RADIOACTIVE EFFLUENT

RELEASE REPORT

2006

PROGRESS ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3

Facility Operating License No. DPR-72

Docket No. 50-302

Prepared By: Rudy Pinner
Sr. Science and Lab Services Specialist

Approved By: [signature]
Superintendent Environmental and Chemistry

Date: 4/12/07

CONTENTS

INTRODUCTION

This report is submitted as required by the Offsite Dose Calculation Manual, section 6.5, and Technical Specfications 5.6.2.3.3 and 5.7.1.1.c.

The scope of this report includes:

- A summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the plant.
- Quarterly and annual dose summaries.
- A list and description of unplanned releases to unrestricted areas.
- A description of any changes to the:

  Process Control Program (PCP), and
  Offsite Dose Calculation Manual (ODCM).

- Significant changes to any radioactive waste treatment system.
- A list of new dose calculation location changes identified by the annual land-use census.
- Information relating to effluent monitors or required supporting instrumentation being inoperable for 30 or more days.

TABLE 1

EFFLUENT AND WASTE DISPOSAL REPORT - 2006

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 1	Quarter 2	Est. Total Error %
A. Fission and activation gases				
1. Total release	Ci	2.62E+00	7.85E-01	30
2. Average release rate for period	μCi/sec	3.38E-01	9.98E-02	
3. Percent of technical specification limit	%	4.06E-03	9.87E-04	
B. Iodines				
1. Total Iodine-131	Ci	0.00E+00	4.55E-07	30
2. Average release rate for period	μCi/sec	0.00E+00	5.79E-08	
3. Percent of technical specification limit	%	0.00E+00	1.09E-02	
C. Particulates*				
1. Particulates with half-lives > 8 days	Ci	0.00E+00	8.50E-07	30
2. Average release rate for period	μCi/sec	0.00E+00	1.08E-07	
3. Percent of technical specification limit	%	0.00E+00	1.09E-02	
4. Gross alpha radioactivity	Ci	2.21E-08	2.99E-08	
D. Tritium				
1. Total release	Ci	2.01E+00	1.92E+00	30
2. Average release rate for period	μCi/sec	2.59E-01	2.44E-01	
3. Percent of technical specification limit	%	6.44E-03	1.09E-02	

* The sum of the particulates reported on this page may be less than the sum from Table 2, as Table 2 includes all particulates, while this table includes only those with half-lives greater than 8 days.

TABLE 2

EFFLUENT AND WASTE DISPOSAL REPORT – 2006

GASEOUS EFFLUENTS - GROUND LEVEL RELEASES

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	**Unit**	**Quarter 1**	**Quarter 2**	**Quarter 1**	**Quarter 2**
A. Fission gases					
Argon-41	Ci				1.22E-01
Krypton-85	Ci			2.62E+00	6.11E-01
Krypton-85m	Ci				
Krypton-87	Ci				
Krypton-88	Ci				
Xenon-131m	Ci				
Xenon-133	Ci			7.65E-03	5.12E-02
Xenon-133m	Ci				
Xenon-135	Ci				
Xenon-135m	Ci				
Xenon-138	Ci				
Total for period	Ci	0.00E+00	0.00E+00	2.62E+00	7.85E-01
B. Iodines					
Iodine-131	Ci		4.55E-07		
Iodine-132	Ci				
Iodine-133	Ci		1.07E-05		
Iodine-135	Ci				
Total for period	Ci	0.00E+00	1.12E-05	0.00E+00	0.00E+00
C. Particulates					
Zinc-72	Ci				
Cobalt-58*	Ci				
Cobalt-60*	Ci				
Strontium-89*	Ci				
Strontium-90*	Ci				
Niobium-95m	Ci				
Technicium-99m	Ci				
Tellurium-132	Ci				
Cesium-134*	Ci				
Cesium-137*	Ci		8.50E-07		
Cesium-138	Ci				
Barium-139	Ci				
Lanthanum-142	Ci				
Cerium-141*	Ci				
Cerium-143*	Ci				
Rhenium-188	Ci				
Total for period	Ci	0.00E+00	8.50E-07	0.00E+00	0.00E+00

* > 8 day half-life

TABLE 3

EFFLUENT AND WASTE DISPOSAL REPORT - 2006

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 3	Quarter 4	Est. Total Error %
A. Fission and activation gases				
1. Total release	Ci	5.92E-01	3.17E-02	30
2. Average release rate for period	μCi/sec	7.45E-02	3.99E-03	
3. Percent of technical specification limit	%	7.98E-04	4.78E-05	
B. Iodines				
1. Total Iodine-131	Ci	3.77E-07	0.00E+00	30
2. Average release rate for period	μCi/sec	4.74E-08	0.00E+00	
3. Percent of technical specification limit	%	7.23E-03	0.00E+00	
C. Particulates*				
1. Particulates with half-lives > 8 days	Ci	0.00E+00	3.41E-07	30
2. Average release rate for period	μCi/sec	0.00E+00	4.29E-08	
3. Percent of technical specification limit	%	0.00E+00	8.56E-03	
4. Gross alpha radioactivity	Ci	4.25E-08	5.43E-08	
D. Tritium				
1. Total release	Ci	1.26E+00	2.65E+00	30
2. Average release rate for period	μCi/sec	1.59E-01	3.34E-01	
3. Percent of technical specification limit	%	7.23E-03	8.56E-03	

* The sum of the particulates reported on this page may be less than the sum from Table 4, as Table 4 includes all particulates, while this table includes only those with half-lives greater than 8 days.

TABLE 4

EFFLUENT AND WASTE DISPOSAL REPORT - 2006

GASEOUS EFFLUENTS - GROUND LEVEL RELEASES

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	**Unit**	**Quarter 3**	**Quarter 4**	**Quarter 3**	**Quarter 4**
A. Fission gases					
Argon-41	Ci			1.22E-02	
Krypton-85	Ci			4.40E-01	2.99E-02
Krypton-85m	Ci				
Krypton-87	Ci				
Krypton-88	Ci				
Xenon-131m	Ci				
Xenon-133	Ci			1.39E-01	1.80E-03
Xenon-133m	Ci				
Xenon-135	Ci			1.37E-03	7.14E-05
Xenon-135m	Ci				
Xenon-138	Ci				
Total for period	Ci	0.00E+00	0.00E+00	5.29E-01	3.17E-02
B. Iodines					
Iodine-131	Ci	3.77E-07			
Iodine-132	Ci				
Iodine-133	Ci				
Iodine-135	Ci				
Total for period	Ci	3.77E-07	0.00E+00	0.00E+00	0.00E+00
C. Particulates					
Zinc-72	Ci				
Cobalt-58*	Ci				
Chromium-51*	Ci				
Strontium-89*	Ci				
Strontium-90*	Ci				
Niobium-95*	Ci				
Tin-113*	Ci				
Indium-113m	Ci				
Barium-133m	Ci				
Cesium-137*	Ci		1.14E-07		
Cesium-138	Ci				
Barium-139	Ci				
Lanthanum-142	Ci				
Cerium-141	Ci		2.27E-07		
Cerium-143	Ci				
Cerium-144*	Ci				
Rhenium-188	Ci				
Total for period	Ci	0.00E+00	3.41E-07	0.00E+00	0.00E+00

* > 8 day half-life

TABLE 5

EFFLUENT AND WASTE DISPOSAL REPORT - 2006

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 1	Quarter 2	Est. Total Error %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	4.07E-03	5.21E-03	25
2. Average diluted concentration during period	μCi/ml	7.15E-12	9.13E-12	
3. Percent of applicable limit	%	9.60E-04	9.89E-05	
B. Tritium				
1. Total release	Ci	5.21E+01	1.75E+01	30
2. Average diluted concentration during period	μCi/ml	9.63E-08	3.07E-08	
3. Percent of applicable limit	%	8.47E-02	3.18E-02	
C. Dissolved and entrained gases				
1. Total release	Ci	8.59E-03	2.94E-03	25
2. Average diluted concentration during period	μCi/ml	1.59E-11	5.15E-12	
3. Percent of applicable limit	%	8.97E-04	2.67E-04	
D. Gross alpha radioactivity				
1. Total release	Ci	1.23E-04	5.69E-05	30
E. Volume of waste released (prior to dilution)				
1. Batch and continuous modes	Liters	1.30E+07	6.00E+06	10
F. Volume of dilution water used during period				
1. Batch and continuous modes	Liters	5.42E+11	5.71E+11	10

TABLE 6

EFFLUENT AND WASTE DISPOSAL REPORT - 2006

LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
Fission and activation products	Unit	Quarter 1	Quarter 2	Quarter 1	Quarter 2
Sodium-24	Ci				
Chromium-51	Ci			3.46E-05	3.24E-04
Manganese-54	Ci			2.00E-07	
Manganese-56	Ci				
Iron-55	Ci	4.96E-04		7.84E-04	2.49E-04
Iron-59	Ci				
Cobalt-57	Ci				
Cobalt-58	Ci			9.72E-05	7.15E-05
Cobalt-60	Ci			6.34E-05	3.83E-05
Zinc-69	Ci				
Strontium-85	Ci				
Strontium-89	Ci				
Strontium-90	Ci			1.49E-04	
Yttrium-91m	Ci				
Yttrium-92	Ci				
Yttrium-93	Ci				
Niobium-95	Ci				
Niobium-95m	Ci				
Niobium-97	Ci				
Zirconium-95	Ci				
Zirconium-97	Ci				
Molybdinum-99	Ci				
Technetium-99m	Ci				
Technetium-101	Ci				
Ruthenium-103	Ci				
Ruthenium-106	Ci				
Silver-110m	Ci			1.27E-04	6.68E-05
Tin-113	Ci				
Indium-113m	Ci				
Antimony-122	Ci				
Antimony-124	Ci				
Antimony-125	Ci			2.32E-03	4.53E-03
Tellurium-129	Ci				
Tellurium-132	Ci				
Iodine-131	Ci				
Iodine-133	Ci				
Iodine-135	Ci				
Cesium-134	Ci			1.77E-06	2.75E-07
Cesium-137	Ci			1.46E-05	3.91E-05
Cesium-138	Ci				
Barium-133m	Ci				
Barium-140	Ci				
Lanthanum-140	Ci				
Cerium-141	Ci				
Cerium-143	Ci			1.00E-05	
Neodymium-147	Ci				
Tungsten-187	Ci				
Neptunium--239	Ci				
Total for period	Ci	4.96E-04	0.00E+00	3.60E-03	5.21E-03

TABLE 6 (CONTINUED)

EFFLUENT AND WASTE DISPOSAL REPORT - 2006

LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
Dissolved and entrained gases	Unit	Quarter 1	Quarter 2	Quarter 1	Quarter 2
Argon-41	Ci				
Krypton-85	Ci			7.63E-03	1.01E-03
Krypton-85m	Ci				
Krypton-87	Ci				
Krypton-88	Ci				
Xenon-131m	Ci				
Xenon-133	Ci			8.30E-04	1.81E-03
Xenon-133m	Ci				
Xenon-135	Ci			1.33E-04	1.23E-04
Xenon-135m	Ci				
Total for period	Ci	0.00E+00	0.00E+00	8.59E-03	2.94E-03

Tritium	Ci	2.50E-01	0.00E+00	5.19E+01	1.75E+01

TABLE 7

EFFLUENT AND WASTE DISPOSAL REPORT - 2006

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 3	Quarter 4	Est. Total Error %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	7.19E-03	4.65E-04	25
2. Average diluted concentration during period	μCi/ml	1.24E-11	8.51E-13	
3. Percent of applicable limit	%	8.39E-04	1.48E-04	
B. Tritium				
1. Total release	Ci	5.52E+01	1.86E+02	30
2. Average diluted concentration during period	μCi/ml	9.52E-08	3.41E-07	
3. Percent of applicable limit	%	9.24E-02	3.25E-01	
C. Dissolved and entrained gases				
1. Total release	Ci	1.33E-03	1.04E-03	25
2. Average diluted concentration during period	μCi/ml	2.29E-12	1.90E-12	
3. Percent of applicable limit	%	1.11E-04	9.80E-05	
D. Gross alpha radioactivity				
1. Total release	Ci	4.92E-05	1.17E-04	30
E. Volume of waste released (prior to dilution)				
1. Batch and continuous modes	Liters	7.08E+06	4.16E+06	10
F. Volume of dilution water used during period				
1. Batch and continuous modes	Liters	5.81E+11	5.46E+11	10

TABLE 8

EFFLUENT AND WASTE DISPOSAL REPORT - 2006

LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
Fission and activation products	Unit	Quarter 3	Quarter 4	Quarter 3	Quarter 4
Sodium-24	Ci				
Chromium-51	Ci			6.29E-05	
Manganese-54	Ci				
Manganese-56	Ci				
Iron-55	Ci			1.50E-04	3.96E-05
Iron-59	Ci				
Cobalt-57	Ci				
Cobalt-58	Ci			1.10E-03	2.70E-05
Cobalt-60	Ci			7.30E-05	1.86E-05
Zinc-69	Ci				
Zinc-72	Ci				
Strontium-85	Ci				
Strontium-89	Ci				7.67E-06
Strontium-90	Ci				
Strontium-92	Ci				
Yttrium-91	Ci				
Yttrium-92	Ci				
Yttrium-93	Ci				
Rubidium-88	Ci				
Niobium-95	Ci				
Niobium-95m	Ci				
Zirconium-95	Ci				
Molybdinum-99	Ci				
Technetium-99m	Ci				
Technetium-101	Ci				
Ruthenium-106	Ci				
Silver-110m	Ci			4.33E-06	
Tin-113	Ci				
Indium-113m	Ci				
Antimony-122	Ci			1.18E-06	
Antimony-124	Ci				
Antimony-125	Ci			5.67E-03	3.33E-04
Tellurium-129	Ci				
Tellurium-132	Ci				
Iodine-131	Ci				
Iodine-132	Ci				
Iodine-133	Ci				
Iodine-135	Ci				
Cesium-134	Ci				4.10E-07
Cesium-136	Ci				
Cesium-137	Ci			5.31E-05	3.91E-05
Barium-133m	Ci				
Barium-139	Ci				
Barium-140	Ci				
Lanthanum-140	Ci				
Cerium-144	Ci			7.18E-05	
Cerium-143	Ci				
Praseodymium-144	Ci				
Neodymium-147	Ci				
Rhenium-188	Ci				
Total for period	Ci	0.00E+00	0.00E+00	7.19E-03	4.65E-04

TABLE 8 (CONTINUED)

EFFLUENT AND WASTE DISPOSAL REPORT - 2006

LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
Dissolved and entrained gases	**Unit**	**Quarter 3**	**Quarter 4**	**Quarter 3**	**Quarter 4**
Argon-41	Ci				
Krypton-85	Ci				
Krypton-85m	Ci				
Krypton-87	Ci				
Krypton-88	Ci				
Xenon-131m	Ci				
Xenon-133	Ci			1.19E-03	1.00E-03
Xenon-133m	Ci				
Xenon-135	Ci			1.34E-04	3.86E-05
Xenon-135m	Ci				
Total for period	Ci	0.00E+00	0.00E+00	1.33E-03	1.04E-03

Tritium	Ci	0.00E+00	0.00E+00	5.48E+01	1.86E+02

TABLE 9

EFFLUENT AND WASTE DISPOSAL REPORT - 2006

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. SOLID WASTE SHIPPED OFFSITE FOR PROCESSING OR BURIAL (Non-irradiated fuel)

1. Type of waste	Unit	12 month period	Est. Total Error %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m3 Ci	4.35E+01 2.11E-02	25
b. Dry compressible waste, contaminated equipment, etc.	m3 Ci	1.11E+02 1.14E-01	25
c. Irradiated components, control rods, etc.	m3 Ci	0.00E+00 0.00E+00	25
d. Other (describe): Combined DAW package	m3 Ci	5.83E+00 4.18E+00	25

2. Estimate of major nuclide composition (by type of waste in %)*			
a.	H-3 1.2 C-14 14.3 Fe-55 26.9	Co-60 17.0 Ni-63 23.4 Ag-110m 1.2	Cs-134 5.0 Cs-137 9.4
b.	H-3 1.5 Fe-55 2.8 Co-60 4.6	Ni-63 32.5 Cs-134 23.2 Cs-137 33.6	
c.			
d.	Fe-55 2.8 Co-60 4.6 Ni-63 32.6	Cs-134 23.2 Cs-137 33.6	

* Curie values and principle radionuclides are estimates based on a combination of direct and indirect methods.

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation *	Destination
2	Hittman	Duratek (TN)
1	Hittman	Studsvik Processing Facility, LLC
2	Hittman	Energy Solutions, LLC (Bulk)

* All exclusive use trucks

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
0	N/A	N/A

Unplanned Releases

There were no unplanned releases in 2006.

Radioactive Waste Treatment Systems

There were no significant changes to the radioactive waste treatment systems.

Annual Land Use Census

The 2006 land-use census did not identify any new dose calculation locations.

Effluent Monitor Instrument Operability

Required effluent monitor instrumentation was not out of service for more than 30 days during 2006.

ODCM & PCP Changes

The ODCM was revised 2 times in 2006. Revision 28 added a clarifying note to table 2-3, Action 30, page 14, which pertains to operability of RM-A12 if a valid counts per minute (cpm) to gallons per day (gpd) conversion factor is not available. The note explains that RM-A12 can still be used as an indicator of the changes in the noble gas concentrations in the condenser offgas, and the monitor should not be declared inoperable in the absence of this conversion factor. In Revision 29, section 2.2, Table 2-3, Action 29, page 14, removed reference of use of the Post Accident Sample System (PASS) Reactor And Noble Gas Effluent Automated Isotopic Monitoring System (RANGE AIMS) as use for a back up alternative method of monitoring if either RM-A1 or RM-A2 mid and/or high range monitors are out of service. The RANGE AIMS system is being abandoned by Engineering Change (EC) 49486. Appropriate manual sampling methods are in place if needed to evaluate elevated effluent releases.

The PCP was not revised in 2006.

Emergency Feed Pump 2 & Steam Releases

Emergency Feed Pump 2 (EFP-2) overspeed testing is performed quarterly using steam from CR-3's steam generators. Due to a small primary to secondary leak, an evaluation was performed to estimate the quantity of radioactive material which was released during 2006 due to operation of this pump. In addition, radioactive releases due to other steam releases have been estimated and included. The results are given below in units of Curies/year.

Xe-133	9.60E-08	I-131	2.40E-09	Cs-134	4.80E-08
Xe-135	9.00E-08	I-133	2.40E-08	Cs-137	5.40E-08
H-3	5.16E-06				

These values are not included in Tables 1 through 4.

Correction to 2005 Radioactive Effluent Release Report

Table 6 liquid effluent batch mode releases for quarter 1 and quarter 2 incorrectly identified Technicium-101 as being present. This radionuclide should have been removed from the report during the nuclide verification process as TC-101 peak criteria was statistically invalid. The reported concentrations of TC-101 were insignificant regarding curies released and dose consequences.

2006 Appendix I Dose Summary

Maximum Hypothetical Individual

Liquid Effluent Dose Limits

Total Body:	1.5 mrem/quarter, 3 mrem/year
Any Organ:	5 mrem/quarter, 10 mrem/year

Liquid Effluent Dose Summary

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual Total
Total Body Dose (mrem)	1.44E-05	1.48E-06	5.33E-06	8.48E-06	2.97E-05
Maximum Organ Dose (mrem)	3.78E-05	5.64E-06	4.20E-05	7.41E-06	9.29E-05
Maximum Organ was GI					

Gaseous Effluent Dose Limits

Gamma Air Dose:	5 mrad/quarter, 10 mrad/year
Beta Air Dose:	10 mrad/quarter, 20 mrad/year
Any Organ:	7.5 mrem/quarter, 15 mrem/year

Gaseous Release Dose Summary

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual Total
Gamma Air Dose (mrad)	3.86E-06	2.27E-06	4.70E-06	1.02E-07	1.09E-05
Beta Air Dose (mrad)	4.06E-04	9.90E-05	7.98E-05	4.78E-06	5.89E-04
Total Body Dose (mrem)	4.83E-04	4.69E-04	3.03E-04	6.38E-04	1.89E-03
Maximum Organ Dose (mrem)	4.83E-04	8.20E-04	5.42E-04	6.38E-04	2.48E-03
Maximum Organ was Thyroid					