

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-186/92004(DRSS)

Docket No. 50-186

License No. R-103

Licensee: University of Missouri - Columbia

Facility Name: Missouri University Research Reactor (MURR)

Inspection At: Research Reactor Facility, Columbia, Missouri

Inspection Conducted: November 2-5, 1992

Inspector: C. Cox

C. Cox
Date 11/25/92

Approved By: J. W. McCormick-Barger, Chief
Emergency Preparedness and
Non-Power Reactors Section

J. W. McCormick-Barger
Date 11/25/92

Inspection Summary

Inspection on November 2-5, 1992 (Report No. 50-186/92004(DRSS))

Areas Inspected: Routine, announced inspection to review actions on: organization, logs, and records (39745); review and audit functions (40745); requalification training (41745); procedures (42745); surveillance (61745); experiments (69745); fuel handling activities (60745); emergency planning (82745); radiation controls (83743); environmental protection (80745); and periodic and special reports (90713).

Results: Of the 11 areas inspected, no violations or concerns were identified. The overall program remained good. Detailed independent audits and detailed Reactor Utilization Requests (RURs) were especially noteworthy.

DETAILS

1. Persons Contacted

University of Missouri-Columbia

- *M. Carter-Tritschler, Services Applications Supervisor - Shipping
- *G. Ehrhardt, Chairman, Isotope Use Committee
- *J. Ernst, Assistant Health Physics Manager
- *L. Foyto, Senior Reactor Operator
- *G. Gunn, Shift Supervisor
- *S. Gunn, Manager, Services Applications
- *C. McKibben, Associate Director, MURR
- *W. Meyer, Reactor Manager
- *J. Rhyne, Director
- *A. Schoone, Operation Engineer
- *T. Seeger, Chief Research Electronic Technician

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

*Denotes those attending the exit meeting on November 5, 1992.

2. General

This inspection, which began on November 2, 1992, was conducted to examine the research reactor program at the University of Missouri Columbia. The facility was toured shortly after arrival. The general housekeeping of the facility was good.

The reactor operated on a weekly cycle, shutting down each Monday for refueling and/or maintenance outages. The facility was used primarily for irradiation services and research activities.

There were 19 unscheduled shutdowns (14 scrams and 5 rod run-ins) during the last 16 months. The unscheduled shutdowns were primarily equipment problems or spurious signals. The average is only slightly higher than the 13 unscheduled shutdowns over 12 months from the last inspection period and still significantly lower than the 54 shutdowns over 17 months in the previous inspection period.

During the course of the inspection, the inspector observed a reactor startup, post scram recovery operations after an unscheduled shutdown, and refueling operations. The operators appeared proficient and knowledgeable, demonstrated good procedural compliance, and made appropriate log entries for the observed evolutions.

No violations or deviations were identified.

3. Action on Previous Inspection Items (92701)

- a. (Closed) Open Item (50-186/91006-01): "High extremity exposure". The licensee assigned a supervisor in the Nuclear Analysis group to be responsible for reviewing exposures in the group. Log

sheets for the group were revised to require personnel to log their pocket dosimeter readings and the dose per rabbit run was routinely reviewed. An automatic canister opener was installed to reduce exposures. All of the above efforts resulted in greatly reduced exposures and well distributed exposures for that group. Especially effective was the new supervisor's review of the doses within the group to ensure no unusual exposures and that the doses were being evenly distributed.

- b. (Open) Open Item (50-186/88001-01): "Assignment of byproduct material to broad-scope or reactor license". The Handbook of Radiological Operations was revised but awaiting resolution and issuance of the new MURR only broad-scope license before it is issued.

4. License Event Reports (92700)

- a. (Closed) LER 92-01: Operation of a fueled experiment with the experiment's direct radiation monitor out of service.

On February 11, 1992, the MURR operated a fueled experiment for approximately six hours with a radiation monitor, part of the Area Radiation Monitor System (ARMS), out of service for a source calibration check. In analyzing the event, the licensee realized that four of the new ARMS detectors' scheduled annual calibration frequencies did not match the semiannual intervals required by technical specifications.

A standing order was issued which required that any time the monitor for the fueled experiment was out of service, that the experiment would be red tagged secured. Operations and maintenance procedures were revised to require verification of the monitor status before starting the fueled experiment or red tagging the experiment secured when the monitor was out of service. The licensee reviewed all technical specification surveillances to ensure that compliance with the stated frequencies and to ensure that the surveillances were being scheduled by the Reactor Operations Compliance Check tracking system.

This item is closed.

- b. (Closed) LER 92-02: Reactor operation with unreliable monitoring of the reactor stack effluent.

The reactor was operated from 1558 hours on June 22, 1992 to 1519 hours on June 23, 1992, with the stack radiation monitor disconnected from the isokinetic sampling probe due to loose sheet metal severing the sample line.

Analysis of the data from a new digital monitoring system that was still connected to the stack determined that no unusual activity was released during the period that the primary system was disconnected. The exhaust ducting vanes that had severed the line were replaced and the new ones were reinforced. Solid tubing was

installed to replace the tygon tubing as the sample line.

This item is closed.

5. Organization, Logs, and Records (39745)

The licensee's staff had recently been reorganized, primarily changing the names of several of the organizations, but essentially there were no changes in responsibilities nor personnel. The organization was verified to be consistent with the Technical Specifications and Safety Analysis Report (SAR). The minimum staffing requirements were verified to be met during reactor operations and fuel handling or refueling operations by actual observation and log reviews. Selected reactor operator logs for 1991 through November 1992 were reviewed with no concerns identified. The licensee records were well-maintained.

No violations or deviations were identified.

6. Reviews and Audits (40750)

The Reactor Advisory Committee (RAC) met on a quarterly basis as required by Technical Specifications. The Isotope Use, Safety, and Procedures Subcommittees meeting minutes were reviewed by the RAC. The inspector reviewed the RAC meeting minutes for 1991 through 1992. The meeting minutes were of good quality and provided a clear record of review and approval of reactor activities including the subcommittees' activities.

The modification of Beamport "E" for the installation of a new Small Angle Neutron Scattering (SANS) experiment was reviewed by the RAC. The modification package was well written and the review by the RAC was thorough and appropriate.

The annual audit for 1992 was reviewed by the inspector. The audit report was very thorough and detailed. Items of concern were addressed by the Reactor Manager and reported to the RAC.

No violations or deviations were identified.

7. Regualification Training (41745)

The inspector reviewed procedures, logs, and training records and interviewed personnel to verify that the regualification training program was being carried out in conformance with the facility's approved plan and NRC regulations.

No violations or deviations were identified.

8. Procedures (42745)

The inspector determined that the required procedures were available to the operators and the contents of selected procedures were found adequate. During several evolutions, the inspector noted good procedural compliance and use of checklists. Procedure changes were reviewed and approved by the Procedures Subcommittee.

No violations or deviations were identified.

9. Surveillance (61745)

A senior reactor operator was assigned responsibility for scheduling required surveillances. The operator maintained a maintenance log for scheduling surveillances on a monthly basis and a separate log book for completed surveillances with the associated data sheets.

No violations or deviations were identified.

10. Experiments (69745)

The RAC reviewed and approved all experiments through the safety subcommittee. The inspector reviewed two Reactor Utilization Requests (RURs) that the safety subcommittee reviewed. RUR 219-116A was for the production of thulium oxide and RUR 219-123 was for the use of boron lined cans for shielding from thermal neutrons. The RURs were well written with the appropriate level of detail describing the experiment and associated hazards.

No violations or deviations were identified.

11. Fuel Handling (60745)

The inspector observed refueling activities. Good procedure compliance and appropriate log entries were noted and the reactor operators appeared proficient.

No violations or deviations were identified.

12. Emergency Planning (82745)

The Facility Emergency Response Organization's structure and training remained as described in inspection report 50-186/90002(DRSS). The April 20, 1992 Exercise simulated a fire in the Alpha Lab with responses from the university hospital, campus security, and the local fire department. A critique was held with improvement items noted and tracked. Emergency kits were inventoried quarterly and the emergency plan reviewed annually as required.

No violations or deviations were identified.

13. Radiation Control (83743)

The MURR radiation control program essentially remained the same as described in inspection report 50-186/91006(DRSS). Minor personnel changes included a new trainee and a new student helper. The assistant health physics manager will become the acting health physics manager in January 1993 when the health physics manager begins a one year professional development tour with the Department of Energy in Washington D.C.. Posting, labeling and surveys were reviewed during tours of the facility with no problems noted. Instrument calibration records were reviewed. Radiation work permits were selectively reviewed with approximately 80 permits generated for 1992 to date. Procedures

were selectively reviewed including verifying that the required annual review of the procedures was performed by the health physics manager.

External exposure records were reviewed. The Reactor Services, Health Physics, and Operations groups continued to be the groups with the highest exposures with 26 of the 28 personnel receiving > 500 mrem whole body for 1991. The highest monthly whole body exposure was 250 mrem. The Nuclear Analysis group was noted in inspection report 50-186/91006(DRSS) as having the highest extremity dose. During this inspection, the inspector noted a marked improvement in the licensee's control of their exposures and the distribution of their exposures more equally within the group. All exposures were within 10 CFR Part 20 limits.

No violations or deviations were identified.

14. Environmental Protection (80745)

Environmental protection essentially remained as described in inspection report 50-186/91006(DRSS). The new digital monitoring system still had not been declared operational at the time of the inspection. The software problems had been resolved; however, the health physics manager was waiting for spare parts to be available before declaring the system operational. Gaseous and liquid effluents were appropriately monitored and were within the technical specification limits. Soil, vegetation, and water samples were analyzed semi-annually as part of the environmental monitoring program and the environmental TLD program was in effect.

No violations or deviations were identified.

15. Review of Periodic and Special Reports (90713)

The inspector reviewed the 1991-92 annual report for timeliness of submittal and adequacy of information submitted.

The report was submitted in a timely manner and contained the information required by Technical Specifications.

No violations or deviations were identified.

16. Exit Interview (30703)

The inspector met with the licensee representatives denoted in Paragraph 1 at the conclusion of the inspection on November 5, 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.