July 27, 2000

EA-00-173

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

SUBJECT: NRC SPECIAL INSPECTION REPORT NO. 50-186/2000-203, UNIVERSITY OF MISSOURI-COLUMBIA RESEARCH REACTOR

Dear Dr. Deutsch:

This letter refers to a special inspection conducted on July 11-13, 2000, at the University of Missouri-Columbia Research Reactor (MURR) facility. The purpose of the inspection was to follow up on an unplanned event that occurred on June 12, 2000, involving the removal of a control blade from the reactor without first establishing the proper core configuration. The enclosed report presents the results of this inspection.

Various aspects of your safety and operations 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 this inspection, two apparent violations were identified and are being considered for escalated enforcement action in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600. On June 12, 2000, MURR facility personnel removed control blade B from the reactor without first removing two fuel elements as required by the operating procedure. The failure to follow procedure is an apparent violation of Technical Specification 6.1.b. With eight fuel elements in the reactor core and one control blade not fully inserted, the reactor did not meet the Technical Specification definition for either shutdown or secured. Therefore, the reactor was in operation. During reactor operation, Technical Specification 3.2.a, Limiting Condition for Operation, requires all control blades to be operable. Therefore, reactor operation with control blade B inoperable is an apparent violation of Technical Specification 3.2.a. No Notice of Violation is presently being issued for the inspection findings. In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC staff review.

As discussed in the cover letter for Special Inspection Report No. 50-186/2000-202 dated July 26, 2000, you should be prepared to discuss this event and apparent violations at the open predecisional enforcement conference planned for August 16, 2000 in Columbia, Missouri. The decision to hold a predecisional enforcement conference does not mean that the NRC staff has determined that a violation has occurred or that enforcement action will be taken. This conference is being held to obtain information to enable the NRC staff to make an enforcement decision, such as a common understanding of the facts, root causes, missed opportunities to identify the apparent violations sooner, corrective actions, the significance of the issues, and the need for lasting and effective corrective actions. In addition, this is an opportunity for you to point out any errors in our inspection report and for you to provide any information concerning

your perspectives on 1) the severity of the apparent violations, 2) the application of the factors that the NRC considers when it determines the amount of a civil penalty that may be assessed in accordance with Section VI.B.2 of the Enforcement Policy, and 3) any other application of the Enforcement Policy to this case, including the exercise of discretion in accordance with Section VII.

You will be advised by separate correspondence of the results of our deliberations on this matter. No response regarding the apparent violations is required at this time.

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. If you have any questions concerning this inspection, please contact Mr. Alexander Adams at 301-415-1127 or Mr. Craig Bassett at 404-562-4712.

Sincerely,

/RA by Charles E. Ader Acting For/

David B. Matthews, Director
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

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

Enclosures: NRC Inspection Report No. 50-186/2000-203

cc w/enclosures:
Please see next page

cc:

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

A-95 Coordinator
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Missouri Department of Natural Resources
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Test, Research, and Training
Reactor Newsletter
University of Florida
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U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No.:	50-186
License No.:	R-103
Report No.:	50-186/2000-203
Licensee:	University of Missouri-Columbia
Facility:	University of Missouri-Columbia Research Reactor
Location:	Research Park Columbia, Missouri
Dates:	July 11-13, 2000
Inspector:	Craig Bassett, NRR
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 was a special, announced inspection of activities at the University of Missouri-Columbia Research Reactor (MURR) facility related to operation of the 10 Megawatt (Mw) Class 1 non-power reactor (NPR). It included onsite review of the licensee's programs concerning an event on June 12, 2000. The event involved the removal of a control blade from the reactor without first establishing the proper core configuration. MURR sent the NRC a written report dated July 18, 2000, regarding the event.

ORGANIZATIONAL STRUCTURE AND FUNCTIONS

- Organizational structure and staffing were consistent with Technical Specification requirements.

- The licensee's organizational structure and functions appear to have contributed to the event.

OPERATIONS

- Failure to follow procedure led to a condition in which the reactor was technically in operation without all the control blades being operational thus apparently violating the requirements stipulated in Technical Specification Section 3.2.

- The effectiveness of MURR's shift turnovers, communication, and operator cognizance of facility conditions continue to be in question.

FUEL HANDLING

- The fuel handling activities met licensee procedural requirements.

PROCEDURES

- An apparent procedural violation, as well as weaknesses in the procedures covering the removal of the offset mechanism associated with the control blades, were noted.

REPORT DETAILS

Summary of Event

On June 12, 2000, as part of normal maintenance day activities at the University of Missouri-Columbia Research Reactor (MURR), one of four control blades was scheduled to be removed. The control blades are used in the reactor for a period of two years with one control blade removed and inspected every six months. The procedure for removing a control blade requires two of the eight fuel elements to be taken out of the reactor core to make the reactor very subcritical. On the morning of June 12, the operating crew removed control blade B and the associated offset mechanism from the reactor. However, two fuel elements had not been removed from the reactor core prior to the blade removal as required by the procedure This resulted in an apparent violation of one of the Technical Specification Limiting Conditions for Operations.

Event Description

On June 12, 2000, at about 3:00 a.m., the reactor was shutdown and the night shift crew completed a normal refueling as part of a typical maintenance day routine. Shortly after reactor shutdown, the operators also found that there was a leak in the shaft seal for primary pump 501A. Completing this maintenance work became the focus of attention for the day shift crew and management because it was a major unplanned activity. During the rest of the morning the crew worked on both the pump seal replacement and the normally scheduled maintenance items. At approximately 11:00 a.m., control blade B and the associated offset mechanism were removed from the reactor. At about 12:15 p.m. the Lead Senior Reactor Operator (LSRO) was reflecting on the day's work and realized that the control blade had been removed from the core without having two of the eight fuel elements removed from the core as required by procedure. With eight fuel elements in the reactor core and one control blade not fully inserted, the reactor did not meet the Technical Specification definition of being either shutdown or secured. Therefore, the reactor was technically in "operation." During reactor operation, Technical Specification 3.2.a, Limiting Condition for Operation, requires all control blades to be operable. Therefore, reactor operation with control blade B inoperable is an apparent violation of Technical Specification 3.2.a.

At that point the Acting Reactor Manager was contacted and it was decided that the most expeditious way to restore TS compliance was to remove two fuel elements from the core. Therefore, a new fuel movement procedure was developed and approved. In accordance with this procedure, the reactor pressure vessel head was removed and two fuel elements were removed from the core. This was completed at 1:52 p.m. By removing the two fuel elements, the reactor was placed in a secured condition. In addition, control blade B was installed back into its original position so the plant could be in the safest possible configuration. The Acting Reactor Manager also ordered a "standdown" from operations and scheduled a meeting for all Reactor Operations staff for the morning of June 13.

During the afternoon of June 12 the licensee reviewed the requirement for minimum shutdown margin. TS Section 3.1.e specifies that the reactor shall be subcritical by a margin of at least 0.02 $\Delta k/k$ with any one shim blade fully withdrawn. The licensee calculated that, in the refueled condition of June 12 with control blade B removed, the reactor was subcritical by 0.083 $\Delta k/k$. Therefore, the requirement for maintaining a minimum shutdown margin of 0.02 $\Delta k/k$ was met

at all times and the reactor was never in a configuration that made it a threat to the public or to employees at the facility.

At 6:30 a.m. on June 13, a meeting was held to discuss the event, contributing causes, and to solicit information concerning the root cause of the problem. At about 1:00 p.m. the Acting Reactor Manager contacted the NRC to report the June 12 event and the initial corrective actions. At 6:30 a.m. on June 14, a second Reactor Operations meeting was held with all reactor operators (except one who was on vacation). That meeting was held to conduct training regarding the root cause of the event, corrective actions to be taken, and expectations for the LSRO position. At about 8:00 a.m. on June 14, a meeting of the Action Subcommittee, a subset of the Safety Subcommittee, was convened to discuss the event and review those corrective actions that had been taken and those that were planned. A conference call with the NRC was initiated to discuss the event and focus of the corrective actions taken in order to allow restart of the reactor. At about 6:00 p.m., a meeting of the Safety Subcommittee was held to review the progress on corrective actions and review the plan for restarting the reactor.

Also on June 14, the Acting Reactor Manager issued Standing Orders 00-09 and 00-10. Standing Order 00-09 required that a Control Room briefing be held immediately prior to beginning an infrequent operation with those involved in the operation. Standing Order 00-10 affirmed that the Standard Operating Procedures had been reviewed to determine whether there were misstatements or omissions in them which would have adverse safety implications for reactor operations. One minor item was noted and the Standing Order corrected this. The correction was issued to require the LSRO and all oncoming crew members to review the log book and receive a briefing from the current operations crew.

The reactor was authorized to restart by the Acting Reactor Manager on June 14 at 10:00 p.m. after it was verified that all pre-startup corrective actions had been taken. A briefing of the operating crew was conducted for the performance of startup and control blade worth measurement at 10:30 p.m. and the reactor returned to full power operation at 5:05 a.m. on June 15.

A more detailed description of the event and the licensee's identified root causes are presented in the licensee's report dated July 18, 2000. On the basis of the findings and observations, the inspector found this July 18 report acceptably accurate and complete.

Corrective Actions

Interim and long-term corrective actions, as specified in the licensee’s report, included the following:

Interim (complete):

- “Standdown” from reactor operations until the root cause of the problem could be determined and corrective actions initiated.
- Focus on the root cause(s) of the event and develop corrective actions as necessary.

- Hold a training session for all reactor operators to review the root cause of the event, corrective actions to be taken, and to emphasize management's expectations for the LSRO position.
- Ensure that pre-startup actions are adequate and have been completed prior to restarting the reactor.
- Issued Standing Order 00-09 which required a Control Room briefing to be held immediately prior to beginning an infrequent operation or other activity with those involved in the operation.
- Have a member of management in attendance on a temporary basis for shift turnover briefings to ensure that the proper information is communicated.
- Establish and maintain Status Boards in the Control Room so that all the operators on each crew would know what operations are in progress and what is happening in the facility.
- Convene a meeting of the Safety Subcommittee to inform the committee of the situation and receive any additional guidance on corrective actions that may be offered.

Long-Term (in progress):

- During the next maintenance meeting (typically held on Wednesdays), brief Reactor Operations personnel who were not on shift during the event concerning the problem and what is expected of them during maintenance operations in the future.
- Have an external review conducted by a team of three persons from outside the Test, Research and Training Reactors (TRTR) community to review both the June 12 event and the April 12 event to determine if there are any common problems and develop possible corrective actions.
- Review operations and maintenance procedures to look for weaknesses and inadequacies.
- Conduct a major review and revision of the Standard Operating Procedures with an anticipated completion date in early 2001.
- Explain and reemphasize the role of the LSRO to ensure that all Reactor Operations staff know that the LSRO has the authority to implement any action deemed necessary to assure the safety of the general public, safety of facility personnel, and the safe efficient operation of the reactor.
- Ensure that the LSRO has a Control Room briefing for each shift turnover.
- Provide training for all Reactor Operations staff to: 1) emphasize safe operation of the reactor is the primary responsibility of operators, 2) explain the responsibilities of the LSRO, 3) emphasize procedure compliance, 4) explain the need of maintaining a questioning attitude, 5) stress the need for proper attention to detail, and 6) explain the need to be prepared, attentive, and alert especially during infrequent operations.

The following is a discussion of the inspection findings in the individual functional areas.

1. ORGANIZATIONAL STRUCTURE AND FUNCTIONS (39745)

a. Scope

The inspector reviewed selected aspects of the following:

- organization and staffing
- management and staff responsibilities

b. Observations and Findings

Through interviews with management and staff personnel it was noted that two senior staff members had left the facility in mid to late 1999. Therefore, the current Associate Director of the Research Reactor Center, who had been a former Reactor Manager, was filling in as the Acting Reactor Manager. Also, another senior staff member, who previously had been the Operations Engineer, was serving as the Interim Operations Engineer. (An individual had been hired to fill the position of Operations Engineer full-time.)

Through a review of the logs and interviews with operations personnel, the inspector determined that both the night shift operations crew and the day shift operations crew were staffed with three individuals. The records and interviews verified that a shift turnover briefing was held when the day shift crew arrived to relieve the night shift and the daily activities were discussed. The Interim Operations Engineer and the individual hired to permanently fill the position of Operations Engineer were also in the control room on the morning of June 12 to observe the maintenance activities and provide assistance as needed.

From the above the inspector determined that the organizational structure was consistent with the requirements of Technical Specifications Section 6.1.a and Figure 6.0. Staffing satisfied the requirements of Technical Specifications Section 6.1.i.

Through interviews with crew member of both shifts and management personnel, the inspector determined that everyone knew that control blade B was scheduled to be removed from the reactor during that maintenance day. The issue was discussed in the shift turnover that morning. The LSROs and the individuals on the crews were also aware of the requirement that two fuel elements were to be removed from the reactor core prior to removing the control blade. The involved MURR staff apparently became focused on the unplanned maintenance that was required for the primary pump and no one checked to ensure that all the prerequisite conditions had been met before removing control blade B from the reactor.

The inspector noted that the licensee's current organizational structure makes use of an LSRO rather than the more traditional shift supervisor. The inspector reviewed this issue with the licensee. Although the licensee's use of an LSRO versus the more traditional shift supervisor meets NRC requirements, it introduces additional operational challenges. Another unusual practice of the licensee was to assign an SRO as the LSRO for one shift then assign another SRO that duty for the following shift, thus rotating the responsibility among all members of the crew. This appeared to inject further challenges for proper communication and a lack of continuity into the daily operations.

As noted above, at the time of the event, an individual who had previously been the Operations Engineer was filling the position on an interim basis. Also, a person has been hired to take over the Operations Engineer position but the event occurred on his first day on the job. The fact that the licensee has filled that position and is anticipating filling the currently vacant position of Reactor Manager should relieve some of the operational and managerial pressure from those who had previously been trying to fill several positions. It should also improve management-to-staff communications and general oversight of the facility. However, there will be a period of time needed for these new hires to learn the details of their new positions.

In considering the fact that the licensee was using an Acting Reactor Manager and an interim Operations Engineer, the inspector found that using one person to fill more than one position for an extended period of time was a contributor to the June 12 event. Also, the previously mentioned LSRO structure appeared to lead to a situation which made it difficult for crew members to remember who was in charge at any given time. During this event, various individuals had the opportunity to review the control blade change out and stop the job until the proper conditions were met. With a diffusion of responsibility, no one stopped to take a look at the "big picture" and no one recognized the potential for a problem. This also appears to have been a contributor to the event.

The licensee convened a meeting of the Action Subcommittee (a subset of the Safety Subcommittee) and also a meeting of the Safety Subcommittee to review the event. These reviews were comprehensive and issues raised by these subcommittees were acceptably resolved as evidenced by the minutes of June 14, 2000.

Following an event which occurred on April 12, the licensee requested a peer review from TRTR. After this current event the licensee retained the services of a team of three individuals, with varying backgrounds in the nuclear field, to review the June 12 event and the previous event and determine whether there are any commonalities with respect to root cause and corrective actions that can be taken. The licensee plans to inform the NRC staff of the disposition of the report when the report is completed.

c. Conclusions

The organizational structure and staffing were consistent with Technical Specification requirements. However, the inspector noted that the licensee's organizational functions and structure contributed to the event.

2. OPERATIONS (39745)

a. Scope

The inspector reviewed selected aspects of the following:

- operational logs and records
- selected shutdown activities

b. Observations and Findings

TS Section 1.17 states that the reactor shall be considered in operation unless it is either shutdown or secured.

TS Section 1.20 states that the reactor shall be considered secured whenever it contains insufficient fuel in the reactor core to establish criticality with all control rods removed or whenever all of the following conditions are met:

1) All shim rods are fully inserted.
2) One of the following conditions exists:
   a) The “Master Control” switch is in the “off” position with the key locked in the key box or in the custody of a licensed operator.
   b) A licensed operator is present in the Control Room and the dummy load control rod test connectors are installed.
3) No work is in progress involving transferring fuel in or out of the core.
4) No work is in progress involving the control rods or control rod drives with the exception of installing or removing dummy load control rod test connectors.
5) The reactor pressure vessel cover is secured in position and no work is in progress on the pressure vessel or its supports.

TS Section 1.21 states that the reactor is shutdown when all shim rods are fully inserted and power is unavailable to the control rod magnets.

TS Section 3.2.a requires that all control blades, including the regulating blade, be operable during reactor operation.

The operating logs and records were clear and provided an indication of operational activities, including documentation of events. The logs and records showed that the licensee shutdown the reactor during the early morning of June 12 and completed the refueling as outlined in the refueling procedure. The log also showed that the control blade B was removed according to the maintenance procedure. However, later log entries indicated that two fuel

elements were removed from the core and subsequently control blade B was reinstalled.

As noted in the organizational section above, a shift turnover briefing was held and the maintenance activities, including the control blade removal, were discussed. The Interim Operations Engineer was also at the facility on the morning of June 12 to provide management overview of the scheduled maintenance activities. The LSROs on both shifts knew that control blade B was scheduled to be removed from the reactor during that day. Both LSROs and the individuals on the crews were also aware of the requirement that two fuel elements were required to be removed prior to removing the control blade. Everyone apparently became focused on the unplanned maintenance involving the primary pump and no one checked to ensure that all the requirements had been met for removing control blade B from the reactor. Management and operations staff attention to detail and awareness of procedural requirements were contributors to the event.

Just after noon the LSRO realized that control blade B had been taken out of service without having two of the eight fuel elements removed from the core as required by procedure. He also remembered that, with eight fuel elements in the reactor core and one control blade not fully inserted, the reactor did not meet the Technical Specification definition of being either shutdown or secured. Therefore, the reactor was technically in “operation.” The inspector informed the licensee that, with the reactor in “operation” and control blade B inoperable, MURR was in apparent violation of the Limiting Condition for Operation stated in Technical Specification (TS) 3.2.a.

c. Conclusions

Failure to follow procedure for removal of the control blade lead to an apparent violation of Technical Specification requirements as stipulated in Section 3.2.a. The event brought into question the effectiveness of MURR’s shift turnovers, management and staff communications, attention to detail, and general awareness of facility conditions.

3. FUEL HANDLING (60745)

a. Scope

The inspector reviewed selected aspects of the following:

- fuel handling procedures
- fuel handling equipment and records

b. Observations and Findings

Fuel handling procedures (SOP/II.2) and the "MURR Refueling Sequence" for the event provided the prescribed method for moving and handling fuel. The

inspector found this guidance consistent with the provisions of the Technical Specifications and the licensee safety analysis. The development of the refueling sequence was in accordance with the corrective action of the April 12 event requiring approval by the Reactor Physicist (or approved designee) and review and countersignature by a SRO of the refueling procedure. It was noted that the Reactor Physicist was on vacation and another person was filling in at the time of the event. The acting Reactor Physicist generated a typical refueling procedure which was followed and completed by the operations crew. However, the refueling procedure did not contain additional steps which are normally added when a control blade is to be changed out. The additional steps direct the crew to leave the fuel elements out of the positions adjacent to the location of the control blade until after the change out is completed and a new control blade is installed. No one on the operations crew noted the lack of the extra steps and a "normal" refueling was completed with all eight fuel elements placed in the core.

c. Conclusions

The fuel handling activities met licensee procedural requirements. However, the inspector noted that acting Reactor Physicist did not include additional steps in the refueling procedure which would have directed the operations crew to leave the two locations adjacent to control blade B empty in anticipation of the control blade changeout. Corrective action from the April 12 event in the area of refueling did not prevent this event from occurring.

4. PROCEDURES (42745)

a. Scope

The inspector reviewed selected aspects of the following:

- administrative controls
- procedural implementation
- logs and records

b. Observations and Findings

TS Section 6.1.b requires that written procedures be in effect for normal operations of the reactor, emergencies, radiological control, and the preparation for shipping and the shipping of byproduct material produced under the reactor license.

Maintenance Procedure, P.M. No. RX-S-1, with a revision date of October 1, 1997, requires in the Plant Conditions Required and Safety Precautions section, Part C, that the reactor and all systems be shutdown and two fuel elements be removed for an offset and control blade changeout.

MURR Standard Operating Procedure (SOP), Revision 23, dated September 24, 1999, requires in Section II.3.1 that the core will be defueled of two fuel elements corresponding to the offset mechanism (and control blade) being removed.

Early on the morning of June 12, the operations crew on night shift followed the refueling procedure and placed fuel elements in all eight positions of the reactor core as directed by the procedure. When preparations were being made for the maintenance activities that would occur on day shift, Maintenance Procedure, P.M. No. RX-S-1 was procured and opened to Page 9. Page 9 of the procedure outlines the steps required to remove the offset mechanism and the control blade and contains a section for individuals to initial as the various steps are completed. However, the steps on Page 9 do not refer to or include the Plant Conditions Required and Safety Precautions stipulated before the work is to begin. The instructions on Page 9 do include a reference to SOP II.3.3. Again, however, that portion of the SOP contains only the steps for removing the control blade and does not contain the Conditions Prior to Removal.

The day shift crew assumed that all the precautionary actions had been taken and that they were only responsible for removing the control blade. By initiating work in the middle of a procedure, the actions required to be taken prior to removing the control blade were not completed. The licensee was informed that failure to follow the operating procedure was an apparent violation of TS Section 6.1.b.

It was also noted that the procedures used for removing the control blades contained some inadequacies. Maintenance Procedure, P.M. No. RX-S-1 had a step referencing the SOP. However, that reference directed the person following the procedure to a place in the middle of the section of the SOP describing the actual removal of the control blade. It did not direct the user to the first portion of the SOP which contained the precautions and prerequisite conditions necessary for work to start. This deficiency in the procedure was a contributing factor in the June 12 event. It was also noted that neither the maintenance procedure nor the SOP had a sign-off step for removing the two fuel elements from the positions adjacent to the location of the control blade. Thus, it was not formally documented in any procedure that the fuel elements had been removed.

As noted in the Corrective Actions section of this report, the licensee is currently reviewing and revising all of the SOPs to provide standard form and content, as well as make any corrections and revisions needed.

c. Conclusions

An apparent procedural violation, as well as weaknesses in the procedures governing the removal of the offset mechanism associated with the control blades, were noted.

8. Exit Interview

The inspection scope and results were summarized on July 13, 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 licensee did not identify as proprietary any of the material provided to or reviewed by the inspector.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Anderson, Lead Senior Reactor Operator (during the event)
B. Brocker, Senior Reactor Operator
K. Brooks, Interim Chief Operations Officer
E. Deutsch, Director, MURR
J. Ernst, Health Physics Manager
L. Foyto, Lead Senior Reactor Operator (during the event)
V. Jones, Senior Reactor Operator
P. Hobbs, Assistant Reactor Manager
R. Hudson, Senior Reactor Operator
K. Kutikkad, Reactor Physicist
W. Meyer, Associate Director, Reactor Income Generating Operations and Interim Operations Engineer
C. McKibben, Acting Reactor Manager & Associate Director, MURR
P. Neel, Reactor Operator
A. Saale, Reactor Operator

Other Personnel

J. Burns, Vice Provost for Research

INSPECTION PROCEDURES USED

IP 39745	Class 1 Non-Power Reactors Organization, Operations, and Maintenance Activities
IP 42745	Non-Power Reactor Procedures
IP 60745	Non-Power Reactor Fuel Movement

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
LSRO	Lead Senior Reactor Operator
IP	Inspection Procedure
MURR	University of Missouri-Columbia Research Reactor
Mw	Megawatt
NPR	Non-Power Reactor
NRC	Nuclear Regulatory Commission
PDR	Public Document Room
SOP	Standard Operating Procedure
TS	Technical Specification