U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-150/92001(DRSS)

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

Licensee: Ohio State University

Facility Name: Research Reactor

Inspection At: Nuclear Reactor Laboratory, Columbus, Ohio

Inspection Conducted: May 26-28, 1992

Inspector: C. R. Cox 6/5/92
Date

Approved By: J. W. McCormick-Barger, Chief 6/5/92
Emergency Preparedness Section Date

Inspection Summary

Inspection on May 26-28, 1992 (Report No. 50-150/92001(DRSS))
Areas Inspected: Routine, announced inspection to review actions on: organization, logs, and records; review and audit functions; requalification training; procedures; surveillances; experiments; fuel handling activities; emergency planning; radiation controls; radwaste management (40750): transportation activities (86740): periodic and special reports (90713): and licensee event reports (92700).
Results: Of the 13 areas inspected, no violations or deviations were identified in the report. The licensee maintains a well run facility. Some of the attributes to their program are as follows:

(1) Reactor Operation Committee (ROC) involvement in approving procedures and modifications.

(2) ROC meeting minutes are very detailed.

(3) Operator logs are well-maintained.

(4) Independent review of radiation protection activities by the campus radiation safety office.

DETAILS

1. Persons Contacted

Ohio State University

*R. D. Myser, Associate Director
J. W. Talnagi, Senior Research Associate
J. M. Hatch, Senior Reactor Operator
V. Burkes, Radiation Safety Technician

*Denotes those attending the exit meeting on May 28, 1992.

2. General

This inspection, which began on May 26, 1992, was conducted to examine the research reactor program at Ohio State University. The facility was toured shortly after arrival. The general housekeeping of the facility was adequate.

The reactor was operated on a as needed basis, averaging 8 hours a week. Operations were primarily for student laboratory classes, irradiation of samples, and experiments.

Since the last inspection, the facility had undergone several changes in the process of increasing the power output of the facility from 15 Kw to 500 Kw. The license amendment was approved, new procedures were written to support the power upgrade, and the licensee completed a reactor pool cooling system modification prior to increasing reactor power to 500 Kw on December 19, 1991.

The inspector witnessed a reactor startup and the insertion/removal of fission chambers for calibration of the chambers for commercial reactors.

No violations or deviations were identified.

3. Organization, Logs, and Records (40750)

The facility organization was reviewed and verified to be consistent with the Technical Specifications and Safety Analysis Report (SAR). The minimum staffing requirements were verified to be met during reactor operation, and fuel handling or refueling operations.

The reactor logs and records were reviewed to verify that:

a. Records were available for inspection.

b. Required entries were made.

c. Significant problems or incidents were documented.

d. The facility was being maintained properly.

The Nuclear Reactor Laboratory (NRL) staff that managed the day-to-day operations of the facility consisted of an Associate Director of the NRL who was a senior reactor operator (SRO) and three additional SROs. The Director of the Engineering Experiment Station and the Director of the NRL were part of the overall management structure for the facility. There had not been any changes in the organization structure since the last inspection. The staff performed its own radiation and contamination surveys. The Office of Radiation Safety (ORS) performed monthly audits of the NRL's health physics program.

The inspector reviewed selected reactor operator logs for 1990 through May 1992 and did not identify any concerns. The licensee records were well-maintained.

The licensee had not experienced many significant problems. Problems that were identified were documented in the reactor operator log and also in the maintenance log where corrective actions were also documented. The number of scrams had decrease since the previous inspection. The decrease was mainly in the number due to instrument problems (noise, personnel bumping instruments). The number due to personnel errors continued to be a small percentage.

No violations or deviations were identified.

4. Reviews and Audits (40750)

The licensee's review and audit program records were examined by the inspector to verify that:

a. Reviews of facility changes, operating and maintenance procedures, design changes, and unreviewed experiments were performed by a safety review committee as required by Technical Specifications or SAR.

b. The review committee and/or subcommittee were composed of qualified members and that quorum requirements and frequency of meetings had been met.

c. Required safety audits had been conducted in accordance with Technical Specification requirements and that identified problems were resolved.

The ROC met on a quarterly basis as required. Several additional meeting were held to approve an experiment to produce iodine-125. The documentation of the meetings was

very good. The inspector easily could determine what items were discussed, what was approved, and any concerns that were identified.

The ROC is required to perform a yearly audit of the facility. The inspector reviewed the 1990 and 1991 audits. These audits appeared to be very detailed in nature and several good comments were identified and subsequently resolved by the NRL staff. The NRL staff also performed informal quarterly audits of logs and records.

No violations or deviations were identified.

5. Requalification Training (40750)

The inspector reviewed procedures, logs, and training records; and interviewed personnel to verify that the requalification training program was being carried out in conformance with the facility's approved plan and NRC regulations. Requalification exams were successfully completed by three SROs in 1990 and 1991. The Associate Director was exempt since he prepared the exams. Records were well-maintained. The program required operators to review procedure changes and information on the power upgrade.

No violations or deviations were identified.

6. Procedures (40750)

The inspector reviewed the licensee's procedures to determine if procedures were issued, reviewed, changed or updated, and approved in accordance with Technical Specifications and SAR requirements. This review also verified:

a. That procedure content was adequate to safely operate, refuel, and maintain the facility.

b. That responsibilities were clearly defined.

c. That required checklists and forms were used.

The inspector determined that the required procedures were available to the operators and the contents of selected procedures were found adequate. Due to the work involved for the power upgrade and for the iodine-125 experiment, several procedure changes had been delayed and the licensee goal of a biennial review of every procedure had not been met. The licensee recognized the backlog in procedure changes and reviews and was properly prioritizing the work load based on safety significance.

The inspectors reviewed selected completed pre-startup and shutdown checklists and ensured they were properly filled out.

No violations or deviations were identified.

7. Surveillance (40750)

The inspector reviewed procedures, surveillance test schedules, and test records and discussed the surveillance and preventive maintenance program with responsible personnel to verify:

a. That procedures were available and adequate to perform tests.

b. That test were completed within the required time schedule.

c. Test records were available.

The licensee maintained a maintenance schedule that lists all of the weekly, monthly, semiannual, and annual surveillances required to be performed. This schedule was posted on the control room window. As surveillances were completed, they were initialed and dated. The inspector reviewed the procedures and the resulting data for the following TS items that required surveillances and concluded the surveillance testing satisfied TS requirements.

TS 4.2.2, Reactor Safety System.
TS 4.6.1, Effluent Monitor.
TS 4.6.3, Area Radiation Monitors.

The licensee recently installed new area radiation monitors which required vendor calibration. The calibration for these monitors had been completed and the calibration procedure was in the process of revision.

No violations or deviations were identified.

8. Experiments (40750)

The inspector verified by reviewing experiment records and other reactor logs that:

a. Experiments were conducted using approved procedures and under approved reactor conditions.

b. New experiments or changes in experiments were properly reviewed and approved.

c. The experiments did not involve an unreviewed safety question, i.e., 10 CFR 50.59.

d. Experiments involving potential hazards or reactivity changes were identified in procedures.

e. Reactivity limits were not or could not have been exceeded during an experiment.

The inspector reviewed an experiment testing the feasibility of producing iodine-125 for commercial use and an experiment for cryogenic irradiation of temperature sensors. All the required reviews for the experiments were completed and thoroughly documented. ROC reviews displayed good insight about potential problems and their comments were adequately addressed by the staff.

No violations or deviations were identified.

9. Fuel Handling (40750)

The facility fuel handling program was reviewed by the inspector. The review included the verification of approved procedures for fuel handling and their technical adequacy in the areas of radiation protection, criticality safety, Technical Specification, and security plan requirements. The inspector determined by records review and discussions with personnel that fuel handling operations were carried out in conformance to procedures.

No violations or deviations were identified.

10. Emergency Planning (40750)

The inspector reviewed records and interviewed personnel to determine that the approved emergency plan was being carried out by verifying:

a. That procedures were in place and required records were being kept.

b. That required drills were conducted and evaluated.

c. That required training had been conducted.

The licensee conducted drills in 1990 and in 1991. The first drill involved a scenario surrounding the fuel cutting assembly. The other drill simulated an individual receiving an overexposure while handling an experiment. Critiques were held subsequent to the drills and several items were discussed as areas of concern or where improvement can be made. Although there were problems associated with the

drills, the licensee was able to correct procedural problems and address shortcomings in their response to events.

No violations or deviations were identified.

11. Transportation Activities (40750)

The inspector reviewed records of radioactive material shipments made since the last inspection to determine if regulatory requirements were met. No problems were noted.

No violations or deviations were identified.

12. Radiation Control (40750)

The inspector reviewed the licensee's radiation protection activities since the last inspection. Records were reviewed, personnel were interviewed, and observations were made to verify that radiation controls were being carried out in accordance with regulatory requirements.

Routine health physics coverage was provided by the reactor staff, including routine direct radiation and contamination surveys. A member of the ORS staff conducted monthly verification surveys of the facility and audits the NRL staff health physics activities. The inspector interviewed the ORS staff member and reviewed records of his surveys and audits. No significant problems were identified.

No violations or deviations were identified.

13. Radwaste Management (40750)

a. Gaseous Radwaste

An extensive program to measure argon-41 buildup in the reactor building in addition to measuring effluent release had been ongoing since the power upgrade. No unexpected increase in argon-41 had been found and the effluent amounts remained well within the Technical Specification release limits.

The effluent monitor had also been calibrated for krypton-85. While not required, this would be useful if a fuel defect developed and there were a noble gas release. The licensee would be able to quantify that release for possible dose projections.

b. Liquid Radwaste

The licensee records for liquid radwaste were reviewed by the inspector. Those records determined the curie

content of the release to the sanitary sewer system. The licensee then used a sewer effluent flow of 9.3E9 ml/day to determine nuclide concentration and ensure compliance with 10 CFR 20.303. Effluent records were also maintained by the ORS. No problems were noted.

c. Solid Radwaste

Solid radwaste was routinely transferred to the university broadscope license for disposal. According to the licensee, such a transfer occurred approximately once every two years.

No violations or deviations were identified.

14. Review of Periodic and Special Reports (90713)

The inspector reviewed the 1990-1991 annual report for timeliness of submittals and adequacy of information submitted. The report was submitted in a timely manner and contained the required information that was requested.

No violations or deviations were identified.

15. License Event Reports (92700)

Through direct observation, discussions with licensee personnel, and review of records, the following event report was reviewed to determine that reportability requirements were fulfilled, immediate corrective action was accomplished, and corrective action to prevent recurrence had been accomplished in accordance with Technical Specifications.

(Closed) Licensee Event Report (LER 150/92001-LL): Failure of a voltage comparator circuit to prevent a reactor startup without a high voltage supply to an uncompensated ion chamber. After 43 minutes of power operations, an operator noticed that the high voltage supply to the B uncompensated ion chamber was off. When the voltage supply was turned on, a voltage spike caused a reactor scram.

The lack of a high voltage supply should have prevented the reactor startup. The licensee found that a voltage comparator amplifier had failed defeating the interlock that would have prevented the startup. The licensee replaced the circuit and modified their startup checklist to prevent a recurrence.

The reporting requirements were met and the corrective actions were appropriate.

No violations or deviations were identified.

16. Exit Interview (30703)

The inspector met with licensee representatives denoted in Paragraph 1 during and at the conclusion of the inspection on May 28, 1992. The inspector summarized the scope and results of the inspection and discussed the likely content of this inspection report. The licensee acknowledged the information and did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.