



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Rhode Island Atomic Energy Commission

16 Reactor Road

Narragansett, RI 02882-1165

Telephone # 401-874-2600

50-193

August 28, 2014

Docket No. 50-193

Mr. Patrick Boyle, Project Manager
Research and Test Reactor Licensing Branch
Division of Policy and Rulemaking
U.S. Nuclear Regulatory Commission (NRC)
Office of Nuclear Reactor Regulation
Washington, DC 20555

Dear Mr. Boyle:

This letter and the 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 401-874-2600.

Sincerely,

Constance Hathaway
Health Physicist

Enclosures (5)

Copy to:

Mr. Craig Bassett, USNRC

Dr. John J. Breen, Chairman, NRSC

Dr. Clinton Chichester, Chairman, RIAEC

Dr. Nancy Breen, RIAEC

Mr. Howard Chun, RIAEC

Dr. Bahram Nassersharif, RIAEC

Dr. Yana K. Reshetnyak, RIAEC

A020
NRL

ENCLOSURE 1
Technical Specifications
Section 6.8.4.a

Month	Year	Operating Hours	Energy (MWH)	Energy (MWD)
July	2013	8.03	7.17	0.30
August	2013	15.48	11.83	0.49
September	2013	7.50	7.97	0.33
October	2013	9.50	8.20	0.34
November	2013	24.73	34.20	1.43
December	2013	21.58	30.23	1.26
January	2014	50.87	55.09	2.30
February	2014	14.42	19.03	0.79
March	2014	37.70	50.27	2.09
April	2014	46.68	66.30	2.76
May	2014	34.95	49.63	2.06
June	2014	34.55	49.30	2.05
TOTAL	FY2014	305.99	389.22	16.02

Total Energy Output since Initial Criticality: 64,708.32 MWhrs or 2696.18 MWdays.

ENCLOSURE 2

EMERGENCY SHUTDOWNS AND SCRAMS

The following is a list of the unscheduled shutdowns and inadvertent scrams that occurred during the 2013-2014 reporting period. This information is required by Technical Specification 6.8.4.b

Date	Run No.	Logbook	Page	Cause	Description
9/05/13	8809	59	149	Instrumentation	Period scram due to bad ground on Neutron Flux Monitor
12/12/13	8826	60	12	Operator	Power mode switch on 0.1MW vs. 2MW
01/07/14	8829	60	15	Operator	Overpower scram due to lowering range, inadvertently shifted 2 ranges
01/24/14	8835	21	21	Operator	Overpower due to lowering range too quickly
04/08/14	8858	60	45	Operator	Overpower due to lowering range, inadvertently shifted 2 ranges
04/30/14	8867	60	55	Instrumentation	Overpower scram on flux monitor signal noise

ENCLOSURE 3

Technical Specification 6.8.4.c requires a listing of the major maintenance operations performed in the 2013-2014 reporting period including their impact upon the safe operation of the reactor and the reasons for the corrective maintenance.

In September of 2013, the primary cooling water pipe gaskets in the high power end of the reactor pool were replaced with like material. The old gaskets had deteriorated due to normal wear and tear.

A major upgrade to the facility's security system began in April of 2014. This project is being sponsored by the Global Threat Reduction Initiative, GTRI, and will completely replace the existing security system. The new system will continue to have the alarms for pool level, loss of power and fire systems trouble and will include a large increase in the capability of the system and the scope of the protected envelope. Noted improvements in the protection of reactor related equipment will be a steel tool box mounted on the wall for fuel handling tool storage equipped with tamper detection and high security locks, and a similar box for the overhead crane pendant with high security locks on both the pendant box and the crane electrical power breaker handle. An independent remote monitoring system with cameras and radiation detection at the reactor pool level will also be installed. The plan is for the new system to go live by the end of August. (Note: At issue of this report, the new system actually went live on July 30th. A final summary will be included in the next annual report.)

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 2013-2014 reporting period. There were no facility changes made during this period requiring a 10 CFR 50.59 evaluation.

The RINSC is continuing with efforts to upgrade and modernize the reactor control room. These changes were previously evaluated and approved by the Nuclear and Radiation Safety Committee. The changes include new displays for reactor power level, core and experiment status, and area radiation levels. Other changes include adding annunciators, alarms, and additional test points.

ENCLOSURE 5

RADIOLOGICAL CONTROLS

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

Quarterly TLD¹ 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 100 mrem per year. The quarterly doses in units of mrem are shown in the table below.

LOCATION	3 rd QTR 2012	4 th QTR 2012	1 st QTR 2013	2 nd QTR 2013
Northeast Wall	0	0	16	19
Demineralizer Door	48	173	120	96
Heat Exchanger Door	17	36	38	18

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 10 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 annual dose rate at the Northeast Wall, 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 in the demineralizer room would be 4.37 mrem. The dose received at the Heat Exchanger Door would be 1.09 mrem. The annual dose received at the Northeast wall would be 0.35 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 and varying use of the different irradiation facilities.

2. Annual Exposures Exceeding 500mrem – 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

¹Thermoluminescent Dosimeter; Radiation Detection Co. reads the dosimeters at minimum of 10 mrem.

specified in 10CFR20, Appendix B, Table II, when averaged over time periods permitted by 10CFR20.²

Gamma spectroscopy of stack gas samples has shown that the principal gaseous effluent is Argon-41. The maximum concentration for this principle contaminant permitted under Technical Specifications is $1E-8 \mu\text{Ci/cc} \times 1E5 = 1E-3 \mu\text{Ci/cc}$. Concentrations released during the year were less than 0.2 of that limit.

The total Argon-41 release during the reporting period was 54.49 curies. The calculated effective dose equivalent for their release is 1.2 mrem/year (COMPLY Code).

B. Liquid effluent concentrations released to the sewer are documented on the Sewer Discharge Radioassay Report (NSC-09). Each release was approved prior to discharge with its ph being within the acceptable range and with the sum of the fractions of the respective radioisotopes being below the discharge limit of 1. For the reporting period, the total volume of discharge was 36,626,856 ml. The isotopes and their relative activities discharged are given below.

Radioisotope	Total Activity Discharged (microcuries)
H3	6306.290
C14	6711.861
Pb214	34.453
Na22	0.141
Sb122	8.052
Co60	0.179
Cd109	3.679

² Technical Specifications, Section 3.7.2.