

March 16, 2000

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. 50-193/00-201

Dear Dr. Tehan:

This letter refers to the inspection conducted on February 28 - March 2, 2000, at your Rhode Island Nuclear Science Center (RINSC) Research Reactor facility. The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection.

Various aspects of your safety and security programs were inspected including selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress. Based on the results of the inspection, no significant safety issues were identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

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

Sincerely,

***/RA/***

Ledyard B. Marsh, Chief  
Events Assessment, Generic Communications  
and Non-Power Reactors Branch  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

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

Enclosure: NRC Inspection Report No. 50-193/00-201

cc w/enclosure:  
Please see next page

cc:

Dr. Vincent C. Rose, Chairman, RIAEC  
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Nuclear and Radiation Safety Committee  
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U. S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION

Docket Nos: 50-193

License Nos: R-95

Report Nos: 50-193/00-201

Licensee: Rhode Island Atomic Energy Commission

Facility: Rhode Island Nuclear Science Center  
University of Rhode Island (URI)

Location: Reactor Road  
Narragansett, Rhode Island

Dates: February 28 - March 2, 2000

Inspector: Craig Bassett, Senior Non-Power Reactor Inspector

Approved by: Ledyard B. Marsh, Chief  
Events Assessment, Generic Communications,  
and Non-Power Reactors Branch  
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 health physics, security, and transportation of radioactive material as they relate to the licensee's 2 Megawatt (Mw) 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.

### 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.

### Procedures

- Health physics procedures were being reviewed, revised, and updated.

### Radiation Protection Program

- Surveys were completed within the period prescribed by the Technical Specifications.
- 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 revised and upgraded.

### Effluent and Environmental Monitoring

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

### Transportation of Radioactive Materials

- No radioactive material had been shipped from the facility under the reactor license.

Safeguards and Security

- Security activities and systems satisfied Physical Protection Plan requirements.

Material Control and Accountability

- Special Nuclear Materials were acceptably controlled and inventoried.

## REPORT DETAILS

### **Summary of Plant Status**

The licensee's two megawatt (2 MW) non-power reactor (NPR) continues 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 a tour by high school students.

#### **1. NPR Organization (Inspection Procedure [IP] 39745)**

##### **a. Inspection Scope**

To verify staffing, reporting, and record keeping requirements specified in Technical Specifications (TS) 6.0 were being met, the inspector reviewed:

- organization and staffing for the facility
- administrative controls
- the reactor console logs
- the facility annual reports

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

The organizational structure and staffing had not changed since the last inspection. The organizational structure and staffing at the facility and as reported in the Annual Report was as required by Technical Specification. Qualifications of the staff met Technical Specification requirements. Review of records verified that management responsibilities were administered as required by Technical Specifications and applicable procedures.

##### **c. Conclusions**

Organization and staffing met the requirements specified in TS 6.0.

#### **2. NPR Review and Audit Functions (IP 40745)**

##### **a. Inspection Scope**

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
- Nuclear and Radiation Safety Subcommittee meeting minutes
- audits and reviews

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

Minutes of the Nuclear and Radiation Safety Committee (NRSC) showed that the committee 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. A

subcommittee of the NRSC and/or persons from other institutions conducted audits and reviews as required and the full NRSC reviewed the results. Problems noted during audits were discussed and recommendations for improvement were made. The licensee implemented the improvements as necessary.

c. Conclusions

Review and oversight functions required by TS 6.4 were acceptably completed by the NRSC.

3. **NPR Procedures (IP 42745)**

a. Inspection Scope

To determine whether facility procedures met TS requirements, the inspector reviewed selected aspects of:

- health physics procedures
- administrative procedures
- procedural reviews and updates

b. Observations and Findings

Health physics procedures were acceptable for the facility and the current staffing level. However, during a previous inspection the licensee had acknowledged that the health physics procedures needed to be reviewed and upgraded. This project was still in progress during the inspection. The licensee was informed that the NRC would continue to follow the revision and upgrade of the health physics procedures and would review this issue during a future inspection.

Health physics surveys and activities were observed during the inspection and adherence to procedure was noted with one exception. Daily smear surveys are required in various areas during operations that could potentially cause a spread of contamination. If no operations take place the licensee permits the surveyor to enter "NWNS" (No Work, No Survey) on Daily Smear Data Sheet to reflect that condition. During a previous inspection the inspector had noted that, when the individual who typically completes the routine surveys at the facility was absent, there were occasions when no one else filled in to perform the surveys or document the fact that no survey was necessary because no work or reactor operations occurred that day. Upon reviewing the issue during this inspection, the inspector noted that there was still some confusion in this area. There continued to be occasions when no entries were made on the Daily Smear Data Sheets. The licensee acknowledged this situation and indicated that, because of a recent change in Radiation Safety Officers, the system that had been established to provide a "backup" was not functioning as intended. During this inspection the Radiation Safety Officer issued new written instructions to outline the

procedure to be used to ensure compliance in this area. The licensee was informed that the NRC would follow the implementation of these instructions as an Inspector Follow-up Item (IFI) and would review the issue during a future inspection (IFI 50-193/00-201-01).

c. Conclusions

Health physics procedures were being reviewed, revised, and updated.

**4. Radiation Protection Program (83743)**

a. Inspection Scope

The inspector reviewed the following to verify compliance with 10 CFR 20 and the applicable licensee TS requirements and procedures:

- radiation and contamination survey records
- radiological signs and posting
- dosimetry records (personnel and environmental)
- calibration and periodic check records for radiation monitoring instruments
- the Radiation Protection Program
- the ALARA Program
- the Bioassay Program
- the Radiation Protection Training Program

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

b. Observations and Findings

(1) Surveys

Daily, weekly, and monthly contamination and radiation surveys were completed except as noted in 3.b above. Results were evaluated and corrective actions taken when readings or results exceeded set action levels.

(2) Postings and Notices

Copies of NRC Form 3, "Notice to Employees," were posted in accordance with 10 CFR 19.11. Caution signs, postings, and controls to radiation areas were as required in 10 CFR 20, Subpart J. Licensee personnel observed the indicated precautions for access the radiation areas.

(3) Dosimetry

Use of dosimeters and exit frisking practices were in accordance with radiation protection requirements. The licensee used a National Voluntary Laboratory Accreditation Program (NVLAP)-accredited vendor to process dosimetry. An

examination of the records of radiological exposures at the facility for the past two years through the date of the inspection showed that occupational doses and doses to the public were well within 10 CFR Part 20 limitations.

(4) Radiation Monitoring Equipment

Selected items of radiation monitoring equipment were examined and each was found to have the acceptable up-to-date calibration sticker attached. The calibration of portable survey meters was typically completed by on-site personnel. Radiation monitoring and survey activities were as required. Equipment used for these activities were maintained, calibrated and used acceptably.

(5) Radiation Protection Program

The licensee indicated that the Radiation Protection Program was established and described in a document entitled "Rhode Island Nuclear Science Center Radiation Safety Guide," Revision March 1995. The inspector noted that the Guide contained instructions concerning audits, personnel responsibilities, and ALARA, and seemed acceptable. During this inspection the inspector noted that the RINSC Radiation Safety Guide was being revised and rewritten. The licensee was informed that the NRC would follow the revision and upgrade of the Guide as an IFI and would review the issue during a future inspection (IFI 50-193/00-201-02).

Although the licensee had several respirators on hand, the licensee did not routinely use respirators for radiological work. The licensee was aware that, if it were to become necessary to use respiratory protective devices at the facility, they would need to establish an appropriate Respiratory Protection Program. Such a program would include training, bioassays, annual personnel physicals, and the proper equipment that would need to be checked and maintained.

(6) ALARA Program

As noted above, the ALARA Program was outlined and established in the "Rhode Island Nuclear Science Center Radiation Safety Guide," Revision March 1995. The ALARA program provided guidance for keeping doses as low as reasonably achievable and was consistent with the guidance in 10 CFR 20.

(7) Radiation Protection Training

The inspector reviewed the training given to RINSC staff members and those who were authorized to use the experimental facilities of the reactor. It was noted during a previous inspection that the program was being revised and upgraded so that authorized users and all radiation workers, including RINSC staff, would be required to receive some type of annual training. The inspector noted that currently all staff members had received the required training. The licensee was

informed that the NRC would continue to follow the revision and upgrade of the training program and would review the issue during a future inspection.

(8) Facility Tours

The inspector toured the control room, selected support laboratories, and other areas of the facility with a licensee representative. The inspector also completed a radiation survey of the areas immediately surrounding the reactor during operation at 2 Mw. The results were compared with the results of a recent licensee survey. No discrepancies were noted.

c. Conclusions

Surveys were generally completed within the period prescribed by TS. Postings met regulatory requirements. Personnel dosimetry was being worn as required and recorded doses were within the licensee's procedural action levels and the NRC's regulatory limits. Radiation monitoring equipment was being maintained and calibrated as required. The Radiation Protection Program and the ALARA Program satisfied regulatory requirements. The radiation protection training program was being revised and upgraded.

**5. Effluent and Environmental Monitoring (80745)**

a. Inspection Scope

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

- the licensee's environmental monitoring program
- annual effluent monitoring and environmental surveillance program reports
- counting and analysis records

b. Observation and Findings

The inspector determined that gaseous releases continued to be monitored as required, were acceptably documented, and were within the annual dose constraint of 10 CFR 20.1101 (d), Appendix B concentrations, and TS limits. The liquid releases from the facility to the sanitary sewer were 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 and TS limits.

**6. Transportation (86740)****a. Inspection Scope**

The inspector interviewed licensee personnel and reviewed various records to verify compliance with regulatory and procedural requirements for transferring/shipping licensed material.

**b. Observations and Findings**

Through discussions with licensee personnel, the inspector determined that the licensee had not made any shipments under the reactor license since the previous inspection in this area.

**c. Conclusions**

No radioactive material had been shipped since the last inspection.

**7. Physical Security (81401, 81402, 81431)****a. Inspection Scope**

To verify compliance with the licensee's NRC-approved Physical Security Plan and to assure that changes, if any, to the plan had not reduced its overall effectiveness, the inspector reviewed:

- logs, records, and reports
- security systems, equipment, and instruments
- implementation of the Physical Security Plan

**b. Observations and Findings**

The Physical Security Plan (PSP) was the same as the latest revision approved by the NRC. The offsite support letter of agreement with the local police department was current. Physical protection systems (barriers and alarms), equipment, and instrumentation were as required by the PSP. The access controls implemented at the facility were as required. Implementing procedures and practices were consistent with the PSP. Acceptable security response and support in accordance with procedures and training were demonstrated through alarm response records.

**c. Conclusions**

Security activities and systems satisfied Physical Security Plan requirements.

**8. Material Control and Accounting (85102)****a. Inspection Scope**

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

- nuclear material inventory and locations
- accountability records

**b. Observations and Findings**

The material control and accountability program tracked locations and content of fuel and fission detectors under the research reactor license. The inventory of material was verified to be consistent with material accountability records. Possession and use of special nuclear material (SNM) were limited to the locations and purposes authorized under the license. The latest material control and accountability forms (DOE/NRC Forms 741 and 742) had been prepared and transmitted as required.

**c. Conclusions**

Special Nuclear Materials were acceptably controlled and inventoried.

**9. Exit Interview**

The inspection scope and results were summarized on March 2, 2000, 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. The licensee's Physical Security Program was identified as proprietary information.

## PARTIAL LIST OF PERSONS CONTACTED

### Licensee

H. Bicehouse, Radiation Protection Officer and Assistant Director for Reactor Safety  
J. Cunningham, Reactor Operator/Health Physics Technician  
J. Davis, Reactor Supervisor  
D. Johnson, Health Physicist  
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 Non-Power Reactors Organization, Operations, and Maintenance Activities  
IP 40745: Class 1 Non-Power Reactors Review and Audit and Design Change Functions  
IP 42745: Class 1 Non-Power Reactors Procedures  
IP 80745: Class 1 Non-Power Reactor Environmental Protection  
IP 83743: Class 1 Non-Power Reactor Health Physics  
IP 81401: Plans, Procedures, and Reviews  
IP 81402: Reports of Safeguards Events  
IP 81431: Fixed Site Physical Protection of Special Nuclear Material of Low Strategic Significance  
IP 85102: Material Control and Accounting - Reactors  
IP 86740: Inspection of Transportation Activities

## ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

50-193/00-201-01	IFI	Follow-up on the implementation of instructions concerning completion and documentation of the Daily Smear Survey Data Sheet.
50-193/00-201-02	IFI	Follow-up on the licensee's efforts to revise and upgrade the "Rhode Island Nuclear Science Center Radiation Safety Guide."

Closed

None

Discussed

50-193/99-201-01	IFI	Follow-up on the licensee's efforts to revise and upgrade the facility health physics procedures.
50-193/99-201-04	IFI	Follow-up on the licensee's program to revise and upgrade the radiation protection training program.

LIST OF ACRONYMS USED

ALARA	As low as reasonably achievable
CFR	Code of Federal Regulations
IFI	Inspector Follow-up Item
IP	Inspection Procedure
Mw	Megawatt
NPR	Non-Power Reactor
NRC	Nuclear Regulatory Commission
NRSC	Nuclear and Radiation Safety Committee
NVLAP	National Voluntary Laboratory Accreditation Program
NWNS	"No Work, No Survey"
PSP	Physical Security Plan
RIAEC	Rhode Island Atomic Energy Commission
RINSC	Rhode Island Nuclear Science Center
SNM	Special Nuclear Material
TS	Technical Specification
URI	University of Rhode Island