

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 90-02

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: September 10-12, 1990

Inspectors:

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10/05/90  
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Inspection Summary: Inspection on September 10-12, 1990 (Report No.  
50-134/90-02)

Areas Inspected: Routine, announced inspection of the radiation safety and reactor operations programs including: staffing, recordkeeping, instrument calibrations, postings, procedures, surveillance, requalification training, and audits.

Results: No violations were identified.

## DETAILS

### 1.0 Persons Contacted

- \*L. Bobek, Nuclear Reactor Facility Director
- \*R. Goloskie, Radiation, Health, and Safeguards Committee Chairman
- J. A. Mayer, Nuclear Engineering Program Director
- \*B. Woods, Radiological Safety Officer

\*Attended the Exit Interview.

### 2.0 Logs and Records

The inspector examined selected operator's logs, maintenance logs, and records. The logs and records appeared to be complete and reflected the conditions as reported in the licensee's annual reports to the NRC. They were compiled and maintained in accordance with Technical Specification (TS) and administrative procedural requirements.

The inspector examined recent recorder traces for the logarithmic and linear reactor power channels and found them consistent with TS requirements. The inspector also reviewed fuel handling logs and records and found them consistent with procedural requirements. No violations or deviations were identified.

### 3.0 Procedures

The licensee's procedures were found to be adequate and there was good management direction to assure compliance with the procedures. Interviews with the licensed reactor operators confirmed their understanding of the procedures and the necessity for procedural compliance. These discussions also verified the operators' understanding of the requirements for the review and approval of procedure changes and deviations. The inspector walked through selected operating procedures and verified that they: 1) met TS requirements, 2) were technically acceptable, and 3) were up-to-date approved versions. No violations or deviations were identified.

### 4.0 Requalification Training

The inspector reviewed the requalification training program and selected records. The records were complete, accurate, and in accordance with the program requirements. The inspector verified that a licensed senior operator, who had not met the requirement for four hours of operational activity in a calendar quarter in 1989, was requalified with an oral examination. This corrective action was reported to the NRC. The inspector also verified that procedure changes were reviewed by licensed operators and training was conducted for both normal and emergency conditions. No violations or deviations were identified.

## 5.0 Surveillance

Surveillance records for the daily critical checks, pool water level, and area radiation monitors were reviewed. The inspector verified that the surveillances were conducted in accordance with TS requirements and the results were reviewed and approved. No violations or deviations were identified.

## 6.0 Experiments

The inspector reviewed the licensee's irradiation log and discussed the monitoring requirements with the Radiological Safety Officer (RSO). The irradiations were generally simple foil irradiations and were within the scope described in the Final Safety Analysis Report and the TS. No violations or deviations were identified.

## 7.0 Health Physics

### 7.1 Personnel Exposures

Personnel exposures are monitored by film badges processed monthly by a National Voluntary Laboratory Accreditation Program (NVLAP) accredited vendor. The RSO maintains records for all personnel on campus receiving occupational exposure in addition to the reactor facility staff. Vendor supplied exposure reports are reviewed by the Reactor, Health, and Safety Committee (RHSC) and the RSO for anomalies. Action was taken recently in the case of a researcher who had received elevated skin exposure. However, most exposures were low and well within NRC limits.

### 7.2 Instrument Calibration

The inspector reviewed the calibration records for the permanently installed area radiation monitors and portable survey meters. Calibrations were performed off site by various vendors using American National Standards Institute (ANSI) accepted techniques and National Institute of Science and Technology (NIST) traceable radiation sources. All instruments were in calibration. The inspector noted some weakness as follows.

- a) Vendors used calibration points in mR/hr on instruments that only have counts per minute meter scales.
- b) The neutron survey meters were only calibrated on the middle two scales yet the probable use would involve the upper and lowest scales which were not calibrated.



- c) There was no calibration procedure for the Ar-41 monitor attached to the air exhaust duct. The licensee uses grab samples to monitor for abnormal releases. On-line monitoring may become important if the licensee proceeds with a planned rabbit tube installation.

The RSO stated that these weaknesses would be resolved. This matter will be reviewed in a future inspection (Follow-up Item 134/90-02-01).

### 7.3 Radiation Surveys

The RSO does a semiannual wipe test at standardized locations in nearby buildings as directed by the RHSC to detect any unmonitored release. The results are reported to the RHSC and then filed. Dose rate and wipe surveys are performed inside the reactor facility at the discretion of the RSO but these are not documented. This appeared to be adequate for the low level of hazards involved. Personnel frisking on exiting the facility was not required since no loose surface contamination has been detected for the past 20 years.

### 7.4 Postings

The only accessible radiation area was on the reactor bridge which was properly posted. Radioactive material storage cabinets and a storage room for calibration sources were properly labeled. An NRC-3 form was conspicuously on the bulletin board.

### 7.5 Staffing

The RSO is the only health physicist on the staff and is fully responsible for implementation of the radiological safety program. Excellent oversight and direction are provided by the RHSC. The current RSO gave notice and will leave in January 1991. A replacement has already been hired and is being trained to assume the RSO duties. The inspector interviewed this individual and determined that he had several years experience as a laboratory technician in the Nuclear Navy and some college training. The licensee was commended for providing a good turnover for this key position.

### 7.6 Procedures and Policies

The RHSC issued detailed instructions for most of the RSO's activities, such as instrument calibrations and HP surveys. The committee also required written reports from the RSO regarding these activities. Users of the reactor facility were provided with "Radiation Regulations" which summarize the requirements from the NRC regulations. However, these were not detailed and assume an understanding of the hazards and required care on the part of the experimenter. The licensee's use of procedures and policies was determined to be very good.

### 7.7 Radiation Safety Audits

The PSO completes a weekly checklist type of audit of the reactor facility for the RHSC. In addition, the secretary of the RHSC audits the facility each quarter and files a written report. The licensee's auditing program is effective.

No violations or deviations were identified.

### 8.0 Design Changes, Audits, and Committees

The inspector reviewed the various logs and reports related to design changes. Except for the conversion to Low Enriched Uranium (LEU) fuel, there were no major design changes since the last inspection. For the LEU conversion, the inspector verified that the licensee performed acceptable testing to assure compliance with the TS during power ascension. The inspector reviewed an internal audit report on the LEU conversion which verified that the conversion was conducted in accordance with the associated plan. The inspector reviewed minutes from the RHSC meetings including those for the LEU conversion effort. The meetings were acceptably conducted with regard to quorum, frequency, and content. No violations or deviations were identified.

### 9.0 Emergency Planning

The inspector reviewed the licensee's emergency plan, a current memorandum of understanding from the Worcester City Hospital, and communications to the Worcester Police and Fire Departments to provide acceptable assurance of a coordinated effort in an emergency. The inspector verified that evacuation drills were conducted and reviewed by the RHSC per the emergency plan, and that operators were trained in their emergency responsibilities. No violations or deviations were identified.

### 10.0 Exit Interview

The inspector met with the personnel denoted in section 1.0 at the conclusion of the inspection on September 12, 1990. The scope and findings of the inspection were presented at that time.