UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 16, 2023

Dr. Lei Raymond Cao, Director
Nuclear Reactor Laboratory
Ohio State University
1298 Kinnear Road
Columbus, OH 43212

SUBJECT: OHIO STATE UNIVERSITY – U.S. NUCLEAR REGULATORY COMMISSION SAFETY INSPECTION REPORT NO. 05000150/2023201

Dear Dr. Cao:

From February 6-10, 2023, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the Ohio State University Research Reactor facility. The enclosed report presents the results of that inspection, which were discussed on February 10, 2023, with you and members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the NRC's rules and regulations and with the conditions of your license. The inspector reviewed selected procedures and records, observed various 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, 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 Publicly Available Records component of the NRC's document system (Agencywide Documents Access and Management System (ADAMS)). ADAMS is accessible from the NRC website at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

If you have any questions concerning this inspection, please contact Andrew Waugh at (301) 415-0230, or by email at Andrew.Waugh@nrc.gov.

Sincerely,

Signed by Tate, Travis
on 03/16/23

Travis L. Tate, Chief
Non-Power Production and Utilization Facility
Oversight Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

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

Enclosure:
As stated

cc w/enclosure: See next page

cc:

Chief
Ohio Department of Health
Bureau of Environmental Health
and Radiation Protection
246 North High Street
Columbus, OH 43215

Radiological Branch Chief
Ohio Emergency Management Agency
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Andrew Kauffman, Associate Director
Nuclear Reactor Laboratory
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1298 Kinnear Road
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Dr. Ayanna Howard, Dean
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Ohio State University
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2070 Neil Avenue
Columbus, OH 43210-1226

Test, Research and Training
Reactor Newsletter
Attention: Amber Johnson
Dept of Materials Science and Engineering
University of Maryland
4418 Stadium Drive
College Park, MD 20742-2115

SUBJECT: OHIO STATE UNIVERSITY – U.S. NUCLEAR REGULATORY COMMISSION SAFETY INSPECTION REPORT NO. 05000150/2023201 DATED: MARCH 16, 2023

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

Docket No.:	50-150
License No.:	R-75
Report No:	05000150/2023201
Licensee:	Ohio State University
Facility:	Ohio State University Research Reactor
Location:	Columbus, Ohio
Dates:	February 6-10, 2023
Inspector:	Andrew Waugh Brian Lin
Approved by:	Travis L. Tate, Chief Non-Power Production and Utilization Facility Oversight Branch Division of Advanced Reactors and Non-Power Production and Utilization Facilities Office of Nuclear Reactor Regulation

Enclosure

EXECUTIVE SUMMARY

Ohio State University
Ohio State University Research Reactor
Inspection Report No. 05000150/2023201

The primary focus of this routine announced inspection was the onsite review of selected aspects of the Ohio State University (OSU, the licensee's) research reactor facility program, including: (1) procedures; (2) experiments; (3) health physics (HP); (4) design changes; (5) committees, audits and review; and (6) transportation activities. The U.S. Nuclear Regulatory Commission (NRC) staff determined that the licensee's program was acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements.

Procedures

- The inspector determined that procedures were controlled, maintained current, implemented, and followed in compliance with technical specifications (TS) and license requirements.

Experiments

- The inspector determined that experiments were reviewed, approved, and conducted in accordance with TS, procedural, and regulatory requirements.

Health Physics

- The inspector determined that the licensee's HP program was conducted in accordance with TS, procedural, and regulatory requirements.

Design Changes

- The inspector determined that design changes were conducted in accordance with TS, procedural, and regulatory requirements.

Committees, Audits and Reviews

- The inspector determined that the licensee's oversight programs were conducted in accordance with TS and procedural requirements.

Transportation Activities

- The inspector determined that the licensee's radioactive material transportation program was in accordance with regulatory and procedural requirements.

REPORT DETAILS

Summary of Facility Status

The OSU 500-kilowatt open pool-type research reactor continued to be operated in support of undergraduate instruction, laboratory experiments, and various types of irradiation projects. During this inspection, the OSU research reactor (OSURR) was started up, operated, and shut down to support these ongoing activities.

1. Procedures

a. Inspection Scope (Inspection Procedure [IP] 69001, Section 02.03)

The inspector reviewed various procedures and observed their implementation, including a pre-startup checklist, reactor start up, and reactor shut down. The inspector also reviewed the following regarding the licensee's procedures to ensure that the requirements of the licensee's administrative procedures and TS 6.3 were met:

- administrative procedure (AP)-06, "Format for Writing, Revising, and Approving Procedures," dated August 24, 2022
- operations and maintenance (OM)-01, "Reactor Operations," dated June 27, 2022
- OM-07, "Fuel Element Inspection," dated September 13, 2022
- radiation safety (RS)-06, "Annual Radiation Monitor Calibrations," dated January 7, 2020
- RS-15, "Radiation Safety Instruction," dated October 3, 2019
- instrumentation use and maintenance-03, "Pre-Startup Checkout," dated June 27, 2022

b. Observations and Findings

The inspector observed that the licensee maintained written procedures covering the areas specified in TS 6.3. The inspector found that the procedures in use by the licensee were current, reviewed and approved as required by TS 6.3, able to be implemented as intended, and adhered to by reactor personnel.

c. Conclusion

The inspector determined that procedures were controlled, maintained current, implemented, and followed in compliance with TS and license requirements.

2. Experiments

a. Inspection Scope (IP 69001, Section 02.06)

The inspector observed the performance of irradiation experiments and reviewed the following to ensure that experiments were reviewed and conducted as required by TS 3.7 and 6.4:

- select, "Request for Reactor Operation Forms," dated 2020-2023
- AP-1, "Obtaining Use of the OSU-NRL," dated January 5, 2017

- AP-3, “Writing and Reviewing Requests for Reactor Operations,” dated August 23, 2022
- AP-14, “OSURR Modification Requests,” dated January 22, 2015

b. Observations and Findings

The inspector found that experiments were reviewed and approved as required by TS 6.4 and Title 10 of the *Code of Federal Regulations (*10 CFR) 50.59, “Changes, tests and experiments.” The inspector also found that experiments were conducted in accordance with the licensee’s procedures and TS 3.7.

c. Conclusion

The inspector determined that experiments were reviewed, approved, and conducted in accordance with TS, procedural, and regulatory requirements.

3. Health Physics

a. Inspection Scope (IP 69001, Section 02.07)

The inspector toured the facility, observed radiation surveys, and observed radiological signs and postings. The inspector also reviewed the following to ensure the licensee’s HP program adheres to the requirements of 10 CFR Part 19, “Notices, Instructions and Reports to Workers: Inspection and Investigations,” 10 CFR Part 20, “Standards for Protection against Radiation,” and TS 3.6 and 4.6:

- select personnel and area dosimetry records, dated 2020-present
- select radiation safety training records, dated 2021-present
- select monthly radiation surveys, dated 2020-present
- semiannual safety evaluation reports, dated 2020-present
- select calibration records for radiation monitors, dated 2020-present
- select AR-41 weekly release records, dated 2021-present
- select quarterly as low as reasonably achievable (ALARA) reports, dated 2020-present
- “Radiation Safety Standards for The Ohio State University,” dated February 11, 2020
- AP-02, “General Rules,” dated February 8, 2019
- RS-03, “Calibrating Gaseous Effluent Monitor,” August 3, 2017
- RS-06, “Annual Radiation Monitor Calibrations,” dated January 7, 2020

b. Observations and Findings

The inspector found that practices regarding the use of dosimetry, radiation monitoring equipment, placement of radiological postings, posting of notices, use of protective clothing, and the handling and storing of radioactive material or contaminated equipment was in accordance with regulations and the licensee’s radiation protection program. The inspector found that the licensee met the regulatory requirements concerning radiological effluent releases and radiation survey, sampling, and monitoring. The inspector also found that training was conducted for radiation workers and ALARA principles were implemented as required by licensee procedures.

c. Conclusion

The inspector determined that the licensee's HP program was conducted in accordance with TS, procedural, and regulatory requirements.

4. Design Changes

a. Inspection Scope (IP 69001, Section 02.08)

The inspector reviewed the following to ensure that modifications to the facility were made in accordance with the requirements of 10 CFR 50.59 and TS:

- select Reactor Oversight Committee meeting minutes, dated 2020-present
- select "OSURR Modification Request Forms," dated 2020-present
- AP-14, "OSURR Modification Requests," dated January 22, 2015
- AP-16, "50.59 Screening and Evaluation," dated September 4, 2014

b. Observations and Findings

The inspector found that design changes were reviewed and approved as required by 10 CFR 50.59. The inspector also found that the performance of modified equipment and the procedures and drawings related to that equipment met regulatory, TS, and procedural requirements.

c. Conclusion

The inspector determined that design changes were conducted in accordance with TS, procedural, and regulatory requirements.

5. Committees, Audits and Reviews

a. Inspection Scope (IP 69001, Section 02.09)

The inspector reviewed the following to ensure that committees, audits and reviews were conducted as required by the licensee's procedures and TS 6.2:

- select reactor oversight committee meeting minutes, dated 2020-present
- "Ohio State University Nuclear Reactor Laboratory Calendar Year 2022 Audit Summary," dated December 14, 2022
- "Ohio State University Nuclear Reactor Laboratory Calendar Year 2021 Audit Summary," dated December 15, 2021
- AP-08, "NRL Audit," dated January 12, 2017

b. Observations and Findings

The inspector found that the licensee's reactor operations committee met and provided reviews as required by the TS. The inspector also found that problems identified from the licensee's required reviews and audits were resolved in accordance with the licensee's procedures and TS.

c. Conclusion

The inspector determined that the licensee's oversight programs were conducted in accordance with TS and procedural requirements.

6. Transportation Activities

a. Inspection Scope (IP 86740)

The inspector reviewed the following to ensure the licensee's program for transporting radioactive materials met NRC and Department of Transportation (DOT) requirements:

- RS-11, "Shipping Packages," dated February 17, 2020
- hazmat worker training certification records
- select survey results, dated 2021-present
- select shipping records, dated 2021-present

b. Observations and Findings

The inspector found that the licensee's procedures and records concerning the transportation of radioactive material were in accordance with NRC and DOT requirements.

c. Conclusion

The inspector determined that the licensee's radioactive material transportation program was in accordance with regulatory and procedural requirements.

7. Exit Interview

The inspection scope and results were summarized on February 10, 2023, with members of licensee management and staff. The inspector described the areas inspected and discussed the inspection results. The licensee acknowledged the results of the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

A. Kauffman	Associate Director, Nuclear Reactor Laboratory and SRO
K. Herminghuysen	Research Associate and SRO
S. White	Research Associate and SRO
D. Konate	Radiation Safety Officer

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
IP 86740	Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened:

None

Closed:

None

Discussed:

None