

October 1, 2009

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

SUBJECT: RHODE ISLAND ATOMIC ENERGY COMMISSION - NRC ROUTINE  
INSPECTION REPORT NO. 50-193/2009-202

The U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection on September 14-17, 2009, at the Rhode Island Nuclear Science Center Reactor facility (Inspection Report No. 50-193/2009-202). The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection.

This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations. 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 requirements was identified. No response to this letter is required.

In accordance with Title 10 of the *Code of Federal Regulations* 2.390 "Inspections, examinations, requests for withholding", a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or the NRC's document system (Agencywide Document Access and Management 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 Jack Donohue at 301-415-3163 or electronic mail at [Jack.Donohue@nrc.gov](mailto:Jack.Donohue@nrc.gov).

Sincerely,

**/RA/**

Johnny H. Eads, 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/ encl: See next page

Rhode Island Atomic Energy Commission

Docket No.: 50-193

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Test, Research, and Training Reactor Newsletter  
University of Florida  
202 Nuclear Sciences Center  
Gainesville, FL 32611  
Dr. T. Tehan, Director

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Johnny H. Eads, Chief  
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**ADAMS ACCESSION NO.: ML092710005**

**TEMPLATE #: NRC-002**

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DATE	7/25/09	9/30/09	10/1/09

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

Docket No: 50-193

License No: R-95

Report No: 50-193/2009-202

Licensee: Rhode Island Atomic Energy Commission

Facility: Rhode Island Nuclear Science Center Research Reactor

Location: Narragansett, Rhode Island

Dates: September 14 - 17, 2009

Inspector: Jack Donohue

Approved by: Johnny H. Eads, 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. 50-193/2009-202

The primary focus of this routine, announced operations inspection was the onsite review of selected aspects of the Rhode Island Atomic Energy Commission (the licensee's) two megawatt Class I research reactor safety programs including organization and staffing, operations and maintenance; surveillance; fuel movement; reactor operator licenses, requalification and medical examinations; and emergency preparedness. The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with U. S. Nuclear Regulatory Commission (NRC) requirements.

### Organization and Operations and Maintenance Activities

Organization, operations, and maintenance were observed to be in accordance with Technical Specification (TS) requirements. The licensee was actively monitoring expectations for continued improvement of communications and for maintaining a safety conscious work environment within the staff.

### Surveillance

Operations were found to be in compliance with the limiting conditions for operation and surveillance requirements as stated in the TS.

### Fuel Movement

The licensee made very infrequent reactor fuel movements but when required, followed written procedures that met TS requirements.

### Reactor Operator Licenses, Requalification and Medical Examinations

The licensee was conducting a reactor operator re-qualification program in compliance with NRC regulations and the licensee's written program.

### Emergency Preparedness

The licensee maintained an effective emergency preparedness program through implementation of the written emergency plan.

## REPORT DETAILS

### Summary of Facility Status

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

### 1. Organization and Operations and Maintenance Activities

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

The inspector reviewed the following regarding the licensee's organization and staffing to ensure that the requirements of Section 6.0, Administrative Controls, of the RINSC Technical Specifications (TS), Amendment No. 29 to License No. R-95 was being met:

- Reactor Logbook No. 56, dated April 4, 2008 to June 11, 2009 and Logbook No. 57, dated June 17, 2009 to present
- Annual Report for July 1, 2008 through June 30, 2009, dated July 31, 2009
- Standard Operating Procedures
- RINSC organizational structure and staffing
- Policy Statement, Safety Conscious Work Environment, Issued by the Rhode Island Atomic Energy Commission
- Rhode Island Atomic Energy Commission (RIAEC) meeting minutes, dated August 7, 2009

#### b. Observations and Findings

The inspector observed a reactor checkout, startup, approach to critical, escalation to full power, and a typical sample irradiation. The inspector reviewed portions of the reactor logbook, verifying compliance with the staffing requirements of TS Sections 6.1.2 and 6.1.3 and that the NRC-licensed Reactor Operator (RO) and Senior Reactor Operator (SRO) on duty were designated by name in the reactor logbook. These individuals executed their duties in accordance with TS Sections 6.3.2, Senior Reactor Operators; 6.3.3, Reactor Operators; 6.5, Operating Procedures; and 6.9, Plant Operating Records.

The inspector noted a change in key licensee personnel. Mr. E. Wentz had resigned as Assistant Director for Reactor Operations, and was replaced by Mr. M. J. Davis appointed as Assistant Director for Operations. Mr. B. MacGregor has been named as Reactor Supervisor succeeding Mr. M. J. Davis. The inspector discussed with licensee management and reaffirmed the importance of

anticipating the replacement of key staff members who are approaching retirement and/or otherwise not suited.

The inspector additionally noted that RINSC procedures have been going through a systematic revision and update process. The original facility procedures were numbered one through thirteen, and each procedure covered a series of tasks. As new procedures were needed, they were added as appendices to the original thirteen procedures. A new numbering system has been developed and approved by the Nuclear and Radiation Safety Committee (NRSC). Under this system, procedures are grouped according to whether they are operating procedures, test procedures, calibration procedures, etc. As the procedures are updated, they are being put into a uniform standard format that was also approved by the NRSC. All new procedures and procedure revisions are submitted to the NRSC for review and approval quarterly. Once approved, the staff is informed about the changes, and the procedures are incorporated into the Procedure History Record, the shared hard drive file for current procedures, and the control room procedure notebook. The Procedure Index is also updated to indicate the current list of procedures, as well as the latest revision in use.

The inspector discussed with licensee management the status of aspects of a chilled work environment addressed in letters dated December 27, 2007 and March 11, 2008. The licensee staff personnel indicated communication among RINSC staff members has improved, a result, in part, of weekly staff meetings called by the Director. The RIAEC was actively monitoring the RINSC environment relative to their expectations for a safety conscious work environment.

c. Conclusions

Organization, operations, and maintenance were observed to be in accordance with TS requirements. The licensee was actively monitoring expectations for continued improvement of communications and for maintaining a safety conscious work environment within the staff.

**2. Surveillance**

a. Inspection Scope (IP 69010)

The inspector reviewed the following to verify compliance with TS Section 3.0, Limiting Conditions for Operation, and to determine if the periodic surveillance tests on safety systems were performed as stipulated in TS Section 4.0, Surveillance Requirements:

- RINSC Reactor Operating Data Notebook, 2008 and 2009
- Periodic Maintenance Notebook containing the documentation of maintenance items
- RINSC Operating Procedure Appendix M, Determining Blade Worth and Insertion Rates, dated January 29, 1999

- RINSC Operating Procedure Appendix F, Inspection of Reactor Pool and Suspension Frames, dated August 24, 1995
- RINSC Operating Procedure Appendix D, Blade Speeds and Drop Times, Rev. 1, dated March 28, 2003
- Technical Specification 4.9.a, Beryllium Reflector [Annual Inspection]
- Reactor Operations Request NSC-49, Pre-Start Check Sheet NCS-1, Shift Record Data Sheet NSC-11, and RINSC Reactor Operations Data NSC-18 for 2008 and 2009

b. Observations and Findings

The inspector witnessed a reactor startup, approach to critical and ascension to power, observing the completion and documentation of numerous TS surveillances and compliance with TS limiting conditions for operation (LCO). This was accomplished through adherence to written procedures which had been reviewed by the NRSC in accordance with TS Section 6.3, Operating Procedures. Additional records for the surveillances cited above were also reviewed including: beam port inspection (October 27, 2008), pool inspection, shim blade drop time (August 3, 2009), cold clean blade reactivity (August 12, 2009), control blade reactivity worth's (August 29, 2009).

c. Conclusions

Operations were found to be in compliance with the LCO and surveillance requirements as stated in the TS.

### 3. Fuel Movement

a. Inspection Scope (IP 69009)

The inspector reviewed the following to verify compliance with TS Sections 4.9.b and 6.9.1.g which require inspection of fuel elements every 5 years and maintaining operating records of the fuel inventory, respectively:

- Reactor Logbook No. 56, April 4, 2008 - June 11, 2009 and Reactor Logbook No. 57, June 17, 2009 to present
- Annual Report for July 1, 2008 through June 30, 2009, dated July 31, 2009
- Standard Operating Procedures
- RINSC Operating Procedure Appendix Z, [Special Nuclear Material] SNM Accounting, Rev. 5, for inventory taken October 22, 2007
- RINSC Operating Procedure Appendix Z, SNM Accounting, Rev. 6, for inventory taken April 14, 2008
- Mr. M. Davis, RINSC to Dr. J. Breen, Nuclear Radiation Safety Committee Chair, RINSC Core Configuration dated August 24, 2009



b. Observations and Findings

During a recent fuel inspection on May 5, 2009, the RINSC staff discovered that the core positions of two fuel elements had been transposed. Following the investigation the staff determined that this transposition had occurred when the two fuel elements were removed from the core and placed into a storage rack to perform a gamma irradiation experiment. Following the experiment the elements were placed back into the core in the reversed locations. The elements were reinstalled in the pool maintaining ALARA considered prior to validation. The most likely cause of the fuel being reinstalled in the incorrect locations is the numbers were misread due to poor lighting and readability in 20 feet of water. The corrective action will be an increase in verification personnel and lighting during validation. Additionally to reduce exposure the fuel will remain in place and the low-enriched uranium (LEU) core No. 4 will be changed to LEU core No. 5. This will make the elemental MWH and fuel build up calculation easier in the future. The NRC was notified on the fuel transposition at the time of the occurrence.

c. Conclusions

The licensee has made infrequent reactor fuel movements and has made additional changes to ensure fuel once removed returns to previous or required locations. The licensee followed written procedures that met TS requirements.

**4. Reactor Operator Licenses, Requalification and Medical Examinations**

a. Inspection Scope (IP 69003)

The inspector reviewed the following to verify compliance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 55, Operators' Licenses, and the licensee's reactor operator requalification program:

- RINSC Operating Procedures Appendix U, Reactor Operator Re-qualification, Revision (Rev.) 2, dated June 29, 2005
- Individual RO and SRO Requalification files containing:
- NRC Form 396, Certification of Medical Examination by Facility Licensee
- Operator Requalification Program Checklist
- Medical Certification and Monitoring of Certified Personnel, of Standard ANSI/ANS 15.4, Selection and Training of Personnel for Research Reactors, to use as the basis for determining adequate physical fitness to serve as an SRO or RO.

b. Observations and Findings

The inspector reviewed the licensee's operator requalification program to verify that it met the requirements of 10 CFR Part 55 and reviewed selected licensed RO and SRO files, verifying that the program was being conducted in accordance with the written procedure. The annual operating examination and

the biennial written examination were of equivalent difficulty to NRC-administered examinations as required. Records were available documenting the fact that during the requalification cycle the individual operators performed the required number of licensed activities and reviewed changes to the facility, regulations, and procedures in addition to passing the examinations. Medical examinations were also reviewed satisfactorily for selected licensed personal.

c. Conclusions

The licensee was conducting a reactor operator requalification program in compliance with NRC regulations and the licensee's written program.

**5. Emergency Preparedness**

a. Inspection Scope (IP 69011)

The inspector reviewed the following documents and visited the facilities discussed below to verify compliance with regulatory requirements and the licensee's emergency plan commitments:

- Emergency Plan, Rev. 2, dated January 2007
- Letter from Mr. M.J. Davis, RINSC to Mr. D. Hughes, NRC, [Transmittal Letter for Revised Emergency Plan], dated March 15, 2007
- RINSC Operating Procedure Appendix X, Emergency Plan Implementing Procedures, Rev. 0, dated June 19, 2007, containing:
  - Attachment B, Form NSC-31, Emergency Communications Network
  - Attachment E, Emergency Classification Matrix
- [Emergency] Communication Tests file
- Emergency Equipment Inventory file
- Emergency Drill file containing:
  - Letter from Mr. H. Bicehouse to NRSC, Radiological Emergency Response Plan, dated October 31, 2007
  - Mr. E. Wentz, Assistant Director of Operations to Dr. S. Mecca Chairman RIAEC from Mr. M. J. Davis, Emergency Drill Critique drill actions items, dated September 26, 2008
  - Letter of Agreement between Narragansett Police Department and RINSC, signed by Mr. M. J. Davis on December 20, 2007, and by Chief J. Cotter on January 2, 2008
  - Letter of Agreement for Medical Services, from Mr. A. Cordeiro, Vice President of Rhode Island Hospital, to Mr. T. Tehan, RIAEC, dated February 4, 2008

b. Observation and Findings

The inspector reviewed the revised emergency plan, including an attachment submitted with the transmittal letter to the NRC explaining why the RINSC staff

and NRSC deemed that the changes did not change the effectiveness of the plan and therefore met the criteria of 10 CFR 50.54(q). The inspector concurred with the licensee's conclusions regarding each of the changes reviewed. The licensee maintained a file of recent agreement letters with off-site emergency agencies identified in the plan and reissues the agreement biennially.

The inspector reviewed previous annual emergency drills for 2007 and 2008 and follow-up action items from the critiques. The critiques were conducted to review emergency preparedness in general and to identify any weakness or lessons learned from the drills that warranted follow-up actions.

The inspector visited the Narragansett Fire Department and discussed with the Fire Chief, J. Cotter the upcoming emergency drill presently scheduled for September 25, 2009, and their emergency preparedness for the drill including personnel training. The Fire Chief described their capabilities and relationship with RINSC staff. He also indicated their capabilities utilizing three available Fire Stations to support of any radiological emergency event at RINSC.

The inspector visited the Emergency Support Center, observing the inventory of emergency supplies, instruments, and information committed to be housed there by the plan. The licensee maintained records indicating that the emergency supplies were periodically inventoried as part of the surveillance program invoked by the emergency plan

c. Conclusions

The licensee maintained an effective emergency preparedness program through implementation of the written emergency plan.

**6. Exit Interview**

The inspector presented the inspection results to licensee management at the conclusion of the inspection on September 17, 2009. The inspector described the areas inspected and discussed in detail the inspection observations. No dissenting comments were received from the licensee. The licensee acknowledged the findings presented and did not identify as proprietary any of the material provided to or reviewed by the inspector during the inspection and that the results of the inspection are subject to management review

## **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	Assistant Director, Rhode Island Nuclear Science Center
B. Nassersharif	Rhode Island Atomic Energy Commission
T. Tehan	Director, Rhode Island Nuclear Science Center
C. Waring	Health Physicist
J. Cotter	Narragansett Fire Chief

## **INSPECTION PROCEDURES USED**

IP 69003	Class 1 Research and Test Reactor Operator Licenses, Requalification, and Medical Examinations
IP 69006	Class 1 Research and Test Reactors Organization and Operations and Maintenance Activities
IP 69009	Class 1 Research and Test Reactors Fuel Movement
IP 69010	Class 1 Research and Test Reactors Surveillance
IP 69011	Class 1 Research and Test Reactors Emergency Preparedness

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

### Opened

None

### Closed

None

### Discussed

50-193/2009-201-01	IFI	Reactor Power was logged when reaching the required power level and used to determine the fuel burn-up for the Annual Report. RINSC Staff will continue to investigate a more accurate determination.
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**LIST OF ACRONYMS USED**

ADAMS	Agencywide Document Access Management System
ALARA	As Low As Reasonably Achievable
CFR	<i>Code of Federal Regulations</i>
IFI	Inspector Follow-up Item
IP	Inspection Procedure
NRC	U. S. Nuclear Regulatory Commission
NRSC	Nuclear and Radiation Safety Committee
NSC	Nuclear Science Center
Rev	Revision
RIAEC	Rhode Island Atomic Energy Commission
RINSC	Rhode Island Nuclear Science Center
RO	Reactor Operator
RSO	Radiation Safety Officer
SOP	Standard Operating Procedure
SRO	Senior Reactor Operator
TS	Technical Specification