

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,

A handwritten signature in black ink that reads "Constance Hathaway". The signature is written in a cursive, flowing style.

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

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

MAINTENACE 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 | 3rd QTR 2014 | 4th QTR 2014 | 1st QTR 2015 | 2nd 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 1E+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 6.083E+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.