July 14, 2011

Dr. Tatjana Jevremovic
Director, Utah Nuclear Engineering Program
122 S. Central Campus Drive, Room 104
University of Utah
Salt Lake City, UT 84112

SUBJECT: UNIVERSITY OF UTAH – NRC ROUTINE INSPECTION REPORT NO. 50-407/2011-201

Dear Dr. Jevremovic:

On June 20-23, 2011, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection at your University of Utah TRIGA Reactor facility (Inspection Report No. 50-407/2011-201). The enclosed report documents the inspection results, which were discussed on June 23, 2011, with you, Dr. Cynthia Furse, Associate Vice President for Research, Dr. Paul Tikalsky, Chair, Department of Civil and Environmental Engineering, Karen Langley, Director, Radiological Health Department and Radiation Safety Officer, and Dr. D. O. Choe, Reactor Supervisor.

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 activities, and interviewed personnel. Based on the results of this inspection, no findings of significance were identified. No response to this letter is required.

In accordance with Title 10 of the *Code of Federal Regulations* Section 2.390, "Public inspections, exemptions, and requests for withholding," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (Agencywide Documents Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Craig Bassett at (301) 466-4495 or by electronic mail at Craig.Bassett@nrc.gov.

Sincerely,

/RA/

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

Docket No. 50-407
License No. R-126

Enclosure: NRC Inspection Report No. 50-407/2011-201
cc w/encl: See next page

University of Utah Docket No. 50-407

cc:

Mayor of Salt Lake City
451 South State
Room 306
Salt Lake City, UT 84111

Dr. Thomas N. Parks
Vice President for Research
201 S. Presidents Circle, Room 210
University of Utah
Salt Lake City, UT 84112-9011

Ms. Karen Langley
Director, University of Utah Radiological Health
100 OSH
University of Utah
Salt Lake City, UT 84112

Director, Division of Radiation Control
Department Of Environmental Quality
168 North 1959 West
P.O. Box 144850
Salt Lake City, UT 84114-4850

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

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Docket No. 50-407
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U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No:	50-407
License No:	R-126
Report No:	50-407/2011-201
Licensee:	University of Utah
Facility:	TRIGA Mark-I Research Reactor Facility
Location:	Merrill Engineering Building Salt Lake City, UT
Dates:	June 20-23, 2011
Inspector:	Craig Bassett
Approved by:	Johnny H. Eads, Jr., Chief Research and Test Reactors Oversight Branch Division of Policy and Rulemaking Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

University of Utah
TRIGA Mark-I Research Reactor Facility
Utah Nuclear Engineering Program
Report No.: 50-407/2011-201

The primary focus of this routine, announced inspection included onsite review of selected aspects of the University of Utah (the licensee's) 100 kilowatt Class II research reactor safety program including: 1) organizational structure and staffing, 2) review and audit and design control functions, 3) reactor operations, 4) operator requalification, 5) facility procedures, 6) fuel handling, 7) maintenance and surveillance, 8) experiments, and 9) emergency preparedness since the last NRC inspection of these areas. The licensee's program was acceptably directed toward the protection of public health and safety and was in compliance with U.S. Nuclear Regulatory Commission NRC requirements. No safety violations or deviations were identified.

Organizational Structure and Staffing

- The organizational structure and staffing at the facility met the requirements specified in Technical Specification Sections 6.1, 6.2, and 6.3.

Review and Audit and Design Control Functions

- Review and oversight functions required by Technical Specification Section 6.5 were acceptably completed by the Reactor Safety Committee or designated individuals.

- Changes made at the facility had been reviewed and approved in accordance with Title 10 of the *Code of Federal Regulations* Section 50.59.

Operations

- Reactor operations and logs were acceptable and in accordance with procedural and Technical Specification requirements.

Operator Requalification Program

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

- Medical examinations for each licensed operator were being completed biennially as required.

Procedures

- Facility procedures and document reviews satisfied Technical Specification Section 6.8 requirements.

Fuel Handling

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

- Fuel elements were being inspected on a biennial basis as specified by Technical Specification Section 4.4.

Maintenance and Surveillance

- Maintenance was being completed as required.

- The program for completing surveillance checks and Limiting Conditions for Operation confirmations was being implemented in accordance with Technical Specifications requirements.

Experiments

- The program for the control of experiments satisfied regulatory requirements and license commitments.

Emergency Preparedness

- The Emergency Plan and implementing procedures were being reviewed and updated biennially as required and were acceptable.

- Emergency response equipment was being maintained as required and first responders were knowledgeable of proper actions to take in case of an emergency.

- Offsite support was acceptable and communications capabilities were adequate.

- Annual drills were being conducted and critiques were being held as required by the Emergency Plan.

- Emergency preparedness training for staff and offsite personnel was being completed as required.

REPORT DETAILS

Summary of Plant Status

The University of Utah (the licensee's) 100 hundred kilowatt (kW) TRIGA Mark-I research and test reactor continued normal, routine operations. The reactor was typically operated in support of educational demonstrations, laboratory experiments, reactor system testing, and sample irradiations. During the inspection, the reactor was not operated but typically operates one or two days a week at various power levels up to 90 kW.

1. Organization Structure and Staffing

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

The inspector reviewed the following to verity that the staffing requirements, personnel responsibilities, and organizational structure specified in Sections 6.1, 6.2, and 6.3 of the licensee's Technical Specifications (TS), (as implemented through Facility License Number (No.) R-126 Amendment No. 7, dated June 23, 1999), were being met:

- Organization and staffing for the facility
- TRIGA Operations Logs Numbers (Nos.) 37 - 38
- Administrative controls and management responsibilities
- Description of Operations (DO) Procedure Manual, Section II, "Organization," Part 1, "Divisional Responsibilities," (undated)
- DO Procedure Manual, Section II, "Organization," Part 2, "CENTER Personnel Responsibilities," (undated)
- The University of Utah TRIGA Reactor Annual Operating Report for the period July 1, 2008, through June 30, 2009, submitted to the U.S. Nuclear Regulatory Commission (NRC) on July 7, 2009
- The University of Utah TRIGA Reactor Annual Operating Report for the period of July 1, 2009 through June 30, 2010, submitted to the NRC July 26, 2010
- American National Standards Institute/American Nuclear Society (ANSI/ANS) Standard 15.1, "Development of Technical Specifications for Research Reactors," dated December 7, 1990
- ANSI/ANS Standard 15.4, "Selection and Training of Personnel for Research Reactors," dated June 9, 1988

b. Observations and Findings

Through discussions with licensee representatives, the inspector determined that designated management responsibilities at the University of Utah TRIGA Mark-I Reactor Facility had not changed since the previous NRC inspection in June 2010 (see NRC Inspection Report No. 50-407/2010-201). The Reactor Supervisor (RS) retained direct control and overall responsibility for safe operation and maintenance of the facility as specified in the TS. The RS reported to the President of the University of Utah through the Reactor Administrator (RA).

As noted during the last inspection, there had been personnel changes at the facility. The person who was formerly the RA had resigned from that position effective April 30, 2009 and the RS had been appointed as RS in the interim. Subsequently, a new person had been selected to become the facility Director. The inspector reviewed this person's qualifications and verified that they were as required by the TS. The inspector also noted that the organization responsible for the reactor was previously designated as or known as the Center for Excellence in Nuclear Technology, Energy, and Research (CENTER). It was noted that the licensee was in the process of changing the acronym "CENTER" to "UNEP" (Utah Nuclear Engineering Program).

The licensee's current operational organization consisted of the RA, a RS, and various students. The RS was a qualified Senior Reactor Operator (SRO). In addition, there were three graduate students who were SROs. Three other students were involved in the operator training program and were scheduled to take an NRC operator examination in the near future. The RA and RS positions were full-time positions while all the others were part-time.

The organizational structure was as required by TS and was consistent with that specified in the ANSI/ANS 15.1, "Development of Technical Specifications for Research Reactors." Qualifications of the staff met TS requirements and were consistent with those specified in the ANSI/ANS 15.4, "Selection and Training of Personnel for Research Reactors."

c. Conclusion

The organizational structure and staffing at the facility met the minimum requirements specified in TS Sections 6.1, 6.2, and 6.3.

2. Review, Audit, and Design Change Functions

a. Inspection Scope (IP 69001)

In order to verify that the licensee had conducted reviews and audits as required and to determine whether modifications to the facility were consistent with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59 and TS Section 6.5, the inspector reviewed:

- RS Quarterly Reports for the past two years
- RA Quarterly Reports for the past two years
- Radiation Safety Officer Quarterly Reports for the past two years
- RSC meeting minutes for 2010 to the present
- University of Utah Center for Excellence in Nuclear Technology, Energy, and Research Audit and Review Plan for NRC License R-126 TRIGA Nuclear Reactor (Docket No. 50-407), Revision (Rev.) 1, dated February 28, 1996
- Completed semiannual audits and reviews as documented in RSC Audit Reports for audits conducted January - June 2009 and July - December

2009 and for audits conducted January – June 2010 and July – December 2010

- DO Procedure Manual, Section II, "Organization," Part 1, "Divisional Responsibilities," (undated)
- The University of Utah TRIGA Reactor Annual Operating Report for the period July 1, 2008, through June 30, 2009, submitted to the NRC on July 7, 2009
- The University of Utah TRIGA Reactor Annual Operating Report for the period of July 1, 2009 through June 30, 2010, submitted to the NRC July 26, 2010

b. Observations and Findings

(1) Reviews and Audits

The inspector reviewed the RSC meeting minutes from March 2010 to the present. These meeting minutes showed that the RSC had met at the required frequency and had considered the types of topics outlined by the TS. Review of the committee meeting minutes also indicated that the RSC provided guidance and direction for safe reactor operations and ensured suitable use and oversight of the reactor.

The inspector noted that the RSC, or individuals specifically designated by the committee, completed audits of the facility operations, programs, and procedures. Since the last NRC inspection, audits had been completed in those areas outlined in the TS. The audits were structured so that the various aspects of the licensee's operations and safety programs were reviewed semiannually. Major facility documents and plans, including the facility procedures, were reviewed biennially. The inspector noted that the audits and the resulting findings were detailed and that the licensee responded and took corrective actions as needed.

(2) Design Change Functions

The inspector inquired about recent changes made at the facility. The licensee indicated that no changes had been initiated since the last NRC inspection. During the last inspection, the inspector reviewed the records of a change made in October 2008, and the steps taken to implement the change. This review showed that the design control program at the facility was being followed. The RS evaluated the proposed modification and made a recommendation to proceed. Subsequently, the RA reviewed the proposed modification and determined that no safety or TS concern existed. The change resulted in the replacement of the fume hood in the RadioChemistry Lab.

The change mentioned above was deemed not to increase the possibility of an accident or malfunction not previously evaluated, did not constitute a safety question, and did not require a change to the facility TSs. Due to the nature of the change, it was not required to be reviewed and approved

by the RSC. However, the RSC was made aware of the change for informational purposes.

c. Conclusion

Review and oversight functions required by TS Section 6.5 were acceptably completed by the RSC. Changes made at the facility had been reviewed and approved in accordance with facility procedures and the guidance of 10 CFR 50.59.

3. Operations

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to verify operation of the reactor in accordance with TS Sections 2, 3, 4, and 6:

- Organization and staffing for the facility
- TRIGA Operations Procedures and Logs Nos. 37 - 38
- Maintenance Procedures and Maintenance Log
- Selected surveillance data sheets, records, and tests
- DO Procedure Manual, Section IV, "Reactor Operations," (undated)
- DO Procedure Manual, Section VII, "TRIGA Reactor Console," (undated)
- Start-up and Termination Procedures and Log containing Form CENTER-001, Rev. 10, "TRIGA Pre-start Checklist, TRIGA Start-up Checklist, and TRIGA Termination Checklist," RSC approval of the form dated April 2, 2004
- The University of Utah TRIGA Reactor Annual Operating Report for the period July 1, 2008, through June 30, 2009, submitted to the NRC on July 7, 2009
- The University of Utah TRIGA Reactor Annual Operating Report for the period of July 1, 2009 through June 30, 2010, submitted to the NRC July 26, 2010

b. Observations and Findings

The inspector reviewed the operations log from June 2009 through the present. The inspector also reviewed TRIGA Pre-start, Start-up and Termination Checklists and Monthly Checklists. Information on the operational status of the facility was generally recorded accurately in the log book or on the required checklists as stipulated by TS Section 6.9. The inspector verified that, according to the data recorded, TS operational limits had not been exceeded as stipulated in TS Sections 2, 3, and 4. Scrams were identified in the logs, were generally reported in the licensee's Annual Report as required, and were resolved before the resumption of operations. Through records review and interviews with operators, the inspector confirmed that shift staffing met the minimum requirements for duty and on-call personnel as required by TS Section 6.3. Also, reactor operations were carried out in accordance with written procedures as required by TS Section 6.8.

c. Conclusion

Based on the procedures and records reviewed, and observations made during the inspection, the inspector determined that reactor operations and logs were acceptable and in accordance with procedural and TS requirements.

4. Operator Licenses, Requalification, and Medical Activities

a. Inspection Scope (IP 69001)

To determine that operator qualification/requalification activities and training were conducted as required by the "University of Utah Center for Excellence in Nuclear Technology, Engineering, and Research Reactor Operator Requalification Plan," Rev. 3, dated February 1996, and that medical requirements were met, the inspector reviewed:

- TRIGA Operations Logs Nos. 37 - 38
- Medical examination records for the past four years
- Status of licenses of those operators who routinely operated the reactor
- Form CENTER-001, Rev. 10, "TRIGA Pre-start Checklist, TRIGA Start-up Checklist, and TRIGA Termination Checklist," RSC approval of the form dated April 2, 2004
- Operator requalification status documented on Form CENTER-025, "University of Utah Center for Excellence in Nuclear Technology, Engineering, and Research Reactor Requalification Program Progress Checklist," (no RSC approval date listed) which included reactivity manipulations, written examinations, training and lectures, and SRO duty
- ANSI/ANS Standard 15.4, "Selection and Training of Personnel for Research Reactors," dated June 9, 1988

b. Observations and Findings

As noted previously, there were four qualified SROs at the facility. The operators' licenses were found to be current although two had been suspended. This was because those two individuals were not currently at the facility. They were completing internships at the Idaho National Laboratory (INL). The licensee indicated that, if those individuals returned and wanted to resume operating the reactor at the facility, they would have to be recertified by the RS. That would be accomplished by each operator serving six hours of shift duty under the observation and supervision of the RS.

A review of facility logs and records showed that training continued to be conducted in accordance with the licensee's requalification and training program. Lectures had been given as stipulated and training reviews and examinations had been completed and documented. Records of quarterly reactor operations, reactivity manipulations, and other operations and supervisory activities were maintained and the required activities completed by each operator. Records indicating the completion of the annual operations tests and supervisory

evaluations were also maintained. Biennial written examinations had been completed by the operators as required as well. The inspector noted that the operators were also receiving the required biennial medical examinations as specified by the program.

c. Conclusion

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

5. Procedures and Procedural Compliance

a. Inspection Scope (IP 69001)

To verify that facility procedures were being reviewed, revised, and implemented as required by TS Section 6.8, the inspector reviewed various aspects of:

- Selected forms and checklists
- Selected operating and administrative procedures and logs
- Procedural reviews and updates documented in the RSC meeting minutes for the past two years
- DO Procedure Manual, Section II, “Organization,” (undated)
- DO Procedure Manual, Section III, “Documentation,” (undated)

b. Observations and Findings

The licensee’s procedures were found to be acceptable for the current facility status and staffing level. The inspector noted that the procedures specified the responsibilities of the various members of the staff as well as the RSC. The procedures were being audited/reviewed biennially, as noted earlier, and were updated as needed. It was also noted that substantive revisions to procedures, checklists, and forms were routinely presented to the RSC for review and approval as required by TS. The inspector verified that the latest revisions to various procedures and forms had been through this review and approval process as required.

c. Conclusion

Facility procedures and document reviews satisfied TS Section 6.8 requirements.

6. Fuel Movement and Handling

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following in order to verify adherence to fuel handling and inspection requirements specified in TS Section 4.4 and the applicable procedures:

- Core Procedures and Log

- TRIGA Operations Log Nos. 37 - 38
- Heavy Water Element Inspection Forms
- Criticality calculations for various storage locations
- University of Utah TRIGA Reactor Core (element location sheet), Core Configuration 24B, last updated February 24, 2009
- Fuel Procedures and Logs for Stainless Steel and Aluminum clad fuel elements
- Form CENTER-004, Rev. 1, "Biennial Fuel Rod Inspection," RSC approval of the form dated December 17, 1997
- Form CENTER-005, Rev. 4, "Core Change and Critical Fuel Loading," RSC approval of the form dated March 29, 2000
- Form CENTER-018, "Fuel Element Inventory Sheet," RSC approval of the form dated May 25, 1988
- DO Procedure Manual, Section IV, "Reactor Operations," (undated)
- The University of Utah TRIGA Reactor Annual Operating Report for the period July 1, 2008, through June 30, 2009, submitted to the NRC on July 7, 2009
- The University of Utah TRIGA Reactor Annual Operating Report for the period of July 1, 2009 through June 30, 2010, submitted to the NRC July 26, 2010

b. Observations and Findings

The inspector determined that the licensee was maintaining the required records of the various fuel movements that had been completed and verified that the movements were conducted and recorded in compliance with procedure. The latest core reconfiguration was completed in December 2003 and the resulting University of Utah TRIGA core and fuel positioning was designated as Core Configuration 24B. The core has remained in that configuration since and was last updated February 24, 2009.

Core loading procedures provided a specific method to move and handle fuel consistent with the requirements and provisions of the TS Section 4.4 and the licensee safety analyses. Fuel movement and fuel examination records showed that the fuel of the current core was moved in accordance with procedures and examined biennially as required. The fuel elements were last inspected in December 2009. It was also noted that fuel handling tools were controlled and secured when not in use. The procedures and the controls specified for these operations were acceptable.

c. Conclusion

Reactor fuel movements and inspections were completed and documented in accordance with applicable procedures and the fuel was being inspected as specified by TS Section 4.4.

7. Maintenance and Surveillance

a. Inspection Scope (IP 69001)

To determine that Limiting Conditions for Operation (LCO) and surveillance activities were being completed as stipulated by TS Sections 3 and 4, and that maintenance was being conducted as required, the inspector reviewed:

- TRIGA Operations Logs Nos. 37 - 38
- Calibration procedures and records
- Selected Surveillance Procedures and Logs
- Start-up and Termination Procedures and Log
- Maintenance Procedures and Maintenance Log
- Selected surveillance data sheets, records, and tests
- "Technical Specification Calendar," last revised July 19, 2007
- Form CENTER-001, Rev. 10, "TRIGA Pre-start Checklist, TRIGA Start-up Checklist, and TRIGA Termination Checklist," RSC approval of the form dated April 2, 2004
- Form CENTER-002, Rev. 3, "Biennial Control Rod Inspection/Control Rod Movement or Repair," RSC approval of the form dated May 23, 2002
- Form CENTER-003, Rev. 7, "Semi-Annual Control Rod Calibrations," RSC approval of the form dated June 30, 2008
- Form CENTER-008, Rev. 4, "Procedure for Adding Water to the Reactor Tank," RSC approval of the form dated December 17, 1997
- Form CENTER-011, Rev. 2, "Calibration of Temperature Monitoring Channels," RSC approval of the form dated March 12, 1997
- Form CENTER-012, Rev. 3, "Semi-Annual Thermal Power Calibration," RSC approval of the form dated March 18, 1998
- Form CENTER-015, Rev. 3, "Emergency Kit Check," RSC approval of the form dated September 17, 2003
- Form CENTER-020, Rev. 12, "Monthly Inspection Checklist," RSC approval of the form dated April 2, 2004
- Form CENTER-022, Rev. 2, "Maintenance Log," RSC approval of the form dated September 21, 1994
- Form CENTER-023, Rev. 4, "Annual Maintenance and Calibration of the Area Radiation Monitors (ARMs) and Continuous Air Monitor (CAM)," RSC approval of the form dated December 17, 1997
- DO Procedure Manual, Section VII, "The Maintenance and Surveillance of the TRIGA Reactor and Support Systems," (undated)
- DO Procedure Manual, Section VIII, "Auxiliary Surveillance Equipment," (undated)
- The University of Utah TRIGA Reactor Annual Operating Report for the period July 1, 2008, through June 30, 2009, submitted to the NRC on July 7, 2009
- The University of Utah TRIGA Reactor Annual Operating Report for the period of July 1, 2009 through June 30, 2010, submitted to the NRC July 26, 2010

b. Observations and Findings

(1) Maintenance

A review of the reactor console log and the maintenance log forms showed that the logs and forms were being completed as required and problems, if any, were being documented and ultimately resolved. This review also demonstrated that maintenance was being conducted consistent with the TS and applicable procedures. Maintenance activities ensured that equipment remained consistent with the Safety Analysis Report and TS requirements.

(2) Surveillance

The inspector determined that selected daily, monthly, semiannual, annual, and biennial checks, tests, and verifications for TS-required LCOs were being documented in the logs and on the appropriate forms. Surveillance checks and tests and LCO verifications reviewed by the inspector were completed on schedule and in accordance with licensee procedures. All the recorded results reviewed by the inspector were within the TS and procedurally prescribed parameters. It was noted that some of the surveillances were being completed more frequently than required by the TS. The records and logs reviewed were complete and were being maintained as required.

c. Conclusion

Maintenance was being completed as required. The program for completing surveillance checks and LCO verifications was being carried out in accordance with TS requirements.

8. Experiments

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following in order to verify that experiments were being conducted within approved guidelines:

- TRIGA Operations Logs Nos. 37 - ___
- Experimental Procedures and Log
- Survey and control of irradiated items
- Selected Routine and Modified Routine Experiments
- Selected TRIGA Reactor Irradiation Request and Performance forms documented on Form CENTER-027, Rev. 4, “TRIGA Reactor Irradiation Request and Performance,” RSC approval of the form dated March 26, 1996
- The current authorized experiment documented on University of Utah TRIGA Reactor Experiment Authorization Form, RSC approval of the form

dated February 20, 1981, Authorization Number 4-08-2011, classified as I-Routine, with an approval by the Reactor Supervisor dated April 8, 2011

- Previously authorized experiments documented on University of Utah TRIGA Reactor Experiment Authorization Form, RSC approval of the form dated February 20, 1981, including:
  - Authorization Number 12-05-02, classified as Modified Routine I, with an approval by the Reactor Supervisor dated December 3, 2002
  - Authorization Number 03-04-05, classified as Modified Routine I, with an approval by the Reactor Supervisor dated March 4, 2005
- Form CENTER-028, Rev. 1, "Experimental Facility Reactivity Worth Determination," RSC approval of the form dated March 12, 1997
- DO Procedure Manual, Section VI, "Experiment Methods," (undated)
- The University of Utah TRIGA Reactor Annual Operating Report for the period July 1, 2008, through June 30, 2009, submitted to the NRC on July 7, 2009
- The University of Utah TRIGA Reactor Annual Operating Report for the period of July 1, 2009 through June 30, 2010, submitted to the NRC July 26, 2010

b. Observations and Findings

The licensee classified experiments as "new", "routine", or "modified routine." It was noted that, historically, routine and modified routine experiments were referred to as Class I and new experiments were referred to as Class II. New experiments typically included any proposed activity utilizing the CENTER reactor that did not conform to an existing Experiment Authorization (EA). All new experiments were required by the TS and procedural guidance to be reviewed and approved by the RSC. Routine and modified routine experiments were those that had existing approval from the RSC and had an existing TRIGA Reactor EA form.

The inspector noted that no new experiments had been initiated, reviewed, or approved since the last inspection. However, licensee representatives stated that the RSC review and approval process for new experiments had been, and would continue to be, followed.

In the past there have been various Routine and Modified Routine experiments conducted at the facility. The inspector noted that currently there is only one authorized and approved experiment classified as Routine-I. The inspector verified that a new EA for that experiment was being completed and approved every year as required. The experiment was very broad in scope and included irradiation of: 1) biological samples and materials, tailings, plastics, and metals for NAA, 2) FTA standards and materials, 3) isotopes for the production of medical tracers, and 4) electronics and materials to include dosimeters.

The irradiations completed under this were conducted under the cognizance of the RS and an SRO. The results of the irradiations were documented in the TRIGA Operations Log book and on the irradiation request forms. The inspector noted that experiments were conducted in accordance with procedural and EA

guidelines and that materials produced were controlled as required by the radiation protection program.

c. Conclusion

The license's program for conducting experiments and controlling products satisfied regulatory requirements and license commitments.

9. Emergency Preparedness

a. Inspection Scope (IP 69001)

To verify that the licensee was implementing and complying with the "University of Utah Center for Excellence in Nuclear Technology, Engineering, and Research Emergency Plan for NRC License R-126: TRIGA Nuclear Reactor," Rev. 6, dated September 30, 2004, as approved by the NRC, the inspector reviewed selected aspects of:

- Documentation of emergency drills and critiques for 2009 and 2010
- Training records for staff and offsite support personnel
- Emergency response supplies, equipment, and instrumentation
- Emergency (Implementing) Procedures including:
  - Unauthorized Entry Procedures, last revised December 31, 2001
  - Emergency Evacuation Procedures, last revised December 31, 2001
  - Evacuation Procedures in Case of Earthquake, last revised December 31, 2001
  - Personnel Emergencies/Contamination, last revised December 31, 2001
  - High-Level Alarm, last revised April 25, 2008
  - Re-entry and Re-Establishing Reactor Operations, last revised December 31, 2001
  - Fire in 1205 MEB, last revised December 31, 2001
  - Prompt Excursion, last revised December 31, 2001
  - Loss of Primary Water in the Reactor Tank, last revised December 31, 2001
  - Loss of Water in the Fuel Storage Pits, last revised December 31, 2001
  - Fuel Element Cladding Leak, last revised December 31, 2001
  - Spill of Radioactive Sample Material In or Around the Reactor, last revised December 31, 2001
  - Unintentional Removal of Cf-252 Sources from the Irradiator, last revised December 31, 2001
  - Explosion of Sample While in Cf Irradiator, last revised December 31, 2001
  - Broken Source Cable, last revised December 31, 2001
  - CENTER Response – University Police Dispatch, last revised February 2005

  - CENTER Response – University Police Officers, last revised February 2005
  - CENTER Response – Salt Lake City Fire Department, last revised February 2005
- CENTER Annual Emergency Training Attendance Record forms for 2009 and 2010
- Form CENTER-015, Rev. 3, "Emergency Kit Check," RSC approval of the form dated September 17, 2003
- Form CENTER-021, Rev. 25, "CENTER Emergency Call List," RSC approval of the form dated June 30, 2009
- Form CENTER-037, "Radiological Emergency Classification Checklist," RSC approval of the form dated December 14, 1994
- Letter of Agreement with Gold Cross Ambulance, dated April 8, 1993

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 was being audited and reviewed biennially as required. Implementing procedures were reviewed and revised as needed. Facilities, supplies, instrumentation and equipment were being maintained, controlled, and inventoried as required in the E-Plan. During the inspection, the contents of various emergency kits were inventoried and verified by the inspector and the Reactor Supervisor.

Emergency drills had been conducted annually as required. Critiques were typically held following the drills to discuss the strengths and weaknesses identified during the exercise and to develop possible solutions to any problems identified. The results of these critiques were documented and filed. Training for reactor staff and support personnel was acceptable and was conducted and documented as required.

Through record reviews and interviews with licensee personnel, emergency responders were determined to be knowledgeable of the proper actions to take in case of an emergency. According to the licensee, agreements with various offsite response organizations, such as the fire department and the hospital, were being maintained between those entities and the University. Therefore, the reactor facility did not need or maintain separate agreements with these groups in addition to those already established with the University. It was noted that communications capabilities with these support groups were acceptable and were tested periodically.

The inspector visited the University Hospital and observed the facilities, supplies, and equipment at that support site that would be available in case of an emergency. The support that would be provided by the University Hospital in case of an accident appeared to be more than adequate. Also, there appeared to be a good working relationship between the licensee and this support organization.

c. Conclusion

The emergency preparedness program was being implemented adequately as evidenced by the following: 1) the Emergency Plan and Implementing Procedures were being reviewed and updated biennially as required and were acceptable, 2) emergency response facilities and equipment were being maintained as required, 3) annual drills were being conducted and critiques were being held as required by the Emergency Plan, 4) emergency preparedness training for staff and offsite personnel was being completed as required, and 5) offsite support was acceptable and communications capabilities were adequate,

10. Follow-up on Previously Identified Items

a. Inspection Scope (IP 92701)

The inspector reviewed the licensee's actions taken in response to a previously identified Unresolved Item (URI).

b. Observation and Findings

URI 50-407/2009-201-01 - Follow-up to determine whether the RSC should annually be reviewing written agreements that detail arrangements with various offsite support groups to ensure continuity of emergency service or whether those reviews should be conducted by the University instead of the RSC.

During a previous inspection in June 2009, the inspector noted that, Section 10.0, “Maintenance of Emergency Preparedness,” Paragraph 10.4, of the licensee’s E-Plan required that the RSC shall annually review written agreements that detail arrangements with the contracted ambulance service, Department of Public Safety, and University Hospital to ensure continuity of emergency service. During the inspection, the inspector questioned the RS about the requirement to have the RSC review written agreements to ensure continuity of emergency service every year. The RS was not certain whether this was being done. There was also some question as to whether or not some administrative unit of the University (i.e., the legal department or some other group) should actually be reviewing these agreements instead of the facility and the RSC. Because this matter could not be resolved during the inspection, and because more information was needed to determine the proper disposition of this issue, the licensee was informed that this issue would be identified as an URI.

The inspector followed up on this issue during this inspection. Through discussions with the Director of the Campus Radiological Health Department and Radiation Safety Officer and the Assistant Emergency Manager, Office of Emergency Preparedness of the University Hospital, it was noted that the support groups they represented were the ones that were responsible for maintaining the (written) agreement with the ambulance provider for such service. They maintained contact with the ambulance company and had had various discussions about the service that should be provided. Because these support groups were aware of and maintaining the agreement with the ambulance service, no further

contact or review by the RSC was deemed necessary. The inspector agreed with this conclusion. The licensee was encouraged to change the requirement in their E-Plan to reflect the current situation. This issue is considered closed.

c. Conclusion

One URI identified during a previous inspection was closed.

11. Exit Interview

The inspection scope and results were summarized on June 23, 2011, 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 Personnel

D. Choe	Reactor Supervisor and Senior Reactor Operator
C. Furse	Associate Vice President for Research
T. Jevremovic	Director of the Utah Nuclear Engineering Program and Reactor Administrator

Other Personnel

K. Langley	Director, Radiological Health Department and Radiation Safety Officer
K. Thompson	Assistant Emergency Manager, Office of Emergency Preparedness, University Hospital
P. Tikalsky	Chair, Department of Civil and Environmental Engineering

INSPECTION PROCEDURE USED

IP 69001	Class II Research and Test Reactors
IP 92701	Review of Previously Identified Items

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

50-407/2009-201-01	URI	Follow-up to determine whether the RSC should annually be reviewing written agreements that detail arrangements with various offsite support groups to ensure continuity of emergency service or whether those reviews should be conducted by the University instead of the RSC.

LIST OF ACRONYMS USED

10 CFR	Title 10 of the *Code of Federal Regulations*
ARM	Area Radiation Monitor
CAM	Continuous Air Monitor
CENTER	Center for Excellence in Nuclear Technology, Engineering, and Research
DO	Description of Operations
EA	Experiment Authorization
E-Plan	Emergency Plan
INL	Idaho National Laboratory
IP	Inspection Procedure

kW	Kilowatt
LCO	Limiting Conditions of Operation
No.	Number
NRC	U.S. Nuclear Regulatory Commission
RA	Reactor Administrator
Rev.	Revision
RS	Reactor Supervisor
RSC	Reactor Safety Committee
SRO	Senior Reactor Operator
TS	Technical Specifications
UNEP	Utah Nuclear Engineering Program
URI	Unresolved Item