



Florida Power

A Progress Energy Company

Crystal River Nuclear Plant

Docket No. 50-302

Operating License No. DPR-72

Ref: 10 CFR 50.36(a)(2)
ITS 5.7.1.1(c)

April 23, 2002
3F0402-05

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Crystal River Unit 3 - 2001 Radioactive Effluent Release Report

Dear Sir:

Florida Power Corporation hereby submits the 2001 Radioactive Effluent Release Report for Crystal River Unit 3 (CR-3) in accordance with 10 CFR 50.36(a)(2) and the CR-3 Improved Technical Specifications (ITS), Section 5.7.1.1(c). The report, provided as Attachment A, includes a summary of the quantities of radioactive liquid and gaseous effluents, and solid waste released from the CR-3 site during 2001. The material provided is consistent with the objectives outlined in the Off-Site Dose Calculation Manual (ODCM) and the Process Control Program (PCP), and is in conformance with 10 CFR 50, Appendix I, Section IV.B.1.

ITS 5.6.2.3.3 requires submittal of licensee initiated changes to the ODCM as part of the Radioactive Effluent Release Report. A complete copy of the ODCM, provided as Attachment B, is included herewith with the affected pages appropriately marked with vertical bars in the left margin. The PCP, revised during 2001, is also included as part of this submittal. The affected pages in the PCP are appropriately marked with vertical bars in the left margin.

If you have any questions regarding this submittal, please contact Mr. Sid Powell, Supervisor, Licensing and Regulatory Programs at (352) 563-4883.

Sincerely,

D. L. Roderick
Director Site Operations

DLR/ff

Attachments:

- A. 2001 Radioactive Effluent Release Report
- B. Off-Site Dose Calculation Manual, Revision 25
- C. Process Control Program, Revision 5

xc: NRR Project Manager
Regional Administrator, Region II
Senior Resident Inspector

Crystal River Nuclear Plant
15760 W. Power Line Street
Crystal River, FL 34428

IE48
A008

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302 / LICENSE NUMBER DPR-72

ATTACHMENT A

2001 Radioactive Effluent Release Report

RADIOACTIVE EFFLUENT

RELEASE REPORT

2001

FLORIDA POWER CORPORATION

CRYSTAL RIVER - UNIT 3

Facility Operating License No. DPR-72

Docket No. 50-302

Prepared By: Pete F. Ezell
Environmental Coordinator

Approved By: [Signature]
Superintendent Environmental and Chemistry

Date: 4/18/02

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 |
| Annual Land Use Census..... | 13 |
| Effluent Monitor Instrument Operability..... | 13 |
| ODCM & PCP Changes..... | 13 |
| Emergency Feed Pump 2..... | 13 |
| Appendix I Dose Summary | 14 |

INTRODUCTION

This report is submitted as required by the Offsite Dose Calculation Manual, section 6.5.

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 - 2001

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

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

A. Fission and activation gases

| | | | | |
|---|--------------------|----------|----------|----|
| 1. Total release | Ci | 2.31E-01 | 3.41E+02 | 30 |
| 2. Average release rate for period | $\mu\text{Ci/sec}$ | 2.97E-02 | 4.34E+01 | |
| 3. Percent of technical specification limit | % | 2.10E-04 | 6.10E-02 | |

B. Iodines

| | | | | |
|---|--------------------|----------|----------|----|
| 1. Total Iodine-131 | Ci | 0.00E+00 | 9.84E-07 | 30 |
| 2. Average release rate for period | $\mu\text{Ci/sec}$ | 0.00E+00 | 1.25E-07 | |
| 3. Percent of technical specification limit | % | 0.00E+00 | 3.58E-02 | |

C. Particulates*

| | | | | |
|---|--------------------|----------|----------|----|
| 1. Particulates with half-lives > 8 days | Ci | 7.58E-09 | 1.57E-07 | 30 |
| 2. Average release rate for period | $\mu\text{Ci/sec}$ | 9.75E-10 | 1.99E-08 | |
| 3. Percent of technical specification limit | % | 5.79E-03 | 3.58E-02 | |
| 4. Gross alpha radioactivity | Ci | 0.00E+00 | 0.00E+00 | |

D. Tritium

| | | | | |
|---|--------------------|----------|----------|----|
| 1. Total release | Ci | 1.81E+00 | 8.59E+00 | 30 |
| 2. Average release rate for period | $\mu\text{Ci/sec}$ | 2.32E-01 | 1.09E+00 | |
| 3. Percent of technical specification limit | % | 5.79E-03 | 3.58E-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 - 2001
GASEOUS EFFLUENTS - GROUND LEVEL RELEASES

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

A. Fission gases

| | | | | | |
|------------------|----|----------|----------|----------|----------|
| Argon-41 | Ci | | | | |
| Krypton-85 | Ci | | | | 3.20E+01 |
| Krypton-85m | Ci | | | | |
| Krypton-87 | Ci | | | | |
| Krypton-88 | Ci | | | | |
| Xenon-131m | Ci | | 2.77E+00 | | 3.93E+00 |
| Xenon-133 | Ci | | 1.12E+02 | 2.16E-01 | 1.88E+02 |
| Xenon-133m | Ci | | 9.96E-01 | | 1.53E+00 |
| Xenon-135 | Ci | | | 1.53E-02 | 8.91E-02 |
| Xenon-135m | Ci | | | | |
| Xenon-138 | Ci | | | | |
| Total for period | Ci | 0.00E+00 | 1.16E+02 | 2.31E-01 | 2.25E+02 |

B. Iodines

| | | | | | |
|------------------|----|----------|----------|----------|----------|
| Iodine-131 | Ci | | 5.40E-07 | | 4.43E-07 |
| Iodine-132 | Ci | | | | |
| Iodine-133 | Ci | | | | |
| Iodine-135 | Ci | | | | |
| Total for period | Ci | 0.00E+00 | 5.40E-07 | 0.00E+00 | 4.43E-07 |

C. Particulates

| | | | | | |
|------------------|----|----------|----------|----------|----------|
| Zinc-72 | Ci | | | | |
| Cobalt-58* | Ci | | | | 2.41E-08 |
| Cobalt-60* | Ci | | | | |
| Strontium-89* | Ci | | | | |
| Strontium-90* | Ci | | | | |
| Niobium-95m | Ci | | | | |
| Technetium-99m | Ci | | | | |
| Tellurium-132 | Ci | | | | |
| Cesium-134* | Ci | | | | |
| Cesium-137* | Ci | | 1.33E-07 | 7.58E-09 | |
| Cesium-138 | Ci | | | | |
| Barium-139 | Ci | | | | |
| Lanthanum-142 | Ci | | | | |
| Cerium-141* | Ci | | | | |
| Cerium-144* | Ci | | | | |
| Rhenium-188 | Ci | | | | |
| Total for period | Ci | 0.00E+00 | 1.33E-07 | 7.58E-09 | 2.41E-08 |

* > 8 day half-life

TABLE 3

EFFLUENT AND WASTE DISPOSAL REPORT - 2001

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

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

A. Fission and activation gases

| | | | | |
|---|--------------------|----------|----------|----|
| 1. Total release | Ci | 1.77E+01 | 6.11E+01 | 30 |
| 2. Average release rate for period | $\mu\text{Ci/sec}$ | 2.23E+00 | 7.69E+00 | |
| 3. Percent of technical specification limit | % | 1.62E-02 | 5.39E-02 | |

B. Iodines

| | | | | |
|---|--------------------|----------|----------|----|
| 1. Total Iodine-131 | Ci | 2.88E-06 | 1.00E-05 | 30 |
| 2. Average release rate for period | $\mu\text{Ci/sec}$ | 3.63E-07 | 1.26E-06 | |
| 3. Percent of technical specification limit | % | 3.06E-02 | 9.23E-02 | |

C. Particulates*

| | | | | |
|---|--------------------|----------|----------|----|
| 1. Particulates with half-lives > 8 days | Ci | 0.00E+00 | 1.28E-07 | 30 |
| 2. Average release rate for period | $\mu\text{Ci/sec}$ | 0.00E+00 | 1.61E-08 | |
| 3. Percent of technical specification limit | % | 0.00E+00 | 9.23E-02 | |
| 4. Gross alpha radioactivity | Ci | 0.00E+00 | 0.00E+00 | |

D. Tritium

| | | | | |
|---|--------------------|----------|----------|----|
| 1. Total release | Ci | 1.89E+00 | 2.23E+00 | 30 |
| 2. Average release rate for period | $\mu\text{Ci/sec}$ | 2.38E-01 | 2.81E-01 | |
| 3. Percent of technical specification limit | % | 3.06E-02 | 9.23E-02 | |

* 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 - 2001
GASEOUS EFFLUENTS - GROUND LEVEL RELEASES

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

A. Fission gases

| | | | | | |
|------------------|----|----------|----------|----------|----------|
| Argon-41 | Ci | | | 6.48E-03 | |
| Krypton-85 | Ci | | | 1.38E+00 | 3.02E+00 |
| Krypton-85m | Ci | | | | 8.80E-04 |
| Krypton-87 | Ci | | | | |
| Krypton-88 | Ci | | | | |
| Xenon-131m | Ci | | | 1.39E-02 | 3.89E-01 |
| Xenon-133 | Ci | 1.15E+01 | 4.92E+01 | 4.36E+00 | 7.62E+00 |
| Xenon-133m | Ci | 7.56E-02 | 2.02E-01 | | 1.95E-02 |
| Xenon-135 | Ci | 3.22E-01 | 6.44E-01 | 6.48E-02 | 4.87E-02 |
| Xenon-135m | Ci | | | | |
| Xenon-138 | Ci | | | | |
| Total for period | Ci | 1.19E+01 | 5.00E+01 | 5.83E+00 | 1.11E+01 |

B. Iodines

| | | | | | |
|------------------|----|----------|----------|----------|----------|
| Iodine-131 | Ci | 2.88E-06 | 1.00E-05 | | |
| Iodine-132 | Ci | | | | |
| Iodine-133 | Ci | 1.04E-06 | | | |
| Iodine-135 | Ci | | | | |
| Total for period | Ci | 3.93E-06 | 1.00E-05 | 0.00E+00 | 0.00E+00 |

C. Particulates

| | | | | | |
|------------------|----|----------|----------|----------|----------|
| Zinc-72 | Ci | | | | |
| Cobalt-58* | Ci | | | | |
| Chromium-51* | Ci | | | | |
| Strontium-89* | Ci | | | | |
| Strontium-90* | Ci | | | | |
| Niobium-95m | Ci | | | | |
| Tin-113* | Ci | | | | |
| Indium-113m | Ci | | | | |
| Barium-133m | Ci | 1.80E-07 | 1.67E-07 | | |
| Cesium-137* | Ci | | 1.28E-07 | | |
| Cesium-138 | Ci | | | | |
| Barium-139 | Ci | | | | |
| Lanthanum-142 | Ci | | | | |
| Cerium-143 | Ci | | 1.54E-07 | | |
| Cerium-144* | Ci | | | | |
| Rhenium-188 | Ci | | | | |
| Total for period | Ci | 1.80E-07 | 4.50E-07 | 0.00E+00 | 0.00E+00 |

* > 8 day half-life

TABLE 5
EFFLUENT AND WASTE DISPOSAL REPORT - 2001
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 | 4.53E-02 | 4.49E-02 | 25 |
| 2. Average diluted concentration during period | μCi/ml | 8.71E-11 | 7.50E-11 | |
| 3. Percent of applicable limit | % | 4.54E-02 | 2.36E-02 | |
| B. Tritium | | | | |
| 1. Total release | Ci | 1.57E+02 | 9.33E+01 | 30 |
| 2. Average diluted concentration during period | μCi/ml | 3.02E-07 | 1.56E-07 | |
| 3. Percent of applicable limit | % | 2.83E-01 | 1.59E-01 | |
| C. Dissolved and entrained gases | | | | |
| 1. Total release | Ci | 1.86E-01 | 2.10E-01 | 25 |
| 2. Average diluted concentration during period | μCi/ml | 3.58E-10 | 3.51E-10 | |
| 3. Percent of applicable limit | % | 1.68E-02 | 1.79E-02 | |
| D. Gross alpha radioactivity | | | | |
| 1. Total release | Ci | 0.00E+00 | 0.00E+00 | 30 |
| E. Volume of waste released (prior to dilution) | | | | |
| 1. Batch and continuous modes | Liters | 5.60E+06 | 9.01E+06 | 10 |
| F. Volume of dilution water used during period | | | | |
| 1. Batch and continuous modes | Liters | 5.20E+11 | 5.99E+11 | 10 |

TABLE 6
EFFLUENT AND WASTE DISPOSAL REPORT - 2001
LIQUID EFFLUENTS

| Fission and activation products | Unit | CONTINUOUS MODE | | BATCH MODE | |
|---------------------------------|------|-----------------|-----------|------------|-----------|
| | | Quarter 1 | Quarter 2 | Quarter 1 | Quarter 2 |
| Sodium-24 | Ci | | | 3.51E-06 | |
| Chromium-51 | Ci | | | 3.13E-04 | 6.90E-03 |
| Manganese-54 | Ci | | | 4.82E-05 | 3.63E-04 |
| Manganese-56 | Ci | | | | |
| Iron-55 | Ci | | | 2.14E-04 | 1.10E-03 |
| Iron-59 | Ci | | | | 1.41E-03 |
| Cobalt-57 | Ci | | | | |
| Cobalt-58 | Ci | | 6.87E-05 | 1.46E-03 | 1.50E-02 |
| Cobalt-60 | Ci | | | 1.11E-03 | 1.26E-03 |
| Zinc-72 | Ci | | | | |
| Strontium-85 | Ci | | | | 8.03E-06 |
| Strontium-89 | Ci | | | | |
| Strontium-90 | Ci | | | | |
| Yttrium-91m | Ci | | | | |
| Yttrium-92 | Ci | | | | |
| Yttrium-93 | Ci | | | | |
| Niobium-95 | Ci | | | 5.45E-05 | 2.04E-03 |
| Niobium-95m | Ci | | | | |
| Niobium-97 | Ci | | | | 2.77E-04 |
| Zirconium-95 | Ci | | | 1.96E-04 | 1.68E-03 |
| Zirconium-97 | Ci | | | 1.01E-03 | 1.04E-04 |
| Molybdenum-99 | Ci | | | | 2.55E-04 |
| Technetium-99m | Ci | | | 3.73E-04 | 4.85E-04 |
| Technetium-101 | Ci | | | | |
| Ruthenium-103 | Ci | | | 1.26E-05 | 2.87E-05 |
| Ruthenium-106 | Ci | | | 2.52E-03 | |
| Silver-110m | Ci | | | 2.03E-02 | 1.78E-03 |
| Tin-113 | Ci | | | | 1.23E-04 |
| Indium-113m | Ci | | | | 1.75E-04 |
| Antimony-122 | Ci | | | | |
| Antimony-124 | Ci | | | 4.30E-04 | 2.35E-05 |
| Antimony-125 | Ci | | | 8.07E-03 | 3.86E-04 |
| Tellurium-129 | Ci | | | 3.26E-05 | |
| Tellurium-132 | Ci | | | | 4.93E-05 |
| Iodine-131 | Ci | | | 3.18E-03 | 6.46E-03 |
| Iodine-133 | Ci | | | 3.56E-03 | 2.12E-03 |
| Iodine-135 | Ci | | | 1.71E-04 | 2.22E-04 |
| Cesium-134 | Ci | | | 6.13E-06 | 1.24E-04 |
| Cesium-137 | Ci | | 6.00E-05 | 1.22E-05 | 8.46E-05 |
| Cesium-138 | Ci | | | | |
| Barium-139 | Ci | | | | 1.80E-05 |
| Barium-140 | Ci | | | | 2.55E-04 |
| Lanthanum-140 | Ci | | | 2.11E-03 | 1.98E-03 |
| Cerium-143 | Ci | | | 4.56E-06 | |
| Cerium-144 | Ci | | | 6.76E-05 | |
| Rhenium-188 | Ci | | | | 3.29E-05 |
| Tungsten-187 | Ci | | | | 5.91E-05 |
| Neptunium-239 | Ci | | | | 2.68E-05 |
| Total for period | Ci | 0.00E+00 | 1.29E-04 | 4.53E-02 | 4.49E-02 |

TABLE 6 (CONTINUED)

EFFLUENT AND WASTE DISPOSAL REPORT - 2001

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 | | | | 1.88E-03 |
| Krypton-85m | Ci | | | | |
| Krypton-87 | Ci | | | 2.00E-07 | |
| Krypton-88 | Ci | | | | |
| Xenon-131m | Ci | | | 3.54E-04 | 6.63E-03 |
| Xenon-133 | Ci | | | 1.27E-01 | 1.70E-01 |
| Xenon-133m | Ci | | | 4.86E-03 | 3.88E-03 |
| Xenon-135 | Ci | | | 5.41E-02 | 2.80E-02 |
| Xenon-135m | Ci | | | 1.77E-05 | 3.74E-05 |
| Total for period | Ci | 0.00E+00 | 0.00E+00 | 1.86E-01 | 2.10E-01 |

| | | | | | |
|---------|----|----------|----------|---------|----------|
| Tritium | Ci | 0.00E+00 | 3.24E-02 | 1.57+02 | 9.32E+01 |
|---------|----|----------|----------|---------|----------|

TABLE 7

EFFLUENT AND WASTE DISPOSAL REPORT - 2001

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 | 3.52E-02 | 4.13E-02 | 25 |
| 2. Average diluted concentration during period | μCi/ml | 5.57E-11 | 8.65E-11 | |
| 3. Percent of applicable limit | % | 2.44E-03 | 1.60E-03 | |

B. Tritium

| | | | | |
|--|--------|----------|----------|----|
| 1. Total release | Ci | 4.78E+01 | 3.61E+01 | 30 |
| 2. Average diluted concentration during period | μCi/ml | 7.56E-08 | 7.56E-08 | |
| 3. Percent of applicable limit | % | 6.99E-02 | 5.38E-02 | |

C. Dissolved and entrained gases

| | | | | |
|--|--------|----------|----------|----|
| 1. Total release | Ci | 7.02E-02 | 2.53E-01 | 25 |
| 2. Average diluted concentration during period | μCi/ml | 1.11E-10 | 5.30E-10 | |
| 3. Percent of applicable limit | % | 5.13E-03 | 1.88E-02 | |

D. Gross alpha radioactivity

| | | | | |
|------------------|----|----------|----------|----|
| 1. Total release | Ci | 0.00E+00 | 6.67E-04 | 30 |
|------------------|----|----------|----------|----|

E. Volume of waste released (prior to dilution)

| | | | | |
|-------------------------------|--------|----------|----------|----|
| 1. Batch and continuous modes | Liters | 8.28E+06 | 7.56E+06 | 10 |
|-------------------------------|--------|----------|----------|----|

F. Volume of dilution water used during period

| | | | | |
|-------------------------------|--------|----------|----------|----|
| 1. Batch and continuous modes | Liters | 6.32E+11 | 4.77E+11 | 10 |
|-------------------------------|--------|----------|----------|----|

TABLE 8
EFFLUENT AND WASTE DISPOSAL REPORT - 2001
LIQUID EFFLUENTS

| Fission and activation products | Unit | CONTINUOUS MODE | | BATCH MODE | |
|---------------------------------|------|-----------------|-----------|------------|-----------|
| | | Quarter 3 | Quarter 4 | Quarter 3 | Quarter 4 |
| Sodium-24 | Ci | | | 1.95E-06 | 8.47E-06 |
| Chromium-51 | Ci | | | 9.01E-04 | 1.05E-03 |
| Manganese-54 | Ci | | | 2.77E-05 | 5.46E-05 |
| Manganese-56 | Ci | | | | |
| Iron-55 | Ci | | | 1.89E-03 | 3.93E-03 |
| Iron-59 | Ci | | | | 8.78E-07 |
| Cobalt-57 | Ci | | | | |
| Cobalt-58 | Ci | | | 3.18E-03 | 6.93E-04 |
| Cobalt-60 | Ci | | | 5.47E-04 | 2.50E-04 |
| Zinc-69 | Ci | | | 6.70E-06 | |
| Zinc-72 | Ci | | | | |
| Strontium-85 | Ci | | | 5.95E-06 | 2.84E-05 |
| Strontium-89 | Ci | | | | |
| Strontium-90 | Ci | | | | |
| Strontium-92 | Ci | | | | |
| Yttrium-91 | Ci | | | | 2.60E-04 |
| Yttrium-92 | Ci | | | | 7.74E-06 |
| Yttrium-93 | Ci | | | | |
| Rubidium-88 | Ci | | | | |
| Niobium-95 | Ci | | | 8.56E-05 | 9.65E-05 |
| Zirconium-95 | Ci | | | 3.23E-05 | 3.79E-05 |
| Zirconium-97 | Ci | | | 9.36E-06 | |
| Molybdenum-99 | Ci | | | | |
| Technetium-99m | Ci | | | | |
| Technetium-101 | Ci | | | | |
| Ruthenium-106 | Ci | | | | 2.43E-05 |
| Silver-110m | Ci | | | 6.69E-04 | 8.15E-06 |
| Tin-113 | Ci | | | | 5.15E-07 |
| Indium-113m | Ci | | | | 8.71E-07 |
| Antimony-122 | Ci | | | 1.51E-07 | 2.11E-07 |
| Antimony-124 | Ci | | | 1.55E-05 | 1.39E-04 |
| Antimony-125 | Ci | | | 2.78E-02 | 3.19E-02 |
| Tellurium-129 | Ci | | | | |
| Tellurium-132 | Ci | | | 6.75E-06 | 2.17E-04 |
| Iodine-131 | Ci | | | 5.05E-06 | 1.33E-04 |
| Iodine-132 | Ci | | | | 1.80E-04 |
| Iodine-133 | Ci | | | 1.96E-07 | |
| Iodine-135 | Ci | | | | |
| Cesium-134 | Ci | | | 3.78E-06 | 7.18E-05 |
| Cesium-136 | Ci | | | | |
| Cesium-137 | Ci | | | 9.83E-06 | 8.87E-05 |
| Barium-133m | Ci | | | 6.69E-06 | |
| Barium-139 | Ci | | | | |
| Barium-140 | Ci | | | 5.36E-07 | |
| Lanthanum-140 | Ci | | | | |
| Cerium-143 | Ci | | 5.38E-05 | | |
| Cerium-144 | Ci | | | | |
| Praseodymium-144 | Ci | | | | 1.95E-03 |
| Tungsten-187 | Ci | | | | |
| Rhenium-188 | Ci | | | | 2.83E-05 |
| Total for period | Ci | 0.00E+00 | 5.38E-05 | 3.52E-02 | 4.13E-02 |

TABLE 8 (CONTINUED)

EFFLUENT AND WASTE DISPOSAL REPORT - 2001

LIQUID EFFLUENTS

| Dissolved and entrained gases | Unit | CONTINUOUS MODE | | BATCH MODE | |
|-------------------------------|------|-----------------|-----------|------------|-----------|
| | | Quarter 3 | Quarter 4 | Quarter 3 | Quarter 4 |
| Argon-41 | Ci | | | | |
| Krypton-85 | Ci | | | 1.39E-03 | 6.65E-03 |
| Krypton-85m | Ci | | | | |
| Krypton-87 | Ci | | | | |
| Krypton-88 | Ci | | | | |
| Xenon-131m | Ci | | | 7.18E-04 | 7.50E-03 |
| Xenon-133 | Ci | 2.41E-04 | | 6.68E-02 | 2.37E-01 |
| Xenon-133m | Ci | | | 9.28E-05 | 1.55E-03 |
| Xenon-135 | Ci | | | 8.91E-04 | 2.41E-04 |
| Xenon-135m | Ci | | | 9.36E-06 | |
| Total for period | Ci | 2.41E-04 | 0.00E+00 | 6.99E-02 | 2.53E-01 |

| | | | | | |
|---------|----|----------|----------|----------|----------|
| Tritium | Ci | 2.66E-02 | 1.74E-02 | 4.77E+01 | 3.61E+01 |
|---------|----|----------|----------|----------|----------|

TABLE 9

EFFLUENT AND WASTE DISPOSAL REPORT - 2001

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 | 2.79E+01 1.38E+00 | 25 |
| b. Dry compressible waste, contaminated equipment, etc. | m3 Ci | 7.06E+02 2.17E+00 | 25 |
| c. Irradiated components, control rods, etc. | m3 Ci | 0.00E+00 0.00E+00 | 25 |
| d. Other (describe): Expended charcoal | m3 Ci | 0.00E+00 0.00E+00 | 25 |
| 2. Estimate of major nuclide composition (by type of waste in %)* | | | |
| a. | Co-58 33.8 Nb-95 27.4 Fe-55 16.8 | Co-60 8.2 Ag-110m 3.6 Mn-54 3.2 | Ni-63 3.1 Zr-95 3.1 |
| b. | Fe-55 35.5 Cs-137 15.4 Ni-63 13.0 | Co-60 11.6 Co-58 11.5 Ag-110m 3.3 | Mn-54 2.8 Nb-95 2.0 |
| c. | | | |
| d. | | | |

3. Solid Waste Disposition

| Number of Shipments | Mode of Transportation | Destination |
|---------------------|------------------------|---------------------------|
| 1 | Exclusive use truck | Barnwell Waste Mngmt (SC) |
| 4 | Exclusive use truck | Alaron Corp. (SC) |
| 5 | Exclusive use truck | Duratek (TN) |
| 5 | Exclusive use truck | ATG Nuclear Services (TN) |
| 1 | Exclusive use truck | ATG Richland Corp (WA) |
| 1 | Exclusive use truck | Envirocare (UT) |

B. 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 was one unplanned releases during 2001. The release was documented in NCR 52926. An estimated 4.4E-06 Curies of gamma emitters and 3.6E-02 Curies of tritium were released. The release path was from Nuclear Services Closed Cycle Cooling System (SW) to the Nuclear Services and Decay Seawater System (RW) by way of leaks in two heat exchangers. The RW system discharges to the site discharge canal. The SW system contains residual contaminated due to a primary coolant leak into the system earlier in 2001, prior to Refuel 12.

Radioactive Waste Treatment Systems

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

Annual Land Use Census

The July 2001 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 2001.

ODCM & PCP Changes

The PCP was revised during 2001. The entire PCP underwent a significant rewrite. The main reason for the revision was to clarify that only qualified vendors, and not station personnel, will perform solidification activities when required.

The ODCM was revised during 2001. The affected pages are ii, 1, 2, 3, 24, 29, 40, 51, 58, 68, 101, 109, 117. The changes were made primarily to make the ODCM consistent with the technical specification 5.6.2.3.g and 5.6.2.3.i language pertaining to I-133. ODCM definitions that were also in technical specifications were deleted from the ODCM.

Emergency Feed Pump 2

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 2001 due to operation of this pump. The results of this evaluation are given below in units of Curies/year.

| | | | | | |
|--------|----------|-------|----------|--------|----------|
| Xe-133 | 2.23E-07 | I-131 | 1.64E-08 | Cs-137 | 1.00E-08 |
| Xe-135 | 6.91E-08 | I-133 | 8.91E-08 | Cs-137 | 8.48E-09 |
| H-3 | 1.90E-03 | | | | |

These values are not included in Tables 1 through 4.

2001 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) | 1.55E-05 | 4.77E-05 | 6.74E-06 | 2.39E-05 | 9.39E-05 |
| Maximum Organ Dose (mrem) | 2.27E-03 | 1.18E-03 | 1.22E-04 | 7.43E-05 | 3.65E-03 |
| 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) | 8.37E-06 | 2.90E-04 | 5.32E-04 | 1.71E-03 | 2.54E-03 |
| Beta Air Dose (mrad) | 2.10E-05 | 6.10E-03 | 1.62E-03 | 5.39E-03 | 1.31E-02 |
| Total Body Dose (mrem) | 4.34E-04 | 2.06E-03 | 4.57E-04 | 5.46E-04 | 3.50E-03 |
| Maximum Organ Dose (mrem) | 4.34E-04 | 2.69E-03 | 2.29E-03 | 6.92E-03 | 1.23E-02 |
| Maximum Organ was Thyroid | | | | | |