

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-134/94-01

Docket No. 50-134

License No. R-61

Licensee: Worcester Polytechnic Institute  
Worcester, Massachusetts

Facility Name: Nuclear Reactor Facility

Inspection At: Worcester, MA

Inspection Conducted: January 10-13, 1994

Inspector: Stephen W. Holmes  
Stephen W. Holmes, Radiation Specialist  
Effluents Radiation Protection Section (ERPS)  
Facilities Radiological Safety  
and Safeguards Branch (FRSSB)

7 FEB 94  
Date

Approved By: Jason C. Janga  
for Judith A. Joustra, Chief, ERPS, FRSSB  
Division of Radiation Safety and Safeguards

2-8-94  
Date

**Areas Inspected:** Personnel dosimetry, instrument calibration, radiation surveys, postings, staffing, procedures and policy, training, oversight, and new 10CFR20 implementation.

**Results:** Staffing, Safety Committee oversight, postings, and personnel dosimetry were good. Written procedures for all health physics operations were now formalized. No violations of regulatory requirements were identified.

## DETAILS

### 1.0 Persons Contacted

- \* L. Bobek, Nuclear Reactor Facility Director
- \* K. Beagle, Assistant Radiation Safety Officer (ARSO)
- \* W. Hobey, Radiation Safety Officer (RSO)
- J. Mayer, Jr., Director, Nuclear Engineering Program
- Various reactor operators
  
- \* Present at exit briefing.

### 2.0 Status of Previously Identified Item

(Closed) **Inspector Follow-up Item (IFI 50-134/92-01-02):** Formal written procedures were not available for all survey and monitoring operations. The inspector found that formal written procedures, approved by the Radiation, Health, and Safety Committee (RHSC), had been promulgated and implemented. This item is closed.

### 3.0 Personnel Dosimetry

The inspector reviewed personnel radiation exposure records, dosimetry procedures, and the Worcester Polytechnic Institute (WPI) RHSC minutes. The licensee uses a National Voluntary Laboratory Accreditation Program (NVLAP) vendor to process personnel thermoluminescent dosimetry. The ARSO maintains dosimetry records for both the reactor facility staff and the campus staff. A review of records indicated that all exposures were within NRC limits, with most showing no exposure above background. The vendor-supplied exposure reports are reviewed by the RHSC and the ARSO. The program includes action levels for investigation of elevated exposures, lost dosimetry badges, declared pregnant workers, and implements the new 10CFR20 dose limits for both occupational workers and members of the public. The licensee has implemented an effective personnel monitoring program. No safety concerns or violations of regulatory requirements were identified.

### 4.0 Instrument Calibration

The inspector reviewed the calibration records for the area radiation monitors, the portable survey instruments, and counting laboratory equipment. Calibrations were performed in-house by the licensee or off-site by certified vendors, using National Institute of Science and Technology (NIST) traceable calibration sources and American National Standards Institute (ANSI) or manufacturer accepted techniques. Calibrations were performed at the manufacture's recommended intervals. The licensee stated that, notwithstanding the manufacture's recommendation, the instruments would be calibrated at least yearly. All instruments checked had been calibrated as required. The licensee arranged to have calibration checks performed and calibration factors annotated for scales of the neutron meter in excess of those required by the manufacturer. This initiative to yield more accurate and precise measurements of neutron fields is noteworthy. No safety concerns or violations of regulatory requirements were identified.

## 5.0 Radiation Surveys

The ARSO performs semiannual wipe tests and "at power" radiation surveys at standardized locations in the facility and surrounding buildings. The "at power" survey, along with the facility's dosimetry results, confirms that the new 10CFR20 exposure limits to the public were being complied with. Weekly reactor facility inspections were also being performed by the ARSO. Results of the surveys and the inspection were reported to and reviewed by the RHSC. Anomalous findings were investigated. The frequency and type of monitoring technique was adequate for the facility's low level of hazard. No safety concerns or violations of regulatory requirements were identified.

## 6.0 Postings

General housekeeping of the facility was good. Warning signs and postings properly reflected the radiological conditions in the facility. Radioactive material storage cabinets and the storage room for calibration sources were secured and properly posted. An NRC Form 3 was conspicuously posted on the bulletin board. The radiological posting program was adequate. No safety concerns or violations of regulatory requirements were identified.

## 7.0 Staffing

Present staffing consisted of a full-time facility director and a part-time campus ARSO, who had functioned as the RSO for the reactor facility for the past two years. The campus RSO provided oversight and direction to the ARSO. The ARSO will be leaving this summer and was training a replacement. The replacement was a nuclear engineering candidate licensed on the WPI reactor. In addition to the radiation courses and training acquired in his degree program and reactor operator's license, he will have had over one year of on-the-job training upon assuming the duties as the ARSO. The staff was qualified and the staffing level was appropriate for this facility. No safety concerns or violations were identified.

## 8.0 Procedures and Policy

The WPI RHSC Radiation Regulations manual had been revised and details the Radiation Protection (RP) and ALARA programs. In conjunction with this revision, the Health Physics (HP) procedures were also updated and supplemented with new formalized procedures. The RHSC Radiation Regulations provide adequate guidance and instruction to radiation workers and fulfills the NRC requirements for a formal RP and ALARA program. The new and updated HP procedures were concise, unambiguous and used a standard format. The licensee's use of procedures and policies was appropriate. No safety concerns or violations were identified.

## 9.0 Training

Radiation Protection training is provided to all persons on campus who enter restricted areas or who may be occupationally exposed in controlled areas. The RHSC Regulations Manual provided a detailed list of instructional areas to be covered. This basic training was appropriately supplemented for those persons who work or visit the reactor. Review of training records and interviews with reactor staff and students verified that required training had been met. No safety concerns or violations were identified.

## 10.0 Oversight

The inspector observed a quarterly meeting of the RHSC and reviewed the committee's minutes for the past two years. The meeting followed the required procedural rules, covered the required record reviews, and demonstrated that the committee functioned as required. The committee formally approved the new RHSC Radiation Regulations and HP Procedures for implementation of the new 10CFR20 requirements. The RHSC instructed the ARSO and reactor staff to continue reviewing the changes and then scheduled another review for the next regular meeting to monitor implementation of the program. Review of the minutes also verified that the committee was active in providing appropriate guidance, direction and oversight to the safety program and ensured suitable use of the reactor. The RHSC's meeting schedule and membership satisfied technical specification requirements. The committee performed its duties as required by license and Technical Specification requirements. Oversight was good. No safety concerns or violations were identified.

## 11.0 New 10CFR20 Implementation

In general, the implementation of the new 10CFR20 requirements had not been functionally difficult for the facility to implement. Dosimetry, surveys, postings, calibrations, and training continued to be performed as normal. Personnel exposures, effluent releases, and area radiation levels at the facility were extremely low or non-existent. No internal exposures or planned special exposures would normally occur. The new public and fetal exposure limits were already being complied with. The actual impact was on written procedures and program guidance. As mentioned in Section 8.0 of this report, new procedures and a revised RHSC Radiation Regulation Manual had been promulgated to comply with the new regulatory requirements. The inspector identified a few lapses in converting to the new 10CFR20. The items were minor and of the type expected during such a conversion of written procedures and policy documents (i.e., referring to quarterly limits rather than yearly, using maximum permissible concentration instead of derived air concentration or annual limit of intake, or referencing the old 10CFR20 table for sewer releases). The licensee corrected these items by the end of the inspection and, as noted in the previous section, was performing an ongoing review of the program. No safety concerns or violations of regulatory requirements were identified.

## 12.0 Exit Interview

The inspector met with the licensee representatives listed in Section 1.0 of this report on January 13, 1994, and discussed the scope and findings of this inspection. The licensee acknowledged the inspection findings.