

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-156/84-01
Docket No. 50-156

License No. R-74

Licensee: University of Wisconsin
Madison, Wisconsin

Facility Name: University of Wisconsin Reactor

Inspection Conducted: May 21--23, 1984

C. C. Thomas
Inspectors: C. C. Thomas

Date: June 13, 1984

A. E. Sanchez-Pope
A. E. Sanchez-Pope (trainee)

Date: June 13, 1984

J. E. Hyder
Reviewed by: J. E. Hyder

Date: June 13, 1984

K. R. Ridgway
Reviewed by: K. R. Ridgway
Project Manager

Date: June 19, 1984

T. N. Tambling
Approved by: T. N. Tambling, Chief
Technical Support Section

Date: June 19, 1984

Inspection Summary

Inspection on May 21--23, 1984 [Report No. 50-156/84-01(DPRP)] Areas Inspected:

Routine, unannounced inspection of records, logs, and organization; review and audit functions, requalification training; procedures; surveillance activities; experiments; fuel-handling activities; environmental protection; radiation control practices; radwaste management program; emergency planning; transportation activities. The inspection involved 37 inspector-hours onsite by one NRC contractor inspector and one NRC contractor inspector trainee, including 1 inspector-hour onsite during off-shifts.

Results: No items of noncompliance were identified in the areas of inspection.

DETAILS

1. Persons Contacted

R. J. Cashwell, Reactor Director
S. M. Matuszewic, Supervisor Nuclear Reactor
M. F. Baumann, University Health Physicist Auditor
G. Poland, University Health Physicist
D. L. LeGare, Senior Reactor Operator
R. M. Jones II, Reactor Operator

2. General

This inspection, which began at 8:30 a.m. on May 21, 1984, was conducted to examine the overall program at the University of Wisconsin Nuclear Reactor. However, the inspection did not examine the security and material accountability and control activities. The facility was toured shortly after arrival.

The reactor was not operated on the first day of the inspection; however, the inspection team did witness a reactor prestartup checkout and startup starting at 7:30 a.m. on May 22, 1984. The conditions of the facility were found to be acceptable, and the operations staff performed in a professional manner with each individual carrying out his duties as a member of a well-organized, albeit small, team during the prestartup and startup activities.

3. Organization, Logs, and Records

The reactor logs and records were reviewed, and no deviations from University of Wisconsin required standards were found. The review verified that (1) required entries were made, (2) records were readily available for inspection, (3) significant problems or incidents were documented, and (4) facility maintenance was being performed as required and on a timely basis. The records were found to be complete and to provide adequate information in all required areas. However, the inspection team noted an operations log entry with respect to a leaking experimental capsule that did not, in the team's opinion, provide adequate information. This experimental capsule leak is discussed in more detail in Paragraph 8, Experiments.

There have been no changes in the organization since the last routine inspection (Report 50-156/81-01) with the exception of the resignation of four reactor operators--one senior operator and three reactor operators. Five individuals are in training as reactor operators at the present time.

No items of noncompliance or deviations were identified in this section of the inspection.

4. Reviews and Audits

The records and associated audit reports for the last five Reactor Safety Committee (RSC) meetings were reviewed. The draft minutes of the RSC

meeting held on May 17, 1984, also were reviewed. The review was performed to verify that the licensee's review and audit program conformed with procedural and regulatory requirements. The audit reports reviewed were found to be timely, thorough, and technically adequate. The RSC reviews of the audits were well done and of appropriate depth.

No violations or deviations were identified in this section of the inspection.

5. Requalification Training

The inspection team reviewed procedures, logs, and training records. The requalification program was found to be in conformance with regulatory requirements and licensee commitments. The written examinations and reexaminations (when required) administered to the operators and the records documenting the "hands-on" experience for each operator during the three requalification periods since the last overall inspection (Report 50-156/81-01) were reviewed. The written examinations and reexaminations covered the subject material thoroughly and in adequate depth. The licensee's requalification program appeared to be in total compliance with both regulatory requirements and procedural commitments.

No items of noncompliance or deviations were found in this section of the inspection.

6. Procedures

The inspectors reviewed the licensee's procedures to determine if procedures were issued, reviewed, changed or updated, and approved in accordance with Technical Specifications and Safety Analysis Report (SAR) requirements.

This review also verified that

- a. the procedure content was adequate to operate, refuel, and maintain the facility safely;
- b. the responsibilities were clearly defined; and
- c. the required checklists and forms were used.

The inspectors determined that the required procedures were available and that the contents of the procedures were adequate.

Nine procedures were selected at random and reviewed in depth; they were found to be adequate. A facility modification to remove the key switch startup delay that had temporary approval by two senior reactor operators was approved at the May 17, 1984, RSC meeting and will be implemented after formal release of the RSC meeting minutes.

No items of noncompliance or deviations were identified in this section of the inspection.

7. Surveillance Activities

The inspection team reviewed surveillance records and had discussions with appropriate operations personnel. The licensee's surveillance program was found to be adequate, well implemented, and conducted in accordance with the Technical Specifications and operational procedures. Adequate procedures are available for surveillance activities and performance of the required tests. The surveillance test records of eight randomly selected tests performed during the past 37 months were examined in depth. All requirements were met and recorded. Required maintenance of components involved in the systems being tested also was reviewed for documentation and reverification of operational performance.

The preventive maintenance records (VWNR 100) for the past 37 months were reviewed. All maintenance activities were performed and documented in accordance with regulatory requirements and procedural commitments.

No items of noncompliance or deviations were identified in this section of the inspection.

8. Experiments

The inspector verified the following by reviewing experiment records and other reactor logs.

- a. Experiments were conducted using approved procedures and under approved reactor conditions.
- b. New experiments or changes in experiments were reviewed properly and approved.
- c. The experiments did not involve an unreviewed safety question, that is, 10 CFR 50.59.
- d. Experiments involving potential hazards or reactivity change were identified in the procedures.
- e. Reactivity limits were not or could not have been exceeded during an experiment.

As stated in Paragraph 3, the inspectors noted an entry in the operation log for April 24, 1983, indicating that a manual scram occurred in response to a continuous air monitor (CAM) alarm. The CAM monitors the radioactivity in the air beneath the reactor bridge. The log further indicated that the alarm was caused by a fission product leak from a sample in a "whale" tube facility. The operator log did not provide any further information on the response to the release. The inspection team discussed the log entry, the facility response, and the magnitude of the release with licensee management personnel. The stack particulate and gaseous air monitors did not indicate radioactivity levels greater than those normally observed during reactor operation. The inspection team confirmed this by review of the stack monitor system strip charts for periods before, during, and after the sample capsule leak. The facility personnel removed the capsule from the facility immediately in accordance with prescribed procedures and determined that it contained fission product activity, indicating the unsuspected presence of uranium. The capsule was placed in

a second air/watertight container and put in a lead shield; it is being stored for decay. Presumably, pressure generated by fission product gases produced a small hole in the usually air/watertight moderation capsule, causing the leak of fission product gases that caused the CAM alarm. The presence of uranium in the soil type sample was not known by the individual submitting the sample for neutron activation analysis. Based on the experience of one member of the inspection team, the inspectors feel that this is not unusual in the case of such samples. The inspection team investigation led them to conclude that all required procedures were followed, the actions of facility personnel were appropriate, and the release concentrations did not approach any safety limits and did not pose any potential hazard to facility personnel or the public. However, the information provided in the operation log entry was not sufficient to allow the inspection team to reach this conclusion. The team discussed the lack of more detailed information in the log with the licensee, who agreed that the log entry was inadequate. The licensee indicated that actions would be implemented to assure that log entries would be more complete in the future.

No items of noncompliance or deviations were identified.

9. Fuel Handling Activities

The facility refueling (fuel handling) program was reviewed by the inspectors. The review included the verification of approved procedures for fuel handling and their technical adequacy in the areas of radiation protection, criticality safety, Technical Specifications, and security plan requirements. The inspectors determined by records review and discussions with personnel that fuel-handling operations and startup tests were carried out in conformance to the licensee's procedures.

No items of noncompliance or deviations were identified.

10. Transportation

There have been no shipments of radioactive material since the last routine inspection. No spent reactor fuel has been shipped since the early 1960s. The licensee maintains current copies of DOT and NRC regulations concerning the transportation of radioactive materials.

11. Radiation Control

The inspectors reviewed records, interviewed personnel, and made observations and independent surveys to verify that radiation control activities were being carried out in accordance with the licensee and NRC regulations. The areas covered were

- a. posting and labeling of restricted areas and radioactive materials,
- b. control of irradiated samples,
- c. calibration of radiation detection instruments,
- d. required periodic dose and contamination surveys,
- e. exposure records of personnel,
- f. posted areas of the facility,

- g. personnel training, and
- h. independent surveys.

During the last health physics inspection, it was noted [Report 50-156/83-03(DRMSP), Paragraph 5] that the training handout for students using the facility did not include a discussion of the possible biological effects of radiation. The licensee agreed to correct this situation. Currently, all such students receive the same training as individuals handling radioactive materials throughout the university and are authorized as radioactive materials handlers after successfully completing the training and an examination. The inspection team's review of the course training manual and a sample examination indicated that this problem has been addressed adequately.

12. Radioactive Waste Management

The inspection team reviewed the records of gaseous, liquid, and byproduct releases since the last health physics inspection [Report 50-156/83-03(DRMSP)]. There have been no solid waste transfers to the University Health Physics office. The review of the liquid radwaste releases to the sanitary sewer since the last health physics inspection indicates that the discharges are a fraction of the 10 CFR 20.303 limits. Argon releases from March 1983 through April 1984 are well below the Technical Specification limits.

During the last health physics inspection [Report 50-156/83-03 (DRMSP), Paragraph 11], it was noted that the average daily sewage flow used for the dilution had not been verified for several years. The licensee indicated that this information would be verified and updated as necessary. However, when he attempted to do so, he found that the water meter for the building that had been used to provide the required data in the past had been removed. Thus, the dilution data cannot be verified. However, both the licensee and the inspection team noted that the liquid radwaste effluent meets requirements without dilution. Use of the current average dilution factors will be continued.

No items of noncompliance or deviation were identified.

12. Emergency Planning

A revised emergency plan has been submitted for approval by NRC. Questions concerning the plan were received recently and responses were submitted immediately after approval by the RSC at its May 17, 1984, meeting.

The facility is operating under its current emergency plan, which requires a full drill once a year and a partial drill in conjunction with the annual requalification program. The inspection team determined that commitments made in the plan, such as an annual review and update, annual drills, procedures, training, emergency equipment, and testing of alarms had been fulfilled.

No items of nonconformance or deviations were identified in this section of the inspection.

13. Review of Periodic and Special Reports

The inspection team reviewed the following reports for timeliness of submittal and adequacy of information submitted.

"Annual Operating Report for License R-74 to the United States Nuclear Regulatory Commission for Fiscal Year 1980--1981 (submitted July 1981).

"Annual Operating Report for License R-74 to the United States Nuclear Regulatory Commission for Fiscal Year 1981--1982 (submitted July 1982).

"Annual Operating Report for License R-74 to the United States Nuclear Regulatory Commission for Fiscal Year 1982--1983" (submitted July 1983).

14. Exit Interview

The inspection team met with licensee representatives (listed in Paragraph 1) at the conclusion of the inspection on May 23, 1984. The following items were discussed.

- a. The purpose and scope of the inspection.
- b. The need for more detailed documentation of incidents, such as the irradiation sample capsule leak (Paragraph 7) in the operations log. The response, in particular, should be documented more thoroughly. The licensee agreed and indicated they already were taking steps to ensure more complete documentation. The inspection team indicated that the implementation of these steps would be reviewed during the next inspection.