January 31, 2007

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

SUBJECT: NRC SPECIAL INSPECTION REPORT NO. 50-186/2006-205

Dear Mr. Butler:

On December 18-21, 2006, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your University of Missouri - Columbia Research Reactor facility. The enclosed report documents the inspection results, which were discussed on December 21, 2006, with Les Foyto, Reactor Manager, and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the NRC's rules and regulations and with the conditions of your license. The inspector reviewed selected procedures and records, observed activities, and interviewed personnel. Based on the results of this inspection, no findings of significance were identified.

In accordance with Section 2.390, "Public inspections, exemptions, and requests for withholding," of Title 10 of the *Code of Federal Regulations*, a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Craig Bassett at 404-358-6515.

Sincerely,

***/RA/***

Johnny H. Eads, Jr., Branch Chief
Research and Test Reactors Branch B
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

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

Enclosures: NRC Inspection Report No. 50-186/2006-205

cc w/enclosure: Please see next page

cc:

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

A-95 Coordinator
Division of Planning
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Mr. H. Floyd Gilzow
Deputy Director for Policy
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
University of Missouri-Columbia

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**ACCESSION NO.: ML070310004** **TEMPLATE #: NRR-106**

| OFFICE | PRT:RI | PRT:LA | PRT:BC |
|---|---|---|---|
| NAME | CBassett:cah | EHylton | JEads |
| DATE | 1/30/2007 | 1/30/2007 | 1/31/2007 |

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

| | |
|---|---|
| Docket No.: | 50-186 |
| License No.: | R-103 |
| Report No.: | 50-186/2006-205 |
| Licensee: | Curators of the University of Missouri - Columbia |
| Facility: | University of Missouri - Columbia Research Reactor |
| Location: | Research Park<br>Columbia, Missouri |
| Dates: | December 18-21, 2006 |
| Inspector: | Craig Bassett |
| Approved by: | Johnny H. Eads, Branch Chief<br>Research and Test Reactors Branch B<br>Division of Policy and Rulemaking<br>Office of Nuclear Reactor Regulation |

# EXECUTIVE SUMMARY

University of Missouri - Columbia
Report No.: 50-186/2006-205

This special, announced inspection included onsite review of licensee activities during a maintenance shutdown which involved changing out the primary and pool heat exchangers. The inspection included a review of the licensee's programs concerning organization and staffing, review and audit and design change functions, training, maintenance and surveillance, fuel handling, reactor operations, radiation protection, and procedure control used during this period. The shutdown was well planned and well executed and 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 were in compliance with the requirements specified in Technical Specifications Section 6.1.

- Staffing for the maintenance shutdown was adequate which ensured that the appropriate coverage and support was available for all the jobs involved in the project.

Review and Audit and Design Change Functions

- Review and oversight functions required by Technical Specifications Section 6.1 were acceptably completed by the Reactor Advisory Committee and the Reactor Safety Subcommittee.

- The evaluation of changes to facility systems and to procedures satisfied NRC requirements.

Training

- Operator and support personnel job-specific training was completed prior to the shutdown.

- Review mock-up training was given to those working on beamport liner maintenance.

Maintenance and Surveillance

- Maintenance activities conducted during the shutdown were well planned and properly coordinated and were completed in accordance with procedure as required.

- Problems were dealt with in an effective manner as they arose.

Reactor Operations

- No actual reactor operations were conducted during the inspection.

- Shift turnovers, communication, and personnel cognizance of changing facility conditions were acceptable.

Radiation Protection

- Continuous HP coverage provided workers with the information they needed to maintain their doses ALARA.
- Surveys were completed acceptably to permit evaluation of the radiation hazards present.
- Personnel dosimetry was being worn as required and recorded doses were within the NRC's regulatory limits.
- Postings met regulatory requirements.

Procedures

- The procedure revision, control, and implementation program satisfied Technical Specifications requirements.

REPORT DETAILS

**Summary of Plant Status**

The University of Missouri - Columbia Research Reactor (MURR) was shut down on late Sunday evening, December 17, 2006, in preparation for a maintenance shutdown. The maintenance shutdown included changing out the primary and pool heat exchangers. That required, among other related jobs, removing the used heat exchangers and placing new ones in service. The shutdown also included replacing two of the graphite reflector wedges located outside the beryllium reflector. In order to replace the graphite wedges, it was necessary to retract Beamports D, E, and F. During the inspection, the coordination of the work activities and the progress of the various jobs involved were observed and the implementation of the licensee's safety programs was verified.

## 1. Organization and Staffing

a. Inspection Scope (Inspection Procedure [IP] 69006)

To verify that the staffing and organizational structure requirements were being met as specified in Technical Specifications (TS), Section 6.1, Amendment No. 33, dated January 29, 2004, and that staffing for the shutdown was adequate, the inspector reviewed:

- current MURR organizational structure
- administrative controls and management responsibilities
- staffing for heat exhanger replacement project

b. Observations and Findings

The inspector noted that the organizational structure had not changed since the last inspection at the facility (refer to NRC Inspection Report No. 50-186/2006-204). The organization and staffing at the facility were as specified in the TS.

It was noted that, for the shutdown and heat exhanger replacement project, management, operations, and support personnel had been divided into two groups. Each group consisted of the following: 1) a team of reactor operators which handled the heat exhanger work (augmented by contractor personnel); 2) a team of Facility Support Operations (FSO) personnel to accomplish the beamport liner removal and reinsertion and maintenance work (augmented by staff from other MURR organizations); 3) a team of Health Physics (HP) personnel to provide continuous coverage for all the heat exhanger replacement and beamport work; and, 4) a team of people from various MURR organizations that supported the other groups and provided such services as laundering personal protective clothing.

Each group worked a 12-hour day, one group on day shift and one group on night shift, for the duration of the shutdown. Each manager or lead person on day shift and each operations or support person on day shift had a counterpart on the night shift. The two groups were well organized and aware of their individual

responsibilities. The organization and staffing provided appropriate coverage for the various jobs completed during the project.

c. Conclusions

The licensee's organization and staffing were in compliance with the requirements specified in TS Section 6.1. Staffing for the maintenance shutdown was adequate which ensured that the appropriate coverage and support was available for all the jobs involved in the project.

## 2. Review and Audit Functions

a. Inspection Scope (IP 69007)

In order to verify that the licensee had established and conducted reviews and audits as required by 10 CFR Part 20 and TS Section 6.1, the inspector reviewed:

- Reactor Advisory Committee meeting minutes, and related documents, from February 2006 to the present
- Selected Subcommittee meeting minutes from March 2006 to the present including the Isotope Use Subcommittee, the Reactor Safety Subcommittee, and the Procedure Review Subcommittee
- MURR Procedure AP-RR-003, “10 CFR 50.59 Evaluations,” Rev. 4, issued July 6, 2006
- selected AP-RR-003 Attachment 1, “50.59 Screen” forms, Numbers 06-33 and 06-34
- MURR Procedure AP-RO-115, “Modification Records,” Rev. 2, issued October 20, 2005

b. Observations and Findings

(1) Review Functions

The inspector reviewed the meeting minutes of the Reactor Advisory Committee (RAC) and the meeting minutes of various subcommittees, including the Reactor Safety Subcommittee, from February 2006 to the present. The most recent meeting held by the RAC was on October 24, 2006. The most recent meeting held by the Reactor Safety Subcommittee was on December 7, 2006. The minutes, and associated documents, indicated that the committees 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. It was noted that the shutdown and maintenance plans and scheduled work were reviewed during these meetings so that the committees were kept abreast of the plans for the heat exchanger replacement project.

(2) Design Change Functions

The inspector reviewed design change reviews that had been conducted by the licensee concerning work to be done and procedures to be used during the heat exhanger replacement project. The reviews were documented on forms associated with MURR Procedure AP-RR-003, "10 CFR 50.59 Evaluations." The 50.59 Screen forms had been completed, reviewed, and approved as required. None of the screens required that a 50.59 Evaluation be conducted.

c. Conclusions

Review and oversight functions required by the TS were acceptably completed by the RAC and the Reactor Safety Subcommittee. The evaluation of changes to the facility and to procedures satisfied NRC requirements.

**3. Training**

a. Inspection Scope (IP 69003)

The inspector reviewed selected aspects of the following to ensure compliance with the "Operator Requalification Program - University of Missouri Research Reactor (MURR)" dated January 7, 1997, and to ensure that operations and support personnel received proper instruction on, and were acquainted with, the responsibilities and duties of their respective jobs for the shutdown:

- operator training records for 2006 and specifically for the heat exhanger replacement
- training records for support personnel

b. Observations and Findings

A review of the logs and records showed that training was conducted in anticipation of the heat exhanger replacement project. Procedures to be used were reviewed and discussed by all operators and the appropriate support personnel. The training also included the set up and operation of the new equipment that would be in place following the shutdown.

For those individuals who were assigned to work on the Beamport Floor and assist with retracting and reinserting Beamport Liners D, E, and F, a mockup was fabricated of the beamport face and teams were given instruction and practiced the proper method of accomplishing that work. For most of the individuals involved, this was refresher training because they had participated in the beamport work during the beryllium change out in January 2006.

c. Conclusions

Operator and support personnel training was completed prior to the shutdown. Review mock-up training was given to those working on the beamport liner maintenance.

## 4. Maintenance and Surveillance

a. Inspection Scope (IP 69006, 69010)

To verify that the licensee was meeting the requirements of their Preventive Maintenance Program, complying with TS Sections 2, 3, 4, and 5, and following the steps of the Heat exhanger replacement Procedure, the inspector reviewed selected aspects of:

- MURR Procedure AP-RO-110, “Conduct of Operations,” Rev. 9, issued December 18, 2006
- MURR Procedure AP-RR-015, “Work Control Procedure,” Rev. 9, issued November 29, 2006
- MURR Procedure OP-RO-410, “Primary Coolant System,” Rev. 6, issued December 18, 2006
- MURR Procedure OP-RO-480, “Secondary Coolant System,” Rev. 10, issued December 18, 2006
- MURR Procedure OP-RO-466, “Pool Level Control - Pool Coolant System,” Rev. 4, issued March 13, 2006
- MURR Procedure OP-RO-741, “Waste Tank System Operation,” Rev. 8, issued March 13, 2006
- MURR Procedure SM-RO-100, “Draining and Filling the Primary System Side of Primary Heat Exchangers,” Rev. 0, issued December 15, 2006
- MURR Procedure SM-RO-105, “Replace Primary and Pool Coolant System Heat Exchangers and Piping,” Rev. 0, issued December 12, 2006
- MURR Procedure SM-RO-638, “Retracting and Reinserting Beamport “D” Liner,” Rev. 1, issued December 15, 2006
- MURR Procedure SM-RO-639, “Retracting and Reinserting Beamport “E” Liner,” Rev. 1, issued December 15, 2006
- MURR Procedure SM-RO-640, “Retracting and Reinserting Beamport “F” Liner,” Rev. 2, issued December 15, 2006

b. Observations and Findings

(1) Maintenance

The inspector observed facility activities on various occasions during the shutdown on both day shift and night shift. All the maintenance activities observed were conducted in accordance with the applicable procedures. The shutdown was conducted in an efficient and well-organized manner. It was apparent that careful planning and preparations had been made prior to the start of the heat exhanger replacement and graphite wedge replacement project.

As noted above, the shutdown included maintenance activities that affected both the reactor and three of the beamports. Separate crews worked in each area. The majority of the heat exchanger work was completed by contractor personnel from J. Louis Crum Corporation, while other replacement work and general reactor maintenance was completed by reactor operators and the beamport maintenance was completed by support personnel. As noted

previously, both groups had been trained and the work progressed generally according to the schedule, the flow chart, and the Gantt Chart that had been developed for the shutdown. As minor problems arose, they were dealt with following discussions among the managers and crew leaders and after agreement was reached on how to proceed.

(2) Surveillance

Following the heat exchanger replacement and the work on the beamports, the appropriate surveillance verifications and calibration of equipment, including the testing of various reactor systems, instrumentation, auxiliary systems, and security systems and alarms, were scheduled to be completed. The licensee was prepared to use "Compliance Procedures" (CPs) or MURR Operations Procedures to conduct these verifications as required.

c. Conclusions

Maintenance activities conducted during the shutdown were well planned and coordinated and completed in accordance with procedure as required. The surveillance program satisfied TS requirements. Problems were dealt with appropriately as they arose.

## 5. Reactor Operations

a. Inspection Scope (IP 69006)

To verify that the licensee was operating the reactor and conducting operations in accordance with TS Section 3 and procedural requirements, the inspector reviewed selected portions of the following:

- Operations Shift Turnover sheets for December 2006
- MURR Control Room Logbooks for December 2006
- MURR Console Watch Logbooks for December 2006
- MURR Procedure AP-RO-110, "Conduct of Operations," Rev. 9, issued December 18, 2006 and the associated forms, FM-11, "Reactor Shutdown Checksheet," FM-56, "Reactor Routine Patrol," FM-57, "Long Form Startup Checklist," and FM-58, "Short Form Startup Checklist"
- MURR Procedure OP-RO-410, "Primary Coolant System," Rev. 6, issued December 18, 2006
- MURR Procedure OP-RO-480, "Secondary Coolant System," Rev. 10, issued December 18, 2006
- MURR Procedure OP-RO-466, "Pool Level Control - Pool Coolant System," Rev. 4, issued March 13, 2006
- MURR Procedure OP-RO-741, "Waste Tank System Operation," Rev. 8, issued March 13, 2006
- MURR Procedure SM-RO-100, "Draining and Filling the Primary System Side of Primary Heat Exchangers," Rev. 0, issued December 15, 2006
- MURR Procedure SM-RO-105, "Replace Primary and Pool Coolant System Heat Exchangers and Piping," Rev. 0, issued December 12, 2006

b. Observations and Findings

(1) Reactor Operation

No actual reactor operations were conducted during the inspection. However, as noted above, many maintenance items were completed and several items were replaced during the shutdown as well. These were completed as required and in accordance with procedures that had been developed for the shutdown

(2) Staff Communication

During the inspection, the inspector attended shutdown management meetings, operations crew shift turnover meetings, and beamport team turnover meetings held daily at 6:00 a.m. and 6:00 p.m., at 6:30 a.m. and 6:30 p.m., and at 7:00 a.m. and 7:00 p.m. respectively. The progress made during the shift and the status of the reactor and the beamport was discussed in detail on each occasion as required. All operators of the relief crews reviewed the appropriate logs and records and all personnel were briefed on the upcoming shift activities and scheduled events. Communication and job control for the various activities that were in progress were a licensee strength.

c. Conclusions

Reactor operations were conducted in accordance with procedures as required. Shift turnovers, communications, and personnel cognizance of changing facility conditions were acceptable.

## 6. Radiation Protection

a. Inspection Scope (IP 69012)

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

- radiation protection training program records
- MURR dosimetry records for each shift during the shutdown
- selected radiation and contamination survey records for the heat exhanger replacement and maintenance shutdown project
- radiological signs and posting in the basement - Room 114 and in the Beamport Floor area
- MURR Procedure AP-HP-105, “Radiation Work Permit,” Rev. 5, issued October 23, 2006, and the associated form, Form FM-17, “Radiation Work Permit” used for the Heat exhanger replacement:
  - RWP 06-94, “Pool Primary Piping and Heat Exchanger Removal and Replacement,” approved December 12, 2006
  - RWP 06-95, “Pool Pump Down,” approved December 17, 2006
  - RWP 06-96, “Beamport D, E, and F Retraction, Reline, and Replace,” approved December 17, 2006

- MURR Procedure AP-HP-117, “MURR Initial Radiation Worker Training Program,” Rev. 7, issued January 30, 2006, and the associated forms, Form FM-26, “MURR Training Questionnaire,” and Form FM-29, “Initial Training Packet”
- MURR Procedure AP-HP-125, “Review of Unplanned Radiation Exposure,” Rev. 1, dated June 2, 2005
- MURR Procedure RP-HP-100, “Contamination Monitoring - Performing a Swipe,” Rev. 4, issued December 19, 2005
- MURR Procedure RP-HP-120, “Personnel Radioactive Contamination,” Rev. 4, issued March 24, 2006, and the associated forms, Form FM-54, “Report of Personnel Contamination,” and Form FM-76, “Personnel Contamination Log”
- MURR Procedure SV-HP-119, “Property Release,” Rev. 2, issued March 24, 2006

The inspector also toured the licensee's facility, witnessed the use of dosimetry and survey meters, and observed personnel entering and exiting controlled areas and monitoring for personal contamination.

b. Observations and Findings

(1) Surveys

During the shutdown, continuous HP coverage was provided for the heat exhanger replacement and the beamport liner maintenance activities. Accordingly, contamination and radiation surveys were conducted in the active work areas as needed to support all the ongoing work. Any contamination detected in concentrations above established action levels was noted and the affected area was decontaminated. Team members were continually updated as to the radiation levels and contamination levels in the affected work areas.

Air sampling was conducted in the basement in Room 114 where the heat exchanger work was being done, as well as for specific jobs conducted on the beamport floor. None of the samples indicated airborne activity in excess of the regulatory limits.

(2) Dosimetry

Through direct observation the inspector determined that dosimetry was acceptably used by facility personnel. It was noted that the licensee used optically stimulated luminescent (OSL) dosimetry for whole body monitoring and thermoluminescent dosimeters (TLDs) in the form of finger rings and wrist badges for extremity monitoring. The dosimetry was supplied and processed by a National Voluntary Laboratory Accreditation Program accredited vendor. In addition, the licensee issued individual electronic personnel dosimeters (EPDs) to each individual working on or supporting the shutdown projects each shift.

An examination of the EPD results, indicating radiological exposures at the facility for the shutdown, showed that the highest occupational doses were well within 10 CFR Part 20 limits. As of December 21, 2006, the highest whole

body exposure received by a single individual for the shutdown was 115 millirem (mr).

(3) ALARA Program

An administrative limit of 100 mr for the entire project was established for each individual working on the heat exchanger replacement (reactor operators and contractors) and an administrative limit of 130 mr was established for those persons involved in the beamport liner maintenance. The licensee also stipulated that management authorization had to be granted for anyone to exceed these limits.

The EPD results were tabulated at the end of each shift and everyone was made aware of their respective dose prior to starting a new work day. Also, team leaders and managers reviewed the EPD results to ensure that no one received more than their allowed limit and to equalize the dose of the individuals involved in the jobs which required work in an area of increased radiation levels.

(4) Radiation Work Permit Program

The inspector reviewed all Radiation Work Permits (RWPs) that had been written for, and used during, the shutdown. It was noted that the instructions specified in MURR Procedure AP-HP-105, “Radiation Work Permit,” Attachment 7.1, Form FM-17, “Radiation Work Permit Instructions” had been adequately followed. Appropriate review by management and health physics personnel had been conducted. The controls specified in the RWPs were acceptable and applicable for the type of work being done.

(5) 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, as required by 10 CFR Part 19, and were posted in various areas throughout the facility such as on the main bulletin board, in main hallways, on the stairway leading to the basement and Room 114, and at the entrance to the Beam Port Floor area.

(6) Facility Tours

The inspector toured Room 114, the Beam Port Floor, and selected support areas 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 the radiation protection program, as implemented by the licensee, satisfied regulatory requirements because: 1) continuous HP coverage provided workers with the information they needed to maintain their doses ALARA; 2) surveys were completed acceptably to permit evaluation of the radiation hazards present; 3) personnel dosimetry was being worn as required and recorded doses were within the NRC's regulatory limits; and, 4) postings met regulatory requirements.

## 7. Procedures

a. Inspection Scope (IP 69008)

To verify compliance with TS Sections 6.1.b and 6.1.c, the inspector reviewed selected portions of the following:

- MURR Procedure AP-DC-100, "Controlled Document Revisions," Rev. 6, issued July 13, 2006
- MURR Procedure AP-DC-102, "Document Control," Rev. 4, issued May 3, 2006
- MURR Procedure AP-RO-110, "Conduct of Operations," Rev. 9, issued December 18, 2006
- MURR Procedure AP-RR-015, "Work Control Procedure," Rev. 9, issued November 29, 2006
- MURR Procedure OP-RO-410, "Primary Coolant System," Rev. 6, issued December 18, 2006
- MURR Procedure OP-RO-480, "Secondary Coolant System," Rev. 10, issued December 18, 2006
- MURR Procedure SM-RO-100, "Draining and Filling the Primary System Side of Primary Heat Exchangers," Rev. 0, issued December 15, 2006
- MURR Procedure SM-RO-105, "Replace Primary and Pool Coolant System Heat Exchangers and Piping," Rev. 0, issued December 12, 2006
- MURR Procedure SM-RO-638, "Retracting and Reinserting Beamport "D" Liner," Rev. 1, issued December 15, 2006
- MURR Procedure SM-RO-639, "Retracting and Reinserting Beamport "E" Liner," Rev. 1, issued December 15, 2006
- MURR Procedure SM-RO-640, "Retracting and Reinserting Beamport "F" Liner," Rev. 2, issued December 15, 2006

b. Observations and Findings

The inspector noted that, because some of the Special Maintenance procedures used for this shutdown had been developed during past shutdowns, they had not been used in some time. Therefore, the licensee had revised the procedures in accordance with MURR Procedure AP-DC-100, "Controlled Document Revisions." Following this revision effort, the procedures were submitted to the MURR Procedure Review Subcommittee for review. The procedures were reviewed and approved as required. The inspector verified that the licensee was implementing the procedure review, revision, and control program that had recently been developed.

c. Conclusions

The current procedure review, revision, control, and implementation program satisfied TS requirements.

## 8. Exit Interview

The inspection scope and results were summarized on December 21, 2006, with members of licensee management and staff. The inspector described the areas inspected and discussed in detail the inspection findings. The licensee did not identify any of the material provided to or reviewed by the inspector during the inspection as proprietary. No dissenting comments were received from the licensee.

## PARTIAL LIST OF PERSONS CONTACTED

Licensee personnel

K. Brooks, Associate Director, Product and Service Operations
R. Butler, Director of MURR
J. Custer, Lead Senior Reactor Operator
M. Dixon, Assistant Reactor Manager - Operations
R. Dobey, Manager, Health Physics
J. Ernst, Associate Director, Regulatory Assurance Group
L. Foyto, Reactor Manager
J. Fruits, Work Control Manager
A. Gaddy, Document Control Coordinator
J. Hemphill, Health Physicist
C. Herbold, Assistant Reactor Manager - Engineering
R. Hudson, Operations Training Coordinator
S. Kelley, Health Physicist
M. Kilfoil, Project Manager
M. Maassen, Senior Research Technician
B. McCracken, Reactor Facilities Engineer
C. McKibben, Senior Advisor
S. Meier, Senior Reactor Service Project Specialist
W. Meyer, Chief Operating Officer
W. Oladrian, Manager, Facility Support Operations
A. Saale, Lead Senior Reactor Operator
S. Sample, Lead Senior Reactor Operator
T. Warner, Lead Senior Reactor Operator

## INSPECTION PROCEDURES USED

IP 69003 Class I Research and Test Reactor Operator Licenses, Requalification, and Medical Activities
IP 69006: Class I Research and Test Reactor Organization, Operations, and Maintenance Activities
IP 69007: Class I Research and Test Reactor Review and Audit and Design Change Functions
IP 69008 Class I Research and Test Reactor Procedures
IP 69010 Class I Research and Test Reactor Surveillance
IP 69012: Class I Research and Test Reactor Radiation Protection

## OPENED, CLOSED, AND DISCUSSED

Opened

None.

Closed

None.

## LIST OF ACRONYMS USED

| | |
|---|---|
| ALARA | As low as reasonably achievable |
| CFR | Code of Federal Regulations |
| CP | Compliance Procedure |
| EPD | Electronic personnel dosimeters |
| FSO | Facility Support Operations |
| HP | Health physics |
| IP | Inspection Procedure |
| IR | Inspection Report |
| mr | millirem |
| MURR | University of Missouri - Columbia Research Reactor |
| NRC | Nuclear Regulatory Commission |
| OSL | Optically stimulated luminescent (dosimeter) |
| PDR | Public Document Room |
| RAC | Reactor Advisory Committee |
| Rev. | Revision |
| RWP | Radiation Work Permit |
| SNM | Special Nuclear Material |
| TLD | Thermoluminescent dosimeter |
| TS | Technical Specification |