

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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License No: R-75
Report No: 50-150/96001(DNMS)
Licensee: Ohio State University
Facility Name: Ohio State University Nuclear Research Reactor
Location: Columbus, Ohio
Dates: October 7-11, 1996
Inspectors: Timothy D. Reidinger
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Approved by: Gary L. Shear, Chief
Fuel Cycle Branch

Executive Summary

Ohio State University Nuclear Research Reactor Report No. 50-150/96001(DNMS)

This routine, announced inspection included aspects of organization; operations and maintenance; procedures; requalification training; surveillance; experiments; radiation controls and environmental protection; design change; audit and review; emergency preparedness; fuel handling activities (IP 40750); transportation activities (IP 86750); periodic and special reports (IP 90713); and inspector identified followup items (IP 92701).

Organization (IP 40750)

- The organizational structure and assignment of responsibilities were as specified in Technical Specifications (TS). (Section 1.0)

Operations and Maintenance (IP 40750)

- The reactor was operated and maintained in accordance with the reactor's license conditions and TS requirements. The licensee's logs and records satisfactorily documented reactor operations and maintenance activities. (Section 2.0)

Procedures (IP 40750)

- The licensee had approved procedures to safely conduct reactor operations, maintenance, experiments, surveillance testing and instrument calibrations in compliance with TS requirements. A previous inspector identified violation was closed. (Section 3.0)

Licensed Operator Requalification (IP 40750)

- Training was being conducted in accordance with the NRC approved program. Adequate training records were being maintained. Two previous inspector identified violations were closed. (Section 4.0)

Surveillances (IP 40750)

- All reactor surveillance tests had been completed and documented at the required frequencies, and the surveillance test results met TS requirements. (Section 5.0)

Experiments (IP 40750)

- All reactor experiments were conducted in accordance with properly reviewed and approved procedures and were satisfactorily documented in the reactor operations log. (Section 6.0)

Radiation Control (IP 40750)

- Some minor confusion existed among the reactor staff and the campus radiation safety staff regarding oversight responsibility for the reactor radiation safety program.

Environmental Protection (IP 40750)

- Airborne and liquid effluent releases were within the regulatory limits. No radioactive solid waste had been disposed of since the last inspection. (Section 8.0)

Audits and Reviews (IP 40750)

- Reactor Operations Committee (ROC) annual audits required by technical specifications were carried out as required within the specified time period.
- Radiation safety audits were also conducted as required. (Section 9)

Emergency Preparedness (IP 40750)

- Emergency Plan exercises and training were adequate to ensure public safety. (Section 10.0)

Fuel Handling (IP 40750)

- Procedures for fuel handling were adequate for reactor operations. HEU fuel was shipped without incident. (Section 11.0)

Periodic and Special Reports (IP 90713)

- Required reports had been submitted to the NRC in accordance with TS requirements. (Section 12.0)

Transportation (IP 86750)

- Irradiated material shipments were in accordance with Department of Transportation Regulations. (Section 13.0)

DETAILS

1.0 Organization

a. Inspection Scope (IP 40750)

The inspectors reviewed Technical Specifications (TS) and the Safety Analysis Report (SAR) related to organization and staffing.

b. Observations and Findings

The inspectors determined that the organizational structure and assignment of responsibilities were as specified in TS 6. The membership of the Reactor Operations Committee (ROC) was in accordance with TS and the SAR.

Through log reviews, the minimum staffing requirements were verified to have been met during reactor operations and fuel handling or refueling operations. Selected reactor operator logs from May 1994 through July 1996 were reviewed with no concerns identified. The operator logs were well maintained. The operators appeared proficient, demonstrated good procedural compliance, and made appropriate log entries for the observed evolutions.

c. Facility Tour

The control room, pool floor, and the beam port floor areas were adequately illuminated and reasonably clean. Fire extinguishers in these areas had appropriate pressures and current inspection dates.

d. Conclusions

Compliance with TS requirements, ROC membership and reactor programs was good.

2.0 Operations and Maintenance Activities

a. Inspection Scope (IP 40750)

The inspectors reviewed the reactor operations and maintenance logs and observed reactor operations to determine compliance with Operating License Condition 3.A. and the requirements in TS 2.0 and TS 3.0.

b. Observations and Findings

The licensee operated the reactor from startup to 5 Kilowatts and then to shutdown using the applicable procedures. The licensee had operated the reactor for tests, experiments, training, and commercial services.

The reactor operations logs and records were in compliance with the reactor's license condition and TS requirements. The licensee had operated the reactor at steady state thermal power levels in accordance with Operating License Condition 3.A. The inspectors verified that the reactor safety limit had not been exceeded and was in compliance with TS 2.1.

The inspectors reviewed the calibration records for power range nuclear instrumentation from July 1994 to present. The inspectors noted that the licensee calibrated the power range instruments 20% below actual power where the licensee has chosen to operate for at least the last three years.

The inspectors observed the operator quickly identify a faulty nuclear instrument high voltage power supply before the reactor startup was attempted. The staff took deliberate and meticulous steps in repairing the faulty circuit board.

c. Conclusions

The reactor was operated and maintained in accordance with the reactor's license conditions, safety limits and limiting conditions for operation, and TS requirements. The licensee's logs and records satisfactorily documented reactor operations and maintenance activities. Operators were observant and systematic in both operations and maintenance activities.

3.0 Procedures

a. Inspection Scope (IP 40750)

The inspectors reviewed the licensee's written procedures for operating and maintaining the reactor, performing surveillance activities and reactor instrument calibrations, and conducting experiments to determine compliance with the requirements in TS 6.3. They also followed up on a violation of procedure requirements to confirm licensee corrective actions.

b. Observations and Findings

The inspectors observed the staff conduct special tests of commercial nuclear detectors. These tests were in accordance with a reactor operation request which provided detailed guidance with respect to the radiation protection aspects as well as the technical requirements. The evolutions were very organized and executed without incident.

Violation 50-150/94001-04 (Closed): Failure to conduct timely ROC audits of the reactor radiation protection program. The inspector verified that the corrective actions described in the licensee's response letters dated August 12, 1994 and September 30, 1994 to be reasonable and complete. This item is closed.

c. Conclusions

The licensee had approved procedures to sufficiently conduct reactor operations, maintenance, experiments, surveillance testing and instrument calibrations in compliance with TS requirements.

4.0 Requalification Training

a. Inspection Scope (IP 40750)

The inspectors reviewed the reactor operator requalification training program to determine compliance with the requirements in 10 CFR 19.12, AP-09, "RO/SRO Requalification", and 10 CFR 55.59. The inspectors also followed up on two previous violations identified in the last inspection.

b. Observations and Findings

The licensee's requalification program conformed to the requirements of 10 CFR Part 55.59. The program had established requirements for ensuring that operators maintain their licenses including attending training, performing the required number of reactivity manipulations, and passing annual written examinations and operating evaluations, medical qualifications, and remedial training if required.

Violation 50-150/94001-02 (Closed): Failure to complete operator license recertification in accordance with 10 CFR 55. The inspector verified the corrective actions described in the licensee's letter dated August 12, 1994, to be reasonable. Although the inspectors noted that the licensee's procedure for tracking the operator's maintenance of hours on the reactor controls did not include guidance for restoring a license to active status, no concerns were identified. The licensee agreed to review the procedure. This item is closed.

Violation 50-156/94001-03 (Closed): Failure to administer timely annual requalification examinations to licensed operators. The inspector verified that the corrective action described in the licensee's response letter, dated August 12, 1994, to be reasonable and complete. This item is closed.

c. Conclusions

A satisfactory training program was being conducted in accordance with the NRC approved program. Adequate training records were being maintained.

5.0. Surveillances

a. Inspection Scope (IP 40750)

The inspectors reviewed surveillance test documentation and observed activities to determine compliance with the requirements in TS 4.0.

b. Observations and Findings

All reactor safety related surveillances were conducted at the required periodicity. The inspectors observed surveillances including OM-15, Process System Checks; IM-01, Scram Checks; and IM-03, OSURR Pre Start Checkout. No concerns were identified.

c. Conclusions

All reactor surveillance tests had been completed and documented at the required frequencies, and the surveillance test results met TS requirements.

6.0 Experiments

a. Inspection Scope (IP 40750)

The inspectors reviewed the licensee's program to control and conduct experiments performed in the reactor to determine compliance with the requirements in TS 3.7, 6.4, and 6.7.

b. Observations and Findings

The inspectors observed insertion and withdrawal of commercial nuclear detectors using the central irradiation facility. The inspectors also reviewed the documentation of several experimental samples placed into the core area. Experiments were conducted in accordance with written procedures which were approved and properly documented as required by TS.

c. Conclusions

All reactor experiments were conducted in accordance with properly reviewed and approved procedures and satisfactorily documented in the reactor operations log.

7.0 Radiation Control

a. Inspection Scope (IP 40750)

The inspectors reviewed the radiation protection program to determine compliance with the requirements in 10 CFR Part 20 and TS 3.4, 3.5, 3.6, 4.3.2, 4.4, 4.5, 4.6, 5.4, 6.2, 6.6, and 6.7.

b. Observations and Findings

The inspectors reviewed personnel exposure records from the last inspection to the present. The records indicated that badged reactor personnel had not exceeded 10 CFR 20.1201 regulatory limits.

Postings, labeling, and surveys met regulatory requirements as observed on the tour of the reactor laboratory. In general, the staff appeared to be adequately trained and aware of the radiological conditions in their work areas.

Area radiation monitors and portable instruments were calibrated as required.

The inspectors observed the video recording of the 1995 shipment of spent fuel from the reactor. No concerns were identified.

The inspectors identified some minor confusion regarding the role of the radiation safety office and its authority. The Radiation Safety Officer perceived his role as a supporting function at the reactor rather than as an oversight authority.

The Radiation Safety Officer (RSO), recently appointed in March 1996, and the Associate Reactor Director clarified their understanding of the protocol with the inspectors. The RSO and Associate Director agreed to pursue this area more actively in the future.

Monthly HP audits conducted by the campus radiation safety office were very thorough although the reactor staff needed to bring minor radiation safety staff concerns to closure.

c. Conclusions

All badged reactor personnel exposures were significantly below 10 CFR 20.1201 limits. Training of the staff and radiation workers appeared to be adequate. Confusion regarding the radiation protection program authority at the reactor laboratory did not result in any significant problems.

8.0 Environmental Protection

a. Inspection Scope (IP 40750)

The inspectors reviewed the licensee's program for the discharge or removal of radioactive liquid, gases, and solids from the reactor laboratory.

b. Observations and Findings

All sewer discharges were within regulatory limits.

Airborne effluent monitoring records for 1994-1995 indicated that the releases were within the regulatory limits. Several analysis records were reviewed and no deficiencies were noted.

The inspectors reviewed the COMPLY code input data for radionuclide emissions from the reactor laboratory and no deficiencies were noted.

The licensee had not transported any solid radioactive waste other than the Highly Enriched Uranium fuel (HEU) shipment in 1995 since the last inspection. The inspectors determined that the solid radioactive waste was properly stored and posted as required.

c. Conclusions

Both airborne and liquid effluent releases were well within the regulatory limits. HEU fuel was shipped without incident.

9.0 Audit and Reviews

a. Inspection Scope (IP 40750)

The inspectors reviewed the meetings, audits and reviews conducted by the Reactor Operations Committee (ROC) to determine compliance with the requirements in TS 6.1. and 6.2. The inspectors also followed up on a previous violation of annual ROC audit requirements.

b. Observations and Findings

Violation 50-150/94001-04 (Closed): Failure to conduct timely ROC audits of the reactor radiation protection program. The inspector verified that the corrective actions described in the licensee's response letters dated August 12, 1994 and September 30, 1994 to be reasonable and complete. This item is closed.

c. Conclusions

ROC meetings were conducted as required.

10.0 Emergency Preparedness

a. Inspection Scope (IP 40750)

The inspectors reviewed the emergency plan for the reactor laboratory to determine compliance with the requirements in 10 CFR 50.54(q) and (r).

b. Observations and Findings

The emergency plan procedures were sufficiently detailed. The ROC review of the audit of the emergency plan and procedures was appropriately documented in the ROC meeting minutes and met the requirements in TS 6.2.

The inspectors reviewed documentation related to the emergency drills held in 1994 and 1995. Record review by the inspectors verified that the operators were trained in the emergency plan and procedures and had participated in the drill.

The inspectors identified one error in the emergency notification call list for the reactor staff on the police computer data base. The inspectors advised the reactor staff of this error.

No significant changes in the Emergency Response Organization were noted.

c. Conclusions

Review of emergency equipment and supplies, changes to the emergency plan, and documentation relating to emergency drills as well as interviews indicated that the licensee's emergency program was maintained in a state of operational readiness.

11.0 Fuel Handling

a. Inspection Scope (IP 40750)

The inspectors reviewed the fuel handling procedures and records at the reactor laboratory to determine compliance with TS 4.1.2 and 6.3.

b. Observations and Findings

The facility fuel handling program review included the verification of procedures for fuel handling and the technical adequacy in the areas of criticality safety and TS. Records

review, observation of a video recording of HEU fuel elements being loaded into the shipping cask for shipment and discussions with personnel indicated that fuel handling operations had been carried out in conformance with the licensee's procedures and DOT regulations. Log entries and fuel location maps for fuel handling activities were appropriately documented.

c. Conclusions

Procedures for fuel handling were technically adequate for reactor operations. Fuel movement was conducted without incident.

12.0 Review of Periodic and Special Reports

a. Inspection Scope (IP 90713)

The inspectors reviewed the licensee's submittal of reports and notifications to the NRC to determine compliance with the requirements in TS 6.6.

b. Observations and Findings

The 1995 annual report had been submitted in a timely manner and contained the information required by TS. No special reports had been issued to the NRC since the last NRC inspection of the reactor laboratory in 1994.

c. Conclusions

Required reports had been submitted to the NRC in accordance with TS requirements.

13.0 Transportation of Radioactive Materials

a. Inspection Scope (IP 86750)

The inspectors reviewed the licensee's radioactive materials shipping program for compliance with the requirements in Department of Transportation (DOT) and NRC regulations, 49 CFR Parts 172 & 173 and 10 CFR Part 71, respectively.

b. Observations and Findings

The inspectors observed the reactor laboratory staff prepare commercial neutron detectors for shipment in accordance with DOT requirements. Radwaste would also be transferred to the university broad scope license for packaging and disposal when the need arose.

c. Conclusions

Shipments of irradiated material was per DOT regulations.

14.0 Persons Contacted

Ohio State University

- * R. Meyser, Nuclear Reactor Laboratory, Reactor Associate Director
- * R. Peterson, Office of Radiation Safety, Radiation Safety Officer
- * B. Hajek, Ohio State University, ROC Member

Additional technical, operational, and administrative personnel were contacted by the inspectors during the course of the inspection.

* Denotes those attending the exit meeting on October 11, 1996.

15.0 Exit Interview (IP 30703)

The inspectors presented the inspection results to members of the licensee management at an exit meeting on October 11, 1996. The licensee acknowledged the findings that were presented. The inspectors asked the licensee whether any material examined during the inspection should be considered proprietary. No proprietary information was identified.

Inspection Procedures Used

IP 40750	Class II Nonpower Reactors
IP 86750	Inspection of Transportation Activities
IP 90713	Review of Periodic and Special Reports
IP 92701	Followup on Inspectors Identified Problems

Items Opened and Closed

Opened

No items were opened.

Closed

50-150/94001-01	VIO	Untimely ROC Audits
50-150/94001-02	VIO	Recertification of SRO
50-150/94001-03	VIO	Requalification exams
50-150/94001-04	VIO	Radiation safety procedures

List of Documents Reviewed

Safety Analysis Report
Safety Evaluation Report
Reactor Operating License
Technical Specifications
Administrative Procedures
Operating Procedures
Maintenance Procedures
Surveillance Procedures
Maintenance and Surveillance Records
Emergency procedures
Training Program
Emergency Plan
Dosimetry Records
Training Records
Various Reports
University Radiation Safety Regulations

List of Acronyms Used

ALARA	As Low as Reasonably Achievable
CFR	Code of Federal Regulations
DNMS	Division of Nuclear Materials Safety
DOT	Department of Transportation
HEU	High Enriched Uranium Fuel
HP	Health Physics
IP	Inspection Procedure
NRC	Nuclear Regulatory Commission
NRL	Nuclear Reactor Laboratory
PDR	Public Document Room
PM	Preventive Maintenance
ROC	Reactor Operations Committee
RSO	Radiation Safety Officer
SAR	Safety Analysis Report
TLD	Thermal Luminescent Detector
TS	Technical Specifications
OSURR	Ohio State University Nuclear Research Reactor