

August 28, 2015

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 unscheduled 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 401-874-9451.

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

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ENCLOSURE 1

REACTOR OPERATING STATISTICS

Technical Specifications

Section 6.8.4.a

Month	Year	Operating Hours	Energy (MWH)	Energy (MWD)
July	2014	45.73	52.60	2.19
August	2014	48.10	38.55	1.60
September	2014	30.78	40.17	1.67
October	2014	15.68	20.13	0.84
November	2014	26.85	33.08	1.38
December	2014	30.18	38.72	1.61
January	2015	23.70	29.73	1.24
February	2015	33.90	27.57	1.15
March	2015	36.05	39.87	1.66
April	2015	38.43	35.35	1.47
May	2015	30.90	36.53	1.52
June	2015	32.78	42.30	1.76
TOTAL	FY2015	393.08	434.60	18.11

Total Energy Output since Initial Criticality: 65,142.92 MWhrs or 2714.29 MWdays.

ENCLOSURE 2

UNSCHEDULED SHUTDOWNS OR SCRAMS

The following is a list of the unscheduled shutdowns or scrams that occurred during the 2014-2015 reporting period. This information is required by Technical Specification 6.8.4.b

Date	Run No.	Logbook	Page	Cause	Description
07/09/14	8890	60	78	Instrumentation	Scram caused by power loss
08/04/14	8904	60	93/94	Instrumentation and Operator	Short Period scram due to interference with wires over bridge during rod adjustment / Hi-flux scram due to operator error
08/14/14	8911	60	101	Instrumentation	Scram due to period spike
11/10/14	8942	60	132/133	Mechanical	Overpower scram during swap of cooling loops during operation. Cold water in idle loop caused overpower
11/18/14	8945	60	36	Operator	Hi Power scram during startup – operator error
02/20/15	8975	61	10	Instrumentation	Reactor Scram due to noise
02/23/15	8976	61	11	Instrumentation	Short period scram due to noise
02/26/15	8979	61	14	Operator	Scram due to operator error
03/23/15	8988	61	23	Mechanical	Scram due to power surge throughout facility
04/23/15	9006	61	43	Operator	Overpower scram due to operator error
08/26/15	9048	61	87/88	Instrumentation	Unscheduled shutdown due to power surge and two overpower scrams due to instrumentation issue during testing

ENCLOSURE 3

MAINTENANCE OPERATIONS

Technical Specification 6.8.4.c requires a listing of the major maintenance operations performed in the 2014-2015 reporting period including their impact upon the safe operation of the reactor and the reasons for the corrective maintenance.

As stated in last year's report, a major security system upgrade was made to the facility beginning in April of 2014. The system went live as of July 30th, 2014. The system has been tested several times in accordance with quarterly facility testing requirements and is working as expected.

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 2014-2015 reporting period.

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

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 2014	4 th QTR 2014	1 st QTR 2015	2 nd QTR 2015
Northeast Wall	0	33	0	No report available
Demineralizer Door	116	83	80	No report available
Heat Exchanger Door	29	0	35	No report available

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 2.79 mrem. The dose received at the Heat Exchanger Door would be 0.64 mrem. The annual dose received at the Northeast wall would be 0.33 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. Note that while dose reports for the second quarter of this year (2015) are not available at the time of this writing, these doses are not expected to significantly change the overall annual dose received by the general public. This expectation is based on the history of these dose values and lack of change of factors which could affect dose rates.

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

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

effluent released from the facility exhaust stacks shall not exceed $1\text{E}+05$ times concentrations 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 $1\text{E}-8 \mu\text{Ci/cc} \times 1\text{E}+5 = 1\text{E}-3 \mu\text{Ci/cc}$. Concentrations released during the year were less than 0.02 of that limit.

The total Argon-41 release during the reporting period was $6.083\text{E}+1$ curies. The calculated effective dose equivalent for their release is 1.3 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 per month being below the discharge limit of 1. For the reporting period, the total volume of discharge was 3,406,870 ml. The isotopes and their relative activities discharged are given below.

Radioisotope	Total Activity Discharged (microcuries)
H3	414
C14	420
Cd109	11.3
Pb214	2.72
Bi214	5.62

² Technical Specifications, Section 3.7.2.