U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 030-32695/94001(DRSS)

Docket No. 030-32695

License No. 24-00513-39

Licensee: The Curators University of Missouri

Facility Name: Missouri University Research Reactor (MURR)

Inspection At: University of Missouri-Columbia

Inspection Conducted: January 24-28, 1994

Inspector: _____ 3-15-94
Mark W. Mitchell
Radiation Specialist
Date

Approved By: _____ 3/16/94
John A. Grobe, Chief
Nuclear Materials Inspection
Date

Inspection Summary

Inspection on January 24-28, 1994 (Report No. 030-32695/94001(DRSS))
Areas Inspected: Routine, unannounced safety inspection to assess the overall adequacy of the university's NRC licensed operations involving its broad scope program located at and administered through the research reactor. The inspection of the broad scope license program included a review of: organization, management controls and staffing; qualifications, training and instruction to workers; radiation protection procedures; facilities and equipment; inventory, material control and accountability; internal audits; receipt and transfer of material; external and internal exposure controls and monitoring; control of radioactive materials and contamination; and posting/labeling.

Results: One concern regarding a License Condition was identified: failure to maintain and make available for inspection a current record of radioactive material possessed (Section 8). The licensee's application tied down in the license was ambiguous on the requirement for a complete inventory. The licensee agreed to request an amendment to their license and clarify this issue within 60 days.

DETAILS

1. Persons Contacted

University of Missouri-Columbia

G. Ehnhardt, Chairman, Radiation Safety Committee Chair
J. Rhyne, Director, MURR
S. Gunn, Manager, Services Applications
*C. McKibben, Associate Director, MURR
*J. Schuh, Health Physicist
*John Ernst, Health Physicist, MURR
Kurt Zinn, Authorized User

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

*Denotes those attending the exit meeting on January 28, 1994.

2. Inspection History and Purpose of Inspection

a. Inspection History

This is the initial inspection under this license. The facility has undergone inspection by the NRC under the Part 50 research reactor license and portions of the facility have been inspected when activities were licensed under the campus broad scope (24-00513-32).

The university has established a Radiation Safety Committee (RSC) as required by 10 CFR 33.13. The committee is required to approve all users and uses of licensed material and provide program direction and oversight through establishment of procedures and other administrative controls.

Prior to the latest license renewal, the university had two separate, autonomous, committees approving the users and uses of radioactive material. A local Columbia campus committee oversaw the Columbia campus, and through the RSO, the day to day operations of the licensed activities at the Columbia campus, including certain activities at the research reactor facility (i.e. Alpha Lab). The Central Radiation Safety Committee was responsible for the broad scope licensed activities throughout the University of Missouri system at several locations (Columbia, Kansas City, Rolla, St. Louis). The Central RSO was responsible but not delegated authority to effectively operate as the RSO at the Columbia campus, including the reactor. The two committee scheme did not provide sufficient oversight and uniformity in the licensed material use at each campus.

In 1992, the University of Missouri reorganized its broad scope license and covered the physical locations under separate broad scope licenses. The Columbia campus medical and research operations became a separate broad scope license (24-00513-32). The research reactor was issued a broad scope license (24-00513-39) for the activities not covered under the reactor license and remains separate in administration from the campus broad scope operations.

Presently, a single RSC oversees and approves uses of NRC-licensed material at the research reactor that are either received from off site or transferred from the reactor license.

The inspector evaluated the current mechanisms and criteria utilized by the RSC to approve users and uses of licensed material. Committee membership and meeting minutes for 1993 to date of inspection were also reviewed by the inspectors. The current committee appears to have an active role in approving users and uses.

b. Purpose of Inspection

This routine inspection was conducted to assess the overall adequacy of the university's NRC-licensed activities authorized under the NRC byproduct material license (24-00513-39). The inspection focused on: the Radiation Safety Officer's (RSO) ability, through the reactor health physics office, to oversee daily licensed activities and implement the reorganized and relicensed 10 CFR Part 33 broad scope program that created this license; the university administration and Radiation Safety Committee involvement in program management and oversight.

In addition to this broad scope license, the University of Missouri also possess six other NRC licenses including License No. 24-00513-32, authorizing use of byproduct materials under broad scope restriction at the University of Missouri-Columbia. This licensed program (24-00513-32) was reviewed during this inspection, and is described in separate report.

3. Summary of Licensed Program

a. Program Summary

This University of Missouri license is a academic research and development broad scope licensee authorized under License No. 24-00513-39 to possess, in part: (1) curie quantities of any byproduct material (with atomic numbers 1 to 83) in any form for research and development (R & D) pursuant to 10 CFR 30.4; and (2) millicurie (mCi) to curie (Ci) quantities of specifically listed sealed and unsealed byproduct materials for use in analytical instruments, gauging devices, and for instrument calibration, student instruction and R & D.

To date the licensee's Radiation Safety Committee (RSC) has approved 16 projects that involve a total of 75 people. The projects are assigned a category based on radiological risk. Five projects have been issued a Level I category, four each a Level II and III and three a Level IV.

4. Organization, Management Controls and Staffing

The inspector reviewed the licensee's organization and management controls for the radiation protection program, including the organizational structure, staffing, and effectiveness of procedures and other management techniques used to implement the program. Inspector findings are presented below.

a. Senior Management

Overall responsibility for the conduct of NRC broad scope license activities at the MURR is vested in the University Chancellor's Office, who reports through the University President to the Curators of the University of Missouri.

The Vice-Provost for Research and Dean of the Graduate School is the senior management representative to which the Director of the MURR facility reports. The Radiation Safety Committee (RSC) reports to the Office of the Provost.

Direct program management and oversight for daily radiation safety activities is provided by the RSC and the Radiation Safety Officer (RSO). The RSC, RSO and MURR Health Physics Office are described in the subsections below.

b. Radiation Safety Committee (RSC)

The licensee has structured the RSC to overlap membership with the Isotope Use Committee (IUS) in its membership. Many of the duties of the IUS are similar in nature to that of the RSC. The IUS is a subcommittee of the Reactor Advisory Committee. This assists the licensee in meeting the reactor technical specifications and the broad scope license commitments. The inspection found that the RSC actions are kept separate from the IUS, thus not confusing license and technical specification issues and requirements.

c. MURR Health Physics Office

The RSO reports to the Associate Director of Missouri University Research Reactor (MURR). The RSO's staffing and budgeting is committed through the MURR Health Physics Office. The RSO also is the MURR Health Physics Manager (MURR HP Manager). The MURR Health Physics Office is directly responsible for governing the day-to-day operations of the radiation protection program at the reactor. The primary responsibility of the office is to ensure proper development and implementation of the radiation protection

program for the reactor. This staffing arrangement eliminates staff duplication. As MURR HP Manager, the RSO is responsible for:

- Personnel monitoring;
- Packaging and shipping of radioactive materials;
- Maintenance of engineered safety systems (filters, etc.);
- Calibration of radiation survey instruments;
- Radioactive waste disposal, effluent monitoring, and waste record maintenance;
- Radiation control and support in decontamination operations.

Other broad scope responsibilities include but are not limited to the following:

- Provide consultation on radiation safety problems to authorized users and to others within the reactor program having a need for technical support. This would include staff assistance to the RSC.
- Provide general surveillance over all activities involving radioactive material through periodic auditing, monitoring and performance of radiation surveys as directed by the RSC.
- Determine compliance with regulatory requirements and conditions of project approval (protocols) as specified by the RSC.
- Supervise all ordering, receipt, monitoring and delivery of all shipments of radioactive material arriving at MURR. Also, oversee all intralaboratory transfers of licensed material.
- Maintain licensed material inventory and an accountability system.
- Communicate with the RSC and university management to keep them informed of program issues, developments and problems.
- Supervise and coordinate the radioactive waste disposal program.

The MURR HP office currently consists of the RSO, five FTE professional staff and two FTE support staff. The licensee is at full intended staffing as described in the license application with one member of the professional staff on sabbatical leave.

The inspector did not observe any staffing problems associated with the dual role of the RSO and use of the health physics staff for both MURR and broad scope coverage.

No items of non-compliance were identified.

5. Qualifications, Training and Instruction to Workers

The inspector reviewed the qualifications and experience of selected RSO staff members, qualifications and training of several selected authorized supervisors (researchers) and the program established for ancillary staff training. The findings are discussed below.

a. Radiation Safety Office Staff

The inspectors reviewed the qualifications and experience of the RSO technical staff members and reviewed their responsibilities for the radiation safety program. No problems were noted. The staff has an adequate variety of technical expertise and experience.

b. Authorized Supervisors and Radiation Workers

The inspector reviewed the training provided to authorized supervisors (lab researchers) and their radiation workers. Each authorized user is required to attend a one-hour radiation safety indoctrination course presented by the MURR HP Staff. The indoctrination course includes a review of a radiation safety video tape and discussion of regulatory and facility requirements, various emergency radiation protection procedures and practices. Retraining is required annually for access to the facility by authorized users. The inspector completed the course during the inspection to be authorized for unescorted access to the facility.

Laboratory workers who use radioactive materials receive basic instruction and general information on radiation safety and responsibilities from the authorized user before the worker is involved with radioactive material.

Authorized supervisors are responsible to provide training to laboratory workers specific to the radiation safety practices appropriate to the uses (protocols) in their lab.

d. Ancillary Staff

The ancillary staff (custodial and maintenance) training program was briefly reviewed during this inspection. According to the licensee, ancillary personnel are provided 10 CFR 19.12 training on an annual basis through formal training programs offered at the direction of the RSO and the site access training. The licensee

stated that this training program format has worked well, since no significant ancillary staff training problems have been identified.

No items of non-compliance were identified.

6. Facilities

a. Laboratories

The licensee currently has 15 general use laboratories with one of the laboratories available as an animal room. The animal room has not been used as such since the license was granted in July, 1993. The inspector toured the laboratories. The facilities and equipment were as described by the licensee in the license application.

Contamination wipe surveys were conducted along with portable instrument surveys in most of the laboratories and in general uses areas like rest rooms and hallways. No removable contamination was identified in excess of the licensee's limit for removable contamination for unrestricted use. Radiation areas were appropriately marked and shielding was effectively used when storing radioactive materials and during the use of licensed material.

All materials listed in the inventory of the broad scope license were in storage during the inspection. However, the inspector was able to observe handling of reactor licensed materials by radiation workers also authorized under the broad scope license. The individuals appeared to exercise appropriate precautions according to the type of materials in use.

No items of non-compliance were identified.

7. Internal Audits

The inspector reviewed the internal audit program implemented by the licensee. This program is an important component giving the licensee the ability to self-identify and correct problems. The RSO's laboratory audit and inspection program involves a schedule of lab visits based on laboratory category which in turn is based on isotope risk factors. Currently all labs are surveyed daily by the MURR HP staff. The staff makes surveys of areas through out the facility as part of the reactor operations. This is more restrictive than the license condition requirements but allows the licensee to assure compliance with both licenses. Quarterly, the MURR HP staff visits the laboratories to verify inventory and follow-up any concerns.

a. RSC External Audit

The broad scope licensees (University of Missouri) may also share among its licenses the combined resources of its radiation safety programs. The could include exchange of personnel to assist in performing audits. The licensee staff stated that the current target for this type of auditing is approximately annually.

No items of non-compliance were identified.

8. Inventory

All radioactive materials that come into the facility are received by this license and entered in an authorized user's inventory. To date all transfers from this license have been to the reactor license or disposed as waste. The licensee currently maintains an inventory of all incoming materials with the individual laboratories. The licensee assures that the inventory of materials will not exceed the license limit by limiting the accumulated total of radioactive material authorized for use under any license item to less than the possession limit of that license item. Each project leader is required to keep a current record of their inventory.

License Condition 26 of License No. 24-00513-39 requires that licensed material be possessed and used in accordance with statements, representations and procedures contained in an application dated February 27, 1992 and October 6, 1993, and letters dated August 7, 1992 and December 6, 1993.

Item 10.4 of the application dated February 28, 1992, states that MURR shall maintain and make available for inspection a current record of radioactive materials possessed under the MURR Broad Scope License. The inspector found that as of January 25, 1994, the license did not maintain a current singular record of radioactive material possessed under this license. The current record of radioactive material was the sum of the inventories maintained in the individual laboratories. Licensee representatives indicated that a data base for maintaining a running inventory would be available in July, 1994. At the request of the inspector the licensee provided a cumulative total of the inventory, including sealed sources, by visiting each laboratory and totaling the individual inventories. The staff indicated that they originally intended for the individual laboratories to maintain an inventory and that this would meet the requirement for a current running inventory.

The licensee committed to request an amendment to the license within 60 days to clarify this requirement for a central inventory.

No items of non-compliance were identified.

9. Radioactive Waste and Effluents

The licensee maintains a complete record of monitoring air and water releases from the facility as part of the reactor operations. All waste water is contained in hold-up tanks that allow monitoring prior to release to the sanitary sewer. The liquids in the hold-up tanks come from the reactor license as well as the activities of this license. The inspector reviewed the 1993 water and air release data. All releases are limited by the reactor technical specifications. No broad scope licensed materials were released in excess of 10 CFR 20, Appendix B limits for air or water.

Solid waste is collected from the laboratories and delivered to the basement waste staging area prior to commingling with the reactor solid waste, compaction and preparation for shipping to a Low Level Repository. The licensee ships waste from the facility on a monthly schedule.

No solid waste is held in storage for decay at the present time. The licensee expressed concern that License Condition 19 limits the materials that can be held in storage for decay based on physical half-life. The license application requested that select isotopes be authorized for inclusion in the hold for decay program. This matter is being referred to the Materials Licensing Section of Region III for review.

No items of non-compliance were identified.

10. Exit Meeting

On January 28, 1994, the inspector held a meeting with licensee personnel and discussed the preliminary findings with those licensee personnel denoted in Section 1. During the exit meeting, the NRC representatives summarized the scope and findings of the inspection and characterized the overall inspection results. Region III management representative John A. Grobe was available during the exit meeting by telephone.