

March 20, 2008

Dr. T. Tehan, Director
Rhode Island Nuclear Science Center
Rhode Island Atomic Energy Commission
16 Reactor Road
Narragansett, RI 02882-1165

SUBJECT: NRC INSPECTION REPORT NO. 50-193/2008-201

Dear Dr. Tehan:

This letter refers to the inspection conducted on March 3 to 7, 2008, at your Rhode Island Nuclear Science Center Reactor Facility. 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 concern or noncompliance of Nuclear Regulatory Commission (NRC) requirements was identified. No response to this letter is required.

In accordance with 10 CFR 2.390 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 Agencywide Document Access 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 Marcus Voth at 301-415-1210.

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. 50-193
License No. R-95

Enclosure: As stated

cc w/ enclosure:
See next page

Rhode Island Atomic Energy Commission

Docket No. 50-193

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: 50-193/2008-201

Licensee: Rhode Island Atomic Energy Commission

Facility: Rhode Island Nuclear Science Center Reactor Facility

Location: Narragansett, Rhode Island

Dates: March 3 to 7, 2008

Inspector: Marcus H. Voth

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

Rhode Island Atomic Energy Commission
Rhode Island Nuclear Science Center Reactor Facility
NRC Inspection Report No. 50-193/2008-201

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the licensee's Class I research reactor facility safety programs including operations and maintenance; review and audit and design change function; experiments; procedures; radiation protection; effluent and environmental monitoring; and transportation. The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements.

Organization and Operations and Maintenance Activities

- The recent implementation of a maintenance logbook provided a mechanism for improved documentation of maintenance work performed at the facility.

Review and Audit and Design Change Functions

- Within the scope of this review, the licensee's review and design change program was found in conformance with Technical Specification requirements.

Experiments

- Reactor experiments were being performed in accordance with the requirements of the Technical Specifications.

Procedures

- Written procedures were being maintained in accordance with Technical Specification requirements.

Radiation Protection

- The licensee had maintained an effective radiation protection program in compliance with regulatory and Technical Specification requirements, resulting in low radiation exposures to facility workers and users.

Effluent and Environmental Monitoring

- The license evaluated annual environmental releases as required by Technical Specifications and reported results well below limits.

Transportation

- The licensee did not ship any radioactive material under the R-95 license since the previous transportation inspection.

REPORT DETAILS

Summary of Facility Status

The Rhode Island Atomic Energy Commission's (RIAEC) Rhode Island Nuclear Science Center (RINSC) two megawatt research reactor continued to be operated in support of education, research, training, and surveillance. During the inspection, the reactor was operated to irradiate samples as part of its research mission.

1. Organization and Operations and Maintenance Activities

a. Inspection Scope (Inspection Procedure (IP)-69006)

The inspector reviewed the following as a limited review of this area:

- Reactor logbook
- Maintenance logbook
- Surveillance status board

b. Observations and Findings

In response to inspector comments in a previous inspection the licensee had made changes. The inspector verified that the surveillance status board was restricted to required surveillance so as to avoid the appearance that surveillance was not being completed; optional surveillance was not shown. Also, a maintenance logbook had been created to document in greater detail than the reactor logbook the nature of significant maintenance performed on the reactor and auxiliary systems.

c. Conclusions

The recent implementation of a maintenance logbook provided a mechanism for improved documentation of maintenance work performed at the facility.

2. Review and Audit and Design Change Functions

a. Inspection Scope (IP 69007 and 92701)

The inspector reviewed the following to ensure that the requirements of Technical Specification (TS) 6.0, Administrative Controls, and 10 CFR 50.59 were being implemented effectively:

- File of Nuclear and Radiation Safety Committee (NRSC) Meeting Minutes from 2006 to 2008
- Annual Report of the RINSC, M. Davis (RINSC) to D. Hughes (NRC), August 27, 2007
- 10 CFR 50.59 Reviews file, November 2004 through September 2007
- Tripp Lite Power Protection UPS for the Reactor Control System, October 20, 2007, with NRSC approval September 24, 2007

b. Observations and Findings

The licensee had requirements for a safety oversight committee in both its federal and state licenses. While the federal license governed nuclear safety and the state license radiation safety, there was sufficient commonality that a single Nuclear and Radiation Safety Committee fulfilled the requirements of both licenses. The licensee considered the more prescriptive state license section on the oversight committee to be the written charter of the NRSC required by TS Section 6.4.3.

The inspector investigated action taken in response to the Inspector Follow-up Item (IFI) 50-193/2007-201-02, "Follow-up to verify the licensee changes the NRSC written charter to require three outside voting members to be present for a NRSC meeting quorum." The licensee had documented this requirement in NRSC minutes, noting that since it treated the state license as its written charter a license amendment would be required for a charter change, which was considered impractical. The inspector agreed that the alternative interim action was sufficient basis to close this IFI. (IFI 50-193/2007-201-02 closed.)

Review of the minutes indicated that the meeting frequency, attendance, and actions met the requirements of TS Section 6.4, Review and Audit. Specifically, the inspector verified that the NRSC reviewed the two changes reported in the most recent annual report, improvements to the control rod drive system and changes to the facility emergency plan. In addition, the inspector verified that the NRSC had reviewed the reactor control system change which had been implemented since the annual report was submitted.

c. Conclusions

Within the scope of this review, the licensee's review and design change program was found in conformance with Technical Specification requirements.

3. Experiments

a. Inspection Scope (IP 69005 and 92701)

The inspector reviewed the following to ensure that the requirements of TS Section 3.1, Reactivity Limits, Section 3.8, Limitations on Experiments, and Section 6.5.9, Operating Procedures [Experiments], were being met concerning experiments:

- RINSC Operating Procedure 12, Use of Pneumatic Irradiation Facility
- RINSC Operating Procedure, Appendix AF, Reactor Experiment Approval, Rev. 1 (with Forms NSC-47 and 49)
- RINSC Operating Procedure, Appendix AG, Reactor Experiment Request, Rev. 0 (with Form NSC-42)
- RINSC Operating Procedure, Appendix AH, Reactor Operation Request, Rev. 0 (with Form NSC-49)
- Form NSC-1, Pre-Startup Checklist, Rev. 11
- Form NSC-11, Shift Record Data sheet, Procedure AD, Rev. 2
- Form NSC-18, Reactor Operations Data, Rev. 2

- Form NSC-49, Reactor Operation Request
- Master Authorization file for authorized RINSC experiments
- RINSC Reactor Logbook
- "Reply to Notice of Violation Dated May 22, 2007," a letter from M. Middleton of RINSC to the NRC, June 2, 2007

b. Observations and Findings

The inspector observed a reactor startup and preparation for loading a series of experimental samples. While the reactor operator appeared to have the procedure memorized, he was observed verifying that the proper steps were taken per the written procedure. The inspector verified that a current authorization was on file for the experiment about to be performed.

In a previous inspection an inspector cited the licensee for a Violation (VIO), "Failure to review and approve experiments in accordance with written operating procedures." The licensee described the reason for the violation and corrective action to prevent recurrence in the June 2, 2007, letter cited above. The inspector reviewed the incident and the overall experimental program and found that the corrective action was effective. (VIO 50-193/2007-201-01 closed.)

c. Conclusions

Reactor experiments were being performed in accordance with the requirements of the Technical Specifications.

4. Procedures

a. Inspection Scope (IP 69008)

The inspector reviewed the following to ensure that the requirements of TS Section 6.5, Operating Procedures, were being met concerning procedures:

- RINSC Procedures Manual
- RINSC Procedure History Notebook
- RINSC Forms Manual

b. Observations and Findings

The inspector reviewed the licensee's process for developing, approving, and maintaining written procedures, finding that written procedures were maintained for each of the categories stipulated in TS Section 6.5. Temporary, minor changes made by a Senior Reactor Operator were found documented and subsequently reviewed by the NRSC; the inspector concurred that TS 6.5 was being implemented and that the changes observed were minor in that the intent of the procedure was not changed. The inspector noted that the Reactor Supervisor was performing a comprehensive update of all procedures, giving priority to those most in need of updating.

c. Conclusions

Written procedures were being maintained in accordance with Technical Specification requirements.

5. Radiation Protection

a. Inspection Scope (IP 69012)

The following documents were reviewed to determine compliance with 10 CFR Parts 19 and 20 and with TS Sections 3.7.1, Radiation Monitoring Systems, and 4.7, Radiation Monitoring Systems and Effluents, requirements regarding radiation protection:

- RINSC Radiation Protection Annual Audit, H. Bicehouse, Radiation Safety Officer (RSO), January 2 to 10, 2008
- Survey Program Summary Data for 2007, printed March 4, 2008
- Survey Program Summary Data for 2008, printed March 4, 2008
- NRC Form 3, "Notice to Employees," May 2005
- File of Landauer Dosimetry Reports, January 11, 2007 to January 11, 2008
- RINSC Radiation Safety Office, SOP Manual
- RINSC Radiation Safety Office, SOP 101, Radiation Safety Training, March 23, 2000
- RINSC Radiation Safety Office, SOP 220, Pocket Dosimeter Calibration, March 28, 2003
- RINSC Radiation Safety Office, SOP 300, Routine Surveys
- RINSC Radiation Safety Office, SOP 801, Instrument Calibration, November 6, 2000
- [Radiation Safety] Training file
- Radiation Safety Training Manual
- Summary of Radiation Area Monitors and Survey Meters as of January 25, 2006
- Instrumentation Calibration of Area Monitors (for reactor bridge, fuel safe, thermal column, heat exchanger area, and cleanup-demineralizer rooms), December 27, 2006
- Instrumentation Calibration of Area Monitors (for reactor bridge, fuel safe, thermal column, heat exchanger area, and cleanup-demineralizer rooms), November 19, 2007
- Instrumentation Calibration of Area Monitors (for reactor bridge, fuel safe, thermal column, heat exchanger area, and cleanup-demineralizer rooms), January 17, 2008
- Main and Stack [Continuous Air] Monitor file
- Survey Meter Calibration File (for GSM 105) through December 21, 2007
- Air Monitor Data Sheet file through February 7, 2008
- Camberra Series 5 Low Background Alpha/Beta Counter Quality Control Records
- RINSC, Operating Procedures, Main Floor Area Monitor Channel Test, Procedure Appendix AB, Rev. 1, July 2, 2003

b. Observations and Findings

Through the review of procedures and records, observations during facility tours, and discussion with staff personnel, the inspector assessed the licensee's radiation protection program, including radiation protection training given to individuals.

The licensee maintained and adhered to written procedures and instructions for all aspects of the radiation safety program. During tours through the facility the inspector verified that postings for radiation workers were in accordance with regulations and procedures. Protective clothing was available if needed but areas were maintained in a clean condition such that it was not required during times of routine operation.

Workers and visitors were observed wearing appropriate dosimetry throughout the facility. Routine radiation surveys, smear samples, and fixed monitor readings were taken throughout the facility to verify that radiation exposure rates were known and maintained As Low As Reasonably Achievable (ALARA). The licensee made effective use of data bases, monitoring for trends and abnormalities requiring corrective action. The inspector found the scope of the radiation detection equipment calibration program to be sufficiently comprehensive and techniques used to be state-of-the-art.

The overall effectiveness of the radiation protection program was monitored with Optically Stimulated Luminescence Devices (OSLD) worn by workers. The maximum annual deep dose equivalent for the reactor staff members during 2007 was 11 millirem; the maximum recorded dose for all facility occupants was 31 millirem, measured on the OSLD of a frequent experimenter.

c. Conclusions

The licensee had maintained an effective radiation protection program in compliance with regulatory and Technical Specification requirements, resulting in low radiation exposures to facility workers and users.

6. Effluent and Environmental Monitoring

a. Inspection Scope (IP 69004)

The following documents were reviewed to determine compliance with 10 CFR Part 20 and with TS Sections 3.7.2, Effluents, and 4.7, Radiation Monitoring Systems and Effluents, requirements regarding radiation protection:

- Annual Report of the RINSC, M. Davis (RINSC) to D. Hughes (NRC), August 27, 2007
- Report of Compliance with the Clean Air Act Limits for Radionuclide Emissions from the COMPLY Code, Version 1.5d, August 7, 2007
- Report of Compliance with the Clean Air Act Limits for Radionuclide Emissions from the COMPLY Code, Version 1.5d, March 3, 2008

b. Observations and Findings

The licensee was required by TS 6.8.4 to submit an annual report for the fiscal year from July 2006 through June 2007. The major effluent is traditionally Argon-41, the activation product of naturally occurring Argon in atmospheric air. The Environmental Protection Agency code, COMPLY, was used for the calculated effluent release with Level 4 facility detail, resulting in an exposure of less than 5% of the 10 CFR Part 20 limit. The licensee repeated the calculation for calendar year 2007 and found the result to be less than half that reported for the fiscal year.

The licensee reported two batches of water released to the sanitary sewer during the fiscal year; a routine release in September 2006 containing about 1 % of the 10 CFR Part 20 limit and a second release during a June 2007 maintenance evolution containing about 4 % of the limit.

The licensee determined that the greatest source of dose to an individual outside of the facility would be an individual standing at certain doors. Dosimeters placed on the doors indicated that at the highest exposure door a person would receive less than 10 % of the 10 CFR Part 20 limit.

There were no solid wastes shipped from the facility during the year. All solid waste generated was held for decay-in-storage.

c. Conclusions

The licensee evaluated annual environmental releases as required by Technical Specifications and reported results well below limits.

7. Transportation

a. Inspection Scope (IP 86740)

- Radioactive Material Shipment file

b. Observations and Findings

The inspector reviewed the file for radioactive shipments made under the reactor license (R-95) and found that there were no shipments made since the previous transportation inspection.

c. Conclusions

The licensee did not ship any radioactive material under the R-95 license since the previous transportation inspection.

8. Exit Interview

The inspection scope and results were summarized on March 7, 2008, with members of licensee management. The inspectors 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

H. Bicehouse, Radiation Safety Officer and Assistant Director for Radiation and Reactor Safety
M. Damato, Health Physics Technician and Reactor Operator
M.J. Davis, Reactor Supervisor
D. Johnson, Health Physicist
S. Lenihan, Administrative Assistant
S. Mecca, Chairman, Rhode Island Atomic Energy Commission
M. Middleton, Assistant Director for Reactor Operations
T. Tehan, Director, Rhode Island Nuclear Science Center
K. Wheeler, Administrative Assistant

INSPECTION PROCEDURES USED

IP 69004	Class 1 Research and Test Reactor Effluent and Environmental Monitoring
IP 69005	Class 1 Research and Test Reactors Experiments
IP 69006	Class 1 Research and Test Reactors Organization and Operations and Maintenance Activities
IP 69007	Class 1 Research and Test Reactors Review and Audit and Design Change Functions
IP 69008	Class 1 Research and Test Reactors Procedures
IP 69012	Class 1 Research and Test Reactor Radiation Protection
IP 86740	Transportation
IP 92701	Follow-up

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

50-193/2007-201-01	VIO	Failure to review and approve experiments in accordance with written operating procedures
50-193/2007-201-02	IFI	Follow-up to verify the licensee changes the NRSC written charter to require three outside voting members to be present for a NRSC meeting quorum

Discussed

None

LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access Management System
ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
IFI	Inspector Follow-up Item
IP	Inspection Procedure
NRC	Nuclear Regulatory Commission
NRSC	Nuclear and Radiation Safety Committee
OSLD	Optically Stimulated Luminescent Device
PARS	Publicly Available Records
Rev	Revision
RIAEC	Rhode Island Atomic Energy Commission
RINSC	Rhode Island Nuclear Science Center
RSO	Radiation Safety Officer
SOP	Standard Operating Procedure
TS	Technical Specifications
VIO	Violation