U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos.: 50-20/91-02 and 70-938/91-02

Docket Nos.: 50-20 and 70-938

License Nos.: R-37 and SNM-986

Licensee: Massachusetts Institute of Technology (MIT)
138 Albany Street and 77 Massachusetts Avenue
Cambridge, Massachusetts

Facility Name: MIT Research Reactor and Campus

Inspection At: Cambridge, Massachusetts

Inspection Conducted: July 15-18, 1991

Inspectors: Craig Z. Gordon 8/20/91
for M. A. Austin, Radiation Specialist, Effluents date
Radiation Protection Section (ERPS), Facilities
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Approved By: Robert J. Bores 8/20/91
Robert J. Bores, Chief, ERPS, FRSSB, DRSS date

Inspection Summary: Inspection on July 15-18, 1991 (Report Nos. 50-20/91-02 and 70-938/91-02)

Areas Inspected: Routine, unannounced inspection of licensed activities including: operational status of the licensee's Emergency Preparedness (EP) program, and status of licensee action on previously identified items.

Results: No violations of NRC requirements were identified. Areas for improvement were identified in the Emergency Plan and Emergency Plan Implementing Procedures (EPIP).

DETAILS

1.0 Individuals Contacted

*J. Bernard, Director, Reactor Operations
J. Beyer, Co-Director, Campus Nurse Practioners
J. Capucci, Lieutenant Day Commander, Campus Police
A. Ducatman, Director, Environmental Medical Service (EMS)
M. Galanek, Associate Campus Radiation Protection Officer
*K. Kwok, Superintendent, Reactor Operations
F. Massé , Campus Radiation Protection Officer (CRPO)
*F. McWilliams, Reactor Radiation Protection Officer (RRPO)

*Denotes those present at the exit interview on July 18, 1991. The inspectors also interviewed other licensee employees during the inspection.

2.0 Licensee Action on Previously Identified Items

(Open) Inspector Followup Item (50-20/90-01-01) Lack of written implementing procedures for radiological controls program. The inspector reviewed a draft copy of meeting minutes for the licensee's Reactor Safeguards Committee (RSC) session held on July 15, 1991, which indicated that the RSC concurred with the general process being implemented at the reactor facility to formally review and approve written radiological control (RC) procedures. This formal process required that each RC procedure prepared by the RRPO, which could directly affect reactor operations (e.g., radiological surveys of containment), would receive approval signatures by two senior reactor operators (SROs) and the Director, Reactor Operations. The other RC procedures prepared by the RRPO, which would not directly affect reactor operations (e.g., administrative notifications), would be informally reviewed by members of the reactor operations staff and receive approval signatures from the CRPO and the Director, EMS. At the time of the current inspection, the RRPO stated that about thirty RC procedures had been drafted and about twenty-five of them were in the review process. Therefore, this item remained open pending completion of the review process and actual implementation of the written procedures.

(Open) Violation (50-20/91-01-01) Failure to provide all information required by 10CFR20.311(b). The RRPO stated that a vendor had been selected to perform the required analyses and the samples would be sent to the vendor laboratory in July 1991. Based upon discussions with the RRPO and other licensee representatives, the inspector confirmed that no waste shipments had been made since the last inspection, and the licensee re-affirmed its commitment to not make any such future shipments until the waste had been properly characterized by the results of the radiochemical analyses. Therefore, this item remained open pending completion of the required analyses and waste characterization.

(Closed) Inspector Followup Item (70-938/91-01-01) Management oversight of compliance with the radiation safety-related requirements of NRC License No. SNM-986. Based upon discussions with the CRPO and the RRPO, the inspector determined that the RRPO was primarily responsible for compliance with the radiation safety-related requirements of NRC License No. R-37 and reported to the Director, EMS for administrative purposes; however, for purposes of radiation safety and compliance with NRC License No. SNM-986, the RRPO reported through the CRPO, who also directly reported to the Director, EMS. In this manner, the CRPO coordinated the radiation safety activities related to SNM-986 and management oversight was provided. The explanation received by the inspector was consistent with that provided by the licensee in a letter, dated April 12, 1991. Therefore, based upon this information, this item was closed.

(Open) Inspector Followup Item (50-20/91-01-02) Upgrading of stack sampling in Engineering Lab. The inspector reviewed a memorandum, dated June 17, 1991, from the RRPO to the Director of Reactor Operations, which documented the need for improvement of the stack sampling system. The inspector reviewed drawings of the proposed, new design that has two sampling lines instead of the single line used by the current system. The RRPO stated that the effectiveness of the new design will be evaluated by the Campus Industrial Hygiene Office after installation. At the time of the current inspection, the licensee had not projected a completion date for this upgrade. Therefore, pending completion of installation and review of the new stack sampling system, this item remained open.

(Closed) Inspector Followup Item (50-20/91-01-03) Review licensee's Emergency Preparedness (EP) program in more detail. The primary focus of the current inspection was to review the operational status of the licensee's EP program. The results of this more detailed review are given below in Section 3.0 of this current report. Therefore, this item was closed.

(Closed) Violation (70-938/91-01-02) Failure to conduct quarterly radiation safety audits in compliance with the requirements of Condition No. 14 of NRC License No. SNM-986. The inspector reviewed a procedure, dated June 26, 1991, written by the CRPO that provided guidance for the conduct of the quarterly audits. The inspector reviewed reports of the quarterly audits conducted by the CRPO in June 1991, and an audit conducted by the Associate CRPO in April 1991. The inspector reviewed meeting minutes, which documented that the RRPO audits were reviewed by the Reactor Safeguards Committee and the CRPO audits were reviewed by the Radiation Protection Committee. Therefore, based upon this review of licensee documentation, this item was closed.

(Closed) Violation (70-938/91-01-04) Failure to perform or document an. al refresher training for health physics (HP) technicians required by Condition No. 15 of NRC License No. SNM-986. The inspector reviewed records that indicated training sessions for the reactor HP technicians had been conducted by the RRPO on March 12, May 10, and June 5, 1991. These individual sessions addressed specific subjects such as respiratory protection and the new revision o 10CFR20. The inspector also reviewed a memorandum dated July 1, 1991, prepared by the the Associate CRPO, which scheduled a training session for other campus HP technicians. This memorandum included a detailed outline of the subjects for the training session which included a review of the pertinent SNM-986 license conditions, current projects using special nuclear material, quarterly audit results, the source inventory and leak test program, a review and demonstration of survey equipment, and a demonstration of air sampling equipment. The inspector noted that the Associate CRPO had prepared a well-planned training session to satisfy this license requirement. Therefore, based upon this review of licensee documentation, this item was closed.

3.0 Emergency Preparedness Program

3.1 General

The inspectors reviewed the operational status of the Emergency Preparedness (EP) program, toured emergency response facilities, examined designated emergency equipment and supplies, and interviewed licensee personnel and members of offsite support groups.

There have been no major changes to the Emergency Plan or implementing procedures since the last inspection. Site personnel were available to staff the emergency response organization in accordance with the Plan. The licensee has established and maintained a good working relationship with MIT security, medical, and ambulance personnel. Adequate arrangements were in place to respond to various types of emergencies within the reactor building including plant transients, [illegible] security compromises, and natural phenomena. No violations or noncompliance items associated with the EP program were identified.

Specific elements of the EP program that were reviewed during the current inspection are discussed in the following paragraphs of this section.

3.2 Emergency Action Levels (EALs)

A tour of the control room revealed that EALs were not discrete initiating conditions or indications on panel displays which, when exceeded, related to specific emergency classifications. EALs based upon degraded core conditions were available but were not clearly defined.

An NRC memorandum dated December 28,1989, which included the results of a review of the licensee's Emergency Plan Implementing Procedures (EPIPs), was provided by the inspectors to licensee representatives during this inspection. (A copy of that memorandum is provided as an attachment to this report.) Generic concerns in the NRC review highlighted the complex format in which information was presented in the EPIPs. The complex format lacked the consideration of human engineering factors that would allow the Plan to be more easily and efficiently implemented. For example, certain actions may not be carried out expeditiously because Emergency Operating Procedures (EOPs), EALs and classfication tables are interrelated. In addition, in many cases, immediate responses such as event classification, notifications, and activation of the emergency organization are not identified sufficiently early in the procedures and therefore may not be taken until an event has significantly progressed. The inspectors requested that the licensee evaluate the NRC review and consider changes to the overall program where appropriate. Particular attention should be given to updating the Plan to reflect current status and to simplifying the EPIPs to facilitate use. Licensee action regarding these items will be reviewed during a future inspection while upgrades to the Plan and EPIPs will be evaluated prior to license renewal (50-20/91-02-01).

3.3 Emergency Plan Implementing Procedures (EPIPs)

The inspectors determined that the licensee used three EPIPs to conduct emergency response. Two of the EPIPs are used for General Emergency situations while the third EPIP specified activities associated with Unusual Event, Alert, and Site Area Emergency situations. A review of the Emergency Plan indicated that worst case accidents would not lead to General Emergency conditions similar to those which are possible at commercial power reactors. The inspectors noted that the EPIPs and classifications could be revised to make responses more realistic and more consistent with those described in offsite (State and local) emergency plans.

3.4 Protective Action Recommendations (PARs)

The Emergency Planning Zone (EPZ) for design basis accidents at MIT extends to approximately 100 meters from the reactor. Discussions with licensee personnel indicated that offsite PARs would be made to Cambridge officials after radioactive releases were verified by evaluation of air particulate stack samples. The inspectors stated that the licensee should consider alternate methods to anticipate degradations in plant conditions based on more readily and rapidly available indications and use this information, together with dose projections from core inventories, to develop PARs. Additionally, since no impact on public health and safety of radioactive releases beyond the EPZ is expected, the need for PARs outside this boundary should also be re-evaluated.

3.5 Offsite Medical Assistance

The inspectors toured the facilities at Massachusetts General Hospital that will be used to support the licensee in an emergency. The inspectors found the facilities were adequate for treating seriously contaminated and injured victims, however, arrangements with the hospital were not formalized by the licensee at the time of the inspection.

4.0 Exit Interview

The inspector met with the licensee representatives indicated in Section 1.0 on July 18, 1991 and summarized the scope and findings of the inspection.