



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

February 8, 2023

Dr. Wei Ji, Director
Rensselaer Polytechnic Institute
110 8th Street
JEC 5040
Troy, NY 12180-3590

SUBJECT: RENSSELAER POLYTECHNIC INSTITUTE – U.S. NUCLEAR REGULATORY
COMMISSION ROUTINE INSPECTION REPORT NO. 05000225/2022201

Dear Dr. Ji:

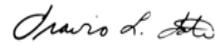
From December 12-14, 2022, the U.S. Nuclear Regulatory Commission (NRC) staff conducted a routine, announced inspection at the Rensselaer Polytechnic Institute Critical Experiments Facility. The enclosed report documents the inspection results, which were discussed on December 14, 2022, with you, members of your staff, Chris Fiore, Emergency Management, and Clery Compliance Officer, Ginger Carvalho, Radiation Safety Officer, and Jen Kazmierczak, Director, Environmental Health and Safety and Risk Management.

The inspection examined activities conducted under your license as they relate to public health and safety to confirm compliance with NRC 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 significance 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 website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

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

Sincerely,



Signed by Tate, Travis
on 02/08/23

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. 50-225
License No. CX-22

Enclosure:
As stated

cc: See next page

Rensselaer Polytechnic Institute

Docket No. 50-225

cc:

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Test, Research and Training
Reactor Newsletter
Attention: Ms. Amber Johnson
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University of Maryland
4418 Stadium Drive
College Park, MD 20742-2115

SUBJECT: RENSSELAER POLYTECHNIC INSTITUTE – U.S. NUCLEAR REGULATORY
COMMISSION ROUTINE INSPECTION REPORT NO. 05000225/2022201
DATED: FEBRUARY 8, 2023

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NAME	CBassett	NParker	TTate
DATE	2/7/2023	2/7/2023	2/8/2023

OFFICIAL RECORD COPY

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

Docket No.: 50-225

License No.: CX-22

Report No.: 05000225/2022201

Licensee: Rensselaer Polytechnic Institute

Facility: Critical Experiments Facility

Location: Schenectady, NY

Dates: December 12-14, 2022

Inspector: Craig Bassett

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

Rensselaer Polytechnic Institute
Critical Experiments Facility
Inspection Report No. 05000225/2022201

The primary focus of this announced, routine inspection was the onsite review of selected aspects of the Rensselaer Polytechnic Institute's (RPI, the licensee) 100 watt research reactor safety program including: (1) organization and staffing, (2) operations logs and records, (3) procedures, (4) operator requalification training, (5) surveillance and limiting conditions for operation (LCOs), (6) design changes, (7) committees, audits and reviews, (8) emergency planning, (9) maintenance logs and records, and (10) fuel handling logs and records. The U.S. Nuclear Regulatory Commission (NRC) staff determined that the licensee's program was acceptably directed toward the protection of public health and safety and in compliance with NRC requirements. One previously identified violation was reviewed and closed.

Organization and Staffing

- Organizational structure and staffing were consistent with the RPI technical specifications (TSs) requirements.

Operations Logs and Records

- Operational activities were consistent with TSs and procedural requirements.

Procedures

- Facility procedural review, revision, control, and implementation satisfied TSs requirements.

Operator Requalification

- Operator requalification was conducted as required by the Requalification Program and Title 10 of the *Code of Federal Regulations* (10 CFR) Part 55, "Operators' Licenses."

Surveillances and LCOs

- LCOs and surveillances required by TSs were met.

Design Changes

- No changes to the facility were proposed or implemented at the facility using the criteria specified in 10 CFR 50.59, "Changes, tests and experiments."

Committees, Audits and Review

- The Nuclear Safety and Review Board (NSRB) completed the review, oversight, and audit functions required by TS.

Emergency Preparedness

- The emergency preparedness program was conducted in accordance with NRC requirements.

Maintenance Logs and Records

- Minor maintenance activities were conducted to ensure equipment reliability during the past 2 years.

Fuel Handling Logs and Records

- Fuel handling activities were conducted in accordance with licensee procedure.

REPORT DETAILS

Summary of Facility Status

The RPI Critical Experiments Facility, Class II research reactor, although licensed to operate at a maximum steady-state thermal power of 100 watts, was limited to a maximum thermal power of 15 watts as specified by the licensee's operating procedure. The reactor is only operated to maintain licensed operator proficiency, perform TS required surveillance activities, and conduct training. During the inspection, the reactor was operated for training.

1. Organization and Staffing

a. Inspection Scope (Inspection Procedure (IP) 69001, Section 02.01)

The inspector reviewed selected aspects of the following to verify compliance with TSs section 6.1, "Organization":

- RPI annual reports to the NRC for 2020 and 2021
- organizational structure and management responsibilities
- Reactor Critical Facility (RCF) operations logbook entries from August 2020 to the present

b. Observations and Findings

Through review of logs and records, and discussions with the reactor operations supervisor, the inspector confirmed that the organizational structure and staff responsibilities met the requirements stated in section 6.1 of the TSs. The inspector noted that a new reactor operations supervisor was appointed on January 1, 2022. The inspector verified that the new supervisor met the minimum requirements specified in the TSs. Also, as part of the records review, the inspector noted that the annual reports to the NRC for the last two calendar years were submitted by March 1 of the year as required by TSs.

c. Conclusion

The inspector determined that the organizational structure and staffing were consistent with TS requirements.

2. Operations Logs and Records

a. Inspection Scope (IP 69001, Section 02.02)

The inspector reviewed selected aspects of the following to verify compliance with TSs section 6.9, "Operating Records":

- various facility procedures
- completed pre-start checklists, RCF operations logbook entries, and completed reactor secured checklists from August 2020 to the present

b. Observations and Findings

The inspector verified, through review of the licensee's RCF operations logbook and pre-startup checklists, that the proper shift staffing for critical facility operation was maintained and consistent with TSs requirements. The inspector noted that the licensee never exceeded reactor thermal power of 15 watts as specified in the licensee's operating procedures. The inspector also noted that all operations documented in the RCF operations logbook for the past 2 years were for the purpose of completing surveillances and operator training or to maintain operator proficiency.

c. Conclusion

The inspector determined that operational activities were consistent with the TSs and procedural requirements.

3. Procedures

a. Inspection Scope (IP 69001, Section 02.03)

The inspector reviewed the following to ensure that the requirements of TSs section 6.4 were met concerning written procedures:

- various RCF procedures
- selected reactor secured checklists
- NSRB meeting minutes from August 2020 to the present
- RCF operations logbook entries from August 2020 to the present

b. Observations and Findings

The inspector found that written procedures are approved and available for the activities required in TSs section 6.4. The inspector confirmed that the licensee updated the procedures as necessary, and changes were reviewed and approved by the Facility Director and NSRB as required by TSs section 6.4. During the inspection, the inspector observed the use of various procedures, and no issues were identified.

c. Conclusion

The inspector determined that procedure review, revision, and implementation satisfied TSs requirements.

4. Requalification Training

a. Inspection Scope (IP 69001, Section 02.04)

The inspector reviewed selected aspects of the following to verify compliance with the NRC approved requalification program and 10 CFR Part 55 requirements:

- licensed operator training records
- NRC-approved RPI RCF requalification program
- RCF operations logbook entries from August 2020 to the present

b. Observations and Findings

The inspector verified that there were four senior reactor operators licensed at the facility; one operator was currently out of qualification. The inspector confirmed that training was conducted in accordance with the RCF requalification and training program. The inspector also verified that other aspects of the program were completed, and records maintained including quarterly 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 and confirmed that the program was up to date.

c. Conclusion

The inspector determined that the operator requalification was conducted as required by the NRC-approved RPI RCF requalification and training program and 10 CFR Part 55.

5. Surveillance and Limiting Conditions for Operation

a. Inspection Scope (IP 69001, Section 02.05)

The inspector reviewed selected aspects of the following to verify compliance with TSs section 3, "Limiting Conditions for Operation," and TS section 4, "Surveillance Requirements":

- various RCF surveillance procedures
- RCF operations logbook entries from August 2020 to the present

b. Observations and Findings

Through logbook and checklist review, the inspector verified that TS required surveillances were performed within their specified surveillance frequencies. The inspector also noted that the LCO regarding minimum reactor water temperature was consistently maintained above 50 degrees as required during critical facility operations. The inspector observed as licensed operators performed a pre-startup checklist, as an operator trainee operated the reactor under supervision, and found no issues.

c. Conclusion

The inspector determined that surveillances and LCOs were implemented and maintained as required by the TSs.

6. Design Changes

a. Inspection Scope (IP 69001, Section 02.08)

To ensure that facility changes were reviewed and approved as required by TSs section 6.2 and 10 CFR 50.59(c)(2), the inspector reviewed selected aspects of:

- RPI annual reports to the NRC for 2020 and 2021
- NSRB meeting minutes from August 2020 to the present
- RCF operations logbook entries from August 2020 to the present

b. Observations and Findings

Through review of applicable records and interviews with licensee personnel, the inspector verified that no changes, tests, or experiments, subject to 10 CFR 50.59 requirements, were performed since the last inspection.

c. Conclusion

No changes, tests, or experiments have occurred since the last inspection.

7. Committees, Audits and Reviews

a. Inspection Scope (IP 69001, Section 02.09)

The inspector reviewed the following to ensure that the audits and reviews stipulated in TSs section 6.2 were completed:

- NSRB charter dated July 25, 2008
- NSRB audit forms 1-4 for 2020 and 2021
- RPI annual reports for 2020 and 2021
- NSRB meeting minutes from August 2020 to the present

b. Observations and Findings

The inspector confirmed through a review of the meeting minutes that the NSRB was meeting semiannually and that a quorum was present as required by TSs section 6.2. In addition, the inspector verified that the required audits of RCF operations, procedures, equipment, and emergency preparedness were completed and documented by a designated individual and reviewed by the NSRB as required by TSs section 6.2. The inspector confirmed that the NSRB was conducting the required oversight of RCF operations as stipulated in the TSs.

c. Conclusion

The inspector determined that the NSRB completed review, audit, and oversight functions required by TSs section 6.2.

8. Emergency Planning

a. Inspection Scope (IP 69001, Section 02.10)

The inspector reviewed the following to verify compliance with the licensee's emergency preparedness program:

- licensed operator training records
- RCF emergency plan (EP) dated November 2016

- RCF emergency procedures dated June 2016
- emergency contact list posted in the control room

b. Observations and Findings

The inspector noted that the NSRB reviewed the RCF EP and emergency procedures annually. The inspector also confirmed that an annual emergency response drill was conducted each year as required by the EP. The inspector verified that RCF building emergency audible alarm was tested annually to verify its functionality. The inspector also noted that the required emergency equipment checks were completed and documented according to the licensee's emergency procedure. The inspector verified that the emergency call list was current and posted in the control room. The inspector verified that operators were current with their emergency preparedness training in accordance with the NRC-approved requalification program.

c. Conclusion

The inspector determined that the emergency preparedness program was conducted in accordance with NRC requirements.

9. Maintenance Logs and Records

a. Inspection Scope (IP 69001, Section 02.11)

The inspector reviewed selected aspects of the following to verify compliance with TSs requirements:

- various RCF maintenance procedures
- RPI annual reports to the NRC for 2020 and 2021
- RCF operations logbook entries from August 2020 to the present

b. Observations and Findings

Through a review of the RCF operations logbook and discussion with the operations supervisor, the inspector verified that limited maintenance activities have occurred in the past 2 years. The inspector confirmed that the maintenance activities primarily dealt with repairing aging equipment including the electrical system.

c. Conclusion

The inspector determined that appropriate minor maintenance activities were conducted in the past 2 years.

10. Fuel Handling Logs and Records

a. Inspection Scope (IP 69001, Section 02.12)

The inspector reviewed selected aspects of the following to verify compliance with TSs sections 3 and 4:

- RCF operations logbook entries from August 2020 to the present
- RCF surveillance procedures, section I, “Fuel Inventory”
- RCF operating procedures, section K, “Fuel Handling, Storage, and Movement”

b. Observations and Findings

Through a review of the reactor operations logbook and a discussion with the operations supervisor, the inspector confirmed that only one major fuel handling evolution (i.e., unloading and reloading of the core) occurred recently; the fuel handling occurred in 2020. The inspector also noted that the fuel handling evolution was conducted and documented in accordance with the licensee’s fuel handling procedure.

c. Conclusion

The inspector determined that fuel handling activities were completed and documented as required by the licensee’s procedure.

11. Followup

a. Inspection Scope (IP 92701)

The inspector reviewed the licensee’s actions taken in response to a violation (VIO) that was identified during a previous inspection.

b. Observation and Findings

050-225/2021201-02 – VIO – Failure of the NSRB to meet at least semi-annually as required by TSs 6.2, “Review and Audit.”

During an inspection in October 2021, the inspector noted that the NSRB did not conduct a regularly scheduled meeting in the spring of 2020 or 2021. The inspector reviewed the NSRB meeting minutes and identified that the NSRB met on December 17, 2019, September 9, 2020, and September 14, 2021.

During this inspection the inspector reviewed the meetings held by the NSRB and confirmed that meetings were held in September and December of 2021. This did not meet the intent of the TSs. However, the NSRB met in April and November of 2022 fulfilling the requirement to meet semiannually. This issue is considered closed.

c. Conclusion

One violation was reviewed and is considered closed.

12. Exit Interview

The inspector presented the inspection results to the licensee management and staff at the conclusion of the inspection on December 14, 2022. 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.

LIST OF PERSONS CONTACTED

Licensee

C. Blake	RPI
G. Carvalho	Radiation Safety Officer
C. Fiore	Emergency Management and Clery Compliance Officer
W. Ji	Reactor Critical Facility Director
J. Kazmierczak	Director, Environmental Health and Safety and Risk Management
P. Kowal	Reactor Critical Facility Operations Supervisor

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
IP 92701	Follow-up

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

050-225/2021201-02	VIO	Failure of the NSRB to meet at least semiannually as required by TSs 6.2, "Review and Audit."
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