01	1.56E+01	3.16E+01	
2. Average Release Rate for Period	uCi/s	8.61E-01	1.16E+00	1.83E-02	1.97E+00	1.00E+00	
3. Percent of Limit	%						
E. Gross Alpha							
1. Total Release	Ci	0.00E+00	2.37E-08	2.63E-08	2.65E-08	7.65E-08	
F. Carbon-14							
1. Total Release	Ci	2.54E+00	2.09E+00	2.83E+00	2.91E+00	1.04E+01	
2. Average Release Rate for Period	uCi/s	3.26E-01	2.66E-01	3.57E-01	3.67E-01	3.29E-01	
3. Percent of Limit	%						

Reg. Guide 1.21, Table 1B, Gaseous Effluents - Ground Level Release - Continuous Mode

Unit: PSL1

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Nuclides Released	Units	Continuous Mode				Annual
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	
A. Fission and Activation Gases						
Kr-85m	Ci	2.01E-01	0.00E+00	0.00E+00	0.00E+00	2.01E-01
B. Iodines and Halogens						
I-131	Ci	6.80E-06	1.34E-06	0.00E+00	5.18E-07	8.66E-06
C. Particulates						
Mn-54	Ci	0.00E+00	2.83E-07	0.00E+00	0.00E+00	2.83E-07
Co-58	Ci	0.00E+00	1.73E-05	0.00E+00	0.00E+00	1.73E-05
Co-60	Ci	1.40E-06	0.00E+00	0.00E+00	0.00E+00	1.40E-06
Cs-137	Ci	4.36E-07	0.00E+00	0.00E+00	0.00E+00	4.36E-07
Total For Period	Ci	1.84E-06	1.76E-05	0.00E+00	0.00E+00	1.94E-05
D. Tritium						
H-3	Ci	5.41E+00	9.11E+00	0.00E+00	1.54E+01	3.00E+01
E. Gross Alpha						
G-Alpha	Ci	0.00E+00	2.37E-08	2.63E-08	2.65E-08	7.65E-08
F. Carbon-14						
C-14	Ci	2.54E+00	2.09E+00	2.83E+00	2.91E+00	1.04E+01

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

Reg. Guide 1.21, Table 1B, Gaseous Effluents - Ground Level Release - Batch Mode

Unit: PSL1

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Nuclides Released	Units	Batch Mode				
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
A. Fission and Activation Gases						
Ar-41	Ci	1.93E+00	1.24E-01	1.85E-01	1.70E-01	2.41E+00
Kr-85m	Ci	3.73E-05	0.00E+00	0.00E+00	0.00E+00	3.73E-05
Kr-85	Ci	3.11E-03	0.00E+00	0.00E+00	0.00E+00	3.11E-03
Kr-87	Ci	3.35E-05	0.00E+00	0.00E+00	0.00E+00	3.35E-05
Xe-131m	Ci	0.00E+00	9.30E-05	0.00E+00	0.00E+00	9.30E-05
Xe-133m	Ci	1.79E-03	0.00E+00	0.00E+00	0.00E+00	1.79E-03
Xe-135	Ci	2.11E-03	8.60E-04	2.73E-03	2.40E-03	8.09E-03
Xe-133	Ci	2.45E-01	2.47E-02	6.96E-02	6.19E-02	4.01E-01
Xe-135m	Ci	3.88E-04	1.41E-04	0.00E+00	0.00E+00	5.30E-04
Total For Period	Ci	2.18E+00	1.50E-01	2.58E-01	2.35E-01	2.82E+00
B. Iodines and Halogens						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C. Particulates						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D. Tritium						
H-3	Ci	1.29E+00	2.59E-02	1.45E-01	1.86E-01	1.64E+00
E. Gross Alpha						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
F. Carbon-14						
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.

Reg. Guide 1.21, Table 1A, Gaseous Effluents - Summation of All Releases

Unit: PSL2

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Total Release	Units	1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual	Uncertainty
A. Fission and Activation Gases							
1. Total Release	Ci	4.82E-01	3.39E+00	1.25E+01	1.85E+00	1.83E+01	
2. Average Release Rate for Period	uCi/s	6.20E-02	4.31E-01	1.58E+00	2.33E-01	5.79E-01	
3. Percent of Limit	%						
B. Iodines and Halogens							
1. Total Release	Ci	6.10E-07	3.23E-05	1.59E-04	9.12E-06	2.01E-04	
2. Average Release Rate for Period	uCi/s	7.84E-08	4.10E-06	2.00E-05	1.15E-06	6.37E-06	
3. Percent of Limit	%						
C. Particulates							
1. Total Release	Ci	4.66E-06	1.24E-05	0.00E+00	5.23E-06	2.23E-05	
2. Average Release Rate for Period	uCi/s	5.99E-07	1.57E-06	0.00E+00	6.58E-07	7.06E-07	
3. Percent of Limit	%						
D. Tritium							
1. Total Release	Ci	1.17E+01	8.68E+00	1.71E+01	3.57E+01	7.31E+01	
2. Average Release Rate for Period	uCi/s	1.50E+00	1.10E+00	2.15E+00	4.48E+00	2.32E+00	
3. Percent of Limit	%						
E. Gross Alpha							
1. Total Release	Ci	3.35E-08	3.94E-08	1.72E-08	3.13E-08	1.21E-07	
F. Carbon-14							
1. Total Release	Ci	2.67E+00	2.56E+00	2.16E+00	2.08E+00	9.47E+00	
2. Average Release Rate for Period	uCi/s	3.43E-01	3.26E-01	2.72E-01	2.62E-01	3.00E-01	
3. Percent of Limit	%						

Reg. Guide 1.21, Table 1B, Gaseous Effluents - Ground Level Release - Continuous Mode

Unit: PSL2

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Nuclides Released	Units	Continuous Mode				
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
A. Fission and Activation Gases						
Kr-88	Ci	0.00E+00	0.00E+00	0.00E+00	9.90E-01	9.90E-01
Xe-133	Ci	0.00E+00	0.00E+00	5.65E+00	0.00E+00	5.65E+00
Total For Period	Ci	0.00E+00	0.00E+00	5.65E+00	9.90E-01	6.64E+00
B. Iodines and Halogens						
I-131	Ci	6.10E-07	0.00E+00	9.46E-05	9.12E-06	1.04E-04
I-133	Ci	0.00E+00	3.23E-05	6.43E-05	0.00E+00	9.65E-05
Total For Period	Ci	6.10E-07	3.23E-05	1.59E-04	9.12E-06	2.01E-04
C. Particulates						
Co-58	Ci	1.61E-06	1.24E-05	0.00E+00	0.00E+00	1.40E-05
Co-60	Ci	1.58E-06	0.00E+00	0.00E+00	0.00E+00	1.58E-06
Zr-95	Ci	0.00E+00	0.00E+00	0.00E+00	2.01E-06	2.01E-06
Nb-95	Ci	0.00E+00	0.00E+00	0.00E+00	3.22E-06	3.22E-06
Cs-137	Ci	1.47E-06	0.00E+00	0.00E+00	0.00E+00	1.47E-06
Total For Period	Ci	4.66E-06	1.24E-05	0.00E+00	5.23E-06	2.23E-05
D. Tritium						
H-3	Ci	1.16E+01	8.41E+00	1.26E+01	3.56E+01	6.81E+01
E. Gross Alpha						
G-Alpha	Ci	3.35E-08	3.94E-08	1.72E-08	3.13E-08	1.21E-07

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

Reg. Guide 1.21, Table 1B, Gaseous Effluents - Ground Level Release - Continuous Mode

Unit: PSL2

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Nuclides Released	Units	Continuous Mode				Annual
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	
F. Carbon-14						
C-14	Ci	2.67E+00	2.56E+00	2.16E+00	2.08E+00	9.47E+00

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

Reg. Guide 1.21, Table 1B, Gaseous Effluents - Ground Level Release - Batch Mode

Unit: PSL2

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Nuclides Released	Units	Batch Mode				
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
A. Fission and Activation Gases						
Ar-41	Ci	3.74E-01	4.07E-01	1.93E+00	1.57E-01	2.87E+00
Kr-85m	Ci	0.00E+00	7.43E-06	0.00E+00	2.60E-04	2.68E-04
Kr-85	Ci	2.08E-02	3.13E-01	1.90E-01	1.83E-01	7.07E-01
Kr-87	Ci	0.00E+00	1.32E-04	0.00E+00	0.00E+00	1.32E-04
Kr-88	Ci	0.00E+00	0.00E+00	0.00E+00	2.22E-04	2.22E-04
Xe-127	Ci	0.00E+00	6.89E-05	0.00E+00	0.00E+00	6.89E-05
Xe-131m	Ci	0.00E+00	2.58E-02	1.65E-02	1.53E-02	5.76E-02
Xe-133m	Ci	0.00E+00	1.46E-02	1.26E-03	7.30E-04	1.66E-02
Xe-135	Ci	3.69E-04	2.40E-03	5.46E-02	6.03E-03	6.34E-02
Xe-137	Ci	0.00E+00	4.58E-03	0.00E+00	0.00E+00	4.58E-03
Xe-133	Ci	8.66E-02	2.62E+00	4.68E+00	4.99E-01	7.89E+00
Xe-135m	Ci	0.00E+00	1.25E-04	1.97E-04	1.20E-04	4.42E-04
Xe-138	Ci	4.28E-04	0.00E+00	0.00E+00	0.00E+00	4.28E-04
Total For Period	Ci	4.82E-01	3.39E+00	6.88E+00	8.62E-01	1.16E+01
B. Iodines and Halogens						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C. Particulates						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D. Tritium						
H-3	Ci	1.36E-01	2.66E-01	4.50E+00	8.60E-02	4.99E+00

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

Reg. Guide 1.21, Table 1B, Gaseous Effluents - Ground Level Release - Batch Mode

Unit: PSL2

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Nuclides Released	Units	Batch Mode				
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
E. Gross Alpha						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
F. Carbon-14						
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.

Reg. Guide 1.21, Table 2A, Liquid Effluents - Summation of All Releases

Unit: Site

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Total Release	Units	1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual	Uncertainty
A. Fission and Activation Products							
1. Total Release	Ci	1.22E-02	5.01E-03	6.47E-03	1.22E-03	2.49E-02	
2. Average Concentration	uCi/mL	1.13E-10	1.18E-10	4.28E-11	1.08E-11	6.01E-11	
3. Percent of Limit	%						
B. Tritium							
1. Total Release	Ci	2.62E+02	1.04E+02	1.31E+02	4.36E+01	5.41E+02	
2. Average Concentration	uCi/mL	2.43E-06	2.45E-06	8.66E-07	3.85E-07	1.30E-06	
3. Percent of Limit	%						
C. Dissolved and Entrained Gases							
1. Total Release	Ci	7.93E-03	6.95E-03	9.11E-02	6.86E-03	1.13E-01	
2. Average Concentration	uCi/mL	7.34E-11	1.64E-10	6.02E-10	6.07E-11	2.72E-10	
3. Percent of Limit	%						
D. Gross Alpha Activity							
1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2. Average Concentration	uCi/mL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
E. Primary Liquid Release Volume							
1. Total Release	Liters	2.38E+07	2.68E+07	8.45E+07	2.37E+07	1.59E+08	
F. Dilution Volume							
1. Total Release	Liters	1.08E+11	4.23E+10	1.51E+11	1.13E+11	4.15E+11	
G. Average Stream Flow							
1. Total Release	m ³ /s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

Reg. Guide 1.21, Table 2A, Liquid Effluents - Summation of All Releases

Unit: PSL1

Starting: 1-Jan-2015 Ending: 31-Dec-2015

<u>Total Release</u>	<u>Units</u>	<u>1ST Quarter</u>	<u>2ND Quarter</u>	<u>3RD Quarter</u>	<u>4TH Quarter</u>	<u>Annual</u>	<u>Uncertainty</u>
A. Fission and Activation Products							
1. Total Release	Ci	6.11E-03	2.51E-03	3.24E-03	6.11E-04	1.25E-02	
2. Average Concentration	uCi/mL	1.13E-10	1.18E-10	4.28E-11	1.08E-11	6.01E-11	
3. Percent of Limit	%						
B. Tritium							
1. Total Release	Ci	1.31E+02	5.18E+01	6.55E+01	2.18E+01	2.70E+02	
2. Average Concentration	uCi/mL	2.43E-06	2.45E-06	8.66E-07	3.85E-07	1.30E-06	
3. Percent of Limit	%						
C. Dissolved and Entrained Gases							
1. Total Release	Ci	3.97E-03	3.47E-03	4.55E-02	3.43E-03	5.64E-02	
2. Average Concentration	uCi/mL	7.34E-11	1.64E-10	6.02E-10	6.07E-11	2.72E-10	
3. Percent of Limit	%						
D. Gross Alpha Activity							
1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2. Average Concentration	uCi/mL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
E. Primary Liquid Release Volume							
1. Total Release	Liters	1.19E+07	1.34E+07	4.23E+07	1.18E+07	7.94E+07	
F. Dilution Volume							
1. Total Release	Liters	5.40E+10	2.12E+10	7.56E+10	5.65E+10	2.07E+11	
G. Average Stream Flow							
1. Total Release	m ³ /s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

Reg. Guide 1.21, Table 2A, Liquid Effluents - Summation of All Releases

Unit: PSL2

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Total Release	Units	1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual	Uncertainty
A. Fission and Activation Products							
1. Total Release	Ci	6.11E-03	2.51E-03	3.24E-03	6.11E-04	1.25E-02	
2. Average Concentration	uCi/mL	1.13E-10	1.18E-10	4.28E-11	1.08E-11	6.01E-11	
3. Percent of Limit	%						
B. Tritium							
1. Total Release	Ci	1.31E+02	5.18E+01	6.55E+01	2.18E+01	2.70E+02	
2. Average Concentration	uCi/mL	2.43E-06	2.45E-06	8.66E-07	3.85E-07	1.30E-06	
3. Percent of Limit	%						
C. Dissolved and Entrained Gases							
1. Total Release	Ci	3.97E-03	3.47E-03	4.55E-02	3.43E-03	5.64E-02	
2. Average Concentration	uCi/mL	7.34E-11	1.64E-10	6.02E-10	6.07E-11	2.72E-10	
3. Percent of Limit	%						
D. Gross Alpha Activity							
1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2. Average Concentration	uCi/mL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
E. Primary Liquid Release Volume							
1. Total Release	Liters	1.19E+07	1.34E+07	4.23E+07	1.18E+07	7.94E+07	
F. Dilution Volume							
1. Total Release	Liters	5.40E+10	2.12E+10	7.56E+10	5.65E+10	2.07E+11	
G. Average Stream Flow							
1. Total Release	m ³ /s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

Reg. Guide 1.21, Table 2B, Liquid Effluents - Continuous Mode

Unit: Site

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Nuclides Released	Units	Continuous Mode				Annual
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	
A. Fission and Activation Products						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B. Tritium						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C. Dissolved and Entrained Gases						
No Nuclides Found	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D. Gross Alpha Activity						
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.

Reg. Guide 1.21, Table 2B, Liquid Effluents - Batch Mode

Unit: Site

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Nuclides Released	Units	Batch Mode				
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
A. Fission and Activation Products						
C-14	Ci	1.00E-02	2.26E-03	5.43E-03	1.18E-03	1.89E-02
Na-24	Ci	0.00E+00	4.40E-06	0.00E+00	0.00E+00	4.40E-06
Be-7	Ci	1.69E-05	0.00E+00	0.00E+00	0.00E+00	1.69E-05
Cr-51	Ci	2.06E-05	4.47E-05	0.00E+00	0.00E+00	6.53E-05
Mn-54	Ci	2.15E-05	2.43E-05	2.18E-05	0.00E+00	6.76E-05
Fe-59	Ci	9.20E-06	0.00E+00	0.00E+00	0.00E+00	9.20E-06
Co-58	Ci	3.08E-04	2.40E-04	1.64E-04	0.00E+00	7.12E-04
Co-60	Ci	4.48E-04	2.80E-04	2.76E-04	1.92E-05	1.02E-03
Zn-65	Ci	2.18E-05	3.21E-06	1.32E-05	0.00E+00	3.82E-05
Br-82	Ci	3.13E-06	0.00E+00	0.00E+00	0.00E+00	3.13E-06
Sr-91	Ci	3.35E-06	4.31E-06	0.00E+00	0.00E+00	7.66E-06
Zr-95	Ci	2.19E-05	1.61E-05	4.37E-06	0.00E+00	4.24E-05
Nb-95	Ci	5.14E-05	2.19E-05	1.31E-06	0.00E+00	7.46E-05
Nb-97	Ci	3.01E-04	4.19E-04	2.85E-04	1.27E-05	1.02E-03
Ru-103	Ci	0.00E+00	0.00E+00	0.00E+00	1.79E-06	1.79E-06
Ag-110m	Ci	2.41E-04	3.59E-04	2.57E-04	4.37E-06	8.61E-04
Sn-113	Ci	8.41E-06	0.00E+00	0.00E+00	0.00E+00	8.41E-06
Sn-117m	Ci	3.62E-05	1.20E-04	1.14E-06	0.00E+00	1.57E-04
Sb-124	Ci	4.46E-06	1.79E-04	0.00E+00	0.00E+00	1.84E-04
Sb-122	Ci	0.00E+00	3.57E-05	0.00E+00	0.00E+00	3.57E-05
Sb-125	Ci	5.30E-04	1.47E-04	0.00E+00	0.00E+00	6.78E-04
Te-123m	Ci	6.33E-06	9.56E-05	0.00E+00	0.00E+00	1.02E-04
Te-129m	Ci	0.00E+00	3.85E-04	0.00E+00	0.00E+00	3.85E-04
Te-129	Ci	0.00E+00	1.16E-04	0.00E+00	0.00E+00	1.16E-04
Te-132	Ci	4.94E-05	1.02E-04	0.00E+00	0.00E+00	1.52E-04
I-130	Ci	1.72E-06	0.00E+00	0.00E+00	0.00E+00	1.72E-06

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

Reg. Guide 1.21, Table 2B, Liquid Effluents - Batch Mode

Unit: Site

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Nuclides Released	Units	Batch Mode				
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
I-131	Ci	0.00E+00	0.00E+00	2.00E-05	0.00E+00	2.00E-05
I-132	Ci	4.52E-05	1.09E-04	0.00E+00	0.00E+00	1.55E-04
I-134	Ci	0.00E+00	0.00E+00	1.45E-06	0.00E+00	1.45E-06
I-135	Ci	0.00E+00	8.26E-06	0.00E+00	0.00E+00	8.26E-06
Cs-137	Ci	3.26E-06	3.72E-05	0.00E+00	0.00E+00	4.04E-05
Cs-138	Ci	1.09E-05	0.00E+00	0.00E+00	0.00E+00	1.09E-05
La-140	Ci	3.97E-05	0.00E+00	0.00E+00	0.00E+00	3.97E-05
Total For Period	Ci	1.22E-02	5.01E-03	6.47E-03	1.22E-03	2.49E-02
B. Tritium						
H-3	Ci	2.62E+02	1.04E+02	1.31E+02	4.36E+01	5.41E+02
C. Dissolved and Entrained Gases						
Kr-85	Ci	0.00E+00	0.00E+00	0.00E+00	2.84E-03	2.84E-03
Xe-131m	Ci	0.00E+00	6.28E-05	1.15E-03	2.50E-04	1.46E-03
Xe-133m	Ci	7.94E-05	2.56E-05	5.02E-04	0.00E+00	6.07E-04
Xe-135	Ci	1.46E-05	0.00E+00	1.42E-05	0.00E+00	2.88E-05
Xe-133	Ci	7.84E-03	6.86E-03	8.94E-02	3.77E-03	1.08E-01
Total For Period	Ci	7.93E-03	6.95E-03	9.11E-02	6.86E-03	1.13E-01
D. Gross Alpha Activity						
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.

Reg. Guide 1.21, Table 2B, Liquid Effluents - Batch Mode**Unit: PSL1****Starting: 1-Jan-2015 Ending: 31-Dec-2015**

Nuclides Released	Units	Batch Mode				
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
A. Fission and Activation Products						
C-14	Ci	5.01E-03	1.13E-03	2.71E-03	5.92E-04	9.45E-03
Na-24	Ci	0.00E+00	2.20E-06	0.00E+00	0.00E+00	2.20E-06
Be-7	Ci	8.47E-06	0.00E+00	0.00E+00	0.00E+00	8.47E-06
Cr-51	Ci	1.03E-05	2.23E-05	0.00E+00	0.00E+00	3.26E-05
Mn-54	Ci	1.08E-05	1.22E-05	1.09E-05	0.00E+00	3.38E-05
Fe-59	Ci	4.60E-06	0.00E+00	0.00E+00	0.00E+00	4.60E-06
Co-58	Ci	1.54E-04	1.20E-04	8.18E-05	0.00E+00	3.56E-04
Co-60	Ci	2.24E-04	1.40E-04	1.38E-04	9.59E-06	5.11E-04
Zn-65	Ci	1.09E-05	1.60E-06	6.61E-06	0.00E+00	1.91E-05
Br-82	Ci	1.57E-06	0.00E+00	0.00E+00	0.00E+00	1.57E-06
Sr-91	Ci	1.67E-06	2.16E-06	0.00E+00	0.00E+00	3.83E-06
Zr-95	Ci	1.09E-05	8.05E-06	2.19E-06	0.00E+00	2.12E-05
Nb-95	Ci	2.57E-05	1.09E-05	6.54E-07	0.00E+00	3.73E-05
Nb-97	Ci	1.51E-04	2.10E-04	1.43E-04	6.33E-06	5.09E-04
Ru-103	Ci	0.00E+00	0.00E+00	0.00E+00	8.93E-07	8.93E-07
Ag-110m	Ci	1.21E-04	1.80E-04	1.28E-04	2.19E-06	4.31E-04
Sn-113	Ci	4.20E-06	0.00E+00	0.00E+00	0.00E+00	4.20E-06
Sn-117m	Ci	1.81E-05	5.98E-05	5.70E-07	0.00E+00	7.85E-05
Sb-124	Ci	2.23E-06	8.97E-05	0.00E+00	0.00E+00	9.19E-05
Sb-122	Ci	0.00E+00	1.79E-05	0.00E+00	0.00E+00	1.79E-05
Sb-125	Ci	2.65E-04	7.36E-05	0.00E+00	0.00E+00	3.39E-04
Te-123m	Ci	3.17E-06	4.78E-05	0.00E+00	0.00E+00	5.10E-05
Te-129m	Ci	0.00E+00	1.93E-04	0.00E+00	0.00E+00	1.93E-04
Te-129	Ci	0.00E+00	5.78E-05	0.00E+00	0.00E+00	5.78E-05
Te-132	Ci	2.47E-05	5.11E-05	0.00E+00	0.00E+00	7.58E-05
I-130	Ci	8.59E-07	0.00E+00	0.00E+00	0.00E+00	8.59E-07

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

Reg. Guide 1.21, Table 2B, Liquid Effluents - Batch Mode

Unit: PSL1

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Nuclides Released	Units	Batch Mode				
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
I-131	Ci	0.00E+00	0.00E+00	9.98E-06	0.00E+00	9.98E-06
I-132	Ci	2.26E-05	5.47E-05	0.00E+00	0.00E+00	7.73E-05
I-134	Ci	0.00E+00	0.00E+00	7.27E-07	0.00E+00	7.27E-07
I-135	Ci	0.00E+00	4.13E-06	0.00E+00	0.00E+00	4.13E-06
Cs-137	Ci	1.63E-06	1.86E-05	0.00E+00	0.00E+00	2.02E-05
Cs-138	Ci	5.47E-06	0.00E+00	0.00E+00	0.00E+00	5.47E-06
La-140	Ci	1.99E-05	0.00E+00	0.00E+00	0.00E+00	1.99E-05
Total For Period	Ci	6.11E-03	2.51E-03	3.24E-03	6.11E-04	1.25E-02
B. Tritium						
H-3	Ci	1.31E+02	5.18E+01	6.55E+01	2.18E+01	2.70E+02
C. Dissolved and Entrained Gases						
Kr-85	Ci	0.00E+00	0.00E+00	0.00E+00	1.42E-03	1.42E-03
Xe-131m	Ci	0.00E+00	3.14E-05	5.73E-04	1.25E-04	7.30E-04
Xe-133m	Ci	3.97E-05	1.28E-05	2.51E-04	0.00E+00	3.03E-04
Xe-135	Ci	7.32E-06	0.00E+00	7.08E-06	0.00E+00	1.44E-05
Xe-133	Ci	3.92E-03	3.43E-03	4.47E-02	1.89E-03	5.39E-02
Total For Period	Ci	3.97E-03	3.47E-03	4.55E-02	3.43E-03	5.64E-02
D. Gross Alpha Activity						
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.

Reg. Guide 1.21, Table 2B, Liquid Effluents - Batch Mode

Unit: PSL2

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Nuclides Released	Units	Batch Mode				Annual
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	
A. Fission and Activation Products						
C-14	Ci	5.01E-03	1.13E-03	2.71E-03	5.92E-04	9.45E-03
Na-24	Ci	0.00E+00	2.20E-06	0.00E+00	0.00E+00	2.20E-06
Be-7	Ci	8.47E-06	0.00E+00	0.00E+00	0.00E+00	8.47E-06
Cr-51	Ci	1.03E-05	2.23E-05	0.00E+00	0.00E+00	3.26E-05
Mn-54	Ci	1.08E-05	1.22E-05	1.09E-05	0.00E+00	3.38E-05
Fe-59	Ci	4.60E-06	0.00E+00	0.00E+00	0.00E+00	4.60E-06
Co-58	Ci	1.54E-04	1.20E-04	8.18E-05	0.00E+00	3.56E-04
Co-60	Ci	2.24E-04	1.40E-04	1.38E-04	9.59E-06	5.11E-04
Zn-65	Ci	1.09E-05	1.60E-06	6.61E-06	0.00E+00	1.91E-05
Br-82	Ci	1.57E-06	0.00E+00	0.00E+00	0.00E+00	1.57E-06
Sr-91	Ci	1.67E-06	2.16E-06	0.00E+00	0.00E+00	3.83E-06
Zr-95	Ci	1.09E-05	8.05E-06	2.19E-06	0.00E+00	2.12E-05
Nb-95	Ci	2.57E-05	1.09E-05	6.54E-07	0.00E+00	3.73E-05
Nb-97	Ci	1.51E-04	2.10E-04	1.43E-04	6.33E-06	5.09E-04
Ru-103	Ci	0.00E+00	0.00E+00	0.00E+00	8.93E-07	8.93E-07
Ag-110m	Ci	1.21E-04	1.80E-04	1.28E-04	2.19E-06	4.31E-04
Sn-113	Ci	4.20E-06	0.00E+00	0.00E+00	0.00E+00	4.20E-06
Sn-117m	Ci	1.81E-05	5.98E-05	5.70E-07	0.00E+00	7.85E-05
Sb-124	Ci	2.23E-06	8.97E-05	0.00E+00	0.00E+00	9.19E-05
Sb-122	Ci	0.00E+00	1.79E-05	0.00E+00	0.00E+00	1.79E-05
Sb-125	Ci	2.65E-04	7.36E-05	0.00E+00	0.00E+00	3.39E-04
Te-123m	Ci	3.17E-06	4.78E-05	0.00E+00	0.00E+00	5.10E-05
Te-129m	Ci	0.00E+00	1.93E-04	0.00E+00	0.00E+00	1.93E-04
Te-129	Ci	0.00E+00	5.78E-05	0.00E+00	0.00E+00	5.78E-05
Te-132	Ci	2.47E-05	5.11E-05	0.00E+00	0.00E+00	7.58E-05
I-130	Ci	8.59E-07	0.00E+00	0.00E+00	0.00E+00	8.59E-07

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

Reg. Guide 1.21, Table 2B, Liquid Effluents - Batch Mode**Unit: PSL2****Starting: 1-Jan-2015 Ending: 31-Dec-2015**

Nuclides Released	Units	Batch Mode				
		1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
I-131	Ci	0.00E+00	0.00E+00	9.98E-06	0.00E+00	9.98E-06
I-132	Ci	2.26E-05	5.47E-05	0.00E+00	0.00E+00	7.73E-05
I-134	Ci	0.00E+00	0.00E+00	7.27E-07	0.00E+00	7.27E-07
I-135	Ci	0.00E+00	4.13E-06	0.00E+00	0.00E+00	4.13E-06
Cs-137	Ci	1.63E-06	1.86E-05	0.00E+00	0.00E+00	2.02E-05
Cs-138*	Ci	5.47E-06	0.00E+00	0.00E+00	0.00E+00	5.47E-06
La-140	Ci	1.99E-05	0.00E+00	0.00E+00	0.00E+00	1.99E-05
Total For Period	Ci	6.11E-03	2.51E-03	3.24E-03	6.11E-04	1.25E-02
B. Tritium						
H-3	Ci	1.31E+02	5.18E+01	6.55E+01	2.18E+01	2.70E+02
C. Dissolved and Entrained Gases						
Kr-85	Ci	0.00E+00	0.00E+00	0.00E+00	1.42E-03	1.42E-03
Xe-131m	Ci	0.00E+00	3.14E-05	5.73E-04	1.25E-04	7.30E-04
Xe-135	Ci	7.32E-06	0.00E+00	7.08E-06	0.00E+00	1.44E-05
Xe-133m	Ci	3.97E-05	1.28E-05	2.51E-04	0.00E+00	3.03E-04
Xe-133	Ci	3.92E-03	3.43E-03	4.47E-02	1.89E-03	5.39E-02
Total For Period	Ci	3.97E-03	3.47E-03	4.55E-02	3.43E-03	5.64E-02
D. Gross Alpha Activity						
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.

TABLE 3.2
SOLID WASTE STORAGE AND SHIPMENTS
(6 PAGES)

NRC Regulatory Guide 1.21 Reports

Report Date : 2/8/2016

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
 During Period From 01/01/2015 to 12/31/2015 Percent Cutoff: 1

Waste Stream : Resins, Filters, and Evap Bottoms

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%

Waste Stream : Dry Active Waste
 DAW 48' Overpack DAW 20' Sealand DAW 40' Sealand IP-1 Bag

Waste Class	Volume		Curies Shipped	%Error (Ci)
	Ft^3	M^3		
A	5.70E+04	1.61E+03	1.13E+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	5.70E+04	1.61E+03	1.13E+00	+/-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%

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Report Date : 2/8/2016

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
 During Period From 01/01/2015 to 12/31/2015 Percent Cutoff: 1

Waste Stream : Other Waste

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%

Waste Stream : Sum of All 4 Categories
 DAW 48' Overpack DAW 20' Sealand DAW 40' Sealand IP-1 Bag

Waste Class	Volume		Curies Shipped	% Error (Ci)
	Ft^3	M^3		
A	5.70E+04	1.61E+03	1.13E+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	5.70E+04	1.61E+03	1.13E+00	+/-25%

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Report Date : 2/8/2016

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2015 to 12/31/2015

Number of Shipments	Mode of Transportation	Destination
17	Hittman Transport (TN)	EnergySolutions Bear Creek
2	Landstar	EnergySolutions Bear Creek
2	Hittman Transport (TN)	Memphis Processing LLC

NRC Regulatory Guide 1.21 Reports

Report Date : 2/8/2016

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
 During Period From 01/01/2015 to 12/31/2015 Percent Cutoff: 1

Dry Active Waste		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
H-3	29.407%	3.32E-01
Cr-51	8.221%	9.29E-02
Mn-54	1.199%	1.35E-02
Fe-55	21.190%	2.39E-01
Co-58	6.791%	7.67E-02
Co-60	12.680%	1.43E-01
Ni-63	6.759%	7.64E-02
Zr-95	3.180%	3.59E-02
Nb-95	5.348%	6.04E-02
Ag-110m	3.021%	3.41E-02
Dry Active Waste		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
H-3	29.407%	3.32E-01
Cr-51	8.221%	9.29E-02
Mn-54	1.199%	1.35E-02
Fe-55	21.190%	2.39E-01
Co-58	6.791%	7.67E-02
Co-60	12.680%	1.43E-01
Ni-63	6.759%	7.64E-02
Zr-95	3.180%	3.59E-02
Nb-95	5.348%	6.04E-02
Ag-110m	3.021%	3.41E-02
Sum of All 4 Categories		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
H-3	29.407%	3.32E-01
Cr-51	8.221%	9.29E-02
Mn-54	1.199%	1.35E-02
Fe-55	21.190%	2.39E-01
Co-58	6.791%	7.67E-02
Co-60	12.680%	1.43E-01
Ni-63	6.759%	7.64E-02
Zr-95	3.180%	3.59E-02
Nb-95	5.348%	6.04E-02
Ag-110m	3.021%	3.41E-02
Sum of All 4 Categories		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
H-3	29.407%	3.32E-01
Cr-51	8.221%	9.29E-02
Mn-54	1.199%	1.35E-02
Fe-55	21.190%	2.39E-01
Co-58	6.791%	7.67E-02

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Report Date: 2/8/2016

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2015 to 12/31/2015 Percent Cutoff: 1

Co-60	12.680%	1.43E-01
Ni-63	6.759%	7.64E-02
Zr-95	3.180%	3.59E-02
Nb-95	5.348%	6.04E-02
Ag-110m	3.021%	3.41E-02

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Report Date : 2/8/2016

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2015 to 12/31/2015

Manifest Number	Date Shipped	Waste Volume Used	Burial volume Used
FPL/PSL 15-119	10/8/2015	Yes	
FPL/PSL 15-120	10/8/2015	Yes	
FPL/PSL 15-110	9/24/2015	Yes	
FPL/PSL 15-108	9/23/2015	Yes	
FPL/PSL 15-093	8/20/2015	Yes	
FPL/PSL 15-083	7/20/2015	Yes	
FPL/PSL 15-079	7/15/2015	Yes	
FPL/PSL 15-080	7/15/2015	Yes	
FPL/PSL 15-074	7/13/2015	Yes	
FPL/PSL 15-075	7/13/2015	Yes	
FPL/PSL 15-072	7/9/2015	Yes	
FPL/PSL 15-071	7/9/2015	Yes	
FPL/PSL 15-069	6/29/2015	Yes	
FPL/PSL 15-068	6/29/2015	Yes	
FPL/PSL 15-044	4/8/2015	Yes	
FPL/PSL 15-029	3/11/2015	Yes	
FPL/PSL 15-028	3/11/2015	Yes	
FPL/PSL 15-022	3/3/2015		Yes
FPL/PSL 15-013	2/11/2015	Yes	
FPL/PSL 15-003	1/14/2015	Yes	
FPL/PSL 15-002	1/12/2015		Yes

TABLE 3.3

DOSE ASSESSMENTS
(15 PAGES)

Reg. Guide 1.21, App B, Sec E3 - Doses due to Radioiodines, Tritium, and Particulates in Gaseous Releases

Unit: Site

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Organ Dose	Units	1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
Bone	mRem	1.75E-01	1.56E-01	1.67E-01	1.67E-01	6.65E-01
Limit	mRem					
Percent of Limit	%					
Liver	mRem	1.79E-01	1.60E-01	1.72E-01	1.81E-01	6.92E-01
Limit	mRem					
Percent of Limit	%					
Total Body	mRem	1.79E-01	1.60E-01	1.72E-01	1.81E-01	6.92E-01
Limit	mRem					
Percent of Limit	%					
Thyroid	mRem	1.81E-01	1.61E-01	1.98E-01	1.83E-01	7.24E-01
Limit	mRem					
Percent of Limit	%					
Kidney	mRem	2.28E-02	2.05E-02	2.18E-02	2.58E-02	9.09E-02
Limit	mRem					
Percent of Limit	%					
Lung	mRem	1.79E-01	1.60E-01	1.72E-01	1.81E-01	6.92E-01
Limit	mRem					
Percent of Limit	%					
GI-Li	mRem	1.79E-01	1.60E-01	1.72E-01	1.81E-01	6.92E-01
Limit	mRem					
Percent of Limit	%					

Period: Ann, 2015

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
NW Site Boundary - In	Infant	6.649E-01	6.922E-01	6.920E-01	7.243E-01	9.091E-02	6.920E-01	6.920E-01	0.000E+00
WNW Site Boundary - I	Infant	9.689E-06	9.689E-06	9.689E-06	9.689E-06	9.689E-06	9.689E-06	9.689E-06	0.000E+00
Maximum Doserate by Organ:		6.649E-01	6.922E-01	6.920E-01	7.243E-01	9.091E-02	6.920E-01	6.920E-01	0.000E+00

Maximum Organ Doserate (mRem/yr): 7.243E-01

Maximum Total Body Doserate (mRem/yr): 6.920E-01

Site Boundary NG Doserate Summary

Gas Receptor Location	Gamma (mRad/yr)	Beta (mRad/yr)	Total Body (mRem/yr)	Skin (mRem/yr)
NW Site Boundary	3.527E-03	1.876E-03	3.335E-03	5.011E-03
WNW Site Boundary	3.038E-03	1.616E-03	2.873E-03	4.317E-03
Maximum NG Dose Rate:	3.527E-03	1.876E-03	3.335E-03	5.011E-03

Reg. Guide 1.21, App B, Sec E3 - Doses due to Radioiodines, Tritium, and Particulates in Gaseous Releases

Unit: PSL1

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Organ Dose	Units	1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
Bone	mRem	8.50E-02	7.00E-02	9.49E-02	9.76E-02	3.48E-01
Limit	mRem					
Percent of Limit	%					
Liver	mRem	8.67E-02	7.24E-02	9.48E-02	1.02E-01	3.56E-01
Limit	mRem					
Percent of Limit	%					
Total Body	mRem	8.67E-02	7.24E-02	9.48E-02	1.02E-01	3.56E-01
Limit	mRem					
Percent of Limit	%					
Thyroid	mRem	8.86E-02	7.28E-02	9.48E-02	1.02E-01	3.58E-01
Limit	mRem					
Percent of Limit	%					
Kidney	mRem	1.09E-02	9.35E-03	1.12E-02	1.34E-02	4.48E-02
Limit	mRem					
Percent of Limit	%					
Lung	mRem	8.67E-02	7.24E-02	9.48E-02	1.02E-01	3.56E-01
Limit	mRem					
Percent of Limit	%					
GI-Li	mRem	8.67E-02	7.24E-02	9.48E-02	1.02E-01	3.56E-01
Limit	mRem					
Percent of Limit	%					

Period: Ann, 2015

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>
NW Site Boundary - In	Infant	3.476E-01	3.556E-01	3.556E-01	3.580E-01	4.482E-02	3.556E-01	3.556E-01	0.000E+00
WNW Site Boundary - I	Infant	4.240E-06	4.240E-06	4.240E-06	4.240E-06	4.240E-06	4.240E-06	4.240E-06	0.000E+00
Maximum Doserate by Organ:		3.476E-01	3.556E-01	3.556E-01	3.580E-01	4.482E-02	3.556E-01	3.556E-01	0.000E+00

Maximum Organ Doserate (mRem/yr): 3.580E-01

Maximum Total Body Doserate (mRem/yr): 3.556E-01

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	1.157E-03	4.438E-04	1.099E-03	1.624E-03
WNW Site Boundary	9.968E-04	3.823E-04	9.468E-04	1.399E-03
Maximum NG Dose Rate:	1.157E-03	4.438E-04	1.099E-03	1.624E-03

Reg. Guide 1.21, App B, Sec E3 - Doses due to Radioiodines, Tritium, and Particulates in Gaseous Releases

Unit: PSL2

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Organ Dose	Units	1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
Bone	mRem	8.95E-02	8.58E-02	7.24E-02	6.96E-02	3.17E-01
Limit	mRem					
Percent of Limit	%					
Liver	mRem	9.25E-02	8.80E-02	7.69E-02	7.91E-02	3.37E-01
Limit	mRem					
Percent of Limit	%					
Total Body	mRem	9.24E-02	8.80E-02	7.69E-02	7.91E-02	3.36E-01
Limit	mRem					
Percent of Limit	%					
Thyroid	mRem	9.26E-02	8.80E-02	1.04E-01	8.17E-02	3.66E-01
Limit	mRem					
Percent of Limit	%					
Kidney	mRem	1.20E-02	1.12E-02	1.06E-02	1.24E-02	4.61E-02
Limit	mRem					
Percent of Limit	%					
Lung	mRem	9.24E-02	8.80E-02	7.69E-02	7.91E-02	3.36E-01
Limit	mRem					
Percent of Limit	%					
GI-Li	mRem	9.24E-02	8.80E-02	7.69E-02	7.91E-02	3.36E-01
Limit	mRem					
Percent of Limit	%					

Period: Ann, 2015

Site/Unit/Discharge Point: PSL2

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

Receptor	Agegroup	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-Lli	Skin
NW Site Boundary - In	Infant	3.173E-01	3.365E-01	3.364E-01	3.663E-01	4.610E-02	3.364E-01	3.364E-01	0.000E+00
WNW Site Boundary - I	Infant	5.448E-06	5.448E-06	5.448E-06	5.448E-06	5.448E-06	5.448E-06	5.448E-06	0.000E+00
Maximum Doserate by Organ:		3.173E-01	3.365E-01	3.364E-01	3.663E-01	4.610E-02	3.364E-01	3.364E-01	0.000E+00

Maximum Organ Doserate (mRem/yr): 3.663E-01

Maximum Total Body Doserate (mRem/yr): 3.364E-01

Site Boundary NG Doserate Summary

Gas Receptor Location	Gamma (mRad/yr)	Beta (mRad/yr)	Total Body (mRem/yr)	Skin (mRem/yr)
NW Site Boundary	2.370E-03	1.432E-03	2.236E-03	3.387E-03
WNW Site Boundary	2.041E-03	1.234E-03	1.927E-03	2.918E-03
Maximum NG Dose Rate:	2.370E-03	1.432E-03	2.236E-03	3.387E-03

Reg. Guide 1.21, App B, Sec E2 - Air Doses Due To Gaseous Releases

Unit: Site

Starting: 1-Jan-2015 Ending: 31-Dec-2015

NG Dose	Units	1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
Gamma Air	mRad	1.11E-03	2.99E-04	1.19E-03	9.29E-04	3.53E-03
Limit	mRad					
Percent of Limit	%					
Beta Air	mRad	4.24E-04	2.66E-04	9.34E-04	2.52E-04	1.88E-03
Limit	mRad					
Percent of Limit	%					
NG Total Body	mRem	1.05E-03	2.79E-04	1.11E-03	8.95E-04	3.34E-03
Limit	mRem					
Percent of Limit	%					
NG Skin	mRem	1.55E-03	4.69E-04	1.78E-03	1.21E-03	5.01E-03
Limit	mRem					
Percent of Limit	%					

Reg. Guide 1.21, App B, Sec E2 - Air Doses Due To Gaseous Releases

Unit: PSL1

Starting: 1-Jan-2015 Ending: 31-Dec-2015

NG Dose	Units	1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
Gamma Air	mRad	9.27E-04	5.93E-05	8.90E-05	8.17E-05	1.16E-03
Limit	mRad					
Percent of Limit	%					
Beta Air	mRad	3.55E-04	2.21E-05	3.49E-05	3.20E-05	4.44E-04
Limit	mRad					
Percent of Limit	%					
NG Total Body	mRem	8.81E-04	5.63E-05	8.45E-05	7.76E-05	1.10E-03
Limit	mRem					
Percent of Limit	%					
NG Skin	mRem	1.30E-03	8.27E-05	1.25E-04	1.14E-04	1.62E-03
Limit	mRem					
Percent of Limit	%					

Reg. Guide 1.21, App B, Sec E2 - Air Doses Due To Gaseous Releases

Unit: PSL2

Starting: 1-Jan-2015 Ending: 31-Dec-2015

NG Dose	Units	1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
Gamma Air	mRad	1.78E-04	2.40E-04	1.10E-03	8.48E-04	2.37E-03
Limit	mRad					
Percent of Limit	%					
Beta Air	mRad	6.91E-05	2.44E-04	8.99E-04	2.20E-04	1.43E-03
Limit	mRad					
Percent of Limit	%					
NG Total Body	mRem	1.69E-04	2.23E-04	1.03E-03	8.17E-04	2.24E-03
Limit	mRem					
Percent of Limit	%					
NG Skin	mRem	2.50E-04	3.86E-04	1.66E-03	1.09E-03	3.39E-03
Limit	mRem					
Percent of Limit	%					

Reg. Guide 1.21, App B, Sec E1 - Doses to a member of the public due to Liquid Releases

Unit: Site

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Ogan Dose	Units	1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
Bone	mRem	8.18E-04	2.90E-04	5.44E-04	1.19E-04	1.77E-03
Limit	mRem					
Percent of Limit	%					
Liver	mRem	1.94E-03	8.82E-04	1.22E-03	3.54E-04	4.39E-03
Limit	mRem					
Percent of Limit	%					
Total Body	mRem	1.86E-03	8.74E-04	1.16E-03	3.55E-04	4.26E-03
Limit	mRem					
Percent of Limit	%					
Thyroid	mRem	1.75E-03	8.34E-04	1.13E-03	3.53E-04	4.05E-03
Limit	mRem					
Percent of Limit	%					
Kidney	mRem	2.00E-03	1.00E-03	1.25E-03	4.00E-04	4.65E-03
Limit	mRem					
Percent of Limit	%					
Lung	mRem	1.91E-03	9.00E-04	1.09E-03	3.53E-04	4.25E-03
Limit	mRem					
Percent of Limit	%					
GI-Lli	mRem	5.06E-03	4.33E-03	3.74E-03	4.34E-04	1.36E-02
Limit	mRem					
Percent of Limit	%					

Period: Ann, 2015

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 Receptor - Teenager	Teenager	1.445E-03	4.392E-03	4.256E-03	4.051E-03	4.649E-03	4.248E-03	1.356E-02	0.000E+00
Liquid Recptor - Child	Child	1.772E-03	4.139E-03	4.119E-03	3.986E-03	2.020E-03	4.045E-03	7.954E-03	0.000E+00
Maximum Dose by Organ:		1.772E-03	4.392E-03	4.256E-03	4.051E-03	4.649E-03	4.248E-03	1.356E-02	0.000E+00

Maximum Organ Dose (mRem): 1.356E-02

Maximum Total Body Dose (mRem): 4.256E-03

Reg. Guide 1.21, App B, Sec E1 - Doses to a member of the public due to Liquid Releases

Unit: PSL1

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Ogan Dose	Units	1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
Bone	mRem	4.09E-04	1.45E-04	2.72E-04	5.95E-05	8.86E-04
Limit	mRem					
Percent of Limit	%					
Liver	mRem	9.70E-04	4.41E-04	6.08E-04	1.77E-04	2.20E-03
Limit	mRem					
Percent of Limit	%					
Total Body	mRem	9.31E-04	4.37E-04	5.82E-04	1.78E-04	2.13E-03
Limit	mRem					
Percent of Limit	%					
Thyroid	mRem	8.73E-04	4.17E-04	5.64E-04	1.76E-04	2.03E-03
Limit	mRem					
Percent of Limit	%					
Kidney	mRem	9.98E-04	5.02E-04	6.25E-04	2.00E-04	2.32E-03
Limit	mRem					
Percent of Limit	%					
Lung	mRem	9.57E-04	4.50E-04	5.45E-04	1.76E-04	2.12E-03
Limit	mRem					
Percent of Limit	%					
GI-Lli	mRem	2.53E-03	2.16E-03	1.87E-03	2.17E-04	6.78E-03
Limit	mRem					
Percent of Limit	%					

Period: Ann, 2015

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 Receptor - Teenager	Teenager	7.226E-04	2.196E-03	2.128E-03	2.025E-03	2.325E-03	2.124E-03	6.781E-03	0.000E+00
Liquid Receptor - Child	Child	8.859E-04	2.070E-03	2.060E-03	1.993E-03	1.010E-03	2.023E-03	3.977E-03	0.000E+00
Maximum Dose by Organ:		8.859E-04	2.196E-03	2.128E-03	2.025E-03	2.325E-03	2.124E-03	6.781E-03	0.000E+00

Maximum Organ Dose (mRem): 6.781E-03

Maximum Total Body Dose (mRem): 2.128E-03

Reg. Guide 1.21, App B, Sec E1 - Doses to a member of the public due to Liquid Releases

Unit: PSL2

Starting: 1-Jan-2015 Ending: 31-Dec-2015

Ogan Dose	Units	1ST Quarter	2ND Quarter	3RD Quarter	4TH Quarter	Annual
Bone	mRem	4.09E-04	1.45E-04	2.72E-04	5.95E-05	8.86E-04
Limit	mRem					
Percent of Limit	%					
Liver	mRem	9.70E-04	4.41E-04	6.08E-04	1.77E-04	2.20E-03
Limit	mRem					
Percent of Limit	%					
Total Body	mRem	9.31E-04	4.37E-04	5.82E-04	1.78E-04	2.13E-03
Limit	mRem					
Percent of Limit	%					
Thyroid	mRem	8.73E-04	4.17E-04	5.64E-04	1.76E-04	2.03E-03
Limit	mRem					
Percent of Limit	%					
Kidney	mRem	9.98E-04	5.02E-04	6.25E-04	2.00E-04	2.32E-03
Limit	mRem					
Percent of Limit	%					
Lung	mRem	9.57E-04	4.50E-04	5.45E-04	1.76E-04	2.12E-03
Limit	mRem					
Percent of Limit	%					
GI-Lli	mRem	2.53E-03	2.16E-03	1.87E-03	2.17E-04	6.78E-03
Limit	mRem					
Percent of Limit	%					

Period: Ann, 2015

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-Lli</u>	<u>Skin</u>
Liquid Receptor - Teenager	Teenager	7.226E-04	2.196E-03	2.128E-03	2.025E-03	2.325E-03	2.124E-03	6.781E-03	0.000E+00
Liquid Receptor - Child	Child	8.859E-04	2.070E-03	2.060E-03	1.993E-03	1.010E-03	2.023E-03	3.977E-03	0.000E+00

Maximum Dose by Organ:	8.859E-04	2.196E-03	2.128E-03	2.025E-03	2.325E-03	2.124E-03	6.781E-03	0.000E+00
------------------------	-----------	-----------	-----------	-----------	-----------	-----------	-----------	-----------

Maximum Organ Dose (mRem): 6.781E-03

Maximum Total Body Dose (mRem): 2.128E-03

TABLE 3.4
VISITOR DOSE
(1 PAGE)

3.4 Visitor Dose

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 mile 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 2015.

VISITOR DOSE RESULTS FOR CALENDAR YEAR 2015 were:

Noble Gas Dose	mrad
Gamma Air Dose	1.09E-03
Beta Air Dose	5.77E-04

Gas, Particulate, Iodine, Carbon Dose	mrem
Bone	1.08E-01
Liver	1.13E-01
Thyroid	1.18E-01
Kidney	1.48E-02
Lung	1.13E-01
GI-LLI	1.13E-01
Total Body	1.13E-01


ENCLOSURE 3

C-200, OFFSITE DOSE CALCULATION MANUAL
REVISION 44 (PCR 1974178) AND REVISION 45 (PCR 2067790)
MARKED UP PAGES
(8 PAGES excludes blank page)

FOR INFORMATION ONLY

Before use, verify revision and change documentation (if applicable) with a controlled index or document.

DATE VERIFIED _____ INITIAL _____

 FPL	ST. LUCIE PLANT CHEMISTRY OPERATING PROCEDURE SAFETY RELATED REFERENCE USE	Procedure No. C-200
		Current Revision No. 4445

Title: **OFFSITE DOSE CALCULATION MANUAL (ODCM)**

Responsible Department: **CHEMISTRY**

REVISION SUMMARY:

Revision 45 - Incorporated PCR 2067790 for addition of Unit 1 and 2 containment equipment hatch monitoring as potential effluent pathways during outages.

Revision 44 - Incorporated PCR 1974178 to implement changes documented in EC 277011 for replacement of U1 PV Radiation Monitor. Updated monitor channel IDs. The new U1 PV Mirion MGP Radiation Monitor does not have a particulate, iodine, or mid range gas detector channel. (Author: J. Hunt)

Revision 43 - Incorporated PCR 1971488 to incorporate changes documented in EC 277010 for replacement of U1 FHB Rad Monitor. Updated monitor channel IDs. The new U1 FHB Rad Monitor does not have an iodine channel. (Author: J. Hunt)

AND

Incorporated PCR 1970406 to provide improved guidance during gaseous radiation monitor inoperability and when annunciation is lost to the control room. Removed unclear guidance that releases may continue during inoperability for up to 30 days. (Author: J. Hunt)

AND

Incorporated PCR 1994917 to remove the goat from Figure 1-2 located at "WSW-3.5, GOAT". The goat is no longer at this location as documented in the Annual Land Use Census. (Author: J. Hunt)

AND

Incorporated PCR 2002584 to improve guidance for conducting REMP Program Supplemental Sampling. (Author: J. Hunt)

Revision 42 - Incorporated PCR 1966270 per AR 1932155 to add changes for development of a strategy that ensures a rapid method to release water from retention ponds either prior or

Revision	Approved By	Approval Date	UNIT #
0	C.M. Wethy	04/27/82	DATE
			DOCT
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			SYS
			STATUS
			REV
			# OF PGS

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TABLE 4.11-2
RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM
(Page 1 of 3)

Gaseous Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection LLD (1) ($\mu\text{Ci/ml}$)
1. Waste Gas Storage Tank	P Each Tank Grab Sample	P Each Tank	Noble Gas P.G.E. (2)	1.E-04
2. Containment Purge (9)	P Each Purge (6) Grab Sample	P Each Purge (6) (7)	Noble Gas P.G.E. (2)	1.E-04
			H-3	1.E-06
3. Vents:(9) a. Plant b. Fuel Bldg (5) c. S/G Blowdown Bldg.	4/M Grab Sample (8)	4/M (7)	Noble Gas P.G.E. (2)	1.E-04
			H-3	1.E-06
4. All Release Types as listed in 3. above (9)	Continuous (3) (8)	4/M Charcoal Sample (4)	I-131	1.E-12
		4/M Particulate Sample (4)	P.G.E.	1.E-11
		4/M Particulate Sample	Gross Alpha	1.E-11
		Q Composite Particulate Sample	Sr-89, Sr-90	1.E-11
		Noble Gas Monitor	Noble Gases Gross Beta or Gamma	1.E-06
5. Cask Handling Facility Vent (8)	W Grab Sample (8)	W	Noble Gas P.G.E. (2)	1. E-04
			H-3	1.E-06
	Continuous (8)	W Charcoal Sample	I-131	1.E-12
		W Particulate Sample	P.G.E.	1.E-11
		W Particulate Sample	Gross Alpha	1.E-11
Q Composite Particulate Sample	Sr-89, Sr-90	1.E-11		

P.G.E. - Denotes Principal Gamma Emitter

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TABLE 4.11-2
RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

(Page 3 of 3)

TABLE NOTATIONS

(continued)

- (2) The principal gamma emitters for which the LLD control applies include the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135 and Xe-138 in noble gas releases and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, I-131, Cs-134, Cs-137, Ce-141 and Ce-144 in Iodine and particulate releases. This list does not mean that only these nuclides are to be considered. Other gamma peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Annual Radioactive Effluent Release Report pursuant to Control 3.11.2.6 in the format outlined in Regulatory Guide 1.21, Appendix B, Revision 1, June 1974.
- (3) The ratio of the sample flow rate to the sampled stream flow rate shall be known for the time period covered by each dose or dose rate calculation made in accordance with Controls 3.11.2.1, 3.11.2.2 and 3.11.2.3.
- (4) Samples shall be changed at least four times per month and analyses shall be completed within 48 hours after changing or after removal from sampler. Sampling shall also be performed at least once per 24 hours for at least 7 days following each shutdown, startup or THERMAL POWER change exceeding 15% of RATED THERMAL POWER within a 1-hour period and analyses shall be completed within 48 hours of changing. When samples collected for 24 hours are analyzed, the corresponding LLDs may be increased by a factor of 10. This requirement does not apply if: (1) analysis shows that the DOSE EQUIVALENT I-131 concentration in the reactor coolant has not increased more than a factor of 3; and (2) the noble gas monitor shows that effluent activity has not increased by more than a factor of 3.
- (5) Tritium grab samples shall be taken at least 4/M from the ventilation exhaust from the spent fuel pool area, whenever spent fuel is in the spent fuel pool.
- (6) Sampling and analysis shall also be performed following shutdown, startup or a THERMAL POWER change exceeding 15% of RATED THERMAL POWER within 1 hour unless (1) analysis shows that the DOSE EQUIVALENT I-131 concentration in the primary coolant has not increased more than a factor of 3; and (2) the noble gas activity monitor shows that effluent activity has not increased by more than a factor of 3.
- (7) Tritium analysis may be delayed for up to 14 days if the LLD is still attainable at the new counting time.
- (8) Frequencies applicable only when the ventilation system is operating.

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- (9) During outages, the affected unit's containment equipment hatch is a potential effluent pathway. Monitoring of the open containment equipment hatch is performed as per procedural guidance. Any calculated release quantity will be reported in the annual report.

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Before use, verify revision and change documentation (if applicable) with a controlled index or document.

INITIAL _____

DATE VERIFIED _____

 FPL	ST. LUCIE PLANT CHEMISTRY OPERATING PROCEDURE SAFETY RELATED REFERENCE USE	Procedure No. C-200
		Current Revision No. 4344

Title: **OFFSITE DOSE CALCULATION MANUAL (ODCM)**

Responsible Department: **CHEMISTRY**

REVISION SUMMARY:

Revision 44 - Incorporated PCR 1974178 to implement changes documented in EC 277011 for replacement of U1 PV Radiation Monitor. Updated monitor channel IDs. The new U1 PV Mirion MGP Radiation Monitor does not have a particulate, iodine, or mid range gas detector channel. (Author: J. Hunt)

Revision 43 - Incorporated PCR 1971488 to incorporate changes documented in EC 277010 for replacement of U1 FHB Rad Monitor. Updated monitor channel IDs. The new U1 FHB Rad Monitor does not have an iodine channel. (Author: J. Hunt)

AND

Incorporated PCR 1970406 to provide improved guidance during gaseous radiation monitor inoperability and when annunciation is lost to the control room. Removed unclear guidance that releases may continue during inoperability for up to 30 days. (Author: J. Hunt)

AND

Incorporated PCR 1994917 to remove the goat from Figure 1-2 located at "WSW-3.5, GOAT". The goat is no longer at this location as documented in the Annual Land Use Census. (Author: J. Hunt)

AND

Incorporated PCR 2002584 to improve guidance for conducting REMP Program Supplemental Sampling. (Author: J. Hunt)

Revision 42 - Incorporated PCR 1966270 per AR 1932155 to add changes for development of a strategy that ensures a rapid method to release water from retention ponds either prior or during severe weather events and emergency conditions. (Author: J. Hunt)

Revision 41 - Incorporated PCR 1839250 to update procedure number reference.

Revision	Approved By	Approval Date	UNIT #
0	C.M. Wethy	04/27/82	DATE
			DOCT
			DOCN
			SYS
			STATUS
			REV
			# OF PGS

PROCEDURE
C-200
COMPLETED
43

REVISION NO.:	PROCEDURE TITLE:	PAGE:
4344	OFFSITE DOSE CALCULATION MANUAL (ODCM)	27 of 231
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C-200		

TABLE 3.3-14
RADIOACTIVE EFFLUENT MONITOR SETPOINT BASIS
 (Page 1 of 4)

ODCM Effluent Gas Channels	CHANNEL ID	BASIS DOCUMENT	ALERT SETPOINT ^e	HIGH SETPOINT ^e
1PV LOW RANGE GAS	RSC26_1L 01-05	C-200 ^a	5 x Bkg. ^q	Allotted % Of Site Limit ^g
1FHB LOW RANGE GAS	RSC26_4L	C-200 ^a	5 x Bkg. ^q	Allotted % Of Site Limit ^g
2A PV PIG LOW RANGE GAS	423	C-200 ^a	5 x Bkg. ^q	Allotted % Of Site Limit ^g For Plant Vent #2
2B PV PIG LOW RANGE GAS	433	C-200 ^a	5 x Bkg.	
2FHB LOW RANGE GAS	413	C-200 ^a	5 x Bkg.	Allotted % Of Site Limit ^g
SGBDB LOW RANGE GAS	45-6	C-200 ^a	5 x Bkg.	Allotted % Of Site Limit ^g
1 CONDENSER AIR EJECTOR	35	C-200	2 x Bkg. ^b	3 x Bkg.
2 CONDENSER AIR EJECTOR	403	C-200	2 x Bkg. ^b	3 x Bkg.
1 BATCH GAS EFFLUENT	42	C-200 ^a	As Per CY-SL-102-0105	As Per CY-SL-102-0105 ^{a,h}
2 BATCH GAS EFFLUENT	203	C-200 ^a	As Per CY-SL-102-0105	As Per CY-SL-102-0105 ^{a,h}
<u>2PV WRGM</u>	<u>Chan</u>			
Low Range Gas	621	624 ^P	C-200 ^a	5 x Bkg. ^P uCi/sec
Mid Range Gas	622			
High Range Gas	623			
<u>2A ECCS WRGM</u>	<u>Chan</u>			
Low Range Gas	601	604 ^P	C-200 ^a	0.75 x High ^P uCi/sec
Mid Range Gas	602			
High Range Gas	603			
<u>2B ECCS WRGM</u>	<u>Chan</u>			
Low Range Gas	611	614 ^P	C-200 ^a	0.75 x High ^P uCi/sec
Mid Range Gas	612			
High Range Gas	613			

ODCM Related Particulate Channels	CHANNEL ID	BASIS DOCUMENT	ALERT SETPOINT ^e	HIGH SETPOINT ^e
1PV PARTICULATE	01-04	FUSAR	5000 CPM	40,000 CPM ^c
1FHB PARTICULATE	RSC26_4P	FUSAR & TS ^d	5000 CPM	10,000 CPM ^c
2A PV PIG PARTICULATE	421	FUSAR	5000 CPM	10,000 CPM ^c
2B PV PIG PARTICULATE	431	FUSAR	5000 CPM	10,000 CPM ^c
2FHB PARTICULATE	411	FUSAR & TS ^d	5000 CPM	10,000 CPM ^c
SGBDB PARTICULATE	45-4	FUSAR	5000 CPM	10,000 CPM ^c

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TABLE 3.3-14
RADIOACTIVE EFFLUENT MONITOR SETPOINT BASIS
(Page 2 of 4)

ODCM Related Iodine Channels	CHANNEL ID	BASIS DOCUMENT	ALERT SETPOINT ^e	HIGH SETPOINT ^e
1PV IODINE	01-03	FUSAR	5000 CPM	10,000 CPM ^e
2A PV PIG IODINE	422	FUSAR	5000 CPM	10,000 CPM ^c
2B PV PIG IODINE	432	FUSAR	5000 CPM	10,000 CPM ^c
2FHB IODINE	412	FUSAR	5000 CPM	10,000 CPM ^c
SGBDB IODINE	45-5	FUSAR	5000 CPM	10,000 CPM ^c

ODCM Related Liquid Channels	CHANNEL ID	BASIS DOCUMENT	ALERT SETPOINT ^e	HIGH SETPOINT ^e
1A S/G BLOWDOWN	44	C-200	2 x Bkg.	2.E-04 uCi/ml ^{f,m}
1B S/G BLOWDOWN	45	C-200	2 x Bkg.	2.E-04 uCi/ml ^{f,m}
2A S/G BLOWDOWN	121	C-200	2 x Bkg.	2.E-04 uCi/ml ^m
2B S/G BLOWDOWN	122	C-200	2 x Bkg.	2.E-04 uCi/ml ^m
1 BATCH LIQUID EFFLUENT	R6627	C-200	As Per CY-SL-102-0104	As Per CY-SL-102-0104 ⁿ
2 BATCH LIQUID EFFLUENT	301	C-200	As Per CY-SL-102-0104	As Per CY-SL-102-0104 ⁿ

Monitor channels not listed are covered per CY-SL-104-0112, Determination of Process Radiation Monitor Setpoints

TABLE NOTATIONS

- a - ODCM Control 3.11.2.1a
- b - ODCM Table 4.11-1 Note (7)
- c - ODCM Control 3.11.2.1.b
- d - TS Table 3.3-6 required instrument 2.a.ii with setpoint per ODCM
- e - Setpoints may be rounded for analog and digital display input limitations.
- f - The channel setpoint to be in cpm equivalent to this activity
- g - per ODCM Methodology Step 2.2.2
- h - Batch Gaseous Release Rate and Maximum activity limits shall be used such that Plant Vent (PV) Release HIGH setpoints should not be exceeded.
- i, j, k, and l not used in notation for clarity

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METHODOLOGY SECTION

2.2 Determining the Total Body and Skin Dose Rates for Noble Gas Releases And Establishing Setpoints for Effluent Monitors (continued)

1. (continued)

- B. No Particulate or Iodine Radioactivity Channels are required by the ODCM. Table 3.3-13 requires Iodine and Particulate Samplers only. Technical Specification Table 3.3-6 requires a Fuel Building Vent Particulate Channel (the bases for the setpoint on the Fuel Building Vent Particulate Channel is described in 2.2.1.C). The Unit 2 FUSAR does describe Particulate and Iodine Radioactivity Channels. These Channels are listed in ODCM Table 3.3-14 and ALERT and HIGH Setpoints are provided. The intent of providing these setpoints is to provide early warning that the effluent pathway conditions have increased such that a grab sample should be obtained if a HIGH Alarm Setpoint is reached or exceeded. The Particulate and Iodine HIGH Alarm Setpoint bases is that the collection mediums are fixed filter where continuing deposition of radioactivity would cause a increase in the channel count rate up to the setpoint level(s), the resulting dose rate can be shown to be less than 1 percent of the site limit for ODCM Control 3.11.2.1.b for Iodine-131, Iodine-133, and all radionuclides in particulate from with half-lives greater than 8 days, is that these channel detectors are gross activity monitors of the scintillation type where the count rate is not dependent (above threshold) on the energy of the isotope entrained on the collection medium, and that these channels are qualitative trend indicators since the channel count rate cannot be corrected for the accrued sample collection volume. Plant historical trends have shown that Noble Gas Activity may contribute to the count rate of the Reactor Auxiliary Building (Plant) Vent Particulate and Iodine Channel(s). In this event the Noble Gas contribution may be added to the Table 3.3-14 Alert and High Setpoints for Unit 2 Plant Vents only.

The sampling mediums associated with the Particulate and Iodine Channels in Table 3.3-14 are also controlled by the requirements of ODCM Table 4.11-2 which requires 4/M Minimum Analysis Frequency of the sampling mediums. These analysis are used to confirm and quantify the isotopic composition of the radioactivity being monitored by these channels. The presence of Noble Gas on collection medium would be confirmed by these analysis.


ENCLOSURE 5

0520025, PROCESS CONTROL PROGRAM
REVISION 14 (PCR 2042572) AND REVISION 15 (PCR 2062643)
MARKED UP PAGES
(11 PAGES excludes blank page)

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Before use, verify revision and change documentation (if applicable) with a controlled index or document.

DATE VERIFIED _____ INITIAL _____

 FPL	<h1 style="text-align: center;">ST. LUCIE PLANT</h1> <h2 style="text-align: center;">ADMINISTRATIVE PROCEDURE</h2> <p style="text-align: center;">NON-SAFETY RELATED REFERENCE USE</p>	Procedure No. 0520025
		Current Revision No. 13C
		Effective Date 12/04/09

Title: **PROCESS CONTROL PROGRAM**

Responsible Department: **HEALTH PHYSICS**

REVISION SUMMARY:

REVISION 13D – Changed HPS to RPM and FRG to ORG, removed reference to deleted T.S 6.10.2q, replaced HP-40 with RP-AA-108-1002 radioactive shipment procedure, removed Barnwell facility (no longer used), ~~removed container type from effluent report not required by reg 1.21~~ and added as applicable for solidification agent and remove ref procedure OM-048-WS.

REVISION 13C - Incorporated PCR 09-3004 for CR 2007-21553. Several steps reference the old FRG terminology and need to be updated to reflect ORG instead.
(Author: Nathan Rightmer)

REVISION 13B - Incorporated PCR 05-3003 for CR 2005-18614 to add Level of Use to procedure cover page. (Helga Baranowsky, 09/29/05)

REVISION 13A - Incorporated PCR 03-3437 to change delegation of procedure from Safety Related to Non-Safety Related. (Bonnie Wooldridge, 12/04/03)

REVISION 13 - Made changes to References Section. (Bruce Somers, 07/20/99)

Revision <u>0</u>	FRG Review Date <u>12/28/82</u>	Approved By <u>J.H. Barrow (for)</u> Plant General Manager	Approval Date <u>12/28/82</u>	S__OPS DATE DOCT PROCEDURE DOCN 0520025 SYS COM COMPLETED ITM 13C
Revision <u>13C</u>	FRG Review Date <u>07/20/99</u>	Approved By <u>R.G. West</u> Plant General Manager N/A Authorized Approver <u>Eric Katzman</u> Authorized Approver (Minor Correction)	Approval Date <u>07/20/99</u> <u>11/13/09</u>	

REVISION NO.: 13C	PROCEDURE TITLE: PROCESS CONTROL PROGRAM	PAGE: 3 of 12
PROCEDURE NO.: 0520025	ST. LUCIE PLANT	
<p>1.0 TITLE</p> <p>PROCESS CONTROL PROGRAM</p> <p>2.0 REVIEW AND APPROVAL</p> <p>See cover page</p> <p>3.0 SCOPE</p> <p>3.1 Purpose</p> <p>The St. Lucie Plant Process Control Program (PCP) implements the requirements of 10 CFR Part 50.36a and General Design Criterion 60 of Appendix A to 10 CFR 50. Specifically, the PCP applies to waste form classification of all radioactive waste destined for land burial in accordance with 10 CFR 20.2006. In addition, the specific requirements are provided for dewatering of bead resins for disposal and for vendor supplied processes for solidification, encapsulation or absorption of liquid or wet solid radioactive wastes when performed on site and under the licenses issued to the St. Lucie Plant by the Nuclear Regulatory Commission.</p> <p>If the Rradioactive waste that is shipped to a licensed radioactive waste disposal facility for disposal, the St. Lucie Plant is responsible to meet all of the license conditions, including waste form and waste classification requirements of the disposal sites radioactive material license.</p> <p>If the Rradioactive waste that is shipped to a radioactive waste processor for further processing of the waste prior to disposal, the St Lucie Plant is responsible to meet all of the license conditions of the radioactive waste processor. In this case, however, it is the responsibility of the radioactive waste processor to meet the requirements of the radioactive waste disposal site license for the radioactive waste shipped to the disposal site.</p>		

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3.2 Discussion

1. The PCP contains provisions to assure that dewatering of bead resins results in a waste form with characteristics that meet the requirements of 10 CFR 61 as implemented by 10 CFR 20 and of the low level radioactive waste disposal site. The PCP ~~rocess Control Program~~ includes in addition to this procedure the following related procedures:
 - A. St. Lucie Plant Health Physics Procedure No. HP-49, "Dewatering Radioactive Bead Resins."
 - B. CHEM-NUCLEAR SYSTEMS, INC. Test procedure for Dewatering Conical Bottom Demineralizers and Resin Liners - Project No. 11118.
 - C. CHEM-NUCLEAR SYSTEMS, INC. Lab Record Sheet for Conical Bottom Demineralizers and Resin Liners - Project No. 11118.
 - D. ~~Vectra Procedure No. OM-048-WS, Operating Procedure for Vectra/Waste Services Group Resin Drying (Dewatering) System at Florida Power & Light - St. Lucie Plant.~~
 - D.E. CS-OP-PR-008-161049 Energy Solutions Self-Engaging Dewatering System Fill Head at St Lucie.

2. Vendor supplied processes for solidification, encapsulation or absorption of liquid radioactive waste are conducted in accordance with a vendor PCP ~~process control program~~ and appropriate operating procedures specific to the process to be used and are reviewed and accepted by the On-Site Review Group (ORG)~~Facility Review Group~~ and approved by the Plant General Manager. Once approved for use at the St. Lucie Plant, changes to the vendor's process control program must be documented in accordance with Technical Specification 6.13 and as shown in Section 4.4. and be reviewed and accepted by the ORG ~~Facility Review Group~~ and approved by the Plant General Manager prior to continued use at the St. Lucie Plant.

3. All radioactive waste shipped for land burial must meet the requirements of 10 CFR 20.2006 regarding waste form classification and packaging. This is implemented through procedure HP-47, "Classification of Radioactive Waste Material for Land Disposal."

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4.0 PRECAUTIONS

4.1 Process Control Procedures used for the dewatering of radioactive bead resins that establish the conditions that must be met shall be based on full scale testing. This is to provide reasonable assurance that the dewatering drying of the resin and disposal container will result in volumes of free standing water, at the time of disposal, within the limits of 10 CFR, Part 61 as implemented by 10 CFR 20 and of the low level radioactive waste disposal site.

4.2 Vendor supplied solidification, encapsulation and absorption processes performed on site shall be based on process control procedures, operating procedures and full scale testing that ensures that the final waste form will meet the applicable requirements of 10 CFR 61 and of the disposal site license. Evidence that the vendor's process control program will meet the applicable waste form requirements of 10 CFR 61 and the disposal site license may be in the form of topical reports, NRC approved documentation, vendor test reports, inspection reports and/or other documentation as appropriate for the specific waste form requirements that must be met (e.g., Class A unstable, Class A stable, Class B or Class C). Procedures which are to be used must be controlled per the vendor's QA program.

4.3 All changes to the St. Lucie Plant PCP ~~Process Control Program~~ shall become effective after review and acceptance by the ORG ~~Facility Review Group~~ and approval of the Plant General Manager.

4.4 All changes to the St. Lucie Plant PCP ~~Process Control Program~~ shall be documented in accordance with Technical Specification 6.13. This documentation shall contain the following:

1. Sufficient information to support the change together with the appropriate analyses or evaluations justifying the change(s) and
2. A determination that the change will maintain the overall conformance of the solidified or dewatered waste product to existing requirements of Federal, State or other applicable regulations.

REVISION NO.: 13C	PROCEDURE TITLE: PROCESS CONTROL PROGRAM	PAGE: 7 of 12
PROCEDURE NO.: 0520025	ST. LUCIE PLANT	

5.0 RESPONSIBILITIES

- 5.1 It is the responsibility of the Plant General Manager to assure that all necessary procedures, equipment and support are provided to properly implement the PCP.
- 5.2 It is the responsibility of the Radiation Protection Manager (RPM) ~~Health Physics Supervisor~~ or his designee to assure that the radioactive bead resin will be dewatered in accordance with the PCP.
- 5.3 It is the responsibility of the RPM ~~Health Physics Supervisor~~ or his designee to assure that radioactive waste material is classified in accordance with the PCP.
- 5.4 FPL Dewatering equipment shall be operated by or under the direction of FPL personnel.

6.0 REFERENCES

NOTE

One or more of the following symbols may be used in this procedure:

§ Indicates a Regulatory commitment made by Technical Specifications, Condition of License, Audit, LER, Bulletin, Operating Experience, License Renewal, etc. and shall NOT be revised without the required Focus review and appropriate approval.

¶ Indicates a management directive, vendor recommendation, plant practice or other non-regulatory commitment that should NOT be revised without consultation with the plant staff.

Ψ Indicates a step that requires a sign off on an attachment.

- 6.1 Bead Resin/Activated Carbon Dewatering Procedure for CNS 14-215 or smaller liners - FO-OP-023.
- 6.2 Test Instruction for Dewatering Conical Bottom Resin Liners and Atmospheric Demineralizers - Zero FSW - Project 11118-A (CNS).
- 6.3 Test Report for Dewatering Conical Bottom Resin Liners and Atmospheric Demineralizers - Zero Water - Project 11118-A (CNS).
- 6.4 HP-47, "Classification of Radioactive Waste Material for Land Disposal.
- 6.5 HP-49, "Dewatering Radioactive Bead Resins."
- 6.6 Vectra Procedure No. OM-048-WS, Operating Procedure for Vectra/Waste Services Group Resin Drying (Dewatering) System at Florida Power & Light, - St. Lucie Plant.

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<p>6.66.7 CS-OP-PR-008-161049 Energy Solutions Self-Engaging Dewatering System Fill Head at St Lucie.</p>		
<p>6.76.8 Nuclear Packaging, Inc., Proprietary Topical Report No. TP-02-P-A covering Nuclear Packaging, Inc. Dewatering System.</p>		
<p>6.86.9 RP-AA-108-1002 HP-40, "Shipment of Radioactive Materials."</p>		
<p>6.96.10 HP-48, "Activity Determination for Radioactive Material Shipments."</p>		
<p>7.0 RECORDS AND NOTIFICATIONS</p>		
<p>7.1 Records shall be as per St. Lucie Plant Health Physics Procedure No. HP-49, "Dewatering Radioactive Bead Resins."</p>		
<p>7.2 Records of vendor supplied solidification, encapsulation or absorption processes for liquid radioactive wastes.</p>		
<p>7.3 Annual Radioactive Effluent Release Reports.</p>		
<p>7.4 Notifications:</p>		
<p>1. If it is suspected that the free standing water requirements may not be met for any container of radioactive bead resin shipped to a disposal site, notify the Plant General Manager and the RPM Health Physics Supervisor.</p>		
<p>2. If the process control procedures have not been followed or if free standing water may be present in the final shipping container of bead resin in amounts greater than allowed by regulations, notify the RPM Health Physics Supervisor or his designee.</p>		
<p>7.5 Records:</p>		
<p>1. Records of reviews performed for changes shall be retained as required by TS 6.10.2.g and shall be maintained in the plant files in accordance with QI-17-PSL-1, "Quality Assurance Records."</p>		

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8.0 INSTRUCTIONS

8.1 Dewatered radioactive bead resins:

1. Disposal of dewatered radioactive bead resins is limited to the containers for which full scale dewatering tests have been conducted; ~~and, in the case of high integrity containers, for which certification by the State of South Carolina for use at the Barnwell, South Carolina land disposal facility has been established.~~
2. Dewater the container as per St. Lucie Health Physics Procedure No. HP-49, "Dewatering of Radioactive Bead Resins." . And/or CS-OP-PR-008-161049 Energy Solutions Self-Engaging Dewatering System Fill Head at St Lucie.
3. Only containers compatible with FPL owned or leased resin transfer/dewatering equipment may be used.
- 2.4. Radioactive bead resins shall be dewatered, as appropriate, to meet shipping and transportation requirements during transit and disposal site requirements when received at the disposal site.
 - A. With dewatering not meeting disposal site, shipping and transportation requirements, suspend shipment of the inadequately dewatered bead resin and correct the PCP ~~PROCESS CONTROL PROGRAM~~, the applicable procedures(s) and/or the dewatering system as necessary to prevent recurrence.
 - B. With dewatering not performed in accordance with the PCP:
 - (1) if the dewatered bead resin has not already been shipped for disposal, verify each container to ensure that it meets burial ground, shipping and transportation requirements and
 - (2) take appropriate administrative action to prevent recurrence.
- 3.5. Prior to disposal, each container of radioactive bead resins shall be tested for free standing liquids to assure that it meets shipping, transportation and disposal site requirements.
- 4.6. Close the container as per the manufacturer's instructions.

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8.2 Solidification, encapsulation or absorption of radioactive waste materials shall be performed in accordance with FPL approved vendor procedures. These procedures shall provide for the following:

1. Vendor's procedures, checksheets, checklists, etc., shall be FPL site specific and reviewed and accepted by the ORG and approved by Plant General Manager prior to implementation.
2. These procedures shall include Hold Points for FPL-PSL verification of crucial steps within the process. These steps may include, but are not limited to the following:
 - A. Sampling of the waste stream
 - B. Review and acceptance of waste analyses
 - C. Verification of process test specimens
 - D. Verification of waste additions
 - E. Verification of chemical additions
 - F. Verification of mixing
 - G. Verification of final waste form and
 - H. Verification of free standing liquid
3. These procedures shall also include steps for testing the final waste form to ensure that all burial site and NRC waste form characteristics requirements are met.

8.3 All radioactive waste material packaged and destined for land disposal shall conform to the requirements of 10 CFR 20.2006 as implemented by procedure HP-47. If waste form classification exceeds Class C or packaging does not meet the requirements of the waste form class, the RPM Health Physics Supervisor shall be notified and shipment shall not be made.

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8.4 The annual Radioactive Effluent Release Reports shall include:


1. The following information for each class of solid waste (as defined by 10 CFR Part 61) shipped off site during the report period:
 - A. Volume
 - B. Total curie quantity (specify whether determined by measurement or estimate)
 - C. Principal radionuclides (specify whether determined by measurement or estimate)
 - D. Type of waste (e.g., dewatered spent resin, compacted dry waste, evaporator bottoms)
 - ~~D.E.~~ Type of container (e.g. LSA, Type A, Type B, Large Quantity) and
~~Type of container (e.g., LSA, Type A, Type B, Large Quantity) and~~
 - ~~E.F.~~ Solidification agent or absorbent (e.g., cement, bitumen, vinyl chloride) -as applicable

2. The following information for major changes to the solid radioactive waste system:
 - A. A summary of the evaluation that led to the determination that the change could be made in accordance with 10 CFR 50.59;
 - B. Sufficient detailed information to totally support the reason for the change with benefit of additional or supplemental information;
 - C. A detailed description of the equipment, components and processes involved and the interfaces with other plant systems;
 - D. An evaluation of the change which shows the predicted quantity of solid waste that differs from those previously predicted and in the license application and amendments thereto;
 - E. A comparison of the predicted releases of radioactive materials in solid waste to the actual releases for the period prior to when the changes are to be made;
 - F. An estimate of the exposure to plant operating personnel as a result of the change;

FOR INFORMATION ONLY

Before use, verify revision and change documentation (if applicable) with a controlled index or document.

DATE VERIFIED _____ INITIAL _____

 FPL	ST. LUCIE PLANT ADMINISTRATIVE PROCEDURE NON-SAFETY RELATED REFERENCE USE	Procedure No. 0520025
		Current Revision No. 16

Title: **PROCESS CONTROL PROGRAM**

Responsible Department: **RADIATION PROTECTION**

REVISION SUMMARY:

Revision 16 - Section 3.2 step 1B and 1C are not PSL use procedures they are reference material only and identified in Section 6.2 and 6.3.

Revision 15 - Incorporated PCR 2042572 to update references that have been superseded or no longer used. (Author: J. Simon)

Revision 14 - Incorporated PCR 1722646 to change HPS to RPM and FRG to ORG, to remove reference to deleted T.S 6.10.2q, to replace HP-40 with RP-AA-108-1002 radioactive shipment procedure, to remove Barnwell facility, to remove container type from effluent report not required by Reg 1.21 and to add as applicable for solidification agent. (Author: J. Simon)

Revision 13C - Incorporated PCR 09-3004 for CR 2007-21553. Several steps reference the old FRG terminology and need to be updated to reflect ORG instead. (Author: Nathan Rightmer)

Revision 13B - Incorporated PCR 05-3003 for CR 2005-18614 to add Level of Use to procedure cover page. (Helga Baranowsky, 09/29/05)

Revision 13A - Incorporated PCR 03-3437 to change delegation of procedure from Safety Related to Non-Safety Related. (Bonnie Wooldridge, 12/04/03)

Revision 13 - Made changes to References Section. (Bruce Somers, 07/20/99)

Revision	Approved By	Approval Date	UNIT #	_____
0	J.H. Barrow	12/28/82	DATE	_____
			DOCT	PROCEDURE
			DOCN	0520025
			SYS	_____
16	R. Coffey	06/04/15	STATUS	COMPLETED
			REV	16
			# OF PGS	_____

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3.2 Discussion

1. The PCP contains provisions to assure that dewatering of bead resins results in a waste form with characteristics that meet the requirements of 10 CFR 61 as implemented by 10 CFR 20 and of the low level radioactive waste disposal site. The PCP includes in addition to this procedure the following related procedures:
 - A. St. Lucie Plant Health Physics Procedure No. HP-49, "Dewatering Radioactive Bead Resins."
 - ~~B. CHEM NUCLEAR SYSTEMS, INC. Test procedure for Dewatering Conical Bottom Demineralizers and Resin Liners Project No. 11118.~~
 - ~~C. CHEM NUCLEAR SYSTEMS, INC. Lab Record Sheet for Conical Bottom Demineralizers and Resin Liners Project No. 11118.~~
 - D.B. CS-OP-PR-008-161049 Energy Solutions Self-Engaging Dewatering System Fill Head at St Lucie.
2. Vendor supplied processes for solidification, encapsulation or absorption of liquid radioactive waste are conducted in accordance with a vendor PCP and appropriate operating procedures specific to the process to be used and are reviewed and accepted by the On-Site Review Group (ORG) and approved by the Plant General Manager. Once approved for use at the St. Lucie Plant, changes to the vendor's process control program must be documented in accordance with Technical Specification 6.13 and as shown in Section 4.4. and be reviewed and accepted by the ORG and approved by the Plant General Manager prior to continued use at the St. Lucie Plant.
3. All radioactive waste shipped for land burial must meet the requirements of 10 CFR 20.2006 regarding waste form classification and packaging. This is implemented through procedure HP-47, "Classification of Radioactive Waste Material for Land Disposal."