

December 4, 2015

Thomas E. Blue, Director  
Nuclear Reactor Laboratory  
Ohio State University  
1298 Kinnear Road  
Columbus, OH 43212

SUBJECT: OHIO STATE UNIVERSITY – NUCLEAR REGULATORY COMMISSION SAFETY  
INSPECTION REPORT NO. 50-150/2015-201

Dear Mr. Blue:

From November 2-5, 2015, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection at the Ohio State University Nuclear Reactor Laboratory facility. The enclosed report documents the inspection results, which were discussed on November 5, 2015, 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 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, and 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 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).

T. Blue

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Should you have any questions concerning this inspection, please contact Mr. Ossy Font at (301) 415-2490 or by electronic mail at [Ossy.Font@nrc.gov](mailto:Ossy.Font@nrc.gov).

Sincerely,

***/Ossy Font for RA/***

Anthony J. Mendiola, Chief  
Research and Test Reactors Oversight Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No. 50-150  
License No. R-75

Enclosure:  
As stated

cc: See next page

Ohio State University

Docket No. 50-150

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

Docket No.: 50-150

License No.: R-75

Report No.: 50-150/2015-201

Licensee: Ohio State University

Facility: Nuclear Reactor Laboratory

Location: Columbus, Ohio

Dates: November 2-5, 2015

Inspector: Ossy Font

Approved by: Anthony Mendiola, Chief  
Research and Test Reactors Oversight Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Enclosure

## EXECUTIVE SUMMARY

Ohio State University  
Nuclear Reactor Laboratory  
Report No: 50-150/2015-201

The primary focus of this routine, announced inspection was the on-site review of selected aspects of the Ohio State University's (the licensee's) Class II research and test reactor safety program including: (1) organization and staffing; (2) operations logs and records; (3) operator requalification; (4) surveillance and limiting conditions for operations; (5) emergency preparedness; (6) maintenance logs and records, and (7) fuel handling logs and records since the last U.S. Nuclear Regulatory Commission (NRC) inspection of these areas. The licensee's program was acceptably directed toward the protection of public health and safety and in compliance with NRC requirements. No violations or deviations were identified.

### Organization and Staffing

- The licensee's organization and staffing qualifications remain in compliance with the requirements specified in the Technical Specifications (TS).

### Operations Logs and Records

- Operational activities were consistent with applicable TS and procedural requirements.

### Operator Requalification

- Operator requalification was being conducted and completed as required by the Operator Requalification Program.

### Surveillance and Limiting Conditions for Operations (LCO)

- The program for Surveillance and LCO confirmation was implemented in accordance with TS Sections 3.0 and 4.0 requirements.

### Emergency Preparedness

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

### Maintenance Logs and Records

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

### Fuel Handling Logs and Records

- Fuel movements and inspections were being completed and documented in accordance with the requirements specified in the TS and by procedure.

## **REPORT DETAILS**

### **Summary of Plant Status**

The Ohio State University's (OSU, the licensee's) five-hundred kilowatt (kW) open pool-type reactor continued to be operated in support of undergraduate instruction, laboratory experiments, reactor operator training, and various types of irradiation projects. During the inspection, the reactor was started up and operated, and shut down in accordance with applicable procedures to support these ongoing activities.

### **1. Organization and Staffing**

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

The inspector reviewed the following regarding the OSU Nuclear Reactor Laboratory (NRL) organization and staffing to ensure that the requirements of Technical Specification (TS) Section 6.1, were being met:

- Organizational structure (TS Figure 6.1)
- Management responsibilities and authority
- Staffing requirements for safe operation of the research reactor facility (TS Section 6.1.3)
- OSU Research Reactor (OSURR) Console Log Book entries from July 26, 2013 (page 7594) to present

#### **b. Observations and Findings**

The inspector determined that the organizational structure at the OSU-NRL facility had not changed since the previous U.S. Nuclear Regulatory Commission (NRC) inspection. The Associate Director (AD) continued to be responsible for the day-to-day operation of the OSURR and ensured that operations were conducted in a safe manner.

The inspector noted that there were three Senior Reactor Operators (SROs) working at the facility and no reactor operators and determined that the minimum shift staffing composition for operation, including on-call personnel, is consistent with the TS.

The licensee is in the process of hiring a new Radiation Safety Officer (RSO).

#### **c. Conclusion**

The licensee's organization and staffing qualifications remain in compliance with the requirements specified in the TS.

### **2. Operations Logs and Records**

#### **a. Inspection Scope (IP 69001)**

The inspector reviewed selected aspects of the following to verify compliance with TS Section 6.3 and 6.7 and applicable procedure requirements for operation:

- OSURR Console Log Book entries from July 26, 2013 (page 7594) to present
- Request for Reactor Operations procedures and forms for 2013 – present
  - Addendum 3; dated Oct. 29, 2015
- Instrumentation Use and Maintenance (IM) 03 and 04, Pre-Startup and Post-Shutdown procedures and forms for 2013 – present
- Radiation Safety (RS) 09, Area Radiation Survey procedures and forms for 2013 – present
- Administrative Procedures-13 (AP); “Personnel Required for Reactor Operations,” rev. 5, dated March 4, 2015
- AP-15; “Logging Unscheduled Shutdowns” and “Attachement A”
- “Annual Report for The Ohio State University Research Reactor, License R-75, Docket 50-150,” for Fiscal Years (FY) 2013/2014 and 2014/2015

b. Observations and Findings

The inspector reviewed selected log book entries, request for operations, and pre-start, post-shutdown, and area radiation safety survey forms and determined that logs and records are maintained as required by the licensee's administrative procedures. Records also showed that operational conditions and parameters were consistent with the license and TS requirements. The inspector also observed the reactor staff perform the required pre-start, post-shutdown, and area radiation survey checkout and a reactor startup and shutdown and the completion of the associated records and logs. The inspector determined that reactor operations were carried out following written procedures as required by TS Section 6.3 and 6.7.

Four scrams occurred from 2013 to the present. They were recorded and resolved before reactor operations were resumed as authorized by the SRO on duty.

c. Conclusion

Operational activities were consistent with applicable TS and procedural requirements.

**3. Operator Requalification**

a. Inspection Scope (IP 69001)

To verify that the licensee was complying with the requirements of the operator requalification program, the inspector reviewed selected aspects of:

- NRL Administrative Procedure AP-09, “RO/SRO Requalification,” Rev. 7, approval dated September 25, 1996
- OSURR Operator Requalification Training Sessions for 2013 and 2014
- Operator physical examination records



- OSURR Operator Requalification Operational Examination Records for 2013 and 2014
- OSURR Operator Requalification Written Examination Records for 2013 and 2014
- OSURR Console Operating Experience Records from 2013 to present
- OSURR Console Log Book entries from July 26, 2013 (page 7594) to present

b. Observations and Findings

As of the date of the inspection, all the operators' licenses were current. All operators were enrolled in the licensee's NRC-approved requalification and training program and had completed a minimum of four hours of shift functions per quarter. The inspector noted that operators were receiving the required biennial medical examinations.

A review of the logs and records showed that training was being conducted in accordance with the program. Requalification program data such as completion of written examinations and operation tests was documented as required. The inspector noted that the training and examinations are completed in December, and, therefore, 2015 activities have not occurred at the time of this inspection. Records of reactivity manipulations, and other operations activities were being maintained throughout the year.

c. Conclusion

Operator requalification was being conducted and completed as required by the Operator Requalification Program.

**4. Surveillance and Limiting Conditions for Operations**

a. Inspection Scope (IP 69001)

To determine that surveillances and Limiting Conditions for Operations (LCOs) verifications were being completed as required by TS Sections 3.0 and 4.0, the inspector reviewed:

- Surveillance tracking log sheets
- OSURR Console Log Book entries from July 26, 2013 (page 7594) to present
- "Annual Report for The Ohio State University Research Reactor, License R-75, Docket 50-150," for FY 2013/2014 and 2014/2015
- Surveillance Records from 2013 to present
  - Annual Records: IM-01, -02, and -05
  - Semi-annual: IM-15
  - Quarterly: T.S. 4.4 and 4.5 Requirement
  - Weekly: Operations and Maintenance (OM) 15
  - Daily/Reactor Operations: IM-03 and -04, and RS-09

b. Observations and Findings

The inspector performed a random sampling of the daily, weekly, monthly, quarterly, semi-annual, and other periodic checks, tests, and verifications for TS required LCOs and determined that they were completed in the specified time frame and in accordance with licensee procedures. The records and logs reviewed were complete and were being maintained as required. The inspector noted that the licensee maintained an effective record keeping system that helped ensure that all required tests, LCO verifications, and calibrations were completed in a timely manner. All routine periodic surveillance items and tasks were listed on log sheets readily visible and available to all operators. It tracks the previous completion and the most recent one, if done.

All the recorded results for the activities reviewed by the inspector were within the TS required parameters.

c. Conclusion

The program for Surveillance and LCO confirmation was implemented in accordance with TS Sections 3.0 and 4.0 requirements.

**5. Emergency Preparedness**

a. Inspection Scope (IP 69001)

The inspector reviewed the implementation of selected portions of the emergency preparedness program including:

- AP-07, "Emergency Preparedness Plan," rev. 18, dated August 11, 2015
- Annual Records from 2013 to present
  - E-Plan Training
  - Emergency Drill and Critique
  - Plan Review
  - Inventory of emergency supplies
- Emergency Procedure EP-01 to 04

b. Observations and Findings

The inspector confirmed that the Emergency Plan (E-Plan) was being audited and reviewed annually as required. Implementing procedures were reviewed biennially and revised as needed to effectively implement the E-Plan. Emergency preparedness and response training for reactor staff was completed during operator requalification and documented in the program's records. Emergency equipment (meters, supplies, communications, security, and alarms) was being maintained and inventoried annually as required in the E-Plan.

Emergency drills had been conducted annually as required by the E-Plan, taking place towards the end of the year. The drill for 2013 was a faculty evacuation tabletop drill, followed by an actual evacuation drill. The drill for 2014 was a small chemical spill and the facility received help from Environmental Health and Safety. Drill critiques and recommendations were written following the exercises. The critiques indicated that the E-Plan was being properly implemented and all recommendations made following the drills were subsequently addressed.

The inspector noted that response to facility emergencies would be provided by the university such as campus police and the University Hospital. Outside agencies such as the City of Columbus Fire Department also would respond to emergencies.

On May 7, 2015, the facility experienced an unplanned response exercise. The emergency dispatch center received a high radiation alarm and notified emergency responders, including university police and Columbus Fire. Proper procedures were followed and it was determined that it was a false alarm due to a power blip. The area radiation monitor read high when it lost power. The licensee discovered that the backup battery needed to be replaced and now has a surveillance to replace the battery more frequently.

Additionally, the event response revealed that an emergency response plan created in the event of a fire had replaced the previous emergency response plan instead of being added to it. The NRL AD worked with the OSU Department of Public Safety to merge the documents and now the OSU Police Department dispatch has one, all-encompassing plan.

The inspector and the AD visited the OSU Police Department's alarm center and dispatch room and inquired about the Emergency Response Plan for the OSU-NRL. The dispatcher had the correct version of the plan and was knowledgeable about responding to an alarm at the NRL. The inspector also visited the hospital emergency room and found they were adequately prepared to receive a contaminated individual. Finally, the inspector visited Columbus Fire and met with the Battalion Chief and his staff and the OSU fire prevention specialist. The inspector found that they are prepared to respond to an event at the facility, as demonstrated during the high radiation false alarm event. The AD and Battalion Chief agreed to coordinate a tour for the Columbus Fire Department soon, since the last one was at the beginning of 2012.

c. Conclusion

The emergency preparedness program was conducted in accordance with the E-Plan.

**6. Maintenance Logs and Records**

a. Inspection Scope (IP 69001)

To determine that maintenance activities were being completed as required by TS Sections 3.0, and 4.0, the inspector reviewed:

- Maintenance Log-Book Volume III, pages 113-132 (Feb. 2, 2014, to July 24, 2015)
- OSURR Console Log Book entries from July 26, 2013 (page 7594) to present
- “Annual Report for The Ohio State University Research Reactor, License R-75, Docket 50-150,” for FY 2013/2014 and 2014/2015
- AP-14, Attachment A, Modification Request 67, “Repair of Rod Drop Timer Module.”

b. Observations and Findings

The inspector reviewed the records regarding scheduled and unscheduled preventive and corrective maintenance activities for 2014 through the present. The records contained thorough documentation describing the maintenance activity and the repair setup. These records were controlled and maintained in the maintenance and/or operations log as required. After completion of maintenance activities, system operational checks were performed to ensure that the affected systems functioned properly before returning them to service. This was also documented.

One of the repairs, Rod Drop Timer Module, required a 50.59 review because a couple of parts used on the circuit board are no longer obtainable. Parts of the circuit had to be redesigned to make use of the available components. However, the repair module is functionally equivalent and maintains the same logic used before. Measurements using the new board are consistent with both historical and independent measurements. The inspector found the review and implementation of the maintenance activity to be appropriate.

c. Conclusion

Maintenance activities ensured that equipment remained consistent with the Safety Analysis Report and TS requirements.

**7. Fuel Handling**

a. Inspection Scope (IP 69001)

In order to verify adherence to fuel handling and inspection requirements specified in TS Sections 4.1.2, 5.3, 5.4, and 5.5, the inspector reviewed:

- OM-07, “Fuel Element Inspections,” Rev. 6, approval dated May 1, 2001
- OM-02, “Control Rod Annual Inspection,” rev. 1; June 5, 1997
- NRL Administrative Procedure AP-13, “Personnel Required for Reactor Operations,” dated March 21, 2008
- OSURR Console Log Book entries on page 7690 (2014) and page 7804 (2015)
- Fuel Inventory Inspection Records for 2014 and 2015
  
- AP-05, “Special Nuclear Material Inventory,” and Attachment B, “Fuel Element

Inspection Form," rev. 5; Feb. 25, 2015

- IM-03, "Pre-Start Checkout," rev. 19, dated August 9, 2012

b. Observations and Findings

The licensee maintained a fuel element record of all their elements. The inspector reviewed selected records for fuel movements conducted for the periodic surveillance measurements and inspection of the reactor fuel. The movements of elements and their position in the core were maintained and tracked. All fuel movements were noted in the appropriate OSURR Console Log Book.

c. Conclusion

Fuel movements and inspections were being completed and documented in accordance with the requirements specified in the TS and by procedure.

**8. Exit Interview**

The inspection scope and results were summarized on November 5, 2015, 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**

### **Licensee Personnel**

T. Blue	Director, Nuclear Reactor Laboratory
A. Kauffman	Associate Director, Nuclear Reactor Laboratory and SRO
G. Hinkle	Acting RSO
K. Herminghuysen	Research Associate and SRO
S. White	Research Associate and SRO

### **Other Personnel**

M. Gregory	Director, Hospital Safety and Security
B. Morris	Dispatcher
C. Scheerle	OSU Fire Prevention Specialist
S. Moore	Battalion Chief, City of Columbus Fire Department
T. Page	Communications Supervisor, OSU Department of Public Safety

## **INSPECTION PROCEDURES USED**

IP 69001 Class II Non-Power Reactors

## **ITEMS OPENED, CLOSED, AND DISCUSSED**

### **Opened**

None

### **Closed**

None

### **Discussed**

None

## **LIST OF ACRONYMS USED**

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ADAMS	Agencywide Documents Access and Management System
AD	Associate Director
AP	Administrative Procedure
E-Plan	Emergency Plan
EP	Emergency Procedure
IM	Instrumentation Use and Maintenance
IP	Inspection Procedure
kW	Kilowatt
LCO	Limiting Conditions for Operation
No.	Number
NRC	U.S. Nuclear Regulatory Commission
NRL	Nuclear Reactor Laboratory
OM	Operations and Maintenance Procedure

OSU	The Ohio State University
OSURR	The Ohio State University Research Reactor
Rev.	Revision
ROC	Reactor Operations Committee
RSO	Radiation Safety Officer
SRO	Senior Reactor Operator
TS	Technical Specifications