

January 10, 2011

Mr. Stephen Frantz, Director  
Reed Research Reactor Facility  
Reed College  
3203 S.E. Woodstock Boulevard  
Portland, OR 97202-8199

SUBJECT: REED COLLEGE – NRC ROUTINE INSPECTION REPORT NO. 50-288/2010-201

Dear Mr. Frantz:

On December 6–9, 2010, the U. S. Nuclear Regulatory Commission (NRC, the Commission) completed an inspection at the TRIGA Mark-I Reed Research Reactor Facility (Inspection Report No. 50-288/2010-201). The enclosed report documents the inspection results, which were discussed on December 9, 2010, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspector reviewed selected procedures and records, observed various activities, and interviewed 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, and 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 questions concerning this inspection, please contact Craig Bassett at 301-466-4495 or by electronic mail at [Craig.Bassett@nrc.gov](mailto:Craig.Bassett@nrc.gov).

Sincerely,

**/GMorlang for RA/**

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

Docket No. 50-288  
License No. R-112

Enclosure: NRC Inspection Report No. 50-288/2010-201  
cc w/encl: Please see next page

Reed College

Docket No. 50-288

cc:

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Test, Research, and Training  
Reactor Newsletter  
University of Florida  
202 Nuclear Sciences Center  
Gainesville, FL 32611

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**\*concurrence via e-mail**

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DATE	12/23/2010	1/7/2011	1/10/2011

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

Docket No: 50-288

License No: R-112

Report No: 50-288/2010-201

Licensee: Reed College

Facility: Reed Research Reactor Facility

Location: 3203 S.E. Woodstock Boulevard  
Portland, Oregon

Dates: December 6 – 9, 2010

Inspector: Craig Bassett

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

Reed College  
Reed Research Reactor Facility  
Report No.: 50-288/2010-201

The primary focus of this routine, announced inspection included onsite review of selected aspects of Reed College's (the licensee's) Class II research reactor safety program. This included a review of: organization and staffing, review and audit and design change functions, conduct of operations, operator requalification program, fuel handling, maintenance and surveillance, procedures, experiments, and emergency preparedness. The licensee's program was acceptably directed toward the protection of public health and safety and in compliance with U. S. Nuclear Regulatory Commission requirements. No deviations or violations were identified.

### Organization and Staffing

- The organization and staffing remain in compliance with the requirements specified in Technical Specification Sections I and K.

### Review, Audit, and Design Change Functions

- Review and oversight functions required by Technical Specification Sections I.2 - I.4 were acceptably completed by the Reactor Operations Committee and the Radiation Safety Committee. Audits were being completed as required.
- Title 10 of the *Code of Federal Regulations* Section 50.59 changes had been reviewed and approved by the appropriate Committee as required. None were determined to constitute a safety concern or question.

### Conduct of Operations

- Operations were generally being conducted in accordance with Technical Specification and procedural requirements.
- The licensee needs to continue to focus on the issue of procedural compliance at the facility.

### Operator Licenses, Requalification, and Medical Activities

- The operator requalification/training program was up-to-date and being acceptably implemented. Documentation of the program was acceptable.
- Biennial medical examinations were being completed as required.

### Fuel Handling and Movement

- Reactor fuel movements and inspections were made and documented in accordance with procedure.
- One-fifth of the fuel elements were being inspected on a biennial basis as allowed by Technical Specification Section E.3.

### Maintenance and Surveillance

- Maintenance was being completed as needed.
- The surveillance program, including calibration of equipment, was being implemented in accordance with Technical Specification requirements specified in Sections D-G.

### Procedures

- Facility procedures and document reviews satisfied Technical Specification Section I.5 requirements.

### Experiments

- The program for the control of experiments satisfied Technical Specification Section J and regulatory requirements.

### Emergency Preparedness

- The Emergency Plan and Emergency Implementation Procedures were being audited and reviewed annually as required.
- Letters of Agreements documenting emergency support to be provided by offsite agencies were being maintained and updated as required.
- Annual drills were being held and documentation was maintained concerning the follow-up critiques. Subsequent corrective actions were taken as needed.
- Emergency preparedness training for staff and offsite personnel was being conducted as stipulated in the Emergency Plan.

## REPORT DETAILS

### Summary of Plant Status

The Reed College two hundred and fifty kilowatt (250 kW) TRIGA Mark I research and test reactor (RTR) continued normal, routine operations. A review of the applicable records indicated that the reactor was typically operated in support of undergraduate instruction, laboratory experiments, reactor system testing, reactor surveillances, and operator training. During this inspection, the reactor was started up and operated on different days at varying power levels to provide operational demonstrations for a group of Community Safety personnel and to facilitate reactor operation training for operator trainees.

### 1. Organization and Staffing

#### a. Inspection Scope (Inspection Procedure [IP] 69001)

To verify organization and staffing requirements specified in Technical Specifications (TS) Section I, Amendment Number (No.) 7, dated March 11, 2003, were being met, the inspector reviewed selected aspects of:

- Main (reactor console) Log – Numbers (Nos.) 74 – 76
- Organization and staffing for the Reed Research Reactor (RRR) Facility
- Administrative controls and management responsibilities specified in the TS
- RRR Administrative Procedures, Section 1, “Personnel,” latest revision dated November 2009
- RRR Administrative Procedures, Section 3, “Reactor Operations,” latest revision dated November 2009
- RRR Standard Operating Procedure (SOP) 60, “Logbook Entries,” latest revision dated April 14, 2010
- Reed Research Reactor Facility Annual Report for the period from September 1, 2008 - August 31, 2009, submitted to the NRC on September 22, 2009
- Reed Research Reactor Facility Annual Report for the period from September 1, 2009 - June 30, 2010, submitted to the NRC on August 23, 2010

#### b. Observations and Findings

Through discussions with licensee representatives the inspector determined that management responsibilities and the organization at the Reed Reactor Facility had not changed since the previous NRC inspection in December 2009 (Inspection Report No. 50-288/2009-201). The inspector determined that the Facility Director retained direct control and overall responsibility for management of the facility as specified in the TS. The Facility Director reported to the President of Reed College through the Dean of the Faculty.

The licensee’s current operational organization consisted of the Facility Director, an Associate Director, an Operations/Reactor Supervisor, and a Training Supervisor. In addition to their administrative duties, these individuals were qualified Senior Reactor Operators (SROs). It was noted that there were also 12

other SROs and 20 Reactor Operators (ROs) qualified to operate the facility RTR. (The positions of Facility Director and Associate Director are full-time positions while the others are part-time.) This organization was consistent with that specified in the TS.

c. Conclusion

Organization and staffing met the requirements specified in TS Section I.

**2. Review, Audit, and Design Change Functions**

a. Inspection Scope (IP 69001)

In order to verify that the licensee had established and conducted reviews and audits as required and to determine whether modifications to the facility were consistent with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59 and TS Sections I.2 – I.4, the inspector reviewed selected portions of:

- Corrective Action Reports for 2009 and to date in 2010
- Completed audits and reviews for 2008-2009 and 2009-2010
- Design changes reviewed under 10 CFR 50.59 for 2009 and 2010
- Radiation Safety Committee meeting minutes from March 2009 through the present
- Reactor Review Committee meeting minutes from March 2009 through the present
- Reactor Operations Committee meeting minutes from March 2009 through the present
- RRR Administrative Procedures, Section 1, "Personnel," latest revision dated November 2009
- RRR Administrative Procedures, Section 2, "Reactor Review Committee," latest revision dated November 2009
- RRR Administrative Procedures, Section 9, "Record Retention," latest revision dated November 2009
- RRR SOP 62, "Changes, Tests, and Experiments," latest revision dated May 27, 2010
- RRR SOP 69, "Corrective Action Report," latest revision dated August 5, 2010
- Reed Research Reactor Facility Annual Report for the period from September 1, 2008 - August 31, 2009, submitted to the NRC on September 22, 2009
- Reed Research Reactor Facility Annual Report for the period from September 1, 2009 - June 30, 2010, submitted to the NRC on August 23, 2010

b. Observations and Findings

(1) Review and Audit Functions

The inspector noted that the licensee had established a Reactor Review Committee (RRC) which consisted of a joint committee of the Reactor Operations Committee (ROC) and the Radiation Safety Committee (RSC). When the ROC and the RSC held a joint meeting of the RRC, each would hold a separate meeting following the RRC meeting to consider and review specific assigned topics and audits. The inspector reviewed the RRC, the ROC, and the RSC meeting minutes from March 2009 to the present. These meeting minutes showed that the committees were meeting at the required frequency and were considering the types of topics outlined by the TS.

The inspector noted that, since the last NRC inspection, the appropriate audits had been completed by the ROC and the RSC in those areas outlined in the TS. The audits were designed so that most aspects of the licensee's operations and safety programs were reviewed every year. Various facility documents, such as the Radiation Protection Program, the Emergency Plan, the Fire Plan, the Administrative Procedures, the Requalification Plan, and the Reactor Experiments and Log were reviewed annually. Standard Operating Procedures were reviewed every 2 years while other major facility documents, such as the facility license and Technical Specifications, were reviewed every 4 years. The inspector noted that the audits and the resulting findings were detailed and that the licensee responded and took corrective actions as needed.

(2) Design Changes

The inspector reviewed the licensee's 10 CFR 50.59 Screen Forms concerning changes or modifications that had been initiated for 2009 and to date in 2010. As a result of the screening process, three Evaluations were required to be conducted. Through review of applicable records and interviews with licensee personnel, the inspector determined that, of the Evaluations that had been completed at the RRR Facility, one required a change to the TS and the other two were submitted to the ROC for review and approval in accordance with the TS requirements. The TS change had been submitted to the NRC for review.

c. Conclusion

Review and oversight functions required by TS Sections I.2 – I.4 were acceptably completed by the ROC and the RSC. Audits were being completed as required. 10 CFR 50.59 changes had been reviewed and approved by the ROC as required and none were determined to constitute a safety concern.

### 3. Conduct of Operations

The inspector reviewed selected aspects of the following to verify operation of the reactor in accordance with TS Sections D – I:

a. Inspection Scope (IP 69001)

- Maintenance Logbook No. VI
- Main (reactor console) Log Nos. 74 – 76
- Corrective Action Reports for 2009 and to date in 2010
- Startup Checklist Forms for the period from January 11, 2010 through the present
- Shutdown Checklist Forms for the period from January 11, 2010 through the present
- RRR Administrative Procedures, Section 3, “Reactor Operations,” latest revision dated November 2009
- RRR SOP 1, “Reactor Operations,” latest revision dated August 24, 2010
- RRR SOP 20, “Startup Checklist,” latest revision dated July 16, 2010
- RRR SOP 20, Appendix A, “Startup Checklist Form,” latest revision dated September 15, 2010
- RRR SOP 21, “Same Day Startup Checklist,” latest revision dated July 16, 2010
- RRR SOP 21, Appendix A, “Same-Day Startup Checklist Form,” latest revision dated July 16, 2010
- RRR SOP 22, “Shutdown Checklist,” latest revision dated July 16, 2010
- RRR SOP 22, Appendix A, “Shutdown Checklist Form,” latest revision dated September 15, 2010
- RRR SOP 23, “Weekly Checklist,” latest revision dated April 28, 2010
- RRR SOP 23, Appendix A, “Weekly Checklist Form,” latest revision dated March 10, 2010
- RRR SOP 24, “Bimonthly Checklist,” latest revision dated July 16, 2010
- RRR SOP 24, Appendix A, “Bimonthly Checklist Form,” latest revision dated April 7, 2010
- RRR SOP 25, “Semiannual Checklist,” latest revision dated August 24, 2010
- RRR SOP 25, Appendix A, “Reed Research Reactor Semiannual Checklist,” latest revision dated April 29, 2010
- RRR SOP 26, “Annual Checklist,” latest revision dated July 16, 2010
- RRR SOP 26, Appendix A, “Annual Checklist Form,” latest revision dated July 16, 2010
- RRR SOP 33, “Nuclear Instruments,” latest revision dated August 24, 2010
- RRR SOP 34, “Control Rods,” latest revision dated October 6, 2010
- RRR SOP 60, “Logbook Entries,” latest revision dated April 14, 2010
- RRR SOP 69, “Corrective Action Report,” latest revision dated August 5, 2010
- Reed Research Reactor Facility Annual Report for the period from September 1, 2008 - August 31, 2009, submitted to the NRC on September 22, 2009

- Reed Research Reactor Facility Annual Report for the period from September 1, 2009 - June 30, 2010, submitted to the NRC on August 23, 2010

b. Observations and Findings

(1) Routine Operations

The inspector reviewed selected reactor operating records from January 2009 through the present. These records included daily Startup Checklists, Shutdown Checklists, Experimental Startup and Shutdown Checklists, associated forms, Weekly Checklists, and the Main (reactor console) Logs. Additionally, the inspector observed the completion of a daily Startup Checklist and routine reactor operations in progress during the inspection. These activities were carried out in accordance with written procedures as required by TS Section I. These checklists were completed and signed off by the appropriate personnel as required.

Information on the operational status of the facility was recorded accurately on the log sheets and/or checklists as required by procedure. Scrams were identified in the logs and were reported and resolved as required before the resumption of operations. Through interviews with operators and review of logs and records, the inspector confirmed that shift staffing met the minimum requirements for duty and on-call personnel as required by SOP 1 except as noted below.

(2) Procedure Compliance Problems

(a) One Person Designated as both the Reactor Operator and the Warm Body

RRR SOP 1, "Reactor Operations," latest revision dated August 24, 2010, Section 1.3.1, requires that a licensed Reactor Operator shall be responsible for the safe operation of the reactor when the reactor is not shutdown as defined by TS Section A.1. Section 1.3.3, requires that a second person (generally know as the "warm body") shall be present in the facility whenever the reactor is not shutdown as defined by TS Section A.1.

On Thursday, July 22, 2010, one student was listed as the Reactor Operator of record at the facility. At the same time, for approximately two hours, this person was also listed as the Warm Body (WB). The persons occupying these positions are indicated at the facility by writing each designated person's name on the status board as well as by having each designated person wear a name tag. The problem was detected when the Facility Director noticed that the person's name was listed on the status board as both the RO of record and the WB and the person was wearing both tags.

The problem was corrected when a second, separate person was designated as the WB. It was also noted that during the entire period three or four other people were present at the facility including the SRO of record. The licensee notified the NRC Project Manager and completed a Corrective Action Report as required by RRR SOP 69, "Corrective Action Report."

(b) No SRO of Record for a Brief Period

RRR SOP 1, "Reactor Operations," latest revision dated August 24, 2010, Section 1.3.2, requires that a licensed Senior Reactor Operator shall be responsible for the oversight of the reactor when the reactor is not shutdown as defined by TS Section A.1. Section 1.3.2, also requires, among other things, that the SRO be on campus whenever the reactor is not shutdown.

On Saturday, August 28, 2010, the RO and SRO completed the reactor startup at about 11:45 a.m. The reactor was shutdown at 11:53 a.m. and the key was secured as required. The next operation was to be a tour that was scheduled for 1:00 p.m. that afternoon. The SRO then left campus for lunch. At 12:45 p.m. the RO obtained the reactor key and inserted the key into the console in preparation for the upcoming tour. The RO knew that the SRO was going to get lunch but assumed that the SRO had remained on campus. When the SRO arrived back at 12:50 p.m. she discovered that she had been listed as the SRO of record even though she had not been aware of it and had not been on campus as required. Although no operations were initiated, the reactor did not meet the definition of shutdown since the key had been inserted.

The problem was corrected when the SRO returned to the facility and was "on campus" as required. The individuals involved notified the Reactor Director of the incident. The licensee notified the NRC Project Manager and completed a Corrective Action Report as required by RRR SOP 69, "Corrective Action Report." The corrective action for this event was to add a checkbox on the Key-In Stamp to verify that the SRO was informed before the key is inserted in the console and the SRO knows that he/she is the SRO of record.

During this inspection, the inspector verified that the Key-In Stamp had been changed to add the checkbox verification of the SRO.

(c) SRO Did Not Sign the Shutdown Checklist

RRR SOP 22, "Shutdown Checklist," latest revision dated July 16, 2010, Section 22.12.8, requires that the SRO shall review and sign the (shutdown) checklist before the checker leaves the facility.

On Saturday, September 25, 2010, an SRO was completing a portion of the shutdown checklist with the assistance of three student trainees in the Reactor Bay while another person was completing the other portion of the shutdown checklist in the Control Room with the assistance of three other trainees. Once the checks were completed, the information was compiled onto the shutdown checklist and the SRO reviewed the checklist. However, because the SRO signed one portion of the shutdown checklist and checked the rest, he thought that he was finished. This inattention to detail was discovered when the Associate Director was reviewing the paperwork.

The problem was corrected when the SRO received an electronic-mail message from the Associate Director and returned to the facility and signed the shutdown checklist. The Facility Director was notified and a Corrective Action Report was completed as required by RRR SOP 69, "Corrective Action Report."

The licensee acknowledged that the procedural compliance was an area that needed to be continually stressed and addressed during new operator training.

c. Conclusion

Reactor operations and logs were acceptable. The licensee needs to continue to focus on the issue of procedural compliance at the facility.

**4. Operator Licenses, Requalification, and Medical Activities**

a. Inspection Scope (IP 69001)

The inspector reviewed selected portions of the following regarding the Reed Reactor Facility Requalification Plan to ensure that the requirements of the Plan and 10 CFR 55.59 were being met:

- Active license status of all current operators
- Medical examination records for selected operators
- Training lectures and records for the current training cycle
- NRC Form 398, "Personal Qualification Statement – Licensee"
- Written examinations given during 2009 and 2010 for selected operators
- Reed Research Reactor Facility Requalification Plan dated July 2009
- NRC Form 396, "Certification of Medical Examination – by Facility Licensee"

- Reed Research Reactor Facility Requalification Meeting Agenda and Attendance Sheets for September 2009 through April 2010
- “Requalification Hours and Reactivity Manipulation” Sheets documenting reactivity manipulations for 2009 through the present for selected operators
- Procedure Change Notice forms maintained for review by all licensed operators and dated from December 2009 to the present
- RRR Administrative Procedures, Section 9, “Record Retention,” latest revision dated November 2009
- RRR SOP 63, “Requalification,” latest revision dated November 3, 2010
- RRR SOP 63, Appendix A, “Reactor Operator Physical Exam,” latest revision dated November 3, 2010
- RRR SOP 63, Appendix B, “Accelerated Requalification Form,” latest revision dated November 3, 2010

b. Observations and Findings

There are currently 16 qualified SROs and 20 qualified ROs at the RRR Facility. The inspector reviewed selected operators’ licenses and noted that they were current.

The inspector noted that operators typically made entries on the “Requalification Hours and Reactivity Manipulation Sheet” that was located in the Control Room. Through these actions, the hours “on duty” and in what capacity (i.e., RO/SRO), as well as the evolutions performed, were documented. The inspector reviewed the Requalification Meeting Agenda and Attendance Sheets for the September 2009 through April 2010 meetings. The inspector also reviewed various individual operators’ Requalification Folders. The inspector reviewed the Requalification Program for July 2009 through June 2010 and for July 2010 through June 2011, as well as the annual drill scenarios and attendance sheets.

The review of the various logs and records noted above showed that training had been conducted in accordance with the licensee’s requalification and training program. Training reviews and examinations had been completed and documented as required. The records of operator activities, including reactivity manipulations and so forth, were being maintained as required. Records indicating the completion of the annual operations tests and supervisory observations were also maintained. Biennial written examinations were being completed as required or credit was taken by the licensee for the exams administered by the NRC to satisfy the requalification cycle exam requirements when applicable. Additionally, the inspector noted that operators were receiving the required biennial medical examinations within the required time frame.

c. Conclusion

The requalification/training program was up-to-date and being acceptably maintained. Medical examinations were being completed as required.

## 5. Fuel Handling and Movement

### a. Inspection Scope (IP 69001)

In order to verify adherence to fuel handling and inspection requirements specified in TS Section E, the inspector reviewed selected aspects of:

- Maintenance Logbook No. VI
- Fuel Element Inspection Cards
- Main (reactor console) Log Nos. 74 – 76
- Fuel Element information contained in the licensee's computer database
- RRR Administrative Procedure Section 6, "Fuel and Special Nuclear Material," latest revision dated November 2009
- RRR SOP 35, "Fuel and Core," latest revision dated March 11, 2010
- RRR SOP 35, Appendix A, "Core Diagram," latest revision dated June 29, 2008
- RRR SOP 35, Appendix B, "Fuel Handling Checklist," latest revision dated March 11, 2010
- RRR SOP 35, Appendix C, "Fuel Handling SRO Qualification," latest revision dated March 28, 2010
- RRR SOP 35, Appendix D, "Fuel Handling Receipt Form," latest revision dated March 28, 2010

### b. Observations and Findings

Through review of the Main Logs, the inspector verified that fuel movements were conducted in compliance with procedure. The inspector also verified that the licensee was maintaining the required records of fuel movements as they were completed. The logs were being filled out properly to indicate which elements were moved and to which locations.

Also through records review it was noted that the reactor fuel was being inspected upon initial receipt and one-fifth of the fuel elements in the core were being inspected biennially as allowed by TS Section E.3. The last biennial fuel inspection was completed during January 11-13, 2010. The inspector verified that all fuel elements were inspected at least once every ten years, including elements in storage and/or removed from service as required.

### c. Conclusion

Reactor fuel movements and inspections were completed and documented in accordance with procedure and the fuel was being inspected as specified by TS Section E.3.

## 6. Maintenance and Surveillance

### a. Inspection Scope (IP 69001)

To verify that operations were conducted in accordance with TS Sections I and K, and to determine that surveillance activities and calibrations were being completed as required by TS Sections D – G, the inspector reviewed selected portions of:

- Maintenance Logbook No. VI
- Main (reactor console) Log Nos. 74 – 76
- Associated surveillance and calibration data and records for 2009-2010
- RRR SOP 23, "Weekly Checklist," latest revision dated April 28, 2010
- RRR SOP 23, Appendix A, "Weekly Checklist Form," latest revision dated March 10, 2010
- RRR SOP 24, "Bimonthly Checklist," latest revision dated July 16, 2010
- RRR SOP 24, Appendix A, "Bimonthly Checklist Form," latest revision dated April 7, 2010
- RRR SOP 25, "Semiannual Checklist," latest revision dated August 24, 2010
- RRR SOP 25, Appendix A, "Reed Research Reactor Semiannual Checklist," latest revision dated April 29, 2010
- RRR SOP 26, "Annual Checklist," latest revision dated July 16, 2010
- RRR SOP 26, Appendix A, "Annual Checklist Form," latest revision dated July 16, 2010
- RRR SOP 34, "Control Rods," latest revision dated October 6, 2010
- RRR SOP 34, Appendix A, "Control Rod Calibration Form," latest revision dated October 6, 2010
- RRR SOP 34, Appendix B, "Control Rod Inspection Checklist," latest revision dated April 14, 2010
- RRR SOP 34, Appendix C, "Control Rod Inspection Form," latest revision dated April 14, 2010
- RRR SOP 38, "Crane," latest revision dated April 30, 2010
- Annual Crane Inspection Reports completed by U.S. Crane and Hoist Company from 2002 through 2008
- Reed Research Reactor Facility Annual Report for the period from September 1, 2008 - August 31, 2009, submitted to the NRC on September 22, 2009
- Reed Research Reactor Facility Annual Report for the period from September 1, 2009 - June 30, 2010, submitted to the NRC on August 23, 2010

### b. Observations and Findings

The licensee conducted various maintenance and surveillance activities which were then documented on the appropriate forms and checklists. The inspector verified that these activities were conducted during the time frame required and according to procedure. The inspector reviewed selected weekly, bimonthly, semiannual, and annual forms and checklists. All the recorded results reviewed

were within the TS and procedurally prescribed parameters. The records and logs reviewed were accurate, complete, and being maintained as required.

The inspector observed a Startup Checklist performed in the Control Room and one completed in the reactor bay. Previously completed Startup and Shutdown Checklists were reviewed. The inspector also observed the completion of a Weekly Checklist at the facility. These activities were conducted appropriately and in accordance with procedure.

A review of the RRR Facility Main Logs and current Maintenance Logbook showed that these records were also being completed as required and problems, if any, were being documented. Through observation and records review, the inspector also confirmed that maintenance was being conducted as needed, consistent with the TS.

c. Conclusion

Maintenance was being completed as required. The program for surveillance was being carried out in accordance with TS requirements.

**7. Procedures**

a. Inspection Scope (IP 69001)

To determine whether facility procedures met the requirements outlined in TS Section I.5, the inspector reviewed portions of:

- Procedural reviews and updates documented in the RRC meeting minutes
- RRR Administrative Procedures, Section 8, "Adoption and Revision of Operating Procedures," latest revision dated November 2009
- RRR Administrative Procedures, Section 9, "Record Retention," latest revision dated November 2009
- RRR SOP 60, "Logbook Entries," latest revision dated April 14, 2010
- RRR SOP 61, "Procedure Writing and Use," latest revision dated November 3, 2010
- RRR SOP 61, Appendix A, "Document Structure," latest revision dated February 24, 2010
- RRR SOP 61, Appendix B, "Document Locations," latest revision dated January 4, 2010
- RRR SOP 61, Appendix C, "Temporary Procedure Change," latest revision dated April 7, 2010

b. Observations and Findings

RRR Administrative Procedures and SOPs were found to be acceptable for the current staffing level and status of the facility. The Administrative Procedures and SOPs specified the responsibilities of the various members of the staff. The procedures were being audited and reviewed annually or biennially as required and updated as needed.

It was noted that all the facility procedures had been restructured and renumbered. This was appropriate and made the procedures more standardized and the content more logical. The licensee was careful to ensure that the procedures were carefully scrutinized so that the various references to Appendices and other procedures had been revised and were appropriate.

The inspector reviewed the Temporary Procedure Changes that had been initiated for the past 12 months. The changes were written after minor problems with the procedures were noted. The temporary changes were typically incorporated in the referenced procedures if deemed appropriate by the licensee. Changes suggested as a result of the ROC/RSC audits were also made as needed.

As noted previously, the inspector observed various activities during this inspection including reactor startup and operation. It was noted that these activities were completed in accordance with the applicable procedures. However, also as noted previously, procedural compliance should remain an area of focus for the licensee.

c. Conclusion

Facility procedures and document reviews satisfied TS Section I.5 requirements. Procedural compliance was acceptable.

**8. Experiments**

a. Inspection Scope (IP 69001)

In order to verify that experiments were being conducted within approved guidelines specified in TS Sections I and J, the inspector reviewed selected portions of:

- Experiment review and approval by the ROC
- Irradiation Request Forms for 2009 and 2010
- Approved RRR Routine Experiments including:
  - Experiment No. 1, "Irradiation with Neutrons," approval dated January 1, 2010
  - Experiment No. 2, "Irradiation with Gammas," approval dated January 1, 2010
  - Experiment No. 3, "Fuel, Graphite, or Source Material," approval dated January 1, 2010
  - Experiment No. 4, "Reactor Power Measurement," approval dated January 1, 2010
  - Experiment No. 5, "Control Rod Worth Measurement," approval dated January 1, 2010
  - Experiment No. 6, "Pool Parameter Measurement," approval dated January 1, 2010

- RRR Special Experiment No. 26, "Pool Parameter Measurement," approval dated July 19, 2010
- RRR Administrative Procedures, Section 4, "Reactor Experiments," latest revision dated November 2009
- RRR Administrative Procedures, Section 9, "Record Retention," latest revision dated November 2009
- RRR SOP 10, "Irradiation Preparation," latest revision dated August 24, 2010
- RRR SOP 10, Appendix A, "Irradiation Request Form," latest revision dated July 16, 2010
- RRR SOP 10, Appendix B, "Rabbit Irradiation Request Form," latest revision dated July 16, 2010
- RRR SOP 10, Appendix C, "Gamma Irradiation Request Form," latest revision dated July 16, 2010
- RRR SOP 10, Appendix D, "Irradiation Request Log," latest revision dated July 16, 2010
- RRR SOP 11, "Irradiation Analysis," latest revision dated August 24, 2010
- RRR SOP 12, "Lazy Susan," latest revision dated August 24, 2010
- RRR SOP 13, "Rabbit," latest revision dated August 24, 2010
- RRR SOP 13, Appendix A, "Rabbit Irradiations Qualification Form," latest revision dated September 15, 2008
- RRR SOP 13, Appendix B, "Rabbit System Diagram (Insertion)," latest revision dated September 15, 2008
- RRR SOP 13, Appendix C, "Rabbit System Diagram (Withdrawal)" latest revision dated September 15, 2008
- RRR SOP 14, "Central Thimble," latest revision dated July 16, 2010
- RRR SOP 15, "Beam," latest revision dated July 16, 2010
- RRR SOP 15, Appendix A, "Beam IR Form," latest revision dated November 16, 2009
- RRR SOP 16, "Near Core," latest revision dated July 16, 2010
- RRR SOP 17, "Gamma Irradiations," latest revision dated July 16, 2010

b. Observations and Findings

The inspector noted that all the various experiments that had been conducted at the facility in the past had been reviewed and placed into one of six categories. There were no longer any experiments that were designated as Modified Routine experiments. It was also noted that one Special Experiment had recently been reviewed and approved by the Reactor Operations Committee. This was Special Experiment No. 26, "Pool Parameter Measurement," with an approval date of July 19, 2010.

The inspector noted that irradiations were conducted under the cognizance of the Facility Director and the Reactor Supervisor as required. The irradiations were documented in the Main Log and the results of the experiments were documented on the Irradiation Request Forms as required. The resulting radioactive material was being transferred to an authorized user or disposed of as stipulated by procedure.

c. Conclusion

The license's program for the control of experiments generally satisfied regulatory and TS Section J requirements.

**9. Emergency Preparedness**

a. Inspection Scope (IP 69001)

To verify compliance with the Reed Reactor Facility Emergency Plan, the inspector reviewed selected aspects of:

- Emergency response training records for the past 2 years
- Emergency drills and exercises held during 2008, 2009, and 2010
- Reed Reactor Facility Emergency Plan last revised November 2010
- Emergency response facilities, supplies, equipment and instrumentation
- RRR SOP 25, "Semiannual Checklist," latest revision dated August 24, 2010
- RRR SOP 25, Appendix A, "Reed Research Reactor Semiannual Checklist," latest revision dated April 29, 2010
- Reed Reactor Facility Emergency Plan, Appendix A, Agreement Letters with off-site support organizations including:
  - American Medical Response (ambulance service) – letter dated June 11, 2009
  - City of Portland Fire Bureau – letter dated April 13, 2009
  - City of Portland Police Bureau – letter dated April 15, 2009
  - Legacy Health Systems (hospital) – no current letter; previous letter dated February 7, 2007
  - Oregon Department of Energy – letter dated April 14, 2009
- Reed Reactor Facility Emergency Plan, Appendix B, Emergency Implementation Procedures (EIPs), dated October 2010

b. Observations and Findings

The Emergency Plan (E-Plan) in use at the reactor was the same as the version most recently submitted to the NRC. The E-Plan and Emergency Implementation Procedures were being audited and reviewed annually as required. Supplies, instrumentation, and equipment staged for emergency use were being maintained, controlled, and inventoried as required in the E-Plan.

Through records review and interviews with licensee personnel, emergency responders were determined to be knowledgeable of the proper actions to take in case of an emergency. The inspector reviewed the Agreement Letters that had been signed with the City of Portland Police Bureau, the City of Portland Fire and Rescue, American Medical Response (AMR) Ambulance Service, and the Oregon Department of Energy. These agreements with the various emergency support organizations were being maintained and had been updated as required.

It was noted that Legacy Health Systems management refused to sign an Agreement Letter with the licensee for 2009. They did, however, verbally agree

to treat victims or an emergency from the RRR facility. Communications capabilities were acceptable and had been tested and emergency information updated as stipulated in the E-Plan.

Emergency drills had been conducted annually as required by the E-Plan. Off-site support organization participation was also as required by the E-Plan. Critiques were held following the drills to discuss the strengths and weaknesses identified during the exercise and to develop possible solutions to any problems identified. The results of these critiques were documented and reported to the RSC. Emergency preparedness and response training for off-site and reactor staff personnel was being conducted annually and documented as stipulated by the E-Plan.

The inspector also visited the City of Portland Fire and Rescue, Station No. 20, which was the station that would respond to the RRF if needed. However, the fire station staff was not present because they had been called to respond to an emergency. In the past it had been noted that the fire station was noted to be well equipped to handle fire emergencies and the personnel were knowledgeable of the correct actions to take at the facility. The licensee assured the inspector that the fire station staff continued to be well trained and there continued to be a good working relationship between the Fire Bureau staff and the licensee staff.

c. Conclusion

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

**10. Follow-up on Previously Identified Issues**

a. Inspection Scope

The inspector reviewed the licensee's actions taken in response to previously identified items in NRC Inspection Report No. 50-288/2005-201.

b. Observation and Findings

IFI 50-288/2008-201-01 -- During a previous inspection in 2008, the inspector had reviewed the actions taken by the licensee as a result of an RRC meeting. The RRC had reviewed various problems that had occurred at the facility and had directed the licensee to take various corrective actions as a result. One corrective action was to have the licensee review ANSI 15.1 and develop proper reporting criteria. Another task directed by the RRC was to have the licensee develop an effective means of promoting a Safety Conscious Work Environment and developing an adequate safety culture at the facility.

During this inspection, the inspector reviewed this issue. It was noted that the licensee had reviewed ANSI 15.1 and had revised their procedures accordingly. RRR SOP 68, "NRC Notification," latest revision dated August 5, 2010, was revised to provide more guidance concerning when a report was needed and

provide more information on the correct person or entity to notify. This appeared to be adequate. The licensee also developed and revised RRR SOP 64 "Work Environment," latest revision dated May 27, 2010. It described what constituted an acceptable work environment and delineated acceptable work practices. The inspector found this procedure to be adequate. This issue is considered closed.

c. Conclusion

One Inspector Follow-up Item was reviewed and closed.

**11. Exit Interview**

The inspection scope and results were summarized on December 9, 2010, with the Facility Director. The inspector 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 inspector during the inspection.

## **PARTIAL LIST OF PERSONS CONTACTED**

### Licensee

R. Bjorkquist	Operations/Reactor Supervisor
T. Cook	Training Supervisor
S. Frantz	Facility Director
E. McMannis	Associate Director, Reed Reactor Facility

### Other Personnel

K. Fisher	Radiation Safety Officer and Campus Environmental Director
E. Janssens	Battalion Chief, City of Portland Fire and Rescue
B. Knotts	Captain, City of Portland Fire and Rescue, Station No. 20
W. Lei	Voting Member, Radiation Safety Committee

## **INSPECTION PROCEDURE USED**

IP 69001	Class II Non-Power Reactors
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## **ITEMS OPENED, CLOSED, AND DISCUSSED**

### Opened

None

### Closed

50-288/2010-201-01	IFI	Follow-up on the licensee's actions to review ANSI 15.1 and develop proper reporting criteria, develop an effective means of promoting a Safety Conscious Work Environment, and develop an adequate safety culture at the facility
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## **LIST OF ACRONYMS USED**

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ADAMS	Agencywide Documents Access and Management System
EIPs	Emergency Implementation Procedures
E-Plan	Emergency Plan
IFI	Inspector Follow-up Item
IP	Inspection Procedure
NCV	Non-Cited Violation
NRC	U. S. Nuclear Regulatory Commission
PARS	Publicly Available Records
RO	Reactor operator
ROC	Reactor Operations Committee
RRC	Reactor Review Committee
RRR	Reed Research Reactor
RSC	Radiation Safety Committee
RTR	Research and Test Reactor
SOP	Standard Operating Procedure
SRO	Senior reactor operator
TS	Technical Specifications