# U.S. NUCLEAR REGULATORY COMMISSION

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License No:	R-103
Report No:	50-186/98202
Licensee:	University of Missouri at Columbia
Facility Name:	University of Missouri at Columbia Research Reactor
Location:	Columbia, Missouri
Dates:	November 16-20, 1998
Inspectors:	T. M. Burdick
Approved by:	Seymour H. Weiss, Director Non-Power Reactor and Decommissioning Project Directorate

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#### Executive Summary

## University of Missouri at Columbia Research Reactor Report No. 50-186/98202 (DRPM)

This routine, announced inspection included aspects of radiation protection (83743); environmental monitoring (80745); transportation activities (86740); physical security (81421), material control and accountability (85102), inspector identified violation follow up (92702), and event report follow up (92700)

## Facility Summary

The facility has continued to operate during the past year in support of education, research, and isotope production. Staffing in operations and shipping have increased somewhat. A new organization structure and refocused priorities have been implemented to improve efficiency while promoting safety.

Year 2000 (Y2K) issues have been addressed by a committee of diverse individuals. No reactor safety systems are affected by Y2K.

#### Radiation Protection (83743)

 ALARA techniques should be emphasized with new employees more emphatically. (Section 1.0)

## Environmental Protection (80745)

 Airborne and liquid effluent releases were within the regulatory limits. Radioactive waste accumulations were properly stored. (Section 2.0)

## Transportation (86740)

New employee training oversight needs management involvement. (Section 3.0)

# Fixed Site Physical Protection of Special Nuclear Material of Moderate Strategic Significance (81421)

Physical Security was implemented according to the program. (Section 4.0)

#### Material Control and Accountability (85102)

Special Nuclear Materials were properly controlled and inventoried. (Section 5.0)

## Noncompliance Follow up Items (92702)

- One previous violation of posting requirements for radioactive material storage was corrected and is closed.
- One previous violation of 'i'echnical Specifications requirements for procedures has been corrected and is closed.
- One previous violation of the requalification exam administration requirements has been corrected and is closed. (Section 6.0)

# Event Follow up (97200)

- New materials to reduce nuclear instrument cable degradation was being evaluated.
- An undersized sample in the Flux Trap was a minor error and had no safety significance. (Section 7.0)

DETAILS

#### 1.0 Radiation Control

## a. Inspection Scope (83743)

The inspector reviewed the radiation protection program to determine compliance with requirements and license conditions.

#### b. Observations and Findings

The inspector accompanied a health physics technician during weekly radiation instrumentation checks. All procedures and actions appeared appropriate.

Ongoing work at the hot cell was observed to assess radiation safety practices. Staff were generally well aware of the hazards and implemented necessary precautions to minimize them. One health physics staff member was observed chewing gum during a brief visit to the laboratory basement where no eating, drinking, or smoking signs were prominently posted. Licensee management reminded workers to observe all posted requirements.

The inspector also observed shipping employees conducting contact radiation surveys of a package. Both individuals were trainees. The person observing the survey had been checked out on package surveys by a qualified shipper and was considered qualified to perform that task by his supervision. The person surveying the package was in direct contact with the package while reading the dose rate. The inspector questioned the management whether the two trainees were sensitive to ALARA. The supervisor conducted remedial training with the two trainees on package survey techniques to reduce dose.

Records were reviewed for personnel exposure, surveys and swipes, and instrument calibration. Shippers continued to receive the largest individual doses. No concerns were identified.

#### c. Conclusions

The radiation protection program was effective in protecting the staff and public. ALARA techniques need to be emphasized with new employees.

#### 2.0. Environmental Protection

## a. Inspection Scope (80745)

The inspector reviewed the licensee's program for the discharge or removal of radioactive liquid, gases, and solids from the reactor laboratory.

## b. Observations and Findings

The licensee had a large amount of low level solid waste stored in the lab basement. It was located in low traffic areas that were well posted to assure that workers are aware of the dose hazards. Airborne releases were monitored to ensure that dose to members of the public were well below the constraint requirements of 10 CFR Part 20.

#### c. Conclusions

Controls for airborne and liquid effluent releases and solid waste acceptably satisfied the regulatory limits.

## 3.0 Transportation of Radioactive Materials

## a. Inspection Scope (86740)

The inspector reviewed the licensee's radioactive materials shipping program for compliance with the requirements in Department of Transportation (DOT) and NRC regulations, 49 CFR Parts 170 through 177 and 10 CFR Part 71, respectively.

## Observations and Findings

Staffing has been increased to ensure workload productivity can be achieved without safety being compromised.

During hot cell preparation of samples by shipping and irradiation processing personnel the inspector observed that second verification was independently obtained in critical steps of the procedures. Tools used in Type B shipping were calibrated as required. New container gaskets and O-rings were controlled as required.

The BMI spent fuel cask arrived during the inspection and was observed while being transferred into the facility without any problems.

The inspector noted that the licensee has restructured the services organization. Some of the changes include closer supervisor control of shipping workload and a system of tracking errors, root causes, and corrective actions. If implemented properly the program could reduce repetitive errors significantly. The record of licensee identified errors was reviewed and seems to reflect better management oversight.

One area that may need licensee attention was the training program for new shipping personnel. The inspector noted that the trainees were solely responsible for keeping their own record of required performance activities. The trainees did not have a fully documented record of required performance. Supervision oversight of training may be necessary to ensure full completion and documentation of training requirements.

## c. Conclusions

Radioactive shipments were conducted in accordance with DOT regulations. Organization restructuring and better oversight of work may reduce shipping errors and promote better safety.

## 4.0 Fixed Site Physical Protection of Special Nuclear Material of Moderate Strategic Significance

a. Inspection Scope (81401/81421)

The inspector reviewed the licensee's physical protection program and system to minimize the potential for unauthorized removal of special nuclear material (SNM), and facilitate the location and recovery of missing SNM to assure that the licensee's physical protection program adequately implements the applicable provisions of 10 CFR Part 73.

## b. Findings and Observations

The licensee was in compliance with the requirements. Observed tests conducted to demonstrate the operation of the system were acceptable. Other program requirements were verified to be properly implemented by the inspector.

c. Conclusions

The licensee's program and system were functional as required.

## 5.0 Material Control and Accountability

a. Inspection Scope (85102)

The inspector reviewed the licensee's material control and accountability program to determine whether the licensee has limited possession and use of special nuclear material (SN:M) to the locations and purposes authorized under the license and to determine whether the licensee has implemented an adequate and effective program to account for and control the SNM in their possession.

b. Findings and Observations

The licensee's inventory was reviewed and partially verified. No concerns were identified.

c. Conclusions

The licensee was in cropliance of the possession and use limits and had effective control of licensed materials.

#### 6.0 Follow up on Inspector Identified Violations

a. Inspection Scope (92702)

The inspector reviewed previously identified violations and licensee corrective action within those areas.

Findings and Observations

(Closed) Violation 50-186/97201-01: posting radioactive materials storage areas. The inspector verified that the licensee has posted areas containing radioactive materials as required.

(Closed) Violation 50-186/97201-02: transportation procedures. The licensee revised all appropriate procedures that were used to conduct preparation and shipping of irradiated materials to ensure that appropriate independent or concurrent verifications were included.

(Closed) Violation 50-186/98201-01: requalification exams. The inspector verified that all licensed operators had been administered annual examinations by authorized personnel for 1997 and 1998.

#### c. Conclusions

The licensee took sufficient corrective actions to ensure that the violations will not be repeated.

## 7.0 Follow up on Reportable Events

## a. Inspection Scope (92700)

The inspector conducted onsite follow up of selected event reports to ensure the licensee has taken the corrective action as stated in the report and that responses to the events met requirements.

## b. Findings and Observations

Radiation induced degradation of nuclear instrument (NI) signal cable was the cause of repeated NI operability problems on June 15, 1998. The licensee took prompt immediate corrective action and has been evaluating a replacement cable material and additional shielding to minimize recurrence.

An undersized sample container in the flux trap sample holder permitted one inch of sample movement at power. The licensee discovered the error during routine loading of samples. A second occurrence like the first was also discovered by the licensee while reviewing the loading records from the previous week. Personnel error was the cause and the licensee reemphasized the requirements for ensuring samples are immobilized when in the reactor at power. The calculated reactivity affects were insignificant.

#### c. Conclusions

The licensee took prompt and acceptable corrective actions to identify and resolve their problems.

## 8.0 YEAR 2000 REVIEW

The licensee has assigned a committee to the task of reviewing computer upgrades for the year 2000. The reactor operations staff indicated that safety related functions have been evaluated and are not affected.

## 9.0 Exit Interview (30703)

The inspector presented the inspection results to members of licensee management at an exit meeting on November 20, 1998. The licensee acknowledged the findings presented. The inspector asked the licensee whether any material examined during the inspection should be considered proprietary. No proprietary information was identified.

## Persons Contacted

Edward Deutsch\* Charles McKibben\* Al Ketring\* Tony Shoone\* John Ernst\*

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Director Associate Director Associate Director Acting Reactor Mar. HP Manager

The inspector also contacted other supervisory, technical and administrative staff personnel.

\* Denotes those attending the exit meeting on November 20, 1998.

## Inspection Procedures Used

- IP 80745 Environmental Protection
- IP 83743 Health Physics
- IP 86740Inspection of Transportation ActivitiesIP 92700Licensee event follow upIP 92702Follow up on items of noncomplianceIP 81401Plans, Procedures, and Reviews

- IP 81810 Protection of Safeguards Information
- IP 85102 Material Control and Accounting
- IP 81421 Fixed Site Physical Protection of Special Nuclear Material of Moderate Strategic Significance

#### Items Opened and Closed

Opened

None

Closed

50-186/97201-01	posting radioactive materials storage areas
50-186/97201-02	Transportation Procedures
50-186/98201-01	Requalification operating examinations

# List of Documents Reviewed

Audits

Safety Analysis Report Safety Evaluation Report Reactor Operating License Technical Specifications Administrative Procedures Surveillance Procedures Shipping records and procedures Dosimetry Records Training Records Various Reports Security program SNM records

## List of Acronyms Used

s Low As Reasonably Achievable
ode of Federal Regulations
epartment of Transportation
ealth Physics
Research Reactor Facility
uclear Regulatory Commission
Iblic Document Room
chnical Specifications

INSPECTION FOLLOWUP SYSTEM (IFS) SPEED CLOSEOUT / UFDATE FORM

DOCKET NUMBERS		5	0	-	1	8	6	RE	RESPONSIBLE INDIVIDUAL: T. Burdick FACILITY: University of Missouri at Columbia						
AFFECTED UNITS (½/3)		ITEM TYPE*			ITEM REPORT				-	SE	Q. 0.	CLOSE/UPDATE REPORT NO.	INSPECTION ISSUE DATE	ITEM STATUS*	
1			V	1	0	9	7	2	0	1	0	1		12/ /98	С
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