May 14, 2003

Dr. T. Tehan, Director
Rhode Island Nuclear Science Center
Rhode Island Atomic Energy Commission
Reactor Road
Narragansett, RI 02882-1197

SUBJECT: NRC INSPECTION REPORT NO. 50-193/2003-202

Dear Dr. Tehan:

This letter refers to the inspection conducted on March 26 & 27, 2003, of the Rhode Island Nuclear Science Center research reactor facility. The inspection included a review of activities authorized for the 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 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 Web site at (the Public Electronic Reading Room) http://www.nrc.gov/reading-rm/adams.html.

Should you have any questions concerning this inspection, please contact Craig Bassett at 404-562-4712.

Sincerely,

/RA by Alexander Adams, Jr., Acting for/

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.: 50-193
License No.: R-95

Enclosure: NRC Inspection Report No. 50-193/2003-202

cc w/enclosure: Please see next page

cc:

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

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

Docket No:	50-193
License No:	R-95
Report No:	50-193/2003-202
Licensee:	Rhode Island Atomic Energy Commission
Facility:	Rhode Island Nuclear Science Center University of Rhode Island
Location:	Reactor Road Narragansett, Rhode Island
Dates:	March 26 & 27, 2003
Inspector:	Craig Bassett
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

This routine, announced inspection included onsite review of various aspects of the licensee's programs concerning radiation protection, material control and accounting, and transportation of radioactive material as they relate to the licensee's 2 Megawatt Class 1 Research Reactor. The licensee's programs were directed toward the protection of public health and safety and were in compliance with NRC requirements. No safety concerns or violations of regulatory requirements were identified.

Organization, and Staffing

- The licensee's organization and staffing remain in compliance with the requirements specified in the Technical Specifications Sections 6.1-6.3.

Review and Audit Functions

- Review and oversight functions required by Technical Specifications Section 6.4 were acceptably completed by the Nuclear and Radiation Safety Committee and a subcommittee thereof.

- Annual reviews of the Radiation Protection Program were being completed by the licensee as required by 10 CFR Part 20.

Procedures

- No new health physics procedures had been developed as of the date of this inspection. The existing procedures were found to be acceptable and had been reviewed and approved by the Nuclear and Radiation Safety Committee as required.

Health Physics

- Surveys were being completed and documented acceptably to permit evaluation of the radiation hazards present.

- Postings met regulatory requirements.

- Personnel dosimetry was being worn as required and recorded doses were within the licensee's procedural action levels, and NRC's regulatory limits.

- Radiation monitoring equipment was being maintained and calibrated as required.

- The Radiation Protection and ALARA Programs satisfied regulatory requirements.

- The radiation protection training program was being implemented acceptably.

Effluent and Environmental Monitoring

- Effluent monitoring satisfied license and regulatory requirements and releases were within the specified regulatory limits.

Transportation of Radioactive Materials

- No radioactive material shipments had been made under the reactor license within the past year.

Material Control and Accountability

- Special Nuclear Material was acceptably controlled and inventoried as required.

REPORT DETAILS

Summary of Plant Status

The licensee's 2 Megawatt Research and Test Reactor continued to be operated in support of laboratory experiments, reactor operator training, and various types of research. During the inspection, the reactor was started-up, operated, and shut down as required to support laboratory experiments and ongoing irradiation work.

1. Organization and Staffing

a. Inspection Scope (Inspection Procedure [IP] 39745)

The inspector reviewed the following regarding the licensee's organization and staffing to ensure that the requirements in Sections 6.1-6.3 of Technical Specifications (TS), Amendment 28, dated August 2, 2001, were being met:

- current organizational structure
- management responsibilities
- staffing requirements for safe operation of the research reactor facility

b. Observations and Findings

Through discussions with licensee representatives, the inspector determined that management responsibilities and the organization at the facility had not changed since the last inspection in the area of radiation protection (refer to NRC Inspection Report No. 50-193/2002-201). The organizational structure and staffing at the facility, as reported in the Annual Report, were as required by TS. Qualifications of the staff met TS requirements as well.

During an inspection in March 2002, it was noted that the person filling the position of Principle Reactor Operator/Health Physics Technician had terminated his employment at the facility in September 2001. Subsequently the licensee sought and obtained permission to hire a person to fill the vacated position. A person was hired in January 2002 but left shortly thereafter to take a higher paying position elsewhere. Another person was then hired in July 2002. As of this inspection, that individual has completed the initial Radiation Worker training and is completing on-the-job training to become a Health Physics Specialist. She is also in training to become a Reactor Operator as well.

After discussing facility operations with licensee personnel, the inspector determined that the staffing at the facility was acceptable to support the current operational load.

c. Conclusions

Organization and staffing remain in compliance with the requirements specified in TS Section 6.

2. Review and Audit and Design Change Functions

a. Inspection Scope (IP 40745)

In order to verify that the licensee had established and conducted reviews and audits as required in TS 6.4, the inspector reviewed:

- Nuclear and Radiation Safety Committee meeting minutes for the past year
- Nuclear and Radiation Safety Subcommittee meeting minutes for the past year
- audits and reviews documented in the Nuclear and Radiation Safety Committee and subcommittee meeting minutes
- Radiation Safety Office Standard Operating Procedure (SOP) 110, "Radiation Protection Review," Revision 0, dated March 23, 2000

b. Observations and Findings

The inspector reviewed the meeting minutes of the Nuclear and Radiation Safety Committee (NRSC) and the NRSC subcommittee from March 2002 to the present. These meeting minutes showed that the committee and subcommittee met at the required frequency and that a quorum was present. The topics considered during the meetings were appropriate and as stipulated in the TS.

Audits and reviews were conducted by a subcommittee of the NRSC and/or persons from other institutions as required and the full NRSC reviewed the results. It was noted that audits and reviews of different portions of the safety program were completed every quarter such that the Radiation Protection Program was reviewed each year in accordance with SOP 110 and as required by 10 CFR 20.1101(c). The inspector noted that the audits and reviews were acceptable.

c. Conclusions

Review and oversight functions required by TS 6.4 were acceptably completed by the NRSC. Annual reviews of the Radiation Protection Program were being completed by the licensee as required by 10 CFR Part 20.

3. Procedures

a. Inspection Scope (IP 42745)

To determine whether facility radiation protection procedures met TS Sections 6.4 and 6.5 requirements, the inspector reviewed selected aspects of the following:

- Radiation Safety Office SOP 300, "Routine Surveys," Revision 0, dated June 21, 2001
- Radiation Safety Office SOP 101, "Radiation Safety Training," Revision 0, dated March 23, 2000
- Radiation Safety Office SOP 801, "Instrument Calibration," Revision 0, dated November 6, 2000

b. Observations and Findings

During the last inspection in the area of health physics, the inspector noted that a number of procedures had been upgraded and/or developed and had been through the complete review and approval cycle. As of the date of this inspection, no new procedures had been developed. One health physics procedure and various operations procedures had been revised and will be reviewed during the next NRSC committee meeting. These revisions will be reviewed by the inspector at a later date following review and approval by the NRSC.

c. Conclusions

No new health physics procedures have been developed to date. The existing procedures were found to be acceptable and had been reviewed and approved by the NRSC as required.

4. Health Physics

a. Inspection Scope (IP 83743)

The inspector reviewed the following to verify compliance with 10 CFR Part 20, the requirements outlined in TS Sections 3.2, 3.7, 4.2, and 4.7, and various procedural requirements:

- Radiation Safety Office SOP 300, “Routine Surveys,” Revision 0, dated June 21, 2001
- Radiation Safety Office SOP 101, “Radiation Safety Training,” Revision 0, dated March 23, 2000
- Radiation Safety Office SOP 801, “Instrument Calibration,” Revision 0, dated November 6, 2000
- radiation and contamination survey records documented on survey form NSC-4
- radiological signs and postings in the Reactor Room and basement level of the facility
- Rhode Island Nuclear Science Center (RINSC) dosimetry records (personnel and environmental) for 2002
- calibration and periodic check records for selected radiation monitoring instruments documented on the applicable form NSC-17
- Radiation Protection and ALARA Programs documented in the “Rhode Island Nuclear Science Center Radiation Safety Guide,” Revision 0
- “Radiation Safety - A Training Manual for the Radiation Safety Principles Course,” published by the URI Radiation Safety Officer, Revision 0, not dated
- “University of Rhode Island Radiation Safety Guide,” Revision 0, dated March 14, 2002

The inspector also toured the licensee's facility, observed the use of dosimetry and radiation monitoring equipment, conducted a radiation survey of the Reactor Room with an NRC instrument, and interviewed licensee personnel.

b. Observations and Findings

(1) Surveys

The inspector reviewed selected weekly, monthly, quarterly, and annual radiation and contamination surveys for the past 12 months. The survey records were being completed as required by Radiation Safety Office SOP 300 and documented on the appropriate forms. Results of the surveys were evaluated and corrective actions taken when readings or results exceeded licensee established action levels.

(2) Postings and Notices

The inspector reviewed the postings at the entrances to various controlled areas within the facility including the entrance to the Reactor Room, areas inside the Reactor Room, and areas in the basement of the facility. Copies of NRC Form 3, "Notice to Employees," were posted in the main hallway and lunch room in accordance with 10 CFR 19.11. Caution signs, postings, and control of radiation areas were as required in 10 CFR 20, Subpart J. Radioactive material storage areas were noted to be properly posted. No unmarked radioactive material was found in the facility. Licensee personnel observed the indicated precautions for access to the radiation areas.

(3) Dosimetry

The inspector determined that the licensee uses optically stimulated luminescence (OSL) dosimetry supplied and processed by a National Voluntary Laboratory Accreditation Program accredited vendor. An examination of the OSL results indicating radiological exposures at the facility for the past year showed that the highest occupational doses, as well as doses to the public, were well within 10 CFR Part 20 limitations. The records showed that most of the licensee personnel received occupational exposures of only a few millirem above background. The highest annual whole body exposure received by a single individual for the past year was less than 80 millirem. The highest annual extremity exposure for the past two years was less than 235 millirem. Through direct observation the inspector determined that dosimetry was acceptably used by facility and contractor personnel.

(4) Radiation Monitoring Equipment

Selected items of radiation monitoring equipment, including survey meters and area radiation monitors (ARMs), were examined by the inspector and each was found to have the appropriate up-to-date calibration sticker or certification attached. The calibration of portable survey meters and ARMs was typically completed by on-site personnel. Radiation monitoring and survey activities were as required.

The calibration records of the selected items of equipment indicated that the instruments were being were maintained, calibrated, and operated acceptably. Calibration frequency met the requirements established in Radiation Safety Office SOP 801 and records were being maintained as required. The inspector also observed the calibration of a portable survey meter. No problems were noted.

(5) Radiation Protection Program

The Radiation Protection Program was established and described in a document entitled “Rhode Island Nuclear Science Center Radiation Safety Guide.” This document was revised in 2000 and was approved by the NRSC. It also had been reviewed and approved by the State of Rhode Island Department of Health. The inspector noted that the Guide contained acceptable instructions concerning audits and personnel responsibilities.

(6) ALARA Program

The ALARA Program was also outlined and established in the “Rhode Island Nuclear Science Center Radiation Safety Guide,” Revision 0. The ALARA program provided guidance for keeping doses as low as reasonably achievable and was consistent with the guidance in 10 CFR Part 20.

(7) Radiation Protection Training

The radiation protection training program had been revised and upgraded so that authorized radioisotope users and all radiation workers, including RINSC staff, received the same type training. The inspector noted that individuals who required unescorted access to the research reactor facility and/or who worked with radioactive material completed a Radiation Safety Principles course or provided evidence that they had received such training at another facility. The training program was determined to be acceptable. The inspector verified that all staff members, including the individual hired in July 2002, had received the required training.

(8) Facility Tours

The inspector toured the control room, reactor room, selected laboratories, the basement area, and other support areas of the facility with a licensee representative. During the inspection, the inspector conducted a radiation survey of the Reactor Room. The readings noted were compared with those found by the licensee. The results detected by the inspector were comparable to those found by the licensee. No discrepancies were noted.

c. Conclusions

The inspector determined that the Radiation Protection Program being implemented at the facility satisfied regulatory requirements because: 1) surveys were generally being completed and documented acceptably, 2) postings met regulatory requirements, 3) personnel dosimetry was being worn as required and recorded doses were within the licensee’s procedural action levels and the NRC’s regulatory limits, 4) radiation monitoring equipment was being maintained and calibrated as required, 5) the Radiation Protection Program and the ALARA Program satisfied regulatory requirements, and 6) the radiation protection training program was being acceptably implemented.

5. Environmental Protection

a. Inspection Scope (IP 69004)

The inspector reviewed the following to verify compliance with the requirements of 10 CFR Part 20 and TS Sections 3.7.2, 4.7, and 6.8.4:

- the licensee's environmental monitoring program
- RINSC Annual Report for July 2001 through June 2002 indicating the effluent monitoring and environmental surveillance program results for that period
- counting and analysis records associated with airborne releases
- RINSC dosimetry records (personnel and environmental) for 2002

b. Observation and Findings

The inspector determined that gaseous releases continued to be monitored as required, were calculated according to established protocol, and were acceptably documented in the annual reports. The airborne concentrations of the gaseous releases were well within the concentrations stipulated in 10 CFR Part 20, Appendix B, Table 2. Also, the dose rate to the public, as a result of the gaseous releases, was well below the dose constraint specified in 10 CFR 20.1101 (d) of 10 millirem per year.

There were no liquid releases from the facility to the sanitary sewer during the past year. The last recorded release, in December 2000, was within the limits specified in 10 CFR 20, Appendix B, Table 3.

c. Conclusion

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

6. Inspection of Transportation Activities

a. Inspection Scope (IP 86740)

The inspector interviewed licensee personnel and reviewed the following records to verify compliance with regulatory and procedural requirements for shipping licensed material:

- Radiation Safety Office SOP 501, "Radioactive Waste Packaging," Revision 0, dated November 6, 2000
- Federal Express booklet entitled, "Procedures for Shipping Dangerous Goods by Air"
- International Air Transport Association (IATA) publication, "Dangerous Goods Regulations," 42 Edition, effective January 1, 2001

b. Observations and Findings

The licensee had not completed development of a procedure for use in shipping radioactive material. However, the licensee used the reference materials from Federal Express and IATA noted above and an extensive data base developed by the Radiation Safety Officer when radioactive material needed to be shipped offsite.

The licensee indicated, and the inspector verified, that no shipments of radioactive material had been made since the previous inspection. Records showed that the radioactive material produced in the reactor was typically transferred to, and shipped under, the university's broad scope license.

c. Conclusions

No radioactive material shipments had been made under the auspices of the reactor license during the past year.

7. Material Control and Accounting

a. Inspection Scope (IP 85102)

To verify compliance with 10 CFR Part 70, the inspector reviewed:

- nuclear material inventories (DOE/NRC Forms 741 and 742) for the past 18 months
- accountability records and fuel storage locations
- physical inventory data documented on Form NSC-85
- overall fuel assembly U inventory data documented on Form NSC-60A
- Megawatt hours of operation data documented on Form NSC-78
- established protocol for calculating fuel burn-up

The inspector also participated in a physical inventory of the unirradiated fuel and detectors in storage.

b. Observations and Findings

The inspector noted that no formal procedure for calculating fuel burn-up had been written to date. The licensee was using an historically established protocol that has been used for many years. The calculations appeared to be correct.

The material control and accountability protocol established by the licensee tracked locations and content of fuel and fission detectors under the research reactor license. Possession and use of special nuclear material (SNM) were limited to the locations and purposes authorized under the license. The material control and accountability forms (DOE/NRC Forms 741 and 742) had been prepared semiannually and transmitted within the time frame specified as required.

The inspector noted that a physical inventory of all SNM on site was conducted semiannually by the licensee. An inventory of the unirradiated fuel elements and detectors in storage during the inspection demonstrated that the fuel was present and in the locations specified.

c. Conclusions

SNM was being acceptably controlled and inventoried as required.

8. Exit Interview

The inspection scope and results were summarized on March 27, 2003, 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. Although proprietary information was discussed during the inspection, no proprietary information is included in this report.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

H. Bicehouse, Radiation Protection Officer and Assistant Director for Reactor Safety
J. Davis, Reactor Supervisor
D. Johnson, Health Physicist
M. Ryan, Reactor Operator/Health Physics Technician-in-training
W. Simoneau, Assistant Director for Reactor Operations
T. Tehan, Director, Rhode Island Nuclear Science Center

Other Personnel

V. Rose, Chairman, Rhode Island Atomic Energy Commission

INSPECTION PROCEDURES USED

IP 39745	Class 1 Research and Test Reactor Organization, Operations, and Maintenance Activities
IP 40745	Class 1 Research and Test Reactor Review and Audit and Design Change Functions
IP 42745	Class 1 Research and Test Reactor Procedures
IP 69004	Class 1 Research and Test Reactor Environmental Protection
IP 83743	Class 1 Research and Test Reactor Health Physics
IP 85102	Material Control and Accounting - Reactors
IP 86740	Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

LIST OF ACRONYMS USED

ALARA	As low as reasonably achievable
ARM	Area Radiation Monitor
CFR	Code of Federal Regulations
IATA	International Air Transport Association
IP	Inspection Procedure
NRC	Nuclear Regulatory Commission
NRSC	Nuclear and Radiation Safety Committee
OSL	Optically stimulated luminescence
RIAEC	Rhode Island Atomic Energy Commission
RINSC	Rhode Island Nuclear Science Center
SNM	Special Nuclear Material
SOP	Standard Operating Procedure
TS	Technical Specification