

May 22, 2003

Dr. Robert U. Mulder, Director  
University of Virginia Reactor Facility  
Environmental Health and Safety  
P.O. Box 400322  
Charlottesville, VA 22904-4322

SUBJECT: NRC INSPECTION REPORT NO. 50-62/2002-201

Dear Dr. Mulder:

This letter refers to the inspection that was conducted on June 17-19, August 13-15, and August 27-28, 2002, at the University of Virginia Research Reactor (UVAR). The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. Based on the results of this inspection, no safety concerns or noncompliances of Nuclear Regulatory Commission (NRC) requirements were identified. No response to this letter is required.

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 website at (the Public Electronic Reading Room) <http://www.nrc.gov/reading-rm/adams.html>. Should you have any questions concerning this inspection, please contact Mr. Stephen Holmes at 301-415-8583.

Sincerely,

**/RA/**

Patrick M. Madden, Section Chief  
Research and Test Reactors Section  
Operating Reactor Improvements Program  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

Docket No. 50-62

License No. R-66

Enclosure: NRC Inspection Report No. 50-62/2002-201

cc w/enclosure:

Please see next page

University of Virginia

Docket No. 50-62

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

Docket No: 50-62

Report No: 50-62/2002-201

Licensee: University of Virginia

Facility: University of Virginia Research Reactor

Location: Charlottesville, VA

Dates: June 17-19, 2002,  
August 13-15, 2002, and  
August 27-28, 2002

Inspector: Stephen Holmes

Approved by: Patrick M. Madden, Section Chief  
Research and Test Reactors Section  
Operating Reactor Improvements Program  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

## EXECUTIVE SUMMARY

University of Virginia  
Report No. 50-62/2002-201

The primary focus of this routine, announced inspection was the on-site review of selected aspects of the licensee's decommissioning activities including: organization and staffing; review and audit functions; procedures; radiation protection and ALARA programs; and the packaging and shipment of radioactive material.

### Changes, Organization and Staffing

- The licensee's organization and staffing remain in compliance with the requirements specified in Technical Specification 6.1 and the Decommissioning Plan.

### Review and Audit Functions

- Audits and reviews were being conducted by the Reactor Decommissioning Committee in accordance with the requirements specified in Technical Specification Section 6.2.C.

### Procedures

- A procedural control and implementation program was acceptably maintained and satisfied Technical Specification Sections 6.2 and 6.3 and Decommissioning Plan 1.2.4.4 requirements.

### Radiation Protection Program

- The Radiation Protection Program being implemented by the licensee satisfied regulatory requirements.

### Transportation of Radioactive Materials

- The University of Virginia waste shipment met 10 CFR Parts 71 and 73, applicable portions of 49 CFR, and licensee shipping requirements.

### Emergency Plan

- The emergency response program was conducted in accordance with the requirements stipulated in the Emergency Plan.

### Decommissioning Operations

- Control and performance of decommissioning activities, and the removal and disposal of pool components, shield blocks, metal and construction debris, and their associated documentation were acceptable and in accordance with Decommissioning Plan, licensee procedures, and Technical Specifications requirements.

### Follow-up on Previously Identified Issues

- One Violation and an Inspector Follow-up Item were closed.



## REPORT DETAILS

### **Summary of Plant Status**

The University of Virginia Reactor (UVAR), a Class III reactor facility, is undergoing active decommissioning in accordance with the University of Virginia Decommissioning Plan (DP) dated February 9, 2000, as supplemented on April 26, June 6, December 19, 2000, and May 4 and 11, 2001. During the inspection, the reactor grid plate, activated sections of the reactor support structure, and activated equipment stored in the reactor pool (e.g., control rod blades) were segmented by divers, packaged into a Chem-Nuclear Systems (CNS) radioactive material cask model number CNS 8-120B, and shipped offsite for disposal. Additionally, the surveying, segregating, and disposal or release of the facilities numerous concrete shielding blocks continued.

### **1. Changes, Organization, and Staffing**

#### **a. Inspection Scope (Inspection Procedures [IPs] 40755 and 69001)**

The inspector reviewed the following regarding the licensee's organization and staffing to ensure that the requirements of Technical Specification (TS) 6.1, Amendment No. 26, dated March 26, 2002, were being met:

- organizational structure
- current staff qualifications
- management responsibilities
- staffing requirements for safe decommissioning of the research facility
- the most recently available Annual Reports
- UVAR DP, updated April 26, 2000

#### **b. Observations and Findings**

Through discussions with licensee representatives, the inspector observed that the management structure supporting decommissioning activities consisted of: (1) the Vice President for Research and Public Service (Level 1) with overall responsibility for management of the reactor facility; (2) the Reactor Facility Director (Level 2) with responsibility for the direction of decommissioning activities; (3) the Reactor Supervisor (Level 3) with responsibility for ensuring that day-to-day decommissioning activities are conducted safely and within the limits prescribed by the facility license; and (4) decommissioning contractors (Level 4) with responsibility for performing decommissioning activities as required by DP 2.4.1. The inspector determined that the individuals assigned to these positions met the qualifications of TSs 6.1.2 and 6.1.4 and were adequately knowledgeable about their duties and responsibilities to ensure safe and effective management of decommissioning activities at the facility.

As stated in DP 2.4.1, UVA management would use qualified contractors to perform the UVAR decommissioning along with UVA personnel. The primary contractor selected was CH2M HILL. CH2M HILL subcontracted with Safety and Ecology Corporation (SEC) to provide overall radiological support, with Bartlett Nuclear, Inc. (Bartlett) for Decommissioning and Decontamination (D&D) services, and with WMG Inc. and Underwater Construction Corporation (UCC) to segment, remove, and dispose of

activated pool components and radioactive sources. Through observations of and discussions with the contractors and licensee staffs, the inspector determined that they were fully integrated into a coordinated decommissioning team.

c. Conclusions

The licensee's organization and staffing remain in compliance with the requirements specified in the TS 6.1. and the DP.

**2. Review and Audit Functions**

a. Inspection Scope (IPs 40755 and 69001)

The inspector reviewed the following to ensure that the audits and reviews stipulated in the requirements of TS Section 6.2.C were being completed:

- 2001 and 2002 Reactor Decommissioning Committee (RDC) minutes
- June 2001 Health Physics (HP) Procedures and Records audit
- 10 CFR 50.59 reviews completed by the licensee
- responses to the safety reviews and audits

b. Observations and Findings

The inspector reviewed the 2001 and 2002 RDC minutes, and the June 2001 HP procedures and records audit. The inspector observed that the RDC met with a quorum present more frequently than the minimum required by TS Section 6.2.C.2. The membership also satisfied the charter requirements stipulated in TS Section 6.2.C.1. Review of the minutes showed that the committee provided guidance and direction to ensure suitable oversight of reactor operations and that the minutes provided a record of this safety oversight. The RDC minutes and audit records also showed that safety reviews and individual audits had been completed at the required frequency for the functional areas specified by TS Section 6.2.C.3. The audits were comprehensive and well documented.

The inspector observed that the RDC met to resolve audit findings, implement enhancements to internal processes, and develop corrective action plans in response to decommissioning challenges posed by the aging facility infrastructure (e.g., inability to batch-release pond water). The audit findings included revising HP survey schedules to be commensurate with ongoing decommissioning activities, the need to schedule an emergency exercise in accordance with Emergency Plan, and a recommendation to terminate the Security Plan since formula quantities of special nuclear material were no longer maintained at the facility. The inspector also observed that 10 CFR 50.59 changes to the Reactor Facility and to procedures in support of decommissioning activities were reviewed and approved by the RDC as required by TS Section 6.2.C.3(1).

c. Conclusions

Audits and reviews were being conducted by the RDC in accordance with the requirements specified in TS Section 6.2.C.

### 3. Procedures

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

The inspector reviewed the following to ensure that the requirements of TS Section 6.3 and DP Section 1.2.4.4 were being met concerning written procedures:

- administrative controls for changing procedures
- records of changes and temporary changes
- RDC meeting minutes for 2000 through 2002
- procedural implementation
- logs and records
- UVAR DP, updated April 26, 2000
- SOP.02.05 Underwater Construction Corp. Contaminated Water Diving Procedure, Rev 2, with an effective date of January 22, 1999
- 02748-01 Underwater Construction Corp. Project Safety Plan, with an effective date of June 13, 2002
- UVAP-QP-001 Nonconformance Control for the University of Virginia Reactor Decommissioning, with an effective date of June 19, 2002
- UVAP-QP-002 Radiological Surveys to Release Materials for Unrestricted Use, Rev 1, with an effective date of May 13, 2002
- UVAP-WP-003 Work Package for Performance of Continuing Characterization Surveys, Rev 0, with an effective date of July 16, 2002
- UVAP-WP-005 Work Package for Disassembling CAVALIER Reactor, Rev 0, with an effective date of June 28, 2002
- UVAP-WP-007 Work Package for Pool Hardware Characterization, with an effective date of June 25, 2002
- UVAP-WP-009 Pool Hardware Removal, with an effective date of July 31, 2002
- UVAP-WP-029 Work Package for Radiological Surveys to Release CAVALIER Materials and Components for Unrestricted Use, with an effective date of June 24, 2002
- UVA-RP-001 Radiation Protection Plan
- SEC Decontamination and Decommissioning Project Procedures Manual Rev 0, with an effective date of May 15, 2002
- Other selected plans, work packages, and procedure manuals

#### b. Observations and Findings

For decommissioning of the facility, UVA incorporated selected CH2M HILL, SEC, Bartlett, and WMG/UCC procedures into their program. All such procedures were reviewed and approved by the RDC before use as required by TS Section 6.3.1.

The inspector confirmed that written HP and decommissioning procedures were available for those tasks and items required by TS Section 6.3, and CH2M HILL, SEC, Bartlett, and WMG/UCC requirements. The procedures were routinely updated with substantive

changes approved by the RDC while minor modifications were made with approval of the RD as required by TS Section 6.3.2. The inspector observed personnel performing radiation surveys, conducting instrument checks, issuing dosimetry, performing cutting, drilling, sawing, lifting, and removal activities while using applicable procedures. The inspector determined that use of, adherence to, and control of the procedures was acceptable. The inspector reviewed training records and interviewed the staff, and determined that the training of personnel on procedures and subsequent changes to procedures was effective.

c. Conclusions

Based on the procedures and records reviewed and observations of staff during the inspection, the inspector determined that the procedural control and implementation program was acceptably maintained and satisfied TS Sections 6.2 and 6.3 and DP 1.2.4.4 requirements.

**4. Radiation Protection Program**

a. Inspection Scope (IPs 40755 and 69001)

The inspector reviewed selected aspects of the radiation protection program (RPP):

- The RPP
- As Low As Reasonably Achievable (ALARA) reviews
- radiation protection training
- radiological signs and posting
- facility and equipment during tours
- routine surveys and monitoring
- University of Virginia Radiation Safety Guide, dated May 29, 1996
- UVAR SOP 10, Radiation Protection
- contamination and area radiation survey procedures
- personnel dosimetry records
- maintenance and calibration of radiation monitoring equipment
- periodic checks, quality control, and test source certification documentation

b. Observations and Findings

(1) Radiation Protection Program

The licensee's Radiation Protection Program was established in the "University of Virginia Radiation Safety Guide," dated May 29, 1996. It had been reviewed, approved, and signed by the current campus Radiation Safety Officer and by the Chair of the Radiation Safety Committee.

Although individual procedures had been revised, the RPP had not appreciably changed since the January 2001 inspection. The program required that all personnel who had unescorted access to work in a radiation area or with radioactive material receive training in radiation protection, policies, procedures, requirements,

and facilities before entry. The program was being reviewed annually as required. The licensee reviewed the RPP at least annually in accordance with 10 CFR 20.1101(c). This review and oversight was provided by the RSO.

(2) Postings and Notices

The inspector observed that caution signs, postings and controls to radiation areas at the UVAR were acceptable for the hazards involving radiation, high radiation, and contaminated areas and were being implemented as required by 10 CFR Part 20, Subpart J. The facility's radioactive material storage areas were noted to be properly posted. No unmarked radioactive material was detected in the facility. The inspector observed licensee and contractor personnel and verified that they complied with the indicated precautions for access to the areas. The inspector confirmed that current copies of NRC Form-3 and notices to workers were posted in appropriate areas in the facility as required by 10 CFR Part 19.

(3) Surveys

The inspector audited the weekly, monthly, quarterly, and other periodic contamination and radiation surveys, including water analyses since the last inspection. They were performed and documented as required by UVAR Survey Procedure 1.0 and CH2M HILL procedures. Results were evaluated and corrective actions taken and documented when readings/results exceeded UVAR Survey Procedure Table 1 action levels of 2200 dpm/100 cm. The inspector's review of the survey records since January 2001, confirmed that contamination in the facility was infrequent and well below limits. The inspector determined that the survey program satisfied 10 CFR 20.1501(a) requirements.

(4) Dosimetry

The dosimetry program requirements and procedures had not changed since the January 2001 inspection. A National Voluntary Laboratory Accreditation Program-accredited vendor was used to provide dosimetry for personnel, environmental, and area monitoring. The inspector confirmed that dosimetry was being issued to staff and visitors as required by UVAR SOP 10.3. All exposures were well within NRC limits and licensee action levels. Most records showed no exposure above background.

In addition to the external monitoring above, internal monitoring through bioassay was performed on all permanent UVAR personnel. Baseline urine samples were collected for all permanent UAPR personnel involved in decommissioning work. Exit samples were collected when individuals' work on the project terminated. There were no positive bioassay results to-date.

The licensee did not require a respiratory protection program or planned special exposure program.

(5) Radiation Monitoring Equipment

The calibration and periodic checks of the portable survey meters, radiation monitoring, and counting lab instruments were performed by the licensee's staff, UVA calibration facilities, or certified contractors. The inspector confirmed that the licensee's calibration procedures and frequencies satisfied TS Section 4.3, Radiation Monitoring and 10 CFR 20.1501(b) requirements, and the American National Standards Institute N323 "Radiation Protection Instrumentation Test and Calibration" or the instrument's manufacturers' recommendations. The inspector verified that the calibration and check sources used were traceable to the National Institute of Standards and Technology and that the sources' geometry and energies matched those used in actual detection/analyses.

The inspector reviewed the facility calibrations performed since January 2001, and confirmed that the calibration for the portable survey meters in use had been done. Additionally, the calibrations for the laboratory counting equipment were reviewed and determined to be acceptable. All instruments checked had current calibrations appropriate for the types and energies of radiation they were used to detect and/or measure.

(6) Training

10 CFR Part 19 training was given by both UVA and contractor HPs to all staff. The training included general awareness and worker protection training. The training was given as outlined in UVAR SOP 10.2 Radiation Protection Training, dated 1970, revised 2002.

(7) Environmental Monitoring

The facility environmental Dosimetry Network consisted of Luxel Aluminum Oxide dosimeters mounted at eight fixed field sites in the vicinity of the UVAR. The sites are outside the UVAR facility but within the area bounded by the exclusion fence. Control locations are 1 to 15 miles distant from the facility. The dosimeters were changed out and read on a quarterly basis. The annual total dose measured at each site was less than 10 CFR 20.1301 dose limits for the public and met the compliance requirements of 10 CFR 20.1302.

A network of air samplers was established to monitor outside to confirm that decommissioning activities did not result in release of airborne radioactivity. Three continuous air samplers are located along the UVAR site boundary with a fourth at a control location offsite. The filters were changed on a weekly basis and analyzed for gross beta activity. All air samples were below the UVAR established concentration limit of  $1 \times 10^{-3}$  uCi/ml for gross beta activity with no indication of radionuclides other than radon daughters. There were no significant differences between the activities measured at the control location and those on site.

(8) Effluents

Because the reactor ceased operation in 1998, no gaseous releases have occurred since that time. Liquid releases, however, have continued. These were approved

by the Reactor Health Physicist and reviewed by the campus Radiation Safety Officer. The inspector reviewed the liquid release records and determined that they were properly documented. It was also noted that the results were within the annual limits and concentration stipulated in TS 3.4.2 and 10 CFR 20.2003 and Appendix B of Part 20.

c. Conclusions

The inspector determined that, because: 1) surveys were being completed and documented as required by 10 CFR Part 20.1501(a), TS, and licensee procedures; 2) postings met regulatory requirements; 3) the personnel dosimetry program was acceptably implemented and doses were in conformance with licensee and 10 CFR Part 20 limits; 4) Portable survey meters, radiation monitoring, and counting lab instruments were being maintained and calibrated as required, the RPP being implemented by the licensee satisfied regulatory requirements.

**5. Transportation**

a. Inspection Scope (IP 86740)

The inspector reviewed the following to verify compliance with 10 CFR Parts 71 and 73, applicable portions of 49 CFR, and licensee shipping requirements:

- UVAR waste shipment documentation
- CNS 8-120B Shipping Cask Certificate of Compliance (COC) Number 9168 (packet Number 71-9168)
- Duretec Procedure, TR-OP-035, "Handling Procedure for transport Cask CNS"
- WMG CNS 8-120B Disposal Liner Packaging Plan
- UVA Registered User Request for the CNS 8-120B Cask, dated July 23, 2002
- UVAR WP-009 POOL Hardware Removal, dated July 31, 2002
- UVAR DP, updated April 26, 2000

b. Observations and Findings

The inspector reviewed the shipping package paperwork, the CNS 8-120B cask maintenance and inspection records, the NRC package COC, and cask user requests. The inspector observed package preparation and pre-inspection, waste loading, package configuration, radiation and contamination surveys, marking and placarding, and post packaging inspection.

The COC for the cask was current. The UVA, as required by 10 CFR 71.12, had requested, and been approved to be a registered user of the CNS 8-120B cask.

The inspector verified that the required annual maintenance, to include gasket replacement, had been done as required. Package pre-inspections, air pressure drop test, and final inspections were performed as outlined in the COC and as required by Department of Transportation (DOT) and NRC regulations. Radiation and contamination surveys were also performed as required.

The package was shipped as exclusive-use. The inspector verified that the package and vehicle radiation and contamination levels were within 49 CFR 173.441 and 443 limits for exclusive-use. Required shipping paperwork was prepared accurately and included all required information including the shipper's certification. The package and the vehicle were marked and placarded as required by the COC, 10 CFR 49 Part 172 and Subpart E. The cask shipment was made August 28, 2002, and UVA was notified that it arrived approximately 10:30 PM that evening.

The inspector observed the inspection of the shipment. No violations or noncompliances with DOT or NRC requirements were found.

c. Conclusions

The UVA waste shipment met 10 CFR Parts 71 and 73, applicable portions of 49 CFR, and licensee shipping requirements.

## **6. Emergency Preparedness**

a. Inspection Scope (IPs 40755 and 69001)

The inspector reviewed selected aspects of:

- the Emergency Plan, Rev 1, dated September 30, 1985
- implementing procedures
- Emergency Equipment Surveillance procedure issued June 1994
- emergency response facilities, supplies, equipment and instrumentation
- training records
- offsite support
- emergency drills and exercises

b. Observations and Findings

The inspector confirmed that the Emergency Plan (E-Plan) in use at the reactor and emergency facilities was the same as the version approved by the NRC. The E-Plan was audited and reviewed as required. Implementing procedures were reviewed and revised as needed to employ the E-Plan effectively. Off-site support organization participation during the drills was as required by the E-Plan. Emergency drills had been conducted as required by the E-Plan. Critiques were held following the drills to discuss the strengths and weaknesses identified during the exercise and to develop possible solutions to any problems identified. The inspector reviewed the documented results of these critiques and found them to be adequate.

The inspector confirmed that emergency preparedness and response training for off-site and reactor staff personnel had been conducted in accordance with the E-plan and that agreements with outside response organizations were current.

The inspector confirmed the checks of facilities, supplies, instrumentation and equipment had been completed as required by the surveillance procedure and the E-Plan.



c. Conclusions

The emergency response program was conducted in accordance with the requirements stipulated in the Emergency Plan.

**7. Decommissioning Operations**

a. Inspection Scope (IP 69001)

The inspector reviewed the following decommissioning activities to verify compliance with the UVAR DP:

- UVAR DP, updated April 26, 2000
- UCC Contaminated Water Diving Procedure IOP.02.05 Revision 2, dated January 1, 1999
- UVAP-WP-009 Pool Hardware Removal, dated July 31, 2002
- WMG Spent Fuel Pool Component Segmentation Plan, dated August 2, 2002
- Radiation Work Permit (RWP) 1372R-02-009, Filtration Unit Operation, issued August 1, 2002
- RWP 1372R-02-010, Removal of Pool Components and Dive Operations, issued August 12, 2002
- RWP 1372R-02-011, Segmentation of Material for Shipment, issued August 15, 2002
- UVAR WP-002 Radiological Surveys to Release Materials for Unrestricted Use, Revision 1, dated May 2002

b. Observations and Findings

(1) General Decommissioning Activities

The inspector reviewed randomly selected, operations, health physics, and contractor logs since January 2002. The inspector observed drilling, cutting, sawing and other decommissioning activities being performed during sampling or removal of ducting, piping, shield blocks, and other reactor and auxiliary components. Decommissioning activities were carried out following written procedures as required by DP Section 1.2.2.4 Record Keeping (Procedure Control), 1.2.4.5 Handling, Storage and Shipping and TS Section 6.3 Procedures. Information on operational status of the facility was recorded clearly in log books and/or checklists as required by procedures, providing a record of operational activities and events.

(2) Material Removal

Decommissioning operations at UVAR have resulted in the removal of potentially contaminated concrete shield blocks, pieces of metal, and miscellaneous construction debris. DP Section 3.1.3, Radioactive Materials Controls, establishes a program to ensure that: 1) radioactive material would not be released to uncontrolled areas; 2) personnel are not inadvertently exposed to radiation from licensed materials; and 3) radioactive material generated during decommission is minimized. Release surveys for solid material consisted of both direct frisking with a portable Geiger Mueller (GM)

detector (Ludlum 2300 with a 43-68 probe or equivalent) and smear sample analysis with a gas flow proportional detector (Tennelec LB 5100 W or equivalent). Materials were released only if no discernable facility-related activity was detected within the capability of the survey methods outlined in the DP.

Through August, a total of 169,590-pounds of potentially contaminated concrete blocks had been surveyed of which 142,404-pounds passed and 27,186-pounds did not pass the criteria for unrestricted release or use. The inspector noted that released blocks were surplus to UVA and the contaminated blocks disposed of as radioactive waste.

Potentially contaminated metal and construction debris had also been surveyed and released for unrestricted use or kept for disposal as appropriate.

### (3) Reactor Pool Components

WMG and their subcontractor, Underwater Construction Corporation (UCC) were to characterize, remove, and ship for disposal the activated pool components, excess sources, and contaminated items. The inspector reviewed the preparation activities performed August 9-13, 2002. Site specific training for the WMG/UCC segmenting and packaging crew was accomplished as required by DP Section 2.5. The reactor bridge was prepared to serve as a dive platform as required by Contaminated Water Diving Procedure Section 5.0. The beam port bladders, drain covers and heat exchanger covers were installed as required by UVARP WP-009 Section 5.9. The cask liner was received, inspected, and placed in the reactor pool as required by UVARP WP-009 Section 6.1. Diving/segmenting operations began August 13, 2002.

The UCC diving team consisted of a Site/Dive Supervisor (DS), a dive tender (DT), and a diver. During operations the DS directed and controlled the actions of the DT and diver while the DT assisted and watched the diver during the entire diving operation to ensure the diver's safety.

A briefing was held prior to each day's dive to discuss the work planned for that day and to review the results of the radiation surveys of the diving areas. The diver was then suited up to include, as required by Section 11 of the Contaminated Water Diving Procedure, whole body and extremity dosimetry, alarming dosimetry, and telemetric dosimetry. The telemetric dosimetry provided real time exposure readings to the UVAR RP monitor during the dives. The dive suit's two-way communications, safety equipment, air supply, and telemetric dosimetry were then checked for operability prior to allowing the dive to proceed. During the dives, continuous communication was maintained between the diver, the DS, DT, and RP monitor. The RP monitor kept the diver informed of his exposure throughout the dive. The diver performed additional radiation surveys of the work/dive areas as needed. The diver received a whole body dose of 26 millirem during the total operation.

Over the course of the diving operations activated portions of the reactor support structure, beam port ends, control rod blades, piping, and miscellaneous parts were surveyed, segmented, and packaged in the cask liner. Excess sources and contaminated items were then loaded into the liner. Loading was completed August 22, 2002.

On August 26, 2002, the liner was lifted from the pool and allowed to drain. Exposure readings were performed to ensure the completed shipping package would not exceed any transportation limit. The liner was transferred to a fork lift stationed at the access door. The forklift moved the liner to the outside of the building where it was then attached to an awaiting crane. The crane lifted the liner and placed it into the shipping cask. Personnel whole body doses were less than 10 millirem during the whole loading operation.

The inspector confirmed that all activities were performed in accordance with the Contaminated Water Diving Procedure, the Spent Fuel Pool Component Segmentation Plan, the Pool Hardware Removal Work Package, and their associated radiation work permits.

c. Conclusions

Based on the procedures and records reviewed, observations made, and interviews performed during the inspection, the inspector determined that control and performance of decommissioning activities, and the removal and disposal of pool components, shield blocks, metal and construction debris, and their associated documentation were acceptable and in accordance with DP, licensee procedures, and TS requirements.

**8. Follow-up on Previously Identified Issues**

a. Inspection Scope

The inspector reviewed the actions taken by the licensee following identification of a violation during an inspection in January 2001, and documented in NRC Inspection Report 50-62/2001-201, dated January 25, 2001. The inspector also reviewed the actions taken by the licensee following identification of an Inspector Follow-up Item (IFI) during the same inspection.

b. Observations and Findings

(1) VIOLATION 50-62/2001-201-01 - Failure to complete various checks of the emergency equipment as required by the Emergency Plan.

Section 8.6 of the Emergency Plan requires that equipment and supplies be inventoried every six months. Emergency Equipment Surveillance procedure issued June 1994 requires: 1) an annual check of the auxiliary lighting in the Front Office; 2) a semi-annual inspection of the windsock to check its condition and movement; 3) a quarterly check of the eyewash and shower to verify they are functional, 4) a check of the fire extinguishers; and 5) a quarterly check of various items of equipment located in the emergency lockers in the facility.

During an inspection in January 2001, the NRC inspector noted that, during the year 2000, no checks of facilities, supplies, instrumentation and equipment had been completed as required by the surveillance procedure and the Emergency Plan. The most recent checks had been done on January 8, 2001, and the previous checks on

September 29, 1999. The failure to complete the required checks of the emergency equipment was a violation of TS 6.3.1(4) and the Emergency Plan Section 8.6.

The licensee responded to this violation in a letter dated February 23, 2001. The cause of the violation was noted as being inadequate management oversight. Corrective actions taken were to assure that all surveillances still required by the license were properly listed on both a schedule list and a surveillance schedule board to facilitate periodic monitoring of timely completion by the Reactor Director and the Reactor Health Physicist. In addition, the licensee committed to notify, semi-annually, the licensee's Radiation Safety Committee regarding the status of completion of the surveillance items. The inspector verified that the emergency equipment and supplies had been inventoried every six months and that the licensee's commitments had been fulfilled. This item is considered closed.

(2) IFI 50-62/2001-201-01 - Follow-up Item on the completion of late audits involving a review of operations records and a review of the HP procedures, Security Plan, and the Emergency Plan.

During an inspection in January 2001, the NRC inspector noted that two audits required by TS Section 6.2.C.3 and the UVAR Security Plan had not been completed as required. The RDC was aware the audits were late and was taking action to have them completed. The inspection confirmed that the audit of operations records and the audit of the HP procedures, Security Plan, and the Emergency Plan had been done and that all required audits since the last inspection had been completed as required. This item is considered closed.

## **9. Exit Interview**

The inspection scope and results were summarized on June 19, August 15, and August 28, 2002, with members of licensee management. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee.

### **PARTIAL LIST OF PERSONS CONTACTED**

#### **Licensee**

B. Mulder	UVAR Director
P. Benneche	Reactor Supervisor
L. Lundberg	CH2M HILL Project Manager
D. Steva	UVA Reactor Health Physicist
F. Meyers	SEC Site Supervisor
D. May	Bartlett Nuclear Inc. D&D Services Superintendent
P. Ervin	CH2M HILL Site Superintendent/Engineer
R. Allen	UVA Decommissioning Committee Chair

### **INSPECTION PROCEDURES USED**

IP 40755	Non-Power Reactor Class III Operations
IP 69001	Class II Non-Power Reactors
IP 86740	Inspection of Transportation Activities

### **ITEMS OPENED, CLOSED, AND DISCUSSED**

#### **Opened**

None

#### **Closed**

50-62/2001-201-01	VIO	Failure to complete various checks of the emergency equipment as required by the Emergency Plan.
50-62/2001-201-01	IFI	Follow-up Item on the completion of audits involving a review of operations records and a review of the HP procedures, Security Plan, and the Emergency Plan.

## **LIST OF ACRONYMS USED**

ALARA	As Low As Reasonably Achievable
Bartlett	Bartlett Nuclear, Inc.
CFR	Code of Federal Regulations
CNS	Chem-Nuclear Systems
COC	Certificate of Compliance
DP	University of Virginia Decommissioning Plan
DOT	Department of Transportation
DS	Site/Dive Supervisor
DT	Dive Tender
E-Plan	Emergency Plan
HP	Health Physics
IFI	Inspector Follow-up Item
IP	Inspection Procedure
NRC	Nuclear Regulatory Commission
RDC	Reactor Decommissioning Committee
RPP	Radiation Protection Program
RWP	Radiation Work Permit
SEC	Safety and Ecology Corporation
TS	Technical Specifications
UCC	Underwater Construction Corporation
UVA	University of Virginia
UVAR	University of Virginia Research Reactor
VIO	Violation