

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

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

Report No: 50-193/97-01

Licensee: Rhode Island Atomic Energy Commission

Facility: Rhode Island Nuclear Science Center

Location: South Ferry Road  
Narragansett, Rhode Island

Dates: March 11-14, 1997

Inspector: Thomas F. Dragoun, Project Scientist

Approved by: John R. White, Chief, Radiation Protection Branch  
Division of Reactor Safety

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## EXECUTIVE SUMMARY

Major component upgrades for 5 Megawatt operation are in place. Operability tests and drawing updates are in progress. The vacant reactor supervisor position was expeditiously filled. Action on previous inspection findings was good.

## Report Details

### Summary of Plant Status

The reactor was operated periodically at 2 Megawatts. The new, second cooling tower was placed on line for the first time. System upgrades to support operation at 5 MW are essentially complete. Documents to request NRC authorization to operate at higher power were in preparation. Weekly surveillance on the emergency power system was conducted.

### **O1    Conduct of Operations**

#### **O1.1   Organization and Operations and Maintenance Activities**

##### **a.    Inspection Scope (Inspection Procedure 39745)**

The inspector reviewed:

- organization and staffing,
- administrative controls,
- the console log, and
- the annual report.

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

The reactor supervisor retired last fall, taking advantage of incentives offered to state employees. An experienced, qualified replacement was hired and is currently preparing to take the SRO license exam in May 1997. The licensee is considering qualifying certain researchers as reactor operators to increase the pool of backups. Planned downsizing of various state programs related to the Rhode Island Nuclear Science Center in fiscal year 1998 is not expected to impact reactor operations, but may affect the campus byproduct materials program. The director stated that he has authorization to expedite replacing licensed operators.

The assistant director for Reactor Operations issues a 6-month schedule of reactor operations, maintenance, and surveillance activities to the staff and monitors completion status. Good administrative control of activities was demonstrated.

The console log was clear and descriptive. The annual report summarized the required information. Records indicated that the facility was operated within parameters specified in the TS.

##### **c.    Conclusions**

Staffing and reporting requirements in TS 6.0 were satisfied.

## **O2 Operational Status of Facilities and Equipment**

### **O2.1 Surveillance**

#### **a. Inspection Scope (Inspection Procedure 61745)**

The inspector reviewed:

- surveillance procedures,
- surveillance data, and
- limiting conditions of operation.

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

During inspection 96-01, the inspector noted that checklists for surveillance on the confinement and emergency exhaust systems needed to be expanded. The licensee revised the appropriate checklists (NSC-14b and NSC-37b) to include specific equipment responses. The checklists are now satisfactory. Inspector followup item 96-01-03 is closed.

During the same inspection, the inspector noted that the licensee was considering a draft change to eliminate the TS 4.6.1(f) limit on dilution air fed to the confinement exhaust system due to difficulty in minimizing the flow. However, investigation revealed that dilution air is injected downstream of the filters and is, therefore, beneficial in reducing public exposures. The licensee indicated that a TS change will propose maximizing dilution air. Pending NRC approval, checklist NSC-37b for surveillance on this system will be revised to the amended specifications.

TS amendment No. 22 granted a one-time extension of the annual requirement for testing the safety blades and reactivity calculations because the reactor was not operated during prolonged system modifications in 1996. The licensee committed to complete these surveillances in January 1997. The inspector confirmed that these, and other selected surveillances, were completed and the data was satisfactory.

High conductivity in pool water was observed during initial startups in January 1997. This was determined to be due to ionization of entrained microbubbles of air. The source of air was suspected to be unvented pockets in the new coolant pumps, heat exchanger or piping. The phenomenon was observed only when the reactor was critical and the pool water appeared "milky." The condition has cleared.

A problem was recently reported by North Carolina University research reactor with the manual and automatic range switching feature of nuclear instrumentation channels manufactured by the Gamma Metrics company. The problem is described as erratic switching when reactor power is at the end of a range. The RIAEC facility installed the same equipment. Records indicate that a similar problem occurred at this facility in 1993. One NI drawer was returned to the vendor for modification. The second drawer was modified on site using electronic parts and instructions provided by the manufacturer. As a further precaution, the licensee modified the high flux scram circuitry so that a scram occurs at 115% (TS limit = 120%) of any

range, not just the top range. In addition, operators are directed to manually switch ranges. Records and discussions with operators indicate that the modifications to the hardware and operating procedures were sufficient to resolve this problem. Records of these changes and system drawing updates were satisfactory.

c. Conclusions

The safety equipment surveillances required by TS Section 4.0 are completed as required.

**O3 Operations Procedures and Documentation**

a. Inspection Scope (Inspection Procedure 42745)

The inspector reviewed:

- operating procedures, and
- document updates.

b. Observations and Findings

During inspection 96-01, the inspector noted that records related to system changes as specified in TS 6.9 were not readily available. The licensee provided the inspector with a comprehensive quality assurance program that provides the process to ensure that appropriate documents are updated and adequately maintained. The responsibility to implement the program will be assigned to the new reactor supervisor, who is expected to be licensed in May 1997. Inspector followup item 96-01-02 remains open.

During inspection 96-02, the inspector questioned the licensee's assumptions that the loss of airborne particulate activity in 170 feet of small bore piping, connecting the probe in the exhaust stack and the sample skid, was negligible. The health physicist provided the results of a March 1997 study that measured these losses. Ventilation was secured across a weekend to allow the buildup of naturally occurring radon daughter products (beta-gamma emitting airborne particulate activity). Ventilation was turned on and air samples taken over a 3-hour period inside the reactor room and at the exhaust stack sample skid. A half life determination verified that only radon daughters were present. A second run was made with ventilation secured for 1 day. Data indicated that transmission of particulate activity was approximately 80% and accommodated correctly by the licensee's procedures. Inspector followup item 96-02-01 is closed.

Use of procedures during reactor operations and equipment surveillances was good.

c. Conclusions

Facility procedures and records satisfied TS 6.0 requirements.

## **O5 Operator Training and Qualification**

### **a. Inspection Scope (Inspection Procedure 41745)**

The inspector reviewed:

- active license status,
- records of reactivity manipulations,
- medical examinations, and
- written examinations.

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

No operator licenses had expired. Requalification status and medical evaluations were up-to-date. The list of required reading included the TRTR newsletter, recent NRC publications, and memos from the assistant director. The inspector noted that some records of required reactivity manipulations had not been transferred from the operations logs to the training records. The assistant director stated that maintaining these records is the responsibility of the reactor supervisor, who retired. Records will be updated by his replacement after qualification.

### **c. Conclusions**

Requirements of the requalification program were satisfied.

## **O7 Quality Assurance in Operations**

### **O7.1 Review and Audit and Design Change Functions**

#### **a. Inspection Scope (Inspection Procedure 40745)**

The inspector reviewed:

- Nuclear and Radiation Safety Committee minutes of meeting, and
- Engineering changes under 10 CFR 50.59.

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

During inspection 96-01, the inspector noted that the NRSC minutes did not specifically indicate acceptance of 50.59 evaluations as specified in TS 6.4.2. The assistant director pointed out that the TS only requires that the NRSC review 50.59 evaluations. To record this review, a signature line will be added to the 50.59 evaluation form. This is acceptable. Inspector followup item 96-01-01, regarding the need to reformat NRSC minutes, is closed. Changes to the 50.59 evaluation form will be verified in a future inspection (Inspector Followup Item 97-01-01).

Minutes of NRSC meetings indicated that the committee met at the required frequency with a quorum present and provided the required oversight.

c. Conclusions

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

**X.1 Exit Interview (Inspection Procedure 30703)**

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on March 11, 1997. The licensee acknowledged the findings presented.



## PARTIAL LIST OF PERSONS CONTACTED

Licensee

D. Johnson, Health Physicist  
 V. Rose, Chairman, RIAEC  
 W. Simoneau, Assistant Director for Reactor Operations  
 T. Tehan, Director

## INSPECTION PROCEDURES USED

IP 30703: EXIT AND ENTRANCE INTERVIEWS

IP 39745: CLASS I NON-POWER REACTORS ORGANIZATION AND OPERATIONS AND MAINTENANCE ACTIVITIES

IP 40745: CLASS I NON-POWER REACTOR REVIEW AND AUDIT AND DESIGN CHANGE FUNCTIONS

IP 41745: CLASS I NON-POWER REACTOR OPERATOR LICENSES, REQUALIFICATION, AND MEDICAL ACTIVITIES

IP 42745: CLASS I NON-POWER REACTOR PROCEDURES

IP 61745: CLASS I NON-POWER REACTOR SURVEILLANCE

## ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-193/97-01-01 IFI 50.59 evaluation form to include NRSC review to include equipment responses

Closed

50-193/96-01-01 IFI

50-193/96-01-03 IFI

50-193/96-02-01 IFI



## LIST OF ACRONYMS USED

NI	Nuclear Instrumentation
NRC	Nuclear Regulatory Commission
NRSC	Nuclear and Radiation Safety Committee
RIAEC	Rhode Island Atomic Energy Commission
SRO	Senior reactor operator
TRTR	National Organization of Test, Research, and Training Reactors
TS	Technical Specifications