September 14, 2011

Mr. William E. Bonzer, Reactor Manager Missouri University of Science and Technology Nuclear Reactor Facility 1870 Miner Circle Rolla, MO 65409-0630

SUBJECT: MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY - NRC ROUTINE INSPECTION REPORT NO.: 50-123/2011-201

Dear Mr. Bonzer:

On August 15-18, 2011, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection at your Nuclear Reactor Facility (Inspection Report No. 50-123/2011-201). The enclosed report documents the inspection results, which were discussed on August 18, 2011 with you and members of your staff.

Areas examined during the inspection are identified in the 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 concerns or non-compliances with NRC requirements were identified. No response to this letter is required.

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

If you have any questions concerning this inspection, please contact Mike Morlang at 301-415-4092 or <u>Gary.Morlang@nrc.gov</u>.

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

Enclosure: NRC Inspection Report No.: 50-123/2011-201 cc w/encl: Please see next page

Missouri University of Science and Technology

CC:

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Test, Research, and Training Reactor Newsletter University of Florida 202 Nuclear Sciences Center Gainesville, FL 32611 Mr. William E. Bonzer, Reactor Manager Missouri University of Science and Technology Nuclear Reactor Facility 1870 Miner Circle Rolla, MO 65409-0630

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

Docket No:	50-123
License No:	R-79
Report No:	50-123/2011-201
Licensee:	Missouri University of Science and Technology
Facility:	Nuclear Reactor Facility
Location:	Rolla, Missouri
Dates:	August 15-18, 2011
Inspector:	Mike Morlang
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

Missouri University of Science and Technology Report No.: 50-123/2011-201

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 operating logs and records, requalification training, surveillance and limiting conditions for operations, emergency planning, 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 in compliance with NRC requirements.

Operations Logs and Records

• Operating logs and records were being maintained in accordance with Technical Specification (TS) Section 6.8, Records.

Requalification Training

• The licensee's reactor operator requalification program was found to be effectively implemented pursuant to Title 10 of the *Code of Federal Regulations* Part 55.

Surveillance and Limiting Conditions for Operation

• The licensee was complying with the TS requirements pertaining to surveillance and limiting conditions for operation.

Emergency Planning

• The emergency preparedness program was being implemented and conducted in accordance with the facility Emergency Plan.

Maintenance Logs and Records

• The licensee was meeting TS requirements pertaining to preventative and corrective maintenance of equipment.

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 200 kW pool-type research reactor continues to be operated in support of graduate and undergraduate instruction, laboratory experiments, reactor operator training, and various forms of research. During the inspection, the inspector observed the conduct of the pre-startup checklist, a reactor startup, and a reactor shut down.

1. Operations Logs and Records

a. Inspection Scope (IP 69001)

The inspector reviewed the following reactor operations records to ensure compliance with the requirements of technical specification (TS) Section 6.8, Records:

- MSTR SOP-102, Pre-Startup Checklist dated January 21, 2011, from July 6, 2009 to present
- Reactor Console Logbook #16, from May 21, 2009 to present
- MSTR SOP-105, Reactor Shutdown Checklist, Rev. April 14, 1998
- MSTR SOP-107, Permanent Hourly Logs and Operational Data, Rev. January 3, 2008, July 9,2009 to present
- MSTR Annual Progress Report April 1, 2009 to March 31, 2010
- MSTR Annual Progress Report April 1, 2010 to March 31, 2011
- MSTR Technical Specifications dated March 30, 2009
- b. <u>Observations and Findings</u>

As indicated above procedures covering reactor operations were being updated on a routine basis. Reactor operations were carried out following written procedures and TS requirements. The inspector reviewed the logs and records related to reactor operations and they indicated that TS operational limits had not been exceeded. The inspector observed the licensee complete the pre-startup checklist, startup the reactor to 10 watts and shutdown the reactor.

c. <u>Conclusions</u>

Operating logs and records were being maintained in accordance with TS Section 6.8, Records.

2. Requalification Training

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that Title 10 of the *Code of Federal Regulations* (10 CFR) Part 55 requirements for reactor operator requalification were being met:

- Reactor Console Logbook #16, from May 21, 2009 to present
- Operator Requalification Program for the University of Missouri-Rolla Reactor, Rev. 3, August 20, 2004
- MSTR Regualification Files for Individual Operators
- 2010 MSTR Operator's Requalification Test
- 2010 & 2011 Reactor Operator's Requalification Sheets
- MSTR file of Operator Form NRC-396 for 2010
- MSTR Technical Specifications dated March 30, 2009
- •

b. <u>Observations and Findings</u>

There were four U.S. Nuclear Regulatory Commission (NRC) licensed senior reactor operators (SROs), and two reactor operators (RO) at the facility. The Requalification Program was maintained up-to-date and the licenses were current. 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. Individual operator records showed that the required quarterly reactor operations, reactivity manipulations, and other operations activities were being documented as required. As only one SRO had a license longer than two years there was only one biennial written exam conducted. The inspector reviewed the biennial medical examinations for all licensed personnel.

c. <u>Conclusions</u>

Operator requalification was up-to-date and was being performed as required by the MSTR Reactor Operator Requalification Program.

3. Surveillance and Limiting Conditions for Operation

a. <u>Inspection Scope (IP 69001)</u>

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

- Reactor Facility Monthly Surveillance Status Report, July 2009 to June 2011
- MSTR SOP 800, Semi-Annual Checklist, dated May 16, 2008 for 2010 and 2011

- MSTR SOP 810, Weekly Checks, Rev. February 21, 2011 for 2010 and 2011
- Reactor Console Logbook #16, from May 21, 2009 to present
- MSTR Annual Progress Report April 1, 2009 to March 31, 2010
- MSTR Annual Progress Report April 1, 2010 to March 31, 2011
- MSTR SOP-806, Temperature Channel, Rev. April 4, 1994
- MSTR SOP-803. Annual Calibrations, Rev. December 17, 2009
- MSTR SOP-804, Safety Amplifier System, Rev. December 20, 2010
- MSTR SOP-816, Power Calibration, Rev. August 30, 1988
- MSTR SOP-813, Rod Drop Time Measurement, Rev. March 20, 1992

b. <u>Observations and Findings</u>

The inspector reviewed surveillance procedures and operating records that documented reactor operations had been conducted in accordance with the limiting conditions for operation specified in TS Section 3.0 and that surveillance had been done in compliance with TS Section 4.0 requirements. Records were organized and were maintained in accordance with the administrative requirements. Logs and records were clear and easily retrievable and provided an accurate characterization of licensed activities. The licensee had a detailed schedule of surveillance requirements that aided in completion of the various requirements.

c. <u>Conclusions</u>

The licensee was complying with the TS requirements pertaining to surveillance and limiting conditions for operation.

4. Emergency Planning

a. Inspection Scope (IP 69001)

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

- MSTR Emergency Plan (E-Plan) Rev. 6, dated December 30, 1994
- E-Plan semester Evacuation Drill records for 2009 and 2010
- Emergency Box Inventory for 2009 through 2011
- MSTR SOP-501, Emergency Procedures for Reactor Building Evacuation, Rev. December 10, 2009
- MSTR SOP-502. Emergency Procedures for an Unusual Event, Rev. December 28, 1994
- MSTR SOP-503, Emergency Procedures for an Alert, Rev. December 28, 1994
- MSTR SOP-504, Emergency Procedures for a Site Area Emergency, Rev. December 28, 1994
- MSTR SOP-506, Emergency Procedure for Bomb Threats, Rev.

December 28, 1994

- MSTR SOP-507, Emergency Procedures Administrative Responsibilities, Rev. January 3, 2008
- MSTR SOP-508, Emergency Procedure for Tornado Threat, Rev. May 13, 1999
- MSTR SOP-509, Emergency Procedure for a Fire, Rev. April 7, 1998
- MSTR SOP-510, Emergency Procedure for Earthquake. Rev. December 28, 1994
- Mutual Aid and Assistance Agreement between Phelps County Regional Medical Center, Rolla Fire Department and Missouri University of Science and Technology dated June 25, 2009
- b. Observations and Findings

Section 10 of the MSTR E-Plan requires that building evacuation drills be held each regular semester. The inspector reviewed evacuation drill records, annual table top discussion minutes and training records to verify that E-Plan required annual emergency response training was conducted. The inspector confirmed that notification procedures and phone numbers were current and posted. E-Plan support agreements with off-site response organizations were current.

The inspector visited the local Fire Department with the licensee and was given a tour of the hazardous material emergency response equipment to be used in the event of a radiological emergency at the MSTR. Through interviews with the Fire Department Training Coordinator and the Fire Chief the inspector confirmed that FD emergency response personnel on all shifts had received annual training.

c. Conclusions

The emergency preparedness program was being implemented and conducted in accordance with the facility E-Plan.

5. Maintenance Logs and Records

a. <u>Inspection Scope (IP 69001)</u>

To verify compliance with maintenance procedure requirements of TS Section 6.4 (5) and maintenance record requirements of TS Section 6.8.1(2), the inspector reviewed:

- Surveillance file for 2009, 2010 and 2011
- Equipment Discrepancy Report files for 2009, 2010 and 2011
- Permanent Logbook #16, May 21, 2009 to present
- MSTR Annual Progress Report April 1, 2009 to March 31, 2010
- MSTR Annual Progress Report April 1, 2010 to March 31, 2011
- b. <u>Observations and Findings</u>

The licensee maintained a detailed equipment deficiency file subdivided by individual system such as rod drives, safety systems and pneumatic systems. The detail of the entries allowed immediate retrieval of important information such as part numbers. Preventative maintenance was well controlled and documented in the Surveillance files and the Permanent Logbooks. The number of entries in the log books showed a continuous maintenance effort required to keep older equipment operational.

c. <u>Conclusions</u>

Maintenance records and performance satisfied TS and procedural requirements.

6. Fuel Handling Logs and Records

a. Inspection Scope (IP 69001)

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

- MSTR SOP-207, Fuel Handling, Rev. February 6, 1997
- MSTR SOP-112, Fuel Management, Rev. February 6, 1997
- Reactor Console Logbook #16 entries regarding fuel movements on August 5, 2009, June 19, 2010, and July 28, 2011
- MSTR Annual Progress Report April 1, 2009 to March 31, 2010
- MSTR Annual Progress Report April 1, 2010 to March 31, 2011
- Core Loading and Fuel Rack Maps posted in the reactor bay

b. <u>Observations and Findings</u>

The inspector reviewed records of fuel movements that were done on the dates specified above. These fuel movements were part of the procedure for control rod inspection. The fuel transfer forms which are 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.

c. Conclusion

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

7. Exit Interview

The inspection scope and observations were summarized on August 18, 2011 with members of licensee management and staff. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee.

PARTIAL LIST OF PERSONS CONTACTED

R. Bono	Director of Environmental Health and Safety and Radiation Safety Officer
W. Bonzer	Reactor Manager
M. Henry	Senior Administrative Assistant, Missouri University of Science and Technology
C. Reisner,	Senior Reactor Operator
R. Smith	Training Officer, RFD
R. Williams	Chief, RFD

INSPECTION PROCEDURE (IP) USED

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ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Open</u>

None

Closed

None

Discussed

None

PARTIAL LIST OF ACRONYMS USED

Code of Federal Regulations
Emergency Plan
Inspection Procedure
Missouri University of Science and Technology Reactor
Nuclear Regulatory Commission
Revision
Rolla Fire Department
Reactor Operator
Standard Operating Procedure
Senior Reactor Operator
Technical Specification