50-186

From: Alexander Adams
To: Daniel, Timothy
Date: 11/28/01 4:44PM
Subject: RE: NRC contacts for State of Missouri research reactors

Mr. Daniel:

The reactor in Columbia has an NRC-approved security plan that meets the requirements for security for this type of reactor and its special nuclear material. The NRC inspection program looks at the licensee's compliance with the security plan and the regulations. The inspection program has shown that the licensee's performance in this area is acceptable. An inspector is on site at MURR this week. I have attached the last inspection report that reviewed security. Because most aspects of security at this facility are safeguards information, the inspection report discusses the inspection results in general terms. If you have any additional questions, please let me know.

Al Adams

>>> "Daniel, Timothy 11/28/01 03:33PM >>>
Mr. Adams:

Thank you.

I have one question. Does this reactor operation in Columbia have a sustain rate of performance for physical security that is in accordance with NRC rules? Are they doing a good job at security? Is there anything important that you can share with me?

Tim Daniel
Special Advisor
Office of Homeland Security
State of Missouri

Please docket

50-186

Thanks

A020

August 1, 2001

Mr. Ralph Butler, Interim Director
Research Reactor Center
University of Missouri - Columbia
Research Park
Columbia, MO 65211

SUBJECT: NRC INSPECTION REPORT NO. 50-186/2001-202

Dear Mr. Butler:

This letter refers to the inspection conducted on July 9 - 12, 2001, at your University of Missouri - Columbia Research Reactor (MURR) 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 available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) http://www.nrc.gov/NRC/ADAMS/index.html.

Should you have any questions concerning this inspection, please contact Craig Bassett at 404-562-4712.

Sincerely,

/RA John R. Tappert Acting For/

Ledyard B. Marsh, Chief
Operational Experience and
Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

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

Enclosures: NRC Inspection Report No. 50-186/2001-202

cc w/enclosure: Please see next page

University of Missouri - Columbia
(INSPECTION REPORT)

Docket No. 50-186

cc:

University of Missouri
Associate Director
Research Reactor Facility
Columbia, MO 65201

A-95 Coordinator
Division of Planning
Office of Administration
P.O. Box 809, State Capitol Building
Jefferson City, MO 65101

Mr. Ron Kucera, Director
Intergovernmental Cooperation
and Special Projects
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

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

August 1, 2001

Mr. Ralph Butler, Interim Director
Research Reactor Center
University of Missouri - Columbia
Research Park
Columbia, MO 65211

SUBJECT: NRC INSPECTION REPORT NO. 50-186/2001-202

Dear Mr. Butler:

This letter refers to the inspection conducted on July 9 - 12, 2001, at your University of Missouri - Columbia Research Reactor (MURR) 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 available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) http://www.nrc.gov/NRC/ADAMS/index.html.

Should you have any questions concerning this inspection, please contact Craig Bassett at 404-562-4712.

Sincerely,

/RA John R. Tappert Acting For/
Ledyard B. Marsh, Chief
Operational Experience and
Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

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

Enclosures: NRC Inspection Report No. 50-186/2001-202
cc w/enclosure: Please see next page

Distribution w/encl:

PUBLIC	REXB r/f	AAdams	CBassett
PDoyle	TDragoun	WEresian	FGillespie
SHolmes	EHylton	PIsaac	LMarsh
DMatthews	MMendonca	EDO (O16-E15)	
BDavis (Cover letter only) (O5-A4)		SWong (Only for IRs with NOVs, O10-H14)	

ACCESSION NO.: ML012000562 TEMPLATE #: NRR-056

***Please see previous concurrence**

OFFICE	REXB:RI	REXB:PM	REXB:LA	REXB:BC
NAME	CBassett:rdr	AAdams	EHylton	LMarsh
DATE	*07/ 19 /2001	07/ 30 /2001	*07/ 20 /2001	08/ 01 /2001

C = COVER E = COVER & ENCLOSURE N = NO COPY

OFFICIAL RECORD COPY

6 6

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

Docket No.:	50-186
License No.:	R-103
Report No.:	50-186/2001-202
Licensee:	Curators of the University of Missouri - Columbia
Facility:	University of Missouri - Columbia Research Reactor (MURR)
Location:	Research Park Columbia, Missouri
Dates:	July 9-12, 2001
Inspector:	Craig Bassett

Approved by: Ledyard B. Marsh, Chief
Operational Experience 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 non-power research reactor. The licensee's programs were directed toward the protection of public health and safety and were generally 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 and applicable procedures.
- Postings met regulatory requirements.
- Personnel dosimetry was being worn as required and recorded doses were within the 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 isotope production, gemstone irradiation, 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

a. Inspection Scope (Inspection Procedure [IP] 39745)

To verify that the staffing and organizational structure requirements specified in the Technical Specifications (TS) were being met, the inspector reviewed:

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

b. Observations and Findings

The organizational structure and staffing had not changed since the last inspection. The organization and staffing at the facility, required for reactor operation, were as specified in the TS. Qualifications of the staff met TS requirements. Review of records verified that management responsibilities were discharged as required by TS and applicable procedures.

c. Conclusions

The organizational structure and staffing were consistent with Technical Specification requirements.

2. NPR Review and Audit Functions

a. Inspection Scope (IP 40745)

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
- Selected Subcommittee meeting minutes
- 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 improvements were made. The licensee took action to implement the improvements as necessary.

c. Conclusions

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

3. Radiation Protection Program

a. Inspection Scope (IP 83743)

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
- Radiation Protection Program
- ALARA Program
- Bioassay Program
- Radiation Protection Training Program

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

b. Observations and Findings

(1) Surveys

Contamination and radiation surveys, required by procedure for isotope production/preparation, were completed by health physics (HP) staff members as required. Continuous coverage was provided by the HP staff and the results of the surveys were evaluated and reviewed. No action levels were exceeded during the operation observed by the inspector.

(2) Postings and Notices

Copies of current notices to workers were posted in appropriate areas in the

facility as required by 10 CFR Part 19. The 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 badges and/or 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 and instrument calibration records indicated that the instruments had the acceptable up-to-date calibration sticker attached. The calibration of portable survey meters was typically completed by licensee 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 HP Procedures that had been reviewed and approved. The program contained instructions concerning audits, personnel responsibilities, and maintaining doses 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.

(6) ALARA Program

The ALARA Program was also 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) 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.

(8) 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.

(9) Facility Tours

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

(10) High Radiation Area Event

While reviewing documentation related to the storage of radioactive material, the inspector noted an Event Review Team Report, Report Number (No.) ERT 00-03, regarding Barrel Storage in the Reactor Basement. The report recounted an event that occurred on Friday, December 15, 2000, when Reactor Operations personnel moved two barrels from the waste tank hallway (a locked High Radiation Area (HRA)) into another area of the basement level, the can melting room, which was not an HRA. The barrels, which were then accessible to individuals, had radiation levels in excess of one hundred millirem per hour (100 mr/hr) as measured at a distance of 30 centimeters from the surface of the barrel. At the end of reactor operations activities, the barrels were not moved back behind the locked gate which secured the HRA in the waste tank hallway. This created an HRA in the can melting room with no controls for entry. The following Monday, the problem was identified by other licensee personnel and the barrels were placed back into a locked HRA.

Upon review of this event, the licensee determined that the primary factor contributing to the problem was that there is no designated area in the basement for storing barrels with radiation levels in excess of 100 mr/hr at 30 centimeters. Also, because there are various barrels in the basement, no one noticed that these high radiation barrels were out of place. The root cause of the event was determined to be a lack of necessary communication between Reactor Operations personnel during shift turnover regarding these high radiation or "hot" barrels. Also, the barrels were not adequately marked as to their content and radiation levels. As corrective actions, the locations of "hot" barrels are now identified on the status board in the Control Room. A specific locked area for the storage of such barrels has yet to be designated but one location has been identified as a good candidate for such storage. The licensee was informed that this issue would be identified as a Non-Cited Violation (NCV) because the problem was licensee-identified and corrective actions have been taken (NCV 50-186/2001-202-01).

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. One NCV was identified.

4. Effluent and Environmental Monitoring

a. Inspection Scope (IP 80745)

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
- 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), Appendix B concentrations, and TS limits. The liquid releases from the facility to the sanitary sewer were within the limits specified in 10 CFR 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

a. Inspection Scope (IP 86740)

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

b. Observations and Findings

Through records reviews and discussions with licensee personnel, the inspector determined that the licensee had shipped solid waste, spent fuel, 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 requirements specified in the regulations.

c. Conclusions

Radioactive material was shipped in accordance with the applicable regulations.

6. Physical Security

a. Inspection Scope (IP 81401, 81402, 81432)

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
- 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. 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 Physical Security Plan requirements.

7. Material Control and Accounting

a. Inspection Scope (IP 85102)

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

- nuclear material inventory and locations
- 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 and within the time period specified.

c. Conclusions

Special Nuclear Materials were acceptably controlled and inventoried.

8. Exit Interview

The inspection scope and results were summarized on July 12, 2001, 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. Although safeguards information was reviewed during the inspection, no such material is included in this report.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Allen, Procedure Upgrade Manager
M. Ballew, Health Physics Technician
R. Butler, Chief Operating Officer, MURR
M. Carter-Tritschler, Senior Research Services Project Specialist
A. Coria, Training Coordinator
C. Cutler, Senior Research Scientist
E. Deutsch, Director, MURR
R. Dobey, Health Physics Assistant Manager
J. Ernst, Health Physics Manager
L. Foyto, Assistant Reactor Manager, Engineering
P. Hobbs, Reactor Manager
S. Keithley, Hazardous Waste Coordinator
K. Kutikkad, Assistant Reactor Manager, Physics
J. Lydon, Senior Research Chemist
C. McKibben, Senior Advisor and Associate Director for License Renewal
J. Quichocho, Health Physics Technician
A. Shipp, Health Physicist

Other Personnel

G. Ehrhardt, Chair, Isotope Use Subcommittee
W. Volkert, Chair, Reactor Advisory Committee

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

50-186/2001-202-01 NCV High radiation area caused by barrels reading greater than 100 mr/hr at 30 centimeters not being controlled within a fenced, locked, and posted area.

Closed

50-186/2001-202-01 NCV High radiation area caused by barrels reading greater than 100 mr/hr at 30 centimeters not being controlled within a fenced, locked, and posted area.

LIST OF ACRONYMS USED

ADAMS	(NRC's) Agencywide Documents Access and Management System
ALARA	As low as reasonably achievable
CFR	Code of Federal Regulations
HP	Health physics
HRA	High Radiation Area
IP	Inspection Procedure
mr/hr	Millirem per hour
MURR	University of Missouri Research Reactor
Mw	Megawatt
NCV	Non-Cited Violation
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