

November 13, 2015

Dr. Peter Caracappa, Director
Reactor Critical Facility
NES Building 1-10
Rensselaer Polytechnic Institute
110 8th Street
Troy, NY 12180-3590

SUBJECT: RENSSELAER POLYTECHNIC INSTITUTE – U.S. NUCLEAR REGULATORY
COMMISSION INSPECTION REPORT NO. 50-225/2015-201

Dear Dr. Caracappa:

From September 14-16, 2015, the U.S. Nuclear Regulatory Commission (NRC) conducted an inspection at the Rensselaer Polytechnic Institute. The inspection included a review of activities authorized for your facility. The enclosed report documents the inspection results, which were discussed on September 16, 2015, and again on October 16, 2015, with you and members of your staff.

The inspection examined activities conducted under your license as they relate to public health and safety to confirm 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).

P. Caracappa

- 2 -

Should you have any questions concerning this inspection, please contact Mr. Ossy Font at (301) 415-2490 or electronic mail at Ossy.Font@nrc.gov.

Sincerely,

/RA/

Anthony Mendiola, Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No.: 50-225
License No.: CX-22

Enclosure:
NRC Inspection Report
No. 50-225/2015-201

cc: See next page

Rensselaer Polytechnic Institute

Docket No. 50-225

cc:

Mayor of the City of Schenectady
Schenectady, NY 12305

Dr. Shekhar Garde
Dean, School of Engineering
Rensselaer Polytechnic Institute
110 8th Street
Troy, NY 12180-3590

Reactor Operations Supervisor
JEC Room 2049
Department of Mechanical Aerospace
and Nuclear Engineering
Rensselaer Polytechnic Institute
110 8th Street
Troy, NY 12180-3590

Chief, Radiation Section
Division of Hazardous Waste
and Radiation Management
NY State Dept. of Environmental
Conservation
625 Broadway
Albany, NY 12233-7255

Radiation Safety Officer
21 Union Street
Gurley Building 2nd Floor
Rensselaer Polytechnic Institute
110 8th St.

RCF Supervisor
NES Building, Room 1-10,
MANE Department
Rensselaer Polytechnic Institute
110 8th St.
Troy, NY 12180

Annette Chism, Director EH&S
21 Union Street
Gurley Building 2nd Floor
Rensselaer Polytechnic Institute
Troy, NY 12180

State Liaison Officer Designee
Senior Project Manager
Radioactive Waste Policy and Nuclear
Coordination
New York State Energy Research &
Development Authority
17 Columbia Circle
Albany, NY 12203-6399

Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611
Troy, NY 12180-3590

P. Caracappa

- 2 -

Should you have any questions concerning this inspection, please contact Mr. Ossy Font at (301) 415-2490 or electronic mail at Ossy.Font@nrc.gov.

Sincerely,

/RA/

Anthony Mendiola, Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No.: 50-225

License No.: CX-22

Enclosure:

NRC Inspection Report

No. 50-225/2015-201

cc: See next page

DISTRIBUTION:

PUBLIC	PROB/rf	RidsNrrDprPrIb
XYin, NRR	RidsOgcMailCenter	MCompton, NRR (cover letter only, O13-E19)
OFont, NRR	RidsNrrDprProb	

ADAMS ACCESSION NO.: ML15316A076

NRC-002

OFFICE	NRR/DPR/PROB	NRR/DPR/PROB
NAME	OFont	AMendiola
DATE	11/13/2015	11/13/2015

OFFICIAL RECORD COPY

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

Docket No: 50-225

License No: CX-22

Report No: 50-225/2015-201

Licensee: Rensselaer Polytechnic Institute

Facility: Reactor Critical Facility

Location: Schenectady, NY

Dates: September 14-16, 2015

Inspector: Ossy Font

Approved by: Anthony Mendiola, Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Enclosure

EXECUTIVE SUMMARY

Rensselaer Polytechnic Institute
Reactor Critical Facility
NRC Inspection Report No. 50-225/2015-201

The primary focus of this announced safety inspection was the onsite review of selected aspects of the Rensselaer Polytechnic Institute's (RPI's or the licensee's) 100 Watt Class II research reactor safety program including: 1) procedures, 2) experiments, 3) radiation protection and environmental monitoring, 4) design changes, 5) committee audits and reviews, 6) transportation of radioactive material since the last U.S. Nuclear Regulatory Commission (NRC) inspection of these areas. The licensee's program was acceptably directed toward the protection of public health and safety and generally in compliance with the NRC requirements. Two Unresolved Items (URI) and two Inspector Follow-up (IFI) were closed.

Procedures

- Procedural control and implementation satisfied TS requirements.

Experiments

- Existing experiments are being conducted as previously approved.

Radiation Protection and Environmental Monitoring

- Postings and control to radiation areas were acceptable.
- The radiation protection program, including dosimetry and surveillances, was generally being implemented appropriately.
- Effluent monitoring satisfied license and regulatory requirements and no releases were performed.

Design Changes

- Records indicated that the licensee's design change program was being implemented as required.

Committee Audits and Reviews

- Audits and reviews were generally being conducted by designated individuals and reviewed by the Nuclear Safety Review Board (NSRB) in accordance with the requirements specified in TS 6.2.

Transportation of Radioactive Material

- No radioactive material was transferred to or from the reactor since the last inspection.

REPORT DETAILS

Summary of Facility Status

The RPI's Reactor Critical Facility (RCF) Class II research reactor, licensed to operate at a maximum steady-state thermal power of 100 Watts, continued to be operated in support of academic instruction, operator training, surveillance, and research. During the inspection the reactor was not operated.

1. Procedures

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the requirements of TS Section 6.4, "Procedures," were being met concerning written procedures:

- RCF Pre-Startup Procedures and Checklist, v. 8.3; dated April 2015
- RCF Secure Procedures and Checklist, v. 3.2; dated April 2015
- RCF Surveillance Procedures, v. 4.0; dated September 2014
- RCF Operating Procedures, v. 3.0; dated July 2013
- RCF Emergency Procedures, Version 3, dated May 2006
- RCF Maintenance Procedures, v. 1.0; approved December 2013

b. Observations and Findings

The inspector determined that written procedures were available for the activities delineated in TS Section 6.4. The licensee updated a number of procedures, including the surveillance procedures. They were approved by the NSRB before they were implemented. The inspector reviewed the updated procedures, and found them to be acceptable. The inspector has closed inspector follow-up item (IFI 50-225/2014-201-01).

RCF staff members conducted TS activities in accordance with applicable procedures.

c. Conclusion

Procedural control and implementation satisfied TS requirements.

2. Experiments

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to verify compliance with TS Section 3.4:

- Experimental administrative controls and precautions
- RCF logbook entries
- "A Manual of Experiments," MANE-4440, dated 2015

- Operations Report for the Rensselaer Polytechnic Institute Reactor Critical Facility for 2014, dated March 25, 2015

b. Observations and Findings

Most of the use of the RCF consisted of classroom training and performance of previously-approved experiments. No new experiment have been approved since the last inspection.

Through review of the experiment procedures, the reactor logbook, and interviews with staff, the inspector determined that if there were a new experiment, the review process and approval would be conducted as required by the TS and in accordance with the regulations.

c. Conclusion

Existing experiments are being conducted as previously approved.

3. Radiation Protection and Environmental Monitoring

a. Inspection Scope (IP 69001)

To verify compliance with Title 10 of the *Code of Federal Regulations* (10 CFR) Parts 19 and 20 and TS sections 3.7, 4.7, and 6.3, the inspector reviewed selected aspects of:

- “Rensselaer Polytechnic Institute Radiation Safety Manual,” dated December 2008
- Dosimetry records for 4Qt of 2014 to present
- Various calibration certificates for the portable survey instruments for the past year
- Completed NSRB quarterly radiation safety audits
- Radiation and Nuclear Safety Committee radiation safety annual reports
- Radiation training records
- “Operations Report for the Rensselaer Polytechnic Institute Reactor Critical Facility,” for 2014

b. Observations and Findings

(1) Facility Tour, Postings and Notices

The inspector toured the RCF. Control of radioactive material and control of access to radiation areas were acceptable. The postings at the entrances to various controlled areas including the reactor bay and radioactive material storage areas were acceptable and indicated the radiation and contamination hazards present. No unmarked radioactive material was found in the facility. A copy of the current NRC Form 3, “Notice to Employees,” required by 10 CFR Part 19, was posted.

(2) Radiation Protection Program, Dosimetry, and Surveillances

The inspector verified that the radiation protection program was reviewed annually as required. This review was performed by the RPI Radiation and Nuclear Safety Committee (RSC). Annual radiation worker training was conducted online or classroom led by the radiation safety officer (RSO), as required.

During the last inspection, the inspector noted that one online training program exam, not related to the radiation worker training, did not have a minimum passing score setting, meaning a person would always pass. The inspector opened an inspection follow-up item (IFI) 50-225/2014-202-01 in order to follow-up on the licensee's investigation as to whether the online radiation worker training exam had a minimum passing score set. The licensee verified the minimum passing settings and corrected the single issue and presented the information to the inspector. The item is now closed. No other issues were identified in the review of the program.

The inspector observed that dosimetry was used acceptably by facility personnel. The licensee used a National Voluntary Laboratory Accreditation Program-accredited vendor to process personnel dosimetry. An examination of the records for the inspection period showed that all exposures were within NRC limits and within licensee action levels.

The inspector reviewed the surveillances for the radiation monitoring equipment for the inspection period which include checks and calibration. Survey meters are sent to Radiation Safety Control Services for calibration, with some being currently out. The inspector determined that the licensee is adhering to TS 4.7.

During the last inspection, the licensee could not locate certain survey records for the inspection period due to the recent departure of the RSO. Additionally, it was discovered that prior to the RSO's departure, the annual report prepared by the RSO for the RSC had declared that they would no longer perform contamination surveys due to no historical need and lack of a source. After informing the licensee that performing surveys and maintaining the survey result records were required per 10 CFR Part 20, the inspector opened two URI: 50-225/2014-202-02 and 50-225/2014-202-03, respectively.

The licensee was able to locate the missing records from 2013 up to the last survey performed 2014. After reviewing the records and determining they were adequate, the inspector closed URI 50-225/2014-202-02.

Regarding URI 50-225/2014-202-03, the licensee resumed performing quarterly surveys. The inspector reviewed the documents and found them to be acceptable. Because the issue was corrected, it was a short period when surveys were not performed, and the recent survey results did not identify a contamination problem, the inspector determined that this constituted a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the Enforcement Policy. The inspector closed the URI.

(3) Environmental Monitoring

The inspector reviewed environmental monitor dosimetry records for the inspection period. Several thermoluminescent dosimeters were placed in locations around the perimeter of the RCF. Records for 2014 to the present indicate that doses were well below the applicable regulatory requirements and were typically measured at background levels.

The licensee used the Environmental Protection Agency computational code "COMPLY," to calculate gaseous emissions from the reactor. Records show that the licensee was in compliance with applicable regulatory requirements. No discharge has occurred since the last inspection.

c. Conclusion

Based on the observations made and the records reviewed, it was determined that the licensee generally satisfied regulatory requirements regarding radiation safety. Specifically, 1) postings and control to radiation areas were acceptable, 2) the radiation protection program, including dosimetry and surveillances, was generally being implemented appropriately, and one IFI related to the radiation worker training program and two URIs regarding missing certain survey records were closed, and 3) effluent monitoring satisfied license and regulatory requirements and no releases were performed.

4. Design Changes

a. Inspection Scope (IP 69001)

To ensure that facility changes were reviewed and approved as required by TS Section 6.2 and 10 CFR 50.59, the inspector reviewed selected aspects of:

- Operations Report for the Rensselaer Polytechnic Institute Reactor Critical Facility for 2014, dated March 25, 2015
- "Safety Analysis of Construction Activities Surrounding RPI RCF", dated September 12, 2015
- "Safety Analysis of Fence Line Reconfiguration", dated September 15, 2015

b. Observations and Findings

Through review of applicable records and interviews with licensee personnel, the inspector determined that no significant changes had been completed at the facility since the last inspection. The inspector verified that administrative controls were in place that required the appropriate review and approval of all changes prior to implementation and previous changes had been performed in accordance with regulatory requirements.

The inspector reviewed two safety analysis documents related to the construction surrounding the facility. One is an analysis of the general construction plan and activities, and the other is an analysis of the reconfiguration of the fence line boundaries. Both consider compliance with TS and 10 CFR Part 20, "Standards for Protection Against Radiation." The analysis was found to be acceptable.

c. Conclusion

Records indicated that the licensee's design change program was being implemented as required.

5. Committees, Audits, and Reviews

a. Inspection Scope (IP 69001)

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

- RPI NSRB meeting minutes for November 19, 2014, and May 12, 2015
- NRSB Audit Forms 1-4 for 2015
- Operations Report for the Rensselaer Polytechnic Institute Reactor Critical Facility for 2014, dated March 25, 2015

b. Observations and Findings

The inspector verified that the NSRB conducted meetings at least semiannually, as required by technical specifications (TS) 6.2. The inspector reviewed the NSRB meeting minutes since the last inspection and discussed certain topics of interest with the licensee and determined that the NSRB provided appropriate guidance and direction for reactor operations and ensured acceptable use and oversight of the reactor.

Since the last inspection, the required audits of reactor operations and records, procedures, equipment, and emergency preparedness had been completed and documented as required. The audits were completed by a designated individual and reviewed by the NSRB. The inspector noted that the annual review of the radiation protection program was being acceptably completed by the RPI Radiation and Nuclear Safety Committee.

c. Conclusion

Audits and reviews were generally being conducted by designated individuals and reviewed by the NSRB in accordance with the requirements specified in TS 6.2.

6. Transportation of Radioactive Material

a. Inspection Scope (IP 86740)

The inspector reviewed selected aspects of:

- Radioactive material shipping procedures
- Interviews with RCF staff

b. Observations and Findings

No radioactive material was transferred from or to the reactor since the last inspection. If needed, material would be passed to the university license and then packaged and shipped by Environmental Health and Safety personnel under the state license.

c. Conclusion

No radioactive material was transferred from or to the reactor since the last inspection.

5. Exit Interview

The inspection scope and results were discussed on September 16, 2015, and again on October 16, 2015, with licensee representatives. The inspector discussed the findings for each area reviewed. The licensee acknowledged the inspection findings and did not identify any material as proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

P. Caracappa	Reactor Critical Facility Director
G. Winters	Reactor Critical Facility Operations Supervisor
Y. Danon	NRSB Chair
A. Chism	Environmental Health and Safety Director
M. Del-Vecchio	Sergeant, Department of Public Safety

INSPECTION PROCEDURES USED

IP 69001	Class II Non-Power Reactors
IP 86740	Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

50-225/2014-201-01	IFI	Follow-up on the licensee's actions to complete, approve, and implement a new version of the procedures
50-225/2014-202-01	IFI	Follow-up on the radiation worker online exam minimum passing score setting
50-225/2014-202-02	URI	Review of missing certain survey records for 2013 and 2014 per 10 CFR 20.1501(a)
50-225/2014-202-03	URI	Review survey record retention per 10 CFR 20.2103

LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ADAMS	Agencywide Document Access and Management System
IP	Inspection Procedure
NSRB	Nuclear Safety Review Board
NRC	Nuclear Regulatory Commission
RCF	Reactor Critical Facility
RPI	Rensselaer Polytechnic Institute
RSO	Radiation Safety Officer
TS	Technical Specifications