



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

October 7, 2021

Dr. Glenn Sjoden, Director  
Utah Nuclear Engineering Program  
Joseph Merrill Engineering Building  
110 Central Campus Drive, Rm 2000  
Salt Lake City, UT 84112

SUBJECT: UNIVERSITY OF UTAH - U.S. NUCLEAR REGULATORY COMMISSION  
ROUTINE INSPECTION REPORT NO. 05000407/2021201

Dear Dr. Sjoden:

From August 16 - 19, 2021, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the University of Utah TRIGA Nuclear Reactor facility. The enclosed report documents the inspection results, which were discussed on August 19, 2021, with you and other faculty and staff members.

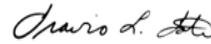
During the inspection, the NRC staff examined activities conducted under your license as they relate to public health and safety to ensure compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination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

Based on the results of this inspection, the NRC has determined that a Severity Level IV violation of NRC requirements occurred. The violation is being treated as a non-cited violation (NCV), consistent with Section 2.3.2.b of the Enforcement Policy. The NCV is described in the subject inspection report. No response to this letter is required. However, if you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U. S. Nuclear Regulatory Commission, Attn: Document Control Desk, Washington DC 20555-0001, with copies to be sent to the Director, Office of Enforcement, U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

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 <https://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](mailto:Craig.Bassett@nrc.gov).

Sincerely,



Signed by Tate, Travis  
on 10/07/21

Travis L. Tate, Chief  
Non-Power Production and Utilization  
Facility Oversight Branch  
Division of Advanced Reactors and Non-Power  
Production and Utilization Facilities  
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:

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SUBJECT: UNIVERSITY OF UTAH - U.S. NUCLEAR REGULATORY COMMISSION  
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**U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION**

Docket No.: 50-407

License No.: R-126

Report No.: 05000407/2021201

Licensee: University of Utah

Facility: University of Utah TRIGA Nuclear Reactor

Location: Salt Lake City, UT

Dates: August 16 – 19, 2021

Inspector: Craig Bassett

Approved by: Travis L. Tate, Chief  
Non-Power Production and Utilization  
Facility Oversight Branch  
Division of Advanced Reactors and Non-Power  
Production and Utilization Facilities  
Office of Nuclear Reactor Regulation

Enclosure

## EXECUTIVE SUMMARY

University of Utah  
University of Utah TRIGA Nuclear Reactor  
Inspection Report No. 05000407/2021201

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 NRC staff determined 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 in the TSs for reactor operations.

### Operations Logs and Records

- Operational logs and records were consistent with 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 (EA) and control program satisfied regulatory and TS requirements.

### Design Changes

- Changes made at the facility during the past 2 years were reviewed in accordance with 10 CFR 50.59, "Changes, tests and experiments," and applicable licensee procedures.

### 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 preparedness program was effectively implemented through the emergency plan (E-Plan) and implementing procedures.

### Maintenance Logs and Records

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

### Fuel Handling

- Reactor fuel movements were completed and documented in accordance with procedure.
- Fuel elements were inspected on a biennial basis as specified by TS Section 4.1.

## REPORT DETAILS

### Summary of Facility Status

The University of Utah 100 kilowatt (kW) 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.

### 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 were met:

- TRIGA Reactor Console Logbooks Nos. 41 and 42
- administrative controls and management responsibilities
- Utah Nuclear Engineering Program (UNEP) Procedure, P-001, "Description of Operations," Revision (Rev.) 1, (UNEP Procedure P-001R1), Section 1, "Organization and Responsibilities"
- Form UNEP-001R17, "Pre-Start/Operation/Termination Procedure"

#### b. Observations and Findings

Through discussions with licensee representatives, the inspector confirmed that designated management responsibilities at the University of Utah TRIGA Reactor (UUTR) facility were not changed since the previous NRC operations inspection in August 2019 (see NRC Inspection Report No. 50-407/2019-202). The inspector noted that 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 inspector verified that 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.

Through review of records and logs, and through discussions with licensee personnel, the inspector confirmed that the organizational structure at the UUTR facility met the requirements stated in Section 6.1 of the TSs. At the time of the inspection, the inspector found that there were two licensed senior reactor operators (SROs). The inspector found other individuals held licenses at the facility, but they were in suspension due to lack of operating hours, lack of a timely medical exam, or other issues.

#### c. Conclusion

The inspector determined that the organizational structure at the facility met the requirements specified in TS Section 6.1.

## 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 implemented as required in TS Sections 3, 4, and 6:

- UUTR Console Logbooks Nos. 41 and 42
- UNEP Maintenance Procedures and Log (ML)
- UNEP Startup and Termination Procedures and Log (STL)
- selected surveillance data sheets, records, and tests
- UNEP Procedure P-001R1, Section 2, "Reactor Operations"
- Form UNEP-001R17, "Pre-Start/Operation/Termination Procedure"
- UNEP Job-Aid 001R1a, "Reactor Supervisor's Periodic Calendar"
- The UUTR Annual Operating Reports for the periods of July 1, 2019, through June 30, 2020, submitted to the NRC on July 27, 2020, and July 1, 2020, through June 30, 2021, submitted on July 30, 2021

### b. Observations and Findings

#### (1) Operating Records

During the inspection, the inspector verified that the reactor operating characteristics, and other procedurally required entries, were logged and that the checklists were completed. The review also indicated that the TS operational limits were not exceeded and that shift staffing met the minimum requirements. The inspector noted that the UUTR console logbook also indicated that a new reactor console was installed at the facility.

#### (2) Violation of TSs

TS Section 3.3.3 states that "[t]he conductivity of the reactor tank water shall be less than 5  $\mu$ mhos/cm" (micromhos per centimeter), and Section 3.3.4 states that "[t]he pH [measure of how acidic/basic water is] shall be between 5.5 and 7.5."

On August 5, 2021, following a routine reactor operation, the licensee noted water quality sensor readings that were not within the limits specified in the TSs. The pH sensor reading was 5.15 and the pre-demineralizer conductivity was 6.444  $\mu$ mhos/cm. Prior to the operation, the readings were within the limits, but the pH was lower than normal and the conductivity was higher than normal. This was attributed to a recent addition of algaecide treatment to the pool water. When licensee personnel reviewed the problem, it was determined that the pool water was not cleaned sufficiently following the algaecide treatment. To correct the problem, the licensee initiated the reactor pool clean-up loop and ran the system overnight. This resulted in water quality parameters returning to acceptable levels. This licensee subsequently made an event report to the NRC concerning this issue through a letter dated August 6, 2021.

The inspector reviewed this event. The licensee indicated that the algaecide treatment exacerbated the water quality problem and the reactor pool clean-up

system was not used long enough before initiating a reactor start-up. As additional follow-up actions, the licensee inspected the pool tank using an underwater camera to check for any unusual tank degradation; none was found. An external pool cleanup pump was also used to remove any debris from the bottom of the pool and improve water quality.

The licensee was informed that this failure to maintain the reactor pool water within the TS limits was a violation of TS Sections 3.3.3 and 3.3.4. However, this non-repetitive, licensee-identified and corrected violation is treated as a Non-cited Violation (NCV), consistent with Section 2.3.2.b of the Enforcement Policy (NCV 05000407/2021201-01).

c. Conclusion

The inspector determined that, with the exception of the violation noted above, operational activities were consistent with applicable TSs and procedural requirements and shift staffing met the minimum requirements for reactor operations.

**3. Procedures**

a. Inspection Scope (IP 69001, Section 02.03)

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

- selected forms and checklists
- UNEP-020R14, "Monthly Inspection Checksheet"
- UNEP Procedure P-001R1, Section 1.4, "Documentation"
- Form UNEP-001R17, "Prestart/Operation/Termination Procedure"
- UNEP-023R6, "Annual Maintenance and Calibration of the Area Radiation Monitors (ARMs) and Continuous Air Monitor (CAM)"
- procedural reviews and updates documented in the RSC meeting minutes for the past 2 years

b. Observations and Findings

The inspector noted that licensee procedures were typically comprised of checklists or forms to assist staff members in completing required work in a systematic, step-by-step manner. The inspector found that some job aides were also available for use. The inspector confirmed that procedures were available for those tasks and items required by the TSs. The inspector confirmed 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.

The inspector verified that those procedures affected by the installation of the new reactor console were revised and submitted to the RSC for review and approval. The inspector also verified that the revised procedures were subsequently approved by the RSC as required by TS Section 6.4.

c. Conclusion

The inspector determined that facility procedures were maintained, reviewed, revised, and implemented as required by TS Section 6.4.

**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:

- UUTR Console Logbooks Nos. 41 and 42
- SAR Chapter 12, Section 9, "Operator Training and Requalification"
- requalification training records for the past 3 years
- medical examination records for the past 3 years
- Form UNEP-017R3, "Familiarization Checksheet"
- Form UNEP-025R3, "Requalification Program Progress Checklist"

b. Observations and Findings

The inspector noted that the active NRC-licensed staff at the facility consisted of two SROs. The inspector verified that both of the SROs licenses were current. The inspector found that other individuals held operator licenses at the facility, but those operator's licenses were suspended because the individuals did not operate the reactor for the required number of hours per quarter, complete the required training, or were not currently working at the facility. The inspector confirmed that, if any of those who were suspended from operating the reactor wanted to return to active status, they would have to be reinstated in accordance with the requalification program.

The inspector verified that the active licensed operators successfully completed the facility's requalification and training program. The inspector confirmed that they completed the minimum required hours of operating the reactor per quarter. The operators also completed annual operating tests and written examinations as required. The inspector verified that the operators also received the appropriate biennial medical examinations as required by the regulation.

c. Conclusion

The inspector determined that 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 conducted the facility surveillance program in accordance with TS requirements, the inspector reviewed:

- UNEP STL and associated forms
- UUTR Console Logbooks Nos. 41 and 42
- UNEP monthly surveillance procedures and log and associated forms
- UNEP scheduled surveillance procedures and log and associated forms
- UNEP unscheduled surveillance procedures and log and associated forms
- UNEP Job-Aid 001R1a, "Reactor Supervisor Periodic Calendar"
- UNEP Procedure P-001R1, Section 3, "The Maintenance and Surveillance of the TRIGA Reactor and Support Systems"
- the two most recent UUTR Annual Operating Reports

### b. Observations and Findings

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

### c. Conclusion

The inspector determined that 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 conducted within the controls specified in TS Sections 3.8, 4.8, and 6.5, and approved guidelines:

- UNEP experiment log
- survey and control of irradiated items
- UUTR Console Logbooks Nos. 41 and 42
- UNEP Procedure P-001R1, Section 4, "Experiment Methods"
- selected Form UNEP-027R6, "TRIGA Reactor Irradiation Request and Performance"
- current authorized routine (Class I) experiment documented on UUTR EA Form, RSC approval dated December 12, 2013, and latest authorization number 1-1-2021
- current authorized (new Class II) experiment documented on UUTR EA Form, RSC approval dated June 23, 2021, and latest authorization number 6-24-2021

b. Observations and Findings

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 reviewed annually and a new EA form for the experiment was completed and approved every year as required by procedure. The inspector also noted that one new experiment was initiated, reviewed, and approved by the RS, the RSC, and the Radiation Safety Department. This experiment was also known as a Class II experiment.

The inspector verified that irradiations completed under the approved experiments were conducted under the cognizance of the RS and an SRO. The inspector verified the results of the irradiations were documented in the UUTR console 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 inspector determined that 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 2019, 2020, and to date in 2021
- UNEP ML, which included various 10 CFR 50.59 screenings and evaluations (as needed) including those entitled: "Replacement of UUTR Control Console with a new Thermo-Fisher Gamma-Metrics (TFGM) Console;" "Replacement of Existing ARMs with Mirion DRM-1/2/2E and removal of high radiation SCRAM;" and, "Repair of the Control Rod Drive Assemblies and Cabling"
- 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 inspector noted that the licensee created a procedure outlining the 10 CFR 50.59 process which was detailed and added job-aids as a supplement. The inspector verified the changes to the facility that were proposed since the last inspection, were documented, screenings were completed, and evaluations were conducted if required. The inspector also confirmed that several changes to the facility were completed

following the required screenings and evaluations. The inspector noted that the screening pertaining to the repair of the control rod drive assemblies appeared adequate. The screening and evaluation pertaining to the replacement of the UUTR Control Console involved more detail and is discussed further in Paragraph 12 below.

c. Conclusion

The inspector determined that, with the exception of the console changes undergoing further inspection, changes made at the facility during the past 2 years were reviewed in accordance with 10 CFR 50.59 and applicable licensee procedures.

**8. Committees, Audits and Reviews**

a. Inspection Scope (IP 69001, Section 02.09)

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

- RSC meeting minutes for 2020 and to date in 2021
- audits completed by the RSC or an RSC designee for 2019, 2020, and 2021
- 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 April 2020 to the present. These meeting minutes showed that the RSC met as required by the TSs and considered the types of topics outlined therein. The inspector also found 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 were completed in those areas outlined in the TSs for 2019, 2020, and to date in 2021. The inspector noted that audits were scheduled so that the various aspects of the licensee's operations and radiation safety program were reviewed at least annually. The inspector verified most facility documents, plans, and major facility procedures were also reviewed annually. The inspector found that 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.

c. Conclusion

The inspector determined that review and oversight functions required by TS Section 6.5 were completed by the RSC.

## 9. Emergency Planning

### a. Inspection Scope (IP 69001, Section 02.10)

To verify that the licensee implemented and complied 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 2019, 2020, and 2021
- UNEP Annual Emergency Training Attendance Record forms for 2019, 2020, and to date in 2021
- 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 inspector confirmed that the E-Plan in use at the reactor and emergency facilities was the same as the version most recently reviewed by the NRC. The inspector noted that the E-Plan was audited annually and the last audit was completed August 13, 2021. Implementing procedures were reviewed and revised as needed.

The inspector verified that semiannual inventories of the various first aid kits and other equipment were conducted as required in the E-Plan. The inspector noted that the supplies, instrumentation, and equipment were maintained as required in the E-Plan. The inspector confirmed that training for reactor staff and support personnel was conducted and documented. The inspector also noted that the UNEP Emergency Call List was up-to-date with the current revision dated July 24, 2021.

The inspector confirmed that emergency drills were conducted annually and critiques were held following each drill documenting strengths and areas for improvement. The inspector found drills were challenging and the critiques were appropriate.

The inspector reviewed the agreement between the licensee and a local company to provide transportation services for a person injured at the facility and verified that it was maintained. The inspector also noted that communications capabilities with the various support groups were acceptable and were tested periodically.

### c. Conclusion

The inspector determined that the emergency preparedness program was implemented as required by the E-Plan.

## 10. Maintenance Logs and Records

### a. Inspection Scope (IP 69001, Section 02.11)

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

- UUTR Console Logbooks Nos. 41 and 42
- UNEP Procedures and Logs including STL and ML
- UNEP Job-Aid 001R1a, "Reactor Supervisor Periodic Calendar"
- various UNEP Equipment Repair/Maintenance Reports
- UNEP Procedure P-001R1, Section 3, "The Maintenance and Surveillance of the TRIGA Reactor and Support Systems"
- various UNEP Forms including: UNEP-002R4, "Biennial Fuel/Tank/Control Rod/Reflector Element Inspection;" UNEP-020R14, "Monthly Inspection Checklist;" and, UNEP-022R4, "Maintenance Log"
- the two most recent UUTR Annual Operating Reports

### b. Observations and Findings

#### (1) Routine Maintenance Review

The inspector reviewed the maintenance records for the period from 2019 through 2021 to date. These included scheduled and unscheduled preventive and corrective maintenance activities. The inspector confirmed that maintenance activities were controlled and documented. A review of the UNEP ML indicated that all maintenance activities were completed in a timely manner to maintain the equipment operational.

The inspector verified that, after all maintenance items were completed, system operational checks were performed to ensure the affected systems were operable before returning them to service. The inspector noted that when more extensive repairs were needed, these projects were reviewed using the 10 CFR 50.59 screening/evaluation process.

#### (2) Component Malfunction

The inspector reviewed the circumstances surrounding a Special Report issued by the licensee, dated April 2, 2020, in accordance with UUTR TS Section 6.7.2.1.5 documenting a component malfunction.

On March 30, 2020, facility personnel completed the routine monthly inspection of various reactor components and systems and initiated a standard reactor startup and termination checklist to test all systems. One portion of this test was to withdraw the safety control rod to 100 percent and then disrupt the power to the magnet causing the rod to drop. The licensee staff noted that the safety rod did not drop as expected which prompted the RO to begin to insert the rod manually. After inserting the safety rod to 98 percent, the rod dropped without further assistance to the fully inserted position. Further troubleshooting showed that the safety rod was not responding as required and the RS terminated the operation. After receiving approval from the

RSC, the RS and licensee staff completed the control rod inspection procedure which entailed removing the safety rod from the reactor pool. The safety rod was disassembled and rust and calcium deposits were noted and subsequently removed. Following these corrective actions, the safety rod was inspected, reassembled, and reinstalled in the core. Testing and calibration of the safety rod indicated that the malfunction was resolved and the rod functioned properly.

The inspector reviewed this issue during the inspection. In their letter to the NRC concerning the component malfunction, the licensee indicated that the procedure involving the inspection of the control rods, UNEP-002R4, "Biennial Fuel/Tank/Control Rod/Reflector Element Inspection," would be revised to include checking for debris, binding, rubbing, or misalignment of the control rod drives that might prevent the control rods from dropping. The licensee indicated that, although this was normally done during completion of the procedure, the wording of the procedure was not revised to reflect these needed actions. The licensee committed to revise the procedure. The licensee was informed that the issue of revising the procedure to include all the actions needed during control rod inspection would be considered an Inspector Follow-up Item (IFI) and would be reviewed during a future inspection (IFI 05000407/2021201-02).

c. Conclusion

The inspector determined that 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 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
- UUTR Console Logbooks Nos. 41 and 42
- UNEP Fuel Procedures and Log – Aluminum and Stainless Steel
- UNEP Procedure P-001R1, Section 2.6, "Fuel Movement, Control Rod Movement, and Core Changes"
- UUTR Core (element location sheet), Core Configuration 24C, last updated
- various forms including: 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 confirmed that the licensee maintained the required records of the various fuel movements that were completed. The inspector verified that the latest core reconfiguration was completed June 24, 2020. The resulting UUTR core was designated as Core Configuration 24C.

The inspector verified that core loading procedures provided a specific method to move and handle fuel consistent with the requirements and provisions of TS Section 3.1.4 and the licensee safety analyses. The inspector noted that the fuel was examined biennially as required. All the various elements were last inspected in the May-June 2020 time frame. The inspector confirmed that the controls specified for those operations were implemented. The inspector also noted that fuel handling tools and equipment were controlled and secured when not in use.

c. Conclusion

The inspector determined that reactor fuel movements and inspections were completed and documented in accordance with applicable procedures. The fuel was 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 previously identified items.

b. Observation and Findings

- (1) IFI 50-284/2019-202-01 – (Open) – Follow-up on the licensee's actions to complete the revision of the E-Plan and have it reviewed and approved by the RSC.

In August 2019, the inspector noted that the RSC did not complete a biennial review of the E-Plan. This was because a revision of the E-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 E-Plan, and review and approval by the RSC would be designated as an IFI.

During this inspection, the inspector reviewed the issue and found that the E-Plan was revised twice and was now under review by the Environmental Health and Safety Department for approval. Once that group approves the E-Plan, it will be submitted to the RSC for final approval and then submitted to the NRC. This issue remains open.

- (2) VIO 05000407/2020201-01 – (Closed) – Failure to have the RS present during initial startup and approach to power of the day during various days in September and October of 2020.

During an inspection in October 2020, the inspector noted a violation of facility TSs. The inspector determined that shift staffing at the UNEP TRIGA Reactor Facility did not meet the requirements stated in Section 6.1.3.3, Specification 3.1 of the TSs. The console operations log indicated that, on September 2, 4, 14, 18, 21, 22, 23, and 24, and October 9, 2020, the Assistant RS was present during reactor startup, not the RS as required. The Assistant RS did not meet the qualifications outlined in American National Standard Institute/American Nuclear Society (ANS/ANSI)-15.4 – 1988; R1999 for the position of Level 3, RS. The licensee was informed that failure

to have a qualified RS present during initial startup of the reactor on various days in September and October was a violation.

During this inspection, the inspector reviewed this issue and the licensee's corrective actions. The inspector noted that, upon notification of the violation, the licensee immediately ceased all reactor operations unless a duly appointed RS was present. On January 22, 2021, a new RS was appointed and was found to have met all the requirements of the facility TSs and ANS/ANSI-15.4. The inspector noted that this person is now available to operate the reactor part-time and the licensee appointed a new RS on March 12, 2021. The inspector verified that the new RS met the requirements of the facility TSs and ANS/ANSI-15.4. According to the records and logs reviewed by the inspector, the RS was present during reactor startup as required. The licensee has also hired an individual who will be appointed to the RS position when the current RS leaves. This issue is considered closed.

- (3) URI 05000407/2020201-02 – (Open) – Review the licensee's completed 10 CFR 50.59 screening and/or evaluation of the installation of a new reactor console.

During the inspection in October 2020, the inspector determined that the licensee was conducting a 10 CFR 50.59 review related to the installation of a new reactor console. The review was not finalized at the time of the inspection. The inspector informed the licensee that the review needed to be complete to determine if the change was appropriately implemented and requested a copy of the completed 10 CFR 50.59 review, along with all the associated documentation.

During this inspection, the inspector obtained a copy of the 10 CFR 50.59 screening and evaluation pertaining to the installation of their new Thermo-Fisher reactor control console which was reviewed, approved, and signed by the UNEP Director and the RSC as required by procedure. The licensee also provided a copy of the console operating procedure which was designated as proprietary. The inspector forwarded the 10 CFR 50.59 documentation to the Non-Power Production and Utilization Facility Licensing Branch for assistance with assessing implementation of the design change process. The coordination of the review is ongoing and this issue remains open.

### **13. Exit Interview**

The inspection scope and results were summarized on August 19, 2021, with licensee representatives. The inspector discussed the findings for each area reviewed. The licensee acknowledged the findings and identified the console operating procedure as the only item reviewed by the inspector that was proprietary.

## **PARTIAL LIST OF PERSONS CONTACTED**

### Licensee Personnel

A. Allison Senior Reactor Operator Trainee  
A. Foley Reactor Supervisor and Senior Reactor Operator  
G. Sjoden Director of the Utah Nuclear Engineering Program

### Other Personnel

M. Barber Professor and Department Chair, Civil and Environmental Engineering, University of Utah  
L. McDonald Associate Professor, Civil and Environmental Engineering, University of Utah  
V. Wang Research Scientist, Civil and Environmental Engineering, University of Utah

## **INSPECTION PROCEDURES USED**

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

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

### Opened

05000407/2021201-01 NCV Failure to maintain the reactor pool water within the limits of TS Sections 3.3.3 and 3.3.4.  
05000407/2021201-02 IFI Follow-up on the licensee's actions to revise procedure UNEP-002R4, "Biennial Fuel/Tank/Control Rod/Reflector Element Inspection," to include maintenance actions needed during control rod inspection.

### Closed

05000407/2020201-01 VIO Failure to have the RS present during initial startup and approach to power of the day during various days in September and October of 2020.  
05000407/2021201-01 NCV Failure to maintain the reactor pool water within the limits of TS Sections 3.3.3 and 3.3.4.

### Discussed

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.

05000407/2020201-02 URI Review the licensee's completed 10 CFR 50.59 screening and/or evaluation of the installation of a new reactor console

**LIST OF ACRONYMS USED**

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
E-Plan	Emergency Plan
EA	Experiment Authorization
IFI	Inspector Follow-up Item
IP	Inspection Procedure
ML	Maintenance Procedures and Log
NRC	U.S. Nuclear Regulatory Commission
Rev.	Revision
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