

April 29, 2002

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

SUBJECT: NRC INSPECTION REPORT NO. 50-186/2002-201

Dear Mr. Butler:

This letter refers to the inspection conducted on April 15-18, 2002, 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 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/*

Patrick M. Madden, Section Chief  
Research and Test Reactors Section  
Operating Reactor Improvements Program  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

Docket No.: 50-186

License No.: R-103

Enclosures: NRC Inspection Report No. 50-186/2002-201

cc w/enclosure: Please see next page

University of Missouri-Columbia

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

Mr. Tim Daniel  
Homeland Security  
Suite 760  
P.O. Box 809  
Jefferson City, MO 65102

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

April 29, 2002

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

SUBJECT: NRC INSPECTION REPORT NO. 50-186/2002-201

Dear Mr. Butler:

This letter refers to the inspection conducted on April 15-18, 2002, 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 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/**

Patrick M. Madden, Section Chief  
Research and Test Reactors Section  
Operating Reactor Improvements  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

Docket No.: 50-186

License No.: R-103

Enclosure: NRC Inspection Report No. 50-186/2002-201

cc w/enclosure:

See next page

**DISTRIBUTION:**

PUBLIC	RORP r/f	AAdams	CBassett
PDoyle	TDragoun	WEresian	FGillespie
SHolmes	EHylton	Plsaac	MMendonca
WBeckner	PMadden	EDO (O16-E15)	
BDavis (Cover letter only) - BLD		NRR enforcement coordinator (Only for IRs with NOV's, O10-H14)	

ACCESSION NO.: ML021130623

TEMPLATE #: NRR-106

\*Please see previous concurrence

OFFICE	RORP:RI		RORP:LA		RORP:SC	
NAME	CBassett:rd		*EHylton:rd		PMadden	
DATE	04/ 29 /2002		04/ 29 /2002		04/ 29 /2002	

C = COVER

E = COVER & ENCLOSURE

N = NO COPY

OFFICIAL RECORD COPY

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

Docket No.: 50-186

License No.: R-103

Report No.: 50-186/2002-201

Licensee: Curators of the University of Missouri - Columbia

Facility: University of Missouri - Columbia Research Reactor

Location: Research Park  
Columbia, Missouri

Dates: April 15-18, 2002

Inspector: Craig Bassett

Approved by: Patrick M. Madden, Section Chief  
Research and Test Reactors Section  
Operating Reactor Improvements Program  
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 radiation protection, security, material control and accountability, and transportation of radioactive material as they relate to the licensee's 10 Megawatt, Class I Research Reactor. The licensee's programs were directed toward the protection of public and facility worker health and safety and were in compliance with NRC requirements. No safety concerns or violations of regulatory requirements were identified.

### 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.
- Annual reviews of the Radiation Protection Program were being completed by the licensee as required by 10 CFR Part 20.

### Procedures

- Licensee Health Physics procedures and changes thereto were being reviewed and approved by the Procedure Review Committee and the Reactor Advisory Committee, as required.

### Radiation Protection Program

- Surveys were completed as outlined in the Annual Report.
- Postings met regulatory requirements.
- Personnel dosimetry was being worn as required and recorded doses were within the NRC's regulatory limits.
- Radiation survey and monitoring equipment was being maintained and calibrated as required.
- The Radiation Protection and ALARA Programs satisfied regulatory requirements.
- Radiation protection training was generally 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 University of Missouri - Columbia Research Reactor (MURR) 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 to support laboratory experiments and product irradiation.

### **1. Organization and Staffing**

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

To verify that the staffing and organizational structure requirements were being met as specified in the Technical Specifications (TS), Section 6.1, Amendment No. 32, dated October 19, 2001, the inspector reviewed:

- organization structure
- administrative controls and management responsibilities
- staffing requirements for safe operation of the facility

#### b. Observations and Findings

The organizational structure had not changed since the last inspection in the area of radiation protection (refer to NRC Inspection Report No. 50-186/2001-202). The inspector noted that the position of MURR Facility Director had not been filled since the former Director left last year. In the interim, the Chief Operating Officer is filling the position of Director. Also, the person who had held the position of Assistant Manager, Health Physics, had been promoted to the position of Manager, Health Physics. In addition, a position of Health Physics Technician II was open because the person occupying that position had been promoted to the position of Manager, Radioactive Materials Shipping. The licensee was in the process of submitting the proper justification to the university to post and fill the position.

Nevertheless, 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. 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 for the past year to date
- Selected Subcommittee meeting minutes for the past year to date
- Selected audits and reviews completed by various management and Health Physics (HP) personnel

b. Observations and Findings

The inspector reviewed the meeting minutes of the Reactor Advisory Committee (RAC) and the minutes of the Reactor Safety Subcommittee from March 2001 to the present. The meeting minutes indicated 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 or other designated persons, including HP personnel, conducted audits and reviews as required and the full RAC reviewed the results. Problems noted during the audits and reviews were reviewed and recommendations for improvement were made. The licensee took action to implement the improvements as necessary.

The inspector also verified that the licensee had completed annual reviews of the Radiation Protection Program as required by 10 CFR Part 20. All aspects of the program had been reviewed and areas were noted where improvements could be made. Commitments and/or improvements from the review completed the previous year were reviewed as well. The reviews were acceptable.

c. Conclusions

Review and oversight functions required by the TS were acceptably completed by the RAC. Annual reviews of the Radiation Protection Program were being completed by the licensee as required by 10 CFR Part 20.

### 3. **Procedures**

a. Inspection Scope (IP 42745)

To determine whether facility radiation protection procedures met TS Section 6.1 requirements, the inspector reviewed selected aspects of the following:

- Procedure Writer's Guide, Revision (Rev.) 3, dated April 9, 2002
- Administrative Procedure - Document Control AP-DC-100, "Procedure and Form Revisions," Rev. 0, dated April 23, 2002
- Administrative Procedure - Document Control AP-DC-102, "Document Control," Rev. 0, dated April 23, 2002
- Administrative Procedure - Health Physics, AP-HP-105, "Radiation Work Permit," Rev. 0, dated October 4, 2001

- AP-HP-117, "MURR Indoctrination Training Program," Rev. 0, dated January 10, 2002
- Instrument Calibration - Health Physics, IC-HP-300, "Calibration - Radiation Survey Instruments," Rev. 0, dated February 25, 2002
- IC-HP-310, "Calibration - Eberline Model PING 1A Stack Monitor - Particulate Channel," Rev. 0, dated January 7, 2002
- IC-HP-311, "Calibration - Eberline Model PING 1A Stack Monitor - Iodine Channel," Rev. 0, dated January 7, 2002
- IC-HP-312, "Calibration - Eberline Model PING 1A Stack Monitor - Gas Channel," Rev. 0, dated January 7, 2002
- Operating Procedure - Health Physics, OP-HP-221, "Environmental Sample - Analysis," Rev. 0, dated February 25, 2002
- OP-HP-353, "Waste Tank Sample - Analysis," Rev. 0, dated February 25, 2002
- Reactor Procedure - Health Physics, RP-HP-100, "Contamination Monitoring - Performing a Swipe," Rev. 0, dated December 18, 2001
- Surveillance Procedure -Health Physics, SV-HP-110, "Environmental Sampling," Rev. 0, dated January 24, 2002
- Shipping Procedure - Health Physics, SP-HP-001, "Radioactive Materials Shipping," Rev. 0, dated November 9, 2001
- SP-HP-004, "Packaging Shipment of Type A, Non-Waste Radioactive Material," Rev. 0, dated August 17, 2001

b. Observations and Findings

Following operational problems in April and June 2000, various issues were identified during subsequent inspections by the NRC and during independent assessments conducted by a TRTR peer group and by licensee contractor personnel. The facility Chief Operation Officer initiated a Performance Enhancement Plan (PEP) to resolve the issues outlined in NRC Inspection Reports No. 50-186/2000-202 and No. 50-186/2000-203, as well as in the assessment reviews issued by the other groups. One of these issues dealt with revising and upgrading facility procedures. During this inspection, the inspector reviewed the progress that had been made concerning completion of the corrective actions specified in the PEP with respect to upgrading and revising Radiation Protection or HP procedures.

The inspector noted during this inspection that progress has been made in this area. The majority of the HP procedures have been upgraded and some new procedures have been developed as a result of the licensee's efforts. The procedures reviewed by the inspector have been reviewed and approved by the Procedures Review Committee. Subsequent to the Procedure Review Committee actions, the RAC reviews and approves the procedures as required. The inspector found the procedures to be acceptable. It was also noted that the procedures were being reviewed annually as required by TS 6.1.b.

c. Conclusions

Health Physics procedures developed to date and revisions of the existing procedures are acceptable and have been reviewed and approved by the Procedure Review Committee and the RAC as required.

#### 4. 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:

- selected radiation and contamination survey records for the past year
- radiological signs and posting in various laboratories and in the Beam Port Floor area
- MURR dosimetry records for 2001 through February of 2002
- calibration and periodic check records for selected radiation survey and monitoring instruments
- Radiation Work Permits documented on Form FM-17, Rev. 0, dated October 5, 2001
- radiation protection training program records
- MURR Radiation Protection Program Manual dated July 8, 1997
- AP-HP-105, "Radiation Work Permit," Rev. 0, dated October 4, 2001
- AP-HP-117, "MURR Indoctrination Training Program," Rev. 0, dated January 10, 2002
- IC-HP-300, "Calibration - Radiation Survey Instruments," Rev. 0, dated February 25, 2002
- IC-HP-310, "Calibration - Eberline Model PING 1A Stack Monitor - Particulate Channel," Rev. 0, dated January 7, 2002
- IC-HP-311, "Calibration - Eberline Model PING 1A Stack Monitor - Iodine Channel," Rev. 0, dated January 7, 2002
- IC-HP-312, "Calibration - Eberline Model PING 1A Stack Monitor - Gas Channel," Rev. 0, dated January 7, 2002
- RP-HP-100, "Contamination Monitoring - Performing a Swipe," Rev. 0, dated December 18, 2001
- MURR Center Security, Emergency, and Health Physics Indoctrination Booklet last updated 2001

The inspector also toured the licensee's facility, conducted a radiation survey in various areas of the Beam Port Floor, and witnessed the use of dosimetry and radiation monitoring equipment. Licensee personnel were interviewed as well.

##### b. Observations and Findings

###### (1) Surveys

Daily and monthly contamination and radiation surveys, outlined in the licensee's Reactor Operations Annual Report for CY2001, were completed by HP staff members as required. Any contamination detected in concentrations above established action levels were noted and the area(s) was decontaminated. Results of the surveys were documented and posted at the entrances of the various areas surveyed so that facility workers would be knowledgeable of the radiological conditions that exist there.

During the inspection the inspector conducted a radiation survey of selected areas throughout the Beam Port Floor area. The radiation levels noted coincided with those listed on survey maps of the area and no anomalies were noted.

(2) Postings and Notices

Copies of current notices to workers were posted in appropriate areas in the facility. Radiological signs and survey maps were typically posted at the entrances to controlled areas. Other postings also showed the industrial hygiene hazards that were present in the areas as well. The copies of NRC Form-3 noted at the facility were the latest issue and were posted in such areas as on the main bulletin board, in main hallways, and at the entrance to the Beam Port Floor area, as required by 10 CFR Part 19.

(3) Dosimetry

The inspector determined that the licensee uses optically stimulated luminescence dosimetry for whole body monitoring and thermoluminescence dosimeters (finger rings) for extremity monitoring. The dosimetry is supplied and processed by a National Voluntary Laboratory Accreditation Program accredited vendor. Dosimetry was readily available and acceptably used by facility personnel.

The inspector examined the personnel exposure records for the past year through the date of the inspection. The records showed that approximately half of the facility personnel received exposures of only a few millirem above background. However, certain groups of individuals, such as reactor operators, HP personnel, and those involved with shipping radioactive material, typically received from 500 to 1650 millirem annually. Although the doses received are below the NRC limits, the licensee was informed that this is an area for improvement. The issue of management and staff being more ALARA-conscious and developing ways to reduce personnel doses will be an Inspector Follow-up Item (IFI) and will be reviewed during subsequent inspections (IFI 50-186/2002-201-01).

(4) Radiation Monitoring Equipment

Examination of selected radiation monitoring equipment indicated that the instruments had the acceptable up-to-date calibration sticker attached. The instrument calibration records indicated calibration of portable survey meters was typically completed by licensee or other university personnel. However, some instruments were shipped to vendors for calibration. Calibration frequency met procedural requirements and records were maintained as required. Area Radiation Monitors and stack monitors were also being calibrated as required. These monitors were typically calibrated by licensee personnel from the Technical Support Services and the HP groups.

(5) Radiation Protection Program

The licensee's radiation protection program was established and described in the MURR Radiation Protection Program Manual dated July 8, 1997, 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.

(6) ALARA Program

As inferred above, the ALARA Program was also outlined and established in the MURR Radiation Protection Program 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. As noted above, an Inspector Follow-up Item will be opened to review the licensee's adherence to and application of the ALARA program.

(7) Radiation Work Permit Program

The inspector reviewed the Radiation Work Permits (RWPs) that had been written and used during the year to date as stipulated in AP-HP-105. It was noted that the controls specified in the RWPs were acceptable and applicable for the work being done. The RWPs had been initiated, reviewed, approved, and eventually terminated as required.

(8) Radiation Protection Training

The inspector reviewed the training given to MURR staff members, those who are not on staff but who are authorized to use the experimental facilities of the reactor, and visitors. The training program was acceptable. However, the inspector noted that the annual refresher training, typically given to current staff members every fall (usually in September), had not been completed for 2001. The licensee indicated that the refresher training, generally referred to as Rad Worker training, had been postponed because other high priority training had been conducted during that period. The other training included an emphasis on Safety Conscious Work Environment training that had been provided for everyone on staff. The issue of annual Rad Worker refresher training for facility personnel was identified as an Inspector Follow-up Item and will be reviewed by the NRC during subsequent inspections (IFI 50-186/2002-201-02).

(9) Facility Tours

The inspector toured the Beam Port Floor area, 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.





c. Conclusions

The inspector determined that, because: 1) surveys were completed and documented acceptably to permit evaluation of the radiation hazards present; 2) postings met regulatory requirements; 3) personnel dosimetry was being worn as required and recorded doses were within the NRC's regulatory limits; 4) radiation survey and monitoring equipment was being maintained and calibrated as required; and 5) the radiation protection training program was acceptable, the Radiation Protection Program and the ALARA Program, as implemented by the licensee, satisfied regulatory requirements. However, areas for improvement were noted.

**5. 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 Section 3.7:

- the environmental monitoring program outlined through various procedures
- annual effluent monitoring and environmental surveillance program reports
- counting and analysis records contained in the HP Computer Folder "Environmental Reports"
- IC-HP-310, "Calibration - Eberline Model PING 1A Stack Monitor - Particulate Channel," Rev. 0, dated January 7, 2002
- IC-HP-311, "Calibration - Eberline Model PING 1A Stack Monitor - Iodine Channel," Rev. 0, dated January 7, 2002
- IC-HP-312, "Calibration - Eberline Model PING 1A Stack Monitor - Gas Channel," Rev. 0, dated January 7, 2002
- OP-HP-221, "Environmental Sample - Analysis," Rev. 0, dated February 25, 2002
- OP-HP-353, "Waste Tank Sample - Analysis," Rev. 0, dated February 25, 2002
- SV-HP-110, "Environmental Sampling," Rev. 0, dated January 24, 2002

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 Section 3.7 limits. The liquid releases from the facility to the sanitary sewer were within the limits specified in 10 CFR 20, Appendix B, Table 3. The above results were acceptably reported in the Reactor Operations Annual Report for CY 2001.

c. Conclusion

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

## 6. Transportation

### a. Inspection Scope (IP 86740)

To verify compliance with regulatory and procedural requirements for transferring/shipping licensed radioactive material, the inspector reviewed the following:

- selected records of various types of radioactive material shipments
- training records of staff members responsible for shipping licensed radioactive material
- SP-HP-001, "Radioactive Materials Shipping," Rev. 0, dated November 9, 2001
- SP-HP-004, "Packaging Shipment of Type A, Non-Waste Radioactive Material," Rev. 0, dated August 17, 2001

The inspector interviewed licensee personnel involved with shipping as well.

### b. Observations and Findings

Through records review and discussions with licensee personnel, the inspector determined that the licensee had shipped spent fuel and other types of radioactive material since the previous inspection in this area. The records indicated that the radioisotope types and quantities were calculated and dose rates measured as required. All radioactive material shipment records reviewed by the inspector had been completed in accordance with Department of Transportation and NRC requirements specified in the regulations. The training of the staff members responsible for shipping the material met the requirements specified in the regulations as well.

### c. Conclusions

Radioactive material was shipped in accordance with the applicable regulations.

## 7. Physical Security

### a. Inspection Scope (IP 81401, 81402, 81421)

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:

- security logs, records, and reports
- security systems and equipment checks
- MURR Directive, MD-001, "Access Authorization," dated November 20, 2000
- AP-RR-010, "Facility Access Criteria," Rev. 2, dated November 15, 2001
- AP-RR-011, "Facility Access Process," Rev. 3, dated May 31, 2001

- selected records of personnel granted unescorted access to the facility by management as documented on FM-02, MURR Access Request Form, Rev. 4, dated July 31, 2001
- selected records of personnel granted access to the reactor containment by management as documented on FM-22, Containment Combination Request Form, Rev. 1, dated July 31, 2001
- MURR Center Security, Emergency, and Health Physics Indoctrination Booklet last updated 2001

b. Observations and Findings

The Physical Security Plan (PSP) was the same as the latest revision approved by the NRC entitled "Physical Security Plan for University of Missouri Research Reactor Facility," Rev. 14, dated May 7, 1997. Special Nuclear Material (SNM) was stored and used as required by the PSP. Physical protection systems (barriers and alarms), equipment, and instrumentation were as required by the PSP and were being tested as required. The access controls implemented at the facility were as required. Implementing procedures and practices were consistent with the PSP.

The inspector visited the campus police department and reviewed their response procedures. Acceptable security response and support in accordance with procedures and training were demonstrated through interviews and alarm response records. The offsite support being provided by the campus police department was acceptable.

c. Conclusions

Security activities and systems satisfied Physical Security Plan requirements.

## 8. **Material Control and Accounting**

a. Inspection Scope (IP 85102)

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

- nuclear material storage locations
- Special Nuclear Material (SNM) monthly and semi-annual inventory results
- accountability records (DOE/NRC Forms 741 and 742) for the past year

b. Observations and Findings

The material control and accountability program tracked locations and content of unirradiated fuel elements, in-core flux probes, fission counters, neutron detectors, fuel plates, fuel pellets, fission plates, Plutonium filters, Uranium phase shifters, fuel solution vials, UO<sub>2</sub> foils, Nucleopore punchings, Nucleopore plates, and fission chambers and detectors possessed by the licensee. The inventory of material was verified to be consistent with material accountability records. Possession and use of SNM were 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 Material was acceptably controlled and inventoried.

**9. Exit Interview**

The inspection scope and results were summarized on April 18, 2002, 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 proprietary and/or safeguards information was reviewed during the inspection, no such material is included in this report.

## PARTIAL LIST OF PERSONS CONTACTED

### Licensee

P. Altman, Senior Research Laboratory Technician and Team Leader, MURR Improvement Team  
R. Butler, Chief Operation Officer and Interim Director of MURR  
M. Carter-Tritschler, Senior Research Services Project Specialist  
A. Coria, Training Coordinator  
M. Dixon, Assistant Reactor Manager, Operations  
R. Dobey, Manager, Health Physics  
J. Ernst, Associate Director, Regulatory Assurance Group  
L. Foyto, Assistant Reactor Manager, Engineering  
J. Hemphill, Health Physics Technician  
P. Hobbs, Reactor Manager  
K. Kutikkad, Assistant Reactor Manager, Physics  
J. Lanigan, CAP Coordinator  
C. McKibben, Senior Advisor and Associate Director for License Renewal  
W. Meyer, Associate Director, Product and Service Operations  
J. Quichocho, Health Physics Technician  
A. Shipp, Health Physicist  
M. Wallis, Lead Senior Reactor Operator

### Other Personnel

W. Miller, Chair, Reactor Safety Subcommittee  
D. Schwandt, Associate Director, University of Missouri Police  
J. Watring, Associate Director, University of Missouri Police

## INSPECTION PROCEDURES USED

IP 39745: Class 1 Research Reactors Organization, Operations, and Maintenance Activities  
IP 42745: Class 1 Research Reactors Procedures  
IP 40745: Class 1 Research Reactors Review and Audit and Design Change Functions  
IP 80745: Class 1 Research Reactor Environmental Protection  
IP 83743: Class 1 Research Reactor Health Physics  
IP 81401: Plans, Procedures, and Reviews  
IP 81402: Reports of Safeguards Events  
IP 81421: 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

50-186/2002-201-01	IFI	Follow-up on the issue of licensee management and staff personnel being more ALARA-conscious and developing ways to reduce personnel exposure.
50-186/2002-201-02	IFI	Follow-up on the issue of annual Rad Worker refresher training being provided for facility personnel.

### Closed

None

## LIST OF ACRONYMS USED

ADAMS	(NRC's) Agencywide Documents Access and Management System
ALARA	As low as reasonably achievable
CAP	Corrective Action Program
CFR	Code of Federal Regulations
HP	Health physics
IFI	Inspector Follow-up Item
IP	Inspection Procedure
MURR	University of Missouri - Columbia Research Reactor
NRC	Nuclear Regulatory Commission
PDR	Public Document Room
RAC	Reactor Advisory Committee
SNM	Special Nuclear Material
TS	Technical Specification