

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-193/94-01

Docket No. 50-193

License No. R-95

Licensee: Rhode Island Nuclear Science Center (RINSC)  
Rhode Island Atomic Energy Commission  
South Ferry Road  
Narragansett, Rhode Island

Facility Name: Rhode Island Nuclear Science Center

Inspection At: Narragansett, Rhode Island

Inspection Conducted: February 14-18, 1994

Inspector: *Stephen W. Holmes* 2/18/94  
Stephen W. Holmes, Radiation Specialist  
Effluents Radiation Protection Section (ERPS)  
Facilities Radiological Safety  
and Safeguards Branch (FRSSB)  
Date

Approved By: *Judith A. Joubert* 3/7/94  
Judith Joubert, Chief, ERPS, FRSSB  
Division of Radiation Safety and Safeguards  
Date

**Areas Inspected:** Status of previously identified items, staffing, radiation worker training, postings, radiation surveys and analyses, instrument calibration, personnel dosimetry, effluent releases, operator requalification, fuel movement, and new 10 CFR 20 implementation.

**Results:** Equipment calibration, surveys, and general housekeeping were good. Fuel handling and movement records were excellent. Two previously identified items were closed. Commitments were made by the Director and RPO for actions to insure requirements of the new 10 CFR 20 are fulfilled by the facility while guidance from the State of Rhode Island is unavailable.

## DETAILS

### 1.0 Persons Contacted

J. Cunningham, Health Physics Technician/Reactor Operator  
\*D. Johnson, Health Physicist  
\*N. Jacob, Radiation Safety Officer  
Mr Richard A. Bouchard, Rhode Island State Liaison Officer  
and Project Manager State Radiation Protection Office  
B. Smith, Principal Reactor Operator  
\*W. Simoneau, Assistant Director  
E. Spring, Senior Reactor Facility Engineer  
\*T. Tehan, Director, Rhode Island Nuclear Science Center

\* Present at exit briefing.

### 2.0 Status of Previously Identified Items

**2.1 (Closed) IFI 50-193/93-01-01** A copy of the calibration certificate for the hospital transfer source was not on file, the change in the neutron meter calibration source strength due to ingrowth had not been verified, and only a single point isotopic calibration was being performed. The inspector verified that a copy of the calibration certificate for the hospital transfer source now was on file, that the licensee had validated the source strength of the neutron calibration source due to ingrowth, and that a single point isotopic calibration of the neutron meter was consistent with the manufacturer's recommendation. This item is closed.

**2.2 (Closed) IFI (50-193/93-01-02)** Formal QC and QA checks were not being performed and NIST-traceable mixed gamma calibration sources were not available for the licensee to independently perform calibration of the gamma spectrometry system. The inspector found that QC checks now were being performed before each analysis and that the system had been calibrated, using NIST-traceable sources, quantitatively and qualitatively for the counting configuration and isotopes of concern. This item is closed.

### 3.0 Staffing

Technical Specification (TS) section 6.0 delineates the health physics staffing requirements of one qualified Radiation Protection Officer and a staff of one Health Physicist (HP) and a HP tech/reactor operator (Fig 6.1 RINSC Organizational Chart). There were four part time staff members implementing the radiation safety program: 1-Radiation Protection Officer (RPO), 1-Health Physicist (HP), 1-Reactor Operator/Health Physics Technician (RO/HPT), and a clerk typist (CT). The RPO, HP, and CT also supported the byproduct licenses at the University of Rhode Island. The RO/HPT also operated the reactor. The time devoted to the reactor facility was the equivalent of two full time staff members. The shared staffing between the

facility and the University byproduct licenses allowed great flexibility and the ability to consolidate support when required. The inspector reviewed the training and experience of the radiation protection staff and determined that the staff was qualified, by training and experience, to perform the duties required by the license. No safety concerns or violation of regulatory requirements were identified.

#### **4.0 Radiation Worker Training**

The licensee's program to provide training required by 10 CFR 19.12, "Instructions to Workers," was reviewed through discussions with the RPO, and review of records and training material. All personnel entering and spending time at the facility were required to be badged or issued a self-reading dosimeter. The facility used a "Personnel Management Form, NSC-22," to track and insure pertinent training was given to each individual. The inspector concluded that the licensee had implemented a relevant training program appropriate for the potential hazards.

#### **5.0 Postings**

The inspector conducted tours of the reactor controlled areas and accompanied staff on a general area walk-through. General housekeeping of the facility was good, with no unlabeled or unsecured radioactive materials evident. The radiation signs and postings properly reflected the radiological conditions in the facility. Reactor facility and radioactive material storage areas were secured and properly posted. The monthly area survey ensured that these posting were current. NRC Forms 3 were conspicuously posted in appropriate areas throughout the facility. The radiological posting program was adequate. No safety concerns or violations were identified.

#### **6.0 Radiation Surveys and Analyses**

The licensee is required by 10 CFR 20.201 to perform such surveys as required to comply with its license and applicable regulations and to insure that these surveys are reasonable to evaluate the radiation hazards that may be present. The inspector reviewed the procedures and records of the daily, weekly, and monthly area smear surveys, the monthly radiation area surveys, the weekly air sample and primary and secondary water analyses. The results of the surveys were evaluated by the RO/HPT and corrective actions taken and documented when readings/results exceeded set action levels. The use of a "Daily Technician Duties" tracking sheet, as well as the individual survey data sheets and diagrams, was good. The inspector noted that health physics procedures were now available for all routine surveys. Within the scope of this inspection, surveys were being performed in an appropriate manner in order to evaluate the radiation hazards that might exist. All records reviewed by the inspector were complete and satisfied the requirements of 10 CFR 20.401(b). No safety concerns or violations of regulatory requirements were identified.

## 7.0 Instrument Calibration

The inspector reviewed the use, availability, and calibration procedures for the licensee's portable survey equipment. The inspector also reviewed calibration, quality control, and test source certification records for portable radiation monitoring instruments and counting room instruments. The calibration of the portable survey equipment was performed in-house by the licensee. Calibration procedures were consistent with American National Standards Institute (ANSI) recommendations or the manufacturers' recommendations. The calibration source strength had been verified by a transfer standard from the Providence Hospital traceable source. The calibration source certificate and records were on file. The licensee had verified the present source strength of the plutonium-beryllium calibration source due to ingrowth of americium-241 and confirmed that the neutron meter pulser and single point isotopic calibration were consistent with the manufacturer's recommendation. All instruments checked by the inspector were in calibration. Calibrations were tracked using a computer program. Records were in order.

The facility routinely used an alpha/beta counter for evaluating smears or planchet samples and a gamma spectrometry system for analyzing pool water and other specific samples for gamma emitters. The systems had been calibrated, using NIST-traceable sources, quantitatively and qualitatively for the counting configuration and isotopes of concern applicable to the required surveys and analyses being performed. Calibration frequency and technique followed the manufacturers' recommendations. Although QC checks were performed before each analysis, charting of this and the standard check source data were inconsistent. The RSO stated that control chart tracking would be done regularly. The facility also participated in the Environmental Protection Agency Laboratory comparison program with good correlation of the spiked sample results. No safety concerns or violations of regulatory requirements were identified.

## 8.0 Personnel Dosimetry

The licensee used a National Voluntary Laboratory Accreditation Program (NVLAP)-accredited vendor to process personnel thermoluminescent dosimetry. The RSO maintained the dosimetry records of both the reactor facility staff and the campus staff. The program included action levels for investigation of elevated exposures, lost dosimetry badges, and procedures for requesting and responding to requests for records. Forms and procedures for declared pregnant workers were in the process of being formalized. The exposure reports were being reviewed by the RSO. An examination of records for the past two years indicated that all exposures were within NRC limits, with most showing no exposure above background. All records appeared to be in order and no safety concerns were noted. The licensee had implemented an effective personnel monitoring program.

## 9.0 Effluent Releases

Tables two and three of Appendix B, of the new 10 CFR 20 provide the limits for release of liquid and gaseous radioeffluents. The inspector reviewed the release records and instrumentation calibrations for both liquids and gases, interviewed the staff, and toured related facility areas. The releases were within the required limits and adequately documented. Calibration of related instrumentation was acceptable as were the written procedures. The liquid radioeffluent procedure requiring both the technician and the radiation protection officer to check the calculations before release is excellent. The inspector noted that, although the present stack velocity was nearly three times the original, the original stack velocity was still used to calculate gaseous release dilution. Use of the actual velocity would demonstrate that actual releases were lower than were being reported. The licensee stated that they would evaluate using the present actual stack velocity when calculating releases. Within the scope of this inspection no safety concerns or violations of regulatory requirements were identified.

## 10.0 Operator Requalification Program

The inspector examined the reactor operator requalification training records, exams, and interviewed operations staff. All operators were active in the current requalification training cycle and had successfully completed the operational and written exams, the emergency procedure exercises, and minimum operator manipulations for the previous cycle, as required by the NRC-approved requalification plan. Exam questions demonstrated good technical depth and biennial physical exams were being given as required. The NRC-approved requalification program was being implemented adequately to ensure appropriate training of the operators.

## 11.0 Fuel Movement

The inspector reviewed fuel movement records and procedures, individual fuel element records, the reactor log book, and interviewed staff members. During the previous inspection ( August 1993, Report No. 193-50/93-03) the inspector observed fuel movement in conjunction with a core reload. This inspection focused on the facility records of those movements and subsequent fuel movements during operations. Individual fuel element records matched both reactor log and group records. Data recorded were clear, concise and relevant. All log keeping and records followed the facility's procedures. The staff was knowledgeable of the records and their location. Movement of the fuel could be reconstructed easily from the available records, including inspections, maintenance, and radiological and security controls used. The facility maintained excellent records and documentation of fuel handling. No safety concerns or violations of regulatory requirements were identified.

## 12.0 New 10 CFR 20 Implementation

As noted in Section 3.0 of this report, the Radiation Safety Program and staff cover both the reactor facility and the university campus. This has been a standard practice for a majority of institutions with research reactors, including those in Agreement States, where radioactive material use on campus is under state jurisdiction. Normally this has posed no problem with NRC inspections of the reactor facilities in these states. At the time of this inspection, however, Rhode Island had not issued to the state licensees its revision to the radiation protection regulations to incorporate the provisions of the new 10 CFR 20. This precluded the formal written implementation of new 10 CFR 20 requirements by the RPO for the campus. Subsequently, the formal written radiation protection program and accompanying procedures and references also were not in place for the reactor on January 1, 1994.

In general, the implementation of the new 10 CFR 20 requirements for the reactor had not been functionally difficult. Dosimetry, surveys, postings, calibrations, and training continue to be performed as normal. Personnel exposures, effluent releases, and area radiation levels at such facilities are extremely low or consistent with background. No internal exposures or planned special exposures would normally occur. The new public and fetal exposure limits were already being complied with. The principal actual impact was on written procedures and program guidance.

The inspector, as documented in this report, determined that, with the exception of not having the new 10 CFR 20 program in writing, all other provisions, limits, or requirements were being fulfilled by the RINSC program. Training had been previously given on the new 10 CFR 20 requirements and a memo was sent to all staff members at the beginning of February reminding them that the provision of the new 10 CFR 20 became effective on January 1, 1994. The inspector confirmed by discussions with various staff members that they were conforming to the new limits and requirements of 10 CFR 20.

The facility Director stated that an in-depth memo outlining the applicable new 10 CFR 20 requirements would be issued and additional specific training on such requirements and implementation would be given to the reactor and health physics staff by March 1, 1994. Additionally, he committed to have the formal radiation protection and ALARA programs documented and in place, along with any procedure revisions required, by June 1, 1994. This will be reviewed during the next inspection (Inspector Followup Item 50-193/94-01-01). No safety concerns were identified.

## 13.0 Exit Interview

The inspector met with the licensee representatives listed in Section 1.0 of this report on February 18, 1994, and discussed the scope and findings of this inspection. The licensee acknowledged the inspection findings and commitments.