



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

September 18, 2019

Ms. Amber Johnson, Director
Nuclear Reactor and Radiation Facilities
University of Maryland
Department of Materials Science and Engineering
4418 Stadium Drive, Room 2303
College Park, MD 20742-2115

SUBJECT: UNIVERSITY OF MARYLAND – NUCLEAR REGULATORY COMMISSION
ROUTINE INSPECTION REPORT NO. 50-166/2019-201

Dear Ms. Johnson:

From April 2-4, 2019, the U.S. Nuclear Regulatory Commission (NRC) conducted an inspection at the Maryland University Training Reactor. The enclosed report presents the results of that inspection, which were discussed on April 4, 2019, with members of your staff.

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

In accordance with Title 10 of the *Code of Federal Regulations* Section 2.390, "Public inspections, exemptions, 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 Publicly Available Records component of 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).

A. Johnson

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Should you have any questions concerning this inspection, please contact Mr. Johnny Eads at (301) 415-0136 or by electronic mail at Johnny.Eads@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. 50-166
License No. R-70

Enclosure:
As stated

cc: See next page

SUBJECT: UNIVERSITY OF MARYLAND – NUCLEAR REGULATORY COMMISSION
 ROUTINE INSPECTION REPORT NO. 50-166/2019-201
 DATE: SEPTEMBER 18, 2019

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University of Maryland

Docket No. 50-166

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Test, Research and Training
Reactor Newsletter
Attention: Ms. Amber Johnson
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U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No. 50-166

License No. R-70

Report No. 50-166/2019-201

Licensee: University of Maryland

Facility: Maryland University Training Reactor

Location: College Park, Maryland

Dates: April 2-4, 2019

Inspector: Johnny H. Eads

Accompanied by: Kevin Roche

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 Maryland
Maryland University Training Reactor Facility
Inspection Report No. 50-166/2019-201

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the University of Maryland (the licensee's) Class II research reactor facility safety programs 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) health physics; (8) design changes; (9) committees, audits and reviews; (10) emergency planning; (11) maintenance logs and records; (12) fuel handling logs and records; and (13) transportation of radioactive materials procedures. The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with the U.S. Nuclear Regulatory Commission (NRC) requirements.

Organization and staffing

- Organizational structure and staffing were consistent with technical specification (TS) requirements.

Operations Logs and Records

- Operations Logs and records were maintained in accordance with procedures and TSs.

Procedures

- The program for changing, controlling, and implementing facility procedures was acceptably maintained as required by the TSs and the applicable procedures.

Requalification Training

- Operator requalification was conducted as required by the Operator Requalification Plan.

Surveillance and Limiting Conditions for Operation

- The inspector found that the surveillance program and supporting procedures met TS requirements.
- Operations met the TS LCO and surveillance requirements.

Experiments

- Experiments were reviewed and approved as required by TS.

Health Physics

- Surveys were being completed and documented as required.
- Postings met regulatory requirements.

- Personnel dosimetry was being worn and recorded doses were within the NRC's regulatory limits.
- Radiation monitoring equipment was being maintained and calibrated as required.
- The radiation protection program (RPP) satisfied regulatory requirements.
- The radiation protection training program was being administered as required.
- Environmental monitoring satisfied license and regulatory requirements.

Design Changes

- The review, evaluation, and documentation of changes to the facility satisfied the NRC requirements.

Committee Audits and Reviews

- The review and audit program was being conducted acceptably as stipulated in TS.

Emergency Planning

- The emergency preparedness program was conducted in accordance with the emergency plan (E-Plan).

Maintenance Logs and Records

- Maintenance logs, records, reviews, and performance satisfied TS and procedure requirements.

Fuel Handling Logs and Records

- Fuel handling and inspection activities were completed and documented as required by TS and facility procedures.

Transportation of Radioactive Materials

- The program for shipping radioactive material satisfied regulatory requirements.

REPORT DETAILS

Summary of Facility Status

The Maryland University Training Reactor (MUTR), licensed to operate at a maximum steady-state thermal power of 250 kilowatts, continued to be operated in support of academic classes, educational demonstrations, operator training, surveillance, and experiments. During the inspection, the reactor was maintained in a shutdown condition for maintenance and repair activities.

1. Organization and Staffing

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

The inspector reviewed the following regarding the licensee's organization and staffing to ensure that the requirements of TS Section 6.1 were being met:

- Staff qualifications
- Management responsibilities
- Staffing requirements for the safe operation of the facility
- MUTR organizational structure and staffing

b. Observations and Findings

This organization was consistent with that specified in the TS. The organizational structure and the responsibilities of the reactor staff had not changed since the last inspection. However, personnel filling the positions of Director and Radiation Safety Officer were new. The inspector reviewed the qualifications of these new individuals and found them to meet regulatory requirements.

The campus health physics staff provided support to the reactor staff as requested and performed specific audits, inspections, and surveys of the reactor. The campus health physics staff also had the responsibility for the university's broad scope State byproduct license. The coordination of radiation protection activities between the health physics staff and the reactor staff was acceptable.

The inspector reviewed the minimum shift staffing requirements for reactor operations and determined that the MUTR continued to meet the TS requirements.

c. Conclusion

The licensee was in compliance with organizational and staffing requirements for operation of the reactor facility.

2. Operation Logs and Records

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that selected records were maintained as required by TSs 6.2, 6.7, and 6.8:

- Annual Report for the MUTR for the period January 1, 2018, to December 31, 2018
- Daily startup checklists (from Operating Procedure (OP)-101) for the past year
- OP-101, "Reactor Startup Checkout," Revision 20, dated May 2, 2017
- Reactor Console Logbook, July 5, 2016, to present

b. Observations and Findings

Reactor operations were carried out following written procedures and TS requirements. A review of the logs and records indicated that TS operational limits had not been exceeded.

c. Conclusion

Operational activities were found to be consistent with applicable TS and procedural requirements.

3. Procedures

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the requirements of TS Section 6.4 were being met concerning written procedures:

- OP-101, "Reactor Startup Checkout," Revision 20, dated May 2, 2017
- Reactor Console Logbook, July 5, 2016, to present

b. Observations and Findings

The inspector reviewed a selection of written procedures and verified they addressed activities delineated in TS 6.4. The procedures were approved by the Reactor Safety Committee (RSC) and were of acceptable clarity and detail.

c. Conclusion

Procedural control and implementation satisfied TS requirements.

4. Requalification Training

a. Inspection Scope (IP 69001)

To verify that the licensee was complying with the requirements of the operator requalification program, the inspector reviewed selected aspects of:

- Requalification/training program for the MUTR and associated program checklists, dated August 29, 2012
- The effective dates of current operator licenses
- Operator medical examination records for the past year
- Current requalification cycle graded written examination
- Requalification training topic lesson plans
- Operator training records

b. Observations and Findings

There were two active NRC-licensed senior reactor operators and two reactor operators on staff at the facility. A review of the logs and records showed that training was being conducted in accordance with the licensee's NRC-approved requalification and training program. Attendance at required training sessions was well documented. Records documenting performance of required reactor manipulations were easily retrievable.

c. Conclusion

Operator requalification was conducted as required by the requalification program.

5. Surveillance and Limiting Conditions for Operation

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with TS Section 3, and to determine if the periodic surveillance tests on safety systems were performed as stipulated in TS Section 4:

- File of daily startup checklists (from OP-101) for the past year
- Reactor Console Logbook, July 5, 2016, to present

b. Observations and Findings

The inspector noted that daily, monthly, quarterly, and annual checks, tests, and/or calibrations for TS-required surveillance were completed as required. The LCO verifications were completed on schedule and in accordance with licensee procedures. All the recorded results were within the TS and procedurally prescribed parameters. The records and logs were noted to be complete and were being maintained as required. The procedures for each of the surveillances provided clear and concise direction and control of reactor operational tests and surveillances.

The inspector reviewed TS 3.5.1 and identified that TS 3.5.1.3 states, "The alarm setpoint shall be stated in a facility OPERATING procedures. The alarm set-point for the bridge monitor is <37 mR/hr (ALERT) and <50 mR/hr (scram)".

However, facility procedure, SP-205, Revision 12, Section 6.0 states that the alarm setpoint is ≤ 50 mR/hr and facility procedure OP-101, Revision 20, also states that the alarm setpoint is ≤ 50 mR/hr. The facility has consistently set the scram point at exactly 50 mR/hr, which appears to be inconsistent with the TS value. Additional research with the licensee and the NRC Reactor Oversight Projects Branch is required to resolve this item.

The inspector identified that the discrepancy between the TS value of <50 mR/hr and the procedure value of ≤ 50 mR/hr was an Unresolved Item (URI 2019-201-1, Bridge Monitor Alert and Scram Setpoint).

c. Conclusion

The licensee's program for completing surveillance inspections and LCO verifications satisfied TS and licensee administrative controls.

6. Experiments

a. Inspection Scope (IP 69001)

To verify compliance with licensee's procedures; TS Section 3.6, TS Section 6.5, and Title 10 of the *Code of Federal Regulations* (10 CFR) 50.59, "Changes, tests and experiments," the inspector reviewed selected aspects of:

- Reactor Console Logbook, July 5, 2016 to present
- Annual Report, January 1, 2018, to December 31, 2018
- RSC Minutes for Meeting of September 6, 2018
- RSC Minutes for Meeting of December 13, 2018

b. Observations and Findings

No new experiments have been initiated, reviewed, and approved since the previous inspection at the facility. The inspector verified that the experiment review and approval was in accordance with TS limits and procedural requirements.

c. Conclusion

Conduct and control of experiments met the requirements of regulations and the licensee's TS.

7. Health Physics

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Part 20, "Standards for Protection against Radiation," requirements:

- 2018 Personnel Dosimetry Data
- 2018 Radiological Surveys
- 2018 Calibration Records
- Radiation Safety Manual, dated 2001
- Environmental Dosimeter Data for 2014 and 2015
- Annual Operating Report, 2018

b. Observations and Findings

The inspector toured the facility, finding practices regarding the use of dosimetry, radiation monitoring equipment, placement of radiological signs and postings, use of protective clothing, and the handling and storing of radioactive material or contaminated equipment to be in accordance with regulations and the licensee's written RPP.

The inspector reviewed the calibration records of the radiation monitoring equipment and found all were calibrated as required by procedure. The inspector performed a spot check of selected radiation monitoring equipment and did not identify any instances where out-of-calibration radiation monitoring equipment had been used during surveys.

The inspector reviewed dosimetry records for the various operators at the MUTR. The Radiation Safety Officer maintained all records in accordance with the TS requirements. During the dosimetry review, it was noted that individual radiation worker doses were minimal compared to this limit and no individual exceeded the dose limits since the last NRC inspection. The inspector performed a spot check of dosimetry in both emergency response kits and found them to be calibrated.

A copy of the current NRC Form 3, "Notice to Radiation Workers," was posted at various locations throughout the reactor facility, as required by 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations."

The inspector reviewed the environmental monitoring records for the fixed dosimeters located throughout the facility and the campus and found that radiation doses were being monitored and reviewed as appropriate.

The inspector determined that facility surveys and postings were properly conducted and met regulatory requirements.

c. Conclusion

The licensee's RPP was effective in minimizing radiation doses to individuals through training, notices to workers, radiation monitoring and surveys, and

calibrated equipment. The RPP met TS requirements. Effluent releases, effluent monitoring, and environmental monitoring satisfied license and regulatory requirements.

8. Design Changes

a. Inspection Scope (IP 69001)

In order to verify that any modifications to the facility were consistent with 10 CFR 50.59 the inspector reviewed selected aspects of:

- Reactor Console Logbook, July 5, 2016, to present
- Annual Report, January 1, 2018, to December 31, 2018
- RSC Minutes for Meeting of September 6, 2018
- RSC Meeting Agenda for December 13, 2018

b. Observations and Findings

Through review of applicable records and interviews with licensee personnel, the inspector determined that since the previous inspection there were no changes made which required prior NRC approval pursuant to 10 CFR 50.59. The inspector verified that administrative controls were in place that required the appropriate review and approval of facility changes prior to implementation.

c. Conclusion

Changes at the facility were acceptably reviewed in accordance with 10 CFR 50.59 and applicable licensee administrative controls.

9. Committees, Audits and Reviews

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the audits and reviews stipulated in TS 6.2 were being completed by the RSC:

- Reactor Console Logbook, July 5, 2016, to present
- Annual Report, January 1, 2018, to December 31, 2018

b. Observations and Findings

The licensee's safety oversight was performed by its RSC. The RSC membership met the requirements of TS 6.2.1.1. The inspector verified that the RSC composition, meeting quorums, and meeting frequency were all in accordance with TS 6.2.1.1.

The inspector also verified that the audit function required in TS 6.2.1.3 was conducted and that the audit reports were reviewed by the RSC.

c. Conclusion

Review and oversight functions of the RSC appear to meet TS requirements.

10. Emergency Planning

a. Inspection Scope (IP 69001)

The inspector reviewed the implementation of selected portions of the emergency preparedness program including:

- Emergency Preparedness Plan (EPP) for the MUTR, Revision 13, dated April 10, 2014

b. Observation and Findings

The inspector reviewed the EPP and determined that it had not changed since the last inspection. The inspector toured the MUTR and found the emergency preparedness equipment and capabilities to be as described in the EPP and implementing procedures.

The emergency plan requires that emergency supplies be maintained and that an inventory list of these supplies be maintained and verified on a routine basis. The inspector verified that the required materials and inventory were being maintained as required.

The E-Plan requires periodic drills to support training of emergency response personnel. The inspectors reviewed documentation related to annual exercises for 2018. Based on a review of these records, the requirements of the emergency plan continue to be met for training of personnel and conduct of drills.

c. Conclusion

The emergency preparedness program was conducted in accordance with the E-Plan and implementing procedures.

11. Maintenance Logs and Records

a. Inspection Scope (IP 69001)

The inspector reviewed the following selected maintenance log and records to verify compliance with the requirements of TS:

- Reactor Console Logbook from 2016 to present

b. Observations and Findings

The inspector reviewed the maintenance records related to scheduled and unscheduled preventive and corrective maintenance activities that had occurred during the inspection period.

Routine and preventive maintenance was controlled and documented in the appropriate logs. These documents indicated that all maintenance activities were in accordance with the requirements in licensee administrative controls. The inspector verified that all maintenance was conducted in accordance with the requirements of TS, and system operational checks were performed before returning them to service.

c. Conclusion

Maintenance was performed, and logs and records maintained consistent with TS and licensee procedure requirements.

12. Fuel Handling Logs and Records

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify that requirements of the TS and administrative procedures were being met:

- Annual Report, January 1, 2018, to December 31, 2018

b. Observation and Findings

The inspector interviewed staff and determined that the only fuel handling operations which occurred since the last inspection were related to fuel removal in support of maintenance on the reactor control rods and annual fuel inspections. These activities appeared to be well planned and controlled in accordance with the TS and administrative procedural requirements.

c. Conclusion

Fuel handling and inspection activities were completed and documented as required by the TS and facility procedures.

13. Transportation

a. Inspection Scope (IP 86740)

To verify that the licensee was complying with the applicable requirements, the inspector reviewed the following:

- Annual Operating Report, January 1, 2018, to December 31, 2018

b. Observations and Findings

The licensee stated that they generally transfer radioactive material from the reactor license to the broad scope campus license for use by experimenters on campus or for processing as waste along with other campus radioactive waste. As a result, shipments under the reactor license are unusual and infrequent.

c. Conclusion

Radioactive material shipments were made according to procedures and regulatory requirements.

14. Exit Interview

The inspection scope and results were summarized on April 4, 2019, with members of licensee management. The inspector described the areas inspected and discussed the inspection findings. The licensee acknowledged the findings presented.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Dorman	Assistant Director, Research Safety
L. Gilde	Supervisory, SRO
A. Johnson	Director
T. Koeth	Associate Research Professor

INSPECTION PROCEDURES USED

IP 69001	Class II Non-Power Reactors
IP 86740	Transportation

ITEMS OPENED, CLOSED

OPENED:

URI 2019-201-1	Bridge Monitor Alert and Scram Setpoint
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CLOSED:

None

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
E-Plan	Emergency Plan
EPP	Emergency Preparedness Plan
IP	Inspection Procedure
LCO	Limiting Condition for Operation
MUTR	Maryland University Training Reactor
NRC	U.S. Nuclear Regulatory Commission
OP	Operating Procedure
RPP	Radiation Protection Program
RSC	Reactor Safety Committee
TS	Technical Specification
URI	Unresolved Item