

September 18, 2008

Dr. William A. Baeslack III  
Dean, College of Engineering  
142A Hitchcock Hall  
Ohio State University  
2070 Neil Avenue  
Columbus, OH 43210

SUBJECT: NRC INSPECTION REPORT NO. 50-150/2008-201

Dear Dr. Baeslack:

During the period August 18-21, 2008, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Ohio State University Research Reactor facility. The enclosed report documents the inspection results, which were discussed on August 21, 2008, with Thomas Blue, Director, Nuclear Reactor Laboratory, Andrew Kauffman, Associate Director, Nuclear Reactor Laboratory, and Robert Peterson, Ohio State University Radiation Safety Officer and Director, Radiation Safety Section.

The inspection examined activities conducted under your license as they relate to safety and compliance with the NRC's rules and regulations and with the conditions of your license. The inspector reviewed selected procedures and records, observed activities, and interviewed personnel. Based on the results of this inspection, no findings of significance were identified.

In accordance with Section 2.390 of Title 10 of the Code of Federal Regulations, "Public Inspections, Exemptions, 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 Publicly Available Records component of NRC's Agencywide Document 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).

Should you have any questions concerning this inspection, please contact Craig Bassett at (404) 358-6515.

Sincerely,

**/RA/**

Johnny H. Eads, Branch Chief  
Research and Test Reactors Branch B  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No. 50-150  
License No. R-075

Enclosure: NRC Inspection Report No. 50-150/2008-201  
cc w/enclosure: Please see next page

Ohio State University  
cc:

Docket No. 50-150

Ohio Department of Health  
ATTN: Radiological Health  
Program Director  
P.O. Box 118  
Columbus, OH 43216

Ohio Environmental Protection Agency  
Division of Planning  
Environmental Assessment Section  
P.O. Box 1049  
Columbus, OH 43216

Mr. Andrew Kauffman  
Associate Director  
Nuclear Reactor Laboratory  
Ohio State University  
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Columbus, OH 43210

Test, Research, and Training  
Reactor Newsletter  
University of Florida  
202 Nuclear Sciences Center  
Gainesville, FL 32611

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**ACCESSION NO.: ML082590208**

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

Docket No.: 50-150

License No.: R-075

Report No.: 50-150/2008-201

Licensee: Ohio State University

Facility: Nuclear Reactor Laboratory

Location: Columbus, Ohio

Dates: August 18-21, 2008

Inspector: Craig Bassett

Accompanied by: Greg Schoenebeck

Approved by: Johnny H. Eads, Branch Chief  
Research and Test Reactors Branch B  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

## EXECUTIVE SUMMARY

Ohio State University  
Nuclear Reactor Laboratory  
Report No: 50-150/2008-201

The primary focus of this routine, announced inspection included onsite review of selected aspects of the licensee's Class II research reactor safety program including: organizational structure and staffing, review and audit and design change functions; procedures; radiation protection; environmental monitoring; and, transportation of radioactive materials since the last NRC inspection of these areas. The licensee's programs were acceptably directed toward the protection of public health and safety. No violations or deviations were noted.

### Organizational Structure and Staffing

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

### Review and Audit and Design Change Functions

- Review, audit, and oversight functions required by the Technical Specification were acceptably completed by the Reactor Operations Committee.
- The design change program was being implemented as required.

### Procedures

- The procedural control and implementation program satisfied Technical Specification requirements.

### Radiation Protection Program

- Surveys were being completed and documented acceptably to permit evaluation of the radiation hazards present.
- Postings met the regulatory requirements specified in 10 CFR Parts 19 and 20.
- Personnel dosimetry was being worn as required and doses were within the NRC's regulatory limits.
- Radiation monitoring equipment was being maintained and calibrated as required.
- Acceptable radiation protection training was being provided to facility personnel.

### Environmental Monitoring

- Effluent monitoring satisfied license and regulatory requirements.
- Liquid and airborne releases were within the specified regulatory and Technical Specification limits.

### Transportation of Radioactive Materials

- Radioactive material was being shipped in accordance with the applicable regulations.

## REPORT DETAILS

### **Summary of Plant Status**

The Ohio State University Research Reactor (OSURR), a five-hundred kilowatt open pool-type reactor, continued to be operated in support of undergraduate instruction, laboratory experiments, reactor operator training, and various types of irradiation projects. During the inspection, the reactor was started up, operated, and shut down as required and in accordance with applicable procedures to support these ongoing activities.

### **1. Organizational Structure and Staffing**

#### a. Inspection Scope (Inspection Procedure [IP] 69001)

The inspector reviewed the following regarding the licensee's organization and staffing to ensure that the requirements of the Technical Specification (TS) Section 6.1, issued June 18, 2008, as Appendix A to the renewed Facility Operating License No. R-075, were being met:

- OSURR organizational structure
- Management responsibilities and authorities
- Selected console log entries for 2007 and 2008
- Staffing requirements for safe operation of the research reactor facility
- Nuclear Reactor Laboratory (NRL) Administrative Procedure AP-13, "Personnel Required for Reactor Operation," Revision (Rev.) 4, dated March 19, 2008, and the latest ROC review dated March 28, 2008

#### b. Observations and Findings

The inspector determined that the operations organizational structure at the facility had not changed since the previous NRC inspection in May 2007 (refer to NRC Inspection Report No. 50-150/2007-201). The Associate Director continued to be responsible for the day-to-day operation of the Ohio State University Research Reactor and ensured that operations were conducted in a safe manner. He reported to the Director, Nuclear Reactor Laboratory (NRL), who continued to have overall responsibility for the management of the facility. The Director reported to the Director of the Engineering Experiment Station (EES) who, in turn, reported to the Dean of the College of Engineering. The responsibility and authority of these positions remained unchanged. Through discussions with licensee management, the inspector noted that the licensee continued to support the NRL and was committed to its safe operation.

The inspector noted that there were five Senior Reactor Operators (SROs) working at the facility. This total included two individuals who worked part-time at the facility. Through review of various records and discussions with personnel, the inspector determined that the operations staff satisfied the TS qualification requirements. A review of reactor console records confirmed that the staffing requirements during reactor operations were met.

#### c. Conclusions

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

## 2. Review and Audit and Design Change Functions

### a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the audits and reviews stipulated in TS Section 6.2 were being completed, and that any modifications to the facility were consistent with 10 CFR 50.59 and TS Section 6.2:

- Maintenance Log-Book, Volume III
- Facility configuration and associated records
- Facility design changes and records for the past two years
- Completed "OSURR Modification Request" forms Nos. 44-51
- Reactor Operations Committee membership and qualifications
- Reactor Operations Committee meeting minutes for the period from September 2006 through March 2008
- Audit of the Nuclear Reactor Laboratory Operations, including the Radiation Protection Program, for Calendar Year (CY) CY06 (covering the period from November 30, 2005 to November 30, 2006), dated March 23, 2007
- Audit of the Nuclear Reactor Laboratory Operations, including the Radiation Protection Program, for CY07 (covering the period from December 1, 2006 to November 30, 2007), dated February 5, 2008
- The Ohio State University Research Reactor Annual Report for FY 2005/2006, dated September 25, 2006
- The Ohio State University Research Reactor Annual Report for FY 2006/2007, dated September 25, 2007
- NRL Administrative Procedure AP-07, "Review of Procedures," Rev. 17, dated September 25, 2006, and the latest ROC review dated September 28, 2006
- NRL Administrative Procedure AP-08, "NRL Audit," Rev. 3, dated October 1, 2002, and the latest ROC review dated September 16, 2004
- NRL Administrative Procedure AP-14, "OSURR Modification Requests," Rev. 4, dated April 25, 2001, and the latest ROC review dated September 16, 2004

### b. Observations and Findings

#### (1) Review and Audit Functions

The composition and meeting frequency of the Reactor Operations Committee (ROC) satisfied the TS requirements. The minutes of the meetings demonstrated that the ROC provided the review and oversight required by the TS. Issues presented to the ROC were resolved in an appropriate time frame and were noted in ROC meeting minutes. All aspects of operations at the facility were discussed and the ROC provided guidance and direction for the safe operation of the facility.

Members of the ROC or other designated individuals from organizations outside of the Ohio State University conducted audits of those topics specified in the TS and the full ROC reviewed the results. The inspector noted that various recommendations for improvement were made as a result of the audits but no significant issues were observed. The inspector also noted that the safety reviews and audits, and the associated findings, were acceptably detailed and that the licensee responded and took corrective actions as needed.

The inspector verified that the licensee had also completed annual reviews of the Radiation Protection Program as required by 10 CFR Part 20. It appeared that all aspects of the program had been reviewed.

(2) Design Change Functions

Facility design changes were controlled and implemented through the NRL Administrative Procedure AP-14. The inspector reviewed the 10 CFR 50.59 evaluations and corresponding design change packages for various changes proposed during 2007 and to date in 2008. The inspector confirmed that questions posed by the ROC following a review of proposed changes and answers provided by the reactor staff were documented and incorporated into the modification packages using the appropriate form, AP-14, Attachment A. ROC review of equipment changes proposed in accordance with 10 CFR 50.59 was thorough.

The inspector determined that the facility design change evaluations had adequate supporting documentation and information. Additionally, the inspector found that the 10 CFR 50.59 reviews and approvals conducted by the ROC were focused on safety and met TS and OSURR/NRL procedure requirements. Post installation verification testing of the changed systems were thorough and adequately documented when completed. Procedure and drawing changes were included in the change packages and were consistent with the requirements for facility changes.

c. Conclusions

Review, audit, and oversight functions required by the TS were acceptably completed by the ROC. The licensee's design change program was being implemented as required.

**3. Procedures**

a. Inspection Scope (IP 69001)

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

- ROC meeting minutes for the period from September 2006 through March 2008
- NRL Administrative Procedure AP-02, "General Rules," Rev. 6, dated July 20, 2006, and the latest ROC review dated September 28, 2006
- NRL Administrative Procedure AP-06, "Format for Writing, Revising, and Approving Procedures," Rev. 7, dated March 19, 1996, and the latest ROC review dated September 16, 2004
- NRL Administrative Procedure AP-07, "Review of Procedures," Rev. 17, dated September 25, 2006, and the latest ROC review dated September 28, 2006
- NRL Administrative Procedure AP-08, "NRL Audit," Rev. 3, dated October 1, 2002, and the latest ROC review dated September 16, 2004
- NRL Administrative Procedure AP-11, "Record Keeping," Rev. 2, dated March 28, 1996, and the latest ROC review dated September 16, 2004

- NRL Administrative Procedure AP-13, "Personnel Required for Reactor Operation," Rev. 4, dated March 19, 2008, and the latest ROC review dated March 28, 2008
- NRL Radiation Safety Procedure RS-08, "NRL Smear Survey," Rev. 11, dated November 20, 2006, and the latest ROC review dated March 28, 2007
- NRL Instrumentation Use and Maintenance Procedure IM-03, "OSURR Pre-Start Checkout," Rev. 15, dated October 12, 2007, and the latest ROC review dated March 28, 2008
- NRL Instrumentation Use and Maintenance Procedure IM-04, "Post-Shutdown Checkout," Rev. 12, dated October 12, 2007, and the latest ROC review dated March 28, 2008

b. Observations and Findings

The inspector determined that written procedures were available for the activities delineated in TS Sections 6.3.1 and 6.3.2. New procedures or changes to existing procedures were reviewed and approved by the ROC as required. The procedures were acceptable for the current operations. Attachment A to procedure AP-07 was a routing slip which was used to circulate revised procedures to the reactor operators. The original copy was retained as proof of this review. Procedures were typically reviewed on a rotating basis such that all were reviewed biennially in accordance with procedure AP-06 and updated as needed. The ROC was kept abreast of the results of these reviews. The licensee used Attachment C to procedure AP-06, "Procedure Change Sheet" to distribute procedure changes to the staff. It was noted that the latest review conducted by NRL staff of the Administrative Procedures, General Reactor Operations and Maintenance Procedures, Radiation Safety Procedures, Instrumentation Use and Maintenance Procedures, and Emergency Procedures had been completed on April 11, 2008.

c. Conclusions

The procedural control and implementation program satisfied TS requirements.

**4. Radiation Protection Program**

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Part 20 and TS Sections 3.6 and 4.6:

- Calibration of radiation monitoring instruments
- Environmental dosimetry results for 2006 to the present
- Personnel monthly dosimetry results for 2006 to the present
- Reactor Building Smear Survey Forms for 2007 to the present
- NRL Monthly Inspection Forms, dated January 2008 to the present
- Radiation Safety Survey Forms, dated September 2007 to present
- Reactor Building Area Radiation Survey forms for 2007 to the present
- Audit of the Nuclear Reactor Laboratory Operations, including the Radiation Protection Program, for CY06 (covering the period from November 30, 2005 to November 30, 2006), dated March 23, 2007

- Audit of the Nuclear Reactor Laboratory Operations, including the Radiation Protection Program, for CY07 (covering the period from December 1, 2006 to November 30, 2007), dated February 5, 2008
- A summary of exposures received by facility personnel documented in the OSU NRL Annual Reports for the period from July 1, 2005 through June 30, 2006, and the period from July 1, 2006 through June 30, 2007
- NRL Administrative Procedure AP-02, "General Rules," Rev. 6, dated July 20, 2006, and the latest ROC review dated September 28, 2006
- NRL Radiation Safety Procedure RS-01, "Labeling and Storage of Radioactive Materials," Rev. 2, dated March 2, 1994, and the latest ROC review dated September 16, 2004
- NRL Radiation Safety Procedure RS-05, "Pool Water Radioactivity," Rev. 2, dated November 15, 1994, and the latest ROC review dated September 16, 2004
- NRL Radiation Safety Procedure RS-06, "Annual Radiation Monitor Calibration," Rev. 7, dated July 14, 2004, and the latest ROC review dated September 16, 2004
- NRL Radiation Safety Procedure RS-08, "NRL Smear Survey," Rev. 11, dated November 20, 2006, and the latest ROC review dated March 28, 2008
- NRL Radiation Safety Procedure RS-09, "Area Radiation Surveys," Rev. 8, dated September 26, 2006, and the latest ROC review dated September 28, 2006
- NRL Radiation Safety Procedure RS-12, "Decontamination Procedures," Rev. 1, dated December 6, 1994, and the latest ROC review dated September 16, 2004
- NRL Radiation Safety Procedure RS-15, "Radiation Safety Instruction," Rev. 7, dated July 15, 2004, and the latest ROC review dated September 16, 2004
- NRL Radiation Safety Procedure RS-16, "Dosimeter Calibration," Rev. 4, dated October 23, 1996, and the latest ROC review dated September 16, 2004

b. Observations and Findings

The licensee received radiological support from the Radiation Safety Section (RSS) of the OSU campus Office of Environmental Health and Safety (EH&S). The RSS staff consisted of the Radiation Safety Officer (RSO), five Health Physicists, and three technical staff members. In addition to having responsibility for the university's state broad scope byproduct license and other licenses, RSS personnel performed specific monthly and quarterly inspections and surveys of the reactor conforming to the campus safety program. Although the licensee received support from the RSS, the reactor staff performed the majority of the radiation safety or health physics functions at the reactor. Coordination of the various radiation protection activities between the RSS staff and the reactor staff was acceptable.

(1) Surveys

The inspector reviewed monthly radiation and contamination surveys of the licensee's controlled areas completed by campus RSS Health Physics (HP) personnel. The results were documented on the appropriate forms and evaluated as required. The number and location of survey points was adequate to characterize the radiological conditions at the facility. No abnormal or elevated readings were noted on the surveys being reviewed. These surveys were generally completed as required and no significant problems had been identified by the RSS HP staff.

Surveys by the reactor staff were conducted in accordance with NRL procedures RS-08 and RS-09. These surveys were completed weekly and survey data sheets included an acceptance range for the survey results to allow identification of abnormal conditions. Any readings that exceeded a certain level required an explanation and a signature from an SRO.

During the inspection, the inspector accompanied a staff member during a routine radiation and contamination survey of the Reactor Bay. The inspector also conducted a radiation survey of the Reactor Bay area and other laboratory and storage areas and compared the readings detected with those found by the licensee. The results were comparable to those of the licensee and no anomalies were noted.

## (2) Postings and Notices

During tours of the facility, the inspector observed that caution signs, postings, and controls in the restricted or controlled areas were acceptable for the hazards involving radiation, high radiation, and contamination and were posted as required by 10 CFR Part 20, Subpart J.

Copies of current notices to workers were posted in the facility. Other notices were also posted which characterized the industrial hygiene hazards that were present in the areas as well. The inspector noted that the copy of NRC Form-3, "Notice to Employees," that was posted at the facility as required by 10 CFR Part 19.11 was the current version.

## (3) Dosimetry

The licensee used a National Voluntary Laboratory Accreditation Program-accredited vendor, Landauer, to process personnel dosimetry. Through direct observation, the inspector determined that dosimetry was acceptably used by facility personnel. For visitors to the facility, a pocket ionization chamber dosimeter was issued for each group of eight people.

There were seven people at the facility who were being routinely monitored, in addition to the RSS personnel that performed duties less than full-time at the facility. An examination of the records for the inspection period showed that all exposures were within NRC limits and within licensee action levels. The highest whole body exposure measured during calendar CY 2006 by Optically Stimulated Luminescence (OSL) dosimeters for an individual was 88 millirem (mrem) deep dose equivalent (DDE). Extremity monitoring, accomplished through the use of thermoluminescent dosimeter (TLD) finger rings, also showed relatively low doses to the hands of staff members. The highest extremity dose received by a staff member for 2006 was 550 mrem shallow dose equivalent (SDE) and the highest skin or other shallow dose was 283 mrem SDE. The highest whole body dose for a person during CY 2007 was 128 mrem DDE and the highest extremity dose for the same period was 640 mrem SDE and the highest skin or other shallow dose was 557 mrem SDE.

It was also noted that, due to extensive maintenance operations conducted in July of this year at the facility, individual doses were much higher than normal. To date in 2008 the highest whole body dose for a single individual was 2,543 mrem DDE, the highest extremity dose was 2,850 mrem SDE, and the highest skin or other

shallow dose was 2,509 mrem SDE. In reviewing the high exposures with the licensee and the RSO, it was noted that this level of exposure had been expected and the proper forms had been completed so that workers would be properly monitored but could receive higher than normal doses.

(4) Radiation Monitoring Equipment

The calibration of portable survey meters and friskers was typically completed by RSS personnel at the EH&S office while fixed radiation detectors and air monitoring instruments were calibrated by OSURR personnel at the facility. The calibration records of portable survey meters, friskers, fixed radiation detectors, and air monitoring equipment in use at the facility were reviewed. Calibration frequency of the portable and fixed meters and monitors met the requirements established in the applicable procedures and records were being maintained as required.

(5) Radiation Protection Program

The licensee's radiation protection program was acceptably established in the OSU Radiation Safety Guidebook and Records Manual and in the Radiation Safety Standards for the Ohio State University, as well as through the facility procedures. The inspector verified that the OSU radiation protection program was being reviewed annually as required. Part of the annual OSU NRL audit ensured that the radiation protection program at the facility was being conducted as required by the applicable procedures. No deficiencies related to the radiation protection program at the OSU NRL were identified during audits of the program.

(6) Training

The facility radiation protection program required that all personnel who had unescorted access to the Reactor Bay (a radiation area) were required to receive training in radiation protection, policies, procedures, requirements, and facilities prior to entry. An interactive computer-based "short course," which consisted of six modules and was offered by the RSS, provided the initial training. Completion of an annual lecture and short test given by OSURR personnel was required for continued access to the Reactor Bay. The training covered the topics required to be taught in 10 CFR Part 19. A review of the results of examinations taken by reactor staff members indicated that they understood what was presented.

(7) Facility Tours

The inspector toured the Reactor Room and the accompanying laboratories. Control of radioactive material and control of access to radiation and high radiation areas were acceptable. The postings and signs for these areas were appropriate.

c. Conclusions

The inspector determined that the Radiation Protection Program being implemented by the licensee satisfied regulatory requirements because: (1) surveys were being completed and documented acceptably to permit evaluation of the radiation hazards present, (2) postings met the regulatory requirements specified in 10 CFR Parts 19 and 20, (3) personnel dosimetry was being worn as required and doses were within the

NRC's regulatory limits, (4) radiation monitoring equipment was being maintained and calibrated as required, and (5) acceptable radiation protection training was being given to facility personnel.

## 5. Environmental Monitoring

### a. Inspection Scope (IP 69001)

The inspectors reviewed the following to verify compliance with the requirements of 10 CFR Part 20 and TS Sections 3.3.5, 3.6.2, and 4.6:

- Hot sink release records for 2007 and 2008
- Effluent monitor calibration records for 2007 and 2008
- Particulate Air Sample Data Sheets for 2007 through the present
- Reactor pool water sample analyses documented on the applicable NRL forms
- Airborne release information documented in the OSU NRL Annual Reports for the period from July 1, 2005 through June 30, 2006, and the period from July 1, 2006 through June 30, 2007
- Liquid release information documented in the OSU NRL Annual Reports for the period from July 1, 2005 through June 30, 2006, and the period from July 1, 2006 through June 30, 2007
- NRL Radiation Safety Procedure RS-02, "Radioactive Waste Disposal," Rev. 5, dated May 8, 2001, and the latest ROC review dated September 16, 2004
- NRL Radiation Safety Procedure RS-03, "Calibrating Gaseous Effluent Monitor," Rev. 6, dated January 20, 2004, and the latest ROC review dated September 16, 2004
- NRL Radiation Safety Procedure RS-04, "Particulate Air Monitoring," Rev. 4, dated April 24, 2001, and the latest ROC review dated September 16, 2004
- NRL Radiation Safety Procedure RS-17, "Ar-41 Release Calculations," Rev. 7, dated May 4, 2001, and the latest ROC review dated September 16, 2004
- NRL Radiation Safety Procedure RS-18, "Environmental Monitoring," Rev. 0, dated August 29, 2003, and the latest ROC review dated September 16, 2004

### b. Observation and Findings

All gaseous releases from the facility were measured with a gaseous effluent monitor. As indicated in the licensee's annual reports, the release of argon-41 from the facility for the previous two years was less than the limit specified in 10 CFR Part 20. The licensee also used the Environmental Protection Agency computational code "COMPLY" to demonstrate that releases were in compliance with 10 CFR 20.1101(d). Using the COMPLY code, the licensee calculated that the highest dose that could be received as a result of gaseous emissions from reactor operations was 0.08 mrem for the period from July 1, 2005 through and June 30, 2006, and 0.09 mrem for the period from July 1, 2006 through June 30, 2007. These doses were well below the limit of 10 millirem per year.

There were two instances of a liquid release from the facility during the 2-year period reviewed. To ensure that the release was within the regulatory limits, the licensee measured the radioactivity of liquid effluents released from the facility. That total was then divided by eighty percent of the water intake of the University campus to determine the concentration of radioactive material released. When the concentration

of the release was compared against applicable limits established in 10 CFR Part 20, Appendix B, the concentration was found to be below the established limits.

Several OSL dosimeters were placed in strategic locations around the restricted and unrestricted areas outside of the reactor bay. Records showed that annual doses were generally minimal, but there were two dosimeters that measured an annual exposure in excess of 100 mrem. The licensee stated that the excess exposure measured by the OSL dosimeters was a result of continuous exposure to all operations. The licensee implemented occupancy factors for determining the maximum dose a member of the general public could receive in the unrestricted areas. By using the occupancy factors, the licensee showed that the resulting dose was below the established limit.

It was noted that the licensee's solid radioactive material continued to be transferred to the OSU Radiation Safety Section for storage and/or disposal.

c. Conclusion

Effluent monitoring satisfied license and regulatory requirements. Liquid and airborne releases were within the specified regulatory and TS limits.

**6. Transportation**

a. Inspection Scope (IP 86740)

To verify compliance with regulatory and procedural requirements for transferring or shipping licensed radioactive material, the inspector reviewed the following:

- Selected records of various types of radioactive material shipments
- Certificate of Compliance documentation and test results for Department of Transportation (DOT) Type 7A packages used for shipments
- NRL Radiation Safety Procedure RS-11, "Routine Shipment of Radioactive Material," Rev. 5, dated August 17, 2006, and the latest ROC review dated September 28, 2006

b. Observations and Findings

Through records review and discussions with licensee personnel, the inspector determined that the licensee had shipped various types of radioactive material since the previous inspection in this area. The records indicated that the radioisotope types and quantities were calculated and dose rates measured as required. The records also indicated that the shipping containers were appropriate and had been labeled, if needed, as required. All radioactive material shipment records reviewed by the inspector had been completed in accordance with Department of Transportation and NRC regulatory requirements.

The inspector verified that the licensee maintained a copy of the license to possess radioactive material of each recipient as required and that the license was verified to be current prior to initiating a shipment to that entity. The training of the staff members responsible for shipping the material was also reviewed. The inspector verified that the shippers' training met DOT requirements.

c. Conclusions

Radioactive material was shipped in accordance with the applicable regulations and licensee procedures.

**7. Exit Interview**

The inspection scope and results were summarized on August 21, 2008, 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 Personnel**

T. Blue	Director, Nuclear Reactor Laboratory
K. Herminghuysen	Research Associate and Senior Reactor Operator
A. Kauffman	Associate Director, Nuclear Reactor Laboratory
R. Myser	Senior Reactor Operator (Part-time)
J. Talnagi	Senior Research Associate and Senior Reactor Operator

### **Other Personnel**

R. Anderson	Health Physicist, Assistant Radiation Safety Officer
R. Peterson	OSU Radiation Safety Officer and Director, Radiation Safety Section

## **INSPECTION PROCEDURES USED**

IP 69001	Class II Research and Test Reactors
IP 86740	Inspection of Transportation Activities

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

### **Opened**

None

### **Closed**

None

## **LIST OF ACRONYMS USED**

ADAMS	Agencywide Documents Access and Management System (NRC's system)
CFR	Code of Federal Regulations
DDE	Deep Dose Equivalent
DOT	Department of Transportation
EES	Engineering Experiment Station
EH&S	Environmental Health and Safety
HP	Health Physics
IP	Inspection Procedure
mrem	millirem
NRC	Nuclear Regulatory Commission
NRL	Nuclear Reactor Laboratory
OSL	Optically Stimulated Luminescence
OSU	The Ohio State University
OSURR	The Ohio State University Research Reactor
ROC	Reactor Operations Committee
RSS	Radiation Safety Section
SDE	Shallow dose equivalent

SRO	Senior Reactor Operator
TLD	Thermoluminescent dosimeter
TS	Technical Specification