February 17, 2012

Mr. Richard L. Holm
Reactor Administrator
216 Talbot Laboratory
104 South Wright St.
Urbana, IL 61801

SUBJECT: NRC INSPECTION REPORT 05000151/12-002(DNMS) ─ UNIVERSITY OF ILLINOIS NUCLEAR REACTOR

Dear Mr. Holm:

On February 2, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed inspection activities at the permanently shut down University of Illinois Nuclear Reactor, Urbana, Illinois. The purpose of this inspection was to determine whether decommissioning activities were conducted safely and in accordance with NRC requirements. Specifically, during onsite inspections on January 5-6 and January 31 – February 2, 2012, the inspectors evaluated the licensee's decommissioning performance in the areas of reviews and audits, health physics, and work controls related to the removal of reactor internals and activated concrete. At the conclusion of the onsite inspections, on February 2, 2012, the inspectors discussed the final inspection results with you and members of your staff.

This inspection consisted of an examination of decommissioning activities at the site as they relate to safety and compliance with the Commission's rules and regulations. Areas examined during the inspection are identified in the enclosed inspection report. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations of activities in progress, and interviews with personnel. No violations of NRC requirements were identified during this inspection.

In accordance with Title 10 of the Code of Federal Regulations 2.390 of the NRC's "Rules of Practice," a copy of this letter and the enclosed report will be available electronically for public inspection in the NRC's Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC's website at http://www.nrc.gov/reading-rm/adams.html.

We will gladly discuss any questions you may have regarding this inspection.

Sincerely,

/RA/

Aaron T. McCraw, Acting Chief
Materials Control, ISFSI, and
Decommissioning Branch
Division of Nuclear Materials Safety

Docket No. 050-00151
License No. R-115

Enclosure:
NRC Inspection Report
No. 05000151/12-002(DNMS)

cc w/encl: James Stubbins, University
of Illinois
Joseph G. Klinger, Illinois Emergency
Management Agency

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.	050-00151
License No.	R-115
Report No.	05000151/12-002(DNMS)
Licensee:	University of Illinois
Facility:	Nuclear Reactor
Location:	Urbana, Illinois
Dates:	January 5-6, 2012 January 31 – February 2, 2012
NRC Inspectors:	Jeremy Tapp, Health Physicist Wayne Slawinski, Senior Health Physicist Lionel Rodriguez, Reactor Engineer
NRC Observer:	Ryan Craffey, Health Physicist
Approved by:	Aaron T. McCraw, Acting Chief Materials Control, ISFSI, and Decommissioning Branch Division of Nuclear Materials Safety

Enclosure

EXECUTIVE SUMMARY
University of Illinois – Nuclear Reactor
Inspection Report 05000151/12-002(DNMS)

The University of Illinois Nuclear Reactor was shut down in 1998 and has been maintained in a safe storage condition (SAFSTOR) since shutdown. In 2004, all spent fuel was shipped off site for permanent storage. In October 2011, the site transitioned to active decommissioning, as the qualified contractor arrived on site; project policies, programs, and procedures were developed and approved; and dismantlement work commenced. The licensee has completed wire saw cutting of the clean bioshield areas and removal of the reactor internal components. All components with radiologically significant dose rates are being stored in the reactor building while waiting to be transported and disposed of as radioactive waste. Currently, the licensee is removing activated concrete in the lower bioshield surrounding the reactor tank using a hydraulic demolition hammer to rubblize the concrete for radioactive waste disposal. This routine decommissioning inspection included a review of the licensee's activities related to reviews and audits, health physics, and work controls during reactor internal component and activated concrete removal activities.

Research and Test Reactor Decommissioning

Work Controls

The licensee's work plans for reactor component and activated concrete removal were adequate to ensure worker safety during the activities and were written in accordance with the Decommissioning Plan (DP). The licensee maintained an adequate and appropriate level of contractor oversight through direct observations and frequent communication during the work. In addition, the licensee's contractors used effective communications to ensure work was performed safely and in a controlled manner. (Section 1.1)

Health Physics

Planning of radiological work for the rotary specimen assembly, or "Lazy Susan," and activated concrete removal was adequate overall and properly executed leading to worker dose that was as low as is reasonably achievable (ALARA). Surveys and air sampling were performed adequately by radiation protection staff to identify the radiological hazards and materials present, and post and label areas with radioactive material as required. Work controls were established as prescribed in radiation work permits (RWPs) and workers followed proper radiation protection practices. (Section 1.2)

Audits and Reviews

The licensee's Reactor Committee met the administrative requirements of the DP and Technical Specifications (TS) and discussed appropriate topics related to current decommissioning activities. The audit reviewed was comprehensive and resulting corrective actions were appropriate. (Section 1.3)

No violations of U.S. Nuclear Regulatory Commission (NRC) requirements were identified during this inspection.

Report Details

1.0 Research and Test Reactor Decommissioning (Inspection Procedure (IP) 69013)

1.1 Work Controls

a. Inspection Scope

During the inspection period, the licensee commenced work to remove reactor internal components and activated concrete in the lower bioshield. The inspectors reviewed work plans UI-MCP-OP-02, "Reactor Component Removal Work Plan," Revision B, and UI-MCP-OP-05, "Activated Material Removal Work Plan," Revision 0, to determine if the processes described contained adequate steps and controls to perform the work safely and were written in accordance with the DP. In addition, primarily for the removal of the Lazy Susan from the reactor tank, the licensee developed an Addendum to RWP-005 titled, "Radiation Safety for Component Removal Checklist." The inspectors reviewed this checklist and verified that the licensee completed the applicable requirements before removing the Lazy Susan.

The inspectors observed the licensee perform the Lazy Susan removal from the reactor tank to a shielded container and verified that the work proceeded as described in the applicable procedure and checklist. In addition, the inspectors observed the licensee remove activated concrete by rubblizing it with a hydraulic demolition hammer and load the debris into waste containers, in this case SuperSacks. The inspectors verified that work proceeded in accordance with the applicable procedure and evaluated the licensee's control and oversight of the contract workforce during the work.

b. Observations and Findings

The inspectors found that UI-MCP-OP-02 and UI-MCP-OP-05 were written in accordance with the approved DP and contained adequate steps to control the work. The steps detailed the prerequisites and general process for each activity. Because the Lazy Susan removal required more detailed controls to ensure it was moved safely, the checklist developed as part of the RWP provided that rigor. The inspectors noted contingency planning as an area for improvement. Although not required, the licensee did not develop a formal contingency plan or communicate worker actions during the pre-job brief observed for the Lazy Susan removal in case of an adverse scenario such as a crane issue causing a load drop or stuck load. After inspectors questioned the licensee on what actions they should take if an issue arose during the evolution, the licensee communicated the actions for each individual to take in that situation.

During observation of the activated concrete removal activities, the inspectors noted the equipment operators utilized effective and frequent communications to ensure the safety of each other. Specifically, they performed peer checking and waited until the demolition dust settled in the work area enclosure before entering to avoid any potential industrial or radiological hazards.

No findings of significance were identified.

c. Conclusions

The licensee's work plans for reactor component and activated concrete removal were adequate to ensure worker safety during the activities and were written in accordance with the DP. The licensee maintained an adequate and appropriate level of contractor oversight through direct observations and frequent communication during the work. In addition, the licensee's contractors used effective communications to ensure work was performed safely and in a controlled manner.

1.2 Health Physics

a. Inspection Scope

The inspectors interviewed site personnel and performed facility tours during both the Lazy Susan and activated concrete removal activities to observe current field conditions. The inspectors evaluated the site's material condition and housekeeping, area radiological conditions, and radiological access control and associated posting/labeling. Independent radiation measurements were made throughout the areas toured and compared to the licensee's postings.

The inspectors reviewed documentation prepared by the licensee for the removal of the Lazy Susan to a shielded storage container that will eventually be shipped off site to a radioactive waste disposal facility. Specifically, the inspectors reviewed the required ALARA Review for Reactor Component Removal; the supporting dose rate calculation titled "Lazy Susan Removal Operational Dose Rates," dated October 28, 2011; and RWP number UI-005, "Component Removal from Reactor," Revision 0, to verify the principles of ALARA were implemented and the evaluation was adequate to ensure worker safety. The inspectors also observed the Lazy Susan removal preparation activities and the move itself to verify the required controls were in place as described in the licensee's documentation.

The inspectors observed and reviewed documentation for removal of activated concrete from the lower bioshield. Specifically, the inspector reviewed RWP number UI-006, "Activated Concrete Removal," Revision 0, and its basis for the concrete demolition activity to ensure appropriate radiation protection controls were designated. During the concrete demolition activities, the inspector observed the licensee perform the work to verify the requirements of the RWP were followed and that the licensee adequately analyzed and controlled the potentially contaminated dust produced from the work. The inspectors also reviewed the ALARA Review for Activated Concrete in Reactor developed to ensure the requirements of Title 10 Code of Federal Regulations (CFR) Part 20, Subpart H, Respiratory Protection, were met. In the case the licensee would determine the need to wear respirators during the activated concrete removal work, the inspectors reviewed the licensee's respiratory protection program described in UI-MCP-RC-08, "Respiratory Protection Program for the University of Illinois Nuclear Reactor Laboratory D&D Project," Revision 0, to verify it was written in accordance with the requirements in 10 CFR 20.1703. The inspectors verified that radiation worker medical and respirator fit test records were current and that the licensee maintained National Institute of Occupational Safety and Health (NIOSH) approved respirators. In addition, the inspectors observed radiation protection technicians performing surveys on rubblized concrete in SuperSacks filled from the activated concrete removal of the lower

bioshield. The inspectors performed confirmatory surveys with a portable gamma spectroscopy survey instrument to verify the licensee's results and radionuclide(s) present.

b. Observations and Findings

The inspectors found that the facility was generally clean and free of debris and personnel hazards throughout the observed work activities. Access control and postings were determined to be adequate for the radiological conditions of the facility for the Lazy Susan removal evolution, storage of the Lazy Susan and remaining reactor components, and activated concrete removal. The inspectors noted that the licensee used adequate shielding to ensure no High Radiation Areas would be required to be posted and controlled and that the Restricted Area remained in the same configuration before and after the Lazy Susan and reactor components were stored outside the reactor tank.

The inspectors found the Lazy Susan removal activities were performed using adequate dose reduction controls as described in the ALARA Review. For example, the licensee performed many mock-up dry runs to ensure the Lazy Susan move would be performed with the maximum distance to radiation workers and the least amount of time possible in transition to the shielded storage container. The inspectors noted the maximum whole body dose to a radiation worker during the evolution was 9 millirem with the total to all individuals involved at 19 millirem. The total predicted dose to all individuals was 22 millirem.

The inspectors discussed the scope and process of the lower bioshield concrete demolition activities with the knowledgeable personnel. The licensee adequately justified the radiological controls and precautions employed during the demolition activities, which were described in the applicable RWP and approved work plan. The inspectors noted the licensee had constructed an enclosure around the demolition activities as described in the work plan to control any potential airborne radioactive materials produced, and added a viewing window to the enclosure so equipment operators would be able to perform the majority of the work remotely. This greatly reduced the potential for radiation workers to receive any internal uptake of radioactive material. The inspectors also noted the licensee performed daily surveys for both activation products in the concrete and removable contamination in the demolition work area to verify radioactivity levels were as predicted from earlier characterization surveys. In addition, the licensee is using water misting as an engineering control to reduce the potential for airborne radioactivity and performing air sampling in the enclosure to determine airborne radioactivity concentration in case equipment operators need to enter the enclosure to work. Thus far, air sampling results have all been at background levels, even after performing demolition on areas with the highest potential for the greatest radioactivity levels.

During confirmatory surveys of the SuperSacks filled with activated concrete demolition debris, the inspectors found Cobalt-60 with the portable gamma spectroscopy detector. This was the radionuclide of concern determined by the licensee for the concrete rubble and confirmed the licensee's previous surveys.

No findings of significance were identified.

c. Conclusions

Planning of radiological work for the Lazy Susan and activated concrete removal was adequate overall and properly executed leading to worker doses that were ALARA. Surveys and air sampling were performed adequately by radiation protection staff to identify the radiological hazards and materials present, and post and label areas with radioactive material as required. Work controls were established as prescribed in RWPs and workers followed proper radiation protection practices.

1.3 Audits and Reviews

a. Inspection Scope

The inspectors reviewed the last Reactor Committee Meeting Minutes, #11-5 dated December 21, 2011. The inspectors determined whether the meetings met the administrative requirements of the DP and TS, including membership, quorums, and meeting frequency. In addition, the inspectors reviewed an audit performed by the licensee's contractor evaluating the approved project procedures, which was completed on November 9, 2011. The inspectors reviewed the audit to understand what issues were identified and whether the licensee's response was appropriate.

b. Observations and Findings

The inspectors found that for the meeting minutes reviewed, the Reactor Committee met the applicable requirements of the DP and TS. Specifically, the Reactor Committee maintained the required membership; a quorum was obtained; and the meeting was held well within the required frequency. The inspectors also noted that the meeting minutes described discussions held that were appropriate for the current decommissioning activities occurring at the reactor. In addition, the inspectors found the audit reviewed to be comprehensive in nature and corrective actions for issues identified to be appropriate.

No findings of significance were identified.

c. Conclusions

The licensee's Reactor Committee met the administrative requirements of the DP and TS and discussed appropriate topics related to current decommissioning activities. The audit reviewed was comprehensive and resulting corrective actions were appropriate.

2.0 Exit Meeting Summary

The inspectors presented the inspection results to licensee management at the conclusion of the onsite inspections on February 2, 2012. The licensee acknowledged the results presented and did not identify any of the documents reviewed by the inspectors as proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

[1]R. Holm, Reactor Administrator
S. LaBuy, Project Manager
[1]C. Dewitt, Assistant Project Manager
[1]D. Ball, Construction Manager
[1]C. Higgins, Project Radiation Safety Officer
[1]D. Jordan, Waste Management Supervisor

[1]Indicates presence at the exit meeting held on February 2, 2012.

LIST OF PROCEDURES USED

IP 69013	Research and Test Reactor Decommissioning

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened	None
Closed	None
Discussed	None

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Is Reasonably Achievable
CFR	Code of Federal Regulations
DNMS	Division of Nuclear Materials Safety
DP	Decommissioning Plan
NIOSH	National Institute of Occupational Safety and Health
NRC	U. S. Nuclear Regulatory Commission
RWP	Radiation Work Permit
TS	Technical Specifications
SAFESTOR	Safe Storage

DOCUMENTS REVIEWED

Licensee documents used during the inspection were specifically identified in the Report Details above.