

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 50-20/78-06
Docket No. 50-20
License No. R-37 Priority -- Category F

Licensee: Massachusetts Institute of Technology

MIT Research Reactor
138 Albany Street
Cambridge, Massachusetts

Facility Name: MITR II

Inspection at: Cambridge, Massachusetts

Inspection conducted: September 27-29, 1978

Inspectors:

T. Stetka
T. Stetka, Reactor Inspector
E. Greenman
E. Greenman, Reactor Inspector

10/10/78
date signed

10/13/78
date signed

Approved by:

E. C. McCabe, Jr.
E. C. McCabe, Jr., Chief, Reactor Projects
Section No. 2, RO&NS Branch

date signed

10-13-78
date signed

Inspection Summary:

Inspection on September 27-29, 1978 (Report No. 50-20/78-06)

Areas Inspected: Routine, unannounced inspection by two NRC regional based inspectors of licensee event report review (inoffice and onsite); surveillance; procedures; independent effort; and, turnover of project inspector responsibility. The inspection involved 32 inspector-hours on site by two NRC regional based inspectors.

Results: Of the three areas inspected, no items of noncompliance were found in two areas; one item of noncompliance was identified in one area (Deficiency - failure to conduct Reactor Safeguards Committee Meeting within required frequency - Detail 3).

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DETAILS

1. Persons Contacted

- *J. Bernard, Day Shift Supervisor
- *L. Clark, Jr., Director of Reactor Operations
P. Coggio, Health Physics Technician
- *K. Collins, Reactor Supervisor
- *G. Dooley, Senior Operator
- *O. Harling, Director of the Reactor Laboratory
E. Karaian, Reactor Protection Officer

The inspector also interviewed other licensee representatives including operations and office staff personnel.

* denotes those present at the exit interview.

2. Previous Inspection Item Update

(Open) Unresolved Item (78-03-03): Requalification Examinations are scheduled for October 28, 1978. Grading and administration will be reviewed subsequent to completion of exams by licensed individuals.

(Closed) Unresolved Item (78-03-02): The licensee filed a supplemental LER (Report No. 50-20/78-2A, dated June 28, 1978), which addressed actions planned to preclude similar type failures. The inspectors also reviewed purchase orders for a new flow/differential temperature system and automatic control circuit. Additional chambers and instrumentation are being procured. The inspectors had no further questions regarding this item.

3. MIT Reactor Safeguards Committee Meetings

The MITRSC met on July 12, 1977 (Meeting No. 57) and September 6, 1978 (Meeting No. 58) and the minutes were reviewed by the inspectors. Minutes indicated committee identification of late completion of the annual report and biannual review of the security plan. The annual report was submitted to the NRC September 12, 1978 (due date August 30, 1978). As of the date of this inspection, the biannual review of a security plan was in progress. The licensee stated that this review will be completed by November 30, 1978. This is an unresolved item (78-06-01). Review of minutes for Meeting Nos. 57 and 58 indicated that meetings were held at a frequency in excess of one year, which is contrary to TS 7.5.2(f) and constitutes a Deficiency level item of noncompliance (78-06-02).

4. Review of Annual Report

The Annual Report for the period July 1, 1977 to June 30, 1978, for the MIT Research Reactor was reviewed. Review included verification that information specified in the Technical Specifications has been reported.

With the exception of the late submittal of this report, as identified in paragraph 3, no unacceptable conditions were identified.

5. Nonroutine Event Review

The inspector reviewed the following nonroutine events, both inoffice and onsite, for safety significant circumstances and relationship to Technical Specification protective limits. The licensee's review, evaluation and corrective action was also verified by inspector review and observation.

LER NumberDescription

50-20/78-03

Auxiliary Intake Damper failed to close during testing. The inspector confirmed that all corrective action had been completed.

50-20/78-04

Two Valves in the Emergency Cooling System were left misaligned following testing. The inspector confirmed that all corrective action had been completed.

The referenced LERs had not yet been reviewed by the Safeguards Committee. A cognizant licensee representative stated that this review would be accomplished at the next meeting scheduled for November, 1978. This item (78-06-03) is unresolved

6. Facility Tour

The inspector toured various areas of the facility including the control room; equipment room; reactor room operating floor; shops and process areas; and, exterior areas to determine the general state of cleanliness, housekeeping and adherence to fire protection guidelines. Minimum licensed operator complement requirements were verified. Nuclear instrumentation operability requirements, flow limits and power level parameters were also confirmed. No unacceptable conditions were identified.

7. Facility Procedure Review

- a. The inspector reviewed the licensee's administrative guidance and verified that responsibilities of operators and senior operators were established via procedures, including changes, approvals and levels of subsequent review. The following procedures were reviewed:

- PM-II, 1.3-1, Authority and Responsibility for Safe Operations, dated December 14, 1973;
- PM-II, 1.4-1, Review and Approval of Plans, Procedures, and Facility Equipment and Changes Thereto, dated April 9, 1974; and,
- PM-II, 1.5-1, Procedure Adherence and Temporary Change Method, dated September 14, 1975.

No unacceptable conditions were identified.

- b. The inspector reviewed the following procedures for technical adequacy and conformance with Technical Specification requirements:

- PM-II, 2.2-2, Nonroutine Reactor Startup, dated March 8, 1975 and Checklist PM 3.1.4, dated February 13, 1978;
- PM-II, 2.4-3, Restart After Unscheduled Shutdown, dated March 24, 1977 and Checklist PM 3.1.6, Restart from Unanticipated Shutdown, dated December 21, 1977;
- PM-II, 2.3, Continuous Power Operation, dated March 8, 1975 and Checklist PM 3.5, Daily Checklist, dated August 9, 1977; and,
- PM-II, 3.7.1, Security Weekly Checklist, dated April 24, 1978.

The inspectors walked through partial portions of Checklists PM 3.5 and PM-II, 3.7.1, identified above, and verified step-by-step that the procedures accomplished their intended purpose and were the latest revision.

No unacceptable conditions were identified.

3. Limiting Conditions of Operations (LCO) Review

The following operating conditions were observed during the plant tour and record reviews:

| <u>Parameter</u> | <u>TS Limit</u> | <u>Observed Value</u> |
|------------------------------------------------------------|-------------------------------------|------------------------------------------------|
| Primary Coolant Flow | > 1800 gpm | 2100 gpm (IO/RR) |
| Reactor Thermal Power | 5 MW | 4.7 MW (IO/RR) |
| Pool Water Level | > 4 inches below overflow pipe | At overflow pipe (IO) |
| Primary Coolant Outlet Temperature | < 60°C | 48°C (IO/RR) |
| Shim Rod Position | Within 2" of Bank Position | Within 0.2" of Bank Position (IO) |
| Scram Insertion Time | < 1.0 sec to 80% of Full Insertion | < 0.7 sec for all control blades (RR) |
| Recombiner Middle Temperature | > 50°C | 105°C (IO) |
| Radiation Monitors Containment Building Overpressure Scram | Operable ≤ 3.0" H ₂ O | Operable (IO/RR) 1.9" H ₂ O (RR) |

IO - Inspector observation of process instrumentation.

RR - Record review by inspector.

No items of noncompliance were identified.

9. Surveillance Review

The following surveillance procedures were reviewed to verify that the procedures were adequate to accomplish their intended function and meet Technical Specification requirements:

- PM 6.1.2.5, Charcoal Filter Efficiency Test, dated November 6, 1975. Data was reviewed for tests performed on May 22, 1978 and November 14, 1977.

- PM 6.1.4.4, Primary Coolant Flow Scram Time, dated June 4, 1975. Data was reviewed for the test performed on February 20, 1978.
- PM 3.1.1.2, section entitled, Magnet Currents, dated March 30, 1978. Data was reviewed for tests performed on September 26, 1978, September 19, 1978, September 12, 1978, September 5, 1978, August 29, 1978 and August 22, 1978.
- PM 6.1.3.3, Primary Coolant Flow Scram Calibration, dated June 4, 1975. Data was reviewed for test performed on February 27, 1978.
- PM 2.3.2, Thermal Power Calibration, dated March 8, 1975. Data was reviewed for calibrations performed for the months of August and September, 1978.
- PM 6.1.4.1, Nuclear Safety System Response Time, dated May 24, 1977. Data was reviewed for test performed on March 4, 1978.
- PM 3.1.1.2, section entitled, Process System Scram Checks, dated May 2, 1978. Data was reviewed for checks performed on September 26, 1978, September 19, 1978, September 12, 1978, September 5, 1978, August 29, 1978 and August 22, 1978.
- PM 6.1.3.9.1, Water Monitor Calibration Procedure, dated May 24, 1977. Data was reviewed for checks performed on February 27, April 24, May 13, June 19 and August 24, 1978.

No items of noncompliance were identified.

10. Primary System

The licensee has completed installation of a third primary coolant to secondary coolant heat exchanger. Amendment No. 14 to License R-37 authorizing this change was issued by the NRC on August 25, 1978. Preoperational test procedures had not been written and approved as of the date of this inspection. The inspectors reviewed documentation associated with the purchase of this unit from a foreign manufacturer. The new heat exchanger is equivalent to one of the existing units. This area is unresolved pending review of procedures, the preoperational test program and applicable requirements for the heat exchanger including welder qualifications (78-06-04).

11. Unresolved Items

Unresolved items are those items for which further information is required to determine whether they are acceptable items or items of noncompliance. Unresolved Items are contained in Paragraph 3, 5 and 10 of this report.

12. Exit Interview

The inspector met with licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on September 29, 1978. The inspector summarized the scope and findings of the inspection as they are detailed in this report. During this meeting, the unresolved items and the item of noncompliance were identified.