

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

Region I

Report No. 50-20/79-02

Docket No. 50-29

License No. R-37 Priority -- Category F

Licenses: Massachusetts Institute of Technology

MIT Research Reactor
138 Albany Street
Cambridge, Massachusetts 02139

Facility Name: MITR II

Inspection at: Cambridge, Massachusetts

Inspection conducted: August 29-31

Inspectors: *T. F. Stetka*
T. F. Stetka, Reactor Inspector

9/20/79
date signed

T. Foley
T. Foley, Reactor Inspector

9/20/79
date signed

_____ date signed

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

9/20/79
date signed

Inspection Summary:

Inspection on August 29-31, 1979 (Report No. 50-20/79-02)

Areas Inspected: Routine, unannounced inspection of personnel changes and shift staffing, operator requalification program, facility procedures, limiting conditions for operation, surveillance, action on IE Circular 79-09, nonroutine events, and action on previous inspection items. Facility tours were conducted. The inspection involved 42 hours onsite by two NRC region-based inspectors.

Results: Three items of noncompliance were identified (Infraction - failure to adhere to radiation protection procedures requiring use of protective clothing; Deficiency - failure to review requalification program prior to implementation; Deficiency - failure of Senior Review Board to annually review operator written examination results).

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DETAILS

1. Persons Contacted

- *J. Bernard, Superintendent of Operations
- *W. Clancy, Assistant Superintendent of Operations
- *L. Clark, Director of Operations
- *P. Coggio, Radiation Protection Technician
- *O. Harling, Director of the Reactor Laboratory
- *E. Karaian, Radiation Protection Officer

The inspectors also interviewed other licensee representatives.

*denotes those present at the exit interview.

2. Licensee Action on Previous Inspection Findings

(Closed) Deficiency (20/78-05-01): This item was corrected subsequent to the inspection conducted on September 13-15, 1978. Corrective action on this item is considered to be complete.

(Open) Followup Item (20/79-01-01): The air meter was calibrated on April 26, 1979 in accordance with Special Procedure entitled Gas Meter Calibration. The licensee will calibrate this instrument prior to the containment leak rate test which is conducted on an annual basis. A safety review remains to be completed on the special procedure and calibration interval. This review will be completed by January 1, 1980.

(Open) Followup Item (20/79-01-02): The hard-wired test signal generator has been completed but has not been installed. This installation will be completed by October 1, 1979.

(Open) Followup Item (20/79-01-04): The licensee will revise Administrative Procedure 1.4 to include a Class B review and approval structure for pre-operational tests. This procedure revision will be completed by January 1, 1980.

(Closed) Unresolved Item (20/79-01-05): The licensed operator in question received his renewal license. This item is considered complete.

(Open) Followup Item (20/79-01-06): The SAR revision is presently being written and is expected to be completed by January 1, 1980.

(Closed) Unresolved Item (20/79-01-07): The welding certification records have been properly completed and the welder qualifications were reviewed. No additional inadequacies were identified.

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(Closed) Unresolved Item (20/78-03-03): Grading of the examinations conducted on October 28, 1978 were accomplished within two weeks of completion of the examinations. Review of this item identified another item pertaining to upgrading of operators in weak areas identified during an examination. This item is discussed in Paragraph 5.b(2) of this report.

(Closed) Unresolved Item (20/78-05-02): A review of MIT's evaluation and survey of neutron film badge results versus actual dose rates indicate compliance with applicable requirements.

3. Personnel Changes and Shift Staffing

- a. The licensee recently appointed a new Operations Superintendent, Assistant Operations Superintendent, and Shift Supervisor to replace personnel who had resigned from these positions. The qualifications of these individuals were reviewed to verify compliance with the Technical Specification qualification requirements. No inadequacies were identified.
- b. The shift staffing schedule and the console log were reviewed to verify that the minimum Technical Specification staffing requirements were met. No inadequacies were identified.

4. Facility Tours

- a. The inspectors toured various areas of the facility including the control room, fuel vault, reactor building, shops and process areas to determine the general state of cleanliness, housekeeping and adherence to fire protection guidelines. The inspector checked equipment status and operability and verified by comparison of control room indications that limits for power, flow and nuclear channel operability were being adhered to. Coolant conductivity and temperature parameters were also examined. The inspector also verified that the minimum licensed operator complement required by Technical Specifications was satisfied and that specific license restrictions if applicable were adhered to. During these tours, two items were identified and are described in the following paragraphs.
- b. While touring the control room on August 30 at 10:57 a.m., the inspector observed, via the television monitor, two individuals on the top of the reactor. One individual (A) was wearing the protective clothing required for that area, but the other individual (B) was not wearing any protective clothing. The control room operator immediately requested individual "B", via intercom, to don protective clothing. This request was ignored, and upon making a second request, individual "B" proceeded

to another area on the reactor top which was also potentially contaminated and required protective clothing. At this point, individual "B" was removed from the reactor top, checked for contamination (there was no contamination), and escorted out of the restricted area.

The inspector discussed this event with individual "B" and other licensee representatives. These discussions indicate that individual "B" was trained for unescorted access and also indicated that individual "B" was a consistent violator of the licensee's radiological control procedures and had been reprimanded for these violations on earlier dates. At the request of the inspector, this individual's unescorted access permission was revoked.

Failure to adhere to the licensee's radiological control procedures is contrary to the requirements of Technical Specification 7.10 and is an item of noncompliance (20/79-02-01).

On September 5, 1979, the licensee was issued Immediate Action Letter (IAL) 79-14, which requires certain remedial actions to be accomplished by specified dates. The licensee's response to IAL 79-14 will be considered the response to this item.

- c. During another tour of the restricted area, the inspector observed an operator remove irradiated material from a "Hot Box" inside the reactor building and carry this material to a storage area outside of the reactor building, but within the restricted area, prior to establishing whether this material was contaminated. In the storage area the material was checked for contamination and was found to be clean.

This practice was discussed with licensee representatives and the possibility of contamination spread emphasized. The licensee representative acknowledged the inspector's remarks and stated that a sign would be placed in the reactor building air lock reminding personnel to check potentially contaminated material prior to carrying the material beyond the air lock. That action is to be completed by September 15, 1979. This item is unresolved (20/79-02-02).

5. Operator Requalification Program

- a. The licensee conducts his licensed operator requalification program in accordance with Procedure 1.16.1, Requalification Program for Licensed Personnel, dated May 21, 1979.

The inspector noted that, while the program was approved by the NRC Operator Licensing Branch on May 18, 1978, it was not approved by the

Director of Reactor Operations until May 18, 1979, and dated for implementation on May 21. The delay was apparently the result of scheduling errors. The inspector also noted that the program has not been reviewed by the MIT Reactor Safeguards Committee (MITRSC).

The last MITRSC meeting, Meeting No. 58, was conducted on September 6, 1978. Failure to review the requalification program by the MITRSC is contrary to Technical Specification 7.5.2 and Procedure 1.4, Review and Approval of Plans, Procedures, and Facility Equipment and Changes Thereto, and is an item of noncompliance (20/79-02-03).

b. Review of operator license records identified the following items:

- (1) Three current watch standing operators, two senior operators and one reactor operator, had their licenses expire on July 12, 1979. Application has been made for license renewal as required by 10 CFR Part 55 and these applications are pending NRC Operator Licensing Branch (OLB) action. This item is unresolved and will be reviewed during subsequent inspections (20/79-02-04).
- (2) Two current watch standing operators who passed the requalification examination conducted on October 23, 1978, failed an individual section of the examination. The licensee has conducted a retraining program for these operators to strengthen the weak areas and will re-examine these operators by September 15, 1979. The inspector queried the licensee with respect to the long time interval between determining a weakness and upgrading the operators. The licensee representative stated that subsequent upgradings will be accomplished within 2 months of determining examination results. This item will be reviewed during subsequent inspections and is unresolved (20/79-02-05).
- (3) Procedure 1.16.1 requires in Section 1.16.1.3 that the Senior Review Board annually review the results of all written examinations together with individual operator and senior operator evaluations to assess the Requalification Program. These annual reviews are not being conducted. Failure to conduct these annual reviews of the NRC approved Requalification Program is contrary to Technical Specification 7.4 and is an item of noncompliance (20/79-02-06).

6. 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:

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- PMII 1.14, General Safety Rules, dated April 9, 1974.
- PMII 1.14.3, Equipment Tagout Procedure, dated August 9, 1976.
- PMII 1.18.3, Security Program, dated November 27, 1974.
- PMII 2.1, Standard Operating Plans, dated March 8, 1975.

No unacceptable conditions were identified.

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

- PMII 2.2, Reactor Startup, dated March 8, 1975, and Startup Checklist 3.1.1.2, dated January 25, 1979.
- PM 2.4.3, Restart After Unscheduled Shutdown, dated March 24, 1977.

The inspector walked through partial portions of Checklists PMII and 3.1.1.2, identified above, and verified step-by-step that the procedures accomplished their intended purpose and were the latest revision.

No unacceptable conditions were identified.

7. 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	2245 gpm (IO/RR)
Reactor Thermal Power	5 MW	4.09 MW (IO/RR)
Pool Water Level	< 4 inches below overflow pipe	At overflow pipe (IO)
Primary Coolant Outlet Temperature	< 60°C	49.3C (IO/RR)
Shim Rod Position	Within 2" of Bank Position	Within 0.1" of Bank Position (IO)
Scram Insertion Time	< 1.0 sec to 80% of Full Insertion	< 0.7 sec for all control blades (RR)

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Recombiner Middle	> 50°C	83.5 (IO/R/R)
Radiation Monitors	Operable	Operable (IO/RR)
Containment Building	≤ 3.0" H ₂ O	-.22" H ₂ O (RR)
Overpressure Scram		

IO - Inspector observation of process instrumentation.

RR - Record review by inspector.

No items of noncompliance were identified.

8. Surveillance Review

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

- PM 6.1.2.4, "Test of Vacuum Breaker Set Points," dated August 20, 1973, and data completed November 29, 1978;
- PM 6.1.3.2, "Period Channel Calibration Test," dated May 24, 1977, and data performed May 8, 1979;
- PM 6.1.3.4, "Reactor Water Outlet Temperature," dated August 21, 1978, and data performed August 21, 1978. Also reviewed Safety Review 78-22 dated September 21, 1978, reflecting appropriate temperature change reviews;
- PM 6.1.3.9.2, "Particulate Monitor Calibration Procedure," dated May 24, 1977, and data performed June 20, 1978 - June 7, 1979;
- PM 6.1.4.4, "Primary Coolant Flow Scram Time Test," dated December 27, 1978, and data completed February 21, 1979;
- PM 6.2.4, "Period Level Indication Offscale Scram Test," dated June 25, 1975, and data completed June 21, 1979;
- Reactor Operator's Console Logs from July 26, 1979 - August 26, 1979;
- Reactor Operating Data Log from July 26, 1979 - August 26, 1979;
- PM 1.14.3-1, Tagout Log data from July 26, 1979 - August 26, 1979; and,

-- PM 1.14, Morning Surveillance Sheets from July 26, 1979 - August 26, 1979.

The inspector identified no significant problems except as noted below:

PMII 2.3.1 requires the reactor operator to record hourly readings per the MIT Reactor Operating Data Log. On a few occasions, during continuous operation greater than 4MW, hourly surveillances were not recorded. Further, the point at which logs are to commence being recorded and the point at which recording logs is to be terminated is not specified. The licensee will brief operators on adherence to procedures and determine at what specific period reactor hourly logs will be recorded. These actions will be completed by September 15, 1979. This item is unresolved (20/79-02-07).

9. Licensee Action on IE Circular 79-09

The inspector requested a review by the licensee of the circumstances identified in IE Circular 79-09, Occurrences of Split or Punctured Regulator Diaphragms in Certain Self-Contained Breathing Apparatus, to determine if this Circular is applicable to the equipment in use at the facility.

The licensee's review identified that the facility uses Mine Safety Appliances (MSA) equipment in lieu of the Scott equipment identified in the Circular. The licensee inspected the MSA units and verified that a similar failure mode did not exist. A licensee representative stated that these units are inspected on an annual basis and after each use and no problems have been identified.

A licensee representative also stated that while the reactor facility did not utilize Scott units, the Industrial Hygiene Office of the Environmental Medical Services did use these units. This office also inspected their units, found no problems, and also have a schedule in which each unit is inspected on a six month interval and after each use.

The inspector had no further questions on this item.

10. Nonroutine Event Review

50-20/79-2, Main Core Tank Level Scram Inoperable.

50-20/79-3, Security Alarm Inoperative.

50-20/79-4, Apparent Fuel Element Cladding Failure.

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As a result of this review the following items were identified.

a. 50-20/79-2

The licensee has not yet added the replacement of the probe insulation to the preventive maintenance schedule. This is to be accomplished by the end of September, 1979. This is an unresolved item (20/79-02-08).

Work is presently in progress to modify the probe to extend its effective life. This work progress will be reviewed during a subsequent inspection (20/79-02-09).

b. 50-20/79-4

Further analysis of the discharge fuel will be accomplished when arrangements are made to transfer the fuel to a testing laboratory (Hot Lab). This transfer is dependent upon cooling of the element and licensing of a shipping cask. Activity in this area will be examined during subsequent inspections (20/79-02-10).

c. The Reactor Safeguards Committee has not yet adjourned and therefore, these occurrences have not been reviewed by the whole committee. This item is unresolved (20/79-02-11).

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 Paragraphs 4.c, 5.b(1), 5.b(2), 8, and 10 of this report.

12. Exit Interview

The inspectors met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on August 31, 1979. The inspector summarized the scope and the findings of the inspection as they are detailed in this report. During this meeting, the unresolved items and items of noncompliance were identified.