

April 6, 2010

Dr. John A. Bernard, Jr.
Director of Reactor Operations
Massachusetts Institute of Technology
MITNRL-NW 12
138 Albany Street
Cambridge, MA 02139

SUBJECT: MASSACHUSETTS INSTITUTE OF TECHNOLOGY - NRC ROUTINE
INSPECTION REPORT NO. 50-020/2010-201

Dear Dr. Bernard:

On March 8-11, 2010, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection at the Massachusetts Institute of Technology Research Reactor facility (Inspection Report No. 50-020/2010-201). The enclosed report documents the inspection results, which were discussed on March 11, 2010, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. Based on the results of this inspection, no findings of significance were identified. No response to this letter is required.

In accordance with Title 10 of the *Code of Federal Regulations* Section 2.390, "Public inspections, exemptions, and requests for withholding," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (Agencywide Documents Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Craig Bassett at (404) 358-6515 or by electronic mail at Craig.Bassett@nrc.gov.

Sincerely,

/RA/

Johnny H. Eads, Jr., Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No.: 50-020
License No.: R-37

Enclosure:
NRC Inspection Report No. 50-020/2010-201
cc: See next page

Massachusetts Institute of Technology

Docket No. 50-020

cc:

City Manager
City Hall
Cambridge, MA 02139

Department of Environmental Protection
One Winter Street
Boston, MA 02108

Mr. Robert Gallagher, Acting Director
Radiation Control Program
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529 Main Street
Charlestown, MA 02129

Nuclear Preparedness Manager
Massachusetts Emergency Management Agency
400 Worcester Road
Framingham, MA 01702-5399

Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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ACCESSION NO.: ML100920003

* concurrence via e-mail

TEMPLATE #: NRC-002

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DATE	3/19/2010	4/5/2010	4/6/2010

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U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No.: 50-020

License No.: R-37

Report No.: 50-020/2010-201

Licensee: Massachusetts Institute of Technology

Facility: Nuclear Reactor Laboratory

Location: Cambridge, Massachusetts

Dates: March 8 – 11, 2010

Inspectors: Craig Bassett
Jack Donohue

Approved by: Johnny H. Eads, Jr., Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

Massachusetts Institute of Technology
Nuclear Reactor Laboratory
NRC Inspection Report No.: 50-020/2010-201

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the Massachusetts Institute of Technology (the licensee's) Class I five megawatt research and test reactor safety program including: 1) organization and staffing, 2) review and audit and design change functions, 3) reactor operations, 4) operator requalification, 5) maintenance and surveillance, 6) fuel handling, 7) experiments, 8) procedures and procedural control, and 9) emergency preparedness since the last U.S. Nuclear Regulatory Commission (NRC) inspection of these areas. The licensee's program was acceptably directed toward the protection of public health and safety and in compliance with NRC requirements. No violations or deviations were identified.

Organization and staffing

- Organizational structure and staffing were consistent with Technical Specification (TS) requirements.

Review and Audit and Design Change Functions

- The Massachusetts Institute of Technology Reactor Safeguards Committee was meeting as required and reviewing the topics outlined in the TS.
- Quarterly and annual audits of facility programs were being completed as required.
- The design change program satisfied NRC requirements

Reactor Operations

- Reactor operations were conducted in accordance with procedure and the appropriate logs were being maintained.
- Various daily and weekly meetings were held to ensure proper communication of, and planning and preparation for, operations activities.

Operator Requalification

- Operator requalification was conducted as required by the Requalification Program and the program was generally being maintained up-to-date.

Maintenance and Surveillance

- The system for tracking and completing maintenance items and surveillance checks and calibrations appeared to be adequate and was being maintained as required.
- Maintenance and surveillance records, performance, and reviews satisfied TS and procedure requirements.

Fuel Handling

- Fuel movement and control was conducted in accordance with TS and procedural requirements.

Experiments

- The program for reviewing and conducting experiments satisfied procedural and TS requirements.

Procedures

- The procedure review, revision, control, and implementation program satisfied TS requirements.

Emergency Preparedness

- The emergency preparedness program was conducted in accordance with the Emergency Plan.
- Emergency response equipment was being maintained and inventoried as required.
- The Letters of Agreement between the licensee and the City of Cambridge Fire, Police, and Emergency Management Departments, as well as between the licensee and the Massachusetts General Hospital, were being maintained.
- Emergency drills were being conducted annually as required by the Emergency Plan.
- Emergency preparedness training for licensed operators and personnel from various support organizations was generally being completed as required.

REPORT DETAILS

Summary of Facility Status

The Massachusetts Institute of Technology (MIT, the licensee) Nuclear Reactor Laboratory (NRL) five megawatt research and test reactor continued to be operated in support of experiments, research and service irradiations, reactor operator training, and periodic equipment maintenance and surveillance activities. The reactor was typically operated approximately 300 days per year with operations running 24 hours a day, 7 days a week, for about four weeks followed by a shutdown varying from 8 hours to two weeks in length. Refueling occurred about every three months. During the first three days of this inspection, the reactor was shutdown for maintenance activities, as well as for the installation of an experiment. Following completion of these tasks, the reactor was started up and operated as usual.

1. Organization and Staffing

a. Inspection Scope (Inspection Procedure [IP] 69006)

The inspectors reviewed the following regarding the Massachusetts Institute of Technology Reactor (designated as MITR-II) organization and staffing to ensure that the requirements of Technical Specification (TS) Section 7, "Administrative Controls," (last revised by License Amendment Number [No.] 37, dated April 22, 2005), were being met:

- Management responsibilities
- Qualifications of facility operations personnel
- MIT NRL Organization Chart, dated March 12, 2010
- Reactor Logbook #117, December 5, 2008, to April 18, 2009
- Reactor Logbook #118, April 19, 2009, to August 20, 2009
- Reactor Logbook #119, August 20, 2009, to December 12, 2009
- Reactor Logbook #120, December 12, 2009, to the present
- Staffing requirements for safe operation of the research reactor
- Procedure Manual (PM) 1.1, "Organization," which included Section 1.1.2, "Reactor Division," latest revision dated January 30, 1984
- "MIT Research Reactor, Nuclear Reactor Laboratory, Massachusetts Institute of Technology Annual Report to the U.S. Nuclear Regulatory Commission for the Period July 1, 2007, to June 30, 2008," submitted to the NRC August 27, 2008
- "MIT Research Reactor, Nuclear Reactor Laboratory, Massachusetts Institute of Technology Annual Report to the U.S. Nuclear Regulatory Commission for the Period July 1, 2008, to June 30, 2009," submitted to the NRC August 28, 2009

b. Observations and Findings

The inspectors noted that the Director of Reactor Operations reported to the Director of the MIT NRL, who in turn reported to the President of the university through the Vice President for Research. This organization was consistent with

that specified in the TS. Also, the organizational structure and the responsibilities of the reactor staff had not changed since the last inspection.

Staffing levels remained consistent with those noted during the last inspection of this facility. The current reactor operations organization consisted of the Director of Reactor Operations, the Superintendent of Operations, and an Assistant Superintendent of Operations, a Quality Assurance Supervisor, a Training Coordinator, various Reactor Supervisors, and various Reactor Operators (ROs). The Director of Reactor Operations, the Superintendent of Operations, the Assistant Superintendent, the Quality Assurance Supervisor, the Training Coordinator, and the majority of the Reactor Supervisors were qualified Senior Reactor Operators (SROs). It was noted that about one-fourth of the Reactor Supervisor and RO positions were full-time while the other three-fourths were part-time positions. In addition to the operations staff, there were various support groups including a Research Staff, a Research Development group, a Reactor Engineering staff, Maintenance personnel, and a Reactor Radiation Protection group.

Through a review of selected reactor operations logs for the period from December 2008 through March 2010, and through interviews with operations personnel, the inspectors determined that the licensee continued to operate 24/7 with three crews and no shift rotation. Each operating crew was staffed with various personnel with at least two people on duty at the MITR-II per shift. Operations shifts were scheduled for a period of 8 hours. A review of the Reactor (Console) Logbooks and associated records confirmed that shift staffing met the minimum requirements for duty and on-call personnel. Staffing during the reactor operations shifts satisfied the requirements of TS Section 7.2.1.

c. Conclusions

The licensee's organization and staffing were in compliance with the requirements specified in TS Section 7.

2. Review and Audit and Design Change Functions

a. Inspection Scope (IP 69007)

To verify that the required reviews and audits were being completed by the MIT Reactor Safeguards Committee as required by TS Sections 7.5.1 and 7.5.2 and to ensure that facility changes were reviewed and approved as required by TS Section 7.5.2 and in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59, the inspectors reviewed selected aspects of:

- Annual Independent Audits conducted in 2008 and 2009
- Administrative Audits for the Calendar Months of January, February, and March; April, May and June; July, August, and September; and October, November, and December 2009
- Charter of the MIT Reactor Safeguards Committee, latest approved revision dated January 20, 2010

- Memorandum addressed to the Reactor Safeguards Committee entitled, "Authority of Standing and Special Subcommittees," dated January 20, 2010
- MIT Reactor Safeguards Committee meeting minutes for 2009 through the present
- MIT Reactor Safeguards Committee Standing Subcommittee meeting minutes for 2009
- PM 1.1, "Organization, which included Section 1.1.1 "MIT Administration and Committees," latest revision dated March 18, 1991
- PM 1.4, "Review and Approval of Plans, Procedures and Facility Equipment and Changes Thereto," which included
 - PM 1.4.1, "Plan, Procedure, and Equipment Change Classification," latest revision dated September 3, 1998
 - PM 1.4.2, "Class C Review and Approval," latest revision dated June 22, 1988
 - PM 1.4.3, "Class B Review and Approval," latest revision dated June 22, 1988
 - PM 1.4.4, "Class A Review and Approval," latest revision dated June 22, 1988
 - PM 1.4.5, "Safety Review Form," latest revision dated June 22, 1988
 - PM 1.4.6, "Procedure Manuals," latest revision dated June 22, 1988
- PM 1.10, "Experiment Review and Approval," which included Section 1.10.2, "MIT Reactor Safeguards Committee," latest revision dated September 19, 1979
- PM 1.18, "Audits, which included:
 - Section 1.18.1, "Internal Audits," latest revision dated January 10, 1986
 - Section 1.18.2, "Independent Audits," latest revision dated September 18, 1984
- Safety Review Form No. O-08-06, Item: PM 7.3.2, "D₂O Ion Column Dedeuterization/Deuterization" dated January 16, 2009
- Safety Review Form No. M-09-1, Item: "Alternate 16" Plug for Reactor Top Shield, dated July 31, 2009
- Safety Review Form No. M-09-2, Item: High Temperature Sample Capsule for Use in the In-Core Sample Assembly, dated December 11, 2009
- Safety Review Form No. O-10-1, Item: PM 6.1.3.11, "Emergency Power Transfer Test," dated March 8, 2010
- "MIT Research Reactor, Nuclear Reactor Laboratory, Massachusetts Institute of Technology Annual Report to the U.S. Nuclear Regulatory Commission for the Period July 1, 2007, to June 30, 2008," submitted to the NRC August 27, 2008
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b. Observations and Findings

(1) Review and Audit Functions

The composition of the MIT Reactor Safeguards Committee (MITRSC) and qualifications of MITRSC members were as specified in TS 7.5.2. Minutes of MITRSC meetings and those of the MITRSC Standing Subcommittee demonstrated that the committee typically met more often than the frequency required by the TS. Through records review the inspectors determined that safety reviews were conducted by the MITRSC or by designated Subcommittee representatives as specified in TS 7.5.1 and 7.5.2. Topics of those reviews were as required by the TS and provided sufficient guidance, direction, and oversight to ensure acceptable use of the reactor.

Quarterly Administrative Audits and Annual Independent Audits were conducted by management and independent auditors respectively. The inspectors noted that the quarterly audits for 2009 and the annual independent audits for Fiscal Year (FY) 2008 and FY 2009 were adequate and reviewed the activities specified in TS 7.5.1 and 7.5.2 including various aspects of the reactor facility operations and programs. It was noted that the audits had been completed by qualified individuals as required. The audits appeared to be adequate and included recommendations concerning potential improvements to the program.

(2) Design Change Functions

To satisfy the regulatory requirements stipulated in 10 CFR 50.59, "Changes, tests, and experiments," the licensee had implemented facility procedure, PM 1.4, "Review and Approval of Plans, Procedures, and Facility Equipment and Changes Thereto." The inspectors verified that the procedure adequately incorporated criteria provided by the regulations with additional requirements mandated by local conditions.

The inspectors noted that all proposed facility plans, procedures, and equipment changes were classified into three categories, Class A, Class B, or Class C. Class C changes were those of less significance and were required to be reviewed and approved by Senior Shift Supervisors and a Group Supervisor. Class B changes were those that required the review and approval of two licensed SROs and the Director of Reactor Operations before implementation. Depending upon the nature of the change or modification, Class B changes might also require a review by the Radiation Protection group and were typically submitted to the MITRSC for information. Class A changes were significant changes involving procedures and/or equipment related to the reactor and related systems, the Emergency Plan, the Operator Requalification Program, or the security system. They typically required a review by the Radiation Protection group, as well as all the reviews and approvals noted above. In addition, these types of changes also required the review

and approval of the MITRSC before implementation. Class A changes also included those that required a change to the license or TS, and thus, would require review and approval by the NRC.

The inspectors reviewed selected Safety Review Forms and the associated safety evaluation documents of reviews conducted during 2009 and to date in 2010. The completed forms showed that the proposals were acceptably reviewed in accordance with the procedure. It was noted that all the recent proposals were designated as Class B and therefore no formal MITRSC approval was required. Also, none of the changes was determined to constitute a safety question or concern and none required a license or TS amendment.

b. Conclusions

The MITRSC was meeting as required and reviewing the topics outlined in the TS. Quarterly and annual audits of facility programs were conducted as required. The design change program satisfied NRC requirements.

3. Reactor Operations

a. Inspection Scope (IP 69006)

To verify that the licensee was conducting reactor operations in accordance with TS Sections 2 and 3 and procedural requirements, the inspectors reviewed selected portions of the following:

- Reactor Logbook #117, December 5, 2008, to April 18, 2009
- Reactor Logbook #118, April 19, 2009, to August 20, 2009
- Reactor Logbook #119, August 20, 2009, to December 12, 2009
- Reactor Logbook #120, December 12, 2009, to the present
- PM 3.1, "Startup Checklists," which included PM 3.1.1, "Full Power Start-up Checklist," latest revision dated August 28, 2006
- PM 3.2, "Shutdown Checklists," which included PM 3.2.2, "Shutdown from Less than 100 kW Operations," latest revision dated April 25, 1997
- PM 3.5, "Daily Surveillance Check," latest revision dated January 29, 2008
- PM 3.9, "Transfer of D₂O Between Storage and Dump Tanks," latest revision dated July 24, 1975
- PM 6.1.3, "Calibrations," which included PM 6.1.3.11, "Emergency Power Transfer Test," latest revision dated March 8, 2010
- "MIT Research Reactor, Nuclear Reactor Laboratory, Massachusetts Institute of Technology Annual Report to the U.S. Nuclear Regulatory Commission for the Period July 1, 2007, to June 30, 2008," submitted to the NRC August 27, 2008
- "MIT Research Reactor, Nuclear Reactor Laboratory, Massachusetts Institute of Technology Annual Report to the U.S. Nuclear Regulatory

Commission for the Period July 1, 2008, to June 30, 2009," submitted to the NRC August 28, 2009

b. Observations and Findings

(1) Reactor Operation

The inspectors observed facility activities on various occasions during the week including maintenance work and later reactor operations. Written procedures and checklists were used for each activity as required. It was noted that the maintenance personnel and reactor operators followed the appropriate procedures, were knowledgeable of the required actions, and professional in the conduct of their duties. The inspectors observed pre-briefing on the emergency power transfer switch test, PM 6.1.3.11, which was used to verify operability of the motor generator set and associated switches. The test was completed and documented to be satisfactory on March 8, 2010.

(2) Staff Communication

During the inspection, the inspectors attended operations crew shift turnover meetings on Tuesday and Wednesday evening. The status of the reactor and the facility was discussed on each occasion as required. The Reactor Supervisors of the relief shifts reviewed the appropriate logs and records and were briefed on the upcoming shift activities and scheduled events before assuming the operations duty. Through direct observation and records review, the inspectors verified that the content of shift turnover briefings held during each shift change was appropriate and that shift activities and plant conditions were discussed in sufficient detail.

The inspectors also attended the Daily Schedule Meeting (or Plan of the Day meeting) on Tuesday and Wednesday morning. The meetings were conducted by the Superintendent of Reactor Operations and reactor operators were in attendance, as well as representatives from the other support organizations at the facility. Safety-significant issues, if any, were discussed and maintenance or operating needs were presented. Any concerns or schedule conflicts were resolved during the meeting. The inspectors noted that the Daily Schedule Meeting ensured that everyone was informed about current facility conditions and aware of the scheduled activities for that day.

c. Conclusions

MITR-II reactor operations, as well as shift turnovers and operator cognizance of facility conditions during pre-startup and routine operation, were acceptable. Daily meetings were being held to ensure proper planning and preparation for operations activities.

4. Operator Licensing, Requalification and Medical Activities

a. Inspection Scope (IP 69003)

To verify that the licensee was complying with the requirements of 10 CFR Part 55 and the NRC approved operator requalification program, the inspectors reviewed selected aspects of:

- Current status of operator licenses
- Results of the 2008 Annual Written Examinations
- Reactor operator files maintained in the Operations Office
- Reactor Logbook #117, December 5, 2008, to April 18, 2009
- Reactor Logbook #118, April 19, 2009, to August 20, 2009
- Reactor Logbook #119, August 20, 2009, to December 12, 2009
- Reactor Logbook #120, December 12, 2009 to the present
- Medical examination records for selected operators for the past three years
- “On-the-Job-Training Notebook, Book 1,” documenting activities of those operators whose last names began with A – Le
- “On-the-Job-Training Notebook, Book 2,” documenting activities of those operators whose last names began with Lu – Y
- PM 1.16, “Requalification and Qualification,” which included:
 - Section 1.16.1, “Requalification Program for Licensed Personnel,” latest revision dated March 11, 1988
 - Section 1.16.2, “MITR Operations Qualification Program for Senior Reactor Operators/Shift Supervisors,” latest revision dated May 6, 2004
 - Section 1.16.3, “MITR Operations Qualification Program for Operators,” latest revision dated May 6, 2004
 - Section 1.16.4, “Operator and Senior Operator Review Board Evaluation Form,” latest revision dated September 19, 1979

b. Observation and Findings

(1) Requalification Program

There were 33 individuals licensed to operate the reactor at MIT. Of those personnel, 23 were qualified SROs and 10 were ROs. A review of various Requalification Program records indicated that the program was generally maintained up-to-date and that RO and SRO licenses were current. MITR-II operator files and Reactor Logbooks also showed that 31 qualified operators maintained active duty status.

A review of the pertinent logs and records showed that training was being conducted in accordance with the licensee’s requalification and training program. A series of lectures were given to new operator trainees. Information regarding facility changes, procedure changes, and other relevant information was routinely routed to all licensed operators for their

review. The inspectors verified that the required reactor operations, reactivity manipulations, other operations activities, and Reactor Supervisor activities were being completed and the appropriate records were being maintained. Records indicating the completion of annual supervisory observations and evaluations for each operator were also maintained. The inspectors also noted that all operators were receiving biennial medical examinations within the time frame allowed as required by the program.

As indicated above, two SROs' licenses were "inactive." This was due to the fact that those individuals had limited time to complete the reactivity manipulations and other required activities. However, the operators were still completing the annual written exams and having biennial medical examinations as required. By completing the written exams and by having the biennial medical examinations, the licenses could be reinstated to "active" if needed by the two operators completing the required number of manipulations and other activities under the supervision and observation of a Reactor Supervisor.

(2) **Timeliness of Annual Written Examinations and Quizzes**

Annual written examinations were being completed by the operators as required. However, it was noted that the annual written examinations for 2009 and some quizzes had not been completed until February or March 2010. The inspectors spoke with the licensee about this apparent problem. The licensee acknowledged that there had been a problem with the administration of the annual examination. The licensee indicated that the schedule had slipped as a result of some personnel issues and the fact that they had, until recently, been heavily involved in security system upgrades. The Director of Reactor Operations indicated that this was not a recurring problem and that more attention would be given to maintaining the Requalification Program up-to-date in the future. The inspectors informed the licensee that the issue of completing annual examinations and quizzes in a timely manner would be identified as an Inspector Follow-up Item (IFI) and would be reviewed during up coming inspections (IFI 50-020/2010-201-01).

c. **Conclusions**

Operator requalification was generally up-to-date and was being completed as required by the MIT Reactor Operator Requalification Program.

5. Maintenance and Surveillance

a. **Inspection Scope (IP 69006, 69010)**

To verify that the licensee was meeting the surveillance requirements specified in TS Section 4, the inspectors reviewed selected aspects of:

- MITR-II Job Workbook
- MITR-II Daily Operations Schedule
- Reactor Logbook #117, December 5, 2008, to April 18, 2009
- Reactor Logbook #118, April 19, 2009, to August 20, 2009
- Reactor Logbook #119, August 20, 2009, to December 12, 2009
- Reactor Logbook #120, December 12, 2009 to the present
- MITR-II Notebook, "Systems, Tests, and Calibrations, Volume 1 of 3," containing documentation of tests and/or calibrations associated with PM 6.1.1 through 6.1.5.5
- MITR-II Notebook, "System Tests and Calibrations, Volume 2 of 3," containing documentation of tests and/or calibrations associated with PM 6.2.1 to 6.4.2.4,
- MITR-II Notebook, "System Tests and Calibrations, Volume 3 of 3," containing documentation of tests and/or calibrations associated with PM 6.5.1 to 7.4.4.2
- PM 6.1, "Technical Specification Tests," which included PM 6.1.1, "Emergency Cooling System," latest revision dated March 28, 1997
- PM 6.1.2. "Containment Tests," which included PM 6.1.2.1, "Building Pressure Test," latest revision dated September 23, 1974
- PM 6.1.3, "Calibrations," which included:
 - PM 6.1.3.7, "Calibration of Core Tank Level Scram Point and Level Indications," latest revision dated November 19, 1979
 - PM 6.1.3.11, "Emergency Power Transfer Test," latest revision dated March 8, 2010
- PM 6.1.4, "Response Times," which included PM 6.1.4.4, "Primary Coolant Flow Scram Time," latest revision dated April 17, 1997
- PM 6.2, "Scram Tests," which included PM 6.2.4, "Period Level Indication Offscale Scram," latest revision dated June 25, 1975
- PM 6.3, "Interlock Tests," which included PM 6.3.3, "Waste Tank System Alarm and Interlock," latest revision dated August 14, 2001
- PM 6.4, "Alarm Tests," which included PM 6.4.5, "Low Flow Auxiliary Pump," latest revision dated May 24, 1977
- PM 6.5, "Miscellaneous Tests and Calibrations," which included PM 6.5.1, "Cathodic Protection System Test," latest revision dated June 6, 1996
- PM 7.1.1.2, "Regulating Rod Drive Mechanism Disassembly and Reassembly Procedures," latest revision dated June 30, 1975
- PM 7.2.4, "Electrical Power Shutdown Checklist," latest revision dated May 6, 1976
- PM 7.4.3.7, "Flushing of Heat-Exchangers by HM-1 and HM-1A," latest revision dated June 28, 1985
- Surveillance activities and equipment maintenance documented in the 2008 Test and Calibration Tracker
- Surveillance activities and equipment maintenance documented in the 2009 Test and Calibration Tracker
- "MIT Research Reactor, Nuclear Reactor Laboratory, Massachusetts Institute of Technology Annual Report to the U.S. Nuclear Regulatory

Commission for the Period July 1, 2007, to June 30, 2008,” submitted to the NRC August 27, 2008

- “MIT Research Reactor, Nuclear Reactor Laboratory, Massachusetts Institute of Technology Annual Report to the U.S. Nuclear Regulatory Commission for the Period July 1, 2008, to June 30, 2009,” submitted to the NRC August 28, 2009

b. Observations and Findings

(1) Maintenance

The inspectors reviewed the system that the licensee had developed to track and complete maintenance activities. The system was designed to ensure that all maintenance activities were planned and completed as scheduled, that post maintenance testing was conducted, and that the entire process was documented appropriately. The licensee used a locally developed system called the “Test and Calibration Tracker” which listed all the tests, checks, and calibrations that were due on a monthly basis. Along with the “Tracker,” the licensee used a “Daily Schedule” which listed all the events that were planned for that day and a “Schedule Book” (which was an “At-A-Glance” 12-Month Calendar) listing activities scheduled for the entire year. The inspectors noted that periodic surveillance activities were also scheduled and tracked through this system. All these activities were discussed and coordinated through the morning meeting held each day (as discussed above). The program appeared to be effective.

(2) Surveillance

Various periodic surveillance verifications and calibration records of equipment, including the testing of various reactor systems, instrumentation, and auxiliary systems were reviewed by the inspectors. TS surveillance items were completed on schedule as required by TS and in accordance with licensee procedures. As noted above, the “Test and Calibration Tracker” system was used to track completion of the various required surveillances and verifications. The inspectors noted that completion of these surveillance activities was documented in one of the three MITR-II “Systems, Tests, and Calibrations” notebooks. These notebooks listed who completed the surveillances and could be used to reference the checklists and associated forms used for the reactor operational tests and surveillances. The results of selected tests, checks, and calibrations reviewed by the inspectors were noted to be within the TS and procedurally prescribed parameters. As noted previously, the inspectors observed as the licensee conducted the pre-brief and the documented results of the Emergency Power Transfer Test.

c. Conclusions

The system for tracking and completing maintenance items and surveillance checks and calibrations appeared to be adequate and was being maintained as required. Maintenance and surveillance records, performance, and reviews satisfied TS and procedure requirements.

6. Fuel Movement and Handling

a. Inspection Scope (IP 69009)

To ensure that the licensee was following the requirements of TS Section 3.10, "Fuel Element and Core Component Handling and Storage," the inspectors reviewed selected aspects of the following:

- Reactor Logbook #117, December 5, 2008, to April 18, 2009
- Reactor Logbook #118, April 19, 2009, to August 20, 2009
- Reactor Logbook #119, August 20, 2009, to December 12, 2009
- Reactor Logbook #120, December 12, 2009 to the present
- PM 1.15 "Refueling," which included PM 1.15.1 "Removal of Spent Fuel," latest revision dated October 27, 1989
- PM 3.3, "Movement of Fuel," which included PM 3.3.1, "General Conduct of Refueling Operations," latest revision dated January 10, 1994
- PM 3.3.1, "General Conduct of Refueling Operations," which included PM 3.3.1.1, "Fuel Element Transfers: Core/Storage Ring/Vault," latest revision dated April 22, 1980
- PM 3.3.2, "General Conduct of Removal of Spent Fuel," which included PM 3.3.2.1, "Fuel Element Transfers: Storage Ring/Storage Vault," latest revision dated July 28, 1981
- PM 3.3.3, General Conduct of Transfer of Spent Fuel to Fission Converter," which included PM 3.3.3.1, "Fuel Element Transfers: Storage Ring to Fission Converter," latest revision dated September 16, 2005
- Core Configuration No. 195 approved packet, including:
 - "Fuel Loading Permission" Form – form revision dated September 19, 1979; and completed for the latest fuel element transfers on March 8, 2010
 - "Fuel Removal Permission" Form – form revision dated July 21, 1981; and completed for the latest fuel element transfers on March 8, 2010
 - "Transfer Schedule" Form – form revision dated September 19, 1979; and completed for the latest fuel element transfers on March 8, 2010
 - "Core Configuration" Form – form revision dated October 27, 1989; and completed for the latest fuel element transfers on March 8, 2010
 - "Transfer Schedule: Fuel Storage Ring/Fuel Storage Pool" Form – form revision dated January 10, 1986; and completed for the latest fuel element transfers on March 8, 2010

- "Fuel Loading Verification" Form – form revision dated September 19, 1979; and completed for the latest fuel element transfers on March 8, 2010
- "Safety and Operating Limits for Core No. 195," no date listed
- "Elements with a 30% Excess Loading over 20-22 inches for Core No. 195," no date listed
- "Elements with a 30% Excess Loading over 2-4 inches for Core No. 195," no date listed

b. Observations and Findings

The inspectors reviewed the fuel movement process and verified that fuel moves were designed according to established procedure and documented on specific fuel movement sheets developed by the Associate Director, Reactor Engineering. The inspectors reviewed selected fuel movement sheets for 2010. They had been developed and used for each specific core refueling as required.

The inspectors reviewed the preparations for, and follow-up to, the refueling recorded in the reactor logbook that occurred on March 8, 2010. The resultant "new" core was designated as Core Number 195. The new core design and fuel moves to achieve the new configuration were developed in a systematic manner using an approved computer code. The core configuration package was approved and subsequently used by reactor operators, in addition to the routine procedures, for completing the fuel moves. The inspectors noted that fuel moves had been completed as specified and that fuel removed from the core was placed in specified locations meeting the requirements of TS 3.10.3. The inspectors also compared the location of fuel elements in the reactor core as indicated on the fuel movement/transfer forms for the latest core with the information maintained on the MITR-II Fuel Status/Location Board in the Control Room. No problems or anomalies were noted.

c. Conclusions

Fuel movements were performed in accordance with approved procedures and TS requirements.

7. Experiments

a. Inspection Scope (IP 69005)

To verify compliance with the licensee's procedures, TS Sections 6.1, 7.5.1, and 7.9, and 10 CFR 50.59, the inspectors reviewed:

- Reactor Logbook #117, December 5, 2008, to April 18, 2009
- Reactor Logbook #118, April 19, 2009, to August 20, 2009
- Reactor Logbook #119, August 20, 2009, to December 12, 2009
- Reactor Logbook #120, December 12, 2009 to the present
- PM 1.4, "Review and Approval of Plans, Procedures and Facility

Equipment and Changes Thereto,” which included

- PM 1.4.1, “Plan, Procedure, and Equipment Change Classification,” latest revision dated September 3, 1998
- PM 1.4.2, “Class C Review and Approval,” latest revision dated June 22, 1988
- PM 1.4.3, “Class B Review and Approval,” latest revision dated June 22, 1988
- PM 1.4.4, “Class A Review and Approval,” latest revision dated June 22, 1988
- PM 1.4.5, “Safety Review Form,” latest revision dated June 22, 1988
- PM 1.10, Experiment Review and Approval,” which included:
 - PM 1.10.1, “General,” latest revision dated September 19, 1979
 - PM 1.10.2, “MIT Reactor Safeguards Committee,” latest revision dated September 19, 1979
 - PM 1.10.3, “MITR Operations,” latest revision dated January 10, 1986
 - PM 1.10.4, “Radiation Protection Office,” latest revision dated January 10, 1986
 - PM 1.10.5, “Engineering and Design Section,” latest revision dated September 19, 1979
 - PM 1.10.6, “Electronics Section,” latest revision dated September 19, 1979
 - PM 1.10.7, “Records,” latest revision dated September 19, 1979
 - PM 1.10.8, “Pneumatic Tube Irradiation Facilities,” which included Subsection PM 1.10.8.1, “One Inch Pneumatic Tube System,” latest revision dated March 11, 1988
- PM 1.10.9, “Radioactive Material Governed by License R-37,” which included:
 - PM 1.10.9.1, “General,” latest revision dated January 31, 1985
 - PM 1.10.9.2, “Acquisition,” latest revision dated January 31, 1985
 - PM 1.10.9.3, “Inventory and Control,” latest revision dated July 22, 1981
- PM 1.10.7.1, “Sample Irradiations,” which included instructions on completion of:
 - “MIT Part I – Irradiation Request Form”
 - “MIT Part II – Irradiation Information Form”
- MIT Part I – Irradiation Request Form, MITR Reference (Ref.) No. 132-1-229, concerning irradiation of gold seeds and examples of the associated MIT Part II – Irradiation Information Forms for irradiations completed in December 2009
- MIT Part I – Irradiation Request Form, MITR Ref. No. CBP-1-272 and Addendum, concerning irradiation of boron 11 and examples of the associated MIT Part II – Irradiation Information Forms for irradiations completed in February and July of 2009

- MIT Part I – Irradiation Request Form, MITR Ref. No. 123-3-17, concerning irradiation of HEU materials and examples of the associated MIT Part II – Irradiation Information Forms for irradiations completed in February of 2009

b. Observations and Findings

The inspectors noted that the review and approval process described in PM 1.10 referred to experimental facilities and equipment installed in the reactor. This was an extensive process and typically involved the completion of a Safety Review Form with accompanying documentation. These were reviewed by Reactor Operations personnel (typically the Superintendent of Reactor Operations) and by the Reactor Radiation Protection Officer and ultimately submitted to the MITRSC for review and approval. The review and approval of samples or material to be irradiated using these facilities or equipment were required to be completed by the Reactor Supervisor and the Reactor Radiation Protection Officer. These reviews were documented on the MIT Part I – Irradiation Request Forms (IRFs). Typically the Superintendent of Reactor Operations also reviewed these forms.

The inspectors reviewed selected Safety Review Forms and IRFs for experiments that were currently active. The experimental facilities and/or equipment had been evaluated in accordance with TS requirements and the associated data sheets indicated that the experiments would be within the specified limits. The analysis for each had been performed and the reviews and approvals completed. The appropriate reviews and approvals had also been completed for the samples and/or materials to be irradiated and the experiments were conducted with the cognizance of the Reactor Supervisor and in accordance with the specified requirements. The inspectors also noted that the materials produced were handled and transferred as required.

c. Conclusions

Conduct and control of experiments met the requirements of the TS and the applicable facility procedures.

8. Procedures

a. Inspection Scope (IP 69008)

To verify that the licensee was meeting the requirements of TS Section 7.8, "Operating Procedures," the inspectors reviewed selected aspects of:

- PM 1.1, "Organization," which included
 - PM 1.1.1, "MIT Administration and Committees," latest revision dated March 18, 1991
- PM 1.1.2, "Reactor Division," latest revision dated January 30, 1984, which included

- PM 1.1.2.1, "Director of Reactor Operations," latest revision dated January 30, 1984
- PM 1.1.2.2, "Operations Group," latest revision dated January 30, 1984
- PM 1.1.2.3, "Mechanical Maintenance," latest revision dated January 2, 1981
- PM 1.1.2.4, "Mechanical Engineering and Design," latest revision dated January 2, 1981
- PM 1.1.2.5, "Business Office," latest revision dated January 2, 1981
- PM 1.1.2.6, "Electronic Engineering and Maintenance," latest revision dated January 2, 1981
- PM 1.1.2.7, "Reactor Utilization Supervisor," latest revision dated January 1, 1982
- PM 1.1.2.8, "Other Nuclear Reactor Laboratory Groups," latest revision dated January 1, 1982
- PM 1.4, "Review and Approval of Plans, Procedures and Facility Equipment and Changes Thereto," which included
 - PM 1.4.1, "Plan, Procedure, and Equipment Change Classification," latest revision dated September 3, 1998
 - PM 1.4.2, "Class C Review and Approval," latest revision dated June 22, 1988
 - PM 1.4.3, "Class B Review and Approval," latest revision dated June 22, 1988
 - PM 1.4.4, "Class A Review and Approval," latest revision dated June 22, 1988
 - PM 1.4.5, "Safety Review Form," latest revision dated June 22, 1988
 - PM 1.4.6, "Procedure Manuals," latest revision dated June 22, 1988
- PM 1.5, "Procedure Adherence and Temporary Change Method," latest revision dated September 19, 1979
- Safety Review Form No. O-08-06, Item: PM 7.3.2, "D₂O Ion Column Dedeuterization/Deuterization" dated January 16, 2009
- Safety Review Form No. O-10-1, Item: PM 6.1.3.11, "Emergency Power Transfer Test," dated March 8, 2010

b. Observations and Findings

The inspectors noted that procedures had been developed for reactor operations and safety as required by the TS Section 7.8. The licensee's procedures were found to be acceptable for the current facility status and staffing level. The inspectors noted that the administrative procedure specified the responsibilities of the various positions and for the MITRSC.

Operations procedures were typically reviewed by operators and support personnel prior to being used/implemented and were revised as needed. The inspectors noted that abnormal and emergency procedures were reviewed annually by all licensed operators as required and revised when needed. Major

procedure revisions were reviewed and approved by the Director of Reactor Operations and submitted to the MITRSC for review. All procedure changes were routinely routed to all operators for review as well.

It was also noted that management and supervisory oversight was focused on proper implementation and adherence to procedures. Through observation of various activities in progress during the inspection, the inspectors noted that adherence to procedures was adequate.

c. Conclusions

Procedures were properly prepared and implemented in compliance with license requirements.

9. Emergency Preparedness

a. Inspection Scope (IP 69011)

The inspectors reviewed selected aspects of the following to verify compliance with TS Sections 7.8.1.i and 7.8.4 and the licensee's Emergency Plan and Procedures:

- Review and Critique of the 2008 Medical Emergency Drill conducted March 31, 2008
- Review and Critique of the 2008 Radiological Emergency Exercise conducted October 28, 2008
- Review and Critique of the 2009 Medical Emergency Drill conducted July 23, 2009
- Review and Critique of the 2009 Radiological Emergency Exercise conducted February 25, 2010
- PM 4.0, "MITR-II Emergency Plan and Procedures," which included:
 - PM 4.3, "Organizations and Responses," latest revision dated April 30, 1997
 - PM 4.4, "Emergency Classification System," latest revision dated April 30, 1997
 - PM 4.5, "Emergency Action Levels," latest revision dated April 30, 1997
 - PM 4.6, "Emergency Planning Zone," latest revision dated April 30, 1997
 - PM 4.7, "Emergency Response," latest revision dated April 30, 1997
 - PM 4.8, "Emergency Facilities and Equipment," latest revision dated April 30, 1997
 - PM 4.9, "Recovery," latest revision dated April 30, 1997
 - PM 4.10, "Maintenance of Emergency Preparedness," latest revision dated April 30, 1997
 - PM 4.0, "MITR-II Emergency Plan and Procedures," Appendix A, "Agreements with Civil Authorities and Hospitals," letters dated March – May 2006

- PM 4.4.4, "Emergency Operating Procedures," which included:
 - PM 4.4.4.10, "Medical Emergency," latest revision dated July 27, 1984
 - PM 4.4.4.11, "NW12 Evacuation," latest revision dated April 30, 1997
 - PM 4.4.4.12, "Reactor Containment Evacuation," latest revision dated September 30, 1998
 - PM 4.4.4.13, "Reactor Reentry," latest revision dated November 29, 1993
 - PM 4.4.4.14, "Excess Radiation at the Exclusion Area (Site) Boundary Resulting from a Contained Source," latest revision dated April 30, 1997
 - PM 4.4.4.15, "Escape of Airborne Radioactive Material from the Containment Building," latest revision dated April 30, 1997
 - PM 4.4.4.16, "Instructions to the MIT Campus Police During MIT Reactor Radiological Emergencies," latest revision dated April 4, 1994
- PM 4.4.4.14, "Excess Radiation at the Exclusion Area (Site) Boundary Resulting from a Contained Source," which included the "MIT Reactor Emergency Notification Lists," latest revision dated March 1, 2010
- PM 6.6.1, "Emergency Plan Exercises, Drills, and Tests," which included
 - PM 6.6.1.1, "Radiological Emergency Exercise," latest revision dated October 11, 1984
 - PM 6.6.1.3, "Medical Emergency Drill," latest revision dated January 9, 1984
- PM 6.6.2, "Emergency Plan Maintenance," which included
 - PM 6.6.2.1, "Fire Extinguishers," latest revision dated January 26, 2000
 - PM 6.6.2.2, "Self-Contained Breathing Devices," latest revision dated February 19, 1987
 - PM 6.6.2.3, "Calibration of Portable Health Physics Instruments and Dosimeters," latest revision dated January 9, 1984
 - PM 6.6.2.4, "Inventory of Emergency Supplies and Equipment," latest revision dated April 13, 1999

b. Observation and Findings

The inspectors reviewed the Emergency Plan (E-Plan) and Implementing (or Emergency) Procedures in use at the reactor and verified that the emergency procedures were reviewed annually by all licensed operators as noted above. The Implementing/Emergency Procedures were also being revised as needed to ensure effective implementation of the E-Plan.

Through records reviews and interviews with facility emergency personnel (i.e., licensed operators or emergency responders), the inspectors determined that they were knowledgeable of the proper actions to take in case of an emergency. Training for staff members had been conducted annually as required and documented acceptably. Training for Cambridge City Fire Department (CCFD) personnel was completed periodically with the last training conducted in the

October – November 2006 timeframe. The licensee indicated that an invitation had been extended to the CCFD on several occasions to attend training or to visit the facility. Because of their busy schedule, the CCFD had not been able to attend recently.

Emergency training for MIT Police Department (PD) personnel was required to be conducted annually by E-Plan Section 4.10.1.1. When the inspectors reviewed the training for the past three years, it was noted that the last training provided the MIT PD had been completed in November 2008. The licensee explained that the training for 2009 had been intentionally postponed. Through an agreement between the Superintendent of Reactor Operations and the MIT Police Chief, training had been delayed pending the completion of various security upgrades at the facility. It was determined that training the MIT police officers on the “old” system would be counterproductive since additional training would be needed following completion of the changes to the system. It was noted that the training was rescheduled and was to begin on March 19, 2010. The licensee was informed that the issue of completing annual training for the MIT PD would be identified as an IFI and would be reviewed during a future inspection (IFI 50-020/2010-202).

The inspectors verified that Letters of Agreement with the City of Cambridge Fire Department, Police Department, and Emergency Management Department, as well as the Letter of Agreement with the Massachusetts General Hospital, were on file and being maintained. It was noted that the agreements had last been signed during the period from March – May 2006. The licensee acknowledged this and indicated that these support organizations had been contacted to initiate updated agreements, however, no updated Letters of Agreement had been obtained to date. The inspectors agreed that, although the E-Plan did not specify a time frame for renewing the letters, it would be advisable to do so.

Communications capabilities with support groups were acceptable and had been checked periodically. Emergency Call Lists had been revised and updated as needed and were available in various areas of the facility, including in controlled copies of the Emergency Procedures Manuals. The inspectors also verified that emergency equipment was being inventoried quarterly as required.

The inspectors verified compliance with the TS Section 7.8.4 requirement for annual Emergency Plan drills. The licensee met this requirement by conducting radiological emergency and medical emergency drills each year. Following each drill a critique was conducted to identify areas of strength and weakness. Action plans were developed if needed to address any weaknesses noted. Drills and critiques were documented in writing as referenced above. The drills appeared to be adequate.

The inspectors, the MITR Superintendent of Operations, and the MITR Quality Assurance Supervisor visited one of the CCFD fire stations, met with various personnel there, and observed some of the equipment that would be used in response to an emergency at the MITR facility. During the tour of the fire station, it was noted that the CCFD maintained more than a sufficient amount of

equipment to respond to any fire emergency at the MITR. The licensee representatives extended an invitation to the fire department personnel to visit the MITR for a tour whenever it was convenient. It was noted that there appeared to be a good working relationship between licensee and CCFD personnel.

c. Conclusions

The licensee was maintaining acceptable emergency preparedness in accordance with TS and E-Plan requirements.

10. Observation of Primary Leakage Identification and Repair Activities

a. Inspection Scope (IP 69012)

To ensure that the licensee was following the requirements of TS Section 7.10, Radiation Protection Program and 10 CFR Parts 19 and 20, the inspectors reviewed selected aspects of the following:

- Quarterly Landauer dosimetry reports for 2009
- Observations of facilities, equipment, operations, and postings during various facility tours
- E-mail from the Reactor Radiation Protection Officer to the Director of Reactor Operations dated March 2, 2010; Subject: "Daily Secondary Water Analysis Daily Cooling Tower Gross Beta activity Trend Curve"
- E-mail from the Quality Assurance Supervisor to the Director of Reactor Operations dated December 13, 2009; Subject: "Notification to MITSC," which indicated that a very low level of activity (1000pci/l) has been detected in the secondary coolant"
- "MIT Research Reactor, Nuclear Reactor Laboratory, Massachusetts Institute of Technology Annual Report to the U.S. Nuclear Regulatory Commission for the Period July 1, 2008, to June 30, 2009," submitted to the NRC August 28, 2009

b. Observations and Findings

Late last year, a very low level of activity (1,000 picoCuries per liter) was detected in the secondary coolant at MIT. This activity was found as a result of a review by the Reactor Radiation Protection Officer (RRPO) of past records and as part of an effort to identify the minimum detectable baseline activity. From the data reviewed the licensee determined that the leak started approximately August 13, 2009. The isotope that was found was Sodium-24 (Na-24) which is relatively short lived (15.99 hour half life). No Tritium was detected. (During this inspection, the inspectors noted that the activity level is currently stable, it is being closely monitored, and it is orders of magnitude below the regulatory limit.)

Following initial notification of the possible leak, the licensee isolated the heat exchangers on December 4, 2009, during a scheduled shutdown. During testing of the three heat exchangers, one (HE-1B) was found to have elevated activity

on the secondary side. The licensee determined that HE-1B was the source of the leak. Although HE-1B was leaking, because of the low levels involved, the licensee decided to place all the heat exchangers on line and operations resumed. The licensee continued to operate the reactor but decided that, if the leak were to become severe, HE-1B could be valved off line and the reactor would be operated at half the licensed power level. The licensee then began making preparations to replace all the heat exchangers with one new, more efficient one.

On March 2, 2010, the RRPO informed the Director of Reactor Operations and the Superintendent of Reactor Operations that the gross beta activity of the secondary water in the cooling tower, determined through daily water analysis, had been increasing over the last month but remained below regulatory limits. The activity level was determined to be 3×10^{-6} microCuries per milliliter of Na-24.

Following this development, the licensee developed a plan of action in case the leak worsens. All operations personnel were informed that: 1) Reactor operators were to frequently check/observe the monitor indicating the activity level in the secondary coolant. 2) Should a step rise in readings above 1,000 counts per minute (cpm) occur, they were to notify the Superintendent of Reactor Operations, and/or the Director, as well as the RRPO, who would then review the situation. 3) Should the readings be above 1,500 cpm, the operators were to shutdown the reactor and contact the aforementioned individuals. If the problem were severe enough, the shutdown for heat exchanger replacement would begin immediately.

Recent data indicates the daily cooling tower gross beta activity has leveled off. Tritium remains undetectable. (It should be noted that the cooling tower blowdown is to the sanitary sewer.) The licensee has scheduled a shutdown to prepare for heat exchanger replacement on April 23, 2010, with the actual replacement scheduled to begin the following week.

c. Conclusions

The inspectors determined that the above action was in accordance with regulatory and licensing requirements because: 1) the daily cooling tower gross beta elevated counts were self identified and the activity of the secondary coolant was within the Part 20 limits; 2) the source of the leak was identified; 3) the operators had been briefed on immediate actions to take in the event of a high radiation monitor indication alarm signaling a worsening of the leak in the heat exchanger, and 4) a plan of action was in place for heat exchanger replacement.

11. Exit Interview

The inspection scope and results were summarized on March 11, 2010, with members of licensee management. The inspectors described the areas inspected and discussed the preliminary inspection findings. The licensee did not offer any dissenting opinions or identify any information to be withheld from public disclosure.

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel:

J. Bernard	Director of Reactor Operations
T. Bork	Irradiation Services Coordinator
E. Block	Maintenance Supervisor
J. Foster	Assistant Superintendent of Operations
E. Lau	Superintendent of Reactor Operations
W. McCarthy	Reactor Radiation Protection Officer and Deputy Director, Environment, Health, and Safety Office, MIT
D. Moncton	Director, Nuclear Reactor Laboratory
T. Newton	Associate Director, Reactor Engineering
S. Tucker	Quality Assurance Supervisor

Other Personnel:

D. Barber	MIT Emergency Planning Coordinator
L. DiBerardinis	Director of Environment Health and Safety Office, MIT
R. Rossi	Assistant Chief, Cambridge City Fire Department

INSPECTION PROCEDURES USED

IP 69003	Class 1 Research and Test Reactor Operator Licenses, Requalification, and Medical Examinations
IP 69005	Class 1 Research and Test Reactor Experiments
IP 69006	Class 1 Research and Test Reactors Organization and Operations and Maintenance Activities
IP 69007	Class 1 Research and Test Reactors Review and Audit and Design Change Functions
IP 69008	Class 1 Research and Test Reactors Procedures
IP 69009	Class 1 Research and Test Reactor Fuel Movement
IP 69010	Class 1 Research and Test Reactor Surveillance
IP 69011	Class 1 Research and Test Reactor Emergency Preparedness

ITEMS OPENED, CLOSED, AND DISCUSSED

OPENED:

50-020/2010-201-01	IFI	Follow-up on the actions taken to ensure that annual written examinations and quizzes required by the Requalification Program are completed in a timely manner.
50-020/2010-201-02	IFI	Follow-up on the licensee's actions to complete the 2009 annual training for MIT Police Department personnel during March/April 2010.

CLOSED:

None

LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ADAMS	Agencywide Documents Access and Management System
CCFD	Cambridge City Fire Department
CPM	counts per minute
E-Plan	Emergency Plan
EHS	Environmental Safety and Health
FY	Fiscal Year
HE-1B	Heat Exchanger 1B
IFI	Inspector Follow-up Item
IP	Inspection Procedure
IRF	Irradiation Request Form
MIT	Massachusetts Institute of Technology
MITR-II	Massachusetts Institute of Technology Reactor
MITRSC	Massachusetts Institute of Technology Reactor Safeguards Committee
Na-24	Sodium-24
No.	Number
NRC	Nuclear Regulatory Commission
NRL	Nuclear Reactor Laboratory
PD	Police Department
PM	Procedure Manual
Ref.	Reference
RO	Reactor Operator
RRPO	Reactor Radiation Protection Officer
RSC	Reactor Safeguards Committee
SRO	Senior Reactor Operator
TS	Technical Specification
Vol.	Volume