August 6, 2009

Dr. Mohamad Al-Sheikhly, Director
Radiation Facilities and Nuclear Reactor
Department of Materials Science and Engineering
2309D Chemical and Nuclear Engineering Building
Building 090, Stadium Drive
The University of Maryland
College Park, MD 20742-2115

SUBJECT: UNIVERSITY OF MARYLAND - NRC ROUTINE INSPECTION REPORT NO. 50-166/2009-201

Dear Dr. Al-Sheikhly:

On July 13-16, 2009, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection at the Maryland University Training Reactor (Inspection Report No. 50-166/2009-201). The inspection included a review of activities authorized for your facility. The enclosed report documents the inspection results, which were discussed on July 16, 2009, with members of your staff.

This inspection was an examination of 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. 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 with NRC requirements was identified. No response to this letter is required.

In accordance with Title 10 of the *Code of Federal Regulations* Part 2.390 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 document system (Agencywide Document Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) http://www.nrc.gov/reading-rm/adams.html

Should you have any questions concerning this inspection, please contact Patrick Isaac at 301-415-1019 or by electronic mail at Patrick.Isaac@nrc.gov.

Sincerely,

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

Docket No. 50-166
License No. R-70

Enclosure:
As stated
cc w/encl: See next page

cc:

Director, Dept. of Natural Resources
Power Plant Siting Program
Energy & Coastal Zone Administration
Tawes State Office Building
Annapolis, MD 21401

Mr. Roland Fletcher, Director
Center for Radiological Health
Maryland Department of Environment
201 West Preston Street
7th Floor Mail Room
Baltimore, MD 21201

Mr. Vincent G. Adams
Facility Coordinator
Chemical and Nuclear Engineering Building 090
University of Maryland
College Park, MD 20742

Maureen M. Kotlas, Director
Department of Environmental Safety
3115 Chesapeake Building 338
University of Maryland
College Park, MD 20742

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

August 6, 2009

Dr. Mohamad Al-Sheikhly, Director
Radiation Facilities and Nuclear Reactor
Department of Materials Science and Engineering
2309D Chemical and Nuclear Engineering Building
Building 090, Stadium Drive
The University of Maryland
College Park, MD 20742-2115

SUBJECT: UNIVERSITY OF MARYLAND - NRC ROUTINE INSPECTION REPORT NO. 50-166/2009-201

Dear Dr. Al-Sheikhly:

On July 13-16, 2009, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection at the Maryland University Training Reactor (Inspection Report No. 50-166/2009-201). The inspection included a review of activities authorized for your facility. The enclosed report documents the inspection results, which were discussed on July 16, 2009, with members of your staff.

This inspection was an examination of 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. 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 with NRC requirements was identified. No response to this letter is required.

In accordance with Title 10 of the *Code of Federal Regulations* Part 2.390 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 document system (Agencywide Document Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) http://www.nrc.gov/reading-rm/adams.html

Should you have any questions concerning this inspection, please contact Patrick Isaac at 301-415-1019 or by electronic mail at Patrick.Isaac@nrc.gov.

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

Docket No. 50-166
License No. R-70
Enclosure:
As stated
cc w/encl: See next page

DISTRIBUTION:
PUBLIC PRTB/rf RidsNrrDprPrtb RidsOgcMailCenter RidsNrrDprPrta
BDavis (cvr ltr only) EReed, NRR GLappert, NRR

ADAMS ACCESSION NO.:ML092090191 **TEMPLATE #: NRC-002**

OFFICE	PRTB:RI	PGCB:LA	PRTB:BC
NAME	PIsaac	GLappert	JEads
DATE	7/31/09	8/5/09	8/6/09

OFFICIAL RECORD COPY

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

Docket No:	50-166
License No:	R-70
Report No:	50-166/2009-201
Licensee:	University of Maryland
Facility:	Maryland University Training Reactor
Location:	College Park, Maryland
Dates:	July 13-16, 2009
Inspectors:	Patrick J. Isaac Gary M. Morlang
Approved by:	Johnny H. Eads, Chief Research and Test Reactors Branch B Division of Policy and Rulemaking Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

University of Maryland
Maryland University Training Reactor Facility
NRC Inspection Report No. 50-166/2009-201

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 procedures, experiments, health physics, design changes, committees, audit and reviews, and transportation activities. 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.

Procedures

- Procedural control and implementation satisfied Technical Specification requirements.

Experiments

- Conduct and control of experiments met the requirements of regulations, the MUTR Technical Specifications, and the applicable facility procedures.

Health Physics

- The inspector determined that the licensee's radiation protection program met applicable regulatory and Technical Specification requirements.

Design Changes

- No new changes subject to 10 CFR 50.59 reporting were performed since the previous inspection.

Committees, Audits and Reviews

- Review and oversight functions of the Reactor Safety Committee appear to meet Technical Specification requirements.

Transportation

- The licensee did not make any radioactive material shipments under the reactor license during the past two years..

REPORT DETAILS

Summary of Facility Status

The licensee's research reactor, licensed to operate at a maximum steady-state thermal power of 250 kilowatts, continues to be operated in support of academic classes, educational demonstrations, operator training, surveillance, and experiments. During the inspection the inspector observed the reactor being started up, operated for a demonstration, and shut down.

1. Procedures

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the requirements of TS Section 6.3 were being met concerning written procedures:

- File 16.1, Control Rod Calibration and Shutdown Margin, performed July 17, 2007 and March 12, 2008
- Reactor Log Book from August 26, 2008 to present
- File 16.2a, Control Rod Drop Times performed on May 2, 2007 and March 6, 2008
- Operating Procedure 100, Control and Maintenance of Procedures, Rev 12 (March 27, 2000)
- Operating Procedure 101, Reactor Startup Checklist, Rev 12 (March 27, 2000)
- Operating Procedure 102, Reactor Shutdown Checklist, Rev 12 (March 27, 2000)
- Operating Procedure 103, Reactor Startup, Rev 12 (March 27, 2000)
- Operating Procedure 104, Reactor Operations, Rev 12 (March 27, 2000)

b. Observations and Findings

The inspector verified by review of a random selection of written procedures that they addressed activities delineated in TS Section 6.3. The procedures were approved by the RSC, and were of acceptable clarity and detail.

The inspector noted that the procedure for control of procedures indicated controlled copies were located in the nuclear engineering conference room. These controlled copies had been relocated to the reactor room for security reasons. The licensee processed a procedural change to indicate the relocation of the controlled copies.

c. Conclusions

Procedural control and implementation satisfied TS requirements.

2. Experiments

a. Inspection Scope (IP 69001)

To verify compliance with licensee's procedures, TS Section 3.5, Limitations on Experiments, TS 6.4, Experiment Review and Approval, and 10 CFR 50.59, the inspector reviewed selected aspects of:

- Reactor Console Logbook, July 2007 to present
- Annual Report, July 1, 2007 to June 30, 2008
- Annual Report, July 1, 2006to June 30, 2007
- Proposal to Irradiate and Remove the Thermal Column Access Plug for Determination of Activation of New Materials and Dose Rates for Sample Removal, February 18, 2009
- Proposal for Gamma Dose Rate Mapping and Neutron Spectrum Unfolding Within the Thermal Column Environmental Control Access Plug, February 18, 2009

b. Observations and Findings

Two new experiments were performed since the last inspection. These were qualified as special experiments. The inspector verified that a current authorization was on file for each of the experiments. The proposals contained the appropriate hazard analyses as applicable, were reviewed and approved by the Reactor Safety Committee (RSC) and the Facility Director prior to initiation.

c. Conclusions

Conduct and control of experiments met the requirements of regulations, the MUTR Technical Specifications, and the applicable facility procedures.

3. Health Physics

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Part 19 and Part 20 and the applicable TS requirements:

- COMPLY Computer Code output dated February 20, 2009
- Radiation Safety Committee meeting minutes for July 16,2008 December 12, 2008 and May 14, 2009
- Monthly Reactor Air and Water Analysis from December 2008 to June 2009
- Monthly Reactor Compartment Monitoring and Sampling from December 2008 to June 2009
- Summary Report of Reactor Operations from February 27 to March 1, 2009 for Thermal Column Mapping

- Radiation Safety Manual - University of Maryland, September 19, 2001
- Radiation Safety Office Departmental Procedure #015, Radioactive Waste Handling, June 2001
- 2008 External Audit of the University of Maryland Radiation Protection Program performed by two certified Health Physicists from NIH
- Occupancy Radiation Exposure Reports for Reactor Fixed Monitors and Personnel from January 25, 2007 to May 1, 2009
- Global Dosimetry Solutions Environmental Report, April 28, 2009
- University of Maryland Radiation Facilities Visitor Log, dated from January 2008 to present
- Calibration data on radiation monitoring equipment

b. Observations and Findings

The RSO administered a campus-wide radiation protection program which included activities conducted under the reactor license. A description of the radiation safety program and its implementing procedures were reviewed.

Data gathered in monthly surveys of the reactor facility indicated that there were no unexpectedly high radiation levels present. Radiation worker dosimetry monitoring indicated that doses were near background levels. Radiation exposure reports indicated the maximum whole body dose to a reactor facility individual was 49 mrem for calendar year 2008. Visitors to the reactor signed a logbook and were issued self-reading dosimeters. The inspector reviewed the log and found that no significant radiation doses were measured.

The inspector also reviewed results of the environmental monitoring program. The reactor facility was monitored with six dosimeters on the exterior of the building. All dosimeters indicated background radiation levels with the exception of the dosimeter outside the gamma irradiator. This dosimeter indicated 37 mrem above background for a 2 month period due to an extended irradiator run. The licensee calculated the maximum potential production of Ar-41 in the reactor using the Environmental Protection Agency computational code “COMPLY,” which showed that the licensee was in compliance with 10 CFR 20.1301(a)(1).

The inspector verified that current versions of NRC Form 3 required by 10 CFR Part 19 was posted at the entrance to the reactor bay. Areas with radiation and contamination hazards present and radioactive material storage areas were found to be properly posted. No unmarked radioactive material was found in the facility.

The calibration data on devices was noted as the inspector toured the facility. All devices observed were found to be within their calibration period.

The inspector observed that proper precautions are used to maintain radiation doses for personnel as low as reasonably achievable (ALARA). The RSO and his staff directly monitored a new experiment conducted at the reactor thermal

column. This resulted in a total of 20 mrem to the 6 individuals involved over a 3 day period. An external audit of the Radiation Protection Program was performed in the fall of 2008 with a final report issued in February 2009.

The inspector verified that appropriate training was being administered to both radiation workers and emergency personnel with need to enter the facility; this was accomplished by reviewing the structure of the training program, training materials used, and records of training administered. Additionally, reactor staff personnel were provided 2 hours of training specific to the facility.

The licensee indicated that they do not support a respiratory protection program nor do they perform planned special exposures.

c. Conclusions

The inspector determined that the licensee's radiation protection program met applicable regulatory and TS requirements.

4. 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 2007 to present
- Annual Report, July 1, 2007 to June 30, 2008
- Annual Report, July 1, 2006 to June 30, 2007

b. Observations and Findings

The licensee reported that since the previous inspection there were no changes made which constituted a change reportable pursuant to 10 CFR 50.59. Through review of applicable records and interview with licensee personnel, the inspector verified that administrative controls were in place, requiring the appropriate review and approval of facility changes prior to implementation.

c. Conclusions

No new changes subject to 10 CFR 50.59 reporting were performed since the previous inspection.

5. Committees, Audits and Reviews

a. Inspection Scope (IP 69001)

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

- Annual E-Drill/External Audit Results, S. Petras (Constellation Nuclear Services) to M. Al-Sheikhly (UMD), July 2, 2008
- Annual E-Drill/External Audit Results, S. Petras (Constellation Nuclear Services) to M. Al-Sheikhly (UMD), August 15, 2007
- Reactor Safety Committee Minutes for Meeting of December 12, 2007
- Reactor Safety Committee Minutes for Meeting of June 11, 2007
- Reactor Safety Committee Minutes for Meeting of September 16, 2008
- Reactor Safety Committee Minutes for Meeting of June 6, 2008
- Reactor Safety Committee Minutes for Meeting of February 18, 2009

b. Observations and Findings

The licensee's safety oversight was performed by its Reactor Safety Committee (RSC). The RSC membership met the requirements of TS 6.2.2. The inspector verified that the RSC composition, meeting quorums, and meeting frequency were all in accordance with TS Section 6.2.2, Reactor Safety Committee Charter and Rules. The inspector also verified that the audit function required in TS Section 6.2.4, Reactor Safety Committee Audit Function, was conducted and that the audit reports were reviewed by the RSC.

c. Conclusions

Review and oversight functions of the RSC appear to meet TS requirements but written documentation requires improvement to reach this conclusion without verbal augmentation.

5. Transportation

a. Inspection Scope (IP 86740)

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

- Shipping Papers, Type A Shipment, April 10, 2008

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. There had been no Type B shipments under the reactor license for the past year. The only other shipment during this time was the above-referenced item that was part of the DOE Orphaned Source Recovery Program.

c. Conclusions

The licensee did not make any radioactive material shipments under the reactor license during the past two years.

6. Exit Interview

The inspection scope and results were summarized on July 16, 2009, with members of licensee management. The inspectors described the areas inspected and discussed the inspection findings. No dissenting comments were received from the licensee.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

V. Adams	Facility Coordinator and Senior Reactor Operator
M. Al-Sheikhly	Director, Radiation Facilities and Nuclear Reactor
T. O'Brien	Radiation Safety Officer, Department of Environmental Safety
B. Zidek	Health Physicist

INSPECTION PROCEDURES USED

IP 69001	Class II Non-Power Reactors
IP 86740	Transportation

ITEMS OPENED, CLOSED, AND DISCUSSED

OPENED:

None

CLOSED:

None

DISCUSSED:

None

PARTIAL LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access and Management System
ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
FC	Facility Coordinator
FD	Facility Director
MUTR	Maryland University Training Reactor
NRC	Nuclear Regulatory Commission
RO	Reactor Operator
RSC	Reactor Safety Committee
RSO	Radiation Safety Officer
SRO	Senior Reactor Operator
TS	Technical Specifications
UMD	University of Maryland