UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 18, 2019

Mr. Matthew Lund, Interim Director
Utah Nuclear Engineering Program
Joseph Merrill Engineering Building
50 S. Central-Campus Drive, Room 1206
Salt Lake City, UT 84112

SUBJECT: UNIVERSITY OF UTAH – U.S. NUCLEAR REGULATORY COMMISSION ROUTINE INSPECTION REPORT NO. 50-407/2019-202

Dear Mr. Lund:

From August 19-22, 2019, the U.S. Nuclear Regulatory Commission (NRC) conducted an inspection at the University of Utah TRIGA Nuclear Reactor facility. The enclosed report documents the inspection results, which were discussed on August 22, 2019, with you and Dr. Glen Sjoden, Energy Solutions President Endowed Chair Professor, Department of Civil and Environmental Engineering, Nuclear Engineering Program.

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 representative records, interviewed personnel, and observed activities in progress. 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, 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).

If you have any questions concerning this inspection, please contact Craig Bassett at (240) 535-1842 or by electronic mail at Craig.Bassett@nrc.gov.

Sincerely,

/RA/

Anthony J. Mendiola, Chief
Research and Test Reactors Oversight Branch
Division of Licensing Projects
Office of Nuclear Reactor Regulation

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

Enclosure:
As stated

cc: 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. Andrew S. Weyrich
Vice President for Research
201 Presidents Circle, Room 210
University of Utah
Salt Lake City, UT 84112-9011

Frederick A. Monette
Director/Radiation Safety Officer
Radiation Safety Office
75 S 2000 E, Room 322
University of Utah
Salt Lake City, UT 84112

Dr. Diane Pataki
Associate Vice President for Research
University of Utah
201 President Circle, Room 210
Salt Lake City, UT 84112

Director, Division of Radiation Control
Dept. of Environmental Quality
195 North 1950 West
P.O. Box 14485
Salt Lake City, UT 84114-4850

Test, Research and Training
Reactor Newsletter
Attention: Ms. Amber Johnson
Dept. of Materials Science and Engineering
University of Maryland
4418 Stadium Drive
College Park, MD 20742-2115

SUBJECT: UNIVERSITY OF UTAH – U.S. NUCLEAR REGULATORY COMMISSION ROUTINE INSPECTION REPORT NO. 50-407/2019-202, DATED:

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

Docket No:	50-407
License No:	R-126
Report No:	50-407/2019-202
Licensee:	University of Utah
Facility:	TRIGA Mark-I Nuclear Reactor Facility
Location:	Salt Lake City, UT
Dates:	August 19 – 22, 2019
Inspector:	Craig Bassett
Approved by:	Anthony J. Mendiola, Chief Research and Test Reactors Oversight Branch Division of Licensing Projects Office of Nuclear Reactor Regulation

Enclosure

EXECUTIVE SUMMARY

University of Utah
TRIGA Mark-I Nuclear Reactor Facility
U.S. Nuclear Regulatory Commission Report No. 50-407/2019-202

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) organization and staffing; (2) operations logs and records; (3) procedures, (4) requalification training, (5) surveillance and limiting conditions for operation; (6) experiments, (7) design changes; (8) committees, audits, and reviews; (9) emergency planning; (10) maintenance logs and records; and (11) fuel handling logs and records 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 in compliance with NRC requirements.

Organization and Staffing

- The organizational structure at the facility met the requirements specified in technical specification (TS) Section 6.1.

- Shift staffing met the minimum requirements for reactor operations.

Operations Logs and Records

- Operational logs and records were consistent applicable TS and procedural requirements.

- Reactor operations, as documented in the records and logs, were conducted in accordance with TSs and procedural requirements.

Procedures

- Facility procedures and document reviews satisfied TS Section 6.4 requirements.

Requalification Training

- Operator requalification was conducted as required by the Requalification Program and Title 10 of the *Code of Federal Regulations* (10 CFR) Part 55, "Operators' Licenses."

Surveillance and Limiting Conditions for Operation

- The surveillance program, including periodic checks, tests, and verifications, was implemented in accordance with TS Sections 3 and 4.

Experiments

- The experiment authorization and control program satisfied regulatory and TS requirements.

Design Changes

- Records indicated that changes at the facility during the past two years were acceptably being reviewed and in accordance with 10 CFR 50.59, “Changes, tests and experiments,” and applicable licensee administrative controls.

Committees, Audits, and Reviews

- Review and audit functions required by TS Section 6.2 were acceptably completed by the Reactor Safety Committee (RSC) or designated individuals.

Emergency Preparedness

- The emergency plan (E-Plan) and implementing procedures were generally being reviewed and updated as required and were acceptable.

- Emergency response equipment was being maintained as required.

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

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

- Offsite support was acceptable, and communications capabilities were adequate.

Maintenance Logs and Records

- Maintenance activities ensured that equipment remained consistent with the safety analysis report and TS requirements.

Fuel Handling

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

- Fuel elements were being inspected on a biennial basis as specified by TS Section 4.1.

REPORT DETAILS

Summary of Facility Status

The University of Utah 100 kilowatt TRIGA Mark-I reactor continued normal routine operations. The reactor was typically operated in support of educational demonstrations, laboratory experiments, reactor system testing, sample irradiations, and operator training. It was usually operated one or two days a week at various power levels up to 90 kW. During the inspection, the reactor was not operated because of instrumentation issues.

1. Organization and Staffing

a. Inspection Scope (Inspection Procedure [IP] 69001, Section 02.01)

The inspector reviewed the following to verify that the staffing requirements, personnel responsibilities, and organizational structure specified in Section 6.1 of the licensee's TSs, as implemented through Amendment Number (No.) 9 of the Renewed Facility Operating License No. R-126, dated December 12, 2011, were being met:

- Organization and staffing for the facility
- TRIGA Console Logbooks Nos. 40 and 41
- Administrative controls and management responsibilities
- Utah Nuclear Engineering Program (UNEP) Procedure, P-001, "Description of Operations," Revision (Rev.) 1, (UNEP P-001R1), Section 1, "Organization and Responsibilities"
- Start-up and Termination Procedures and Log containing Form UNEP-001R14, "Pre-Start/Operation/Termination Procedure"
- The University of Utah TRIGA Reactor (UUTR) Annual Operating Report for the period of July 1, 2017, through June 30, 2018, submitted to the NRC on September 6, 2018
- The UUTR Annual Operating Report for the period July 1, 2018, through June 30, 2019, submitted to the NRC on July 30, 2019

b. Observations and Findings

Through discussions with licensee representatives, the inspector determined that designated management responsibilities at the UUTR facility had not changed since the previous NRC operations inspection in July 2017 (see NRC Inspection Report No. 50-407/2017-201). The Utah Nuclear Engineering Facility (UNEF) Manager, who was also designated as the Director of the UNEP, was responsible for general reactor facility operation. The Reactor Supervisor (RS) was responsible for the day-to-day operation and maintenance of the facility as specified in the TSs. The RS reported to the Vice President for Research of the University of Utah through the UNEF Manager. It was noted that the person designated as the RS was also temporarily filling the position of the Director of the UNEP.

Through review of records and logs, and through discussions with licensee personnel, the inspector determined that the organizational structure observed at the UUTR facility met the requirements stated in Section 6.1 of the TSs. At the time of the inspection there was one licensed senior reactor operator (SRO) and one licensed reactor operator (RO) who maintained their licenses current at the facility. Other individuals held licenses at the facility, but they were in suspension due to lack or operating hours, lack of a timely medical exam, or other issues. However, the inspector noted that shift staffing during reactor operations, as documented in the appropriate logs, met the minimum requirements specified in the TSs.

c. Conclusion

The organizational structure at the facility met the requirements specified in TS Section 6.1. Shift staffing met the minimum requirements for reactor operations.

2. Operations Logs and Records

a. Inspection Scope (IP 69001, Section 02.02)

The inspector reviewed selected aspects of the following to ensure that the operations program was being implemented as required in TS Sections 3, 4, and 6:

- TRIGA Console Logbooks Nos. 40 and 41
- UNEP Maintenance Procedures and Log (ML)
- UNEP Startup and Termination Procedures and Log (STL)
- Selected surveillance data sheets, records, and tests
- UNEP P-001R1, Section 2, “Reactor Operations”
- Form UNEP-001R14, “Pre-Start/Operation/Termination Procedure”
- UNEP Job-Aid 001R1a, “Reactor Supervisor’s Periodic Calendar,” Rev.1.a
- The two most recent UUTR Annual Operating Reports

b. Observations and Findings

During the inspection, the inspector observed maintenance activities and reviewed the UUTR console log books, monthly and daily surveillance check sheets, and operating record forms. The inspector verified that the reactor operating characteristics, and other procedurally required entries, were logged appropriately and that the checklists were completed. A review of the licensee’s logs and records also indicated that the TS operational limits had not been exceeded and that, as noted previously, shift staffing met the minimum requirements.

The inspector was not able to observe reactor operations because the licensee was trouble shooting the console and instrumentation electronics following erratic readings on the linear channel. The licensee was being careful to try and isolate and correct the problem prior to authorizing restart of the reactor.

c. Conclusion

Operational activities were consistent with applicable TSs and procedural requirements.

3. Procedures

a. Inspection Scope (IP 69001, Section 02.03)

To verify that facility procedures were being reviewed, revised, and implemented as required by TS Section 6.4, the inspector reviewed various aspects of:

- Selected forms and checklists
- UNEP P-001R1, Section 1.4, “Documentation”
- Procedural reviews and updates documented in the RSC meeting minutes for the past two years
- UNEP-001R14, “Prestart/Operation/Termination Procedure,” Rev. 14
- UNEP-002R4, “Biennial Fuel/Tank/Control Rod/Reflector Element Inspections,” Rev. 4
- UNEP-016R4, “Agreement for Off-Hours Access,” Rev. 4

b. Observations and Findings

The inspector noted that the licensee used procedures to conduct operations at the facility. The procedures were typically comprised of checklists or forms to assist staff members in completing required work in a systematic, step-by-step manner. However, some job aides were also available for use. The procedures were available for those tasks and items required by the TSs. Substantive changes to the procedures were reviewed and approved by the RSC as required. Training of personnel on procedures and the applicable changes was acceptable.

There was no TSs requirement to review facility procedures on a specific periodic basis. However, the facility procedures were reviewed, as needed, with the last review being completed in May 2017. The licensee indicated that they plan to initiate a periodic review of their procedures, but this was still pending.

c. Conclusion

Facility procedures and document reviews satisfied TS Section 6.4 requirements.

4. Requalification Training

a. Inspection Scope (IP 69001, Section 02.04)

To verify that the operator requalification activities and training were conducted in accordance with various regulatory requirements in 10 CFR Part 55 and the requirements stipulated in the Operator Requalification Program contained in the safety analysis report (SAR), the inspector reviewed selected aspects of:

- TRIGA Console Logbooks Nos. 40 and 41
- SAR Chapter 12, Section 9, “Operator Training and Requalification”
- Requalification Training Records for the past three years
- Medical examination records for the past three years
- Form UNEP-017R3, “Familiarization Checksheet”
- Form UNEP-025R3, “Requalification Program Progress Checklist”

b. Observations and Findings

As of the date of the inspection, the active NRC-licensed staff at the facility consisted of one SRO and one RO. The inspector verified that both had current licenses. Other individuals held operator licenses at the facility, but the operator’s licenses were suspended because the individuals had not had the time to operate the reactor for the required number of hours per quarter or complete the required training because they were graduate students and had just graduated. Other individuals with suspended licenses were working or completing internships elsewhere. The licensee planned to send in a notification to the NRC that these individuals no longer required a license.

The active licensed operators were maintaining the proper qualifications and were successfully completing the facility’s requalification and training program. The inspector verified that they had completed the minimum required hours of operating the reactor per quarter. The operators had also completed annual operating tests and biennial written examinations as required. The inspector verified that the tests and examinations were administered at the specified frequency and that the level of difficulty was comparable to that of NRC-administered tests and examinations. The inspector confirmed that the requalification program was being administered in a manner that would sufficiently maintain the qualifications and proficiency of the licensed operators currently working at the facility. The inspector also noted that the operators had also received the appropriate biennial medical examinations as required.

c. Conclusion

Operator requalification was conducted as required by the licensee’s Operator Requalification Program and 10 CFR Part 55.

5. Surveillance and Limiting Conditions for Operation

a. Inspection Scope (IP 69001, Section 02.05)

To verify that the licensee had conducted the facility surveillance program in accordance with TS requirements, the inspector reviewed:

- UNEP STL
- TRIGA Console Logbooks Nos. 40 and 41
- UNEP Monthly Surveillance Procedures and Log
- UNEP Scheduled Surveillance Procedures and Log
- UNEP Unscheduled Surveillance Procedures and Log
- UNEP Job-Aid 001R1a, “Reactor Supervisor Periodic Calendar”

- UNEP P-001R1, Section 3, “The Maintenance and Surveillance of the TRIGA Reactor and Support Systems”
- Various UNEP Procedures/Forms including: UNEP-001R14, “TRIGA Pre-Start Checklist;” UNEP-002R4, “Biennial Fuel/Tank/Control Rod/Reflector Element Inspection;” UNEP-003R8, “Semi-Annual Control Rod Calibration;" UNEP-011R3, “Calibration of Temperature Monitoring Channels;” UNEP-012R4, “Semi-Annual Thermal Power Calibration;” UNEP-020R13, “Monthly Inspection Checklist;” UNEP-022R4, “Maintenance Log;” and, UNEP-036, “Calibration of pH Meter”
- The two most recent UUTR Annual Operating Reports

b. Observations and Findings

Daily, monthly, and other periodic checks, tests, and verifications required by the TSs were being completed as required. The inspector reviewed selected UUTR required surveillances and verified all the recorded results were within the TSs and procedurally prescribed parameters. The records and logs were noted to be complete and were being maintained as required.

c. Conclusion

The program for surveillance, including periodic checks, tests, and verifications, was implemented in accordance with TS Sections 3 and 4 requirements.

6. Experiments

a. Inspection Scope (IP 69001, Section 02.06)

The inspector reviewed selected aspects of the following to verify that experiments were being conducted within the controls specified in TS Sections 3.8, 4.8, and 6.5, and approved guidelines:

- Survey and control of irradiated items
- UNEP Experimental Procedures and Log
- TRIGA Console Logbooks Nos. 40 and 41
- UNEP P-001R1, Section 4, “Experiment Methods”
- Selected TRIGA Reactor Irradiation Request forms documented on Form UNEP-027R6, “TRIGA Reactor Irradiation Request and Performance”
- Current authorized routine (Class I) experiment documented on UUTR Experiment Authorization (EA) Form, RSC approval dated December 12, 2013, latest authorization number 12-10-2014
- First current authorized new (Class II) experiment documented on UUTR EA Form, RSC approval dated January 10, 2018, latest authorization number 01-18-2018
- Second current authorized new (Class II) experiment documented on UUTR EA Form, RSC approval dated December 18, 2018, latest authorization number 12-18-2018
- The two most recent UUTR Annual Operating Reports

b. Observations and Findings

In the past, there were various experiments that had been approved to be conducted at the facility. However, the inspector noted that currently there was only one authorized and approved experiment classified as a Routine (historically known as a Class I) experiment. The inspector verified that the experiment was being reviewed annually and a new EA form for the 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 neutron activation analysis, (2) fission track analysis standards and materials, (3) isotopes for the production of medical tracers, and (4) electronics and materials (to include dosimeters).

Since the previous inspection in this area of experiments, the inspector noted that two experiments had been initiated, reviewed, and approved by the RS, the RSC, and the Radiation Safety Department. These experiments were new (also known as a Class II) experiments. One of the new experiments dealt with the calibration of Neutron Detectors. The other new experiment dealt with production of Molybdenum-99 in the Central Irradiator of the reactor.

The irradiations completed under the approved experiments were conducted under the cognizance of the RS and an SRO as required. The results of the irradiations were documented in the TRIGA Operations Logbook and on the appropriate Irradiation Request and Performance 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 irradiated products satisfied regulatory and TS requirements.

7. Design Changes

a. Inspection Scope (IP 69001, Section 02.08)

To determine whether modifications to the facility were consistent with 10 CFR Section 50.59 and TS Section 6.2, the inspector reviewed:

- Form UNEP-035R4, “Audit and Review Program”
- RSC meeting minutes for 2017, 2018, and to date in 2019
- UNEP P-001R1, Section 1.3.1.3, “Radiation Safety Committee”
- UNEP ML, which included various 10 CFR 50.59 screenings including UNEP 10 CFR 50.59, “Replacement of the UUTR Fission Counter Amplifier,” completed September 24, 2018
- UNEP Administrative Procedure 001, Rev. 1 (AP-001R1) “Guidelines for 10 CFR 50.59 Evaluations”

- Various UNEP Job-Aids including: 002R1, “10 CFR 50.59 Screening,” 003R1, “10 CFR 50.59 Evaluation,” and 004R1, “10 CFR 50.59 Screener/Evaluator Designation”
- The two most recent UUTR Annual Operating Reports

b. Observations and Findings

The licensee had created a procedure outlining the 10 CFR 50.59 process which was noted as being detailed and had easy-to-follow job-aids as a supplement. The changes that had been made to the facility, since the last inspection, were well documented, thorough screenings were completed, and evaluations were conducted if required. The inspector also noted that several changes to the facility were currently in progress but had not been completed because the screenings were not yet done.

c. Conclusion

Records indicated that changes at the facility during the past two years were acceptably being reviewed and in accordance with 10 CFR 50.59 and applicable licensee administrative controls.

8. Committees, Audits, and Reviews

a. Inspection Scope (IP 69001, Section 02.09)

To verify that the licensee had conducted reviews and audits as required by TS Section 6.2, the inspector reviewed:

- RSC meeting minutes for 2017, 2018, and to date in 2019
- Audits completed by the RSC or an RSC designee for 2017, 2018, and to date in 2019
- UNEP P-001R1, Section 1.3.1.3, “Radiation Safety Committee”
- Form UNEP-035R4, “Audit and Review Program”
- The two most recent UUTR Annual Operating Reports

b. Observations and Findings

The inspector reviewed the RSC meeting minutes from September 2017 to the present. These meeting minutes showed that the RSC had met more frequently than required by the TSs and had considered the types of topics outlined therein. 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 TSs for 2017 and 2018. The audits were structured so that the various aspects of the licensee's operations and radiation safety programs were reviewed at least annually. Most facility documents and plans, including the

major facility procedures, were reviewed annually. The Security Plan and the Description of Operations Procedure Manual were reviewed biennially. The inspector noted that the reviews and audits were thorough, and the resulting findings were meaningful. The licensee responded and took corrective actions as needed.

It was noted that no audits had been completed in 2019 to date. When the inspector inquired about this issue, the licensee indicated that one audit, being conducted for the Chair of the RSC (for the first and second quarters of 2019), was in progress. The other annual or biennial audits were being scheduled.

It was also noted that the RSC had not completed a biennial review of the Emergency Plan. This was because a revision of the plan to incorporate suggested changes was not finished. The licensee indicated that the revision was in progress and would be ready for review by the December meeting of the RSC. The licensee was informed that the revision of the Emergency Plan, and review and approval by the RSC would be designated as an Inspector Follow-up Item (IFI) and would be reviewed during a future inspection (IFI 50-407/ 2019-202-01).

c. Conclusion

Review and oversight functions required by TS Section 6.5 were acceptably completed by the RSC.

9. Emergency Planning

a. Inspection Scope (IP 69001, Section 02.10)

To verify that the licensee was implementing and complying with the "University of Utah, Utah Nuclear Engineering Program (UNEP) Emergency Plan for NRC License R-126: TRIGA Nuclear Reactor," Rev. 8, dated July 20, 2011, the inspector reviewed selected aspects of:

- Selected Emergency (Implementing) Procedures
- Training records for staff and training for offsite support personnel
- Emergency response supplies, equipment, and instrumentation
- Documentation of emergency drills and critiques for 2017, 2018, and 2019
- UNEP Annual Emergency Training Attendance Record forms for 2017, 2018, and to date in 2019
- Various UNEP Forms including: UNEP-015R4, "Emergency Kit Check;" UNEP-021R28, "UNEP Emergency Call List;" and, UNEP-037, "Radiological Emergency Classification Checklist"
- Letter of Agreement with Gold Cross Ambulance, dated October 9, 2014

b. Observations and Findings

The E-Plan in use at the reactor and emergency facilities was the same as the version most recently reviewed by the NRC. The E-Plan was being audited annually and was last audited/reviewed June 5, 2018. Implementing procedures

were reviewed and revised as needed. The E-Plan was required to be reviewed and approved biennially by the RSC. As noted in the previous paragraph, this had not been done to date. An IFI has been established to review this issue in the future.

The inspector verified that semiannual inventories of the various first aid kits and other equipment were generally being conducted as required in the E-Plan. Supplies, instrumentation, and equipment were being maintained as required in the E-Plan. Training for reactor staff and support personnel was being conducted and generally documented as required. It was noted that the UNEP Emergency Call List was last updated March 6, 2019.

Emergency drills were being conducted annually as required. In the past, critiques were held following each drill but there was no documentation of the meetings. During this inspection the inspector followed up on what the licensee had done to correct this problem. It was noted that the critiques for the drill held in 2018 and the one in 2019 had been held and the results of the critiques, including strengths and apparent weaknesses, had been documented. The drills and critiques appeared to be adequate.

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 upper level management at the University. Therefore, the reactor facility did not need or maintain separate agreements with these groups in addition to those already established by the University. An agreement with an offsite entity to provide transportation services for a person injured at the facility was being maintained. It was also noted that communications capabilities with the various support groups were acceptable and were tested periodically.

As part of the inspection, the inspector, the RS, and an RO trainee visited the University of Utah Hospital (also known as 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 and the staff personnel were adequately trained. Also, there appeared to be a good working relationship between the licensee staff and hospital personnel.

c. Conclusion

The emergency preparedness program was being implemented adequately as evidenced by the following: (1) the E-Plan and Implementing Procedures were generally being reviewed and updated as required and were acceptable, (2) emergency response equipment was being maintained as required, (3) annual drills were being conducted and critiques held as required by the E-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. Maintenance Logs and Records

a. Inspection Scope (IP 69001, Section 02.11)

To verify that the licensee had conducted the facility surveillance program in accordance with TS requirements, the inspector reviewed:

- TRIGA Console Logbooks Nos. 40 and 41
- UNEP Procedures and Logs including STL and ML
- UNEP P-001R1, Section 3, "The Maintenance and Surveillance of the TRIGA Reactor and Support Systems"
- UNEP Job-Aid 001R1a, "Reactor Supervisor Periodic Calendar"
- Various UNEP Forms including: UNEP-002R4, "Biennial Fuel/Tank/Control Rod/Reflector Element Inspection;" UNEP-020R13, "Monthly Inspection Checklist;" and, UNEP-022R4, "Maintenance Log"
- Various UNEP Equipment Repair/Maintenance Reports including: "Reactor Control Console," dated July 8,2015; "Percent and Log Power Ion-Chambers," dated August 27, 2015; and, "Log and Period Power Electronics Control Card," dated August 5, 2015, including the related 10 CFR 50.59 Screening Forms
- The two most recent UUTR Annual Operating Reports

b. Observations and Findings

The inspector reviewed the maintenance records for the period from 2017 through 2019 to date. These included scheduled and unscheduled preventive and corrective maintenance activities. Various items of equipment required maintenance, many apparently due to the age of the reactor and the associated equipment.

Routine and preventive maintenance was controlled and documented in a tracking system called DevonWay. A review of the UUTR ML indicated that all maintenance activities were generally being documented and completed in a timely manner to maintain the equipment operational. Various Maintenance Log pages were not complete as of the date of this inspection. The licensee indicated that 10 CFR 50.59 screenings were in the process of being filled out and, when completed, the work would be completed along with the log entries.

After all maintenance items were completed, system operational checks were performed to ensure the affected systems were operable before returning them to service. It was noted that when more extensive repairs were needed, these projects were reviewed using the 10 CFR 50.59 screening process. None of the items reviewed had "screened in" (i.e., required an evaluation) to date.

c. Conclusion

Maintenance activities ensured that equipment remained consistent with the SAR and TS requirements.

11. Fuel Handling Logs and Records

a. Inspection Scope (IP 69001, Section 02.12)

The inspector reviewed selected aspects of the following in order to verify adherence to fuel handling and inspection requirements specified in TS Sections 3.1, 4.1, 5.3, and 5.4 and the applicable procedures:

- UNEP Core Log (CL)
- TRIGA Console Logbooks Nos. 40 and 41
- Heavy Water Element Inspection Forms
- UNEP Fuel Procedures and Log (FL) - Aluminum
- UNEP FL - Stainless Steel
- UNEP P-001R1, Section 2.6, “Fuel Movement, Control Rod Movement, and Core Changes”
- UUTR Core (element location sheet), Core Configuration 24B, last updated February 27, 2019
- Various UNEP Forms including: UNEP-002R4, “Biennial Fuel/Tank/Control Rod/Reflector Element Inspection;” UNEP-005R5 Core Change and Critical Fuel Loading;” and, UNEP-018, “Fuel Element Inventory Sheet”
- The two most recent UUTR Annual Operating Reports

b. Observations and Findings

The inspector determined that the licensee was maintaining the required records of the various fuel movements that had been completed as required. 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, as indicated in UNEP CL, on February 27, 2019.

Core loading procedures provided a specific method to move and handle fuel consistent with the requirements and provisions of the TS Section 3.1.4 and the licensee safety analyses. Fuel movement and fuel examination records showed that the fuel in the current core and in storage was examined biennially as required. The inspector also reviewed the records of movement and examination of various heavy water and graphite elements. All the various elements were last inspected in the May-June 2018 time frame. The controls specified for these operations were acceptable. It was also noted that fuel handling tools were controlled and secured when not in use.

c. Conclusion

Reactor fuel movements and inspections were completed and documented in accordance with applicable procedures. The fuel was being inspected biennially as required by TS Section 4.1.

12. 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 IFI.

b. Observation and Findings

IFI 50-284/2017-201-01 – (Closed) – Follow-up on the licensee's actions to document the results of the critiques held following each annual drill.

In July 2017, the inspector had determined that the licensee was conducting emergency drills annually as required and critiques were held. However, no formal documentation of the critiques existed. An Inspector IFI was opened during that inspection to follow the issue.

During this inspection, the inspector reviewed the issue of documenting the results of critiques held following each drill. As noted above, the drills for 2018 and 2019 were held and critiques were held following to highlight strengths and initiate efforts to address any weaknesses. As a result of the efforts by the licensee to correct the problem of failing to document the drill critiques, this issue and IFI are considered closed.

13. Exit Interview

The inspection scope and results were summarized on August 22, 2019, 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

M. Barber	Academic Interim Director for UNEP, University of Utah
A. Foley	Reactor Operator
C. Furse	Associate Vice-President for Research, University of Utah
D. Kim	Senior Reactor Operator
M. Lund	Interim Director of the Utah Nuclear Engineering Program/Reactor Supervisor and Senior Reactor Operator
S. Pappas	Laboratory Technician and Reactor Operator Trainee
A. Weyrich	Vice President for Research, University of Utah

Other Personnel

P. Chaffee	Director, Emergency Management, University of Utah Hospital
F. Monette	Director, Radiological Health Department and Radiation Safety Officer for the University of Utah
K. Thompson	Emergency Management Manager, University of Utah Hospital
G. Sjoden	Energy Solutions President Endowed Chair Professor, Department of Civil and Environmental Engineering, Nuclear Engineering Program
K. Windsor	Emergency Program Manager, University of Utah Hospital

INSPECTION PROCEDURE USED

IP 69001	Class II Research and Test Reactors
IP 92701	Follow-up on Previously Identified Items

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-407/2019-202-01	IFI	Follow-up on the licensee's actions to complete the revision of the Emergency Plan and have it reviewed and approved by the RSC.

Closed

50-407/2017-201-01	IFI	Follow-up on the licensee's actions to ensure that the critiques following the emergency drills are properly documented as required by the Emergency Plan.

LIST OF ACRONYMS USED

10 CFR	Title 10 of the *Code of Federal Regulations*
CL	Core Log
E-Plan	Emergency Plan
EA	Experiment Authorization
FL	Fuel Procedures and Log
IFI	Inspector Follow-up Item
IP	Inspection Procedure
ML	Maintenance Procedures and Log
No.	Number
NRC	U.S. Nuclear Regulatory Commission
Rev.	Revision
RO	Reactor Operator
RS	Reactor Supervisor
RSC	Reactor Safety Committee
SAR	Safety Analysis Report
SRO	Senior Reactor Operator
STL	Startup and Termination Procedures and Log
TSs	Technical Specifications
UNEF	Utah Nuclear Engineering Facility
UNEP	Utah Nuclear Engineering Program
UUTR	University of Utah TRIGA Reactor