

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No: 50-20

License No: R-37

Report No: 50-20/96-02

Licensee: Massachusetts Institute of Technology

Facility: MIT Research Reactor

Location: 138 Albany Street
Cambridge, Massachusetts

Dates: September 16-20, 1996

Inspector: Thomas F. Dragoun, Project Scientist

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

EXECUTIVE SUMMARY

Massachusetts Institute of Technology

Report No. 00-20/96-02

Emphasis on maintenance and training after the departure of several staff members has resulted in improved program performance.

Report Details

Summary of Plant Status

The reactor was operated continuously at full power during the week except for Tuesday night swing shift. At that time, a shutdown occurred for troubleshooting and repairs after No.6 shim blade magnet current pegged high. Orientation tours for physics students were 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, and
- the console log and the job workbook

b. Observations and Findings

Since the last inspection in July 1995, three senior supervisors and the lead electronics technician departed. All positions were refilled quickly. In addition, the Nuclear Reactor Laboratory Director (Prof. Harling) announced he would retire at the end of September 1996. The Reactor Operations Director will act in this position until it is filled. Interviews and observations by the inspector indicated that the new appointees were well qualified and motivated. In particular, the electronics maintenance function was assigned to a senior reactor operator who corrected long standing equipment problems that lead to violations of the TS last year. One additional operator was assigned to help reduce the repair backlog. The electronics shop was cleared of clutter and additional benchtop instruments ordered.

Use of a published weekly operations schedule and a daily "white board" schedule updated in grease-pencil demonstrated good planning and work coordination.

Logs were clear and descriptive. Data records indicated that the facility was operated within parameters specified in the TS. Equipment malfunctions and abnormalities were clearly identified and copied to the job workbook for action. The Assistant Superintendent of Operations reviews and initials each page of the console log.

Good safety-consciousness was involved in the decision to quickly shutdown the reactor after shim blade #6 magnet current pegged high. Good teamwork was demonstrated during the trouble-shooting and repair, which took about three hours. The reactor was returned to full power before the end of the shift.

c. Conclusions

Staffing requirements in TS 7.0 were satisfied. Record keeping was good. Electronics maintenance has improved.

O2 Operational Status of Facilities and Equipment

O2.1 Surveillance

a. Inspection Scope (Inspection Procedure 61745)

The inspector reviewed:

- surveillance procedures,
- surveillance data,
- limiting conditions of operation, and
- observed performance of a surveillance

b. Observations and Findings

Surveillances were found to be complete in accordance with monthly schedules contained in procedure PM 7.3.1. Picoammeter channel #3, which had not passed the loss-of-signal scram test during the last NRC inspection, has been repaired. Equipment malfunctions or abnormalities found during surveillances were well documented and followed-up by the Operations Superintendent until resolved.

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 updates, and
- adherence to procedures

b. Observations and Findings

Documented safety reviews, as specified in 10 CFR 50.59, were completed for each change to the operating procedures. The formalized approval process for changes was followed in all cases. Records and interviews indicated that changes were reviewed by all reactor operators. Proper use of procedures was noted during a reactor shutdown and conduct of a surveillance.

In a September 25, 1995 letter responding to inspection 95-02, the licensee stated that written guidance to operators for dealing with equipment malfunctions was written but not used because the equipment was repaired. This was verified by the inspector. Inspector Follow Item 95-02-01 is closed.

c. Conclusions

Use of facility procedures, and changes thereto, satisfied TS 7.8 requirements.

O5 Operator Training and Qualification

a. Inspection Scope (Inspection Procedure 41745)

The inspector reviewed:

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

b. Observations and Findings

The results of an NRC initial licensing exams conducted the previous week were not available. However, early indications were that all candidates passed, demonstrating the effectiveness of the training program.

Requalification status and medical evaluations were up to date for all staff. A new committee was created to oversee requalification progress, a function previously assigned to a single supervisor, when it was determined that the workload was excessive for one person.

Several student operators were on staff and in training. This increased personnel resource provides a better opportunity for the permanent staff to upgrade programs and perform maintenance. Mentors were assigned to each trainee to assure proper focus and understanding of the nature and requirements of reactor operations.

c. Conclusions

The requalification program satisfied the requirements in TS 7.4, 10 CFR 55 and Appendix 13.C of the SAR.

O7 Quality Assurance in Operations

O7.1 Review and Audit and Design Change Functions

a. Inspection Scope (Inspection Procedure 40745)

The inspector reviewed:

- MIT Reactor Safeguards Committee membership and minutes of meeting,
- Annual independent audit and quarterly administrative audits, and
- Peer audit

b. Observations and Findings

In a letter forwarding inspection report 95-02, the NRC stated that the complexity of factors contributing to the operation of the reactor with one shim blade partially inserted indicated the need for a peer review of programs. On August 19-20, 1996, two directors from other research reactor facilities conducted a peer review. A draft report concluded that corrective actions were appropriate for the 1995 equipment failures and provided five additional recommendations. The licensee's resolution of the finalized recommendations will be reviewed in a future inspection.

In a related matter, after the 1995 event, the licensee stated that a safety analysis of operating with one blade partially inserted would be completed. The inspector reviewed a student doctoral thesis presented by the licensee that contained safety analysis. However, only fully withdrawn blades were analyzed by this effort. This matter remains open.

All required audits were completed on time and provided good insight for the programs reviewed.

c. Conclusions

Review and oversight functions required by TS 7.0 and licensee commitments were satisfactorily completed.

P1 Conduct of EP Activities

a. Scope (Inspection Procedure 82745)

The inspector reviewed:

- changes to the emergency plan,
- changes to implementing procedures,
- facilities, equipment, and supplies,
- exercises and drills, and
- training.

b. Observations and Findings

The emergency plan and implementing procedures were revised to be more user friendly and provide operator aids. A review of the changes by the inspector indicated that appropriate guidance was followed. Implementation of the revision will occur after MITSRC approval, expected during the next scheduled meeting in October 1996.

The inspector accompanied a SRO and a trainee during the monthly inventory of emergency self contained breathing apparatus. The operational check technique used was effective and the number of units available exceeded the minimum specified in the emergency plan. However, a review of records indicated that medical evaluations prior to respirator use and initial fit testing were not done since 1994. The RRPO stated that the MIT Industrial Hygiene Department provides these services, and committed that arrangements would be made to assure that the required qualifications and subsequent record update would be completed by October 30, 1996. This matter will be reviewed in a future inspection (Inspector Follow Item 96-02-01).

Records of the annual drill and training were satisfactory.

c. Conclusions

The emergency plan was acceptably implemented.

V. Management Meeting

X1. Exit Meeting Summary (Inspection Procedure 30703)

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on September 20, 1996. The licensee acknowledged the findings presented.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Bernard, Director of Reactor Operations
T. Date, Assistant Reactor Radiation Protection Officer
E. Lau, Assistant Operations Superintendent
F. McWilliams, Reactor Radiation Protection Officer (RRPO)
T. Newton, Assistant Operations Superintendent

INSPECTION PROCEDURES USED

- IP 30703: ENTRANCE AND EXIT 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
- IP 82745: CLASS I NON-POWER REACTOR EMERGENCY PREPAREDNESS

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-20/96-02-01 IFI Annual medical evaluation of respirator users and initial fit testing to be brought up to date by October 30, 1996.

Closed

50-20/95-02-01 IFI Written guidance to be provided to reactor operator for dealing with equipment malfunctions until repairs can be made.

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
IFI	Inspector Follow Item
MITRSC	MIT Reactor Safeguards Committee
NRC	Nuclear Regulatory Commission
RRPO	Reactor Radiation Protection Officer
SAR	Safety Analysis Report
SRO	Senior reactor operator
TS	Technical Specifications