

January 16, 2003

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

SUBJECT: NRC INSPECTION REPORT NO. 50-288/2002-201

Dear Mr. Frantz:

This letter refers to the inspection conducted on December 16-19, 2002, at your TRIGA Mark-I Reactor Facility. The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. Based on the results of this inspection, no safety concern or noncompliance to NRC requirements was identified. No response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) <http://www.nrc.gov/NRC/ADAMS/index.html>.

Should you have any questions concerning this inspection, please contact Mr. Craig Bassett at (404) 562-4712.

Sincerely,

/RA/

Patrick M. Madden, Section Chief
Research and Test Reactors Section
Operating Reactor Improvements Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

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

Enclosure: NRC Inspection Report No. 50-288/2002-201

cc w/encl: 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. Peter Steinberger
Dean of the Faculty
3203 S.E. Woodstock Boulevard
Portland, OR 97202-8199

Reed College
ATTN: Dr. Colin Diver
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

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U. S. NUCLEAR REGULATORY COMMISSION

Docket No: 50-288

License No: R-112

Report No: 50-288/2002-201

Licensee: Reed College

Facility: Reed College Reactor Facility

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

Dates: December 16-19, 2002

Inspector: Craig Bassett

Approved by: Patrick M. Madden, Section Chief
Research and Test Reactors Section
Operating Reactor Improvements Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

This routine, announced inspection included onsite review of various aspects of the licensee's programs concerning conduct of operations and emergency preparedness as they relate to the licensee's Class 2 research reactor. The licensee's programs were directed toward the protection of public health and safety and were in compliance with NRC requirements. No safety concerns or violations of regulatory requirements were identified.

Organization, Operations, and Maintenance Activities

- Staffing, operations, and record keeping met requirements specified in Technical Specifications Sections I and K. Maintenance was being completed as required.

Review, Audit, and Design Change Functions

- Review and oversight functions required by Technical Specification Sections I.2 - I.4 were acceptably completed by the Reactor Operations Committee.
- The 10 CFR 50.59 changes had been reviewed and approved by the Committee as required and none were determined to constitute an unviewed safety concern.

Operator Licenses, Requalification, and Medical Activities

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

Procedures and Procedural Compliance

- Facility procedures and document reviews satisfied Technical Specification Section I.5 requirements. Procedural compliance was acceptable.

Fuel Handling and Movement

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

Surveillance

- The program for surveillance and calibration of equipment was being implemented in accordance with Technical Specification requirements specified in Sections D-G.

Experiments

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

Emergency Preparedness

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

REPORT DETAILS

Summary of Plant Status

The licensee's two hundred and fifty kilowatt (250 kW) TRIGA Mark-I research reactor continued normal, routine operations. A review of the applicable records indicated that the reactor is 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 one day at varying power levels to provide a demonstration of operations for staff members from the Reed College Admissions Office.

1. Organization, Operations, and Maintenance Activities

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

To verify staffing, operations, and record keeping requirements specified in Technical Specifications (TS) Sections I and K, Amendment No. 6, dated September 17, 1998, were being met, the inspector reviewed:

- organization and staffing for the Reed Reactor Facility
- administrative controls and management responsibilities specified in the TS
- the facility Main Log (reactor console log) Nos. 57, 58, and 59 and Maintenance Log for 2001 through the present
- Reed Reactor Facility Administrative Procedures, Section II, "Personnel and Programmatic Responsibilities," latest revision dated November 2002
- Reed Reactor Facility Administrative Procedures, Section III, "Reactor Operations," latest revision dated November 2002
- Standard Operating Procedure (SOP) 10, "Writing in Log Books," latest revision dated October 2000
- SOP 80, "Ion Exchange Tank Maintenance," latest revision dated August 1998
- SOP 82, "Lazy Susan Maintenance," latest revision dated August 1998
- Reed Reactor Facility Annual Report for September 1, 2001 - August 31, 2002

b. Observations and Findings

Through discussions with licensee representatives the inspector determined that management responsibilities and the organization at the Reed Reactor Facility (RRF) had not changed since the previous NRC inspection of operations in December 2000 (Inspection Report No. 50-288/2000-201). The inspector determined that the Facility Director retained direct control and overall responsibility for management of the facility as specified in the TS. The Facility Director reported to the President of Reed College through the Dean of the Faculty.

The licensee's current operational organization consisted of the Facility Director, an Associate Director, a Reactor Supervisor, and a Contract Health Physicist. Of these individuals, the Facility Director, the Associate Director, and the Reactor Supervisor were Senior Reactor Operators (SROs). In addition, there were nine other SROs and fourteen Reactor Operators (ROs) qualified to operate the reactor. The positions of

Facility Director and Associate Director are full-time positions while all the others are part-time. This organization was consistent with that specified in the TS.

The Facility Director maintained a schedule for reactor operations and tracked the completion of maintenance and surveillance activities. This practice kept the staff aware of upcoming activities and helped ensure good administrative control over operational aspects of the facility.

A review of the RRF Main Logs and Maintenance Log showed that they were being completed as required and problems, if any, were being documented. This review also confirmed that maintenance was being conducted consistent with the TS and applicable procedures.

c. Conclusions

Staffing, operations, and record keeping met the requirements specified in TS Section I and K. Maintenance was being completed as required.

2. Review, Audit, and Design Change Functions

a. Inspection Scope (IP 69001)

In order to verify that the licensee had established and conducted reviews and audits as required and to determine whether modifications to the facility were consistent with 10 CFR 50.59 and TS Sections I.2 - I.4, the inspector reviewed:

- Reactor Operations Committee meeting minutes from September 2001 through the present
- Radiation Safety Committee meeting minutes from September 2001 through the present
- Reactor Review Committee meeting minutes from September 2001 through the present
- completed audits and reviews for 2000 through 2002
- design changes reviewed under 10 CFR 50.59 for 2001 and 2002
- Reed Reactor Facility Administrative Procedures, Section II, "Personnel and Programmatic Responsibilities," latest revision dated November 2002

b. Observations and Findings

The inspector reviewed the Reactor Operations Committee (ROC), the Radiation Safety Committee (RSC), and the Reactor Review Committee (RRC) meeting minutes from September 2001 to the present. These meeting minutes showed that the ROC, the RSC, and the RRC had met at the required frequency and had considered the types of topics outlined by the TS.

The inspector noted that, since the last NRC inspection, audits had been completed by the ROC and the RSC in those areas outlined in the TS. The audits were designed so that all major aspects of the licensee's operations and safety programs were reviewed

every year. Standard Operating Procedures (SOPs) were reviewed every two years while other major facility documents, such as the facility license and Technical Specifications, were reviewed every four years. The inspector noted that the audits and the resulting findings were detailed and that the licensee responded and took corrective actions as needed.

Through review of applicable records and interviews with licensee personnel, the inspector determined that each design or equipment change (10 CFR 50.59 review) that had been initiated and/or completed at the RRF since the last NRC operations inspection had undergone a review by the ROC as required. Following the review, the changes were approved in accordance with the TS requirements. It was noted that none of the changes were determined to constitute a safety question or concern and none required a license amendment.

c. Conclusions

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

3. Operator Licenses, Requalification, and Medical Activities

a. Inspection Scope (IP 69001)

To determine that operator requalification activities and training were conducted as required and that medical requirements were met, the inspector reviewed:

- Reed Reactor Facility Requalification Plan dated 2000
- active license status of all current operators
- logs and records of reactivity manipulations for the 2001 through the present for selected operators
- written examinations given during 2001 and 2002 for selected operators
- training lectures and records for the current training cycle
- medical examination records for selected operators

b. Observations and Findings

As noted above, there are currently twelve qualified SROs and fourteen ROs at the RRF. All of the operators' licenses were current.

A review of the logs and records showed that training had been conducted in accordance with the licensee's requalification and training program. Training reviews and examinations had been documented as required. Records of quarterly reactor operations, reactivity manipulations, other operations activities, and Reactor Supervisor activities were being maintained. Records indicating the completion of the annual operations tests and supervisory observations were also maintained. Biennial written examinations were being completed as required or credit was taken by the licensee for the SRO exams administered by the NRC to satisfy the requalification cycle exam

requirements when applicable. The inspector noted that operators were receiving the required biennial medical examinations as well.

The inspector noted that completion of the training and quarterly reactor operations and manipulations were not always documented as required by the Requalification Program. This inspector's observation is noted as an area for improvement, and will be reviewed during a subsequent inspection and is identified as Inspection Follow-up Item (IFI) (IFI 50-288/2002-201-01).

c. Conclusions

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

4. Procedures and Procedural Compliance

a. Inspection Scope (IP 69001)

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

- Reed Reactor Facility Administrative Procedures, Section VII, "Adoption of Operating Procedures," latest revision dated November 2002
- SOP 01, "Startup Checklist," latest revision dated October 2002
- SOP 03, "Reactor Operations," latest revision dated June 2001
- SOP 04, "Same Day Startup," latest revision dated April 2002
- SOP 05, "Shutdown," latest revision dated April 2002
- procedural reviews and updates documented in the RRC meeting minutes

b. Observations and Findings

RRF SOPs were found to be acceptable for the current facility status and staffing level. The SOPs specified the responsibilities of the various members of the staff. The procedures were being audited and reviewed biennially and updated as needed. It was also noted that revisions to procedures were routinely presented to the RRC for review and approval. The inspector verified that the latest revisions to various SOPs had been through this review and approval process as required.

The inspector observed various activities during this inspection including a reactor start up, steady state operation, and shut down. It was noted that the operations were completed in accordance with the applicable procedures.

c. Conclusions

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

5. Fuel Handling and Movement

a. Inspection Scope (IP 69001)

In order to verify adherence to fuel handling and inspection requirements specified in TS Sections E.3 and E.4, the inspector reviewed:

- SOP 40, "Fuel Element Inspection," latest revision dated November 2002
- SOP 40: Appendix A, "Fuel Handling Checklist," latest revision dated June 2001
- SOP 43, "Control Rod Calibration," latest revision dated July 2000
- Main Log Nos. 57, 58, and 59 and Maintenance Log
- Fuel Element Information Cards

b. Observations and Findings

The inspector determined that the licensee was maintaining the required records of the various fuel movements that had been completed. The inspector also verified that the movements were conducted in compliance with procedure. The reactor fuel was being inspected upon initial receipt and one-fifth of the fuel elements were being inspected biennially as allowed by TS Section E.3. The procedure used for fuel inspection was acceptable and the radiological control requirements specified for these operations were adequate.

c. Conclusions

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

6. Surveillance

a. Inspection Scope (IP 69001)

To determine that surveillance activities and calibrations were being completed as required by TS Sections D - G, the inspector reviewed:

- SOP 41, "Control Rod Inspection," latest revision dated November 2002
- SOP 41: Appendix A, "Control Rod Inspection Checklist," latest revision dated June 2001
- SOP 42, "Control Rod Drop Times," latest revision dated August 1998
- SOP 43, "Control Rod Calibration," latest revision dated July 2000
- SOP 44, "Power Calibration," latest revision dated July 2000
- SOP 70, "Weekly Checklist," latest revision dated June 2001
- SOP 70: Appendix A, "Weekly Checklist," latest revision dated June 2001
- SOP 71, "Bimonthly Checklist," latest revision dated July 2001
- SOP 71: Appendix A, "Bimonthly Checklist," latest revision dated July 2002
- SOP 72, "Semiannual Checklist," latest revision dated June 2001
- SOP 72: Appendix A, "Semiannual Checklist," latest revision dated June 2001

- SOP 73, "Annual Checklist," latest revision dated July 2002
- SOP 73: Appendix A, "Annual Checklist," latest revision dated July 2002
- SOP 73: Appendix B, "Reed Reactor Facility Console Instrumentation Checkout," latest revision dated April 2001
- associated surveillance and calibration data and records for 2000-2002

b. Observations and Findings

The inspector determined that selected weekly, bimonthly, semiannual, and annual checks, tests, and/or calibrations for TS-required surveillances and calibrations were completed as stipulated. The surveillances and calibrations reviewed were generally completed on schedule and in accordance with licensee procedures. All the recorded results were within the TS and procedurally prescribed parameters. The records and logs reviewed were accurate, complete, and being maintained as required.

c. Conclusions

The program for surveillance and calibration of equipment was being carried out in accordance with TS requirements.

7. Experiments

a. Inspection Scope (IP 69001)

In order to verify that experiments were being conducted within approved guidelines specified in TS Section J, the inspector reviewed:

- Reed Reactor Facility Administrative Procedures, Section IV, "Reactor Experiments," latest revision dated November 2002
- SOP 50, "Irradiation Request Forms," latest revision dated November 2002
- SOP 50: Appendix A, "Irradiation Request Form," latest revision dated August 1998
- SOP 50: Appendix B, "Activity Estimation," latest revision dated August 1998
- SOP 50: Appendix C, "Sample Preparation," latest revision dated November 2000
- SOP 50: Appendix D, "Sample Transfer," latest revision dated August 1998
- SOP 50: Appendix E, "Neutron Activation Analysis," latest revision dated November 2002
- SOP 51, "Rabbit Irradiations," latest revision dated June 2001
- SOP 51: Appendix A, "Rabbit Irradiations Training," latest revision dated August 1998
- SOP 52, "Lazy Susan Irradiations," latest revision dated November 2000
- SOP 53, "Central Thimble Irradiations," latest revision dated December 2000
- SOP 55, "Beam Irradiations," latest revision dated June 2001
- SOP 55: Appendix A, "Beam Irradiations Checklist," latest revision dated June 2001
- selected Routine, Modified Routine, and Special Experiments
- experiment review and approval by the ROC
- selected Irradiation Request Forms for 2001 and 2002

b. Observations and Findings

The inspector noted that all the experiments conducted at the facility were well-established procedures that had been in place for several years. There were sixteen Routine and/or Modified Routine experiments and twenty-two Special experiments that have been reviewed and approved by the ROC. The last experiment to be approved was Special Experiment No. 24, "Mica Wafers as a Directional Fast Neutron Detector," dated February 3, 1995.

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

c. Conclusions

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

8. Emergency Preparedness

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of:

- the Reed Reactor Facility Emergency Plan last revised October 1999
- the Reed Reactor Facility Emergency Plan, Appendix A, Agreement Letters
- the Reed Reactor Facility Emergency Plan, Appendix B, Emergency Implementation Procedures, dated November 2002 with Attachments A-E
- emergency response facilities, supplies, equipment and instrumentation
- training records for the past two years
- emergency drills and exercises held during 2001 and 2002

b. Observations and Findings

The Emergency Plan (E-Plan) in use at the reactor and emergency facilities was the same as the version most recently approved by the NRC. The E-Plan and Emergency Implementation Procedures were being audited and reviewed annually as required. Facilities, supplies, instrumentation, and equipment 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. Agreements with outside response organizations were being maintained and had been updated as required. Communications capabilities were acceptable and had been tested and emergency information updated as stipulated in the E-Plan.

Emergency drills had been conducted annually as required by the E-Plan. Off-site support organization participation was also as required by the E-Plan. Critiques were held following the drills to discuss the strengths and weaknesses identified during the exercise and to develop possible solutions to any problems identified. The results of these critiques were documented. Emergency preparedness and response training for off-site and reactor staff personnel was being conducted and documented as stipulated by the E-Plan. However, the training for off-site support personnel had not been completed as of the date of the inspection. The licensee anticipated completing the training by February of 2003. This will be verified during the next NRC inspection at the facility.

The inspector also visited the hospital identified in the E-Plan as the one which would care for injured personnel from the RRF if needed. The hospital, Good Samaritan Hospital of Portland, was well equipped to handle such emergencies and there was a good working relationship between the staff at the hospital and the licensee staff.

c. Conclusions

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

9. Exit Interview

The inspection scope and results were summarized on December 19, 2002, with licensee representatives. 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

L. Cool, Senior Reactor Operator
S. Frantz, Facility Director
A. Neuhoff, Senior Reactor Operator
E. Weis, Associate Facility Director

Other Personnel

D. Bright, Emergency Room Manager, Good Samaritan Hospital, Legacy Health System
K. Fisher, Radiation Safety Officer and Campus Environmental Director
M. Parrott, Reactor Health Physicist (Contractor)
B. Price, Radiation Safety Officer, Meridian Park Hospital, Legacy Health System

INSPECTION PROCEDURE USED

IP 69001 Class II Non-Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-288/2002-201-01 IFI Follow-up on complete and accurate documentation of activities specified in the Requalification plan

Closed

None

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
CFR	Code of Federal Regulations
E-Plan	Emergency Plan
IP	Inspection Procedure
kW	Kilowatt
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
RO	Reactor operator
ROC	Reactor Operations Committee
RRC	Reactor Review Committee
RRF	Reed Reactor Facility
RSC	Radiation Safety Committee
RTR	Research and Test Reactor
SOP	Standard Operating Procedure
SRO	Senior reactor operator

TS Technical Specifications