STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

RHODE ISLAND ATOMIC ENERGY COMMISSION
Rhode Island Nuclear Science Center
16 Reactor Road
Narragansett, RI 02882-1165

July 28, 2011

Docket No. 50-193

Mr. William Kennedy, Project Manager
Non-Power Reactors, Decommissioning and
Environmental Project Directorate
Division of Reactor Projects - III/IV/V
U. S. Nuclear Regulatory Commission (NRC)
Washington, DC 20555

Dear Mr. Kennedy:

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,

Stephen N Guarino
Health Physicist

Enclosures (5)

Copy to:

Mr. Jack Donohue, USNRC Region I
Dr. John J. Breen, Chairman NRSC
Dr. Stephen Mecca, Chairman RIAEC
Dr. Anthony C. Nunes, RIAEC
Dr. Peter Gromet, RIAEC
Dr. Andrew Kadak, RIAEC
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ENCLOSURE 1
Technical Specifications
Section 6.8.4.a

Total Energy Output since Initial Criticality: 63,880.5 MWH, 2661.68 MWD

Month	Year	Reactor Operating (Hours)	Energy Generated (MWH)	Energy Generated (MWDays)
July	2010	23.78	24.57	1.02
August	2010	29.55	35.55	1.48
September	2010	20.83	24.71	1.03
October	2010	19.08	17.67	0.73
November	2010	27.4	31.63	1.32
December	2010	20.32	29.93	1.25
January	2011	25.78	31.44	1.31
February	2011	19.6	25.43	1.06
March	2011	29.07	34.4	1.43
April	2011	42.98	55.67	2.32
May	2011	71.68	124.17	5.18
June	2011	66.8	107.43	4.48
FY '11 Totals		396.87	542.6	22.61

ENCLOSURE 2

EMERGENCY SHUTDOWNS AND SCRAMS

The following is a listing of the emergency shutdowns and inadvertent scrams that occurred during the 2009-2010 reporting period. This information is required by Technical Specification 6.8.4.b.

Date	Run No.	Logbook	Page	Description	Deliberate/Inadvertent
7/1/10	8501	57	143	Loss of Power to Magnet Amps	Inadvertent
7/2/10	8502	57	144	Scram for Tour	Deliberate
7/13/10	8504	57	146	Scram for Experiment	Deliberate
7/23/10	8508	57	150	Scram for Tour	Deliberate
8/3/10	8510	57	152	Scram for Tour	Deliberate
8/11/10	8513	57	155	Rods dropped for inspection	Deliberate
8/12/10	8514	57	156	Rods dropped for inspection	Deliberate
8/30/10	8520	58	5	Rods dropped for inspection	Deliberate
8/31/10	8521	58	6	Rods dropped for inspection	Deliberate
10/26/10	8536	58	22	Scram for Tour	Deliberate
11/4/10	8539	58	25	Equipment malfunction	Inadvertent
11/8/10	8540	58	26	Scram for Tour	Deliberate
11/10/10	8542	58	28	Scram for Tour	Deliberate
11/21/10	8546	58	32	Scram for Tour	Deliberate
11/22/10	8547	58	33	Scram for Experiment	Deliberate
11/23/10	8548	58	34	Operator error - Wrong Power Range	Inadvertent
12/3/10	8550	58	36	Rods dropped for inspection	Deliberate
12/14/10	8552	58	38	Scram for Tour	Deliberate
12/16/10	8553	58	39	Scram for Tour	Deliberate
1/4/11	8556	58	43	Equipment malfunction	Inadvertent
1/7/11	8558	58	45	High Neutron Flux	Inadvertent
1/10/11	8559	58	46	High Neutron Flux - Low Power	Inadvertent
1/28/11	8564	58	51	Loss of Power to Magnet Amps	Inadvertent
2/2/11	8566	58	53	High Neutron Flux - Low Power	Inadvertent
2/10/11	8568	58	56	Loss of Power to Magnet Amps	Inadvertent
3/15/11	8577	58	64	Loss of Power to Magnet Amps	Inadvertent
3/29/11	8581	58	69	Loss of Power to Magnet Amps	Inadvertent
4/5/11	8584	58	72	Loss of Power to Magnet Amps	Inadvertent
4/15/11	8589	58	77	Scram for Tour	Deliberate
4/19/11	8590	58	78	Scram for Tour	Deliberate
4/27/11	8593	58	81	Scram for Experiment	Deliberate
4/28/11	8595	58	83	High Neutron Flux - Low Power	Inadvertent
4/28/11	8595	58	83	Scram for Experiment	Deliberate
6/1/11	8609	58	97	Loss of AC Power	Inadvertent
6/16/11	8617	58	105	Equipment malfunction	Inadvertent

Table includes planned scrams, ("deliberate"), and unplanned scams, ("inadvertent").

The Scrams involving "Loss of Power to Magnet Amps" during Run Numbers 8564, 8568, 8577 8581, and 8584 were attributed to an electrical fluctuation caused by Rabbit System #2. When the system timer completes the predetermined countdown it causes valves to open and close to change the direction of airflow in the pipes and return the sample to the Send/Receive station. These scrams coincided with the sudden change in airflow and the return of the samples. It was found that the sudden electrical fluctuation would cause the reactor magnet current amplifiers to trip, and thereby remove the current to the reactor safety system and cause a shutdown. This problem was resolved with modifications to the recently upgraded Rabbit System Controls.

ENCLOSURE 3

Technical Specification 6.8.4.c requires a listing of the major maintenance operations performed in the 2010-2011 reporting period including their impact upon the safe operation of the reactor and the reasons for the corrective maintenance.

Secondary Cooling System #1 is in the process of being re-piped so the pipes will go through a cinderblock wall at the rear of the building rather than through an opening in the exterior doors. This will increase security in the Vital Area as well as allow use of the exterior doors by approved personnel. The cooling tower will also be relocated approximately 10 feet for better positioning and drainage.

Several facility doors have been replaced with heavy-duty fire-rated commercial doors. Some of these doors allow access to Vital Areas and have been equipped with security alarms in accordance with the Security Plan. These new doors provide better safety, security, and ease of use.

The Rabbit System project that underwent a 10 CFR 50.59 evaluation in FY10 has been completed. The blower that provides the air pressure for sample transport has been replaced with a larger capacity blower to accommodate the new system. Additional security measures have been added to protect the use of the system and the storage of radioactive material.

The exterior window located adjacent to the Rabbit System has been upgraded to a high-security impact resistant window to increase security surrounding reactor related systems.

ENCLOSURE 4

FACILITY CHANGES - 10CFR50.59 REVIEW

Technical Specification 6.8.4.d requires that we provide a listing and description of any 10 CFR 50.59 evaluations conducted during the 2010-2011 reporting period.

A malfunction in the test generator card of the facility neutron flux monitor has caused an error in one channel in the calibration check. This malfunction has also caused the "Non-Op" light to illuminate. The equipment has been inspected and no required safety channels have been affected by the malfunction. Procedures have been updated to reflect the changes while new equipment is being fabricated to replace the damaged components.

The secondary cooling system and confinement air handling instrumentation and controls were upgraded to contain a new digital interface. The system allows for manual control through traditional push buttons or automatic control through a digital touch-screen display. Additional sensors were added to the systems to monitor various flow rates, temperatures, and pressures. The system allows for better control of the system, more information for the operator, and replaces aging equipment.

ENCLOSURE 5

RADIOLOGICAL CONTROLS

1. Environmental Surveys outside the Facility - Technical Specification 6.8.4.e

   Quarterly OSL[1] 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	3RD QTR 2010	4TH QTR 2010	1ST QTR 2011	2ND QTR 2011[2]
Northeast Wall	16	19	2	M*
Demineralizer Door	45	M	M	M
Heat Exchanger Door	3	9	23	121

   *M is below the minimum measurable dose of the badges. In this case, 1 mrem. For purposes of calculating annual dose M will be assumed to be 0.

   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 0.37 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 0.45 mrem. Likewise the dose received at the Heat Exchanger Door would be 1.56 mrem. The variations from quarter to quarter and from previous reports were due in part to movements of items within the reactor building during the fiscal year.

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. Individual gaseous effluent concentrations for each reactor operation are recorded on the Monthly Information Sheets (Form NSC-78). The concentration of radioactive materials in the effluent released from the facility exhaust stacks shall not exceed 1E+05 times concentrations specified in 10CFR20, Appendix B, Table II, when averaged over time periods permitted by 10CFR20.[3]

      Gamma spectroscopy of stack gas samples has shown that the principal gaseous effluent is Argon-41. The maximum concentration for this principal contaminant permitted under that Technical Specification is 1E-8 times 1E5 or 1E-3 µCi/cc. Concentrations released during the year were less than 0.02 of that limit.

      The total Argon-41 release during the reporting period was 75.63 curies. The calculated effective dose equivalent for this release is 1.6 mrem/year (COMPLY Code).

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[1] Optically Stimulated Luminescence
[2] Landauer reads the OSL dosimeters to 1 mrem.
[3] Technical Specifications, Section 3.7.2.

ENCLOSURE 5

RADIOLOGICAL CONTROLS

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). During the reporting period, one discharge was made to the sewer. On June 6, 2011, 50 gallons of water from the RINSC Retention Tank were discharged to the sewer. The discharge contained 5.020 μCi of Tritium, 2.460 μCi of Sodium-24, 0.189 μCi of Antimony-122, 0.026 μCi of Antimony-124, and 0.024 μCi of Tellurium-132. The concentrations discharged were, Tritium 2.65E-05 μCi/ml, Sodium-24 1.3E-05 μCi/ml, Antimony-122 1.00E-06 μCi/ml,, Antimony-124 1.39E-07 μCi/ml, and Tellurium-132 1.27E-07 μCi/ml. Using the sum of the fractions rule, the discharge was 0.032 (3.2%) of the discharge limit.