



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

December 8, 2022

Dr. Cameron Goodwin, Director
Rhode Island Nuclear Science Center
16 Reactor Road
Narragansett, RI 02882-1165

SUBJECT: RHODE ISLAND ATOMIC ENERGY COMMISSION – U.S. NUCLEAR
REGULATORY COMMISSION ROUTINE INSPECTION REPORT
NO. 05000193/2022202

Dear Dr. Goodwin:

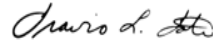
From September 12 – 15, 2022, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at your Rhode Island Nuclear Science Center reactor facility. The enclosed report documents the inspection results which were discussed on September 15, 2022, with you and members of your staff.

The inspection examined activities conducted under your license, as they relate to public health and safety, by confirming compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. Based on the results of this inspection, no findings of non-compliance were identified. No response to this letter is required.

In accordance with Title 10 of the *Code of Federal Regulations*, Section 2.390, "Public inspections, exemptions, requests for withholding," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (Agencywide Documents Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Should you have any question concerning this inspection, please contact Craig Bassett at (240) 535-1842, or by email at Craig.Bassett@nrc.gov.

Sincerely,



Signed by Tate, Travis
on 12/08/22

Travis L. Tate, Chief
Non-Power Production and Utilization Facility
Oversight Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

Docket No. 50-193
License No. R-95

Enclosure:
As stated:

cc: See next page

cc:

Governor
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Providence, RI 02903

Howard Chun, Commissioner
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Providence, RI 02908-5097

Test, Research and Training
Reactor Newsletter
Attention: Amber Johnson
Dept of Materials Science and Engineering
University of Maryland
4418 Stadium Drive
College Park, MD 20742-2115

SUBJECT: RHODE ISLAND ATOMIC ENERGY COMMISSION – U.S. NUCLEAR
REGULATORY COMMISSION ROUTINE INSPECTION REPORT NO.
05000193/2022202 DATED: DECEMBER 8, 2022

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OFFICE	NRR/DANU/UNPO/RI	NRR/DANU/UNPO/LA	NRR/DANU/UNPO/BC
NAME	CBassett	NParker	TTate
DATE	11/10/2022	11/21/2022	12/8/2022

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No.: 50-193

License No.: R-95

Report No.: 05000193/2022202

Licensee: Rhode Island Atomic Energy Commission

Facility: Rhode Island Nuclear Science Center

Location: Narragansett, Rhode Island

Dates: September 12 – 15, 2022

Inspectors: Craig Bassett
Juan Arellano

Approved by: Travis L. Tate, Chief
Non-Power Production and Utilization Facility
Oversight Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

Enclosure

EXECUTIVE SUMMARY

Rhode Island Atomic Energy Commission
Rhode Island Nuclear Science Center Reactor Facility
Inspection Report No. 05000193/2022202

The primary focus of this routine announced inspection was the onsite review of selected aspects of the Rhode Island Atomic Energy Commission's (the licensee's) Rhode Island Nuclear Science Center (RINSC) Class I, two-megawatt research reactor safety program including: (1) operator licenses, requalification, and medical examinations; (2) experiments; (3) organization and operations and maintenance activities; (4) review and audit and design change functions; (5) procedures; (6) fuel movement; and (7) surveillance. The U.S. Nuclear Regulatory Commission (NRC) staff determined the licensee's program was acceptably directed toward the protection of public health and safety and in compliance with NRC requirements.

Operator Licenses, Requalification, and Medical Examinations

- Operator requalification was completed as required by the licensee's Operator Requalification Program and operators received their biennial medical examinations as required by the regulations.

Experiments

- The program for reviewing, authorizing, and conducting experiments satisfied technical specification (TS) and procedural requirements.

Organization and Operations and Maintenance Activities

- Organizational structure and staffing were consistent with TS requirements.
- Operational and maintenance activities were conducted in accordance with TS and procedural requirements.

Review and Audit and Design Change Functions

- The Nuclear and Radiation Safety Committee (NRSC) met at the required frequency and reviewed the topics outlined in the TSs. Audits were completed as required by the TSs.
- Facility modifications and procedure changes were evaluated in accordance with the requirements specified in Title 10 of the *Code of Federal Regulations* (10 CFR) 50.59, "Changes, tests and experiments."

Procedures

- The procedural review, revision, and implementation program satisfied requirements of the TSs.

Fuel Movement

- Fuel movements and inspections were conducted in accordance with the TS and procedural requirements.

Surveillance

- The surveillance program was conducted in accordance with the TS and procedural requirements.

REPORT DETAILS

Summary of Facility Status

The licensee's RINSC Class I, two-megawatt research reactor continued to be operated in support of research, development, education, training, and surveillance. During the inspection, the reactor was not operated.

1. Operator Licenses, Requalification, and Medical Examinations

a. Inspection Scope (Inspection Procedure (IP) 69003)

The inspector reviewed selected aspects of the following to ensure compliance with the licensee's operator requalification program outlined in RINSC administrative procedure (AP) AP-02, "Reactor Operator Re-qualification," Revision 4:

- reactor logbooks Nos. 66 and 67
- senior reactor operator (SRO) requalification files containing copies of:
 - operator requalification program check sheet forms from 2020 – present (referred to as Nuclear Science Center Form No. 45 [NSC-45])
 - annual operational requalification examination forms from 2020 – present
 - biennial operator requalification examinations from 2020 - present
- individual SRO NRC Form 396, "Certification of Medical Examination by Facility Licensee," from 2020 – present

b. Observations and Findings

The inspector verified that there were four qualified, licensed SROs working at the facility. The inspector confirmed that training was conducted in accordance with the licensee's requalification and training program. The inspector noted that procedure reviews and examinations were documented, which included information regarding facility changes. The inspector confirmed that other relevant information was routed to all licensed operators for their review. The inspector also verified that other aspects of the program were completed, and records maintained including quarterly reactor operations, reactivity manipulations, supervisory activities, annual operations tests and supervisory observations, and biennial written exams. The inspector noted that all operators received biennial medical examinations within the allowed time frame as required by the regulations. The inspector confirmed that the program was maintained and up to date.

c. Conclusion

The inspector determined that operator training and requalification was conducted in accordance with the licensee's Operator Requalification Program and operators received their biennial medical examinations as required by the regulations.

2. Experiments

a. Inspection Scope (IP 69005)

The inspector reviewed selected aspects of the following to verify that the licensee complied with TS sections 3.1, 3.8, 4.1, 4.8, 4.9, and 6.5:

- newly approved experiments
- reactor logbooks Nos. 66 and 67
- experiment approval, authorization, administrative controls, and precautions
- operating data notebooks for 2022 containing completed copies of various reactor operations request forms (NSC-49)

b. Observations and Findings

Since the last inspection, the inspector noted that five new experiments were proposed. The inspector verified the experiments were reviewed by the reactor staff and were reviewed and approved by the NRSC as required by TS 6.5. The inspector also verified that appropriate irradiation request forms were completed and approved prior to reactor operations. The inspector confirmed that experiments were conducted using approved methods or procedures and engineering and radiation protection controls were implemented to limit exposure of the workers handling the irradiated items.

c. Conclusion

The inspector determined that the program for reviewing, authorizing, and conducting experiments satisfied the TS and facility procedural requirements.

3. Organization and Operations and Maintenance Activities

a. Inspection Scope (IP 69006)

To verify that the licensee complied with the requirements for organization and staffing; operations; and maintenance activities as specified in TS sections 2.0, 3.0, 6.1; and procedural requirements, the inspector reviewed selected aspects of the following:

- reactor logbooks Nos. 66 and 67
- RINSC maintenance board 2022 spreadsheet
- NSC-1C, "Shutdown Check Sheet," from 2021 – present
- NSC-11, "Shift Record Data Sheet," from 2021 – present
- NSC-14A, "Emergency Power System Check List," from 2021 – present
- NSC-14B, "Evacuation System Check List," from 2021 - present
- NSC-18, "RINSC Reactor Operation Data," from 2021 – present
- NSC-44, "RINSC Emergency Generator Maintenance Checklist," from 2021 – present
- NSC-49, "Reactor Operations Request," from 2021 – present
- annual beam port inspection documents and photos from 2021 – present
- reactor pool and support structure inspection documents and photos from 2021 – present

- RINSC inspection procedure (IP) IP-03, "Inspection of Reactor Pool and Suspension Frame," Revision 1
- RINSC IP-04, "Beam Port and Through Port Inspection," Revision 1
- RINSC maintenance procedure (MP) MP-05, "Emergency Generator Maintenance," Revision 1
- RINSC MP-10, "Evacuation System Test," Revision 2
- RINSC MP-11, "Emergency Power Systems Operational Test," Revision 2
- RINSC operating procedure (OP) OP-02, "Pre-Start Checkout," Revision 20
- RINSC annual reports for the periods from July 1, 2020, through June 30, 2021, dated July 14, 2021, and July 1, 2021, through June 30, 2022, dated July 27, 2022

b. Observations and Findings

(1) Organization

The inspector reviewed the facility organization and staffing and found that the organization did not change since the last inspection and continued to be staffed as required by TSs. The inspector also confirmed that the organizational structure at the facility remained in compliance with the TSs. The inspector also noted that the facility engineer position was vacant. The inspector confirmed that, as a result, the licensee was in the process of hiring a new individual to fill that position.

The inspector noted that there were four SROs on staff at the facility which was an adequate number of staff members to support the reactor program.

(2) Operations

The inspector noted that documentation was maintained to verify compliance with staffing requirements of TS sections 6.1.2 and 6.1.3. In addition, the inspector verified that recorded results regarding reactor operation were within TS required parameters and normal operating ranges during reactor operations.

The inspector planned to observe a reactor start-up, routine operation, and shutdown in support of an experiment. However, due to changes in circumstances by the experimenter, no reactor operation was needed.

(3) Maintenance

The inspector noted that the licensee continued to use a spreadsheet for tracking maintenance and surveillance activities. The inspector verified that the activities tracked were completed in accordance with TS and licensee procedures and preventive maintenance activities were completed as stipulated by procedure. The inspector also confirmed that following maintenance activities, systems and equipment were tested to ensure that they were operational prior to returning them to service.

c. Conclusion

The inspector determined that the organizational structure complied with the TS requirements and the present staffing level was adequate for current operations. The

inspector also determined that reactor operations and maintenance activities were conducted in accordance with the applicable procedure and TS requirements.

4. Review and Audit and Design Change Functions

a. Inspection Scope (IP 69007)

The inspector reviewed selected aspects of the review and audit program to ensure compliance with TS section 6.2, and selected design change activities to ensure compliance with 10 CFR 50.59:

- NRSC meeting minutes dated December 12, 2021
- NRSC meeting minutes dated June 3, 2022
- RINSC AP-03, "Facility Modifications," Revision 2
- NSC-24, "10 CFR 50.59 Screen," revision date July 17, 2020
- NSC-51, "10 CFR 50.59 Review," revision date November 12, 2013
- RINSC annual reports for the last two reporting periods as noted above

b. Observations and Findings

(1) Review and Audit Functions

Through a review of the NRSC meeting minutes and associated records, the inspector confirmed that two meetings were held each year and safety reviews and audits were conducted by various members of the NRSC as required by TSs. The inspector verified that topics of these reviews and audits were consistent with the TS requirements and provided guidance, direction, and oversight for the facility and use of the reactor.

(2) Design Change Functions

The inspector evaluated the 10 CFR 50.59 review process used by the licensee at the facility. The inspector noted that the licensee's procedure governing design changes provided guidance concerning the review of facility modifications, review of new experiments, and changes to procedures using the 10 CFR 50.59 review or evaluation process. The inspector also noted that screening forms were used to determine whether a full 10 CFR 50.59 review and evaluation were required for any change that was contemplated. Through review of records and interviews with licensee personnel, the inspector found that no changes were implemented for the facility since the last inspection.

c. Conclusion

The inspector determined that the NRSC held meetings and reviewed the topics outlined in the TSs. The inspector also determined that audits were completed, the design change program was implemented, and associated records were maintained as required by 10 CFR 50.59.

5. Procedures

a. Inspection Scope (IP 69008)

To verify that facility procedures were prepared, reviewed, revised, and implemented as required by TS section 6.4, the inspector reviewed selected aspects of:

- reactor logbooks Nos. 66 and 67
- NRSC meeting minutes dated December 12, 2021
- NRSC meeting minutes dated June 3, 2022
- RINSC AP-04, "License Amendment Request," Revision 2
- RINSC calibration procedure (CP) CP-06, "Stack Monitor Calibration Check," Revision 4
- RINSC MP-03, "Primary Water Analysis," Revision 4

b. Observations and Findings

The inspector found that procedures were developed for the safe routine operation of the reactor, as well as for abnormal circumstances. The inspector verified that substantive procedural changes, as well as all new procedures, were screened in accordance with the licensee's 10 CFR 50.59 process. The inspector also verified that procedures were reviewed and approved by the NRSC as required by the TSs.

The inspector discussed the process for training on procedures and review of new procedures and procedure changes with the reactor supervisor (RS). The RS indicated that new and revised procedures were routed to staff members by various means including electronic mail. The inspector noted that periodic staff meetings were also held to review facility and procedure changes.

The inspector noted that only one procedure was updated since the last inspection, RINSC CP-06, "Stack Monitor Calibration Check," Revision 4, which was subsequently reviewed and approved by the NRSC.

c. Conclusion

The inspector determined the procedural review, revision, and implementation process satisfied the TS requirements.

6. Fuel Movement

a. Inspection Scope (IP 69009)

The inspector reviewed the following to verify compliance with TS section 4.9.2 and subsection 6.8.1, which require visual inspection of fuel elements every 5 years on a rotating basis and maintenance of records associated with fuel inventories and transfers, respectively:

- reactor logbooks Nos. 66 and 67
- "Refuel Plan for LEU Core 8," Revision 1
- 2021 fuel inspection documents and photos

- 2022 fuel inspection documents and photos
- RINSC IP-01, "Core Element Movement and Inspections," Revision 2
- RINSC OP-05, "Reactor Fuel/Reflector Movement," Revision 3
- core change summary for conversion from RINSC LEU Core #7 to LEU Core #8

b. Observations and Findings

The inspector reviewed documentation of selected fuel movements and interviewed licensee staff about the process. The inspector noted that a plan for each series of fuel movements, which was developed prior to the activity, was used for core refueling, core rearrangement, and performing inspections of fuel elements. The inspector confirmed that the fuel handling equipment was stored and secured.

The inspector reviewed the licensee's fuel handling procedures and verified that fuel was inspected in accordance with a specific inspection schedule. The inspector noted that fuel inspections were completed in 2021 and 2022, and that the inspection documents contained descriptions of fuel conditions including discolorations and markings.

The inspector compared the current location of the selected fuel elements in the reactor core (as illustrated by a printed core configuration map) with the information maintained on the fuel status board in the control room and on the fuel movement sheets. The inspector verified that fuel was used and stored in approved locations as indicated. The inspector also verified that due to the refueling and core rearrangement done in 2022, the licensee's current core was designated as "LEU Core #8."

c. Conclusion

The inspector determined that fuel movements were conducted in accordance with written procedures that met the TS requirements and fuel inspections were completed annually.

7. Surveillance

a. Inspection Scope (IP 69010)

The inspector reviewed the following to verify compliance with the limiting conditions for operation specified in TS sections 3.1 through 3.9 and to determine whether periodic surveillance tests, checks, and calibrations of selected safety systems were performed as stipulated in TS sections 4.1 through 4.9:

- reactor logbooks Nos. 66 and 67
- RINSC maintenance board 2022 spreadsheet
- initial LEU Core #8 control rod worth documents
- initial LEU Core #8 excess and shutdown margin reactivity documents
- annual excess reactivity and shutdown margin dated October 4, 2021
- gamma spectrum analysis reports for primary water and secondary water from 2022 - present
- NSC-3, "Nuclear Instrumentation Calibration Worksheet," dated June 28, 2022
- NSC-3A, "Secondary Water," from 2021 – present
- NSC-3D, "Weekly Gross Radioactivity for Primary Water," from 2021 – present

- NSC-5, "Primary Temperature Channel Calibration," from 2021 – present
- NSC-43, "Control Rod Reactivity Insertion Rates 10/4/21"
- NSC-69, "Be Reflector Lifetime N Fluence," from 2021 – present
- NSC-80, "Primary Flow Channel Calibration," from 2021 – present
- RINSC CP-01, "Primary Temperature Channel Calibration," Revision 2
- RINSC MP-03, "Primary Water Analysis," Revision 4
- RINSC MP-04, "Secondary Water Analysis," Revision 2
- RINSC reactor parameter test procedure (TP) TP-02, "Determining Cold, Clean Critical Rod Heights," Revision 0
- RINSC TP-03, "Determining Control Rod Worth," Revision 1
- RINSC TP-05, "Determining Shutdown Margin and Excess Reactivity," Revision 0

b. Observations and Findings

The inspector reviewed various surveillance records including nuclear instrumentation calibration forms, shim safety blade inspection forms, reactivity worth calculation forms, and alarm, scram, and interlock check sheets. The inspector noted that data recorded in the reactor logbooks and on the surveillance data sheets indicated that system and instrument checks, tests, and calibrations were completed on schedule and in accordance with licensee procedures. The inspector verified the results of these surveillance items were within the TS and procedurally prescribed parameters and no problems were noted.

c. Conclusion

The inspector determined that the surveillance program was conducted as specified by the TS requirements.

8. Exit Interview

At the conclusion of the inspection on September 15, 2021, the inspector presented the inspection results to licensee management and staff. The inspector reiterated the areas inspected and discussed the inspection observations. The licensee acknowledged the results of the inspection and did not identify as proprietary any of the material provided to or reviewed by the inspector during the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

J. Davis	Assistant Director for Operations
J. Dunn	Principal Reactor Operator
C. Goodwin	Facility Director
M. Marrapese	Reactor Supervisor

INSPECTION PROCEDURES USED

IP 69003	Class I Research and Test Reactor Operator Licenses, Requalification, and Medical Examinations
IP 69005	Class I Research and Test Reactor Experiments
IP 69006	Class I Research and Test Reactors Organization and Operations and Maintenance Activities
IP 69007	Class I Research and Test Reactor Review and Audit and Design Change Functions
IP 69008	Class I Research and Test Reactor Procedures
IP 69009	Class I Research and Test Reactor Fuel Movement
IP 69010	Class I Research and Test Reactor Surveillance

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None