January 2, 2013

Dr. Melinda Krahenbuhl, Director
Reed Reactor Facility
Reed College
3203 S.E. Woodstock Boulevard
Portland, OR 97202-8199

SUBJECT: REED COLLEGE – NRC ROUTINE INSPECTION REPORT NO. 50-288/2012-201 AND NOTICE OF VIOLATION

Dear Dr. Krahenbuhl:

From December 3 to 6, 2012, the U.S. Nuclear Regulatory Commission (NRC or the Commission) completed an inspection at the TRIGA Mark-I Reed Research Reactor facility (Inspection Report No. 50-288/2012-201). The enclosed report documents the inspection results, which were discussed on December 6, 2012, with you; Dr. McDougal, Dean of Faculty; and Kathleen Fisher, Radiation Safety Officer.

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, the NRC has determined that a Severity Level IV violation of NRC requirements occurred. The violation was evaluated in accordance with the NRC Enforcement Policy, which can be found on the NRC's Web site at www.nrc.gov by selecting "What We Do," "Enforcement," and then "Enforcement Policy." The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because it constitutes the failure to meet a regulatory requirement that has more than minor safety significance and it was identified by the NRC.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In addition, based on the results of this inspection, the NRC has determined that two other Severity Level IV violations of NRC requirements occurred. These violations are being treated as non-cited violations (NCVs), consistent with Section 2.3.2.b of the Enforcement Policy. The NCVs are described in the subject inspection report. No response to NCVs is required. However, if you contest the violations or significance of the NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

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.

Sincerely,

/RA/

Gregory T. Bowman, 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

Enclosures:
1. Notice of Violation
2. NRC Inspection Report No. 50-288/2012-201

cc w/encls: Please see next page

Reed College Docket No. 50-288

cc:

Mayor of City of Portland
1220 Southwest 5th Avenue
Portland, OR 97204

Reed College
ATTN: Dr. Patrick McDougal
Dean of the Faculty
3203 S.E. Woodstock Boulevard
Portland, OR 97202-8199

Reed College
ATTN: Mr. John Kroger
President
3203 S.E. Woodstock Boulevard
Portland, OR 97202-8199

Oregon Department of Energy
ATTN: David Stewart-Smith, Director
Division of Radiation Control
625 Marion Street, N.E.
Salem, OR 97310

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

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).

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ACCESSION NO.: ML12348A001 ***concurrence via e-mail** **TEMPLATE #: NRC-002**

OFFICE	PROB:RI *	PRPB:LA	PROB:BC
NAME	CBassett	GLappert	GBowman
DATE	12/12/12	12/13/12	1/2/13

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NOTICE OF VIOLATION

Reed College
Reed Research Reactor

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

During a U.S. Nuclear Regulatory Commission (NRC) inspection conducted from December 3 to 6, 2012, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

Title 10 of the *Code of Federal Regulations* (10 CFR) Paragraph 50.59(c)(1) states, in part, that a licensee may make changes in the facility as described in the final safety analysis report without obtaining a license amendment pursuant to 10 CFR 50.90 only if: (i) a change to the Technical Specifications incorporated in the license is not required, and (ii) the change does not meet any of the criteria in 10 CFR 50.59(c)(2).

10 CFR 50.59(c)(2) requires, in part, that a licensee shall obtain a license amendment pursuant to 10 CFR 50.90 prior to implementing a proposed change if the change would: (i) result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the final safety analysis report; (ii) result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated in the final safety analysis report; (iii) result in more than a minimal increase in the consequences of an accident previously evaluated in the final safety analysis report; (iv) result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the final safety analysis report; (v) create a possibility for an accident of a different type than any previously evaluated in the final safety analysis report; (vi) create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in the final safety analysis report; (vii) result in a design basis limit for a fission product barrier as described in the final safety analysis report being exceeded or altered; or (viii) result in a departure from a method of evaluation described in the final safety analysis report used in establishing the design bases or in the safety analyses.

10 CFR 50.59(d)(1) requires, in part, that the licensee shall maintain records of changes in the facility made pursuant to 10 CFR 50.59(c). These records must include a written evaluation which provides the basis for the determination that the change does not require a license amendment pursuant to 10 CFR 50.59(c)(2).

Contrary to the above requirements, from February 2 to 4, 2011, the licensee made a change to the facility as described in the safety analysis report without conducting an evaluation to determine whether or not the change should have required a license amendment. Specifically, the licensee added 15 more fuel elements to the reactor core in addition to those already installed, for a total of 79 elements, thus changing the core configuration. The licensee did not perform an evaluation of the change against the criteria in 10 CFR 50.59(c)(2) to determine if the change should have required a license amendment.

This has been determined to be a Severity Level IV violation (Section 6.1).

Pursuant to the provisions of 10 CFR 2.201, Reed College is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with a copy to the responsible inspector, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid further violations; and (4) the date when full compliance will be achieved. Your response may reference or include previously docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time. If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of the NRC's Agencywide Documents Access and Management System (ADAMS), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room). If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 2nd day of January 2013

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

Docket No:	50-288
License No:	R-112
Report No:	50-288/2012-201
Licensee:	Reed College
Facility:	Reed Research Reactor
Location:	3203 S.E. Woodstock Boulevard Portland, Oregon
Dates:	December 3–6, 2012
Inspector:	Craig Bassett
Approved by:	Gregory T. Bowman, 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.: 50-288/2012-201

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. One cited Severity Level IV violation was identified.

Organization and Staffing

- The organization and staffing remain in compliance with the requirements specified in Technical Specification 6.1.

Review, Audit, and Design Change Functions

- Review and oversight functions required by Technical Specification 6.2 were acceptably completed by the Reactor Operations Committee and the Radiation Safety Committee. Audits were being completed as required.

- One violation was noted for failure to conduct an evaluation pursuant to Section 50.59 of Title 10 of the *Code of Federal Regulations* prior to reconfiguring the reactor core.

Conduct of Operations

- Operations were generally being conducted in accordance with Technical Specification and procedural requirements.

Operator Licenses, Requalification, and Medical Activities

- The operator requalification/training program was up-to-date and being acceptably implemented and documented.

- Biennial medical examinations were being completed as required.

Fuel Handling and Movement

- Reactor fuel movements and inspections were conducted and documented in accordance with procedure.

- Forty percent of the fuel elements were being inspected on a biennial basis, as required by Technical Specification 4.1.

Maintenance and Surveillance

- Maintenance was being completed as needed.

- The surveillance program, including calibration of equipment, was being completed in accordance with Technical Specification Sections 3 and 4.

Procedures

- Facility procedure and document reviews satisfied Technical Specification 6.4 requirements.

Experiments

- The program for the control of experiments satisfied Technical Specifications 3.6, 4.6, and 6.5 and other regulatory requirements.

Emergency Preparedness

- The Emergency Plan and Emergency Implementation Procedures were being audited and reviewed annually as required.

- Letters of agreement documenting emergency support to be provided by offsite agencies were being maintained and periodically updated.

- Annual drills were being held and documentation of the drills and the follow-up critiques was maintained. 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

Reed College's (the licensee's) 250 kilowatt TRIGA Mark I research reactor continued normal, routine operations. 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 various groups of students and to facilitate reactor operator training.

1. Organization and Staffing

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

To verify organization and staffing requirements specified in Technical Specifications (TS) 6.1 were being met, the inspector reviewed selected aspects of:

- Main (Reactor Console) Log – Numbers (Nos.) 76 – 81
- Organization and staffing for the Reed Research Reactor (RRR) Facility
- Administrative controls and management responsibilities specified in the TS and facility procedures
- RRR Administrative Procedures, Section 1, "Personnel," latest revision dated January 2012
- RRR Administrative Procedures, Section 3, "Reactor Operations," latest revision dated January 2012
- RRR Standard Operating Procedure (SOP) 60, "Logbook Entries," latest revision dated April 14, 2010
- RRR Annual Report for the period from July 1, 2010, through June 30, 2011, submitted to the U.S. Nuclear Regulatory Commission (NRC) on August 1, 2011
- RRR Annual Report for the period from July 1, 2011, through June 30, 2012, submitted to the NRC on August 7, 2012

b. Observations and Findings

Through discussions with licensee representatives, the inspector determined that management responsibilities and the organizational structure at the RRR facility had not changed since the previous NRC inspection in November 2011 (Inspection Report No. 50-288/2011-203). 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 Faculty. This organization was consistent with that specified in the TS.

It was noted that the previous president had left Reed College and a replacement had been selected. The licensee had notified the NRC of this action, as required, by submitting a letter dated June 29, 2012, indicating the change.

The licensee's current operational organization consisted of the Facility Director, an Associate Director, a Radiation Safety Officer, an Operations/Reactor Supervisor, a Training Supervisor, an Assistant Training Supervisor, a Science Officer, and a Requalification Supervisor. Except for the Radiation Safety Officer, in addition to their administrative duties, the aforementioned individuals were qualified senior reactor operators (SROs). It was noted that there were also 13 other SROs and 18 reactor operators (ROs) qualified to operate the RRR. (The positions of Facility Director, Associate Director, and Radiation Safety Officer are full-time positions at Reed College, while the others are part-time.)

c. Conclusion

Organization and staffing met the requirements specified in TS 6.1.

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 facility modifications and change reviews were consistent with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59 and TS 6.2, the inspector reviewed selected portions of:

- Corrective Action Reports (CARs) for 2011 and to date in 2012
- Completed audits and reviews for 2009-2010 and 2011-2012
- Design changes reviewed under 10 CFR 50.59 for 2011 and 2012
- Radiation Safety Committee (RSC) meeting minutes from March 2011 through the March 2012
- Reactor Review Committee (RRC) meeting minutes from March 2011 through the March 2012
- Reactor Operations Committee (ROC) meeting minutes from March 2011 through November 2012
- RRR Administrative Procedures, Section 1, "Personnel," latest revision dated January 2012
- RRR Administrative Procedures, Section 2, "Reactor Review Committee," latest revision dated January 2012
- RRR Administrative Procedures, Section 9, "Record Retention," latest revision dated January 2012
- 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
- RRR Annual Report for the period from July 1, 2010, through June 30, 2011, submitted to the NRC on August 1, 2011
- RRR Annual Report for the period from July 1, 2011, through June 30, 2012, submitted to the NRC on August 7, 2012

b. Observations and Findings

(1) Review and Audit Functions

In the past the licensee had established two separate committees to conduct the review and audit functions stipulated in the TS. These were designated as the ROC and the RSC. When the ROC and RSC held joint meetings, the resultant group was called the RRC. Following a joint RRC meeting, the ROC and RSC would each typically hold a separate meeting to consider and review specific assigned topics and audits. The inspector reviewed RRC and RSC meeting minutes from March 2011 through March 2012. The inspector reviewed the ROC meeting minutes from March 2011 through November 2012. 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 RSC in the various areas outlined in the previous/older version of the TS, which were dated March 11, 2003. 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. SOPs were reviewed every 2 years, while other major facility documents, such as the facility license and TSs, 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) Restructuring of the RRR Safety Committee

Following facility license renewal and implementation of the resultant revised TS in April 2012, the licensee restructured their safety committee. Instead of maintaining two separate committees, the licensee opted to merge the ROC and the RSC into one committee designated as the Reactor Operations Committee. The size of the new ROC was reduced with the approval of Reed College management. In addition to being more practical, the licensee decided that a smaller committee better reflected the actual risk factors associated with a reactor facility like the RRR.

(3) Design Changes

(a) 10 CFR 50.59 Reviews

The inspector reviewed the licensee's 10 CFR 50.59 screening forms concerning changes or modifications that had been initiated at the facility for 2011 and to date in 2012. The licensee indicated

that none of the screenings required further evaluation under 10 CFR 50.59.

(b) Safety Review Completed for Replacing the Aluminum Clad Fuel Elements in the Reactor Core with Stainless Steel Clad Fuel Elements That Had Been Received from the University of Arizona

In January 2011, the licensee received 91 stainless steel clad (SS) fuel elements from the University of Arizona. The fuel had been used for several years at the University of Arizona, but was still in good condition, such that it was suitable for use at RRR. The licensee performed a 10 CFR 50.59 screening to evaluate the replacement of their aluminum clad (AL) fuel elements with the SS ones. At that point 54 of the 64 elements in the reactor were the AL type. Through the screening process, the licensee determined that their TS (the previous/older version of the TS which were current at the time) allowed them to use either AL or SS fuel elements in the reactor without respect to location or number. Because the "new" SS fuel was in better physical condition than the "old" AL fuel, the licensee proceeded with replacing all the AL fuel elements.

The inspector reviewed the RRR 10 CFR 50.59 screening form that was developed for replacing the AL fuel elements with the SS elements. It was noted that the screening form was not formally initiated/documented until April 26, 2011, and was not approved by the Facility Director until April 29, 2011. The screening form did contain a note indicating that the screening/analysis was performed on January 11, 2011, but not completed until the date noted above.

The licensee developed Special Experiment (SE) 1 to use when loading the "new" fuel into the reactor. It was written and approved by the RRR Facility Director. The experiment was then submitted to the ROC via electronic mail (e-mail) for approval. The various members of the ROC subsequently approved the experiment by e-mail, with the latest approval dated January 25, 2011. (The inspector noted that, similar to the screening form reviewed above, SE 1 was not formally initiated/documented by the Facility Director until January 26, 2011, and not formally signed by the Chair of the ROC until March 10, 2011.) With the approval of the ROC, the licensee then proceeded to unload the 54 AL fuel elements and replace them with SS elements. This was completed on February 2, 2011. However, the licensee found that with only 64 SS fuel elements in the core, the reactor could not achieve criticality.

(c) Failure to Complete a 10 CFR 50.59 Evaluation Prior to Core Reconfiguration – Adding More Elements to the Reactor Core

Because the core did not contain enough elements to achieve criticality, the Facility Director again e-mailed the ROC seeking permission to load more fuel into the core so the criticality could be achieved. The same experiment, SE 1, was to be used and the protocol would be to add five elements at a time until the core loading approached that needed for criticality. At that point one fuel element at a time would be added until a functioning core was established. The Chair of the ROC approved the addition of more elements, provided that symmetry in the core was maintained. The licensee began to add more fuel until the reactivity of the core was approximately the same as the previous core. On February 4, 2012, a total of 15 more fuel elements had been added and were in place. At that point a total of 79 SS fuel elements and 5 graphite elements were in the core.

When the issue of core reconfiguration was reviewed by the inspector, it was noted that no 10 CFR 50.59 screening or evaluation had been completed prior to reconfiguring the core and increasing the number of fuel elements in the core from 64 to 79. The completion of a screening or evaluation had been discussed, but the licensee decided that this was covered by the original screening that had been done to replace the “old” AL elements with the SS elements. As noted above the licensee determined that the TS in effect at the time allowed them to use either “AL or SS fuel elements in the reactor without respect to location or number.” However, no neutronic evaluation, thermal hydraulic analysis, or any other type of review of the reconfigured core was done.

The inspector reviewed the RRR Safety Analysis Report and verified that reactor structure and basic components were identified there. When the inspector reviewed the TS, it stated that “the core shall be an assembly of TRIGA Mark I aluminum and/or stainless-steel clad, fuel-moderated elements arranged in a close-packed array with two exceptions,” but no mention was made of the number of elements that could be located in the core.

The inspector identified that the licensee should have completed a 10 CFR 50.59 evaluation to fully review the reconfiguration of the core prior to loading more than the original 64 elements. The evaluation should have included, for example, a neutronic evaluation and thermal hydraulic analysis. The inspector determined that the failure to fully evaluate this change as required by 10 CFR 50.59 was of more than minor significance because the change could have resulted in changes to core characteristics, which may have required prior NRC approval. The failure to conduct a 10 CFR 50.59 evaluation was determined

to be a Severity Level IV violation of NRC requirements. (VIO 50-288/2012-201-01).

c. Conclusion

Review and oversight functions required by TS 6.2 were acceptably completed by the ROC and the RSC. Audits were being completed as required. One violation was identified for failure to conduct a 10 CFR 50.59 evaluation prior to reconfiguration of the reactor core.

3. Conduct of Operations

The inspector reviewed selected aspects of the following to verify operation of the reactor in accordance with TS Sections 3 and 4:

a. Inspection Scope (IP 69001)

- Maintenance Logbook No. VI
- Main (Reactor Console) Log Nos. 76 – 81
- CARs for 2011 and to date in 2012
- Selected Startup Checklist Forms for the period from January 11, 2012, through the present
- Selected Shutdown Checklist Forms for the period from January 11, 2012, through the present
- RRR Administrative Procedures, Section 3, “Reactor Operations,” latest revision dated January 2012
- RRR SOP 1, “Reactor Operations,” latest revision dated April 11, 2012
- RRR SOP 20, “Startup Checklist,” latest revision dated April 11, 2012
- RRR SOP 20, Appendix A, “Startup Checklist Form,” latest revision dated April 11, 2012
- RRR SOP 21, “Same Day Startup Checklist,” latest revision dated April 6, 2012
- RRR SOP 21, Appendix A, “Same-Day Startup Checklist Form,” latest revision dated April 6, 2012
- RRR SOP 22, “Shutdown Checklist,” latest revision dated May 4, 2011
- RRR SOP 22, Appendix A, “Shutdown Checklist Form,” latest revision dated May 4, 2012
- RRR SOP 23, “Weekly Checklist,” latest revision dated April 12, 2012
- RRR SOP 23, Appendix A, “Weekly Checklist Form,” latest revision dated April 12, 2012
- RRR SOP 24, “Bimonthly Checklist,” latest revision dated November 28, 2012
- RRR SOP 24, Appendix A, “Bimonthly Checklist Form,” latest revision dated November 28, 2012
- RRR SOP 25, “Semiannual Checklist,” latest revision dated April 20, 2012
- RRR SOP 25, Appendix A, “Reed Research Reactor Semiannual Checklist,” latest revision dated April 20, 2012
- RRR SOP 26, “Annual Checklist,” latest revision dated January 7, 2012

- RRR SOP 26, Appendix A, “Annual Checklist Form,” latest revision dated January 7, 2012
- RRR SOP 33, “Nuclear Instruments,” latest revision dated April 20, 2012
- RRR SOP 34, “Control Rods,” latest revision dated April 12, 2012
- RRR SOP 60, “Logbook Entries,” latest revision dated April 14, 2010
- RRR SOP 69, “Corrective Action Report,” latest revision dated August 5, 2010
- RRR Annual Report for the period from July 1, 2010, through June 30, 2011, submitted to the NRC on August 1, 2011
- RRR Annual Report for the period from July 1, 2011, through June 30, 2012, submitted to the NRC on August 7, 2012

b. Observations and Findings

(1) Routine Operations

The inspector reviewed selected reactor operating records from January 2012 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 6.4. These checklists were completed and signed off by the appropriate personnel as required, except as discussed below.

Information on the operational status of the facility was generally recorded properly 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.

(2) Failure to Comply with the Requirements of 10 CFR 50.54(k)

Regulation 10 CFR 50.54(k) requires that an operator or senior operator licensed pursuant to 10 CFR Part 55 shall be present at the controls at all times during the operation of the facility.

TS Section A, “Definitions,” Paragraph 1, “Shutdown,” (the version in effect until April 2012) states the reactor, with fixed experiments in place, shall be considered to be shut down (not in operation) whenever all of the following conditions have been met: (a) the console key switch is in the “off” position and the key is removed from the console and under the control of a licensed operator (or stored in a locked storage area); (b) sufficient control rods are inserted so as to assure the reactor is subcritical by a margin greater than 0.7% delta k/k cold, without xenon;

and (c) no work is in progress involving fuel handling or refueling operations or maintenance of its control mechanisms.

At approximately 12:20 p.m., on February 6, 2012, the RO at the console was finishing the core excess calculations. When that task was finished, the RO informed the SRO then he would be shutting down the reactor. The RO then proceeded to drive in the rods until they were fully inserted. The RO informed the SRO that the reactor was shut down and left the control room and reactor bay area. When the RO left the control room, he neglected to remove the key from the console.

At approximately 1:35 p.m., the Facility Director and the Associate Director came to the facility and noticed that the blue light in the hallway of the facility was illuminated, indicating that the reactor was “on” and the key was in the console and set in the “operate” position. When they entered the Control Room they found that no one was in the room and that, indeed, the reactor key was still in the console. The Associate Director immediately removed the key from the console and secured it.

The licensee investigated the event and determined that the key had apparently been left in the console for 75 minutes before the condition was discovered due to an oversight by the RO. The Director and Associate Director also evaluated the problem to determine whether or not it was reportable and determined that it was not a violation of the TS, but was a violation of 10 CFR 50.54(k). The TS in effect at that time did not require that the event be reported to the NRC but, at 2:25 p.m. on February 6, 2012, the licensee made an information-only notification to the NRC Operations Center.

The licensee took a number of corrective actions in response to the violation. The reactor was not authorized to go back to power until after the results of the investigation were fully understood. The RO involved in the event was given extensive additional training. During the next meeting of all licensed operators on April 27, 2012, the event was reviewed and all were reminded of the importance of removing and securing the key. The licensed operators were also reminded that the blue light in the hallway and the “saloon” doors that are at the exit of the control console area are to remind people that the reactor is operating and/or that key is still in the console. Additionally, the licensee initiated a CAR in accordance with RRR SOP 69, “Corrective Action Report.” CAR No. 12-01 documented the event and the corrective actions. No further corrective actions were identified, but the licensee indicted that, should the problem recur, other actions would be considered.

The inspector reviewed the event. It was noted that the licensee identified the problem, evaluated the cause, and took corrective actions. The NRC was given an information-only notification as well. The inspector verified that the corrective actions had been completed by the licensee as indicated. The inspector concluded that failure to remove the

key from the console was a violation of the requirements of 10 CFR 50.54(k) and that this was a Severity Level IV violation.

However, because the violation was identified by the licensee, appropriate corrective actions had been identified and completed, and the violation was not repetitive or willful, it is being treated as a non-cited violation (NCV), consistent with Section 2.3.2.b of the NRC Enforcement Policy (NCV 50-186/2012-201-02). This NCV is considered closed.

(3) Violation of TS 3.2.2 Requirement

TS 3.2.2 requires that the reactor shall not be operated unless the reactor power measuring channels in Table 2 of TS 3.2.2 are operable. Table 2 stipulates that a minimum of one of each of following measuring channels be operable: percent power channel, linear channel, and logarithmic channel.

TS 3.2.3 requires that the reactor shall not be operated unless the minimum number of safety channels in Table 3 and interlocks in Table 4 of TS 3.2.3 are operable. Table 4 stipulates that a minimum of one of each of following interlocks be operable: source interlock and control rod drive circuit.

TS 4.2(e) requires that a channel check of each of the reactor power measuring channels in TS 3.2.2, Table 2, shall be performed prior to each operation of the reactor.

At approximately 11:17 a.m., on November 1, 2012, while the reactor was secured, a new experimental apparatus was installed in the reactor. This new experiment included an electronic readout which was positioned on the bridge above the core.

At 11:27 a.m., the RO began a reactor startup, not noticing that the logarithmic power channel was not functioning as required. A few minutes later, while the reactor was critical and stabilizing at 5 watts, another individual entered the control room and noticed that the log channel was reading incorrectly (i.e., the digital chart recorder showed that the power channel reading had remained constant and much higher than it should have during operation at this power level, while the actual power had increased slowly during startup). The Duty SRO instructed the RO to scram and secure the reactor. This was completed at 11:39 a.m. The Reactor Director was notified of the event and the NRC Operations Center was subsequently notified as required by TS 6.7.2(a).

The licensee investigated the event and determined that the readout associated with the new experiment produced electronic interference with the preamplifier for the logarithmic power channel (log channel) and rendered it inoperable. As a result, the source interlock associated with the log channel was also inoperable. The licensee determined that the

RO had failed to check the log channel before inserting the console key and failed to pay attention to it while operating. Instead, the RO was watching the linear channel exclusively, contrary to the training he had received. The licensee also found that individual operators were not relying on the readings of the log channel because they felt it was erratic and the readings could not be trusted.

The licensee took various corrective actions. The reactor was not authorized to go back to power until after the situation was investigated. When it became know that the log channel false readings were being caused by the electronic readout that had been placed on the bridge directly over the preamplifier for the log channel, that piece of electronics was relocated and the log channel readings returned to normal. The area on the bridge over the log channel preamplifier was marked off and everyone was informed that no electronics or equipment should be placed there.

The licensee also initiated a CAR in accordance with RRR SOP 69, CAR No. 12-02. The CAR documented various corrective actions that were also taken. The RO involved in this event was required to complete several hours of additional training. The event was discussed at the next requalification and training meetings held for all operators and trainees. The additional training also reiterated the correct method of reading the various instrument channels and reading the log scale. These meetings were held on November 12, 2012.

The inspector reviewed the event. It was noted that the licensee identified the problem, evaluated the situation, and took appropriate corrective actions, including notifying the NRC. The inspector verified that the corrective actions had been completed by the licensee as indicated. The inspector concluded that failure to operate the reactor with all the reactor power measuring channels in an operable condition (i.e., operating the reactor without the logarithmic power channel) was a violation of the requirements of TS 3.2.2 and that this was a Severity Level IV violation.

However, because the violation was identified by the licensee, appropriate corrective actions had been identified and completed, and the violation was not repetitive or willful, it is being treated as an NCV, consistent with Section 2.3.2.b of the NRC Enforcement Policy (NCV 50-186/2012-201-03). This NCV is considered closed.

(4) Shutdown Checklists Not Completed

During the review of the licensee's CARs, the inspector identified that on October 12, 2011, and again on October 27, 2011, the reactor was operated and no Shutdown Checklist was completed before the end of the day, contrary to licensee procedures. Through CAR No. 11-05, which documented the problem, and through interviews with the licensee, it was

noted that the activities for October 12, 2011, had been scheduled separately from the reactor's web-based scheduling program known as "IRIS." Because the checklist was not on the regular schedule, there was confusion concerning who would complete the Shutdown Checklist. As a result, it was not done.

The licensee investigated the problem and determined that, in many cases, the reactor is operated several times per day. As a result, an operator finishing an operation may not know whether or not a Shutdown Checklist is appropriate. Also, operators may assume that someone else will perform the Shutdown Checklist. In many cases, the operators may not be able to do it themselves because, after securing the reactor, they typically leave the facility to go to class or attend to other obligations. Also, some operators cannot perform a Shutdown Checklist on their own because they do not have access to the vita area of the facility. In addition, there was no routinely scheduled check to ensure that a Shutdown Checklist was completed.

The licensee initiated various corrective actions. All supervisors were required to ensure that all reactor operation be scheduled on IRIS. The Operations Supervisor was assigned the responsibility for ensuring that the Shutdown Checklist was performed. These actions were completed on October 28, 2011. The procedure was revised to require that all operations and checklists be on the schedule (scheduled on IRIS). This was completed on April 11, 2012, when the revision of the procedure was approved.

Notwithstanding these corrective actions, on December 4, 2012, a Shutdown Checklist was not completed. Because the situation appeared to be similar to the events that occurred earlier, the licensee created an addendum to CAR No. 11-05. Through investigation of the December event, the licensee determined that the Shutdown Checklist, and all events for the day, had indeed been scheduled on IRIS. Although the Operations Supervisor had been checking every evening to ensure that the Shutdown Checklists were completed as required, he was unavailable on December 4, 2012, and as a result, did not check on the completion until after midnight.

One of the possible corrective actions that had been considered following the events that occurred in October 2011 was to request that the Reed College webmaster establish an automatic e-mail notification daily at a specific time in the evening to warn the various supervisors that the Shutdown Checklist had not been accounted for on IRIS. This had not been implemented as of the date of the inspection, but the licensee indicated that they intend to request that this be completed as soon as practical. In the interim, the Associate Director took the responsibility to check that a Shutdown Checklist was completed, in addition to the check being made by the Operations Supervisor.

The licensee was informed that the issue of ensuring that the proper documentation (i.e., completion of the Shutdown Checklist) was completed as required by licensee procedures would be followed by the NRC as an Inspector Follow-up Item (IFI) and would be reviewed during upcoming inspections (IFI 50-288/2012-201-04).

c. Conclusion

Reactor operations and logs were acceptable. Two NCVs and one IFI were identified.

4. Operator Licenses, Requalification, and Medical Activities

a. Inspection Scope (IP 69001)

The inspector reviewed selected portions of the following regarding the RRR 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 2011 and 2012 for selected operators
- RRR Facility Requalification Plan, dated July 2009
- NRC Form 396, "Certification of Medical Examination – by Facility Licensee"
- RRR Facility Requalification Meeting Agenda and Attendance Sheets for September 2011 through November 2012
- "Requalification Hours and Reactivity Manipulation" Sheets documenting reactivity manipulations for 2010 through the present for selected operators
- RRR Administrative Procedures, Section 9, "Record Retention," latest revision dated January 2012
- 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 May 13, 2011

b. Observations and Findings

There are currently 20 qualified SROs and 18 qualified ROs at the RRR facility. The inspector reviewed selected operators' licenses and noted that they were current.

The inspector reviewed the requalification program for July 2010 through June 2011 and for July 2011 through June 2012, as well as the annual drill scenarios and attendance sheets. It was 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 tasks performed, were documented. The inspector also reviewed the Requalification Meeting Agenda and Attendance Sheets for the period from September 2011 through November 2012. The inspector reviewed various individual operators' requalification records as well.

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 indicated that operators were completing the required activities, including reactivity manipulations and number of operating hours. Records indicated that annual operations tests and supervisory observations were being completed. Biennial written examinations were also 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 biennially 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 4.1, the inspector reviewed selected aspects of:

- Maintenance Logbook No. VI
- Fuel Element Inspection Cards
- Main (Reactor Console) Log Nos. 76 – 81
- Fuel element information contained in the licensee's computer database
- RRR Administrative Procedure Section 6, "Fuel and Special Nuclear Material," latest revision dated January 2012
- RRR SOP 35, "Fuel and Core," latest revision dated April 20, 2012
- RRR SOP 35, Appendix A, "Core Diagram," latest revision dated January 11, 2011
- RRR SOP 35, Appendix B, "Fuel Handling Checklist," latest revision dated March 11, 2011
- RRR SOP 35, Appendix C, "Fuel Handling SRO Qualification," latest revision dated March 28, 2009
- RRR SOP 35, Appendix D, "Fuel Handling Receipt Form," latest revision dated January 11, 2011

b. Observations and Findings

Through review of the main logs and interviews with licensee personnel, 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 what locations.

Also through records review, it was noted that the reactor fuel was being inspected upon initial receipt and forty percent of the fuel elements in the core were being inspected biennially as required by TS 4.1. The last biennial fuel inspection was completed during January 9–11, 2012. The inspector verified that all fuel elements were inspected at least once every 5 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 4.1.

6. Maintenance and Surveillance

a. Inspection Scope (IP 69001)

To verify that operations, surveillance activities, and calibrations were being completed as required by the TS, the inspector reviewed selected portions of:

- Maintenance Logbook No. VI
- Main (Reactor Console) Log Nos. 76 – 81
- Associated surveillance and calibration data and records for 2011-2012
- RRR SOP 23, “Weekly Checklist,” latest revision dated April 12, 2012
- RRR SOP 23, Appendix A, “Weekly Checklist Form,” latest revision dated April 12, 2012
- RRR SOP 24, “Bimonthly Checklist,” latest revision dated November 28, 2012
- RRR SOP 24, Appendix A, “Bimonthly Checklist Form,” latest revision dated November 28, 2012
- RRR SOP 25, “Semiannual Checklist,” latest revision dated April 20, 2012
- RRR SOP 25, Appendix A, “Reed Research Reactor Semiannual Checklist,” latest revision dated April 20, 2012
- RRR SOP 26, “Annual Checklist,” latest revision dated January 7, 2012
- RRR SOP 26, Appendix A, “Annual Checklist Form,” latest revision dated January 7, 2012
- RRR SOP 34, “Control Rods,” latest revision dated April 12, 2012
- RRR SOP 34, Appendix A, “Control Rod Calibration Form,” latest revision dated April 12, 2012

- 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 Annual Report for the period from July 1, 2010, through June 30, 2011, submitted to the NRC on August 1, 2011
- RRR Annual Report for the period from July 1, 2011, through June 30, 2012, submitted to the NRC on August 7, 2012

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 within 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 appeared to be complete and were being maintained as required.

The inspector observed a Startup Checklist performed during the inspection. A portion of the checklist was completed in the control room and the other portion in the reactor bay. The required checks were conducted and the data was documented. Previously completed Startup and Shutdown Checklists were also reviewed. These activities appeared to have been 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 6.4, 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 January 2012

- RRR Administrative Procedures, Section 9, “Record Retention,” latest revision dated January 2012
- RRR SOP 60, “Logbook Entries,” latest revision dated April 14, 2010
- RRR SOP 61, “Procedure Writing and Use,” latest revision dated October 6, 2011
- RRR SOP 61, Appendix A, “Document Structure,” latest revision dated October 6, 2011
- RRR SOP 61, Appendix B, “Document Locations,” latest revision dated October 6, 2011
- RRR SOP 61, Appendix C, “Temporary Procedure Change,” latest revision dated April 7, 2010

b. Observations and Findings

Procedures were in effect for those activities specified in TS 6.4 as required. 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. Substantive changes to procedures were being reviewed and approved by the ROC. The procedures were being audited and reviewed annually or biennially as required and updated as needed.

The inspector reviewed the temporary procedure changes that had been promulgated during 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 incorporated into the procedures if deemed appropriate.

As noted previously, the inspector observed various activities during this inspection, including reactor startup and operation. It was noted that these activities were generally completed in accordance with the applicable procedures. However, as noted in Section 3 of this inspection report, some deficiencies associated with procedural compliance were identified.

c. Conclusion

Facility procedures and document reviews satisfied TS 6.4 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 3.6, 4.6, and 6.5, the inspector reviewed selected portions of:

- Experiment review and approval by the ROC

- Selected Irradiation Request Forms for 2011 and 2012
- Approved RRR Routine Experiments (RE), including:
  - RE 1, “Irradiation with Neutrons,” latest approval dated May 16, 2011
  - RE 2, “Irradiation with Gammas,” latest approval dated January 1, 2010
  - RE 3, “Fuel, Graphite, or Source Material,” latest approval dated January 1, 2010
  - RE 4, “Reactor Power Measurement,” latest approval dated January 1, 2010
  - RE 5, “Control Rod Worth Measurement,” latest approval dated January 1, 2010
  - RE 6, “Pool Parameter Measurement,” latest approval dated January 1, 2010
  - RE 7, “Fuel Loading,” latest approval dated March 8, 2012
  - RE 8, “Cerenkov Radiation Spectrum Acquisition,” reviewed by the ROC but yet to be approved pending some modifications
- Approved RRR SEs, including:
  - SE 1, “Fuel Loading,” latest approval dated March 10, 2012
  - SE 2, “Rod Calibration,” latest approval dated August 1, 2011
  - SE 3, “Subcritical Multiplication,” not yet approved
  - SE 4, “Core Temperature Measurements,” latest approval dated October 18, 2012
- RRR Administrative Procedures, Section 4, “Reactor Experiments,” latest revision dated January 2012
- RRR Administrative Procedures, Section 9, “Record Retention,” latest revision dated January 2012
- RRR SOP 10, “Irradiation Preparation,” latest revision dated October 20, 2011
- RRR SOP 10, Appendix A, “Irradiation Request Form,” latest revision dated September 21, 2011
- RRR SOP 10, Appendix B, “Rabbit Irradiation Request Form,” latest revision dated September 21, 2011
- RRR SOP 10, Appendix C, “Gamma Irradiation Request Form,” latest revision dated September 21, 2011
- RRR SOP 10, Appendix D, “Irradiation Request Log,” latest revision dated July 16, 2010
- RRR SOP 11, “Irradiation Analysis,” latest revision dated October 20, 2011
- RRR SOP 12, “Lazy Susan,” latest revision dated September 21, 2011
- RRR SOP 13, “Rabbit,” latest revision dated January 11, 2011
- 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 September 21, 2011

- RRR SOP 15, “Beam,” latest revision dated September 24, 2011
- RRR SOP 15, Appendix A, “Beam IR Form,” latest revision dated September 24, 2011
- RRR SOP 16, “Near Core,” latest revision dated October 6, 2011
- RRR SOP 17, “Gamma Irradiations,” latest revision dated July 16, 2010

b. Observations and Findings

The inspector noted that the various experiments conducted at the facility were being reviewed and approved as required. It was also noted that several SEs had recently been proposed by licensee staff and students. Some of the SEs had been reviewed and approved by the ROC while others were still under development.

Through a review of console logs and various irradiation request forms, 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 TS 3.6, 4.6, and 6.5 and other regulatory requirements.

9. Emergency Preparedness

a. Inspection Scope (IP 69001)

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

- Emergency response training records for the past 2 years
- Emergency drills and exercises held during 2011 and 2012
- Emergency response facilities, supplies, equipment and instrumentation
- RRR SOP 25, “Semiannual Checklist,” latest revision dated April 20, 2012
- RRR Facility E-Plan last revised November 2010
- RRR SOP 25, Appendix A, “Reed Research Reactor Semiannual Checklist,” latest revision dated April 20, 2012
- RRR E-Plan, Appendix A, listing the most recent Agreement Letters with off-site support organizations including:
  - American Medical Response (AMR), 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, no letter for 2009; previous letter dated February 7, 2007
  - Oregon Department of Energy, letter dated April 14, 2009

- RRR E-Plan, Appendix B, Emergency Implementation Procedures (EIPs), dated November 17, 2011

b. Observations and Findings

The E-Plan in use at the reactor was the same as the version most recently submitted to the NRC. The E-Plan and EIPs 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 Bureau, AMR Ambulance Service, and the Oregon Department of Energy. These agreements with the various emergency support organizations were being maintained and were last updated in 2009. It was noted that Legacy Health Systems management did not sign an Agreement Letter with the licensee for 2009. They did, however, verbally agree to treat victims of an emergency from the RRR facility. Communications capabilities were acceptable and had been tested and emergency information updated as stipulated in the E-Plan. It was noted that the Emergency Notification Call List, posted in various locations throughout the facility, was current and had last been updated on September 12, 2012.

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 exercises and to develop possible solutions to any problems identified. The results of these critiques were documented and reported to the RSC/ROC. Emergency preparedness and response training for off-site and reactor staff personnel was being conducted annually and documented as stipulated by the E-Plan.

A visit to the hospital identified in the E-Plan was not possible during this inspection due to schedule conflicts. However, the inspector was able to meet with the Director of Health and Counseling from the Reed College Health Center. The role of the Health Center during an emergency situation was discussed. Although the Health Center would normally not be involved in emergency response, they were prepared and willing to provide any assistance required. It was noted that one of the physicians at the Health Center performs the physical examinations of students who are licensed operators at the RRR. The inspector was able to verify that Health Center personnel were aware of, and followed, the guidance outlined in ANSI Standard 15.4.

c. Conclusion

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

10. Exit Interview

The inspection scope and results were summarized on December 6, 2012, with the Facility Director, the Radiation Safety Officer, and the Dean of Faculty. 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

M. Carlson	Reactor Supervisor
K. Conahan	Training Supervisor
K. Fisher	Radiation Safety Officer and Campus Environmental Director
I. Flower	Requalification Supervisor
M. Krahenbuhl	Director, Reed Reactor Facility
R. Lazarus	Associate Director, Reactor Facility
P. McDougal	Dean of Faculty

Other Personnel

K. Smith	Director, Health and Counseling, Reed College Health Center

INSPECTION PROCEDURE USED

IP 69001 Class II Non-Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-288/2012-201-01	VIO	Failure to conduct a 10 CFR 50.59 evaluation prior to the reconfiguration of the reactor core.
50-288/2012-201-02	NCV	Failure to remove the key from the console contrary to the requirements of 10 CFR 50.54(k).
50-288/2012-201-03	NCV	Operating the reactor without the logarithmic power channel being operable as required by TS 3.2.2.
50-288/2012-201-04	IFI	Follow-up on the issue of ensuring that the proper documentation, i.e., completion of the Shutdown Checklist, is completed as required by licensee procedures.

Closed

50-288/2012-201-02	NCV	Failure to remove the key from the console contrary to the requirements of 10 CFR 50.54(k).
50-288/2012-201-03	NCV	Operating the reactor without the logarithmic power channel being operable as required by TS 3.2.2.

LIST OF ACRONYMS USED

10 CFR	Title 10 of the *Code of Federal Regulations*
ADAMS	Agencywide Documents Access and Management System
AMR	American Medical Response
CAR	Corrective Action Report

E-Plan	Emergency Plan
EIP	Emergency Implementation Procedures
IFI	Inspector Follow-up Item
IP	Inspection Procedure
NCV	Non-Cited Violation
No.	Number
NRC	U.S. Nuclear Regulatory Commission
RE	Routine Experiment
RO	Reactor operator
ROC	Reactor Operations Committee
RRC	Reactor Review Committee
RRR	Reed Research Reactor
RSC	Radiation Safety Committee
SE	Special Experiment
SOP	Standard Operating Procedure
SRO	Senior reactor operator
SSC	Structure, system, or component
TS	Technical Specifications