

April 28, 2010

Dr. Leslie P. Tolbert, Vice President
for Research, Graduate Studies &
Economic Development
University of Arizona
P.O. Box 210066
Tucson, Arizona 85721-0066

SUBJECT: UNIVERSITY OF ARIZONA - NRC ROUTINE, ANNOUNCED INSPECTION
REPORT NO. 50-113/2010-201

Dear Dr. Tolbert:

On April 6-7, 2010, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection at the University of Arizona Nuclear Reactor Laboratory (Inspection Report No. 50-113/2010-201). The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection.

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 Mike Morlang at 301-415-4092 or by electronic mail at Gary.Morlang@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. 50-113
License No. R-52

Enclosure: As stated
cc: See next page

University of Arizona

Docket No. 50-113

cc:

Office of the Mayor
City of Tucson
City Hall, 10th Floor
255 W. Alameda St.
Tucson, AZ 85701

Arizona Radiation Regulatory Agency
4814 South 40th Street
Phoenix, AZ, 85040

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Nuclear Reactor Laboratory
University of Arizona
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Mr. Daniel Silvain, Director
Radiation Control Office
University of Arizona
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Tucson, AZ 85724

Test, Research and Training
Reactor Newsletter
202 Nuclear Sciences Center
University of Florida
Gainesville, FL 3261

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GLappert, NRR

ADAMS ACCESSION NO.:ML101050318 *Concurrence via e-mail

TEMPLATE #: NRC-002

OFFICE	PROB:RI *	PRPB:LA	PROB:BC
NAME	GMorlang	GLappert	JEads
DATE	4/28/2010	4/28/2010	4/28/10

OFFICIAL RECORD COPY

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

Docket No: 50-113

License No: R-52

Report No: 50-113/2010-201

Licensee: The University of Arizona

Facility: Nuclear Reactor Laboratory

Location: Tucson, Arizona

Dates: April 6-7, 2010

Inspectors: Mike Morlang
Patrick Isaac

Accompanied by: Linh Tran, Project Manager

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 Arizona
Nuclear Reactor Laboratory
NRC Inspection Report No. 50-113/2010-201

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the University of Arizona (the licensee) Class II research reactor facility safety programs including organization and staffing; operations logs and records; 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 were in compliance with the U.S. Nuclear Regulatory Commission (NRC) requirements.

Organization and Staffing

- Organizational structure and responsibilities were consistent with Technical Specification requirements.
- Shift staffing met the minimum requirements for current operations.

Operations Logs and Records

- Operation logs and recordkeeping program conformed to Technical Specification requirements.

Health Physics

- The radiation safety program is commensurate with Title 10 of the *Code of Federal Regulations* Part 20 requirements, Technical Specifications, and Procedures.

Emergency Planning

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

Maintenance Logs and Records

- Maintenance was performed and logs and records maintained consistent with Technical Specification and licensee procedure requirements.

Fuel Handling Logs and Records

- Fuel handling logs and activities satisfied the Technical Specification requirements and facility procedural requirements.

REPORT DETAILS

Summary of Facility Status

The University of Arizona's (the licensee's) 110 kilowatt Training Research Isotope Production General Atomics (TRIGA) Mark I research reactor has been operated in support of experiments, reactor operator training, and periodic equipment surveillances.

1. Organization and Staffing

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

The inspectors reviewed the following to verify compliance with the organization and staffing requirements in Technical Specification (TS) Section 6.1:

- Staffing requirements for the safe operation of the reactor
- Organizational structure and staffing
- TS for The University of Arizona Research Reactor (UARR), Amendment No. 18, dated April 9, 2001
- Operating Logbook No. 48, from April 30, 2007 to May 21, 2009
- Operating Logbook Number 49, from May 21, 2009 to present
- UARR Procedure, UARR 100, "Administrative and Operating Procedures," dated May 6, 1999

b. Observations and Findings

Current UARR staff consisted of the Facility Director (FD), Reactor Supervisor (RS), both of whom are licensed Senior Reactor Operators (SROs), and two Reactor Operators (ROs). There is also an electrical technician who is responsible for maintenance of reactor systems.

All positions were filled with qualified personnel and a review of the applicable records verified that staffing was as required by TS Section 6.1 and the licensee's procedures. The inspectors noted that the staffing at the facility was acceptable to support the ongoing activities.

c. Conclusion

The organization and staffing was consistent with TS requirements.

2. Operations Logs and Records

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to ensure that the operations program was being implemented as required in TS Sections 3, 4, and 6:

- Staffing for reactor operations
- Operating Logbook No. 48, from April 30, 2007 to May 21, 2009
- Operating Logbook No. 49, from May 21, 2009 to present
- Annual Report for License R-52, Docket 50-113, dated September 11, 2009
- UARR 100, "Administrative and Operating Procedures," dated May 6, 1999
- UARR 129, "Procedures for the Conduct of Operating Personnel in the Control Room and Reactor Room," dated July 6, 1994
- UARR 147, "Instructions for Staff Members During Operation of the University of Arizona TRIGA Reactor," dated November 3, 1998
- UARR 150, "Reactor Operational Rules," dated September 6, 2000
- UARR 152, "Preliminary Checklist," dated November 3, 1998
- Power Channel Adjustments, dated July 1, 2009
- Control Rods Calibration, dated May 20, 2009

b. Observations and Findings

Reactor operations were carried out following written procedures. The operating logs and records were well maintained and provided a clear indication of operational activities, changes in reactivity, and maintenance actions or malfunctions that had occurred. The logs and records indicated that shift staffing was as required by TS. Logs and records also showed that operational conditions and parameters were consistent with license and TS requirements and that operational limits had not been exceeded. Information on the operational status of the facility was recorded in log books and on checklists as required by procedure. Scrams and other malfunctions were identified in the logs and their cause(s) resolved before the resumption of operations. The inspector determined that reactor operations were carried out following written procedures.

c. Conclusion

Operational activities were consistent with applicable TS and procedural requirements.

3. Health Physics

a. Inspection Scope (IP 69001)

The inspectors reviewed the following to verify compliance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20 requirements:

- The University of Arizona Nuclear Reactor Laboratory 2008 Annual Review - Health Physics, dated June 2, 2009
- UARR 149, "Radiation Protection Instructions for the Nuclear Reactor Laboratory," dated July 2009
- University of Arizona Contamination Survey Instrument Calibration, dated January 28, 2010

- University of Arizona Nuclear Reactor Laboratory Wipe Survey, January 2010 and November 2009
- University of Arizona Reactor room survey, dated February 10, 2010
- Radiation Survey, TRIGA Reactor, August 2008, November 2009, November 2009
- Annual Personal Radiation Exposure Report for University of Arizona Nuclear Reactor Laboratory, dated May 9, 2009 and March 15, 2010
- Annual Report for License R-52, Docket 50-113, dated September 11, 2009

b. Observations and Findings

The inspectors reviewed records of radiological surveys performed by the staff of the University of Arizona Radiation Safety Office. The radiation surveys were performed in accordance with procedures and TS. Contamination surveys have indicated activity levels to be generally consistent with background radiation.

Facility postings and observed instrument indication by the inspectors supported the survey records. No unmarked radioactive material was found in the facility. A copy of the current NRC Form 3 notice to radiation workers required by 10 CFR Part 19 was posted at the entrance to the Control Room and other conspicuously placed areas near laboratory work stations.

The calibration records of selected devices were reviewed. Calibration tags on devices found throughout the facility were verified to be current and in accordance with the calibration records that were reviewed. The inspectors reviewed dosimetry records, radiation protection procedures, and determined that radiation worker dose was consistent with the as low as reasonably achievable (ALARA) principle.

The review of argon-41 discharge through the monitored exhaust stack is below the regulatory limits of concern as specified in Appendix B of 10 CFR Part 20. The facility did not discharge radiological effluent waste to the sewer system in 2009.

c. Conclusion

The inspectors verified that the licensee's radiation protection program was effective in minimizing radiation doses to individuals. Effluent monitoring satisfied license and regulatory requirements and releases were within the specified regulatory limits.

4. Emergency Planning

a. Inspection Scope (IP 69001)

To verify that the licensee was implementing and complying with the Emergency Plan (E-Plan) requirements, the inspectors reviewed selected aspects of:

- Training records for emergency response personnel dated March 23 and 25, 2009
- E-Plan for the University of Arizona Nuclear Reactor Laboratory, Rev. 10, dated May 2009
- Written documentation of Annual Emergency Drill conducted on June 16, 2009
- Letter of Agreement (LOA) between University of Arizona Police Department (UAPD) and UARR, dated January 8, 2010
- LOA between City of Tucson Fire Department and UARR, dated February 9, 2010
- LOA between University Medical Center (UMC) and UARR, dated January 12, 2010
- LOA between University of Arizona Radiation Control Office and UARR, dated January 6, 2010
- UARR Emergency Notification List, dated December 3, 2009
- UARR 101, "Emergency Procedures," Rev. 7, dated March 11, 2008
- Emergency Plan training records for UARR personnel, dated June 2, 2009

b. Observations and Findings

The inspectors verified that the UARR E-Plan was being fully implemented to maintain the emergency preparedness of the reactor. The E-Plan was audited and reviewed as required. E-Plan Implementing Procedures were also reviewed and revised as needed to effectively execute the E-Plan. Revision 10 of the E-Plan did not decrease its effectiveness, as described in 10 CFR 50.54, as it enhances the emergency preparedness of local, state, and federal stakeholders with regards to the National Incident Management System. New Emergency Notification Lists for Nuclear Reactor Laboratory personnel and outside agencies had been incorporated into the emergency procedures.

NRL operators, staff, and members of the radiological controls office having emergency response duties must complete an initial training program and annual review, in accordance with procedures. Training records for annual training were complete and up-to-date. Emergency drills had been conducted annually as required by the E-Plan. Critiques were written following the drills to document the strengths and weaknesses identified during the exercise. Action items were developed to correct the deficiencies.

LOAs with offsite response organizations and support groups had been updated annually and maintained as required.

The inspectors met with University Medical Center (UMC) staff responsible for campus medical emergency preparedness and discussed the emergency readiness of the appropriate personnel. The inspectors toured the UMC facilities for dealing with contaminated injured personnel. The facility was new and had been designed specifically for contaminated injured personnel.

c. Conclusion

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

5. Maintenance Logs and Records

a. Inspection Scope (IP 69001)

To verify that the licensee was complying with the applicable regulations, the inspectors reviewed selected aspects of:

- Operating Logbook No. 49, dated from May 21, 2009, to present
- Operating Logbook No. 48, dated from April 30, 2007 to May 20, 2009
- Annual Report for License R-52, Docket 50-113, dated September 11, 2009
- Console and Monitor Calibration Data Notebook, dated May 13, 2009 to present
- Reactor Up-grade and Instrument Maintenance Log No. 5, dated June 19, 2008 to present
- UARR 108, "Procedures for Repair, Modification, Calibration, or Installation of Electronic Equipment in the Console and Control Rod Drive Systems," dated March 7, 2001
- UARR 109, "General Procedures for the Repair, Modification, Calibration, or Installation of Equipment," dated March 7, 2001
- UARR 159, "Bimonthly Reactor Operations Audit," Rev. 2 dated December 10, 2007
- Completed UARR 159 forms, dated from November 2008 to present

b. Observations and Findings

The inspectors 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. The inspectors reviewed the Work Record for the replacement of the right safety channel high voltage power supply conducted January 15, 2010. These documents indicated that all maintenance activities were controlled and documented in accordance with the requirements in 10 CFR 50.59. All maintenance of reactor systems were reviewed and approved by the RS. The inspectors verified that all maintenance was conducted in accordance with the requirements of TS section 4.5. After all

maintenance items are completed, system operational checks are performed to ensure the affected systems function before returning them to service.

c. Conclusion

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

6. Fuel Handling Logs and Records

a. Inspection Scope (IP 69001)

The inspectors reviewed the following to verify compliance with requirements of TS Sections 4.1 and 6.3.

- Fuel Log Binder, a record of the movements of each fuel element
- UARR 105, "Procedure for Fuel Element Changing", dated July 1994
- Fuel Status Board in the Reactor Bay
- Operating Logbook No. 48, dated from April 30, 2007 to May 20, 2009
- Operating Logbook No. 49, dated from May 21, 2009, to present

b. Observations and Findings

Procedures for refueling, fuel movement, and TS required fuel inspections and surveillances were reviewed and approved as required and were available to control operations. Fuel movement, log keeping, and data recording were being done as directed by procedures. Data recorded for fuel handling was clear and cross-referenced in the Fuel Log Binder, on the Fuel Status Board in the reactor bay, and in the Reactor Logbook. Log entries clearly identified that a licensed senior reactor operator was present for all fuel transfers. No fuel movements had been conducted since the last inspection.

c. Conclusions

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

7. Exit Interview

The inspectors presented the inspection results to licensee management at the conclusion of the inspection on April 7, 2010. The inspectors described the areas inspected and discussed in detail the inspection observations. No dissenting comments were received from the licensee. The licensee acknowledged the observations presented and did not identify as proprietary any of the material provided to or reviewed by the inspectors during the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Williams	Nuclear Reactor Laboratory Director
R. Offerle	Reactor Supervisor
W. Lohmeier	Nuclear Reactor Laboratory Staff
Kathryn Knak	Emergency Preparedness Officer, University Medical Center
Richard Wagner	Radioactive Material Manager

Other Personnel

Cmdr. Seastone	University of Arizona Police Department
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INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
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ITEMS OPENED, CLOSED, AND DISCUSSED

None

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ALARA	As Low As Reasonably Achievable
IP	Inspection Procedure
LOA	Letters of Agreement
NRC	U. S. Nuclear Regulatory Commission
NRP	Nuclear Reactor Program
PARS	Publicly Available Records
Rev.	Revision
RO	Reactor Operator
RC	Reactor Committee
RCO	Radiological Controls Office
RS	Reactor Supervisor
RSAC	Reactor Safety and Auditing Committee
SRO	Senior Reactor Operator
TS	Technical Specifications
UAPD	University of Arizona Police Department
UMC	University Medical Center