June 21, 2011

Dr. Gunter Kegel
Director - Radiation Laboratory
University of Massachusetts - Lowell
One University Avenue
Lowell, MA 01854

SUBJECT: UNIVERSITY OF MASSACHUSETTS LOWELL – NRC ANNOUNCED ROUTINE INSPECTION REPORT NO. 50-223/2011-201

Dear Dr. Kegel:

The U.S. Nuclear Regulatory Commission (NRC) conducted an inspection on May 23 to 26, 2011, at the University of Massachusetts Lowell Research Reactor Facility (Inspection Report No. 50-223/2011-201). The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection. Areas examined during the inspection are identified in the enclosed report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress.

Based on the results of this inspection, no safety concern or noncompliance of NRC requirements was 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 and requests for withholding," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's 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).

Should you have any questions concerning this inspection, please contact Jack Donohue at 301-452-1950 or email at Jack.Donohue@nrc.gov.

Sincerely,

/RA/
Johnny H. Eads, Jr., Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-223
License No. R-125

Enclosure: As stated

cc w/encl: 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

Director
Radiation Control Program
Department of Public Health
90 Washington Street
Dorchester, MA 02121

Nuclear Preparedness Manager
Massachusetts Emergency Management Agency
40 Worcester Road
Framingham, MA 01702-5399

Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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DATE	6/1/2011	6/16/2011	6/21/2011

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

Docket No:	50-223
License No:	R-125
Report No:	50-223/2011-201
Licensee:	University of Massachusetts
Facility:	University of Massachusetts – Lowell Research Reactor
Location:	Lowell, Massachusetts
Dates:	May 23-26, 2011
Inspector:	Jack Donohue
Approved by:	Johnny H. Eads, Jr., Chief Research and Test Reactors Oversight Branch Division of Policy and Rulemaking Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

University of Massachusetts - Lowell
Research Reactor Facility
NRC Inspection Report No.: 50-223/2011-201

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the University of Massachusetts – Lowell (UML, the licensee) Research Reactor facility safety programs including operations logs and records; surveillance and limiting conditions for operation; design changes; committee, audits and reviews; maintenance logs and records and fuel handling logs and records. The licensee's programs were acceptably directed toward the protection of public health and safety, and were in compliance with the U.S. Nuclear Regulatory Commission (NRC) requirements.

Operations Logs and Records

- Within the scope of this review, the licensee's record keeping program conformed to license requirements.

Surveillance and Limiting Conditions for Operation

- The surveillance program required by the Technical Specifications (TS) was being implemented effectively.

Design Changes

- Records indicated that changes at the facility were acceptably reviewed in accordance with Title 10 of the *Code of Federal Regulations* Section 50.59 and applicable licensee administrative controls.

Committees, Audits, and Reviews

- The Reactor Safety Subcommittee provided the oversight required by the TS.

Maintenance Logs and Records

- The inspector reviewed reactor logbook entries that documented principal maintenance activities in compliance with license requirements.

Fuel Handling Logs and Records

- Fuel movements were performed safely in accordance with TS requirements and licensee procedural requirements.

REPORT DETAILS

Summary of Facility Status

The one megawatt University of Massachusetts - Lowell Research Reactor (UMLRR) had been operated in support of educational experiments and demonstrations, research and service irradiations, reactor operator training, and periodic equipment surveillances. The University of Massachusetts Lowell (UML, the licensee) reported annual operation of 262 critical hours and 38 megawatt hours. The information detailed below was gathered by the inspector through personal observations when touring the facility, observations of specific tasks and evolutions, discussions with members of the licensee's staff, and review of records.

1. Operations Logs and Records

a. Inspection Scope (IP 69001-02.02)

The inspector observed operations and reviewed selected reactor operations records to ensure that the requirements of Technical Specifications (TS) Section 6.7, Plant Operating Records, were being met:

- Procedure RO-5, Reactor Operation, Rev. 3, October 12, 2005
- Procedure RO-7, Reactor Checkout, Rev. 1, July 28, 2008
- Procedure RO-7B, Prestart Check Sheet (Forced circulation), Rev. 1, July 28, 2008
- Procedure SP-15, Scram Function Test, August 31, 2010
- Reactor Console Logbook #30, August 3, 2009 to February 23, 2011
  Reactor Console Logbook #31, February 24, 2011 to present

b. Observations and Findings

The inspector observed a reactor prestart checkout, reactor startup, loading and unloading of samples into and out of the reactor, and performance of a routine scram function surveillance test. The reactor operator was observed to make reactor logbook entries in accordance with TS 6.7, Plant Operating Records, related to each evolution. For the records included in this review, the licensee's administrative requirements were met.

c. Conclusion

Within the scope of this review, the licensee's record keeping program conformed to license requirements.

2. Surveillance and Limiting Conditions for Operation

a. Inspection Scope (IP 69001-02.05)

The inspector reviewed the following to determine if the periodic surveillance tests on safety systems were being performed in accordance with TS Section 4.0, Surveillance Requirements:

- Surveillance Master Schedule 2010
- Surveillance Master Schedule 2011
- TS Surveillance Audit, 2010 and 2011
- Procedure SP-15, Scram Function Test, Rev. 5, dated August 31, 2010
- Procedure SP-6, Charcoal Filter Check, Rev. 3, dated November 19, 2010
- Procedure SP-7, Vent Flow Measurements, Rev. 1, dated November 19, 2010
- Procedure SP-9, Rod Reactivity Worth, Rev. 4, dated August 30, 2010
- Procedure SP-10, Reactor Water Analysis, Rev. 5, dated March 7, 2006
- Procedure CP-1, Calibration of LogN Detector, Rev. 3, dated December 13, 2006
- Procedure CP-2, Calibration of Linear Detector, Rev. 3, dated December 13, 2006

b. Observations and Findings

The inspector reviewed the licensee's master schedule of surveillances against the TS requirements. The schedule of surveillances performed was reviewed to assure that required surveillances were being performed at their required frequency. The master schedule accurately reflected the completed as well as planned surveillances. All the recorded results were in accordance with TS requirements.

c. Conclusion

The surveillance program required by the TS was being effectively implemented.

3. Design Changes

a. Inspection Scope (IP 69001-02.08)

In order to verify that any modifications to the facility were consistent with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59 and TS Section 6.2, Review and Audit, the inspector reviewed selected aspects of:

- Reactor Safety Committee (RSC) Meeting Minutes for December 2, 2010, September 27, 2010, and June 18, 2010

- Reactor Safety Subcommittee (RSSC) Meeting Minutes for meeting for September 23, 2010, June 17, 2010 and March 12, 2010.
- Procedure AP-6, 10 CFR 50.59 Screen and Evaluation, Rev. 0, dated December 16, 2009
- Reactor Test Using Down-comer Flow Mode, Activity Screening No. 10-01 dated February 25, 2010

b. Observations and Findings

The inspector reviewed two changes to the facility that were reviewed and approved under the10 CFR 50.59 screening process. The first involved changes to the drive mechanism control system relay logic, position indicators and wiring. Upgrades were made to eliminate spurious scram that occurred during routine operations. The second was made to the normal primary coolant flow path from cross-stall to down-comer mode. This mode is described in the FSAR. The temporary change was made to perform vibration test on the reactor control blades. The changes were reviewed by the RSC and concluded a change to the TS was not required.

The inspector reviewed a series of documents listed above which were reviewed by the RSC as part of a 10 CFR 50.59 review of facility changes, test and experiments. The licensee had recently written a new procedure (AP-6) for performing 10 CFR 50.59 reviews. In all cases the inspector found that the licensee staff and the RSC met the requirements of the regulations and facility TS.

c. Conclusion

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

4. Committees, Audits, and Reviews

a. Inspection Scope (IP 69001-02.09)

The inspector reviewed the following to ensure that the audits and reviews stipulated in TS Section 6.2, Review and Audit, were being completed:

- (RSC Meeting Minutes for December 2, 2010, September 27, 2010, and June 18, 2010
- Reactor Safety Subcommittee (RSSC) Meeting Minutes for meeting for September 23, 2010, June 17, 2010 and March 12, 2010.
- 2009 Radiation Safety Audit, dated May 20, 2010

b. Observations and Findings

The inspector verified that the composition of the RSSC was as specified in the TS, quorums were present at meetings, meetings were held at the required frequency, and meeting minutes were published in accordance with TS requirements. A review of records indicated that the RSSC provided the oversight and reviews of the reactor programs as required by the TS. The inspector reviewed RSO audit and verified findings were within TS requirements

c. Conclusion

The RSSC provided the oversight required by the TS.

5. Maintenance Logs and Records

a. Inspection Scope (IP 69001-02.11)

The inspector reviewed the following selected maintenance and reactor operations records to ensure that the requirements of TS Sections 6.7, Plant Operating Records, were being met:

- Reactor Console Logbook #30, August 3, 2009 to February 23, 2011
- Reactor Console Logbook #31, February 24, 2011 to present

b. Observations and Findings

The licensee stated that their practice was to keep records of principal maintenance activities, as required by TS Section 6.7, in the reactor console logbook. The inspector reviewed the logbook for maintenance records related to scheduled and unscheduled preventive and corrective maintenance activities that had occurred during the inspection period.

c. Conclusion

The inspector reviewed reactor logbook entries that documented principal maintenance activities in compliance with license and its requirements.

6. Fuel Handling Logs and Records

a. Inspection Scope (IP 69001-02.12)

The inspector reviewed the following records to verify implementation of the requirements of TS Section 6.7, Plant Operating Records:

- Procedure RO-2, Unloading and Reloading the Core to a Known Configuration, Rev. 5, April 1, 2005

- Procedure RO-8, Handling of Irradiated Fuel, Rev. 2, dated, March 7, 2006
- Procedure SP-12, Inspections of Blades and Fuel, Rev. 5, dated, January 13, 2011
- Reactor Console Logbook #30, August 3, 2009 to February 23, 2011
- Reactor Console Logbook #31, February 24, 2011 to present

b. Observations and Findings

The inspector found that the procedures used for fuel handling provide for the safe handling of fuel elements. The only fuel movement recorded in recent years was for the biennial inspection of a representative sample of fuel elements required by TS Section 4.6, Fuel Surveillance.

c. Conclusion

Fuel movements were performed safely in accordance with TS requirements and licensee procedural requirements

7. Exit Interview

The inspector reviewed the inspection results with members of licensee management at the conclusion of the inspection on May 26, 2011. The licensee acknowledged the findings presented and did not identify as proprietary any of the material provided to or reviewed by the inspector during the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

L. Bobek	Reactor Supervisor
J. Chen	Vice-Provost for Research
D. Medich	Radiation Safety Officer
T. Regan	Chief Reactor Operator
S. Snay	Assistant Radiation Safety Officer
J. White	Professor of Chemical Engineering and Chairman of the Reactor Safety Subcommittee

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the *Code of Federal Regulations*
ADAMS	Agencywide Document Access and Management System
IP	Inspection Procedure
NRC	U. S. Nuclear Regulatory Commission
PARS	Publicly Available Records
Rev.	Revision
RSC	Radiation Safety Committee
RSSC	Radiation Safety Subcommittee
TS	Technical Specifications
UML	University of Massachusetts Lowell
UMLRR	University of Massachusetts - Lowell Research Reactor