



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

August 30, 2018

Mr. Craig Reisner, Interim Reactor Manager
Missouri University of Science
and Technology
Nuclear Reactor Facility
250 West 13th Street
Rolla, MO 65409-0630

SUBJECT: MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY – U.S. NUCLEAR
REGULATORY COMMISSION ROUTINE INSPECTION REPORT
NO. 50-123/2018-201 AND NOTICE OF VIOLATION

Dear Mr. Reisner:

From August 6-9, 2018, the U.S. Nuclear Regulatory Commission (NRC) conducted an inspection at the Missouri University of Science and Technology nuclear reactor facility. The enclosed report documents the inspection results, which were discussed on August 9, 2018, with you and a member of your staff, as well as, the Director of Environmental Health and Safety.

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 inspectors reviewed selected procedures and records, observed various activities, and interviewed personnel.

Based on the results of this inspection, the NRC has determined that a Severity Level IV violation of NRC requirements occurred. The violation was evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at <https://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>. The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because it constitutes a failure to meet regulatory requirements that has more than minor safety significance and the licensee failed to identify the violation.

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

In accordance with Title 10 of the *Code of Federal Regulations*, Section 2.390, "Public inspections, exemptions, and requests for withholding," a copy of this letter, its enclosures, and your response will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of 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). To the extent possible, your response should not include any personal privacy or proprietary information, so that it can be made available to the Public without redaction.

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. 50-123
License No. R-79

Enclosures:
As stated

cc: w/enclosures: See next page

cc:

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930 Wildwood Drive
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Department of Natural Resources
1101 Riverside Drive
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A-95 Coordinator
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Reactor Newsletter
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1101 Riverside Drive
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SUBJECT: MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY – NUCLEAR
REGULATORY COMMISSION ROUTINE INSPECTION REPORT
NO. 50-123/2018-201 AND NOTICE OF VIOLATION DATED AUGUST 30, 2018

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OFFICE	NRR/DLP/PROB/RI*	NRR/DLP/PROB/LA*	NRR/DLP/PROB/BC
NAME	CBassett	NParker	AMendiola
DATE	8/22/2018	8/22/2018	8/30/2018

OFFICIAL RECORD COPY

NOTICE OF VIOLATION

Missouri University
of Science and Technology

Docket No. 50-123
License No. R-79

During a U.S. Nuclear Regulatory Commission (NRC) inspection conducted August 6-9, 2018, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

Title 10 of the *Code of Federal Regulations* (10 CFR) 50.34(b)(6)(v) states that each application for an operating license shall include a final safety analysis report. The final safety analysis report shall include information that describes the facility, presents the design bases and the limits on its operation, and presents a safety analysis of the structures, systems, and components and of the facility as a whole, and shall include the following concerning facility operation: Plans for coping with emergencies, which shall include the items specified in Appendix E.

Section 10.1 of the Emergency Plan for the Missouri University of Science and Technology Nuclear Reactor facility requires that, during each regular semester (August to December and January to May) a drill will be conducted on the evacuation of the building.

Contrary to the Emergency Plan requirements referenced above, on August 8, 2018, the NRC inspector found that, during calendar year 2017, no evacuation drills were held at the facility during either regular semester.

This has been determined to be a Severity Level IV violation (Section 6.6).

Pursuant to the provisions of 10 CFR 2.201, "Notice of violation," Missouri University of Science and Technology is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an Order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (Agencywide Documents Access and Management System), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy,

proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements."

In accordance with 10 CFR 19.11, "Posting of notices to workers," you may be required to post this Notice within two working days of receipt.

Dated this 30th day of August 2018.

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

Docket No: 50-123

License No: R-79

Report No: 50-123/2018-201

Licensee: Missouri University of Science and Technology

Facility: Nuclear Reactor Facility

Location: Rolla, MO

Dates: August 6-9, 2018

Inspector: Craig Bassett

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

EXECUTIVE SUMMARY

Missouri University of Science and Technology
Missouri University of Science and Technology Reactor
NRC Inspection Report No. 50-123/2018-201

The primary focus of this routine, announced inspection, was the on-site review of selected aspects of the licensee's Class II research reactor facility safety program including: (1) organization and staffing, (2) operations logs and records, (3) procedures, (4) requalification training, (5) surveillance and limiting conditions for operation (LCO), (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. The licensee's program was acceptably directed toward the protection of public health and safety and in compliance with U.S. Nuclear Regulatory Commission (NRC) requirements.

Organization and Staffing

- The licensee's organization and staffing were in compliance with Section 6.1 of the technical specifications (TSs).

Operations Logs and Records

- Operations logs and records were being maintained in accordance with TS Section 6.8.

Procedures

- Written procedures were being maintained in accordance with the requirements outlined in TS Section 6.4.

Requalification Training

- Operator requalification was generally being conducted as required by the Operator Requalification Program.
- Medical examinations were being completed for each operator biennially as required.

Surveillance and Limiting Conditions for Operation

- The licensee was complying with the TS requirements pertaining to surveillance and LCO.

Experiments

- Reactor experiments were being performed in accordance with the requirements of the TSs and the applicable procedure.

Design Changes

- The licensee maintained a procedure to process facility changes in accordance with regulatory requirements.

Committees, Audits, and Reviews

- The Radiation Safety Committee (RSC) continued to perform independent oversight in accordance with TS requirements.

Emergency Planning

- The facility emergency plan (EP) was being reviewed by the RSC as required.
- Emergency response equipment was being maintained and alarms were tested at the required periodicity.
- Annual evacuation drills and biennial emergency drills were being conducted as required by the EP.
- Emergency preparedness training for staff and first responders was being completed as required.

Maintenance Logs and Records

- Maintenance records and performance satisfied TSs and procedural requirements.

Fuel Handling Logs and Records

- The licensee was conducting fuel handling activities and maintaining records in a manner consistent with regulatory and license requirements.

REPORT DETAILS

Summary of Plant Status

The Missouri University of Science and Technology (Missouri S&T or the licensee) 200 kilowatts pool-type research reactor continued to be operated in support of graduate and undergraduate instruction, laboratory experiments, reactor operator training, and various types of research. During the inspection, the Missouri University of Science and Technology Reactor (MSTR) was operated to support the completion of surveys by campus health physics technicians.

1. Organization and Staffing

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

The inspector reviewed selected aspects of the following regarding the licensee's organization and staffing to ensure that the requirements of Section 6.1 of the TSs, implemented as Appendix A to the Facility Operating License Number (No.) R-79, dated March 30, 2009, were being met:

- Contact phone number list, dated January 8, 2018
- Hourly Log Sheets from January 2016 to the present
- Reactor Console Logbooks No. 18, from October 10, 2014 to March 12, 2018, and No. 19, from March 12, 2018 to the present
- Selected MSTR standard operating procedures (SOPs) for the period from January 2016 to the present including: SOP-102, "Pre-Startup Checklist Procedure;" SOP-105, "Reactor Shutdown & Reactor Securing Procedures;" and, SOP-107, "Permanent Log, Hourly Log, and Operational Data"
- "Progress Report for the Missouri University of Science and Technology Nuclear Reactor Facility," (facility annual report) for the period from April 1, 2016, to March 31, 2017, dated June 1, 2017
- "MSTR Progress Report for the Missouri University of Science and Technology Reactor," for the period from April 1, 2017, to March 31, 2018, dated June 12, 2018
- RSC meeting minutes for 2016 through 2018

b. Observations and Findings

The organizational structure and staff responsibilities had not changed since the last NRC inspection in this area (refer to NRC Inspection Report No. 50-123/2016-201). The facility remained under the direct control of the Interim Reactor Manager (IRM) and he was responsible to the Nuclear Reactor Director for safe operation and maintenance of the reactor and its associated equipment. The Nuclear Reactor Director continued to report to the Chair of Mining and Nuclear Engineering Department (i.e., TS Level 1) as stipulated in the TSs.

The inspector noted that the individual who was serving as the Chair of the Mining and Nuclear Engineering Department (TS Level 1) had stepped down from that position. A new Department Chair had been appointed and took over

on July 1, 2018. The licensee had submitted a report of this change to the NRC as required.

There were two licensed senior reactor operators (SROs) and two licensed reactor operators (ROs) at the facility. A review of the logs and records indicated that shift staffing was as required in the TSs. The inspector noted that each time the SRO or RO changed, an appropriate console log book entry was made. Additionally, the SRO on duty had his name written on a placard attached to the reactor console. A current contact list was posted as required by TS Section 6.1.3.2.

c. Conclusion

Organization and staffing were being maintained in accordance with TS Section 6.1.

2. Operations Logs and Records

a. Inspection Scope (IP 69001, Section 02.02)

The inspector reviewed the following reactor operations records to ensure compliance with the requirements of TS Section 6.8:

- Reactor Console Logbooks No. 18, from October 10, 2014, to March 12, 2018, and No. 19, from March 12, 2018 to the present
- Selected MSTR SOPs and forms for the period from January 2016 to the present including: SOP-101, "General Operating Procedures;" SOP-102, "Pre-Startup Checklist Procedure;" SOP-103, "Reactor Startup to Low Power;" SOP-104, "Reactor Power Changes and Stable Operations;" SOP-105, "Reactor Shutdown & Reactor Securing Procedures;" SOP-107, "Permanent Log, Hourly Log, and Operational Data;" and, SOP-810, "Weekly Checklist"
- MSTR (Annual) Progress Reports for the last two reporting periods

b. Observations and Findings

All reactor operations, including maintenance and unplanned scrams, were documented in the Reactor Console Logbook and records were being maintained as required. Reactor operations were carried out following written procedures and TS requirements. The inspector reviewed the logs, checklists, and other related records related to reactor operations for the past 2 years and confirmed that TS operational limits had not been exceeded.

c. Conclusion

Operations logs and records were being maintained in accordance with TS Section 6.8.

3. Procedures

a. Inspection Scope (IP 69001, Section 02.03)

To ensure that written instructions for those activities specified in TS Section 6.4 were in effect, the inspector reviewed selected aspects of the following:

- Reactor Console Logbooks No. 18, from October 10, 2014 to March 12, 2018, and No. 19, from March 12, 2018 to the present
- Selected MSTR SOPs and forms for the period from January 2016 to the present including: SOP-102, "Pre-Startup Checklist Procedure;" SOP-105, "Reactor Shutdown & Reactor Securing Procedures;" SOP-107, "Permanent Log, Hourly Log, Operational Data;" SOP, "10 CFR 50.59 Changes, Tests, and Experiments;" and, SOP-501, "Emergency Procedures for Reactor Building Evacuation;" SOP-601, "Handling of Radioactive Samples;" SOP-800, "Annual Checklist;" and, SOP-810, "Weekly Checklist"
- MSTR (Annual) Progress Reports for the last two reporting periods
- RSC meeting minutes for 2016 through 2018

b. Observations and Findings

TS Section 6.4 required that operating procedures be prepared for specific activities. It also specified a means for making minor and substantive changes to procedures. The inspector determined that the licensee was complying with the TS guidance for making changes to procedures. Facility annual reports listed the procedures that had been updated during the year and the RSC minutes reflected review and approval of procedure changes.

The inspector noted that all licensed operators were required to review changes to procedures. Records reviewed by the inspector indicated that all operators were reviewing the procedure changes as required. It was also noted that all procedures were required to be reviewed annually by the Reactor Manager, the Reactor Director, or a licensed operator. The inspector verified that this was being completed as required and documented appropriately.

c. Conclusion

Procedures had been established in accordance with TS Section 6.4 and were being maintained, reviewed, and updated as required.

4. Requalification Training

a. Inspection Scope (IP 69001, Section 02.04)

The inspector reviewed the following to ensure that Title 10 of the *Code of Federal Regulations* (10 CFR) Part 55, "Operators' Licenses," requirements for reactor operator requalification and the requirements stipulated in the licensee's NRC-approved Operator Requalification Program were being met:

- Requalification files for individual operators
- Completed and partially completed Reactor Operator's Requalification Sheets for the 2015 through 2016 requalification cycle and the 2017 through 2018 requalification cycle
- Written Biennial Requalification Examination records for the last 4 years
- Reactor Console Logbooks No. 18, from October 10, 2014 to March 12, 2018, and No. 19, from March 12, 2018, to the present
- The licensee requalification program entitled, "Operator Requalification Program for the University of Missouri-Rolla Reactor," Revision 3, dated August 20, 2004
- A revised version of the licensee requalification program entitled, "Operator Requalification Program for the Missouri University of Science and Technology Reactor," Revision 4, dated January 10, 2018, and submitted to the NRC on August 1, 2018
- MSTR file of Operator Form 396 forms for the period from 2015 to 2018 showing the dates of individual operators' medical examinations

b. Observations and Findings

(1) Operator Requalification

There were two NRC licensed SROs and two licensed ROs at the facility. The Operator Requalification Program was established and the licensee was endeavoring to maintain it. It was noted that all operators' licenses were current.

The inspector reviewed the various operators' training records and noted that most records were available for review but some records had apparently been misplaced. The requalification records for the IRM pertaining to the 2016 requalification cycle could not be located. This problem had occurred following the departure of the former Reactor Manager without an adequate turnover of records and responsibilities. Nevertheless, the completion of the various requirements stipulated in the Requalification Plan were able to be determined through a detailed review of the operations logs and examinations records. The proper and adequate completion and maintenance of operator requalification records was identified as an inspector follow-up item (IFI) and will be closely reviewed during a future NRC inspection (IFI 50-123/2018-201-01).

The available records showed that the operators were knowledgeable of the appropriate subject material required by the program as demonstrated by successful completion of biennial written examinations. Individual requalification records also showed that each operator demonstrated operational competence which was checked by the Reactor Supervisor as required by the requalification program. The inspector further confirmed that the operators typically completed the required reactivity manipulations and the quarterly hours of operation required by the program. If an operator did not complete the required manipulations or quarterly hours of operation, he or she was placed in an "inactive" status. The operator then had to complete six hours of training and operation

under supervision in order to be considered “active” and placed back on the list of operators permitted to operate the reactor.

The inspector reviewed the biennial medical examinations for all licensed personnel and confirmed that these examinations were being completed as required. It was noted that one operator was due for an examination by the end of August.

(2) Revision of the Operator Requalification Plan

As noted above, there were two versions of the Operator Requalification Plan for review at the facility. The older version, and the one currently accepted by the NRC, was one entitled, “Operator Requalification Program for the University of Missouri-Rolla Reactor,” Revision 3, dated August 20, 2004. At the beginning of this year, 2018, the licensee had finished a revision to the plan which was mainly created to update the plan cover page and correct various grammatical errors in the old version. The new version entitled, “Operator Requalification Program for the Missouri University of Science and Technology Reactor,” Revision 4, dated January 10, 2018, had been presented to the University for review of the new cover page. However, as a result of this review, the University notified the licensee that the cover page was not acceptable.

Because of various pressing issues, the licensee was not able to create a cover page that was acceptable to the University until the summer. The revised Requalification Plan, with a new cover page dated August 1, 2018, was then submitted to the NRC. Unfortunately, the date on the second page (title page) of the document was not changed to reflect the new submittal date. Also, the plan was submitted to NRC’s Document Control without a cover letter explaining the purpose and nature of the changes that had been made. Therefore, the NRC has not yet been able to review the revised version of the Requalification Plan.

c. Conclusion

Operator requalification was generally being conducted as required by the Operator Requalification Program. Medical examinations were being completed biennially for operators as required.

5. Surveillance and Limiting Conditions for Operation

a. Inspection Scope (IP 69001, Section 02.05)

The inspector reviewed sections of the following documents to verify that LCO specified in TS Section 3.0 and periodic surveillance checks and tests stipulated in TS Section 4.0 were being met:

- Reactor Console Logbooks No. 18, from October 10, 2014 to March 12, 2018, and No. 19, from March 12, 2018 to the present
- Selected MSTR SOPs and the associated forms for the period from January 2016 to the present including: SOP-651, “Contamination Survey;”

- SOP-800, “Annual Checklist;” SOP-810, “Weekly Checks;” SOP-813, “Rod Drop Time Measurement;” and, SOP-816, “MSTR Power Calibration Report”
- MSTR (Annual) Progress Reports for the last two reporting periods

b. Observations and Findings

The inspector reviewed selected records of TSs required checks, tests, and LCO verifications performed since January 2016. These included the weekly checklists that provided documentation of the proper functioning and setpoint verifications (as applicable) of rod prohibits, rundowns, scrams, period trips, rod drop currents, and building evacuation alarms. Other periodic surveillances and verifications were reviewed including radiation area monitor calibrations, nuclear instrumentation calibrations, power calibrations, control rod inspections, and fuel elements inspections. The review showed that the periodic checks, tests, and LCO verifications for TS-required surveillances were completed as required. The results of these activities were within prescribed TS limits and procedure parameters and in agreement with the previous surveillance results.

The various surveillance checks, inspections, and verifications reviewed were being tracked through the Weekly and Annual Checklists, and equipment-specific surveillance forms. Documentation of completion of these activities was maintained on the appropriate Checklists or forms.

c. Conclusion

The licensee was complying with the TS requirements pertaining to surveillance and LCO.

6. Experiments

a. Inspection Scope (IP 69001, Section 02.06)

To ensure that the requirements of TS Sections 3.7 and 6.5 were being met, the inspector reviewed:

- Reactor Console Logbooks No. 18, from October 10, 2014 to March 12, 2018, and No. 19, from March 12, 2018 to the present
- MSTR SOP-702, “Irradiation Request Forms [IRF]”
- File of completed IRFs for the past 2 years
- MSTR (Annual) Progress Reports for the last two reporting periods
- RSC meeting minutes for 2016 through 2018

b. Observations and Findings

The inspector reviewed the licensee’s program for conducting experiments. It was noted that each experiment was initiated using a previously written and approved IRF or by filling out a new request form. If a new form was needed, it had to be completed in accordance with the appropriate procedure, SOP-702, “Irradiation Request Forms,” and TS Sections 3.7 and 4.7. This would be the

case if no IRF was available covering the material to be irradiated or the experimental equipment to be used.

The inspector reviewed console log entries for the past 2 years and selected IRFs that were listed in the log as having been used for the experiments. The IRFs reviewed had been completed, reviewed, and approved as required. The results of the experiments were documented on Sample Irradiation Log forms that were associated with the applicable IRFs as required. It was noted that certain older IRFs were used repeatedly and were considered "standard" experiments. There was good agreement between the console logs and the Sample Irradiation Log forms. No problems or discrepancies were noted.

c. Conclusion

Reactor experiments were being performed in accordance with the requirements of the TSs and the applicable procedure.

7. Design Changes

a. Inspection Scope (IP 69001, Section 02.08)

To ensure that the requirements of 10 CFR 50.59 and the licensee's administrative procedures were being met, the inspector reviewed:

- Reactor Console Logbooks No. 18, from October 10, 2014, to March 12, 2018, and No. 19, from March 12, 2018, to the present
- MSTR SOP-310, "Facility Modifications"
- 10 CFR 50.59 Screening form entitled "Paperless Temperature/CAM Recorder," No. 17-01, dated July 24, 2017
- 10 CFR 50.59 Evaluation form entitled "Paperless Temperature/CAM Recorder," No. 17-01, dated July 24, 2017, reviewed by the RSC on September 15, 2017
- "MSTR Paperless Temperature/CAM Recorder Installation and Test Plan," dated July 24, 2017
- Revised SOPs for issuance with New Temperature/CAM Recorder including: SOP-102, "Pre-Startup Checklist Procedure;" SOP-106, "Restart of Reactor When It Is Not Secured;" and, SOP-810, "Weekly Checklist"
- Revised safety analysis report sections for issuance with the New Temperature/CAM Recorder
- RSC meeting minutes for 2016 through 2018
- MSTR (Annual) Progress Reports for the last two reporting periods

b. Observations and Findings

The only recent facility change involved the installation of a digital recorder. The temperature and constant air monitor paper recorders were replaced with a digital recorder. An appropriate 10 CFR 50.59 screening and evaluation were completed as required. Testing was performed on August 10, 2017, as part of

maintenance activities. No other 10 CFR 50.59 changes have been initiated to date.

c. Conclusion

The review and evaluation of changes satisfied NRC requirements specified in 10 CFR 50.59.

8. Committees, Audits, and Reviews

a. Inspection Scope (IP 69001, Section 02.09)

To ensure that the requirements of TS Section 6.2 were being met, the inspector reviewed:

- Annual independent audits conducted by University of Missouri-Columbia Research Reactor staff members for the past 2 years
- “Missouri S&T Monthly Reactor Health Physics Audit,” reports for 2017 and to date in 2018
- “2016 Audit of the Missouri University of Science and Technology (Missouri S&T) Radiation Protection and ALARA (As Low As Reasonably Achievable) Program,” dated January 20, 2017
- “2017 Audit of the Missouri University of Science and Technology (Missouri S&T) Radiation Protection and ALARA (As Low As Reasonably Achievable) Program,” dated January 22, 2018
- RSC meeting minutes for 2016 through 2018
- MSTR (Annual) Progress Reports for the last two reporting periods

b. Observations and Findings

The licensee used a single independent oversight safety committee to fulfill requirements for both the reactor license and the campus byproduct material license. This committee, called the RSC, typically met more frequently than the TS-required annual meeting. Committee membership satisfied TS Section 6.2.2 requirements. The Reactor Manager briefed the committee each quarter on matters relating to reactor safety. Review of the meeting minutes from April 2016 through June 2018 indicated that the committee provided oversight for the reactor as required.

The RSC minutes and audit records showed that safety reviews and individual audits had been completed at the required frequency for the functional areas specified by TS Sections 6.2.3 and 6.2.4. The inspector noted that audit topics included reactor operations, the operator requalification program, the radiation protection program, corrective actions when needed, experiments, emergency preparedness, and security procedures. The inspector reviewed the results of the audits that had been completed and determined that the audit findings, and licensee actions taken in response to the findings, were acceptable.

c. Conclusion

The RSC continued to perform independent oversight in accordance with TS requirements.

9. Emergency Planning

a. Inspection Scope (IP 69001, Section 02.10)

To verify that the licensee was implementing and complying with the NRC-approved EP for the MSTR, the inspector reviewed selected aspects of:

- “Emergency Plan for Missouri Science and Technology Nuclear Reactor Facility,” Revision 8, dated August 15, 2017
- EP Semester Evacuation Drill records for 2015, 2016, 2017, and to date in 2018
- Emergency Box Inventories for 2015, 2016, 2017, and to date in 2018
- Selected MSTR SOPs and forms for the period from January 2016 to the present including: SOP-501, “Emergency Procedures for Reactor Building Evacuation;” SOP-502, “Emergency Procedures for an Unusual Event;” SOP-503, “Emergency Procedures for an Alert;” SOP-504, “Emergency Procedures for a Site Area Emergency;” SOP-506, “Bomb Threat;” SOP-507, “Emergency Procedures - Administrative Responsibilities;” SOP-508, “Tornado Threat;” SOP-509, “Fire;” SOP-510, “Earthquake;” and, SOP-511, “Response to Missing Special Nuclear Material”
- Mutual Aid and Assistance Agreement between Phelps County Regional Medical Center, Rolla Fire Department, and Missouri S&T, dated June 25, 2009

b. Observations and Findings

(1) Emergency Plan and Emergency Training

The inspector verified that the EP in use at the facility was the same as the version most recently submitted to the NRC. The EP was being audited and reviewed annually by the Reactor Manager or an appointee as required. The implementing procedures were being reviewed annually and revised as needed.

The inspector reviewed annual tabletop discussion minutes and training records and verified that annual emergency response training was conducted as required by the EP. The inspector confirmed that notification procedures and phone numbers were current and posted, the most recent version dated January 8, 2018.

(2) Emergency Equipment

The inspector determined that the emergency equipment and portable detection instrumentation listed in the emergency procedures were generally available and being tested and maintained as required by the

EP and various MSTR procedures. Emergency equipment was kept in several locations, including the bottom floor of the Physics Building, and inventoried on an annual basis.

The inspector and the IRM went to the Physics Building to verify that the equipment box listed in the EP was available and located in the specified room. Upon trying to unlock the door of the storage room, the IRM found that the key did not work and that the door lock had apparently been changed. When a person was located who had a key to the storage room, the door was opened and it was noted that the room contained many boxes of janitorial supplies and equipment. The emergency box could not be seen or inventoried because of all the other supplies in the room. The licensee was informed that the issues of having the correct key to the storage room and proper access to the equipment box would be considered by the NRC as an IFI and would be reviewed during a future inspection (IFI 50-123/2018-201-02).

(3) Mutual Aid and Assistance Agreement and Visit to the Campus Police Department and the City of Rolla Fire Department

The inspector reviewed the Mutual Aid and Assistance Agreement that had been established with the offsite medical support organization, the Phelps County Regional Medical Center and the Rolla Fire Department. The Assistance Agreement was required to be updated biennially. The most recent version was dated February 21, 2017, and indicated that the hospital would assist in case of medical emergencies.

The inspector, accompanied by the IRM, visited the MSTR Police Department (PD) and a City of Rolla Fire and Rescue station. Both support groups were knowledgeable of their roles in case of emergency and both appeared well equipped to handle any problem that might be encountered. During the visit to the PD, the inspector observed a test of an alarm (initiated from the reactor) and discussed the actions that would be taken in response. Through this test, it was noted that the PD Dispatch Office was prepared to respond appropriately and in accordance with procedures and training. The support being provided by the PD and City of Rolla Fire and Rescue was acceptable. The inspector noted that there was a good working relationship between facility staff members and the support personnel.

(4) Building Evacuation Drills

10 CFR 50.34(b)(6)(v) states that each application for an operating license shall include a final safety analysis report. The final safety analysis report shall include information that describes the facility, presents the design bases and the limits on its operation, and presents a safety analysis of the structures, systems, and components and of the facility as a whole, and shall include the following concerning facility operation: Plans for coping with emergencies, which shall include the items specified in Appendix E.

Section 10.1 of the EP for the Missouri Science and Technology Nuclear Reactor Facility requires that, during each regular semester (August to December and January to May) a drill will be conducted on the evacuation of the building.

The inspector reviewed the documentation of the evacuation drills that had been held during the past 4 years. It was noted that evacuation drills had been held during each regular semester as required in 2015 and 2016, and one had been held in 2018. However, there was no documentation of any evacuation drills being held in 2017. When the inspector inquired as to whether the drills had been held in 2017, the licensee indicated that none had been held. The licensee was informed that failure to hold evacuation drills during either semester in 2017 was a violation of 10 CFR 50.34(b)(6)(v) and Section 10.1 of the MSTR EP (50-123/2018-201-03).

c. Conclusion

The emergency preparedness program was generally being implemented and conducted in accordance with the facility's EP. A violation was noted for failure to hold evacuation drills during each regular semester in 2017 as required by 10 CFR 50.34(b)(6)(v) and Section 10.1 of the MSTR EP (50-123/2018-201-03).

10. Maintenance Logs and Records

a. Inspection Scope (IP 69001, Section 02.11)

To verify compliance with maintenance procedure requirements of TS Section 6.4 and maintenance record requirements of TS Section 6.8.1, the inspector reviewed:

- Maintenance files maintained on computer for 2016, 2017, and to date in 2018 and entitled Equipment Discrepancy Reports
- Reactor Console Logbooks No. 18, from October 10, 2014 to March 12, 2018, and No. 19, from March 12, 2018, to the present
- MSTR (Annual) Progress Reports for the last two reporting periods

b. Observations and Findings

The licensee maintained a detailed equipment deficiency file subdivided by individual systems, such as rod drives, safety systems, and pneumatic systems. The detail of the entries allowed immediate retrieval of important information, such as part numbers. It was noted that preventative maintenance was well controlled and documented in the maintenance files as well as in the permanent console logbooks. Completed maintenance items were marked in red in the console log book, making them easy to identify.

c. Conclusion

Maintenance records and performance satisfied TSs and procedural requirements.

11. Fuel Handling Logs and Records

a. Inspection Scope (IP 69001, Section 02.12)

To verify compliance with regulatory and license requirements, the inspector reviewed:

- Reactor Console Logbooks No. 18, from October 10, 2014 to March 12, 2018, and No. 19, from March 12, 2018, to the present
- MSTR SOP-112, "Fuel Management"
- MSTR SOP-207, "Fuel Handling," and the associated forms entitled "Transfer Order Form," and "UMRR Core and Rack Storage Form"
- Core Loading and Fuel Rack Maps posted in the reactor bay and the associated 1/M plots for the various fuel transfers
- MSTR (Annual) Progress Reports for the last two reporting periods

b. Observations and Findings

The inspector reviewed records of fuel movements that were completed for the past two years. These fuel movements were typically conducted for control rod annual inspection or for operator training. The fuel transfer forms, which were part of the standard procedure, were verified against the console log and the core maps for accuracy. Serial numbers were verified during fuel moves and a physical inventory was completed following completion of the fuel moves.

It was noted that the current core configuration was designated as 128W.

c. Conclusion

The licensee was conducting fuel handling activities and maintaining records in a manner consistent with regulatory and license requirements.

12. Exit Interview

The inspection scope and results were summarized on August 9, 2018, with members of licensee management and staff. The inspector described the areas inspected and discussed in detail the inspection findings. The licensee acknowledged the results of the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

C. Reisner	Interim Reactor Manager
A. Alchin	Electronics Technician and Senior Reactor Operator
M. Bresnahan	Director of Environmental Health and Safety
J. Graham	Facility Director

Other Personnel

J. Breen	Assistant Chief, City of Rolla Fire and Rescue
D. Roberts	Police Chief, Missouri S&T Police Department
R. Smith	Fire Chief, City of Rolla Fire and Rescue
L. Young	Lieutenant, Missouri S&T Police Department

INSPECTION PROCEDURE USED

IP 69001	Class II Non-Power Reactors
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ITEMS OPENED, CLOSED, AND DISCUSSED

Open

50-123/2018-201-01	IFI	Review the proper and adequate completion and maintenance of operator requalification records as specified in the licensee's Operator Requalification Program.
50-123/2018-201-02	IFI	Ensure that the licensee has the correct key to the storage room in the Physics Building and proper access to the equipment box in that room.
50-123/2018-201-03	VIO	Failure to hold evacuation drills during either semester in 2017 as required by 10 CFR 50.34(b)(6)(v) and Section 10.1 of the MSTR EP.

Closed

None

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
IP	Inspection Procedure
IRF	Irradiation Request Form
IRM	Interim Reactor Manager

LCO	Limiting Conditions for Operation
Missouri S&T	Missouri University of Science and Technology
MSTR	Missouri University of Science and Technology Reactor
NRC	U.S. Nuclear Regulatory Commission
No.	Number
RO	Reactor Operator
RSC	Radiation Safety Committee
SOP	Standard Operating Procedure
SRO	Senior Reactor Operator
TS	Technical Specification