

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-20/84-01

Docket No. 50-20

License No. R - 37

Priority -

Category F

Licensee: Massachusetts Institute of Technology

MIT Research Reactor

38 Albany Street

Cambridge, Massachusetts 02139

Facility Name: MIT Research Reactor (MITR - II)

Appraisal At: Cambridge, Massachusetts

Appraisal Conducted: April 3 - 6, 1984

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6/5/84  
date

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6/5/84  
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for Gregory Martin  
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6/5/84  
date

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Emergency Preparedness Section, DETP

6/6/84  
date

Appraisal Summary: Appraisal on April 3 - 6, 1984 (Report No. 50-20/84-01)

Areas Appraised: Special announced emergency preparedness appraisal regarding the implementation of the Emergency Preparedness Program.

Results: No violations were identified. The emergency preparedness program in general provides reasonable assurance that the emergency response organization can respond in the event of a radiological emergency, however, one significant finding regarding EAL's and five improvement items regarding procedures and the location of dosimeters were identified.

## Details

### 1. Emergency Organization

The inspectors reviewed the overall emergency organization as described in Section 4.3 and shown on Figure 4.3.1.4-2 of the Emergency Plan and noted that appropriate authorities, functional areas, lines of succession and interfaces had been established.

Based on the above findings this portion of the licensee's program appears to be acceptable.

### 2. Onsite Organization

The inspectors reviewed the description and responsibilities of the onsite organization as shown in Section 4.3.2 of the Emergency Plan. The inspectors held discussions and conducted walk-throughs with onsite response personnel having key positions within the organization and noted that response personnel interviewed demonstrated adequate knowledge to perform effectively in the emergency organization.

Based on the above findings this portion of the licensee's program appears to be acceptable.

### 3. Fire Protection

The inspectors interviewed members of the City of Cambridge Fire Department and noted that offsite fire protection is provided by the Fire Department as requested.

MIT provides annual training to the Fire Department which includes a facility tour, a review of procedures for hazards control and radiation safety practices.

Based on the above findings this portion of the licensee's program appears to be acceptable.

### 4. Police Protection

The inspectors held discussions with members of the MIT Security Department and noted that they can provide support for events such as civil disturbances, traffic control, unauthorized entry to the MIT Reactor facility, and assistance with evacuations and radiological surveys. Annual training is provided regarding the above support.

The inspectors also interviewed members of the City of Cambridge Police Department and noted that police protection is provided upon request. Annual training for response to emergencies is provided by MIT, including a tour of the facility.

Based on the above findings this portion of the licensee's program appears to be acceptable.

5. Medical Support, Hospital and Ambulance Services

The MIT Medical Department provides medical facilities and the MIT Security Department provides ambulance services. These facilities operate under a management protocol for response to personnel injuries with or without radiological consequences. This protocol includes procedures for managing persons injured in any accident which involves radioactive contamination or external exposure. The medical facilities are equipped for treatment and decontamination of patients and the ambulance service also has a container for transport to provide contamination control.

Additional services and support are also provided by Massachusetts General Hospital, Boston, Massachusetts, as requested.

Based on the above findings this portion of the licensee's program appears to be acceptable.

6. Information Releases to the News Media and Public

The MIT News Office will issue information releases based on information provided by the Emergency Director. This office has established a public affairs officer with a line of succession for this function. Discussion with the public affairs officer indicated that this office can perform the functions of public affairs.

Based on the above findings this portion of the licensee's program appears to be acceptable.

7. Notification and Activation of the Emergency Organization

The inspector reviewed Section 4.7 "Emergency Response" and Section 4.8.4 "Communications Equipment" of the Emergency Plan, Emergency Operating Procedures (EOPs), Abnormal Operating Procedures (AOPs), inspected communications systems, equipment and notification lists, conducted interviews with response personnel, and noted that the licensee demonstrated an adequate program with regard to notification and activation.

During the review of the procedures it was noted that not all sections are clearly labeled with the title of the person responsible for performing the actions, and therefore it was not clear who was responsible for accomplishing the notification steps within these sections. The shift supervisors interviewed displayed some uncertainty

as to their responsibility for performing some of the actions in the procedures beyond the "Immediation Actions" stage which were labeled for the shift supervisor.

Based on the above findings this portion of the licensee's program appears to be acceptable, but the following matter should be considered for improvement:

Each section of the procedures should be clearly labeled with the title of the individual responsible for its implementation (20/84-01-01).

8. Identification and Classification Procedures

The inspectors reviewed applicable sections in the emergency plan, technical specifications, SAR, supporting procedures, and conducted interviews and walk-throughs with individuals who are responsible for identification and classification.

Emergency Action Levels are discussed in Sections 4.5.3 and 4.7.2 of the Emergency Plan. Section 4.5.3 states that instrument readings corresponding to specific action levels are contained in the appropriate Abnormal Operating Procedures (AOP). However upon reviewing the AOPs (i.e. 5.6.2) it was determined that EALs based on instrument readings were provided only for the General Emergency Classification. No EALs based upon specific instrument readings are provided for the Unusual Event, Alert or Site Area Emergency classification levels. Review of Emergency Plan Section 4.7.2.2 "EALs for a General Emergency" and discussion with licensee personnel indicated that, using certain assumptions, calculations were made to determine specific instrument readings corresponding to the General Emergency Class, and that a linear extrapolation from the General Emergency to the Unusual Event was used to determine instrument readings for the other classifications. The result of the extrapolation was that the readings were below normal background levels for the instruments (Ref EP 4.7.2 page 13). After reviewing the Technical Specifications, the SAR and the radiological guidance for each classification in ANSI/ANS 15.16, calculations can be made which will yield meaningful instrument readings for each emergency class.

During the interviews and walk-throughs with personnel who are responsible for identification and classification it was noted that none of the individuals could correctly identify an event other than a General Emergency. The absence of EAL's makes it impossible to discriminate between the Site Area Emergency, Alert and Unusual Event classifications.

It was noted that in several places the procedures refer the user to the Emergency Plan, for example AOP 5.8.2 Immediate Action step 5 refers the user to EP 4.4.1 "Emergency Classification" which contains general information but does not provide any guidance on how to classify an event. (Another example is: EOP 4.4.4.1 Immediate Action step 3 refers user to

4.4.1). Procedures are intended to direct a user to take some necessary action, if information necessary to performing one action is needed it should be provided in the procedure or reference should be made to another procedure, reference to general information such as the Emergency Plan sections listed above is inappropriate. The procedures are not designed to provide guidance to the responsible individual on classification which will result in a formal classification being declared. It was further noted that the actions to be taken in the EOP's are not integrated with classification levels. In other words the declaration of a specific classification level implies that certain actions should be taken as a response (i.e. evacuation, access control, notifications, protective actions, assessment actions). The steps to be taken in the EOP's are not related to the classification levels specified in the Emergency Plan.

Based on the above findings, improvement in the following area is necessary:

- Develop EAL's based on specific instrument readings for each of the four classification levels specified in the Emergency Plan (20/84-01-02).

In addition, the following matters should be considered for improvement:

- Incorporate EAL's in a procedure or procedures in such a manner that they may be used by the responsible individual to arrive at a formal classification and declaration of an emergency event for all classification levels (20/84-01-03).
- Review EOPs and AOP's to determine if the information required for performing the indicated action is contained in the procedure and/or if the indicated reference is appropriate (20/84-01-04).

## 9. Equipment

The inspectors reviewed applicable sections of the emergency plan and supporting procedures, toured the MITR facility, observed radiological and non-radiological monitoring equipment relied upon for emergency detection, inspected records of calibration and operability tests of monitoring equipment, and held discussions with Health Physics personnel concerning sampling techniques and measurement capabilities. The inspectors concluded that the licensee has excellent, well maintained equipment and has demonstrated an adequate program with regard to emergency monitoring equipment.

Based on the above findings, this portion of the licensee's program appears to be acceptable.

10. Assessment Actions

The inspectors reviewed the appropriate sections of the Emergency Plan and supporting procedures, and held discussions concerning procedures and techniques with personnel responsible for performing assessment actions. It was noted that the licensee demonstrated an adequate program with respect to assessment actions.

Based on the above findings, this portion of the licensee's program appears to be acceptable.

11. Protective/Corrective Actions

The inspectors held discussions with licensee emergency response personnel, reviewed the description of the Emergency Support Center as included in the Emergency Plan, toured the primary and backup center, inspected the communications equipment and noted that suitable Emergency Support Centers had been established for use during a radiological emergency.

Based on the above findings this portion of the licensee's program appears to be acceptable.

12. Protective Equipment

The inspectors held discussions with licensee personnel, inspected contents of dedicated emergency kits located at several locations within the facility and concluded that adequate protective clothing, respiratory protection equipment, and radiation detection equipment would be available for use during a radiological emergency. However, no high range dosimeters were available in containment, thus individuals would have to leave containment in order to obtain a high range dosimeter. All individuals who enter the restricted area are provided with a dosimeter of 0-200 MR range, which may be insufficient under accident conditions.

Based on the above findings, this portion of the licensee's program appears to be acceptable, but the following matter should be considered for improvement:

Provide several high-range dosimeters within the containment building emergency lockers. (20/84-01-05).

13. Decontamination Capabilities

The inspectors held discussions with licensee health physics personnel, toured decontamination facilities, inspected decontamination supplies and equipment, reviewed decontamination instructions and noted that the licensee had the capability to decontaminate personnel and to minimize the spread of contamination.

Based on the above findings this portion of the licensee's program appears to be acceptable.

14. Equipment Maintenance and Calibration

The inspector held discussions with licensee health physics personnel, reviewed records of operability and calibration checks, inspected portable radiation monitoring equipment for operability and noted that suitable radiation monitoring equipment would be available for use during a radiological emergency.

Based on the above findings this portion of the licensee's program appears to be acceptable.

15. Evacuation

The inspectors interviewed licensee personnel, reviewed appropriate procedures, and noted that there were evacuation alarms and adequate electrical signs at doorways to provide appropriate messages. These operated from the control room. The inspectors also noted that each room of the building adjacent to containment was posted with an evacuation route map.

Based on the above findings, this portion of the licensee's program appears to be adequate.

16. Accountability of Personnel

The inspectors contacted licensee personnel, reviewed pertinent procedures and noted that a means had been established to account for personnel who may have been within the controlled area and the Administration Building during an accident. Provisions were also provided for surveying and segregating potentially contaminated personnel.

Based on the above findings, this portion of the licensee's program appears to be adequate.

17. Assembly Areas

The inspectors interviewed licensee personnel, reviewed appropriate procedures, toured primary and alternate assembly and reassembly areas and noted that suitable areas had been established for use during a radiological emergency.

Based on the above findings, this portion of the licensee's program appears to be adequate.

18. Personnel Monitoring

The inspector held discussions with licensee personnel, reviewed Section 4.7.4 of the Emergency Plan and noted that there were provisions for monitoring all individuals evacuating the reactor facility and for monitoring potentially contaminated individuals at the primary and alternate assembly areas. However, individuals, such as Campus Police responding to the facility to transport an injured and contaminated patient or performing field surveys are not routinely supplied with dosimeters.

Based on the above findings this portion of the licensee's program appears to be acceptable, but the following matter should be considered for improvement:

Provide procedural guidance on supplying all emergency response personnel with appropriate dosimetry (20/84-01-06).

19. Personnel Exposure Control

The inspectors held discussions with licensee personnel, reviewed appropriate sections of the emergency plan, and noted that exposure guidelines had been established for emergency personnel during their performance of corrective or life saving activities. There were provisions for access control to contaminated and high radiation areas, for personnel dosimetry and protective equipment.

Based on the above findings this portion of the licensee's program appears to be acceptable.

20. First Aid and Rescue

The inspectors contacted licensee personnel, reviewed emergency procedures, and inspected portions of the first aid equipment and supplies, and noted that provisions had been established for first aid and rescue.

Based on the above findings, this portion of the licensee's program appears to be acceptable.

21. Emergency Training and Retraining

The inspectors reviewed the training/retraining program that was established for licensed personnel, non-licensed personnel, and offsite personnel and reviewed training records. The inspectors also interviewed various onsite and offsite emergency response personnel in regard to their training. The inspectors also noted that licensee personnel were required to complete examinations regarding the emergency plan and



emergency procedures with the exception of three individuals that provide the major portion of the training instruction and conduct examinations. The training/retraining program conducted for offsite support personnel also includes a tour of the facility and adjacent areas.

Based on the above findings, this portion of the licensee's program appears to be acceptable.

22. Drills and Exercises

The inspectors reviewed the established emergency drill and exercise schedule with licensee personnel. The inspectors also noted that observers are provided and records are maintained for any required follow-up for improvement items observed during the exercise or drills. A medical drill is conducted annually and includes response of an ambulance and may include use of medical facilities. A communication drill is also conducted annually to test communication links with Federal, State and local government offsite support agencies. An evacuation drill of the Administration/Reactor building is performed twice each year. A radiological exercise is performed annually and includes offsite support organizations, offsite radiological surveys, evacuation, and use of emergency equipment.

Based on the above findings, this portion of the licensee's program appears to be acceptable.

23. Maintaining of Plan and Procedures

The inspectors discussed the maintenance of the Emergency Plan and Emergency Procedures with licensee personnel and noted that records were maintained to verify that the Plan and Procedures had been reviewed and approved by the MIT Reactor Safeguards Committee in accordance with the Emergency Plan and Technical Specifications.

Based on the above findings, this portion of the licensee's program appears to be acceptable.

24. Exit Meeting

On April 6, 1984, the inspectors met with the individuals identified in Annex A and summarized the scope and findings of the appraisal.

At no time during this appraisal was written material provided to the licensee by the inspectors.

ANNEX A

Individuals Contacted

- L. Andexler, Shift Supervisor
- \* J. Bernard, Reactor Superintendent
- R. Beyers, Director of News Office
- \* L. Clark, Jr., Director of Reactor Operations
- \* P. Coggio, Radiation Protection Technician
- R. DiIorio, Assistant Director of News Office
- M. Galanek, Assistant Radiation Protection Officer
- J. Gehret, Senior Shift Supervisor
- K. Grimes, Reactor Operator
- \* O. Harling, Director of Nuclear Reactor Laboratory
- \* E. Karaian, Reactor Radiation Protection Officer
- \* K. Kwok, Assistant Reactor Superintendent
- W. Lyons, Captain of Campus Police
- F. Masse, Radiation Protection Officer
- W. McDermott, Shift Supervisor
- P. Menadier, Shift Supervisor
- J. Olivieri, Chief of Campus Police

Representatives of offsite support organizations were also contacted during the appraisal.

\*Denotes those individuals attending the exit meeting on April 6, 1984.