

February 24, 2000

Dr. Edward A. Deutsch, Director
Research Reactor Center
University of Missouri - Columbia
Research Park
Columbia, Missouri 65211

SUBJECT: NRC INSPECTION REPORT NO. 50-186/2000-201

Dear Dr. Deutsch:

This refers to the inspection conducted on January 24 - 27, 2000, at your University of Missouri - Columbia Research Reactor facility. The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection.

Various aspects of your safety and security programs were inspected including selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress. Based on the results of the inspection, no significant safety issues were identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

Should you have any questions concerning this inspection, please contact us.

Sincerely,

/RA/

Ledyard B. Marsh, Chief
Events Assessment, Generic Communications
and Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No.: 50-186
License No.: R-103

Enclosure: NRC Inspection Report No. 50-186/2000-201

cc w/enclosure:
See next page

University of Missouri - Columbia
(INSPECTION REPORT)

Docket No. 50-186

cc:

Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No.: 50-186

License No.: R-103

Report No.: 50-186/2000-201

Licensee: Curators of the University of Missouri - Columbia

Facility: University of Missouri - Columbia Research Reactor

Location: Research Park
Columbia, Missouri

Dates: January 24-27, 2000

Inspector: Craig Bassett

Approved by: Ledyard B. Marsh, Chief
Events Assessment, Generic Communications,
and Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

This routine, announced inspection included onsite review of various aspects of the licensee's programs concerning operations, health physics, security, and transportation of radioactive material as they relate to the licensee's 10 Megawatt (Mw) Class 1 research reactor. The licensee's programs were directed toward the protection of public health and safety and were in compliance with NRC requirements. No safety concerns or violations of regulatory requirements were identified.

Changes, Organization, and Staffing

- The licensee's organization and staffing remain in compliance with the requirements specified in the Technical Specifications.

Review and Audit Functions

- Review and oversight functions required by the Technical Specifications were acceptably completed by the Reactor Advisory Committee.

Radiation Protection Program

- Surveys were completed as required by the Technical Specifications.
- Postings met regulatory requirements.
- Personnel dosimetry was being worn as required and recorded doses were within the licensee's procedural action levels and NRC's regulatory limits.
- Radiation monitoring equipment was being maintained and calibrated as required.
- The Radiation Protection and ALARA Programs satisfied regulatory requirements.
- The radiation protection training program was acceptable.

Effluent and Environmental Monitoring

- Effluent monitoring satisfied license and regulatory requirements and releases were within the specified regulatory and Technical Specifications limits.

Transportation of Radioactive Materials

- Radioactive material was shipped in accordance with the applicable regulations.

Safeguards and Security

- Security activities and systems satisfied Physical Protection Plan requirements.

Material Control and Accountability

- Special Nuclear Materials were acceptably controlled and inventoried.

REPORT DETAILS

Summary of Plant Status

The licensee's ten megawatt (10 MW) non-power reactor (NPR) continues to be operated in support of laboratory experiments, reactor operator training, and various types of research. During the inspection, the reactor was started-up and operated as required to support laboratory experiments and product irradiation.

1. **NPR Organization (Inspection Procedure [IP] 39745)**

a. Inspection Scope

To verify staffing, reporting, and record keeping requirements specified in the Technical Specifications (TSs) were being met, the inspector reviewed:

- organization and staffing for the facility,
- administrative controls,
- the reactor console logs, and
- the facility annual reports.

b. Observations and Findings

The organizational structure and staffing had not changed since the last inspection. The organizational structure and staffing at the facility and as reported in the Annual Report was as required by TS. Qualifications of the staff met TS requirements. Review of records verified that management responsibilities were administered as required by TSs and applicable procedures.

The inspector noted that annual reports summarized the required information and were issued at the frequency specified in the TS.

c. Conclusions

The organizational structure and functions were consistent with TS requirements.

2. **NPR Review and Audit Functions (IP 40745)**

a. Inspection Scope

In order to verify that the licensee had established and conducted reviews and audits as required in the TS, the inspector reviewed:

- Reactor Advisory Committee meeting minutes,
- Various subcommittee meeting minutes, and
- audits and reviews.

b. Observations and Findings

Minutes of the Reactor Advisory Committee (RAC) showed that the committee met at the required frequency and that a quorum was present. The topics considered during the meetings were appropriate and as stipulated in the TS. A subcommittee of the RAC and/or other designated persons conducted audits and reviews as required and the full RAC reviewed the results. Problems noted during audits were discussed and recommendations for improvement were made. The licensee implemented the improvements as necessary.

c. Conclusions

Review and oversight functions required by the TS were acceptably completed by the RAC.

3. Radiation Protection Program (83743)

a. Inspection Scope

The inspector reviewed the following to verify compliance with 10 CFR Part 20 and the applicable licensee TS requirements and procedures:

- radiation and contamination survey records,
- radiological signs and posting,
- dosimetry records (personnel and environmental),
- calibration and periodic check records for radiation monitoring instruments,
- the Radiation Protection Program,
- the ALARA Program,
- the Bioassay Program, and
- the Radiation Protection Training Program.

The inspector also toured the licensee's facility and observed the use of dosimetry and radiation monitoring equipment. Licensee personnel were interviewed as well.

b. Observations and Findings

(1) Surveys

Daily, weekly, and monthly contamination and radiation surveys were completed by health physics staff members as required by TS. Results were evaluated and corrective actions taken when readings or results exceeded set action levels.

(2) Postings and Notices

Copies of current notices to workers required by 10 CFR Part 19 were posted in appropriate areas in the facility. Copies of NRC Form-3 posted at the facility were the latest issue.

(3) Dosimetry

The licensee used a National Voluntary Laboratory Accreditation Program (NVLAP) accredited vendor to process personnel film badge/ thermoluminescent dosimetry. An examination of the records for the past two years through the date of the inspection showed that all exposures were within NRC limits. Dosimetry was readily available and acceptably used by facility personnel.

(4) Radiation Monitoring Equipment

Examination of selected radiation monitoring equipment demonstrated that the instruments had the acceptable up-to-date calibration sticker attached. The calibration of portable survey meters was typically completed by on-site or other university personnel. Calibration frequency met procedural requirements and records were maintained as required.

(5) Radiation Protection Program

The licensee's Radiation Protection Program was established and described in the University of Missouri Research Reactor (MURR) Policy and Procedures Manual and through the various Health Physics Procedures that had been reviewed and approved. The program contained instructions concerning audits, personnel responsibilities, and ALARA, and appeared to be acceptable.

The licensee did not routinely use respirators for radiological work and did not have a respiratory protection program. If it were to become necessary to use respiratory protective devices at the facility, the licensee was aware that they would need to establish an appropriate Respiratory Protection Program, that training would need to be conducted, that bioassays would need to be completed, that annual personnel physicals would need to be conducted, and that the equipment would need to be checked and maintained.

(6) ALARA Program

As noted above, the ALARA Program was outlined and established in the MURR Policy and Procedures Manual. The ALARA program provided guidance for keeping doses as low as reasonably achievable and was consistent with the guidance in 10 CFR Part 20.

(7) Facility Tours

The inspector toured the control room, selected support laboratories, and other areas with a licensee representative on various occasions. The inspector noted that the facility's radioactive material storage areas were properly posted. No unmarked radioactive material was noted. Radiation and High Radiation Areas were posted as required.

(8) Bioassays

The inspector inquired about the licensee's bioassay program at the facility. It was noted that the licensee does not currently have a bioassay program. If one is required to support operations in the future, the licensee is aware that an effective program will need to be developed and implemented.

(9) Radiation Protection Training

The inspector reviewed the training given to MURR staff members, those who are authorized to use the experimental facilities of the reactor, and visitors. The training program was acceptable. The inspector noted that the current staff members have received the required training.

c. Conclusions

Surveys were completed as required by TS. Postings met regulatory requirements. Personnel dosimetry was being worn as required and recorded doses were within the licensee's procedural action levels and the NRC's regulatory limits. Radiation monitoring equipment was being maintained and calibrated as required. The Radiation Protection Program and the ALARA Program satisfied regulatory requirements. The radiation protection training program was acceptable.

4. Effluent and Environmental Monitoring (80745)

a. Inspection Scope

The inspector reviewed the following to verify compliance with the requirements of 10 CFR Part 20 and the TS:

- the licensee's environmental monitoring program,
- annual effluent monitoring and environmental surveillance program reports, and
- counting and analysis records.

b. Observation and Findings

The inspector determined that gaseous releases continued to be monitored as required, were acceptably documented, and were well within the annual dose constraint of 10 CFR 20.1101 (d), 10 CFR Part 20 Appendix B concentrations, and TS limits. The liquid releases from the facility to the sanitary sewer were within the limits specified in 10 CFR Part 20, Appendix B, Table 3.

c. Conclusion

Effluent monitoring satisfied license and regulatory requirements and releases were within the specified regulatory and TS limits.

5. Transportation (86740)

a. Inspection Scope

The inspector interviewed licensee personnel and reviewed various records to verify compliance with regulatory and procedural requirements for transferring/shipping licensed material.

b. Observations and Findings

Through records reviews and discussions with licensee personnel, the inspector determined that the licensee had shipped solid waste and other types of radioactive material in accordance with the requirements specified in the regulations. The training of the staff members responsible for shipping the material met the minimum requirements specified in the regulations.

c. Conclusions

Radioactive material was shipped in accordance with the applicable regulations.

6. Physical Security (81401, 81402, 81432)

a. Inspection Scope

To verify compliance with the licensee's NRC-approved Physical Security Plan and to assure that changes, if any, to the plan had not reduced its overall effectiveness, the inspector reviewed:

- logs, records, and reports,
- security systems, equipment, and instruments, and
- implementation of the Physical Security Plan.

b. Observations and Findings

The Physical Security Plan (PSP) was the same as the latest revision approved by the NRC. The offsite support being provided by the campus police department was acceptable and police personnel understood their responsibilities. Physical protection systems (barriers and alarms), equipment, and instrumentation were as required by the PSP. The access controls implemented at the facility were as required. Implementing procedures and practices were consistent with the PSP. Acceptable security response and support in accordance with procedures and training were demonstrated through alarm response records.

c. Conclusions

Security activities and systems satisfied PSP requirements.

7. Material Control and Accounting (85102)

a. Inspection Scope

To verify compliance with 10 CFR Part 70, the inspector reviewed:

- nuclear material inventory and locations, and
- accountability records.

b. Observations and Findings

The material control and accountability program tracked locations and content of fuel and fission detectors under the research reactor license. The inventory of material was verified to be consistent with material accountability records. Possession and use of special nuclear material (SNM) was limited to the locations and purposes authorized under the license. The latest material control and accountability forms (DOE/NRC Forms 741 and 742) had been prepared and transmitted as required.

c. Conclusions

Special Nuclear Materials were acceptably controlled and inventoried.

8. Exit Interview

The inspection scope and results were summarized on January 27, 2000, with members of licensee management and staff. The inspector described the areas inspected and discussed in detail the inspection findings.

No dissenting comments were received from the licensee. The PSP was identified as safeguards information.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Anderson, Senior Reactor Operator
C. Burkey, Senior Research Laboratory Technician
M. Carter-Tritschler, Senior Reactor Services Project Specialist
E. Deutsch, Director, MURR
R. Dobey, Health Physicist Assistant Manager
J. Ernst, Health Physicist Manager
L. Foyto, Senior Reactor Operator
K. Kutikkad, Reactor Physicist
W. Meyer, Associate Director, Reactor Income Generating Operations
C. McKibben, Interim Reactor Manager & Re-Licensing Leader
N. Pearson, Senior Research Laboratory Technician
T. Seeger, Chief Research Electrical Technician
A. Shipp, Health Physicist

Other Personnel

D. Cowan, Chair, Reactor Advisory Committee
J. Watring, Associate Director of University Police
D. Kamp, Dispatcher, University Police

INSPECTION PROCEDURES USED

IP 39745: Class 1 Non-Power Reactors Organization, Operations, and Maintenance Activities
IP 40745: Class 1 Non-Power Reactors Review and Audit and Design Change Functions
IP 80745: Class 1 Non-Power Reactor Environmental Protection
IP 83743: Class 1 Non-Power Reactor Health Physics
IP 81401: Plans, Procedures, and Reviews
IP 81402: Reports of Safeguards Events
IP 81432: Fixed Site Physical Protection of Special Nuclear Material of Moderate Strategic Significance
IP 85102: Material Control and Accounting - Reactors
IP 86740: Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

LIST OF ACRONYMS USED

ALARA	As low as reasonably achievable
CFR	Code of Federal Regulations
HP	Health physics
IP	Inspection Procedure
MURR	University of Missouri Research Reactor
Mw	Megawatt
NPR	Non-Power Reactor
NRC	Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
PDR	Public Document Room
RAC	Reactor Advisory Committee
SNM	Special Nuclear Material
TS	Technical Specification