August 30, 2011

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

SUBJECT: RENSSELAER POLYTECHNIC INSTITUTE - NRC ROUTINE INSPECTION REPORT NO. 50-225/2011-201

Dear Dr. Sreepada :

The U.S. Nuclear Regulatory Commission (NRC) conducted an inspection on August 1-3, 2011, at your Reactor Critical Facility (Inspection Report No. 50-225/2011-201). The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection. Areas examined during the inspection are identified in the enclosed report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. Based on the results of this inspection, no safety concern or noncompliance of requirements was 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, and requests for withholding" a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's document system (Agencywide Document Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) http://www.nrc.gov/reading-rm/adams.html.

Should you have any questions concerning this inspection, please contact Jack Donohue at 301-452-1950 or electronic mail at Jack.Donohue@nrc.gov.

Sincerely,

/RA/
Johnny H. Eads, Jr., 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: As stated
cc w/ encl: See next page

cc:

Mayor of the City of Schenectady
Schenectady, NY 12305

Barbara Youngberg
Radiation Section Chief
New York State Department of Environmental Conservation
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Dr. David Rosowsky
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Test, Research and Training Reactor Newsletter
Director of Nuclear Facilities
University of Florida
202 Nuclear Science Center
Gainesville, FL 32611-8300

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DATE	8/10/11	8/18/2011	8/30/11

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

Docket No:	50-225
License No:	CX-22
Report No:	50-225/2011-201
Licensee:	Rensselaer Polytechnic Institute
Facility:	Reactor Critical Facility
Location:	Schenectady, NY
Dates:	August 1 - 3, 2011
Inspectors:	Jack Donohue Taylor Lichatz (In-Training)
Approved by:	Johnny H. Eads, Jr., Chief Research and Test Reactors Oversight Branch Division of Policy and Rulemaking Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

Rensselaer Polytechnic Institute
Reactor Critical Facility
NRC Inspection Report No. 50-225/2011-201

The primary focus of this routine announced inspection was the on-site review of selected aspects of the Rensselaer Polytechnic Institute's (the licensee's) research reactor safety program. This included a review of; organization and staffing, operations logs and records, procedures, operator requalification, surveillance and limiting conditions for operations, experiments, design changes, maintenance logs and records, and fuel handling. The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with U. S. Nuclear Regulatory Commission (NRC) requirements.

Organization and Staffing

- The organization and staffing were consistent with the Technical Specifications (TS) requirements

Operations Logs and Records

- Operational activities were consistent with applicable TS and procedural requirements.

Procedures

- Procedural control and implementation satisfied TS requirements.

Operator Requalification

- The Reactor Operator Requalification Program was implemented satisfactorily, the program was up-to-date, and plan requirements were met.

Surveillance and Limiting Conditions for Operations

- The licensee's program for completing surveillance inspections and Limiting Conditions for Operation confirmations satisfied TS and licensee administrative controls.

Experiments

- The approval and control of experiments met TS and applicable regulatory requirements.

Design Changes

- The licensee's design change program was being implemented as required.

Maintenance Logs and Records

- Maintenance logs, records, and performance satisfied TS and procedure requirements.

Fuel Handling

- Fuel handling activities were completed and documented as required by TS and facility procedures.

REPORT DETAILS

Summary of Facility Status

The Rensselaer Polytechnic Institute (RPI, the licensee) 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 to support experiment preparations.

1. Organization and Staffing

a. Inspection Scope (Inspection Procedure (IP) 69001-02.01)

The inspectors reviewed the following regarding the licensee's organization and staffing to ensure that the requirements of Section 6.1 of the Technical Specifications (TS) License No. CX-22 dated June 27, 2011, were being met:

- Organizational structure
- Staffing requirements for safe operation of the research reactor facility
- [Annual] Operations Reports for the RPI RCF, dated February 29, 2010 and March 7, 2011
- Standard Operating Procedures
- RCF Logbook entries from September 9, 2009 to present

b. Observations and Findings

Through discussions with licensee representatives, the inspector determined that the management structure met TS requirements. The recent structure is as follows; Dr. David Rosowsky, Dean, School of Engineering is responsible for the facility license. The Facility Director, Dr. Sastry Sreepada reports to the Dean.

The RCF staff consisted of an Operations Supervisor, a qualified Senior Reactor Operator (SRO), three SRO's, two part-time Knowles Atomic Power Laboratory (KAPL) employees, and one RPI graduate student and several students in training.

Through review of the reactor logbook the inspectors verified that the individuals staffing for the reactor were clearly designated and met the TS requirements.

c. Conclusion

The licensee's organization and staffing were in compliance with the requirements specified in the TS.

2. Operations Logs and Records

a. Inspection Scope (IP 69001-02.02)

The inspectors reviewed selected parts of the following reactor operations records to verify that the requirements of TS Section 6.6 were being met:

- RCF Procedure, Pre-Startup Procedure, Revision (Rev.) 7.0, dated June 2011
- RCF Procedure, Pre-Startup Checklist, Version 3.0, dated January 2011
- RCF Procedure, Secured Checklist, Version 2.1, dated September 2006
- RCF Logbook entries from September 2, 2009 to present
- Completed Pre-start Checklists, September 2009 to present
- Completed Reactor Secured Checklists, October 2008 to present

b. Observations and Findings

The inspectors found that records were comprehensive and complete indicating that the operations were conducted in accordance with written procedures that were properly reviewed and approved.

The procedures were electronically available for use at the control panel for use during reactor operations and maintenance of the reactor. The inspectors determined the logs reflect accurate accounts of reactor operations and maintenance.

c. Conclusion

Operational activities were consistent with applicable TS and procedural requirements.

3. Procedures

a. Inspection Scope (IP 69001)

The inspectors audited the following to ensure that the requirements of TS Section 6.2 were being met concerning written procedures:

- List of current versions of approved procedures and written procedures
- RCF Procedure: Operating Procedures, Version 2.1, dated September 2006
- RCF Procedure: Startup Procedure, Version 7.0, dated June 2011
- RCF Procedure: RCF Power Calibration Surveillance Test, Version 2.1, dated September 2006

b. Observations and Findings

The inspectors determined that written procedures were available for the activities delineated in TS Section 6.2 and were approved by the Nuclear Safety Review Board (NSRB) before they were implemented. The clarity and detail in the procedures were acceptable. Temporary changes to the procedures that do not change their original intent could be authorized by the Operations Supervisor and were required to be subsequently reviewed by the NSRB. RCF staff members conducted TS activities in accordance with applicable procedures.

c. Conclusion

Procedural control and implementation satisfied TS requirements.

4. Requalification Training

a. Inspection Scope (IP 69001-02.04)

The inspectors reviewed the following to verify that the requirements of Title 10 of the Code of Federal Regulations (10 CFR) 50.55, Operators' Licenses, were being met:

- RPI RCF Requalification Program, Version 1.0, dated September, 2008
- Medical File for SROs
- RCF Logbook entries from September 3, 2009 to present

b. Observations and Findings

The licensee's requalification program is in accordance with TS 6.1.4 and ANSI/ANS-15.4-1988, Section 4-6, American National Standard for Selection and Training of Personnel for Research Reactors. The inspectors verified through review of records that four RPI personnel holding SRO licenses undergo continuous training for oral checkouts, an annual operating test and a biennial written examination. The inspectors reviewed records indicating that SRO's performed requalification activities in accordance with the program. Additionally, the inspectors reviewed medical records of all SRO's and found them complete and satisfactory.

c. Conclusion

Operator requalification was conducted as required by the licensee's Requalification Program.

5. Surveillance and Limiting Conditions for Operation

a. Inspection Scope (IP 69001-02.05)

The inspectors reviewed the following to verify compliance with TS Section 3.0, Limiting Conditions for Operation (LCO), and to determine if the periodic

surveillance test on safety systems were performed as stipulated in TS Section 4.0, Surveillance Requirements (SR):

- RCF Surveillance Procedures Version 3.0, dated February 2006
- RCF Procedure, Pre-Startup Procedure, Rev. 6.3, dated July 2008
- RCF Procedure, Pre-Startup Checklist, Version 2.3, dated July 2008, and Version 3.0, dated January 2011
- RCF Procedure, Secured Checklist, Version 2.1, dated September 2006
- RCF Logbook entries from September 2, 2009 to present
- Completed Pre-start Checklists, September 2009 to present
- Completed Reactor Secured Checklists, September 2009 to present
- Gold foil activation for power calibration performed on May 5, 2010 and January 19, 2011, per Standard Operating Procedure (SOP) Section C, Version 3, dated February, 2006

b. Observations and Findings

The inspectors selected a sample of the TS limiting conditions for operation to verify implementation. In general, the licensee demonstrated a method of compliance built into Standard Operating Procedures (SOP) and documenting completion in reactor logbooks or on supplementary forms.

Surveillances were completed on schedule and in accordance with licensee procedures for those items on the audit list. The protocols and techniques were effective in verifying acceptable performance of the safety equipment checked. The recorded results reviewed were within the TS and procedurally prescribed parameters. The records and logs were complete and were being maintained as required by the TS.

c. Conclusion

Operations were found to be in compliance with the LCO and SR as stated in the TS.

6. Experiments

a. Inspection Scope (IP 69001)

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

- Experimental program requirements
- Experimental administrative controls and precautions
- RCF Logbook entries from September 3, 2009 to present
- Installation of Zircaloy Reflector Slabs, RPI Reactor Critical Facility dated July 2011

b. Observations and Findings

There was one new experiment approved during the interval since the last inspection. Most of the utilization consisted of classroom training and performing previously approved experiments.

At the time of the inspection, preparatory work was in progress for a new experiment that had been recently approved by the NSRB. The purpose of the experiment is to determine core reactivity on Zircaloy Slabs.

c. Conclusion

The approval and control of experiments met TS and applicable regulatory requirements.

7. Design Changes

a. Inspection Scope (IP 69001)

In order to verify that any modifications to the facility were consistent with 10 CFR 50.59, the inspectors reviewed selected aspects of:

- Facility design changes and records for the past two years
- RCF Logbook entries from September 3, 2009 to present
- [Annual] Operations Reports for the RPI RCF, dated February 29, 2010 and March 7, 2011
- RCF Procedures
- Installation of Zircaloy Reflector Slabs, RPI, dated July 2011

b. Observations and Findings

Through review of applicable records and interviews with licensee personnel, the inspectors determined that no significant changes had been completed at the facility since the last inspection. The inspectors 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.

c. Conclusion

Based on the records reviewed, the inspectors determined that the licensee's design change program was being implemented as required.

8. Maintenance Logs and Records

a. Inspection Scope (IP 69001-02.11)

The inspectors reviewed the following selected maintenance logs and records to verify compliance with the requirements of regulations and TS Sections 6.2.7, 6.5.1.d, and 6.6.1.a:

- RCF Logbook entries from September 2, 2009 to present
- [Annual] Operations Reports for the RPI RCF, dated February 29, 2010 and March 7, 2011

b. Observations and Findings

The inspectors reviewed selected portions of the reactor logbooks governing the interval of time since the previous inspection. Major maintenance activities were found documented there with detail commensurate with the safety significance of the activity.

During log review, the inspectors reviewed bank worth measurements, integral rod worth, ceramic material testing, power calibrations, temperature measurement, gold foil activation and rod drop testing. The logs were complete, well written and comprehensive.

c. Conclusion

Maintenance performed along with logs and records of maintenance activities met TS requirements.

9. Fuel Handling Logs and Records

a. Inspection Scope (IP 69001-02.12)

The inspectors reviewed the following to verify compliance with requirements of TS Sections 5.6 and 6.2.2:

- RCF Logbook entries from December 3, 2009 to present
- RCF Procedure, Operating Procedure Section C, Fuel Handling, Version 2.1, dated September 2006
- Installation of Zircaloy Reflector Slabs, RPI, dated July 2011

b. Observations and Findings

The inspectors reviewed a core configuration change following approval of the Zircaloy experiment. Fuel will be moved in accordance with the approved written procedure to a known core configuration. Fuel is presently in the fuel vault awaiting installation. Fuel move and inspection were recorded in the reactor logbook.

c. Conclusion

Fuel handling activities were completed and documented as required by TS and facility procedures.

10. Exit Interview

The inspection scope and results were summarized on August 3, 2011, with the Facility Director and Staff. The inspectors discussed the findings for each area reviewed. The licensee acknowledged the findings and did not identify as proprietary any of the material provided to or reviewed by the inspectors during the inspection and the results of the inspection are subject to management review.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

Z. Blain	Senior Reactor Operator
A. Chism	Director Environmental Health and Safety
Y. Danon	Professor and NSRB Chair
M. DelVeccio	Sergeant Public Safety
W. Ji	Professor, Nuclear Engineering
E. Liu	Professor, Nuclear Engineering
S. Sreepada	Reactor Critical Facility Director
J. Thompson	Operations Supervisor

INSPECTION PROCEDURES USED

IP 69001	Class II Non-Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

LIST OF ACRONYMS USED

10 CFR	Title 10 of the *Code of Federal Regulations*
ADAMS	Agencywide Document Access and Management System
ANSI/ANS	American National Standards Institute/American Nuclear Society
IP	Inspection Procedure
NIMS	National Incident Management System
NSRB	Nuclear Safety Review Board
NRC	U.S. Nuclear Regulatory Commission
RCF	Reactor Critical Facility
Rev.	Revision
RPI	Rensselaer Polytechnic Institute
SOP	Standard Operating Procedure
SRO	Senior Reactor Operator
TS	Technical Specification