

April 13, 2001

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. 50-193/2001-201 AND NOTICE OF VIOLATION

Dear Dr. Tehan:

This letter refers to the inspection conducted on March 26-29, 2001, of the Rhode Island Nuclear Science Center (RINSC) research reactor facility. The inspection included a review of activities authorized for the 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 this inspection, the NRC has identified two violations of NRC requirements. The violations are cited in the enclosed Notice of Violation (Notice). The circumstances surrounding the violations are described in detail in the subject inspection report. The violations are of concern because they were identified by the NRC and not by your internal review and audit program.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response in accordance with its policies to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

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

Enclosures: 1. Notice of Violation  
2 NRC Inspection Report No. 50-193/2001-201

cc w/enclosures:

Please see next page

Rhode Island Atomic Energy Commission

Docket No. 50-193

cc:

Dr. Vincent C. Rose, Chairman, RIAEC  
University of Rhode Island  
Chemical Engineering Department  
118 Crawford Hall  
Kingston, RI 02881

Dr. Harry Knickle, Chairman  
Nuclear and Radiation Safety Committee  
University of Rhode Island  
College of Engineering  
102 Bliss Hall  
Kingston, RI 02881

Mr. Charles McMahon  
Supervisor, Radiation Control Specialist  
Rhode Island Department of Health  
Division of Occupational and  
Radiological Health  
3 Capitol Hill Cannon  
Providence, RI 02808-5097

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

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ENCLOSURE 1

NOTICE OF VIOLATION

Rhode Island Atomic Energy Commission  
Rhode Island Nuclear Science Center

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

During an NRC inspection conducted on March 26-29, 2001, two violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violations are listed below:

1. Section 6.5.6 of the Technical Specifications requires, in part, that written Radiological Control procedures, that are adequate to assure the safe operation of the reactor and that have been reviewed and approved by the Nuclear and Radiation Safety Committee, be used at the facility.

Contrary to the above, a set of written instructions on performing contamination surveys was never submitted to the Nuclear Radiation Safety Committee nor approved as a radiological control procedure.

This is a Severity Level IV violation (Supplement IV).

2. 10 CFR 50.34(c) requires that the licensee have a Physical Protection Plan.

The section entitled "Lock System" in the licensee's Physical Protection Plan requires that a physical inventory of locks, cores, and keys be conducted at least once every 90 days.

Contrary to the above, inventories were conducted on January 24, May 18, and August 2, 2000, and on January 2, 2001. The periods between January 24, 2000, and May 18, 2000, and between August 2, 2000, and January 2, 2001, exceed 90 days.

This is a Severity Level IV violation (Supplement III).

Pursuant to the provisions of 10 CFR 2.201, the Rhode Island Nuclear Science Center is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with a copy to the responsible inspector, U.S. Nuclear Regulatory Commission, Region II, 61 Forsyth St. S. W., Suite 23T85, Atlanta, GA 30303, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or Demand for Information may be issued as to why the license should not be modified, suspended, or

revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001.

Because your response will be placed in the NRC Public Document room (PDR), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure or information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.790(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated at Rockville, Maryland  
this 13th day of April, 2001.

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

Docket No: 50-193

License No: R-95

Report No: 50-193/2001-201

Licensee: Rhode Island Atomic Energy Commission

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

Location: Reactor Road  
Narragansett, Rhode Island

Dates: March 26-29, 2001

Inspector: Craig Bassett

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. Two 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 revised and updated.

### Radiation Protection Program

- A violation was identified for failure to have an approved procedure for conducting surveys.
- 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 generally satisfied Physical Security Plan requirements but a violation was noted for failure to conduct physical inventories of the locks and keys at the required frequency as required.

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 irradiation work.

#### **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**

Meeting 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

During a previous inspection the licensee acknowledged that the existing health physics procedures needed to be revised and upgraded and other procedures needed to be developed. As a result of that finding, an Inspector Follow-up Item was established by the NRC. The inspector noted during this inspection that some progress has been made in this project. Various procedures have been upgraded and/or developed but not all have not been through the complete review and approval cycle. Procedures dealing with how to write procedures, radiological safety training, personnel dosimetry, radioactive waste packaging, and certain ones detailing instrument calibration have been approved by the NRSC. However, the licensee was informed that the NRC will continue to follow the revision and upgrade of the health physics procedures and will review this issue during future inspections.

c. Conclusions

Health physics procedures were being developed, revised, and upgraded.

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

a. Inspection Scope

The inspector reviewed the following to verify compliance with 10 CFR Part 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
- 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 and weekly contamination and radiation surveys were generally completed as required. Results were evaluated and corrective actions taken when readings or results exceeded set action levels.

The inspector noted that a set of instructions was written giving guidance on performing contamination surveys. The instructions required that smear surveys be taken daily in certain specified locations and that another set of smears be taken in other locations on a weekly basis. The set of instructions was never submitted to nor approved by the Nuclear Radiation Safety Committee as a radiological control procedure. Section 6.5.6 of the Technical Specifications requires that the licensee have written Radiological Control procedures that have been approved by the Nuclear and Radiation Safety Committee. The licensee was informed that failure to have a procedure that had been reviewed and approved by the NRSC to give adequate guidance on conducting contamination surveys was an apparent violation of Technical Specification Section 6.5.6 (VIO 50-193/2001-201-01).

(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 control of 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 uses a National Voluntary Laboratory Accreditation Program (NVLAP)-accredited vendor to supply and process dosimetry for personnel at the facility. 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 appropriate 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. The various items of equipment used for these activities were maintained, calibrated, and operated 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 1999. The inspector noted that the Guide contained acceptable instructions concerning audits, personnel responsibilities, and ALARA. It was also noted that the Guide had recently been revised and upgraded.

(6) Respiratory Protection Program

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 use of proper equipment that would need to be checked and maintained.

(7) ALARA Program

The ALARA Program was outlined and established in the "Rhode Island Nuclear Science Center Radiation Safety Guide," Revision 1999. The ALARA program provided guidance for keeping doses as low as reasonably achievable and was consistent with the guidance in 10 CFR Part 20.

(8) Radiation Protection Training

It was noted during a previous inspection that the training program was being revised and upgraded so that authorized users and all radiation workers, including RINSC staff, would receive the same type training. The inspector noted that the training program and the manual had been revised and upgraded. Currently all staff members had received the required training.

(9) Facility Tours

The inspector toured the control room, selected support laboratories, and other areas of the facility with a licensee representative. No discrepancies were noted.

c. Conclusions

A violation was identified for failure to have an approved procedure for conducting surveys. 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 (IP 80745)**

### **a. Inspection Scope**

The inspector reviewed the following to verify compliance with the requirements of 10 CFR Part 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 (IP 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 under the auspices of the reactor license since the last inspection.

## **7. Physical Security (IP 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.

Although the aforementioned portions of the PSP were being implemented or completed as required, a deficiency was noted in the area of conducting a physical inventory of locks and keys.

10 CFR 50.34(c) requires that the licensee have a Physical Security Plan. The section entitled "Lock System" in the licensee's Physical Security Plan requires that a physical inventory of locks, cores, and keys be conducted at least once every 90 days.

A review of the physical inventory records showed that inventories were conducted on January 24, May 18, and August 2, 2000, and on January 2, 2001. The licensee indicated that, due to a change in responsibility, the person that had been newly assigned to complete the inventory had adjusted the schedule by one month (later than the scheduled inventory). This resulted in the problem that the inventories were not completed once every 90 days as required. The licensee was informed that the failure to complete physical inventories once every 90 days was an apparent violation of the Physical Security Plan (VIO 50-193/2001-201-02).

### **c. Conclusions**

Security activities and systems generally satisfied Physical Security Plan requirements but a violation was noted for failure to conduct physical inventories of the locks and keys at the required frequency as required.



## **8. Material Control and Accounting (IP 85102)**

### **a. Inspection Scope**

To verify compliance with 10 CFR Part 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. 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. Follow-up on Previous Inspection Items**

### **a. Inspection Scope**

The inspector reviewed the licensee's actions taken in response to previously identified Inspector Follow-up Items.

### **b. Observation and Findings**

- (1) (Open) IFI 50-193/99-201-01 - During an inspection in March 1999, the licensee acknowledged that the facility health physics procedures needed to be revised and/or updated. Some procedures needed to be developed for certain applications as well. During this inspection the inspector reviewed the progress that had been made in this project. Although the licensee had made progress in this area, there were still procedures that were in the process of being revised and/or upgraded in preparation for submission to the NRSC for approval. This item will remain open and will be reviewed by the NRC during subsequent inspections.
- (2) (Closed) IFI 50-193/99-201-04 - During the inspection in March 1999, it was also noted that the licensee needed to revise and upgrade the radiation safety training program for the facility. Upon review of this project, the inspector noted that a new training program had been developed and a new training manual was in use at the facility. These were reviewed and found to be acceptable. This item is considered closed.

- (3) (Closed) IFI 50-193/2000-201-01 - During an inspection in March 2000, health physics surveys and activities were observed and adherence to the survey instructions was reviewed. Daily smear surveys were required in various areas during operations that could potentially cause a spread of contamination. If no operations took place the licensee permitted the surveyor to enter "NWNS" (No Work, No Smears) 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 the situation had not been corrected. There continued to be occasions when no entries were made on the Daily Smear Data Sheets. Also, there were two occasions when no weekly surveys had been completed. The inspector also noted that the instructions used as guidance for performing the surveys had never been reviewed and approved by the NRSC as a formal procedure. This was identified as an apparent violation (see Paragraph 4.b(1) above). This IFI is closed.
- (4) (Closed) IFI 50-193/2000-201-02 - During the inspection in March 2000, it was also noted that the licensee was in the process of revising the Rhode Island Nuclear Science Center Radiation Safety Guide. The revised Guide was reviewed and found to be acceptable during this inspection. This item is considered closed.

c. Conclusions

Four IFIs identified during a previous inspection were reviewed and three were closed during this inspection.

**10. Exit Interview**

The inspection scope and results were summarized on March 29, 2001, 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, Senior 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**

50-193/2001-201-01	VIO	Failure to have a reviewed and approved procedure in place giving guidance on conducting surveys.
50-193/2001-201-02	VIO	Failure to complete physical inventories of the locks and keys at the facility once every 90 days as required.

### **Closed**

50-193/99-201-04	IFI	Follow-up on the licensee's program to revise and upgrade the radiation protection training program.
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50-193/2000-201-01	IFI	Follow-up on the implementation of instructions concerning completion and documentation of the Daily Smear Survey Data Sheet.
50-193/2000-201-02	IFI	Follow-up on the licensee's efforts to revise and upgrade the "Rhode Island Nuclear Science Center Radiation Safety Guide."

Discussed

50-193/99-201-01	IFI	Follow-up on the licensee's efforts to revise and upgrade the facility health physics procedures.
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**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 Smears" (i.e., no survey was conducted)
PSP	Physical Security Plan
RIAEC	Rhode Island Atomic Energy Commission
RINSC	Rhode Island Nuclear Science Center
SNM	Special Nuclear Material
TS	Technical Specification
VIO	Violation
URI	University of Rhode Island