



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Rhode Island Atomic Energy Commission  
NUCLEAR SCIENCE CENTER

16 Reactor Road  
Narragansett, R.I. 02882-1165

August 26, 2002

Docket No. 50-193

Mr. Marvin Mendonca, Senior Project Manager  
Non-Power Reactors, Decommissioning and  
Environmental Project Directorate  
Division of Reactor Projects - III/IV/V  
U.S. Nuclear Regulatory Commission (NRC)  
Washington, D.C. 20555

Dear Mr. Mendonca,

This letter and enclosures constitute the annual report required by the RINSC Technical Specifications (Section 6.8.4). Enclosure 1 provides reactor operating statistics. Enclosure 2 provides information pertaining to inadvertent reactor shutdowns or scrams. Enclosure 3 discusses maintenance operations performed during the reporting period. Enclosure 4 describes changes to the facility carried out under the conditions of Section 50.59 of Chapter 10 of the Code of Federal Regulations. Lastly, Enclosure 5 summarizes the radiological controls information. If there are any questions regarding this information, please call me at 401-789-9391.

Sincerely,

Wayne Simoneau  
Assistant Director

WS:jd

Enclosures (5)

Copy to :

Mr. Craig Bassett, USNRC Region I  
Dr. Harry Knickle, Chairman NRSC  
Dr. Vincent Rose, Chairman RIAEC  
Dr. Bruno Giletti, RIAEC  
Dr. Stanley J. Pickart, RIAEC  
Dr. Stephen Mecca, RIAEC  
Dr. Alfred L. Allen, RIAEC

ENCLOSURE 1

Technical Specifications  
Section 6.8.4.a (01-02)

| Month  | Reactor<br>Critical<br>(hours) | Energy<br>Generated<br>(MWh) | Energy<br>Generated<br>(MWd) |
|--|--------------------------------|------------------------------|------------------------------|
| July-01  | 13.28                          | 24.62                        | 1.03                         |
| August-01                                      | 29.65                          | 53.37                        | 2.22                         |
| September-01                                   | 9.25                           | 17.40                        | 0.73                         |
| October-01                                     | 20.13                          | 36.99                        | 1.54                         |
| November-01                                    | 15.77                          | 28.84                        | 1.20                         |
| December-01                                    | 23.20                          | 42.25                        | 1.76                         |
| January-02                                     | 24.05                          | 45.13                        | 1.88                         |
| February-02                                    | 17.12                          | 29.46                        | 1.23                         |
| March-02                                       | 15.95                          | 31.84                        | 1.33                         |
| April-02                                       | 13.70                          | 26.65                        | 1.11                         |
| May-02   | 17.87                          | 33.28                        | 1.39                         |
| June-02  | 15.23                          | 30.47                        | 1.27                         |
| 2000-01 Totals:                                | 215.20                         | 400.30                       | 16.68                        |
| Total Energy Output since Initial Criticality: |                                | 58,065.66                    | 2,419.40                     |

(Continued)

**NSC-78**

\*added HEU=49698.01

## SUMMARY

|                   |             |               |               |             |               |
|-------------------|-------------|---------------|---------------|-------------|---------------|
| <b>Operating</b>  | <b>Max.</b> | <b>Actual</b> |               | <b>Max.</b> | <b>Actual</b> |
| <b>Hours</b>      | 140.0       | 13.3          | <b>MWH's:</b> | 280.0       | 24.6          |
| <b>Percentage</b> |             | 9%            |               |             | 9%            |

## (Continued)

NSC-78

\*added HEU=49698.01

## SUMMARY

|                   |             |               |               |             |               |
|-------------------|-------------|---------------|---------------|-------------|---------------|
| <b>Operating</b>  | <b>Max.</b> | <b>Actual</b> |               | <b>Max.</b> | <b>Actual</b> |
| <b>Hours</b>      | 140.0       | 29.7          | <b>MWH's:</b> | 280.0       | 53.4          |
| <b>Percentage</b> |             | 21%           |               |             | 19%           |

## (Continued)

**NSC-78**

\*added HEU=49698.01

## SUMMARY

|                   |             |               |               |             |               |
|-------------------|-------------|---------------|---------------|-------------|---------------|
| <b>Operating</b>  | <b>Max.</b> | <b>Actual</b> |               | <b>Max.</b> | <b>Actual</b> |
| <b>Hours</b>      | 140.0       | 9.3           | <b>MWH's:</b> | 280.0       | 17.4          |
| <b>Percentage</b> |             | 7%            |               |             | 6%            |



(Continued)

NSC-78

\*added HEU=49698.01

## SUMMARY

|                   |             |               |               |             |               |
|-------------------|-------------|---------------|---------------|-------------|---------------|
| <b>Operating</b>  | <b>Max.</b> | <b>Actual</b> |               | <b>Max.</b> | <b>Actual</b> |
| <b>Hours</b>      | 140.0       | 15.8          | <b>MWH's:</b> | 280.0       | 28.8          |
| <b>Percentage</b> |             | 11%           |               |             | 10%           |

## (Continued)

NSC-78

\*added HEU=49698.01

## SUMMARY

|                   |             |               |               |             |               |
|-------------------|-------------|---------------|---------------|-------------|---------------|
| <b>Operating</b>  | <b>Max.</b> | <b>Actual</b> |               | <b>Max.</b> | <b>Actual</b> |
| <b>Hours</b>      | 140.0       | 23.2          | <b>MWH's:</b> | 280.0       | 42.3          |
| <b>Percentage</b> |             | 17%           |               |             | 15%           |



## (Continued)

NSC-78

\*added HEU=49698.01

## SUMMARY

|                   |             |               |               |             |               |
|-------------------|-------------|---------------|---------------|-------------|---------------|
| <b>Operating</b>  | <b>Max.</b> | <b>Actual</b> |               | <b>Max.</b> | <b>Actual</b> |
| <b>Hours</b>      | 147.0       | 24.1          | <b>MWH's:</b> | 294.0       | 45.1          |
| <b>Percentage</b> |             | 16%           |               |             | 15%           |

## (Continued)

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|               |  |                 |
|---------------|--|-----------------|
| Month: Feb-02 |  | Revised 5/15/01 |
|---------------|--|-----------------|

### Cumulative MWH's

**TOTAL**

**LEU**

|               |           |  |             |           |          |
|---------------|-----------|--|-------------|-----------|----------|
| <b>Start:</b> | 57,913.97 |  | <b>End:</b> | 57,943.43 | 8,245.41 |
|---------------|-----------|--|-------------|-----------|----------|

\*added HEU=49698.01

| Run No.        | Day (1-31) | Ave Pwr Level (MW) | Start Time (hhmm) | S/D Time (hhmm) | Operating Time (hrs) | Todays total MWH | Stack Monitor max CPM | Ar-41 Released      |        |
|----------------|------------|--------------------|-------------------|-----------------|----------------------|------------------|-----------------------|---------------------|--------|
|                |            |                    |                   |                 |                      |                  |                       | Limit = 4E-4 uCi/cc |        |
|                |            |                    |                   |                 |                      |                  |                       | uCi/cc              | Ci/day |
| 7460           | 5          | 2.00               | 1006              | 1050            | 0.73                 | 1.47             | 8,000                 | 2.43E-05            | 0.01   |
| 7461           | 7          | 1.90               | 1008              | 1308            | 3.00                 | 5.70             | 9,000                 | 2.74E-05            | 0.06   |
| 7462           | 12         | 1.95               | 1137              | 1220            | 0.72                 | 1.40             | 7,000                 | 2.13E-05            | 0.01   |
| 7463           | 14         | 2.00               | 1038              | 1338            | 3.00                 | 6.00             | 9,000                 | 2.74E-05            | 0.06   |
| 7464           | 19         | 2.00               | 1055              | 1150            | 0.92                 | 1.83             | 8,000                 | 2.43E-05            | 0.02   |
| 7465           | 21         | 2.00               | 1045              | 1200            | 1.25                 | 2.50             | 9,000                 | 2.74E-05            | 0.03   |
| 7466           | 26         | 1.25               | 0935              | 1530            | 5.92                 | 7.40             | 9,000                 | 2.74E-05            | 0.12   |
| 7467           | 28         | 2.00               | 1046              | 1221            | 1.58                 | 3.17             | 9,000                 | 2.74E-05            | 0.03   |
|                |            |                    |                   |                 |                      |                  |                       |                     |        |
|                |            |                    |                   |                 |                      |                  |                       |                     |        |
|                |            |                    |                   |                 |                      |                  |                       |                     |        |
|                |            |                    |                   |                 |                      |                  |                       |                     |        |
|                |            |                    |                   |                 |                      |                  |                       |                     |        |
|                |            |                    |                   |                 |                      |                  |                       |                     |        |
|                |            |                    |                   |                 |                      |                  |                       |                     |        |
|                |            |                    |                   |                 |                      |                  |                       |                     |        |
|                |            |                    |                   |                 |                      |                  |                       |                     |        |
| <b>Totals:</b> |            |                    |                   |                 | 17.12                | 29.46            |                       | 2.07E-04            |        |

## SUMMARY

|                   |             |               |               |             |               |
|-------------------|-------------|---------------|---------------|-------------|---------------|
| <b>Operating</b>  | <b>Max.</b> | <b>Actual</b> |               | <b>Max.</b> | <b>Actual</b> |
| <b>Hours</b>      | 140.0       | 17.1          | <b>MWH's:</b> | 280.0       | 29.5          |
| <b>Percentage</b> |             | 12%           |               |             | 11%           |





ENCLOSURE 1

(Continued)

NSC-78

**Monthly Information Sheet**

NSC-78

|                      |  |                       |
|----------------------|--|-----------------------|
| <b>Month:</b> May-02 |  | <b>Revised</b> 5/8/02 |
|----------------------|--|-----------------------|

**Cumulative MWH's**

TOTAL

LEU

|                         |  |                       |          |
|-------------------------|--|-----------------------|----------|
| <b>Start:</b> 58,001.92 |  | <b>End:</b> 58,035.20 | 8,327.78 |
|-------------------------|--|-----------------------|----------|

\*added HEU=49698.01

Stack Calibration Factor = 4 375E-9

| Run No.        | Day (1-31) | Ave Pwr Level (MW) | Start Time (hhmm) | S/D Time (hhmm) | Operating Time (hrs) | Todays total MWH | Stack Monitor max CPM | Ar-41 Released         |            |
|----------------|------------|--------------------|-------------------|-----------------|----------------------|------------------|-----------------------|------------------------|------------|
|                |            |                    |                   |                 |                      |                  |                       | Limit = 1.0E-03 uCi/cc |            |
|                |            |                    |                   |                 |                      |                  |                       | uCi/cc                 | % of Limit |
| 7485           | 1          | 2.00               | 1052              | 1208            | 1.27                 | 2.53             | 8,000                 | 3.50E-05               | 3.50       |
| 7486           | 7          | 1.90               | 0857              | 1119            | 2.37                 | 4.50             | 8,000                 | 3.50E-05               | 3.50       |
| 7487           | 8          | 0.10               | 0926              | 1010            | 0.73                 | 0.07             | 700                   | 3.06E-06               | 0.31       |
| 7488           | 9          | 2.00               | 1120              | 1359            | 2.65                 | 5.30             | 8,000                 | 3.50E-05               | 3.50       |
| 7489           | 14         | 2.00               | 0909              | 1035            | 1.43                 | 2.87             | 7,000                 | 3.06E-05               | 3.06       |
| 7490           | 16         | 2.00               | 1111              | 1132            | 0.35                 | 0.70             | 7,000                 | 3.06E-05               | 3.06       |
| 7491           | 21         | 2.00               | 1051              | 1428            | 3.62                 | 7.23             | 10,000                | 4.38E-05               | 4.38       |
| 7492           | 22         | 0.10               | 1444              | 1510            | 0.43                 | 0.04             | 2,500                 | 1.09E-05               | 1.09       |
| 7493           | 23         | 2.00               | 0959              | 1205            | 2.10                 | 4.20             | 9,000                 | 3.94E-05               | 3.94       |
| 7494           | 28         | 2.00               | 0902              | 1010            | 1.13                 | 2.27             | 8,000                 | 3.50E-05               | 3.50       |
| 7495           | 30         | 2.00               | 1013              | 1200            | 1.78                 | 3.57             | 8,500                 | 3.72E-05               | 3.72       |
|                |            |                    |                   |                 |                      |                  |                       |                        |            |
|                |            |                    |                   |                 |                      |                  |                       |                        |            |
|                |            |                    |                   |                 |                      |                  |                       |                        |            |
|                |            |                    |                   |                 |                      |                  |                       |                        |            |
|                |            |                    |                   |                 |                      |                  |                       |                        |            |
|                |            |                    |                   |                 |                      |                  |                       |                        |            |
| <b>Totals:</b> |            |                    |                   |                 | 17.87                | 33.28            |                       | 3.36E-04               |            |

**SUMMARY**

| Operating  | Max.  | Actual |        | Max.  | Actual |
|------------|-------|--------|--------|-------|--------|
| Hours      | 161.0 | 17.9   | MWH's: | 322.0 | 33.3   |
| Percentage |       | 11%    |        |       | 10%    |



ENCLOSURE 2

**EMERGENCY SHUTDOWNS AND SCRAMS**

The following is a listing of the emergency shutdowns and inadvertent scrams, including the reasons, which occurred during the 2001-2002 reporting period. This information is required by Technical Specification 6.8.4.b.

| DATE     | RUN # | LOGBOOK / PAGE | CAUSE  |
|----------|-------|----------------|--|
| 8/27/01  | 7412  | 50 / 17        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 8/30/01  | 7414  | 50 / 21        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 9/11/01  | 7417  | 50 / 24        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 9/13/01  | 7418  | 50 / 25        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 10/2/01  | 7423  | 50 / 31        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 10/9/01  | 7425  | 50 / 33        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 10/11/01 | 7426  | 50 / 35        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 10/16/01 | 7427  | 50 / 36        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 10/18/01 | 7428  | 50 / 37        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 11/13/01 | 7436  | 50 / 47        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 12/6/01  | 7442  | 50 / 58        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 12/6/01  | 7442  | 50 / 58        | Reactor scram caused by spike on the Wide Range Monitor #2 channel due to loss of detector ground. |
| 12/11/01 | 7444  | 50 / 60        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 12/20/01 | 7448  | 50 / 65        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 12/27/01 | 7449  | 50 / 67        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 1/3/02   | 7450  | 50 / 68        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 1/10/02  | 7452  | 50 / 71        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 1/15/02  | 7454  | 50 / 74        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 1/17/02  | 7455  | 50 / 76        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 1/22/02  | 7456  | 50 / 78        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 1/24/02  | 7457  | 50 / 81        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 1/29/02  | 7458  | 50 / 83        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 2/5/02   | 7460  | 50 / 86        | Reactor scram caused by short period on the Log N channel due to noise.                            |
| 3/14/02  | 7471  | 50 / 100       | Reactor scram caused by short period on the Log N channel due to noise.                            |

ENCLOSURE 2

**EMERGENCY SHUTDOWNS AND SCRAMS**

|         |      |          |   |
|---------|------|----------|---|
| 3/19/02 | 7472 | 50 / 102 | Reactor scram caused by short period on the Log N channel due to noise. |
| 3/26/02 | 7474 | 50 / 104 | Reactor scram caused by short period on the Log N channel due to noise. |
| 4/30/02 | 7484 | 50 / 115 | Reactor scram caused by short period on the Log N channel due to noise. |
| 5/2/02  | 7485 | 50 / 117 | Reactor scram caused by short period on the Log N channel due to noise. |
| 5/9/02  | 7488 | 50 / 121 | Reactor scram caused by short period on the Log N channel due to noise. |
| 5/16/02 | 7490 | 50 / 124 | Reactor scram caused by short period on the Log N channel due to noise. |
| 5/21/02 | 7491 | 50 / 125 | Reactor scram caused by short period on the Log N channel due to noise. |
| 5/23/02 | 7493 | 50 / 127 | Reactor scram caused by short period on the Log N channel due to noise. |
| 6/6/02  | 7497 | 50 / 133 | Reactor scram caused by short period on the Log N channel due to noise. |

All but one of the emergency shutdowns and scrams were due to noise on the Log N Period Channel. New instrumentation for this channel was installed, but the problem has continued. The connection between the detector and the instrumentation has been a makeshift connection because the connectors do not match. We are hopeful that once we get the proper matching connectors installed, the problem will be solved. The only scram that occurred that was not due to noise on the Log N Period channel was due to a spike on the Wide Range Monitor #2 channel. This was due to noise caused by the breakdown of the insulation between the detector and the shroud that it is in. The insulation has been replaced, and the channel is working properly.



### ENCLOSURE 3

The following is a listing of the major maintenance operations performed in the 2001-2002 reporting period which includes impact upon the safe operation of the reactor and the reasons for corrective maintenance. This information is required by Technical Specification 6.8.4.c.

#### **1. Secondary System Cooling Tower Plumbing**

During the 2000-2001 reporting period, the secondary system cooling towers were relocated. The plumbing for this project was completed this year. Both cooling loops have been tested, and have been found to be working well.

ENCLOSURE 4

**FACILITY CHANGES - 10CFR50.59 REVIEW**

The following is a listing and description of 10CFR50.59 evaluations conducted during the 2001-2002 reporting period. This information is required by Technical Specification 6 8.4.d.

**1. Instrumentation Upgrade**

With funds from the Reactor Instrumentation Grant Program, RINSC purchased and received a new Gamma Metrics Neutron Flux Monitor to replace the Log N Power , Log N Period, and Start-Up channels. Pursuant to 10CFR50.59, a committee was formed to evaluate this change, and it found that the upgrade did not involve a change in the Technical specifications, nor did it create an unreviewed safety question.

## ENCLOSURE 5

### RADIOLOGICAL CONTROLS

#### 1. Environmental Surveys Outside the Facility - Technical Specification 6.8.4.e

Quarterly OSL<sup>1</sup> badges are deployed outside the reactor building in three separate locations. The general public does not frequent these locations and therefore occupancy factors may be used to approximate annual dose. The allowable external dose rates must be below 50 mrem per year. The quarterly doses in units of mrem are shown in the table below.

| LOCATION            | 3 <sup>RD</sup> QTR 2001 | 4 <sup>TH</sup> QTR 2001 | 1 <sup>ST</sup> QTR 2002 | 2 <sup>ND</sup> QTR 2002 <sup>2</sup> |
|---------------------|--------------------------|--------------------------|--------------------------|---------------------------------------|
| Northeast Wall      | 49                       | 33                       | 29                       | 32                                    |
| Demineralizer Door  | 68                       | 80                       | 68                       | 69                                    |
| Heat Exchanger Door | 5                        | 6                        | 4                        | 13                                    |

These areas are in locations where access is limited. Consequently, the general public will not frequent these areas, and appropriate occupancy factors can be used to approximate annual dose. Assuming that the maximum time that a member of the general public would be present in one of these locations is 15 minutes per day, an occupancy factor of 0.01 can be used to obtain the annual dose that would be received by a member of the general public, in any of these areas.

The dose rate in the Northeast Wall area is due to storage of RAM, and is present regardless of reactor operation. Applying the occupancy factor, the annual dose to an individual in this area would be 1.43 mrem over the course of last year. The annual dose rate at the Demineralizer and Heat Exchanger Doors is dependent on the operations schedule of the reactor. Ignoring the fact that the dose rate is not present 24 hours per day, and applying the occupancy factor of 0.01, the annual dose that would be received by an individual at the Demineralizer Door would be 2.85 mrem. Likewise the dose received at the Heat Exchanger Door would be 0.28 mrem.

#### 2. Annual Exposures Exceeding 500 mrem - Technical Specification 6.8.4.f

There were no personnel exposures greater than 500 mrem.

#### 3. Radioactive Effluents - Technical Specification 6.8.4.g

A. Gaseous effluent concentrations are documented on the Monthly Information Sheets (Form NSC-78) enclosed. The gaseous effluents, primarily Argon-41, were less than 5% of the 10 CFR 20, Appendix B, Table 2, Column 1 effluent limits.

B. Liquid effluent concentrations released to the sewer are documented on the Sewer Disposal Record (Form NSC-52) and/or the Liquid Release Record (Form NSC-17). . No liquids were discharged during the reporting period.

<sup>1</sup> Optically Stimulated Luminescence

<sup>2</sup> Landauer reads the OSL dosimeters to 1 mrem.