

October 14, 2008

Mr. Glenn C. Winters, Director
Reactor Critical Facility
NES Building 1-10
Rensselaer Polytechnic Institute
110 8th Street
Troy, NY 12180-3590

SUBJECT: NRC ROUTINE INSPECTION REPORT NO. 50-225/2008-201

Dear Mr. Winters:

This letter refers to the inspection conducted on September 22 to 25, 2008, at your Reactor Critical Facility. 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 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 Nuclear Regulatory Commission (NRC) requirements was identified. No response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," 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 (PARS) component of NRC's Agencywide Document Access 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 questions concerning this inspection, please contact Marcus Voht at 301-415-1210.

Sincerely,

/RA/

Johnny H. Eads, Branch Chief
Research and Test Reactors Branch B
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

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

Enclosure: As stated
cc w/ enclosure: See next page

Rensselaer Polytechnic Institute

Docket No. 50-225

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

Docket No: 50-225

License No: CX-22

Report No: 50-225/2008-201

Licensee: Rensselaer Polytechnic Institute

Facility: Reactor Critical Facility

Location: Schenectady, NY

Dates: September 22 to 25, 2008

Inspector: Marcus H. Voth, Lead
Jack J. Donohue
G. Michael Morlang

Approved by: Johnny H. Eads, Branch Chief
Research and Test Reactors Branch B
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

Rensselaer Polytechnic Institute
Reactor Critical Facility
NRC Inspection Report No. 50-225/2008-201

The primary focus of this routine, announced, operations inspection was the on-site review of selected aspects and activities since the last NRC inspection of the licensee's non-power reactor safety programs including: organization and staffing, operations logs and records, operator requalification training, surveillance and limiting conditions for operations, emergency preparedness, maintenance logs and records, and fuel handling. The inspectors also performed a follow-up on previous open items. The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements.

Organization and Staffing

- The licensee's organization and staffing were in compliance with the requirements specified in the Technical Specifications.

Operations Logs and Records

- Operational activities were consistent with applicable Technical Specification and procedural requirements.
- A follow-up item regarding a procedure ambiguity was closed.

Operator Requalification Training

- Operator requalification was conducted as required by the licensee's Requalification Program.
- The outstanding follow-up item regarding the basis for determining individuals physically fit to perform the duties of a licensed operator was closed.

Surveillance and Limiting Conditions for Operations

- Operations were found to be in compliance with the limiting conditions for operation and surveillance requirements as stated in the Technical Specifications.

Emergency Preparedness

- The emergency preparedness program was conducted in accordance with the requirements stipulated in the Emergency Plan.

Maintenance Logs and Records

- Maintenance performed along with logs and records of maintenance activities met Technical Specification requirements.

Fuel Handling Logs and Records

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

Follow-up on Previous Open Item

- Preparation of a charter for the Nuclear Safety Review Board provided the basis for closure of an inspector follow-up item.

REPORT DETAILS

Summary of Facility Status

The Rensselaer Polytechnic Institute (RPI) 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 licensee performed a minor core configuration change, a reactor checkout and startup, student tours, and training at the reactor controls for a student reactor operator trainee.

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), Amendment No. 11 to License No. CX-22 dated September 7, 2004, were being met:

- organizational structure
- staffing requirements for safe operation of the research reactor facility
- Annual Report for the RPI-RCF for the Year 2007, February 29, 2008
- Standard Operating Procedures (SOP)
- Reactor Critical Facility Logbook entries from August 3, 2007 to present

b. Observations and Findings

Through discussions with licensee representatives, the inspectors determined that the management structure met TS requirements. The RCF staff consisted of three part-time RPI employees, each holding an NRC Senior Reactor Operator (SRO) license, and three additional SROs; two being current RPI graduate students and the third being a recent RPI graduate working at the Knolls Atomic Power Laboratory but volunteering services and maintaining an SRO license.

The RCF Director, G. Winters, reported to the Head of the Mechanical, Aerospace and Nuclear Engineering Department. Reporting to the RCF Director were Adjunct Professor T. Trumbull and Operations Supervisor J. Geuther. The Acting Department Head was A. Messac, reporting to T. Wei, former department head and current Acting Dean of Engineering.

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

c. Conclusions

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

2. Operations Logs and Records

a. Inspection Scope (IP 69001-02.02 and 92701)

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, Rev. 6.2, July 2008
- RCF Procedure, Pre-Startup Checklist, Version 2.3, July 2008
- RCF Procedure, Pre-Startup Checklist, Version 2.1, September 2006
- RCF Procedure, Facility Administration Version 2.1, September 2006
- RCF Logbook entries from August 3, 2007 to present
- Completed Pre-start Checklists, August 3, 2007 to present
- Completed Reactor Secured Checklists, August 3, 2007 to present

b. Observations and Findings

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

In the previous inspection an Inspector Follow-up Item (IFI) designated 50-225/2007-201-01 was defined to track improved logging and analysis of information, specifically the pre-start checkout of startup channels. The inspectors found that the startup procedure had been revised, directing that inconsistent values be brought to the attention of the Senior Reactor Operator (SRO) and another calibration be done if needed. Since the procedure change the data recorded was no longer ambiguous and the IFI was therefore considered closed. (IFI 50-225/2007-201-01 Closed.)

c. Conclusions

Operational activities were consistent with applicable Technical Specification and procedural requirements. A follow-up item regarding a procedure ambiguity was closed.

3. Requalification Training

a. Inspection Scope (IP 69001-02.04 and 92701)

The inspectors reviewed the following to verify that the requirements of 10 CFR 50.55, Operators' Licenses, were being met:

- RPI RCF Operator Requalification Program, last updated October 13, 2002
- Medical File for SROs
- RCF Logbook entries from August 3, 2007 to present

b. Observations and Findings

The licensee's requalification program included the traditional requirement for a Training Coordinator who was exempt from taking the annual operating test and biennial written

examination. The inspectors reviewed records indicating that all other licensed operators were examined and performed requalification activities in accordance with the program.

In the previous inspection the inspector defined follow-up item IFI 50-225/2007-201-02, looking for indication of the basis used by physicians for certifying medical fitness for a reactor operator. During the present inspection the inspectors reviewed recent medical files and found documentation of physicians using Section 7, Medical Certification and Monitoring of Certified Personnel, of the American Nuclear Society and the American National Standards Institute Standard ANSI/ANS 15.4-1988, Selection and Training of Personnel for Research Reactors. Being that the acceptable standard was being met, this IFI was therefore considered closed. (IFI 50-225/2007-201-02 Closed.)

c. Conclusions

Operator requalification was conducted as required by the licensee's Requalification Program. The outstanding follow-up item regarding the basis for determining individuals physically fit to perform the duties of a licensed operator was closed.

4. 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, and to determine if the periodic surveillance tests on safety systems were performed as stipulated in TS Section 4.0, Surveillance Requirements:

- RCF Procedure, Pre-Startup Procedure, Rev. 6.2, July 2008
- RCF Procedure, Pre-Startup Checklist, Version 2.3, July 2008
- RCF Procedure, Pre-Startup Checklist, Version 2.1, September 2006
- RCF Procedure, Facility Administration Version 2.1, September 2006
- RCF Logbook entries from August 3, 2007 to present
- Completed Pre-start Checklists, August 3, 2007 to present
- Completed Reactor Secured Checklists, August 3, 2007 to present
- Rod drop time tests performed July 2 to 8, 2008, per SOP Section B, Version 2, May 2004
- Calibration of Area Criticality Detection System performed on July 2, 2008, per SOP Section B, Version 2, May 2004
- Gold foil activation for power calibration performed on August 6, 2008, per SOP Section C, Version 3, May 2006

b. Observations and Findings

The inspectors selected a sample of the TS limiting conditions for operation to verify implementation. In all cases the licensee demonstrated a method of compliance built into SOPs and documenting completion in reactor logbooks or on supplementary forms.

Surveillances were completed on schedule and in accordance with licensee procedures. The protocols and techniques were effective in verifying acceptable performance of the safety equipment. All the recorded results reviewed were within the TS and procedurally

prescribed parameters. The records and logs were complete and were being maintained as required. Checks and calibrations were completed as required by TS.

The reactor was shut down and fuel was removed from the core during the months of July, August and September of 2007 for the upper grid plate modification project. The potential for the outage to extend this long, the inability to perform quarterly surveillance, and contingency plans were discussed with the NRC inspector on August 1, 2007, during the previous inspection. During the present inspection the inspectors verified that the licensee followed the contingency plan for performing surveillance. Namely, control rod drop times were measured after the rods were replaced but before reactor fuel was loaded.

c. Conclusions

Operations were found to be in compliance with the limiting conditions for operation and surveillance requirements as stated in the Technical Specifications.

5. Emergency Planning

a. Inspection Scope (IP 69001-02.10)

The inspectors reviewed the implementation of selected portions of the emergency preparedness program including:

- Emergency Plan, RPI Critical Experiment Facility, Rev. 3.0, August 2004
- RCF Emergency Procedures, Version 3.0, May 2006, which contained:
 - Table 2. Emergency Notification List, updated July 23, 2008
 - Table 3. Operations Contact List, updated July 23, 2008
- File of June 26, 2008, RCF Tabletop

b. Observations and Findings

The RCF is located in the City of Schenectady, approximately 30 miles from the RPI campus. RPI Public Safety provided routine oversight of the RCF through periodic inspections and processing alarms transmitted into their dispatch center from the RCF. However, rapid emergency response was provided by the Schenectady Police Department and the Schenectady Fire Department with the Ellis Hospital of Schenectady prepared to accept contaminated, injured personnel. The inspectors noted that letters of agreement with the off-campus agencies were on the order of 5 years old and in the process of being updated to confirm continued cooperation and any changes in personnel or services.

The licensee reported that a tabletop exercise was conducted in July of 2008 wherein the various agencies discussed their interfacing roles with counterparts. The agencies were trained in the National Incident Management System (NIMS) methodology. A critique of the table-top was being prepared by the Schenectady County Office of Emergency Management.

Through a review of RCF records the inspectors verified that annual drills were being conducted, the Emergency Plan was undergoing periodic review, reactor staff members

were performing an annual review of the plan, and the emergency call lists were being updated in a timely manner.

c. Conclusions

The emergency preparedness program was conducted in accordance with the requirements stipulated in the Emergency Plan.

6. 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 August 3, 2007 to present
- Annual Report for the RPI-RCF for the Year 2007, February 29, 2008

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.

Over the past year the licensee made a modification to the upper grid plate of the reactor that allowed a number of fuel pins to be replaced with an unfueled region in the center of the core. A safety analysis had been performed and the Nuclear Safety Review Board (NSRB) had approved the modification after discussing the safety implications. The inspectors pointed out that the modification should have undergone review under the criteria of 10 CFR 50.59 and been reported in the annual but did not identify any deficiency in the safety review itself. The licensee acknowledged this and stated that it would be documented as a 50.59 change and reported in the annual report for 2008 operations.

c. Conclusions

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

7. 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 August 3, 2007 to present
- RCF Procedure, Operating Procedure Section C, Fuel Handling, Version 2.1, September 2006

b. Observations and Findings

The inspectors reviewed fuel handling records for the core reassembly following the 2007 upper grid plate modification, a core configuration change on August 13, 2008, and a single pin addition to the core during the inspection period. Fuel was moved in accordance with an approved written procedure and recorded in the reactor logbook.

c. Conclusions

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

8. Follow-up on Previous Open Item

a. Inspection Scope (IP 92701)

The inspectors reviewed the following document:

- Charter of the Nuclear Safety Review Board (NSRB), July 25, 2008

b. Observations and Findings

In the previous inspection the inspector defined follow-up item IFI 50-225/2007-201-03, review documentation of how TS requirements of the NSRB are being implemented. Since that time the licensee developed the NSRB charter cited above which clarified the ambiguities surrounding NSRB practices in meeting their TS requirements. The follow-up item was therefore closed. (IFI 50-225/2007-201-03 Closed.)

c. Conclusions

Preparation of a charter for the Nuclear Safety Review Board provided the basis for closure of an inspector follow-up item.

9. Exit Interview

The inspection scope and results were summarized on September 25, 2008, with members of licensee management. The inspectors described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

P. Caracappa, Radiation Safety Officer
M. Del-Vecchio, Sergeant, Department of Public Safety
M. Podowski, Chair, Nuclear Safety Review Board
J. Riegert, Lieutenant, Department of Public Safety
T. Trumbull, Adjunct Professor of Nuclear Engineering
G. Winters, Reactor Critical Facility Director

INSPECTION PROCEDURES USED

IP 69001 Class II Non-Power Reactors
IP 92701 Follow-up

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

50-225/2007-201-01 IFI Improve logging and analysis of information, specifically the pre-start checkout of startup channels, demonstrating a questioning attitude and attention to detail

50-225/2007-201-02 IFI Indicate the standard used as the basis for certifying medical fitness as a reactor operator on NRC Form 396

50-225/2007-201-03 IFI Review documentation of how TS requirements of the NSRB are being implemented

Discussed Without Closure

None

LIST OF ACRONYMS USED

ADAMS Agencywide Document Access and Management System
ANSI/ANS American National Standards Institute/American Nuclear Society
CFR Code of Federal Regulations
IFI Inspector Follow-up Item
IP Inspection Procedure
NIMS National Incident Management System
NSRB Nuclear Safety Review Board

NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
RCF	Reactor Critical Facility
Rev.	Revision
RPI	Rensselaer Polytechnic Institute
SOP	Standard Operating Procedure
SRO	Senior Reactor Operator
TS	Technical Specification