

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-186/85005(DRP)

Docket No. 50-186

License No. R-103

Licensee: University of Missouri

Facility Name: University of Missouri
Research Reactor Facility

Inspection Conducted: May 22-24, 1985

Inspectors: *K. R. Ridgway*
K. R. Ridgway

6/10/85
Date

E. R. Schweibinz

E. R. Schweibinz
Approved By: E. R. Schweibinz, Chief
Technical Support Staff

6-11-85
Date

Inspection Summary

Inspection on May 22-24, 1985 (Report No. 50-186/85005(DRP))

Areas Inspected: Routine, unannounced inspection of records, logs, and organization; review and audit functions; requalification training; procedures; surveillance and maintenance; fuel handling activities; transportation activities; followup action relative to Licensee Event Reports and previous open inspection items. This inspection involved a total of 40 inspector-hours by two NRC inspectors.

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

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DETAILS

1. Persons Contacted

- * R. Brugger, Director, Research Reactor Facility
- * D. Alger, Associate Director, Research Reactor Facility
- * J. McKibben, Reactor Manager
- * R. Hultsch, Reactor Physicist
- * W. Meyers, Jr., Reactor Operations Engineer
- C. Edwards, Reactor Plant Engineer
- S. Gunn, Reactor Services Engineer
- M. Falco, Supervisor, Reactor Services

* Indicates those present at the exit interview.

2. General

This inspection, which began at 8:30 A.M. on May 22, 1985, was conducted to examine the research reactor program at the University of Missouri Research Reactor Facility. The facility was toured shortly after arrival. The inspectors observed a reactor startup and the loading of the flux trap during the inspection. The general housekeeping of the facility had improved since the last inspection (Inspection Report No. 50-186/84-01) due to the shipment of low-level waste.

3. Organization, Logs, and Records

The facility organization was reviewed and verified to be consistent with the Technical Specifications and/or Safety Analysis Report (SAR). The minimum staffing requirements were verified to be present 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.

Since the last inspection, Dr. Peter Magrath has been appointed President of the University, replacing Dr. J. Olson. Dr. Jay Barton has been appointed Vice President, Academic Affairs, replacing Dr. M. George and Dr. Herbert S. Goldberg is Acting Associate Vice President for Research and Academic Affairs, replacing Dr. Tom Collins.

The licensee announced that starting May 24, 1985, J. C. McKibben, Reactor Manager had been relieved of his present duties and will spend full time on upgrading the reactor fuel and power level. W. Meyers, Jr., Reactor

Operations Engineer, has been made Acting Reactor Manager during this period, carrying some of his present responsibilities and other Operating Engineer responsibilities will be assigned to the Shift Supervisors.

Two Auxiliary Operators are preparing for licensing examinations and one Reactor Operator is preparing for his Senior Operator examination.

No items of noncompliance or deviations were identified.

4. Reviews and Audits

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 had been conducted by a safety review committee as required by Technical Specifications or SAR.
- b. That the review committee and/or subcommittees 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 any identified problems were resolved.

A review of the Reactor Advisory Committee and the Reactor Safety and Procedure Review Subcommittee's meeting minutes indicated the committee and subcommittees were meeting all requirements.

Audits of the Quality Assurance Program, required for shipping containers, and the reactor operations area had been conducted since the last inspection (Inspection Report 50-186/84-01). The QA Program audit had been performed by a person with prior industry experience. The audit and many of the recommendations had been completed before the fuel shipping program in late 1984.

The licensee has established a cooperative audit interchange with the Rolla Research Reactor; personnel from Columbia audit Rolla and conversely, Rolla audits Columbia. This interchange appears to have improved the exchange of ideas, improved the administration and records of both safety programs as well as enhancing the knowledge and experience of the individual participants.

No items of noncompliance were identified.

5. Requalification Training

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 examinations had been conducted in 1983.

The inspectors noted that one part of one examination had been misplaced and later found during the inspections and that some examinations had only first names and others were not dated. Since these examinations are considered official records for two years, these irregularities were brought to the attention of the licensee, who agreed to more formal control of future examinations.

No items of noncompliance were identified.

6. Procedures

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 and the contents of the procedures were adequate.

No items of noncompliance were identified.

7. Surveillance

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

- a. That when necessary, procedures were available and adequate to perform tests.
- b. That tests were completed within the required time schedule.
- c. Test records were available.

The inspector noted that Reactor Test Procedure (RTP-13) Building Leak Test, had been changed to Compliance Procedure (CP-26). The last leak rate surveillance, required annually, was reviewed and found to be acceptable.

The licensee's surveillance program appeared to be satisfactory.

No items of noncompliance were identified.

8. Experiments

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 requirements regarding experiments were met.
- 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 Reactor Utilization Requests, RUR-243, Irradiation of Small Arms Propellants, and RUR-265, Nuclear Powered Fluorescence. These RURs and addendums to them had been properly reviewed and approved by the Reactor Advisory Committee.

No items of noncompliance were identified.

9. Fuel Handling

The facility 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, and Technical Specification requirements. The inspectors determined by records review and discussions with personnel that fuel handling operations were carried out in conformance of the licensee's procedures.

The inspector noted that 64 core changes had been completed in 1984, and 27 in 1985. Refueling records were reviewed including loading sequence, element location and status sheets and 1/M plots for new mixed core startups.

No items of noncompliance were identified.

10. Transportation Activities

The inspectors reviewed records of fuel shipments made since the last inspection to determine that Department of Transportation (DOT) regulations were being followed in:

- a. The use of the certified shipping casks.

b. The preparation of the casks for shipping.

c. The records of shipments.

The inspectors reviewed the shipping records for three fuel shipments made since the last inspection. Those shipments were made to DOE facilities in Idaho Falls. No significant problems were encountered.

No items of noncompliance or deviations were identified.

11. Licensee Event Reports Followup

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

- a. (Closed) Licensee Event Report 50-186/84-02, Emergency Generator (EG) Failed During Load Test, December 13, 1984. The EG stalled after 45 seconds of operation carrying the required loads. Subsequent testing was accomplished without further problems and the EG was declared operable. Later the timing of the EG engine was found to be adjusted to an incorrect r.p.m. and the distributor vacuum advance had never been used. Since correcting the above, the EG has been satisfactorily tested and operated. To reduce the load to the EG, the exhaust fan, operating at the time of the power failure, has been sequenced to be picked up when the EG starts. The licensee is also considering some method of heating the engine so that emergency starts will not be made cold.

Although there have been 5 EG failures during the last 3 years, the EG is not required for reactor shutdown or the removal of decay heat. It provides only power to emergency lighting, exhaust fans, reactor instrumentation, and the emergency air compressor.

The reactor building is provided with other emergency lighting which is battery supplied.

The exhaust fans are not required during a containment isolation which occurs on a complete power outage when the isolation dampers fail in the closed position.

The reactor instrumentation provides no automatic safety function for the safe shutdown and cooling of the reactor, and automatic cooling functions are observable from the reactor bridge.

The reactor is automatically shutdown and automatically switched without power to the in-pool heat exchanger for indefinite decay heat removal. Containment integrity can not be indefinitely guaranteed without emergency power which operates an emergency air compressor supplying air to the airlock door seals. However,

the emergency compressor feeds a small supply tank which would provide several door open-close cycles for the immediate evacuation of personnel and containment integrity is not required when the reactor is not operating.

- b. (Closed) Licensee Event Report 50-186/85001, Incorrect Settings on Power Range Channel 6. The Channel 6 power range monitor indicator and recorder dropped approximately 12 percent for a period of 17 minutes. During this period the rod run-in and scram trip points would have actuated at power levels of 121% and 126% respectively and would not have been within Technical Specifications 3.3a and 3.4c which require rod run-ins at 115% and reactor scrams at 125%. Channels 4 & 5, which perform the same safety functions were operable and either could have performed their intended functions. The cause of the momentary power decrease of Channel 6 was attributed to a faulty DC amplifier connector which has been replaced. No fluctuations have been observed since. All operators have been appraised of the importance of the nonconservative setpoints.
- c. (Closed) Licensee Event Report 50-186/85002, Failure of Regulating Rod Position Indicator Chain. On May 19, 1985, the Regulating Rod Position Indication Chain failed due to a failed master link. The reactor was shutdown and the link repaired. Failure of the chain removed the less than 10 percent rod run-in function required by Technical Specification 3.4. During the subsequent maintenance shutdown on May 23, 1985, the chain was replaced with a heavier one. The licensee has also revised the semiannual preventive maintenance check to include an inspection of the chain's condition.

12. Followup on Previous Items of Noncompliance and/or Open Inspection Items

- a. (Closed) Open Item (50-186/84-01-01) Startup Check Sheets Incomplete. A review of startup sheets and other operational records indicated there were no apparent omissions since the last inspection.
- b. (Closed) Open Item (50-186/84-01-03) Some Operator Evaluation Forms Were Not Complete. The evaluation forms appeared to be up-to-date.
- c. (Open) Open Item (50-186/84-01-04) Some Compliance Procedures Did Not Have Technical Specification References. The inspector noted that the specification reference in CP-16 had been corrected; however, some of the other Compliance Procedures had not been changed to include references or limits.

13. Review of Periodic and Special Reports

The inspectors reviewed monthly reports for March 1984 to April 1985 for timeliness of submittal and adequacy of information submitted.

No items of noncompliance were identified.

14. Exit Interview

The inspectors met with the licensee representatives (listed in Paragraph 1) at the conclusion of the inspection on May 24, 1985, and summarized the scope and findings of the inspection. The inspectors also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection. The licensee did not identify any documents or processes as proprietary.

The licensee acknowledged the following remarks by the inspectors at the meeting.

- a. The need for better control of requalification training records (Paragraph 5).
- b. The apparent benefits resulting from the cooperative audit interchange with the Rolla Research Reactor (Paragraph 4).
- c. The need to investigate the automatic control for the cooling water to the pool heat exchanger. It was observed that this system required manual adjustment to maintain the pool water temperature.