

January 14, 2014

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.  
50-288/2013-201 AND NOTICE OF VIOLATION

Dear Dr. Krahenbuhl:

This refers to the inspection conducted from December 16–19, 2013, at your Reed Research Reactor facility (Inspection Report No. 50-288/2013-201). The enclosed report documents the inspection results which were discussed with Dr. Nigel Nicholson, Dean of the Faculty; Kathleen Fisher, Radiation Safety Officer and Campus Environmental Director; Brian Fairchild, Reactor Operations Manager; and you on December 19, 2013.

During this inspection, the U.S. Nuclear Regulatory Commission (NRC) staff examined activities conducted under your license as they relate to public health and safety to confirm compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

Based on the results of this inspection, the NRC has determined that a Severity Level IV violation of NRC requirements occurred. This 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 is repetitive as a result of inadequate corrective actions. A similar violation occurred on February 6, 2012, and corrective actions for that violation were inadequate to prevent recurrence.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with Title 10 of the *Code of Federal Regulations* Section 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response will be available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System, accessible from the NRC

Dr. Krahenbuhl

- 2 -

Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room). To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the Public without redaction.

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

Enclosure:  
NRC Inspection Report 50-288/2013-201

cc w/encl.: Please see next page

Reed College Docket No. 50-288

cc:

Mayor of the City of Portland  
1220 Southwest 5<sup>th</sup> Avenue  
Portland, OR 97204

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

Reed College  
ATTN: 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

Dr. Krahenbuhl

- 2 -

Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room). To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the Public without redaction.

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

Enclosure:  
NRC Inspection Report 50-288/2013-201

cc w/encl.: Please see next page

**DISTRIBUTION:**

PUBLIC	PRTB r/f	RidsNrrDprPrta	RidsNrrDprPrtb
AAdams	PBlechman	GWertz	MCompton (Lt only)

**ACCESSION NO.: ML13361A183** \* concurred via e-mail **NRC-002**

OFFICE	NRR/DPR/PROB*	NRR/DPR/PROB
NAME	CBassett	GBowman
DATE	1/6/2014	1/14/2014

**OFFICIAL RECORD COPY**

## NOTICE OF VIOLATION

Reed College  
Reed Research Reactor

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

During an NRC inspection conducted from December 16–19, 2013, 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 50.54(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.

Technical Specification (TS) Section 6.1.3 requires, in part, that the minimum staffing when the reactor is operating shall be a licensed reactor operator in the control room.

TS Section 1 defines the reactor as operating whenever it is not shut down or secured.

Contrary to the above requirements, on November 16, 2013, a licensed operator or senior operator was not present in the control room when the reactor was in operation. Specifically, the on-shift reactor operator and senior reactor operator left the control room while the reactor key was still in the console, leaving the control room unattended with the reactor in an unsecured and, therefore, an operating condition.

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; and (4) the date when full compliance will be achieved. Your response may reference or include previous 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 NRC's document system, accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, 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. 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 14th day of January 2014.

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

Docket No: 50-288

License No: R-112

Report No: 50-288/2013-201

Licensee: Reed College

Facility: Reed Research Reactor

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

Dates: December 16–19, 2013

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  
TRIGA Mark-I Research Reactor  
Report No: 50-288/2013-201

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the Reed College (the licensee's) Class II 250 kilowatt research reactor safety program including: (1) organization and staffing, (2) review and audit and design change functions, (3) radiation protection, (4) effluent and environmental monitoring, (5) procedures, and (6) transportation of radioactive material since the last U.S. Nuclear Regulatory Commission (NRC) inspection of these areas. The licensee's program was acceptably directed toward the protection of public health and safety and was generally in compliance with NRC requirements. One Severity Level IV violation was identified.

### Organizational Structure and Staffing

- Facility organization and staffing were in compliance with the requirements specified in Section 6.1 of the Technical Specifications.

### Review and Audit and Design Change Functions

- Reviews and audits were being conducted by the Reactor Operations Committee in compliance with the requirements specified in the Technical Specifications.
- Proposed changes at the facility had been analyzed using Title 10 of the *Code of Federal Regulations* Section 50.59 safety evaluation process.

### Radiation Protection Program

- Signs, notices, and postings met the regulatory requirements.
- Personnel dosimetry was being worn as required and doses were well within the licensee's procedural action levels and NRC's regulatory limits.
- Surveys were completed and documented acceptably to permit evaluation of the radiation hazards present.
- Radiation survey and monitoring equipment was being maintained and calibrated acceptably.
- Radiation protection training was acceptable and was being conducted as required.
- The Radiation Protection and the As Low As Reasonably Achievable Programs satisfied regulatory requirements.

#### Environmental Monitoring Program

- Effluent monitoring satisfied licensee procedural and regulatory requirements and releases were calculated to be within the specified regulatory limits.

#### Procedures

- Facility procedures were acceptably reviewed, approved, and implemented.

#### Transportation of Radioactive Materials

- The program for shipping radioactive material satisfied regulatory requirements.

#### Follow-up on a Violation

- One Severity Level IV violation was identified for the failure to have an operator in the control room while the reactor was not secured, as required.

## REPORT DETAILS

### **Summary of Plant Status**

Reed College's (the licensee's) Class II 250 kilowatt TRIGA Mark-I research reactor continued to be operated in support of undergraduate instruction, laboratory experiments, reactor operator training, and various types of research. During the inspection, the reactor was operated as needed for laboratory experiments and training.

### **1. Organizational Structure and Staffing**

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

To verify organization and staffing requirements specified in Technical Specifications (TS) Section 6.1, dated April 25, 2012, were being met, the inspector reviewed selected aspects of:

- Current facility organization and staffing
- Management responsibilities as outlined in the applicable procedures
- Reed Research Reactor (RRR) Administrative Procedures, dated May 2012
- RRR Annual Report for the period from July 1, 2011, through June 30, 2012, submitted on August 7, 2012
- RRR Annual Report for the period from July 1, 2012 through June 30, 2013, submitted August 7, 2013

#### b. Observations and Findings

The organizational structure had not changed since the last NRC inspection, which occurred in December 2012 (Inspection Report No. 50-288/2012-201). The current Reactor Director remained in that position. A new individual had been hired to fill the position of Reactor Operations Manager.

The radiation protection duties at the facility were completed by various individuals, including the Reactor Operations Manager and students who were also Reed College part-time employees. These individuals conducted surveys, completed instrument calibrations, and handled and counted samples. These activities were reviewed and approved by the Facility Director and the Radiation Safety Officer.

The organizational structure and staffing at the facility were as required by the TS. Review of records verified that management and staff responsibilities were carried out as required by the TS and applicable procedures.

#### c. Conclusion

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

## 2. Design Change and Review and Audit Functions

### a. Inspection Scope (IP 69001)

In order to ensure that the audits and reviews required by TS Section 6.2 were being completed, and to verify that any modifications to the facility were consistent with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59, the inspector reviewed the following:

- Corrective action reports for 2012 and to date in 2013
- Recent changes reviewed using the licensee's RRR 10 CFR 50.59 screen forms
- Minutes of the meetings held by the Reactor Operations Committee (ROC) from November 2011 to the present
- Safety review and audit records for 2011–2012 and 2012–2013 as documented on RRR standard audit forms
- RRR Administrative Procedures, dated May 2012
- RRR Standard Operating Procedure (SOP) 60, "Logbook Entries," dated April 14, 2010
- RRR SOP 62, "Changes, Tests, and Experiments," dated May 27, 2010
- RRR SOP 69, "Corrective Action Report," dated August 5, 2010
- RRR Annual Report for the period from July 1, 2011, through June 30, 2012, submitted on August 7, 2012
- RRR Annual Report for the period from July 1, 2012 through June 30, 2013, submitted August 7, 2013

### b. Observations and Findings

#### (1) Review and Audit Functions

The inspector reviewed the ROC meeting minutes from November 2011 to the present. These meeting minutes showed that the committees met as required by the TS with a quorum being present. Records showed that the safety reviews and audits conducted by the committee or designated individuals were completed at the TS-required frequency. Topics of these reviews were also consistent with TS requirements and provided guidance, direction, and oversight of the reactor.

The inspector noted that the safety reviews and audits that had been completed, as well as the associated findings, were acceptably detailed and that the licensee responded and took corrective actions as needed. The inspector also reviewed the corrective action log. Various recommendations had been discussed and reviewed and a solution to each had been determined and subsequently implemented as needed.

#### (2) Design Change

Through review of the ROC meeting minutes, and through interviews with licensee personnel, the inspector determined that no major changes had

been initiated and/or completed at the facility since the last NRC inspection. Nine 10 CFR 50.59 screens were completed in 2012 and three have been completed to date in 2013. It was also noted that, as a result of the screens being conducted, no evaluations were required to be completed in 2012 and none were required as of the date of the inspection in 2013. Because the licensee determined that the changes were minor in nature, they had been reviewed and approved by the Facility Director, but were not required to be approved by the ROC.

c. Conclusion

Review, audit, and oversight functions required by TS Section 6.2 were acceptably completed by the ROC. Proposed changes at the facility had been analyzed using the 10 CFR 50.59 review process as required.

**3. Radiation Protection Program**

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Parts 19 and 20, and TS Sections 3.5 and 4.5:

- Radiological signs and posting
- Radiation work permit notebook
- ROC Audits for 2011–2012 and 2012–2013
- Personnel dosimetry records for 2011, 2012, and to date in 2013
- Daily reactor startup and shutdown checklists for the past 12 months
- Routine surveys and monitoring records for 2012 and 2013, including weekly checklists, biweekly wipes, and bimonthly checklists
- Records of maintenance and calibration of radiation survey and monitoring instruments
- Reed Reactor Facility Radiation Protection Plan, dated August 2006
- As Low As Reasonably Achievable (ALARA) Program, as described in the Radioactive Materials Policy and Procedures Manual, dated April 2013
- RRR Administrative Procedures, dated May 2012
- Various RRR SOPs
- “Radioactive Materials Handling Study Guide,” dated July 2004
- “Reed College Radioactive Materials Policy and Procedures Manual,” dated April 2013
- Reed Research Reactor Radiation Protection Program Annual Review 2012–2013
- RRR Annual Report for the period from July 1, 2011, through June 30, 2012, submitted on August 7, 2012
- RRR Annual Report for the period from July 1, 2012 through June 30, 2013, submitted August 7, 2013

The inspector also observed the use of dosimetry and radiation monitoring equipment during tours of the facility.

b. Observations and Findings

(1) Postings and Notices

Copies of current notices to workers were posted inside the reactor control room at RRR. Radiological signs were typically posted at the entrances to controlled areas as well. The posted copies of NRC Form 3, "Notice to Employees," observed at the facility were the latest issue, as required by 10 CFR Part 19.11, and were posted in the reactor bay, and in the laboratory room.

Caution signs, postings, and controls for radiation areas were as required in 10 CFR Part 20, Subpart J. The inspector verified that licensee personnel observed the precautions for access to radiation areas.

(2) Dosimetry

The inspector determined that the licensee used optically stimulated luminescent (OSL) dosimeters for whole body monitoring of beta and gamma radiation exposure. The licensee also used thermoluminescent dosimeter (TLD) finger rings for monitoring beta and gamma radiation exposure of the extremities. The dosimetry was supplied and processed by a National Voluntary Laboratory Accreditation Program accredited vendor. An examination of the OSL and TLD results indicating radiological exposures at the facility for the past two years showed that the highest occupational doses, as well as doses to the public, were well within 10 CFR Part 20 limitations.

Through direct observation the inspector determined that dosimetry was acceptably used by facility personnel and exit frisking practices were in accordance with facility radiation protection requirements.

(3) Surveys

Selected daily, weekly, and biweekly radiation and/or contamination surveys were reviewed by the inspector. The surveys had been completed by staff members as required. Any contamination detected in concentrations above the established action level was noted and the area was decontaminated. Results of the surveys were documented so that licensee personnel would be knowledgeable of the radiological conditions that existed in the various areas of the facility.

(4) Radiation Monitoring Equipment

Examination of selected radiation monitoring equipment indicated that the instruments had an acceptable up-to-date calibration sticker attached.

The instrument calibration records indicated that the calibration of portable survey meters was typically completed by reactor staff personnel and/or the Reactor Health Physicist (RHP). Calibration frequency met procedural requirements and records were maintained as required. Fixed location radiation area monitors and stack monitors were also being calibrated as required. These monitors were also typically calibrated by reactor staff personnel and/or the RHP.

The inspector compared selected calibration records with reactor operations logs and startup and shutdown checklists for the past 18 months. The daily startup checklists typically contained a listing of portable monitors that were available during reactor operations. The inspector determined that the instruments that were available and ready for use in the reactor bay had been calibrated as required.

During the inspection it was noted that the air particulate monitor, which had not been operational for over a year, had been repaired, calibrated, and placed back in service. It was also noted that a problem with a kinked tygon tubing line which led to the constant air monitor had been corrected through replacement of the tygon tubing with semi-rigid nylon tubing designed to handle increased air pressure and resist collapsing.

(5) Radiation Protection and ALARA Programs

The licensee's radiation protection and ALARA programs were established and described in the Reed College Radioactive Materials Policy and Procedures Manual, dated April 2013, and through associated SOPs that had been properly reviewed and approved. The programs contained instructions concerning organization, training, monitoring, personnel responsibilities, audits, record keeping, and reports. The ALARA program provided guidance for keeping doses as low as reasonably achievable and was consistent with the requirements in 10 CFR Part 20. These programs, as established, appeared to be acceptable.

The inspector determined that the licensee continued to complete annual reviews of the radiation protection program as required by 10 CFR 20.1101(c).

The licensee did not require or use a respiratory protection program or planned special exposure program.

(6) Radiation Work Permits (RWPs)

The inspector reviewed the RWP program that had been established as stipulated in RRR SOP 53. It was noted that no RWPs had been issued in 2012 or as of the date of the inspection in 2013. The controls specified in previously issued RWPs were generally acceptable and applicable for

the types of work being done. Those RWPs had been initiated, reviewed, and approved as indicated on the forms.

(7) Radiation Protection Training

The inspector reviewed the radiation worker training given to RRR staff members and Reed faculty, to student operators and other students who worked at the facility, and to other personnel such as maintenance workers. Each group received different training that was based upon their duties and activities. Refresher training was conducted every three years. The training program appeared to be acceptable.

The licensee indicated that radiation worker training for reactor staff members was given upon initial entry into the RRR program and then reiterated during operator requalification training. Training records showed that personnel were acceptably trained in radiation protection practices.

(8) Facility Tours and Inspector Observations

The inspector toured the control room, the reactor bay, the mechanical room, the laboratory room, and the counting room at the facility. Control of radioactive material was acceptable, as was control of access to radiation areas.

During the inspection the inspector also visited the calibration range at the facility and discussed the calibration of survey meters with the RHP. It was noted that the range had been reconfigured so that the radiation beam produced by the calibration source was directed at a rear wall. This was an appropriate application of the ALARA principle. The inspector concluded that the calibrations of instruments at the facility were completed using the appropriate techniques and according to procedure. Proper precautions were in place.

(9) Radiation Safety Committee (RSC) Meeting Observations

The inspector had the opportunity to attend and observe a Reed College RSC meeting. It was noted that the appropriate subjects were addressed.

c. Conclusion

The inspector determined that the Radiation Protection and ALARA Programs, as implemented by the licensee, satisfied regulatory requirements because: (1) postings met regulatory requirements, (2) personnel dosimetry was being worn as required and recorded doses were well within the NRC's regulatory limits, (3) surveys and associated checks were completed and documented acceptably to permit evaluation of the radiation hazards present, (4) radiation

survey and monitoring equipment was being maintained and calibrated as required, and (5) the radiation protection training program was acceptable.

#### 4. Environmental Monitoring Program

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

The inspector reviewed the following to verify compliance with the requirements of 10 CFR Part 20 and TS Sections 3.5 and 4.5:

- ROC Audits for 2011–2012 and 2012–2013
- Environmental counting and analysis records
- Routine surveys and monitoring records for 2012 and 2013
- Release calculation records
- RRR Administrative Procedures, dated May 2012
- RRR SOP 52, “Environmental Sampling,” dated June 13, 2013
- Various other RRR SOPs
- RRR Annual Report for the period from July 1, 2011, through June 30, 2012, submitted on August 7, 2012
- RRR Annual Report for the period from July 1, 2012 through June 30, 2013, submitted August 7, 2013

##### b. Observation and Findings

Environmental soil and water samples were collected, prepared, and analyzed generally every two months consistent with procedural requirements. Only naturally occurring radionuclides were detected in the soil samples and no tritium or carbon-14 were detected in the water samples during 2012 and to date in 2013.

Radiation monitoring inside the reactor bay and outside the facility was completed using TLDs placed in accordance with the applicable procedures. The results were reported in the Annual Report as required. No doses above regulatory limits were noted.

The licensee calculated the airborne activity released to the environment using data from the continuous air monitor sampling. Licensee records and calculations indicated that the air emissions of radioactive material to the environment were well below the 10 millirem constraint specified in 10 CFR 20.1101(d). The inspector found no new potential release paths following observation of the facility.

The program for the monitoring, storage, or transferring of radioactive liquid, gases, and solids was consistent with applicable regulatory requirements. The principles of ALARA were acceptably implemented to minimize radioactive releases. Records were current and acceptably maintained and indicated that no radioactive liquid had been released from the reactor facility during 2012 or as of the date of the inspection in 2013. Monitoring equipment was acceptably maintained and calibrated as noted previously.

c. Conclusion

Effluent monitoring satisfied procedural and regulatory requirements and releases were calculated to be within the specified regulatory and TS limits.

**5. Procedures**

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to verify compliance with TS Section 6.4:

- Selected facility procedures
- Procedural implementation and compliance
- Recent minor and substantive procedural changes
- ROC and RSC meeting minutes for November 2011 through the present
- Administrative controls specified in RRR Administrative Procedures, dated May 2012
- RRR SOP 61, "Procedure Writing and Use," dated October 6, 2011

b. Observations and Findings

The inspector noted that facility procedures were no longer being reviewed biennially by the ROC; that requirement had been removed from the updated TS. The Facility Director indicated that all procedures are reviewed annually by the Director and the Reactor Operations Manager. Administrative control of changes to procedures, and the associated review and approval process, were as stipulated by RRR SOP 61. Substantive changes to procedures were required to be reviewed and approved by the ROC. The inspector verified that this was being done.

Training of personnel on procedures and changes was acceptable. Through discussions with licensee personnel, the inspector verified that operations and radiological surveys were conducted in accordance with applicable procedures. Observation and review also showed that procedures for instrument calibration, reactor operation, maintenance, and emergency conditions were available as required.

c. Conclusion

Facility procedures were acceptably reviewed, approved, and implemented.

## 6. Transportation

### a. Inspection Scope (IP 86740)

To verify compliance with 10 CFR 71.5 and procedural requirements for the transfer or shipment of licensed radioactive material, the inspector reviewed the following:

- Records of radioactive material shipments completed for 2012 and to date in 2013, including completed NRC Form 540, "Uniform Low Level Radioactive Waste Manifest," Rev. 08-06, completed July 25, 2012
- RRR Administrative Procedures, dated May 2012
- RRR SOP 54, "Waste Handling and Disposal," dated June 13, 2013
- RRR SOP 67, "Shipping Radioactive Material," dated October 6, 2009
- RRR Annual Report for the period from July 1, 2011, through June 30, 2012, submitted on August 7, 2012
- RRR Annual Report for the period from July 1, 2012 through June 30, 2013, submitted August 7, 2013

### b. Observations and Findings

Through records reviews and discussions with licensee personnel, the inspector determined that the licensee had completed one shipment of licensed material since the last inspection of transportation in December 2011. The shipment consisted of one drum of solid radioactive waste. The necessary forms containing the appropriate information were completed as required. Appropriate procedures were in place for shipping various types of radioactive material.

The inspector noted verified that the licensee individual who was designated as a "shipper" had completed the appropriate training to become qualified to ship radioactive material.

### c. Conclusion

The program for shipping radioactive material satisfied regulatory requirements.

## 7. Follow-Up on Technical Specification Violation

### a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following related to a licensee report describing a condition contrary to the requirements of 10 CFR 50.54(k) and TS 6.1.3.

- Corrective Action Report 13-01, "Key Left in Console," initiated November 18, 2013
- Control room reactor console logbook for the period from May 21–November 21, 2013
- Letter from Reed College to the NRC concerning the event, submitted

November 25, 2013

b. Observations and Findings

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 6.1.3 requires, in part, that the minimum staffing when the reactor is operating shall be a licensed reactor operator in the control room.

TS Section 1 defines the reactor as operating whenever it is not shut down or secured.

At approximately 11:00 a.m. (PST), on November 16, 2013, a reactor operator and a senior reactor operator, along with one other individual, were operating the reactor to complete a core excess determination. After the completion of a standard core excess, all rods were driven in to shut down the reactor. Subsequently, the control room was locked and the three individuals left. However, the reactor key was inadvertently left in the console and no "key out and secured" log entry was made in the console logbook. At approximately 12:11 p.m., on the same day, the Operations Supervisor entered the control room and noted that the key was in the console, contrary to 10 CFR 50.54(k) and TS Section 6.1.3.

The licensee investigated the event. It was determined that the key had apparently been left in the console due to an oversight by the operators (they were distracted by cleaning activities in the control room), and that this condition had existed for approximately 71 minutes before being discovered. The control room was locked the entire time and no one accessed that area until the Operations Supervisor arrived. The Director and Reactor Operations Manager also evaluated the problem to determine whether or not it was reportable and determined that it was a violation of the TS, as well as a violation of 10 CFR 50.54(k). In accordance with TS Section 6.7.2(a), at 4:25 p.m. (EST) on November 18, 2013, the licensee notified the NRC Headquarters Operations Center.

The licensee took a number of corrective actions in response to the violation. A sign was immediately placed in the control room to remind people to take the key out following reactor shut down and prior to leaving the control room. The operators who left the key in the console were given additional training by the Facility Director before being allowed to operate the reactor again. During the week of the inspection, the licensee was still considering whether additional administrative or engineering controls could be developed to prevent recurrence of the problem.

The inspector reviewed the event. It was noted that the licensee identified the problem, evaluated the cause, and took some corrective actions. The NRC was notified as well. The inspector verified that the corrective actions initiated to date

had been completed by the licensee. However, the inspector noted that a similar problem had occurred in 2012. Corrective actions from the previous violation had focused on training for the operators at the facility at the time, but were not sufficient to prevent recurrence of the issue. As such, the inspector concluded that this problem was repetitive as a result of inadequate corrective actions from the previous violation, and that this issue should be treated as a cited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy.

The licensee was informed that failure to have a licensed operator in the control room when the key had not been removed from the console was a violation of the requirements of 10 CFR 50.54(k) and TS Section 6.1.3, and that this issue represented a Severity Level IV violation (VIO 50-288/2013-201-01).

c. Conclusions

One violation was identified for not having an operator in the control room while the reactor was not secured as required.

**8. Follow-Up on Previously-Identified Item**

a. Inspection Scope

The inspector reviewed the licensee's actions taken in response to a previously-identified inspector follow-up item (IFI).

b. Observation and Findings

IFI 50-288/2011-203-01 (Closed) - Review the results of the elimination of the facility RHP position, the completion of the RHP duties by staff members and/or students, and the completion of an annual audit of the Radiation Protection Program by someone from outside the facility, such as a certified health physicist (CHP).

Prior to 2011, the radiation protection duties at the facility were completed by various individuals who were Reed College part-time employees. They filled the position at the RRR facility designated as the RHP. Recently, after discussions among Reed College management and staff, it was decided that the RHP position was not needed and that the College would be better served by having staff members and/or students complete the radiation protection duties at the RRR facility. Because the facility TS still required that there be an RHP on various committees, the Reactor Director was assigned as the interim RHP. Reed College management also decided that a CHP would be retained once each year to conduct an audit of the campus radiation protection program. It was noted that the campus Environmental Director continued to fill both that position and the position of Radiation Safety Officer for the campus. The licensee was informed that the elimination of the facility RHP position, the completion of the RHP duties by staff members and/or students, and the completion of an annual audit of the radiation protection program by someone from outside the facility, such as a CHP, would be reviewed during a subsequent inspection.

During this inspection the inspector reviewed this issue with the licensee. It was noted that, since the time of the previous inspection, the TS had been revised and the position of RHP was eliminated. As noted above, the radiation protection duties at the facility are now completed by various individuals, including the Reactor Operations Manager and students who were also Reed College part-time employees. These activities were reviewed and approved by the Facility Director and the Radiation Safety Officer and were being completed consistent with regulatory requirements. This IFI is considered closed.

c. Conclusion

One IFI identified during a previous inspection was reviewed during this inspection was closed.

**9. Exit Interview**

The inspection scope and results were summarized on December 19, 2013, with members of licensee management. The inspector described the areas inspected and discussed in detail the inspection findings. No proprietary material was reviewed by the inspector during the inspection.

## **PARTIAL LIST OF PERSONS CONTACTED**

### **Licensee Personnel**

C. Barrett	Reactor Operations Supervisor
K. Fisher	Radiation Safety Officer and Campus Environmental Director
M. Krahenbuhl	Director, Reed Reactor Facility
B. Fairchild	Reactor Operations Manager
N. Nicholson	Dean of the Faculty, Reed College

## **INSPECTION PROCEDURES USED**

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

## **ITEMS OPENED, CLOSED, AND DISCUSSED**

### **Opened**

50-288/2013-201-01	VIO	Failure to have a licensed operator in the Control Room when the key had not been removed from the console was a violation of the requirements of 10 CFR 50.54(k) and TS Section 6.1.3
--------------------	-----	--

### **Closed**

50-288/2011-203-01	IFI	Review the results of the elimination of the facility RHP position, the completion of the RHP duties by staff members and/or students, and the completion of an annual audit of the Radiation Protection Program by someone from outside the facility.
--------------------	-----	--

## **LIST OF ACRONYMS USED**

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ALARA	As Low As Reasonably Achievable
CHP	Certified Health Physicist
IFI	Inspector Follow-Up Item
IP	Inspection Procedure
NRC	U.S. Nuclear Regulatory Commission
OSL	Optically-Stimulated Luminescent (dosimeter)
RHP	Reactor Health Physicist
ROC	Reactor Operations Committee
RRR	Reed Research Reactor
RSC	Radiation Safety Committee
RWP	Radiation Work Permit
SOP	Standard Operating Procedure
TLD	Thermoluminescent Dosimeter
TS	Technical Specification