

December 30, 2011

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

SUBJECT: NRC INSPECTION REPORT 05000151/12-001(DNMS) – UNIVERSITY OF
ILLINOIS NUCLEAR REACTOR

Dear Mr. Holm:

On December 16, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed inspection activities at the permanently shut down University of Illinois Nuclear Reactor, Urbana, IL. The purpose of the inspection was to determine whether decommissioning activities were conducted safely and in accordance with NRC requirements. Specifically, during on-site inspections on November 28 to 30 and December 14, 2011, and subsequent in-office review through December 16, 2011, the inspector evaluated the licensee's decommissioning performance in the areas of transportation of radioactive waste, reviews and audits, effluent control, and health physics and work control related to concrete cutting activities. At the conclusion of the on-site inspections, the inspector discussed the interim inspection results with you and members of your staff. At the conclusion of the in-office review, a final telephone exit meeting was conducted on December 16, 2011, to discuss the final results with you.

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 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.

Based on the results of this inspection, no violations of NRC requirements were identified.

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 Public Document Room or from the NRC's Agencywide Document Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

R. Holm

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

Sincerely,

/RA/

Christine A. Lipa, Chief
Materials Control, ISFSI, and
Decommissioning Branch
Division of Nuclear Materials Safety

Docket No. 50-151
License No. R-115

Enclosure:
NRC Inspection Report
No. 05000151/12-001(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. 05000151/12-001(DNMS)

Licensee: University of Illinois

Facility: Nuclear Reactor

Location: Urbana, Illinois

Dates: November 28 – 30 and December 14, 2011
(on-site) through December 16, 2011 (in-
office review)

NRC Inspector: Jeremy Tapp, Health Physicist

NRC Observer: Claire Wellinghoff, Health Physicist

Approved by: Christine A. Lipa, Chief
Materials Control, ISFSI, and
Decommissioning Branch
Division of Nuclear Materials Safety

Enclosure

EXECUTIVE SUMMARY
University of Illinois – Nuclear Reactor
Inspection Report 05000151/12-001(DNMS)

The University of Illinois Nuclear Reactor was shut down in 1998 and has been maintained in a safe storage condition (SAFSTOR) since. In 2004, all spent fuel was shipped offsite for permanent storage. In October 2011, the site transitioned to active decommissioning as the qualified contractor arrived onsite; project policies, programs, and procedures were developed and approved; and dismantlement work commenced. This routine decommissioning inspection included a review of the licensee's activities related to the transportation of radioactive waste, reviews and audits, effluent control, and health physics and work control during upper bioshield concrete cutting activities.

Research and Test Reactor Decommissioning

Work Controls

The approved work plan for concrete cutting was adequate to ensure safety during the work and was written in accordance with the Decommissioning Plan (DP) requirements. The licensee maintained an adequate and appropriate level of contractor oversight through direct observations and frequent communication during the work. In addition, the issue of control of material to be free released was adequately corrected (Section 1.1).

Health Physics

Inspector observations of the facility and concrete cutting work determined that radiological and industrial controls ensured worker safety, controlled the spread of potentially contaminated water, and prevented loose radiological contamination in uncontrolled areas. The licensee performed adequate radiological surveys to determine if the cut concrete blocks had detectable surface contamination. For the block results reviewed, each was released in accordance with the requirements in the DP (Section 1.2).

Effluent Controls and Environmental Monitoring

The licensee processed and cleaned the reactor tank water in accordance with the approved procedure and released it to the sanitary sewer system at concentrations under the required release criteria for the radionuclides of concern at the site (Section 1.3).

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 (Section 1.4).

Solid Radioactive Waste Management and Transportation

Radioactive waste shipments were prepared, sampled, analyzed and manifested consistent with the licensee's waste management and transportation plan to meet the requirements of 10 CFR Parts 20 and 61 and those of the Department of Transportation (DOT) in Title 49 of the Code of Federal Regulations (CFR) Parts 170-189. Radioactive waste shippers were knowledgeable of waste handling and package loading, and had completed 49 CFR 172.704 required Subpart H training (Section 1.5).

Report Details

1.0 Research and Test Reactor Decommissioning (69013)

1.1 Work Controls

a. Inspection Scope

During the inspection period, the licensee commenced work to cut the upper section of the concrete bioshield into blocks that could be lifted and moved by the installed crane in the building. The inspector reviewed work plan UI-MCP-OP-04, "Bioshield Concrete Cutting Work Plan," Revision 0 to determine if the process described contained adequate steps and controls to perform the work safely and it was written in accordance with the DP. The inspector observed the concrete cutting work each day while onsite, verified the work proceeded as described in the procedure, and evaluated the licensee's control and oversight of the contract workforce during the work.

In addition, as discussed in Inspection Report (IR) 2010-001, the inspector followed up on the issue identified regarding a procedural deficiency allowing the free release of small amounts of radioactive material. The inspector determined if the licensee's corrective actions were adequate.

b. Observations and Findings

The inspector found that UI-MCP-OP-04 was written in accordance with the approved DP and contained adequate steps to control the work. The steps detailed the process of cutting the blocks with respect to when and how but were not too specific as to allow changes when safety or efficiency would require it. While onsite, the inspector noted that when a minor process change was identified that would allow the lifting of concrete blocks in a safer manner, the licensee was contacted by the contractor to review the changes before the new work process commenced. The change was performed in a controlled manner and involved all appropriate parties before work resumed using the new process.

The inspector reviewed the corrective actions taken by the licensee to ensure no detectable licensed radioactive material would be free released to an unauthorized recipient, as required by the DP. The licensee wrote a formal memo to file describing the free release process that conformed to the requirements in the DP. In addition, the licensee changed the format of the survey reports developed during free release surveys so that results with detectable levels of radioactivity would be easier to identify than before.

No findings of significance were identified.

c. Conclusions

The licensee's work plan for concrete cutting was adequate to ensure safety during the work and was 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 issue of control of material to be free released was adequately corrected.

1.2 Health Physics

a. Inspection Scope

The inspector interviewed site personnel and performed a facility tour to observe current field conditions. The inspector 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 inspector observed radiation protection technicians performing surveys on concrete blocks cut from the upper bioshield area for final disposition as clean or contaminated waste. A selection of surveys of the concrete blocks that were cut was reviewed. The inspector also reviewed the Radiation Work Permit (RWP) and its basis for the concrete cutting activity to ensure appropriate radiation protection controls were in place before the work commenced, where necessary. During the concrete cutting activities, the inspector observed the licensee perform the work to verify the requirements of the RWP were followed and the licensee controlled the potentially contaminated water in accordance with the approved work plan.

b. Observations and Findings

The inspector found that the facility was generally clean and free of debris and personnel hazards. Access control and postings were determined to be adequate for the radiological conditions of the facility. Radiation protection technicians adequately performed surveys of the cut concrete blocks using an adequate scanning speed, distance from the surface on the material being surveyed, and survey coverage of the material and equipment. Smears were taken as required in the survey plan for the concrete blocks to determine if there was any removable contamination, including tritium and alpha contamination. Static counts were then taken using an appropriate survey instrument at each smear location as required.

The inspector found for the survey documentation reviewed, the cut concrete blocks had no detectable surface contamination with one exception. On Survey No. UI-056, dated December 9, 2011, for concrete block number 13, one static measurement resulted in a result greater than the minimum detectable concentration. The inspector informed the licensee of this and they promptly performed a measurement of that same location. The result this time was below the minimum detectable concentration. After review of the original result was completed, it was determined that it was within the band of normal background radiation readings in the area and therefore, not detectable licensed material. The inspector noted that even though the result was not actual radioactive contamination, the required independent review of the survey report did not identify this result and correct it. The licensee planned to implement corrective actions including highlighting results greater than the minimum detectable concentration for free release surveys so they can be more easily identified during review.

The inspector discussed the scope and process of the upper bioshield concrete cutting activities with the knowledgeable personnel. The licensee adequately justified the radiological controls and precautions employed during the cutting activities, which were described in the applicable RWP and approved work plan. The inspector noted that the licensee minimized the potential spread of contamination by controlling the spread of water used in the cutting process.

No findings of significance were identified.

c. Conclusions

Inspector observations of the facility and concrete cutting work determined that radiological and industrial controls ensured worker safety, controlled the spread of potentially contaminated water, and prevented loose radiological contamination in uncontrolled areas. The licensee performed adequate radiological surveys to determine if the cut concrete blocks had detectable surface contamination. For the block results reviewed, each was released in accordance with the requirements in the DP.

1.3 Effluent Control and Environmental Monitoring

a. Inspection Scope

In order to prepare for the work to cut the upper bioshield concrete, the licensee needed to partially drain down the reactor tank. The water was drained into a holdup tank that was then processed and cleaned to meet the effluent release criteria to the sanitary sewer system in 10 CFR Part 20, Appendix B. The inspector reviewed the licensee's procedure for performing this release, NRLHPP-13, "Analysis of Radioactivity in Water," revised October 18, 2011, to determine if the acceptance criteria for release were consistent with the applicable required release limits. In addition, the inspector reviewed the sample analysis results from November 21, 2011 to verify they were also below the required release limits.

b. Observations and Findings

The inspector found the licensee's procedure for release of water to the sewer contained the applicable required release criteria for the radionuclides of concern at the site. In addition, the inspector found that for the water sample results reviewed, all were under the required release criteria prior to discharge to the sewers.

No findings of significance were identified.

c. Conclusions

The licensee processed and cleaned the reactor tank water in accordance with the approved procedure and released it to the sewers at concentrations under the required release criteria for the radionuclides of concern at the site.

1.4 Audits and Reviews

a. Inspection Scope

The inspector reviewed the last two Reactor Committee Meeting Minutes, #11-3 dated October 19, 2011, and #11-4 dated November 16, 2011. The inspector determined whether the meetings met the administrative requirements of the DP and TS, including membership, quorums, and meeting frequency.

b. Observations and Findings

The inspector 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 during both meetings; and meetings were held well within the required frequency. The inspector also noted that the meeting minutes described discussions held that were appropriate for the current decommissioning activities occurring at the reactor.

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.

1.5 Solid Radioactive Waste Management and Transportation

a. Inspection Scope

The licensee packaged and sent their first radioactive waste shipment as part of the formal decommissioning process. The inspector reviewed documentation related to this shipment to verify it was sent in accordance with the applicable Department of Transportation (DOT) and NRC requirements. Specifically, the inspector reviewed the licensee's completed NRC Form 540, Uniform Low-level Radioactive Waste Manifest, dated November 17, 2011, for Shipment # UI-001, and associated radiation surveys, emergency instructions to the carrier, sample analyses for characterization of the waste, and calculations to determine isotopic distribution and activity for shipment classification. Knowledgeable staff members were also interviewed involving their specific duties with respect to the shipment.

In addition, the inspector verified the individuals performing the radioactive waste shipping were trained as required by DOT in 49 CFR 172 Subpart H. Selected staff involved in shipment activities were interviewed by the inspector to determine if they had adequate knowledge to accomplish shipment related tasks and understood the applicable regulations.

b. Observations and Findings

The licensee's shipment consisted of three packages that contained solid metal debris, dry-active waste (DAW), and activated graphite blocks. The licensee collected samples from each different type of waste that was representative of those waste streams. The sample analysis results were appropriately applied to determine the isotopic mix and ratio for each waste stream in order to adequately calculate the activity present. Using these results, the inspector found the licensee accurately classified the shipment in accordance with 10 CFR Part 61.55. In addition, the calculated activity was used to correctly determine the hazardous material description for the waste in accordance with DOT requirements as a Low Specific Activity (LSA)-II shipment. The inspector noted the required radiation surveys of the loaded packages were performed as required and results were well within the DOT dose rate restrictions for a LSA-II shipment.

The inspectors determined that the radwaste shippers had completed DOT required Subpart H training within the required three year timeframe, and demonstrated adequate familiarization with the hazmat transportation requirements pertinent to their specific responsibilities.

No findings of significance were identified.

c. Conclusions

Radioactive waste shipments were prepared, sampled, analyzed and manifested consistent with the licensee's waste management and transportation plan to meet the requirements of 10 CFR Parts 20 and 61 and those of the DOT in 49 CFR Parts 170-189. Radioactive waste shippers were knowledgeable of waste handling and package loading, and had completed 49 CFR 172.704 required Subpart H training.

2.0 Exit Meeting Summary

The inspector presented the interim inspection results to licensee management at the conclusion of the onsite inspections. After in-office review was completed on December 16, 2011, a final exit teleconference was held. 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

^{1,2,3}R. Holm, Reactor Administrator
¹S. LaBuy, Project Manager
¹D. Ball, Construction Manager
¹C. Higgins, Project Radiation Safety Officer

¹Indicates presence at the interim on-site exit meeting held on November 30, 2011.
²Indicates presence at the interim on-site exit meeting held on December 14, 2011.
³Indicates presence at the telephone exit meeting held on December 16, 2011.

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
CFR	Code of Federal Regulations
DAW	Dry-Active Waste
DNMS	Division of Nuclear Materials Safety
DOT	Department of Transportation
DP	Decommissioning Plan
IR	Inspection Report
LSA	Low Specific Activity
NRC	U. S. Nuclear Regulatory Commission
RWP	Radiation Work Permit
TS	Technical Specifications

DOCUMENTS REVIEWED

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