



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

October 16, 2022

Dr. Partha Chowdhury, Director
Nuclear Radiation Laboratory
University of Massachusetts-Lowell
One University Avenue
Lowell, MA 01854

SUBJECT: UNIVERSITY OF MASSACHUSETTS LOWELL – U.S. NUCLEAR REGULATORY
COMMISSION SAFETY INSPECTION REPORT NO. 05000223/2022201

Dear Dr. Chowdhury:

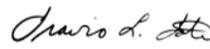
From August 15-17, 2022, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the University of Massachusetts Lowell Research Reactor facility. The enclosed report presents the results of that inspection, which were discussed on August 17, 2022, with you and members of your staff.

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 selected 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).

If you have any questions concerning this inspection, please contact Andrew Waugh at (301) 415-0230, or by email at Andrew.Waugh@nrc.gov.

Sincerely,



Signed by Tate, Travis
on 10/16/22

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. 50-223
License No. R-125

Enclosure:
As stated

cc: w/enclosure: See next page

University of Massachusetts - Lowell

Docket No. 50-223

cc:

Mayor of Lowell
City Hall
Lowell, MA 01852

Mr. Leo Bobek
Reactor Supervisor
University of Massachusetts - Lowell
One University Avenue
Lowell, MA 01854

Department of Environmental Protection
One Winter Street
Boston, MA 02108

Jack Priest, Director
Radiation Control Program
Department of Public Health
Schrafft Center, Suite 1M2A
529 Main Street
Charlestown, MA 02129

Ms. Samantha Phillips, Director
Massachusetts Emergency Management Agency
400 Worcester Road
Framingham, MA 01702-5399

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

SUBJECT: UNIVERSITY OF MASSACHUSETTS LOWELL – U.S. NUCLEAR REGULATORY COMMISSION SAFETY INSPECTION REPORT NO. 05000223/2022201 DATED: OCTOBER 16, 2022

DISTRIBUTION:

PUBLIC

TTate, NRR

JBorromeo, NRR

NParker, NRR

EHelvenston, NRR

LTran, NRR

AWaugh, NRR

KRoche, NRR

JBowen, NRR

CCarusone, NRR

DTiftt, RGN I

RMcKinley, RGN I

RidsNrrDanuUnpo Resource

ADAMS Accession No.: ML22244A150

NRC-002

OFFICE	NRR/DANU/UNPO	NRR/DANU/UNPO/LA	NRR/DANU/UNPO/BC
NAME	AWaugh	NParker	TTate
DATE	09/02/2022	09/07/2022	10/16/2022

OFFICIAL RECORD COPY

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

Docket No.: 50-223

License No.: R-125

Report No: 05000223/2022201

Licensee: University of Massachusetts Lowell

Facility: University of Massachusetts Lowell Research Reactor

Location: Lowell, Massachusetts

Dates: August 15-17, 2022

Inspector: Andrew Waugh

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 Massachusetts Lowell
Research Reactor Facility
Inspection Report No. 05000223/2022201

The primary focus of this routine announced inspection was the onsite review of selected aspects of the University of Massachusetts Lowell's (UML, the licensee's) Class II research reactor facility program, including: (1) procedures; (2) experiments; (3) health physics (HP); (4) design changes; (5) committees, audits and review; and (6) transportation of radioactive materials. The U.S. Nuclear Regulatory Commission (NRC) staff determined that the licensee's program was acceptably directed toward the protection of public health and safety, and in compliance with the NRC requirements.

Procedures

- The inspector determined that procedures were controlled, maintained current, implemented, and followed in compliance with the technical specifications (TS) and license requirements.

Experiments

- The inspector determined that experiments were reviewed, approved, and conducted in accordance with the TS, procedural, and regulatory requirements.

Health Physics

- The inspector determined that the licensee's HP program was conducted in accordance with the TS, procedural, and regulatory requirements.

Design Changes

- The inspector determined that design changes were conducted in accordance with the TS, procedural, and regulatory requirements.

Committees, Audits and Reviews

- The inspector determined that the licensee's oversight programs were conducted in accordance with the TS and procedural requirements.

Transportation Activities

- The inspector determined that the licensee's radioactive material transportation program was in accordance with the regulatory and procedural requirements.

REPORT DETAILS

Summary of Facility Status

The UML 1 megawatt research reactor is operated in support of education, research, commercial service irradiations, reactor operator training, and periodic equipment surveillances. During the inspection, the reactor was started up, operated, and shut down to support these ongoing activities.

1. Procedures

a. Inspection Scope (Inspection Procedure [IP] 69001, Section 02.03)

The inspector reviewed various procedures and observed their implementation, including a reactor startup and fast neutron irradiation experiment. The inspector also reviewed the following regarding the licensee's procedures to ensure that the requirements of the licensee's administrative procedures (AP) and TS 6.4 were met:

- AP-0, "Authority," dated March 3, 2004
- AP-1, "Procedure Control and Distribution," dated September 18, 2003
- AP-2, "Procedure Development," dated September 18, 2003
- reactor operating procedure (RO)-2, "Unloading and Reloading the Core to a Known Configuration," dated April 1, 2005
- RO-4, "Addition or Removal of Core Samples," dated June 14, 2005
- RO-5, "Reactor Operations," dated October 12, 2005
- RO-8, "Handling of Irradiated Fuel," dated May 22, 1991
- calibration procedure-4, "Calibration of Temperature Monitoring Devices," dated August 30, 2010
- select logbook entries from 2020-present

b. Observations and Findings

The inspector observed that the licensee maintained written procedures covering the areas specified in TS 6.4. The inspector found that the procedures in use by the licensee were current, reviewed and approved as required by TS 6.4, able to be implemented as intended, and adhered to by reactor personnel.

c. Conclusion

The inspector determined that procedures were in compliance with the TS and license requirements.

2. Experiments

a. Inspection Scope (IP 69001, Section 02.06)

The inspector observed the performance of fast neutron irradiation experiments and reviewed the following to ensure that experiments were reviewed and conducted as required by TS 3.7, 3.8, and 6.5:

- RO-4, "Addition or Removal of Core Samples," dated June 14, 2005
- facility procedure-5, "Sample Handling for the Reactor," dated September 18, 2008
- AP-6, "10 CFR 50.59 Screenings and Evaluations," dated December 18, 2015
- select experiment approval records
- select "Irradiation Request Forms," from 2020-present

b. Observations and Findings

The inspector found that experiments were reviewed and approved as required by TS 6.5 and Title 10 of the *Code of Federal Regulations* (10 CFR) 50.59, "Changes, tests and experiments." The inspector also found that experiments were conducted in accordance with the licensee's procedures and TS 3.7 and 3.8.

c. Conclusion

The inspector determined that experiments were reviewed, approved, and conducted in accordance with the TS, procedural, and regulatory requirements.

3. Health Physics

a. Inspection Scope (IP 69001, Section 02.07)

The inspector toured the facility, observed radiation surveys, and observed radiological signs and postings. The inspector also reviewed the following to ensure the licensee's HP program adheres to the requirements of 10 CFR Part 19, "Notices, Instructions, and Reports to Workers: Inspection and Investigations," 10 CFR Part 20, "Standards for Protection against Radiation," and TS 3.6 and 4.6:

- "University of Massachusetts Lowell Radiation Safety Guide," dated February 2015
- select personnel dosimetry records from 2020-present
- environmental dosimetry records from 2020-present
- select pool water analysis records from 2020-present
- select training records from 2020-present
- select radiation survey records 2020-present
- 2020 and 2021 annual radiation safety program audits
- 2020 and 2021 as low as reasonably achievable reports
- select calibration records for radiation area monitors and constant air monitors from 2020-present

b. Observations and Findings

The inspector found that practices regarding the use of dosimetry, radiation monitoring equipment, placement of radiological postings, posting of notices, use of protective clothing, and the handling and storing of radioactive material or contaminated equipment was in accordance with regulations and the licensee's radiation protection program. The inspector found that the licensee met the regulatory requirements concerning radiological effluent releases and radiation survey, sampling, and monitoring. The inspector also found that training was conducted for radiation workers and as low as reasonably achievable principles were implemented as required by licensee procedures.

c. Conclusion

The inspector determined that the licensee's HP program was conducted in accordance with the TS, procedural, and regulatory requirements.

4. Design Changes

a. Inspection Scope (IP 69001, Section 02.08)

The inspector reviewed the following to ensure that modifications to the facility were made in accordance with the requirements of 10 CFR 50.59 and the TS:

- AP-6, "10 CFR 50.59 Screenings and Evaluations," dated December 18, 2015
- select reactor safety subcommittee meeting minutes from 2020-present
- annual operating report 2020-2021
- select "50.59 Screen Forms," from 2020-present

b. Observations and Findings

The inspector found that the design changes were reviewed and approved as required by 10 CFR 50.59. The inspector also found that the performance of modified equipment and the procedures and drawings related to that equipment met the regulatory, TS, and procedural requirements.

c. Conclusion

The inspector determined that the design changes were conducted in accordance with the TS, procedural, and regulatory requirements.

5. Committees, Audits and Reviews

a. Inspection Scope (IP 69001, Section 02.09)

The inspector reviewed the following to ensure that committees, audits, and reviews were conducted as required by the licensee's procedures and TS 6.2:

- "Radiation Safety Committee Charter," dated June 9, 2022
- select reactor safety subcommittee meeting minutes from 2020-2022

b. Observations and Findings

The inspector found that the licensee's reactor safety subcommittee met and provided reviews as required by the TS. The inspector also found that problems identified from the licensee's required reviews were resolved in accordance with the licensee's procedures and TS.

c. Conclusion

The inspector determined that the licensee's oversight programs were conducted in accordance with TS and procedural requirements.

6. Transportation Activities

a. Inspection Scope (IP 86740)

The inspector reviewed the following to ensure the licensee's program for transporting radioactive materials met NRC and Department of Transportation (DOT) requirements:

- health physics procedure (HPP)-2, "Receipt of Radioactive Material," dated October 21, 2002
- HPP-3, "Shipment of Radioactive Materials," dated February 5, 2008
- select shipping forms from 2020-present

b. Observations and Findings

The inspector found that the licensee's procedures and records concerning the transportation of radioactive material were in accordance with NRC and DOT requirements.

c. Conclusion

The inspector determined that the licensee's radioactive material transportation program was in accordance with regulatory and procedural requirements.

7. Exit Interview

The inspection scope and results were summarized on August 17, 2022, with members of licensee management and staff. The inspector described the areas inspected and discussed the inspection results. The licensee acknowledged the results of the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

L. Bobek	Reactor Supervisor
S. Snay	Director of Radiation Safety
T. Cao	Senior Reactor Operator
D. Lajeunesse	Senior Reactor Operator
C. Buckley	Radiation Security Specialist

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
IP 86740	Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened:

None

Closed:

None

Discussed:

None