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

December 6, 2021

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. 05000193/2021203

Dear Dr. Goodwin:

From September 20-23, 2021, 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 23, 2021, with you and members of your staff, as well as Dr. Clinton Chichester, Chairman of the Rhode Island Atomic Energy Commission.

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 electronic mail at Craig.Bassett@nrc.gov.

Sincerely,


Signed by Tate, Travis
on 12/06/21

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:

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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. 05000193/2021203 DATED: DECEMBER 6, 2021

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

Docket No.:	50-193
License No.:	R-95
Report No.:	05000193/2021203
Licensee:	Rhode Island Atomic Energy Commission
Facility:	Rhode Island Nuclear Science Center
Location:	Narragansett, Rhode Island
Dates:	September 20-23, 2021
Inspector:	Craig Bassett
Accompanied by:	Juan Arellano, Nuclear Regulator Apprenticeship Network
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. 05000193/2021203

The primary focus of this announced, routine 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, 2 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.

- 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 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 the requirements of TSs.

Fuel Movement

- Fuel movements were conducted in accordance with TS and procedural requirements.
- Fuel inspections were completed annually as required by TSs.

Surveillance

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

REPORT DETAILS

Summary of Facility Status

The licensee's RINSC Class I, 2-megawatt research reactor continued to be operated in support of research, development, education, training, and surveillance. During the inspection, the reactor was operated in support of this inspection.

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 Requalification," Revision (Rev.) 4:

- Reactor Logbooks Numbers (Nos.) 65 and 66
- individual reactor operator (RO) and senior reactor operator (SRO) requalification files containing copies of the following:
  - operator requalification program check sheet forms (referred to as Nuclear Science Center Form No. 45 [NSC-45])
  - annual operational requalification exam forms
  - biennial operator requalification examinations
- a current copy of each operators' biennial NRC Form 396, "Certification of Medical Examination by Facility Licensee"

b. Observations and Findings

The inspector verified that there were four qualified, licensed operators working at the facility, three SROs and one RO. A review of the logs and records by the inspector showed 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, via electronic mail, who then acknowledged their review of this information.

The inspector verified that quarterly reactor operations, reactivity manipulations, and supervisory activities were completed and records were maintained. The inspector noted that all these activities were tracked, documented, and signed off by the Reactor Supervisor (RS). The inspector confirmed that records indicated the successful completion of the annual operations tests and supervisory observations were also maintained. The inspector verified that biennial written exams were administered to the qualified operators and all operators completed those required tests and exams. The inspector also 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. 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 was in compliance with TS Sections 3.1, 3.8, 4.1, 4.8, 4.9, and 6.5:

- various approved experiments
- reactor logbooks Nos. 65 and 66
- various RINSC experiment procedures
- experiment approval, authorization, administrative controls and precautions
- operating data notebooks for 2021 containing completed copies of various reactor operations request forms (NSC-49)

b. Observations and Findings

Since the last inspection in this area, the inspector noted that no new experiments were proposed but one previously approved experiment was revised. The inspector verified that each of the approved experiments included a discussion of the entire experiment, as well as the hazards involved and the anticipated results. The inspector verified that the experiments were reviewed by the reactor staff and were reviewed and approved by the NRSC as required by TS 6.5.

The inspector confirmed that the appropriate irradiation request forms for the various experiments were completed and approved prior to reactor operations. The inspector also confirmed that all experiments were conducted using approved methods or procedures and with the cognizance of the SRO on duty. The inspector noted that experiments conducted at the facility were documented on the appropriate forms and in the operations log. Engineering and radiation protection controls were implemented as required to limit exposure of the workers handling the irradiated samples.

c. Conclusion

The inspector determined that the program for reviewing, authorizing, and conducting experiments satisfied the TS and 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. 65 and 66
- various RINSC maintenance procedures
- RINSC maintenance board (spreadsheet)
- listing of the members of the RINSC NRSC
- various RINSC operating procedures (OPs)
- maintenance notebook and associated documents
- RINSC checklist for securing reactor facility forms (NSC-15)
- reactor operations documents maintained in operating data notebooks for 2021
- RINSC Annual Reports for the periods from July 1, 2019, through June 30, 2020, dated July 13, 2020, and July 1, 2020, through June 30, 2021, dated July 14, 2021

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 noted that the Director continued to have responsibility for all activities in the facility as stipulated in the TSs. The inspector noted that during reactor operations, a licensed SRO was assigned with the responsibility for all activities. The inspector confirmed that the organizational structure at the facility remained in compliance with the TSs. The inspector also noted that, because the person who was the Principle Reactor Operator (PRO) was selected to be the RS at the facility, that left a vacancy in the PRO position. The inspector confirmed that as a result, the licensee hired a new individual to fill that position.

The inspector noted that there were three SROs and one ROs on staff at the facility as noted above. This was an adequate number of staff members to support the reactor program. The inspector also noted the person who was hired as the new PRO is currently in training to become an SRO.

(2) Operations

The inspector reviewed various forms that were completed to document reactor operations. The inspector also reviewed reactor logbook entries to verify compliance with staffing requirements of TS Sections 6.1.2 and 6.1.3. The inspector noted that appropriate documentation was maintained. 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 observed a reactor start-up, routine operation, and shutdown in support of irradiation of various samples. The inspector noted that an SRO and an operator trainee conducted this work evolution. The activities observed by the inspector were conducted in an efficient manner and in accordance with licensee procedures.

(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. The inspector verified that maintenance records indicated that preventive maintenance activities were completed as stipulated by procedure. The inspector confirmed that routine maintenance activities were conducted at the required frequencies and in accordance with the TSs and/or the applicable maintenance 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 Charter, Rev. 5, approval dated September 11, 2017
- NRSC meeting minutes dated December 11, 2019, through the present
- design change related forms including: “10 CFR 50.59 Screen” (NSC-24), and “10 CFR 50.59 Review (Attachment B)” (NSC-51)
- RINSC AP-03, “Facility Modifications,” Rev. 2
- RINSC Annual Reports for the last two reporting periods as noted above

b. Observations and Findings

(1) Review and Audit Functions

The inspector reviewed the NRSC meeting minutes and associated records from December 11, 2019, to the present. 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 was required for any change that was contemplated. Through review of records and interviews with licensee personnel, the inspector verified that the licensee conducted two screenings and an evaluation for replacing an ion chamber. The inspector verified that the evaluation did not identify any issues.

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. 65 and 66
- various procedures including:
  - RINSC Calibration Procedure (CP) CP-04, "Alarm, Scram, and Interlock Checks," Rev. 12
  - RINSC CP-06, "Stack Monitor Calibration Checks," Rev. 3
  - RINSC OP-02, "Pre-Start Checkout," Rev. 20
  - RINSC Experiment Procedure (XP) XP-01, "Experiment Request and Approval," Rev. 4
  - RINSC XP-10, "Dry Irradiation Facility Irradiations," Rev. 2
- NRSC meeting minutes dated December 11, 2019, through the present

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 TSs.

The inspector discussed the process for training and review of new procedures and procedure changes with the 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 verified, through observation of various activities at the facility including reactor operation, that licensee personnel conducted activities in accordance with applicable procedures. The inspector also noted that the facility procedures were revised, reviewed, and approved as required by TSs.

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. 65 and 66
- RINSC IP-01, "Core Element Movement and Inspections," Rev. 2
- RINSC OP-05, "Reactor Fuel/Reflector Movement," Rev. 3
- reactor data notebook containing the fuel element inspection sheets and the rotating inspection schedule for inspecting the elements

b. Observations and Findings

The inspector reviewed documentation of selected fuel movements and interviewed licensee staff about the process. 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 as scheduled in 2019 and 2020, and that the inspection documents contained descriptions of fuel conditions including discolorations and markings.

The inspector compared the current location of selected fuel elements in the reactor core (as illustrated by a printed core configuration or 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 the locations as indicated. The inspector also verified that the licensee's current core was designated as "LEU Core #7."

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. 65 and 66
- RINSC maintenance board (spreadsheet)
- various RINSC reactor parameter testing procedures
- confinement system notebook and associated documents
- instrumentation calibration notebook and associated documents
- primary and secondary water analysis notebook and associated documents
- reactor operations documents maintained in operating data notebooks
- reactor data notebook and associated records documenting surveillance items

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 found to be 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 TS requirements.

8. Follow-up

a. Inspection Scope (IP 92701)

The inspector reviewed the actions taken in response to an NRC-identified inspector follow-up item (IFI).

b. Observation and Findings

IFI-05000193/2020201-01 – Update audit records in the NRSC meeting minutes to include the complete list of facility audits as specified by TS Section 6.2.4.

During an inspection in March 2020, the inspector noted that not all facility audits, as specified under TS Section 6.2.4, were documented in the NRSC meeting minutes, Section 13, “Review Radiation Safety and Operations Records Audit.” Specifically, the Emergency Plan (E-Plan) and implementing procedures (TS Subsection 6.2.4.3) and the radiation safety program (TS Subsection 6.2.4.5) needed to be added to Section 13 of this list in the meeting minutes to document that these subject areas were actually audited.

During the current inspection, the inspector reviewed this issue. The inspector noted that recent NRSC meeting minutes indicated that the topics of the E-Plan and implementing procedures and the radiation safety program were audited and discussed as required by TSs. This fulfills the TS Section 6.2.4 requirement. This issue is considered closed.

c. Conclusion

The inspector determined that IFI 05000193/2020201-01 is closed.

9. Exit Interview

At the conclusion of the inspection on September 23, 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 and Reactor Operator Trainee
C. Goodwin	Facility Director
M. Marrapese	Reactor Supervisor
J. McCullah	Reactor Health Physicist
S. Nam	Assistant Director for Radiation and Reactor Safety and Radiation Safety Officer
B. Sirr	Facility Engineer and Reactor Operator

Other Personnel

C. Chichester	Chairman, Rhode Island Atomic Energy Commission

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

05000193/2020201-01	IFI	Update audit records in the NRSC meeting minutes to include the complete list of facility audits as specified by TS 6.2.4.

LIST OF ACRONYMS USED

10 CFR	Title 10 of the *Code of Federal Regulations*
AP	Administrative Procedure
CP	Calibration Procedure

E-Plan	Emergency Plan
IFI	Inspector Follow-up Item
IP	Inspection Procedure
Nos.	Numbers
NRC	U.S. Nuclear Regulatory Commission
NRSC	Nuclear and Radiation Safety Committee
NSC	Nuclear Science Center
OP	Operating Procedure
PRO	Principle Reactor Operator
Rev.	Revision
RINSC	Rhode Island Nuclear Science Center
RO	Reactor Operator
RS	Reactor Supervisor
SRO	Senior Reactor Operator
TSs	Technical Specifications
XP	Experiment Procedure