

RADIOACTIVE EFFLUENT

RELEASE REPORT

1995

FLORIDA POWER CORPORATION

CRYSTAL RIVER - UNIT 3

Facility Operating License No. DPR-72

Docket No. 50-302

Prepared By: Peter S. Cizell
Chemrad Specialist II

Approved By: Ronald E. Fuller
Manager, Nuclear Chemistry

Date: 4/26/96

CONTENTS

Introduction	1
Tabular Data Summaries	
Gaseous Effluents - Quarters 1 & 2	2
Gaseous Effluents - Quarters 3 & 4	4
Liquid Effluents - Quarters 1 & 2	6
Liquid Effluents - Quarters 3 & 4	9
Radwaste Shipments	12
Unplanned Releases	13
Radioactive Waste Treatment Systems	13
Environmental Radiological Monitoring Program	13
Effluent Monitor Instrument Operability	13
ODCM & PCP Changes	13

INTRODUCTION

This report is submitted as required by ODCM section 6.5. The following information is included:

A summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the plant.

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 - 1995
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 1	Quarter 2	Est. Total Error %
--	------	--------------	--------------	-----------------------

A. Fission and Activation Gases

1. Total Release	Ci	3.48E+00	2.02E-01	30
2. Average Release Rate For Period	μCi/sec	4.48E-01	2.56E-02	
3. Percent of Technical Specification Limit	%	3.00E-03	2.79E-04	

B. Iodines

1. Total Iodine - 131	Ci	0.00E+00	0.00E+00	30
2. Average Release Rate for Period	μCi/sec	0.00E+00	0.00E+00	
3. Percent of Technical Specification Limit	%	0.00E+00	0.00E+00	

C. Particulates*

1. Particulates with Half-Lives > 8 Days	Ci	4.22E-07	0.00E+00	30
2. Average Release Rate For Period	μCi/sec	5.42E-08	0.00E+00	
3. Percent of Technical Specification Limit	%	2.39E-02	1.90E-02	
4. Gross Alpha Radioactivity	Ci	0.00E+00	5.80E-08	

D. Tritium

1. Total Release	Ci	7.39E+00	5.95E+00	30
2. Average Release Rate for Period	μCi/sec	9.50E-01	7.57E-01	
3. Percent of Technical Specification Limit	%	2.39E-02	1.90E-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 only those with half-lives greater than 8 days.

TABLE 2

EFFLUENT AND WASTE DISPOSAL REPORT - 1995

GASEOUS EFFLUENTS - GROUND LEVEL RELEASES

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2

1. Fission Gases

Argon-41	Ci				
Krypton-85	Ci			2.99E-01	1.56E-01
Krypton-85m	Ci				
Krypton-87	Ci				
Krypton-88	Ci				
Xenon-131m	Ci			5.79E-03	
Xenon-133	Ci			1.91E-01	4.51E-02
Xenon-133m	Ci	2.46E+00		1.05E-03	
Xenon-135	Ci	5.27E-01		1.54E-04	
Xenon-135m	Ci				
Xenon-138	Ci				
Total for Period	Ci	2.99E+00	0.00	4.97E-01	2.02E-01

2. Iodines

Iodine-131	Ci				
Iodine-132	Ci				
Iodine-133	Ci				
Iodine-135	Ci				
Total for Period	Ci	0.00	0.00	0.00	0.00

3. Particulates

Zinc-72	Ci				
Cobalt-58	Ci				
Cobalt-60	Ci				
Strontium-89	Ci				
Strontium-90	Ci				
Yttrium-93	Ci				
Tin-113	Ci				
Cadmium-113m	Ci				
Indium-113m	Ci				
Cesium-134	Ci				
Cesium-137	Ci	4.22E-07			
Cesium-138	Ci				
Barium-139	Ci				
Lanthanum-142	Ci				
Cerium-143	Ci				
Cerium-144	Ci				
Rhenium-188	Ci				
Total for Period	Ci	4.22E-07	0.00	0.00	0.00

TABLE 3

EFFLUENT AND WASTE DISPOSAL REPORT - 1995
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 3	Quarter 4	Est. Total Error %
--	------	--------------	--------------	-----------------------

A. Fission and Activation Gases

1. Total Release	Ci	1.27E+00	1.35E+00	30
2. Average Release Rate For Period	μCi/sec	1.59E-01	1.70E-01	
3. Percent of Technical Specification Limit	%	1.78E-03	2.26E-03	

B. Iodines

1. Total Iodine - 131	Ci	0.00E+00	0.00E+00	30
2. Average Release Rate for Period	μCi/sec	0.00E+00	0.00E+00	
3. Percent of Technical Specification Limit	%	0.00E+00	0.00E+00	

C. Particulates*

1. Particulates with Half-Lives > 8 Days	Ci	1.70E-06	1.49E-06	30
2. Average Release Rate For Period	μCi/sec	1.51E-01	1.88E-01	
3. Percent of Technical Specification Limit	%	1.14E-02	1.43E-02	
4. Gross Alpha Radioactivity	Ci	5.76E-09	0.00E+00	

D. Tritium

1. Total Release	Ci	3.51E+00	4.19E+00	30
2. Average Release Rate for Period	μCi/sec	4.42E-01	5.28E-01	
3. Percent of Technical Specification Limit	%	1.14E-02	1.43E-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 only those with half-lives greater than 8 days.

TABLE 4

EFFLUENT AND WASTE DISPOSAL REPORT - 1995

GASEOUS EFFLUENTS - GROUND LEVEL RELEASES

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4

1. Fission Gases

Argon-41	Ci				
Krypton-85	Ci			5.17E-07	1.62E-01
Krypton-85m	Ci		2.32E-07		
Krypton-87	Ci				
Krypton-88	Ci				
Xenon-131m	Ci				1.90E-02
Xenon-133	Ci	6.43E-01	5.53E-07	1.89E-01	5.27E-01
Xenon-133m	Ci			1.25E-03	
Xenon-135	Ci	4.32E-01	6.41E-01		2.18E-03
Xenon-135m	Ci				
Xenon-138	Ci				
Total for Period	Ci	1.08E+00	6.41E-01	1.90E-01	7.11E-01

2. Iodines

Iodine-131	Ci				
Iodine-132	Ci				
Iodine-133	Ci				
Iodine-135	Ci				
Total for Period	Ci	0.00	0.00	0.00	0.00

3. Particulates

Zinc-72	Ci				
Cobalt-58	Ci		1.32E-06		
Cobalt-60	Ci				
Strontium-89	Ci				
Strontium-90	Ci				
Yttrium-93	Ci				2.89E-09
Tin-113	Ci	9.01E-07			
Cadmium-113m	Ci				1.69E-07
Indium-113m	Ci	1.18E-06			
Cesium-134	Ci				
Cesium-137	Ci	2.98E-07			
Cesium-138	Ci				
Barium-139	Ci		2.53E-06		
Lanthanum-142	Ci				
Cerium-143	Ci		4.80E-07		
Cerium-144	Ci				
Rhenium-188	Ci				
Total for Period	Ci	2.37E-06	4.34E-06	0.00	1.72E-07

TABLE 5
EFFLUENT AND WASTE DISPOSAL REPORT - 1995
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	1.43E-02	1.10E-02	25
2. Average diluted concentration during period	μCi/ml	4.51E-11	3.23E-11	
3. Percent of applicable Limit	%	2.00E-01	1.74E-01	

B. Tritium

1. Total Release	Ci	5.95E+01	1.72E+02	30
2. Average diluted concentration during period	μCi/ml	1.87E-07	4.98E-07	
3. Percent of applicable Limit	%	1.87E-03	4.98E-03	

C. Dissolved and entrained gases

1. Total release	Ci	3.31E-02	1.35E-02	25
2. Average diluted concentration during period	μCi/ml	1.04E-10	3.96E-11	
3. Percent of applicable Limit	%	5.20E-05	1.98E-05	

D. Gross alpha radioactivity

1. Total Release	Ci	1.05E-04	2.96E-05	30
------------------	----	----------	----------	----

E. Volume of Waste released (prior to dilution)

1. Batch and Continuous Modes	Liters	5.59E+06	1.09E+07	10
-------------------------------	--------	----------	----------	----

F. Volume of dilution water used during period

1. Batch and continuous Modes	Liters	3.17E+11	3.41E+11	10
-------------------------------	--------	----------	----------	----

TABLE 6
EFFLUENT AND WASTE DISPOSAL REPORT - 1995

LIQUID EFFLUENTS

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
Sodium-24	Ci				
Chromium-51	Ci				5.85E-05
Manganese-54	Ci			6.51E-05	3.32E-05
Manganese-56	Ci				2.06E-05
Iron-55	Ci			8.94E-03	7.94E-03
Iron-59	Ci				
Cobalt-57	Ci			3.15E-06	3.28E-06
Cobalt-58	Ci			1.21E-03	2.82E-04
Cobalt-60	Ci			1.02E-03	8.28E-04
Zinc-65	Ci				
Zinc-72	Ci				
Strontium-85	Ci			1.75E-06	4.60E-06
Strontium-89	Ci			8.53E-05	1.67E-05
Strontium-90	Ci			1.05E-05	4.89E-06
Strontium-92	Ci			1.17E-04	1.35E-04
Yttrium-92	Ci				
Yttrium-93	Ci				
Bromine-82	Ci				
Niobium-95	Ci			2.20E-05	1.83E-05
Niobium-97	Ci			5.95E-04	6.77E-04
Zirconium-95	Ci			6.55E-06	
Zirconium-97	Ci			7.05E-06	1.20E-05
Molybdenum-99	Ci			2.06E-04	
Technetium-99M	Ci			4.32E-04	4.22E-05
Technetium-101	Ci				
Ruthenium-103	Ci				
Ruthenium-106	Ci			7.09E-05	2.91E-06
Silver-110m	Ci			3.45E-04	4.04E-04
Tin-113	Ci			1.31E-05	
Indium-113m	Ci			1.88E-05	
Cadmium-113m	Ci				
Antimony-122	Ci			7.10E-06	5.12E-07
Antimony-124	Ci			1.36E-05	
Antimony-125	Ci			2.3E-04	7.64E-05
Tellurium-129	Ci				
Tellurium-132	Ci				
Iodine-131	Ci			1.78E-05	1.73E-06
Iodine-132	Ci				2.40E-05
Iodine-133	Ci			1.19E-05	2.60E-05
Iodine-135	Ci				1.85E-05
Cesium-134	Ci			1.26E-04	2.61E-05
Cesium-137	Ci			5.15E-04	2.00E-04
Cesium-138	Ci				2.20E-05
Barium-139	Ci				
Barium-140	Ci			8.37E-06	8.29E-06
Lanthanum-140	Ci			1.75E-04	
Cerium-143	Ci				1.83E-05
Cerium-144	Ci				2.15E-05
Rhenium-188	Ci				3.37E-05
Neptunium-239	Ci			5.17E-07	
Total for Period	Ci	0.00	0.00	1.43E-02	1.10E-02

TABLE 6 (CONTINUED)

EFFLUENT AND WASTE DISPOSAL REPORT - 1995

LIQUID EFFLUENTS

Dissolved & Entrained Gasses	Unit	CONTINUOUS MODE		BATCH MODE	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
Argon-41	Ci				
Krypton-85	Ci			4.10E-04	1.08E-03
Krypton-85m	Ci				1.07E-05
Krypton-87	Ci				
Krypton-88	Ci				
Xenon-131m	Ci				
Xenon-133	Ci			3.03E-02	1.20E-02
Xenon-133m	Ci			3.90E-04	6.69E-05
Xenon-135	Ci			2.03E-03	4.05E-04
Xenon-135m	Ci				
Total for Period	Ci	0.00	0.00	3.31E-02	1.36E-02

Tritium	Ci	0.00	0.00	5.95E+01	1.71E+02
---------	----	------	------	----------	----------

TABLE 7
EFFLUENT AND WASTE DISPOSAL REPORT - 1995
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	8.35E-03	1.66E-01	25
2. Average diluted concentration during period	μCi/ml	2.42E-11	4.83E-10	
3. Percent of applicable Limit	%	1.78E-01	6.43E+00	

B. Tritium

1. Total Release	Ci	1.87E+02	3.87E+02	30
2. Average diluted concentration during period	μCi/ml	5.42E-07	1.13E-06	
3. Percent of applicable Limit	%	5.42E-03	1.13E-02	

C. Dissolved and entrained gases

1. Total release	Ci	3.04E-02	5.88E-02	25
2. Average diluted concentration during period	μCi/ml	8.83E-11	1.71E-10	
3. Percent of applicable Limit	%	4.42E-05	8.55E-05	

D. Gross alpha radioactivity

1. Total Release	Ci	5.09E-05	2.70E-05	30
------------------	----	----------	----------	----

E. Volume of Waste released (prior to dilution)

1. Batch and Continuous Modes	Liters	6.40E+06	5.37E+06	10
-------------------------------	--------	----------	----------	----

F. Volume of dilution water used during period

1. Batch and continuous Modes	Liters	3.45E+11	3.44E+11	10
-------------------------------	--------	----------	----------	----

TABLE 8
EFFLUENT AND WASTE DISPOSAL REPORT - 1995
LIQUID EFFLUENTS

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
Sodium-24	Ci			5.14E-06	1.35E-05
Chromium-51	Ci				1.23E-06
Manganese-54	Ci			2.00E-04	4.96E-03
Manganese-56	Ci			7.00E-06	
Iron-55	Ci			8.67E-04	1.29E-03
Iron-59	Ci				
Cobalt-57	Ci				2.92E-04
Cobalt-58	Ci			5.79E-04	2.51E-03
Cobalt-60	Ci			3.63E-02	8.96E-02
Zinc-65	Ci				
Zinc-72	Ci				
Strontium-85	Ci				3.32E-07
Strontium-89	Ci				
Strontium-90	Ci			8.28E-06	4.77E-06
Strontium-92	Ci			1.43E-04	
Yttrium-92	Ci				
Yttrium-93	Ci				2.19E-04
Bromine-82	Ci				
Niobium-95	Ci			3.58E-05	3.05E-05
Niobium-95m	Ci				3.07E-05
Niobium-97	Ci			8.05E-04	
Zirconium-95	Ci				
Zirconium-97	Ci			4.91E-06	1.85E-03
Molybdenum-99	Ci				
Technetium-99m	Ci			8.67E-05	6.49E-05
Technetium-101	Ci			1.02E-05	
Ruthenium-103	Ci				
Ruthenium-106	Ci			7.50E-05	1.26E-02
Silver-110m	Ci			6.65E-04	3.63E-02
Tin-113	Ci				5.87E-05
Indium-113m	Ci				7.98E-05
Cadmium-113m	Ci				
Antimony-122	Ci				1.21E-07
Antimony-124	Ci				
Antimony-125	Ci			7.05E-04	5.48E-03
Tellurium-129	Ci				
Tellurium-132	Ci			1.16E-05	
Iodine-131	Ci			6.76E-06	4.14E-04
Iodine-132	Ci				
Iodine-133	Ci			4.39E-05	3.83E-04
Iodine-135	Ci			9.19E-06	
Cesium-134	Ci			6.23E-05	2.96E-03
Cesium-137	Ci			3.51E-04	4.60E-03
Barium-139	Ci				2.20E-05
Barium-140	Ci				
Lanthanum-140	Ci				
Cerium-143	Ci				1.79E-05
Cerium-144	Ci				1.70E-03
Rhenium-188	Ci			4.01E-05	
Total for Period	Ci	0.00	0.00	8.35E-03	1.66E-01

TABLE 8 (CONTINUED)
EFFLUENT AND WASTE DISPOSAL REPORT - 1995
LIQUID EFFLUENTS

Dissolved & Entrained Gasses	Unit	CONTINUOUS MODE		BATCH MODE	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
Argon-41	Ci				
Krypton-85	Ci				7.78E-05
Krypton-85m	Ci				
Krypton-87	Ci				
Krypton-88	Ci				
Xenon-131m	Ci			2.58E-04	3.44E-04
Xenon-133	Ci			3.00E-02	5.77E-02
Xenon-133m	Ci			4.27E-05	2.09E-04
Xenon-135	Ci			1.63E-04	3.76E-04
Xenon-135m	Ci				
Total for Period	Ci	0.00	0.00	3.04E-02	5.88E-02

Tritium	Ci	0.00	0.00	1.87E+02	3.87E+02
---------	----	------	------	----------	----------

TABLE 9
EFFLUENT AND WASTE DISPOSAL REPORT - 1995
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. SOLID WASTE SHIPPED OFFSITE FOR PROCESSING AND/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	4.32E+01 1.21E-02	25
b. Dry compressible waste, contaminated equipment, etc.	m3 Ci	1.06E+02 1.66E-01	25
c. Irradiated components, control rods, etc.	m3 Ci	0.00 0.00	
d. Other (describe): Asphalt	m3 Ci	5.02E+00 7.11E-03	25
2. Estimate of major nuclide composition (by type of waste in %)*			
a.	Cs-137 39.1 Cs-134 14.5	Co-60 2.7	C-14 34.2 H-3 7.2 Ni-163 1.1
b.	Fe-55 29.9 Co-60 14.0 C-14 9.4	Ni-63 9.7 C-14 9.4 Cs-137 12.6	Co-58 5.3
c.			
d.	C-14 9.3 Fe-55 29.9	Ni-63 9.6 Co-60 14.0 Cs-137 12.5	

3 Solid Waste disposition

Number of Shipments	Mode of Transportation	Destination
2	Exclusive Use Vehicle	Barnwell, SC (CNSI)
4	Exclusive Use Vehicle	Oak Ridge, TN (SEG)

Type a wastes were shipped in Liners. Type b and d wastes were shipped in strong tight containers.

IRRADIATED FUEL SHIPMENTS (Disposition)

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

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

Unplanned Releases

There were no unplanned gaseous or Liquid releases.

Radioactive Waste Treatment Systems

There were no significant changes to radioactive waste treatment systems.

Radiological Environmental Monitoring Program

The June, 1995, 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.

ODCM & PCP Changes

The PCP was not revised during 1995 .

The ODCM was not revised during 1995.