

August 27, 2013

Mr. R. J. Agasie, Reactor Director
Nuclear Reactor Laboratory
University of Wisconsin - Madison
1513 University Avenue, Room 1215
Madison, WI 53706-1687

SUBJECT: UNIVERSITY OF WISCONSIN – NRC ROUTINE INSPECTION REPORT
NO. 50-156/2013-201

Dear Mr. Agasie:

From August 5 – 8, 2013, the U.S. Nuclear Regulatory Commission (NRC, the Commission) completed an inspection at your University of Wisconsin Nuclear Reactor Laboratory. The enclosed report documents the inspection results, which were discussed on August 8, 2013, with you and members of your staff.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspector observed various activities in progress, interviewed personnel, and reviewed selected procedures and representative records.

Based on the results of this inspection, the NRC has determined that one Severity Level IV violation of NRC requirements has occurred. This violation is being treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2.b of the Enforcement Policy. The NCV is described in the subject inspection report. If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with Title 10 of the *Code of Federal Regulations*, Section 2.390, "Public inspections, exemptions, and requests for withholding," 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 NRC's document system (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).

R. J. Agasie

- 2 -

Should you have any questions concerning this inspection, please contact Craig Bassett at (301) 466-4495 or by electronic mail at Craig.Bassett@nrc.gov.

Sincerely,

/RA/ (Patrick Isaac Acting for)

Gregory T. Bowman, Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No.: 50-156

License No.: R-74

Enclosure:

NRC Inspection Report No. 50-156/2013-201

cc: Please see next page

R. J. Agasie

- 3 -

University of Wisconsin

Docket No. 50-156

cc:

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

Docket No: 50-156

License No: R-74

Report No: 50-156/2013-201

Licensee: University of Wisconsin

Facility: Nuclear Reactor Laboratory

Location: Madison, WI

Dates: August 5 – 8, 2013

Inspector: Craig Bassett

Approved by: Gregory T. Bowman, Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

University of Wisconsin - Madison
Nuclear Reactor Laboratory
Report No: 50-156/2013-201

The primary focus of this routine, announced inspection was the on-site review of selected aspects of the University of Wisconsin (the licensee's) Class II research and test reactor safety program including: 1) organization and staffing, 2) review and audit and design change functions, 3) reactor operations, 4) operator requalification, 5) procedures, 6) fuel handling, 7) maintenance and surveillance, 8) experiments, and 9) emergency preparedness since the last U.S. Nuclear Regulatory Commission (NRC) inspection of these areas. The licensee's program was acceptably directed toward the protection of public health and safety and in compliance with NRC requirements. No violations or deviations were identified.

Organizational Structure and Staffing

- The organizational structure was consistent with Technical Specifications requirements.
- Shift staffing met the requirements for duty, relief, and on-call personnel.

Review and Audit and Design Change Functions

- The review and audit functions required by Technical Specifications Section 6.2 were being acceptably completed by the Reactor Safety Committee.
- The 50.59 design change process at the facility was being followed as required and no recent changes required NRC approval.

Reactor Operations

- Reactor operations were conducted in accordance with Technical Specifications requirements and applicable procedures.

Operator Licenses, Requalification, and Medical Activities

- The operator requalification/training program was up-to-date and acceptably maintained.
- Medical examinations for facility operators were being completed biennially as required.

Procedures and Procedural Control

- Facility procedural review, revision, and control satisfied the requirements specified in Section 6.5 of the Technical Specifications.
- Procedural compliance was acceptable.

Fuel Handling

- Reactor fuel movements and inspections were completed and documented in accordance with procedure.
- The fuel was being inspected as specified by Technical Specifications Section 4.3 and the core was arranged as required in Technical Specifications Section 5.2.

Maintenance and Surveillance

- Maintenance logs and records were being kept and maintenance activities were being conducted in accordance with procedural requirements.
- The program for tracking and completing surveillance checks and Limiting Conditions for Operation verifications satisfied Technical Specifications requirements and licensee administrative and procedural controls.

Experiments

- Conduct and control of experiments and irradiations met the requirements specified in Technical Specifications Section 6.8, the applicable experiment and irradiation authorizations, and associated procedures.

Emergency Preparedness

- The Emergency Plan and Implementing Procedures were being reviewed annually as required and updated as needed.
- Emergency response facilities and equipment were being maintained as required.
- Emergency responders were knowledgeable of proper actions to take in case of an emergency.
- Off-site support was available and acceptable.
- Semiannual drills were being conducted as required by the Emergency Plan.
- Emergency preparedness training for staff personnel was being completed as required.

REPORT DETAILS

Summary of Plant Status

The University of Wisconsin (UW or the licensee) continued to operate the one megawatt TRIGA conversion reactor as needed in support of laboratory and lecture courses, research in the area of neutron irradiation, and the Reactor Sharing Program. During this inspection the facility was in the process of reloading the reactor core following the annual maintenance shutdown and the reactor was not operated.

1. Organizational Structure and Staffing

a. Inspection Scope (Inspection Procedure (IP) 69001)

To verify that the organization, responsibility, and staffing requirements specified in Section 6.1 of the facility Technical Specifications (TS) designated as Appendix A of the UW Nuclear Reactor renewed license, dated March 25, 2011, the inspector reviewed selected aspects of the following:

- Management responsibilities stipulated in the TS
- Staffing requirements for operation of the reactor facility
- Selected Startup Checklists for 2012 and to date in 2013
- Organizational structure for the Nuclear Reactor Laboratory
- Selected Operations Log Sheets, checklists, and associated forms and records for 2012 and to date in 2013
- University of Wisconsin Nuclear Reactor (UWNR) Procedure number (No.) 001, "Standing Operating Instructions," Revision (Rev.) 14, Reactor Safety Committee approval dated May 23, 2013
- "The University of Wisconsin Nuclear Reactor Laboratory Fiscal Year 2010 – 2011 Annual Operating Report," for the period from July 2010 through June 2011, submitted to the NRC on August 1, 2011
- "The University of Wisconsin Nuclear Reactor Laboratory Fiscal Year 2011 – 2012 Annual Operating Report," for the period from July 2011 through June 2012, submitted to the NRC on August 14, 2012

b. Observations and Findings

Through discussions with licensee representatives, it was noted that management responsibilities and the organization at the University of Wisconsin Nuclear Reactor Laboratory had not changed since the previous NRC inspection in July 2012 (Inspection Report No. 50-156/2012-201). The Reactor Supervisor retained direct control and overall responsibility for safe operation and maintenance of the facility as specified in the TS. The Reactor Supervisor reported to the Chancellor of University of Wisconsin-Madison through the Reactor Director and the Chair of the Engineering Physics Department as required.

The licensee's current operational organization consisted of a Reactor Director, a Reactor Supervisor, a Reactor Instrumentation Specialist, and three reactor operators. This organization was consistent with that specified in the TS.

A review of selected reactor Operating Log Sheets and the associated records for the past two years showed that the logs were being maintained as required. The logs and records confirmed that shift staffing met the requirements for duty, relief, and on-call personnel.

a. Conclusions

The licensee's organization and staffing met the requirements specified in the TS and applicable procedures.

2. Review and Audit and Design Change Functions

a. Inspection Scope (IP 69001)

In order to verify that the audits stipulated in TS Section 6.2.4 had been conducted by the Radiation Safety office and the Reactor Safety Committee (RSC), and that reviews required by TS Section 6.2.3 had been completed by the RSC, and to determine whether modifications to the facility were consistent with 10 CFR 50.59, the inspector reviewed:

- RSC meeting minutes from June 2011 through the present
- Selected Operations Log Sheets, checklists, and associated forms and records for 2012 and to date in 2013
- Charter of the Reactor Safety Committee of the University of Wisconsin Nuclear Reactor, revised June 3, 2011
- Records of design changes and/or modifications to the facility documented on forms entitled, "UWNR Modification Checklist," "Safety Screening," and "Safety Evaluation"
- Audits completed by Radiation Safety Office staff personnel documented in monthly reports submitted to the RSC entitled "Nuclear Reactor Audit and Report" for 2011, 2012, and to date in 2013
- Audits completed by operations staff personnel documented in monthly reports submitted to the RSC entitled "Monthly Operations Summary" for 2011, 2012, and to date in 2013
- Audits of the facility Requalification Plan, the Emergency Plan, and the Security plan completed by personnel from various organizations, including the UW Safety Department and the UW Police Department, which had been delegated that responsibility by the RSC
- UWNR Procedure No. 005, "UWNR Administrative Guide," Rev. 57, RSC approval dated May 23, 2013
- UWNR Procedure No. 019, "Changes, Tests, and Experiments," Rev. 1, RSC approval dated May 23, 2013
- "The University of Wisconsin Nuclear Reactor Laboratory Fiscal Year 2010 – 2011 Annual Operating Report," for the period from July 2010 through June 2011, submitted to the NRC on August 1, 2011
- "The University of Wisconsin Nuclear Reactor Laboratory Fiscal Year 2011 – 2012 Annual Operating Report," for the period from July 2011 through June 2012, submitted to the NRC on August 14, 2012

b. Observations and Findings

(1) Review and Audits Functions

The inspector reviewed the RSC's meeting minutes from June 2011 to the present. These meeting minutes demonstrated that the RSC had met at the required frequency and that a quorum was present. The minutes also indicated that the RSC, or a designated subcommittee, was completing reviews of those items and documents required by the TS. Through these reviews, the RSC was providing appropriate oversight and direction for reactor.

The inspector noted that various audits had been conducted of the facility in the areas of reactor operations, radiation protection, emergency preparedness, security, requalification of operators, and procedures. The inspector noted that the RSC reviewed these audits as required. The audits were structured so that the various aspects of the licensee's radiation protection and safety programs were reviewed on a monthly basis. Major facility documents and plans were reviewed annually, as were the facility procedures. The inspector noted that the audits and the resulting findings were adequately documented and that the licensee responded and took corrective actions to the findings as needed.

(2) Design Control Functions

Through review of applicable records and interviews with licensee personnel, the inspector determined that various modifications and design changes had been initiated at the facility since the last NRC operations inspection. Some of the recent changes involved various issues which included Remote Annunciator Reset, Remodel (Room) B1215 to Support the Advanced Reactor Materials Handling Laboratory, Core Inlet Temperature Monitor Replacement, and Console Recorder Replacement.

The inspector verified that the licensee was following the established design change program and that the required reviews and approvals of the changes had been completed by the RSC, if required, prior to implementation. It was noted that the design change procedure had been revised to help licensee personnel determine whether or not a full safety evaluation was required when a change was proposed. The procedure incorporated screening criteria for this purpose. The licensee determined that none of the changes that had been proposed to date met the criteria of 10 CFR 50.59(c)(2) paragraphs (i) through (viii) which would require NRC approval of the changes.

c. Conclusions

Review and audit functions required by TS Section 6.2 were acceptably completed by the RSC. The 50.59 process for reviewing and approving design

changes at the facility was being followed as required and no recent changes required NRC approval.

3. Reactor Operations

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to ensure that actions taken during routine operations or during abnormal occurrences were in compliance with TS Sections 6.6 and 6.7, and with the procedures specified in TS Section 6.4:

- UWNR Special Orders which were currently in effect including Nos. 2006-02, 2006-03, 2008-01, and 2008-02 (all dealing with neutron radiography experiments and shielding)
- UWNR Operators Turn-Over Log maintained on the computer in the Control Room
- Selected Operations Log Sheets, checklists, and associated forms and records for 2012 and to date in 2013
- Selected audits completed by Safety Department staff personnel documented in monthly reports submitted to the RSC entitled "Nuclear Reactor Audit and Report" for 2012 and to date in 2013
- Various reviews completed by operations staff personnel documented in monthly reports submitted to the RSC entitled "Monthly Operations Summary" for 2012 and to date in 2013
- Various UWNR Procedures including Procedure No. 001, "Standing Operating Instructions," Rev. 16, RSC approval dated May 23, 2013
- "The University of Wisconsin Nuclear Reactor Laboratory Fiscal Year 2010 – 2011 Annual Operating Report," for the period from July 2010 through June 2011, submitted to the NRC on August 1, 2011
- "The University of Wisconsin Nuclear Reactor Laboratory Fiscal Year 2011 – 2012 Annual Operating Report," for the period from July 2011 through June 2012, submitted to the NRC on August 14, 2012
- UWNR/Licensee letter to the NRC, "14 Day Follow-Up Special Report to Event Notification Report Number 47053," dated July 19, 2011

b. Observations and Findings

(1) Routine Operations

The inspector observed various activities and operations on Wednesday, August 7, 2013. The operations included reactor start-up, brief full power operation, and shut down. Licensee personnel also performed various surveillances during that period. It was noted that the appropriate forms and checklists were completed and that the appropriate data were recorded as required.

The inspector reviewed selected Daily Reactor Pre-Startup Check Lists, Reactor Startup Check Sheets, Operating Log Sheets, and Reactor Shutdown Checklists from December 2011 through the date of this

inspection. The forms were color coded to facilitate location of the recorded data and to ensure proper usage of the forms. Through this review and first hand observation, the inspector determined that reactor operations were carried out following written procedures as required by the TS. Any problems or abnormal events noted during operation, were documented in the operations log, reported, reviewed, and the problems resolved as required by TS and the procedures. Scrams were identified on specific forms in the logs and records, reported as required, and their cause(s) resolved before the resumption of operations under the authorization of a licensed SRO.

The inspector verified that the information that was required to be recorded by the TS and various procedures were logged on the appropriate forms and cross referenced with other logs and/or forms. The data indicated that no TS operational limits had been exceeded. As noted above, shift staffing was adequate and satisfied the requirements for duty and on-call personnel.

(2) Failure to Comply With the Requirements of TS Section 6.1.3.1(a)

TS Section 1.3 indicates that the reactor is secured when, in addition to other conditions, the reactor is shutdown and the console key switch is in the "off" position and the key is removed from the console and under the control of a licensed operator or stored in a locked storage area.

TS Section 6.1.3 requires that the minimum staffing when the reactor is not secured shall be a licensed reactor operator in the control room.

On Thursday, July 14, 2011, two licensed reactor operators were performing required reactor scram checks in accordance with UWNR Procedure No. 122, "Surveillance SCRAM Checks." Step 8 of the procedure involves testing the pool level high and low scrams and requires that those performing the checks call the University of Wisconsin Police Department (UWPD) to verify that the two alarms were received by UWPD. One of the operators (the second person) placed the telephone call to the UWPD. The on-duty operator completed the other steps of the procedure and turned the reactor console key switch to the "OFF" position and removed the key to secure the reactor. Subsequently, the second operator informed the on-duty operator that the UWPD had not received both alarm signals as required. The on-duty operator consulted with the senior reactor operator (SRO) and was instructed to conduct the test again and allow more time between testing the high and low level trips.

The on-duty operator inserted the console key into the slot and turned the key switch to the "TEST" position to complete Step 8 once again. They then conducted the scram test as the SRO had directed. The UWPD was then contacted and it was verified that both alarms had been received as required. Having successfully completed the scram check, both operators left the control room without turning the console key switch to the "OFF" position and removing the key. Approximately two minutes

later the SRO entered the reactor control room and immediately noted that there was no reactor operator in the Control Room as required by TS Section 6.1.3 when the reactor was not secured. The SRO immediately turned the key switch to the "OFF" position and removed the key to secure the reactor.

The reactor remained shutdown and secured until the proper notifications were made. The Reactor Director was notified of the event on July 14, 2011, and of the immediate corrective actions that had been taken. The Chairman of the Reactor Safety Committee was notified of the event by the Reactor Director on July 15, 2011. The licensee subsequently notified the NRC and submitted a letter dated July 19, 2011.

The licensee conducted an analysis of the cause of the problem and determined that, if the test were conducted too quickly, the network would only report the last known state to the UWPD (i.e., only one alarm would be noted). It was reasoned that this was the case on July 14, 2011. The licensee also determined that the on-duty operator had completed UWNR Procedure No. 122 prior to confirming that the UWPD had received the required two alarms during the first evolution. When Step 8 of the procedure was required to be performed again, the on-duty operator completed only that step but not the rest of the procedure. The on-duty operator and second operator then left the Control Room and failed to turn the console key switch to "OFF," remove the key, and secure the reactor.

The immediate corrective actions involved turning the key switch to the "OFF" position, removing the key from the console by the SRO thus securing the reactor, and informing management of the problem. The licensee also submitted a letter describing the event to the NRC on July 19, 2011. Subsequent corrective actions included revising UWNR Procedure No. 122 to put it into the form of a check-off type of procedure. In accordance with UWNR Procedure No. 001, "Standing Operating Instructions," it is required that the operator not proceed with the completion of other actions until the UWPD alarms have been verified. Also, all operations staff were made aware of the event and trained on the revised UWNR Procedure No. 122.

The inspector discussed the self-reported TS violation with the licensee and interviewed various reactor staff personnel. The circumstances of the event and the notifications were reviewed and the inspector verified that the licensee had completed the corrective actions.

The licensee was informed that the reactor operators leaving the Control Room with the key still in the console was a Severity Level IV violation of TS Section 6.1.3.1(a). However, the potential safety consequence was low because the Control Room generally accessible (i.e., is in a locked area) and was only vacant for less than two minutes. As indicated above, the inspector determined that the problem had been identified and reviewed by the licensee and reported to the NRC. Corrective actions had been identified and completed as well. As a result, the licensee was

informed that this non-repetitive, licensee-identified and corrected violation would be treated as a Non-Cited Violation (NCV), consistent with section VI.A.8 of the NRC Enforcement Policy (NCV 50-156/2013-201-01). This issue is considered closed.

c. Conclusions

Reactor operations and other required actions were completed in accordance with TS requirements and applicable procedures. One Non-Cited Violation was reviewed and is considered closed.

4. **Operator Requalification**

a. Inspection Scope (IP 69001)

To determine that operator requalification activities and training were conducted in accordance with UWNR Procedure No. 004, "University of Wisconsin Nuclear Reactor Operator Proficiency Maintenance Program," Rev. 4, RSC approval dated May 23, 2013 (the licensee's operator requalification plan) and 10 CFR Part 55, and that medical requirements were met, the inspector reviewed:

- Active operators' license status
- Written examination records for 2011 and 2012
- Operator medical examination records from 2010 to the present
- Selected Operations Log Sheets, checklists, and associated forms and records for 2012 and to date in 2013
- Audits completed by operations staff personnel documented in monthly reports submitted to the RSC entitled "Monthly Operations Summary" for 2012 and to date in 2013
- "20XX Training Status Record" forms for selected individuals for the past three years

- "UWNR Operator Evaluation Check Sheet" records for the past three years
- "UWNR Operator Proficiency Maintenance Program - Class Record Sheets" for the past three years
- Various UWNR Procedures including Procedure No. 004, "University of Wisconsin Nuclear Reactor Operator Proficiency Maintenance Program," Rev. 4, RSC approval dated May 23, 2013, and UWNR Procedure No. 005, "UWNR Administrative Guide," Rev. 57, RSC approval dated May 23, 2013
- Logs and records of reactivity manipulations documented on forms associated with UWNR Procedure No. 112, "Operating Log Sheet," Rev. 10, RSC approval dated May 23, 2013
- "The University of Wisconsin Nuclear Reactor Laboratory Fiscal Year 2010 – 2011 Annual Operating Report," for the period from July 2010 through June 2011, submitted to the NRC on August 1, 2011
- "The University of Wisconsin Nuclear Reactor Laboratory Fiscal Year 2011 – 2012 Annual Operating Report," for the period from July 2011

- through June 2012, submitted to the NRC on August 14, 2012
- ANSI/ANS Standard 15.4, "Standards for Selection and Training of Personnel for Research Reactors," dated June 9, 1988

b. Observations and Findings

As noted above, there are currently three qualified SROs at the facility and three ROs. All of the operators' licenses were verified to be current. It was noted that there were no people in training to become qualified operators as of the date of the inspection but a class was scheduled to begin in the fall.

A review of facility logs and training records showed that training and classroom instruction had been conducted in accordance with the licensee's requalification and training program. It was noted that annual written examinations had been given as stipulated and the results documented. A review of the records of quarterly reactor operations, reactivity manipulations, other operations and supervisory activities, indicated that these required activities were being completed by each licensed operator. Records indicating the completion of the quarterly performance evaluations were also maintained. The inspector noted that the licensee's training program appeared to be comprehensive and was well documented.

Through discussions with licensed operators and a review of records, the inspector also verified that each operator was receiving a biennial medical examination as required.

c. Conclusions

The requirements of the Operator Requalification Program were being met and the program was being acceptably implemented. Medical examinations for facility operators were being completed biennially as required.

5. Procedures and Procedural Control

a. Inspection Scope (IP 69001)

To determine whether facility procedures met the requirements outlined in TS Section 6.4, the inspector reviewed:

- Selected operating procedures and administrative logs
- Selected forms and checklists associated with current procedures
- Procedural reviews and updates as documented in RSC meeting minutes
- UWNR Procedure No. 005, "UWNR Administrative Guide," Rev. 57, RSC approval dated May 23, 2013
- "The University of Wisconsin Nuclear Reactor Laboratory Fiscal Year 2010 – 2011 Annual Operating Report," for the period from July 2010 through June 2011, submitted to the NRC on August 1, 2011
- "The University of Wisconsin Nuclear Reactor Laboratory Fiscal Year 2011 – 2012 Annual Operating Report," for the period from July 2011 through June 2012, submitted to the NRC on August 14, 2012

b. Observations and Findings

The inspector determined that the licensee had developed procedures for the operations, tasks, and conditions listed in Section 6.4 of the TS. The inspector noted that procedure UWNR Procedure No. 001, "Standing Operating Instructions," specified the role and use of procedures at the facility. The licensee's procedures and checklists were found to be acceptable for the current facility status, staffing, and level of operations. The procedures were being audited and/or reviewed annually, as noted earlier, and were updated as needed.

Minor changes of some types of procedures were allowed to be reviewed and approved by two SROs. These types of items were presented to the RSC for information and were reviewed by that committee. Major changes to the procedures were required to be reviewed and approved by the RSC prior to implementation. The inspector determined that substantive revisions to checklists and forms were also routinely presented to the RSC for review and approval. The inspector verified that the latest revisions to selected procedures and forms had been through this review and approval process as required. It was also noted that, since the previous inspection, a new procedure had been developed, submitted to the RSC, and approved. The procedure dealt with the design change and control program.

Through observation of various activities during this inspection, the inspector noted that operations were completed in accordance with the applicable checklists and procedures as required. Adherence to procedure was acceptable.

c. Conclusions

Facility procedures satisfied TS Section 6.5 requirements and procedure reviews were being completed annually. Procedural compliance was acceptable.

6. Fuel Handling

a. Inspection Scope (IP 69001)

In order to verify adherence to fuel handling and inspection requirements specified in TS Sections 3.1.4, 3.1.6, 4.1, 5.3 and 5.4, the inspector reviewed:

- UWNR LEU Fuel Bundle Data Record Books
- Core Status Boards located at the reactor pool top and in the Control Room
- Operator Information Book which included core loading diagrams and standard fuel loading instructions
- Selected Operations Log Sheets, checklists, and associated forms and records for 2012 and to date in 2013
- Various UWNR Procedures including Procedure No. 143, "Procedure for Fuel Handling and Core Arrangements," Rev. 3, RSC approval dated May 23, 2013, and Procedure No. 143A, "Core Loading Diagram," Rev. 4, RSC approval dated May 23, 2013
- "The University of Wisconsin Nuclear Reactor Laboratory Fiscal Year

2010 – 2011 Annual Operating Report,” for the period from July 2010 through June 2011, submitted to the NRC on August 1, 2011

- “The University of Wisconsin Nuclear Reactor Laboratory Fiscal Year 2011 – 2012 Annual Operating Report,” for the period from July 2011 through June 2012, submitted to the NRC on August 14, 2012

b. Observations and Findings

The inspector verified that the reactor fuel bundles in the core and in storage were being inspected annually as required by TS. The results of the inspections were recorded as required and comments on the condition of each fuel bundle were noted on the appropriate pages in the Fuel Record Book. The procedures and the controls specified for these operations were acceptable.

The inspector determined that the licensee was maintaining the required records of the various fuel movements that had been completed using Fuel Movement Log Sheets. This information was routinely stored with the facility Operating Log Sheets. The inspector verified that the movements were conducted and recorded in compliance with procedure.

c. Conclusions

Reactor fuel movements and inspections were completed and documented in accordance with procedure. The fuel was being inspected as specified by TS Section 4.1, and the core was arranged as required in TS Section 5.4.

7. Maintenance and Surveillance

a. Inspection Scope (IP 69001)

To determine that surveillance and Limiting Conditions of Operation activities and verifications were being completed as required by TS Sections 3 and 4, and that maintenance activities were being conducted, the inspector reviewed:

- Selected preventive maintenance records for 2012 and to date in 2013
- Open Pool Reactor Manual (OPRM) referenced in UWNR Procedure No. 100A
- Selected forms and records associated with the procedures UWNR listed below
- Various UWNR Procedures including Procedure No. 100, “Surveillance Activities,” Rev. 54, RSC approval dated May 23, 2013, and Procedure No. 169, “Annual Maintenance Procedure,” Rev. 14, RSC approval dated December 13, 2012
- “The University of Wisconsin Nuclear Reactor Laboratory Fiscal Year 2010 – 2011 Annual Operating Report,” for the period from July 2010 through June 2011, submitted to the NRC on August 1, 2011
- “The University of Wisconsin Nuclear Reactor Laboratory Fiscal Year 2011 – 2012 Annual Operating Report,” for the period from July 2011 through June 2012, submitted to the NRC on August 14, 2012

b. Observations and Findings

(1) Maintenance

The inspector reviewed the maintenance that had been completed for 2012 and to date in 2013 as required by UWNR Procedure No. 100 and UWNR Procedure No. 169. The records indicated that some maintenance was conducted monthly and some annually as required. The majority of the annual maintenance was completed in June each year. Also, preventive maintenance activities were tracked and conducted as scheduled and any problems found were addressed in accordance with the TS, applicable procedures, the OPRM, or other equipment manuals. Maintenance activities ensured that equipment remained consistent with the Safety Analysis Report and TS requirements. Unscheduled maintenance or repairs were reviewed to determine if they required 50.59 evaluations. The inspector verified that system verifications and operational checks were performed to ensure system operability before the equipment involved was returned to service.

(2) Surveillance

The inspector determined that selected daily, weekly, monthly, semiannual, and annual checks, tests, and verifications for required Limiting Conditions of Operation (LCO) and surveillance activities were completed as stipulated. Those surveillance and LCO verifications reviewed were completed on schedule and in accordance with licensee procedures. All the recorded results were within the TS and procedurally prescribed parameters. The records and logs reviewed appeared to be complete and were being maintained as required.

c. Conclusions

Maintenance logs and records were being maintained and maintenance activities were being conducted in accordance with procedural requirements. The program for surveillance and LCO verifications was being carried out in accordance with TS requirements.

8. Experiments

a. Inspection Scope (IP 69001)

In order to verify that experiments were being conducted in accordance with approved procedural guidelines and reviewed and approved as specified in TS Section 6.5 and within, the inspector reviewed:

- Control of irradiated items and potential hazards identification
- Records of recently proposed experiments and/or changes to approved experiments documented on forms entitled, "Experiment Review Questionnaire"
- Selected forms and records associated with those procedures UWNR

listed below

- Various UWNR Procedures including Procedure No. 002, "Experiment Standing Operating Instructions," Rev. 12, RSC approval dated May 23, 2013, and Procedure No. 030, "Experiment Review Questionnaire," Rev. 7, RSC approval dated May 23, 2013

b. Observations and Findings

In accordance with the licensee's TS, experiments were classified as "routine," "modified routine," or "special." It was noted that routine and modified routine experiments could be conducted at the discretion of the SRO responsible for reactor operation. Special experiments were required to be reviewed by the RSC and possibly were of such a nature that they could require review and approval by the NRC. It was noted that three experiments were currently in use at the facility. The inspector determined that no new experiments had been initiated since 2007. The inspector reviewed the current experiments and verified that they had been reviewed and approved by the Reactor Director as required. Copies of the Experiment Review Questionnaires had also been forwarded to the RSC for information and had been reviewed by the committee. Irradiation authorizations, documented on UWNR 134 forms, had also been reviewed and approved as required.

The conduct and results of the experiments and irradiations were documented on the Operations Log Sheets and on the irradiation request forms, UWNR Procedure No. 130, "Request for Isotope Production." The inspector verified that experiments and irradiations were conducted, and the material produced was controlled, as required in the TS, the applicable questionnaires or authorizations, and the associated procedures.

c. Conclusions

Conduct and control of experiments and irradiations met the requirements specified in the TS Section 6.8, the applicable experiment and irradiation authorizations, and associated procedures.

9. Emergency Preparedness

a. Inspection Scope (IP 69001)

To ensure that the licensee's emergency response program was being conducted in accordance with UWNR Procedure No. 006, "University of Wisconsin Nuclear Reactor Emergency Plan," Rev. 4, RSC approval dated May 23, 2013 (the licensee's Emergency Plan), the inspector reviewed:

- Offsite support for the UWNR facility
- Records of emergency and evacuation drills
- Training records regarding emergency response
- Various UWNR Procedures including Procedure No. 005, "UWNR Administrative Guide," Rev. 57, RSC approval dated May 23, 2013, and

UWNR Procedure No. 150, "Emergency Procedure - Reactor Accident, Fission Product Release, or Major Spill of Radioactive Materials," Rev. 22, RSC approval dated December 13, 2012

- Emergency response requirements stipulated in ANSI/ANS 15.16 – 1982 (R1988), "Emergency Planning for Research Reactors"

b. Observations and Findings

The emergency plan in use at the UWNR Laboratory was the facility procedure, UWNR Procedure No. 006, "University of Wisconsin Nuclear Reactor Emergency Plan." The Emergency Plan (E-Plan) was audited and reviewed annually as required. E-Plan Implementing Procedures, UWNR Procedure Numbers 150-154, 156 and 157, were also reviewed annually and revised as needed.

Through records review and interviews with licensee and support personnel, emergency responders were determined to be knowledgeable of the proper actions to take in case of an emergency. One agreement with an off-site response organization, the University of Wisconsin Hospital and Clinics, was updated every two years and was being maintained as detailed in the facility E-Plan. Other agreements were not needed because the fire department and police force were under statutory requirements to respond to the UWNR in case of an emergency. Communications capabilities with these support groups were tested periodically and were acceptable.

Emergency drills for operations personnel were conducted semiannually as required by the E-Plan. One of the semiannual drills was required to include a practice evacuation of the facility. The other drill involved reviewing the emergency procedures, discussing what actions to take, and conducting walk-through training in various areas or on various pieces of equipment. The results of the drills were documented and filed.

Training for reactor staff personnel in emergency response was conducted and documented through the Operator Requalification Program. The inspector verified that the E-Plan and implementing procedures were reviewed annually by UWNR staff as a part of their training as required. As noted earlier, a review of facility logs and training records showed that other related training and classroom instruction had also been conducted as required.

The inspector toured the University of Wisconsin Hospital and Clinics Emergency Room (ER) area with the UWNR Reactor Director and three hospital representatives on August 7, 2013. It was noted that the room and equipment set aside for use during a radiological event appeared to be adequate and in a state of readiness. During the tour the inspector asked about the hospital staff response capabilities in case of an event at the Nuclear Reactor Laboratory. The hospital representatives stated that they had the training needed to provide whatever support the UWNR might need in an emergency. The representatives also showed the inspector the emergency decontamination facility and conducted a demonstration of the facility capabilities. It was well suited to process many contaminated individuals in a rapid sequence without any problem. The inspector also noted that there appeared to be a good working relationship

between the licensee and the hospital staff.

c. Conclusions

The inspector concluded that the emergency preparedness program was being conducted in accordance with the Emergency Plan because: 1) The Emergency Plan and Implementing Procedures were being reviewed annually as required and updated as needed; 2) emergency response facilities and equipment were being maintained as required; 3) emergency responders were knowledgeable of proper actions to take in case of an emergency; 4) off-site support was acceptable; 5) semiannual drills were being conducted as required by the E-Plan; and 6) emergency preparedness training for staff personnel was being completed as required.

10. Exit Meeting Summary

The inspection scope and results were summarized on August 8, 2013, with licensee representatives. The inspector discussed the findings for each area reviewed. The licensee acknowledged the results of the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

R. Agasie	Reactor Director
M. Blanchard	Reactor Supervisor
C. Edwards	Nuclear Reactor Technician/Electronics Technician

Other Personnel

M. Bartlett	Safety and Hazard Control Manager, University of Wisconsin Hospital and Clinics
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INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
IP 92701	Follow Up on Items

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-156/2013-201-01	NCV	Failure to comply with TS 6.1.3.1(a) which requires that, when the reactor is in operation (i.e., not secured), the minimum staffing shall be a licensed reactor operator in the control room.
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Closed

50-156/2013-201-01	NCV	Failure to comply with TS 6.1.3.1(a) which requires that, when the reactor is in operations (i.e., not secured), the minimum staffing shall be a licensed reactor operator in the control room.
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PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ALARA	As Low As Reasonably Achievable
E-Plan	Emergency Plan
IP	Inspection Procedure
LCO	Limiting Conditions of Operation
NCV	Non-Cited Violation
MW	Megawatt
No.	Number
NRC	Nuclear Regulatory Commission
OPRM	Open Pool Reactor Manual
PARS	Publicly Available Records
Rev.	Revision
RO	Reactor Operator
RSC	Reactor Safety Committee
SRO	Senior Reactor Operator
TS	Technical Specifications
UW	University of Wisconsin
UWNR	University of Wisconsin Nuclear Reactor