



UNIVERSITY OF MARYLAND

GLENN L. MARTIN INSTITUTE OF TECHNOLOGY
A. JAMES CLARK SCHOOL OF ENGINEERING
Department of Materials Science and Engineering

29 July 2011

Document Control Desk
United States Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Reference: University of Maryland, Maryland University Training Reactor (MUTR)
Docket No. 50-166, License No. R-70
Request for Additional Information (RAI) Regarding Maximum MHA Dose

The University of Maryland herewith submits the following documents in connection with its application for a renewal of the MUTR license identified above:

1. Response to the NRC RAI regarding dose to the general public in the event of a Maximum Hypothetical Accident (MHA)

If you have questions about this submittal, please write me at 2309F Chemical and Nuclear Engineering Building, University of Maryland, College Park, MD 20742-2115 or email me at mohamad@umd.edu. Please copy Prof. Robert Briber on any correspondence: 2135 Chemical and Nuclear Engineering Building, University of Maryland, College Park, MD 20742-2115; rbriber@umd.edu.

I declare under penalty of perjury that the foregoing and the enclosed documents are true and correct.

Sincerely,

Mohamad Al-Sheikhly
Professor and Director
Maryland University Training Reactor

Enclosures (2)
cc: R. Briber

This document was redacted in accordance with "Research and Test Reactors Program Guidance for Handling of Sensitive Unclassified (Non-safeguards) Information That Could Reasonably Be Expected to Be Useful to a Potential Adversary (Redaction Guide - Rev. 10)." ML112070712

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NRC

Response to the NRC RAI regarding dose to the general public in the event of a Maximum Hypothetical Accident (MHA)

With the MUTR ventilation system off, the dose calculations indicate that a member of the general public in closest proximity to the reactor building (lower level outside the reception room on the south side of the reactor building) would receive a dose of 25.86 mrem/hr. In order to ensure that doses are below those required in 10CFR20, Section 7.4 of the MUTR Emergency Plan was revised.

In the event of a Class 2 event, which involves significant radiation/radiological consequences, the current Emergency Plan required the evacuation of the reactor building, but not the Chemical and Nuclear Engineering Building. Therefore, there was no provision for preventing a member of the general public to be in close proximity to the reactor building in the event of an MHA

The revised Section 7.4 requires evacuation of the reactor building and the Chemical and Nuclear Engineering Building. Access to the evacuated areas is under the direct control of the Emergency Coordinator and approval for entry/reentry into an evacuated area is given only by the Emergency Director.

In order to determine the time needed to evacuate the Chemical and Nuclear Engineering Building, a drill was held on 29 June 2011. The building was evacuated within [REDACTED] of the initiation of the fire alarm.

With the calculated dose rate of 25.86 mrem/hr, the maximum dose that a member of the general public in closest proximity to the reactor building would receive is 2.59 mrem. Additionally, since access and reentry into evacuated areas is controlled, there is no possibility that a member of the general public would be allowed into controlled areas. Therefore, doses below 10CFR20 limits are ensured.

Three documents are attached: (1) Section 7.4 of the current Emergency Plan; (2) Section 7.4 of the revised Emergency Plan; and (3) Department of Environmental Safety Fire Exit Drill Record.

CURRENT

7.4 ALERT (CLASS 2)

7.4.1 Activation of Emergency Organization

Events of this class involving significant radiation/radiological consequences are generally credible only when reactor power operations or [REDACTED] handling are in progress. Therefore, for events of this class that occur during duty hours, the operator on duty shall activate the emergency organization. When required, the Emergency Director shall make requests for emergency off-campus support. For events that occur during non-duty hours, the MUTR staff member or the Campus Police shall notify the Reactor Director (Emergency Director). Upon the recommendation of the Reactor Director, the police will notify members of the emergency organization via paging system or telephone, using the emergency notification/call roster.

7.4.2 Assessment Actions

The Emergency Director, utilizing reports from the Emergency Coordinator and Reactor Support Coordinator, shall perform assessment. This class of emergency shall be defined by the occurrence of any of the Class 2 Emergency action levels listed in Table 5.1. The appropriate assessment actions described in section 7.2.2 for a Class 1 emergency shall be performed, if not already accomplished, and radiation/radiological assessments shall be performed within the reactor building as well as at and beyond the operations boundary, as necessary.

7.4.3 Corrective Actions

For all events in this class, the reactor shall be shutdown and the ventilation system shall be secured. In addition, the reactor building shall be evacuated. The applicable corrective actions delineated in sections 7.1.3 and 7.2.3 shall be performed if not already accomplished, as necessary, in addition to the modified corrective action for loss of pool water described below.

For a severe loss of reactor pool water, the Emergency Director may authorize the removal of [REDACTED] from the reactor pool into [REDACTED] storage [REDACTED] ([REDACTED]). In any case, the Emergency Director shall direct that all available means to establish and maintain a standing water level in the pool be taken. Should the [REDACTED] become uncovered, the Emergency Director shall order the reactor building and reactor roof evacuated and direct the initiation of radiation/radiological assessments at the reactor building boundary, as necessary.

7.4.4 Protective Actions

1. Evacuation

For a class 1 or higher emergency dictated by radiation/radiological conditions, the reactor building or affected areas within the building shall be evacuated by voice order and building evacuation alarm. All personnel are to evacuate the building immediately by the nearest safe exit and assemble as shown on Figures 7.1 and 7.2.

2. Personnel Accountability

Personnel accountability shall be by direct observation of the affected area. If the emergency involves the release of radioactive materials, all evacuees shall be surveyed for contamination. Protective measures, including decontamination, shall be taken to avoid or limit the spread of contamination if personnel contamination is found.

3. Protective Measures

The type and severity of the emergency will dictate the protective measures for emergency personnel. Protective anti-contamination clothing, respirators, dosimetry equipment and radiation detection equipment will be provided to emergency personnel as necessary. All off-campus emergency personnel entering the reactor building will be provided with health physics office escorts as appropriate.

Guidance for emergency exposure limits to emergency personnel during rescue and recovery activities are described in Appendix B.

4. Access Control

To provide additional protection to emergency personnel and to minimize the spread of radioactive contamination, access to the reactor building or affected areas within the reactor building, shall be under the direct control of the Emergency Coordinator and approval for entry/reentry into such an evacuated area shall rest with the Emergency Director.

5. Radiation/Radiological Monitoring

The reactor Radiation Area Monitoring System is required to be operable by Technical Specifications and can be used for the initial determination of the emergency class. In addition, handheld radiation detection instruments are available in the reactor building, and at outside locations within the Chemical and Nuclear Engineering Building including the Nuclear Engineering Laboratories and the Radiation Safety Office. Radioactive contamination levels can be determined by counting and analyzing smear wipes and air samples with counting equipment available at the Radiation Safety Office Nuclear Engineering Laboratories, and other laboratories throughout campus accessible to the Radiation Safety Office. The Radiation Safety Office can make dosimeters available for emergencies. Self-reading dosimeters are available in the reactor building, reactor emergency boxes and the Radiation Safety Office. All results of surveys, analysis, etc shall be transmitted to the Emergency Coordinator by recorded data/reports and/or radio and then passed on to the Emergency Director.

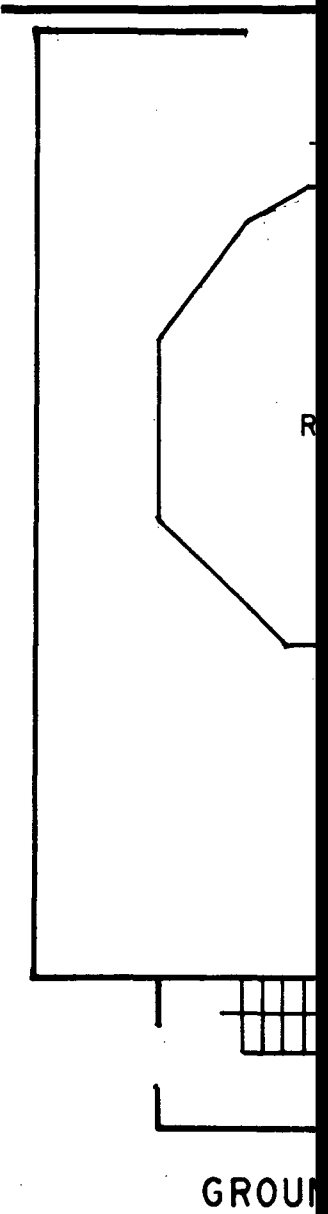
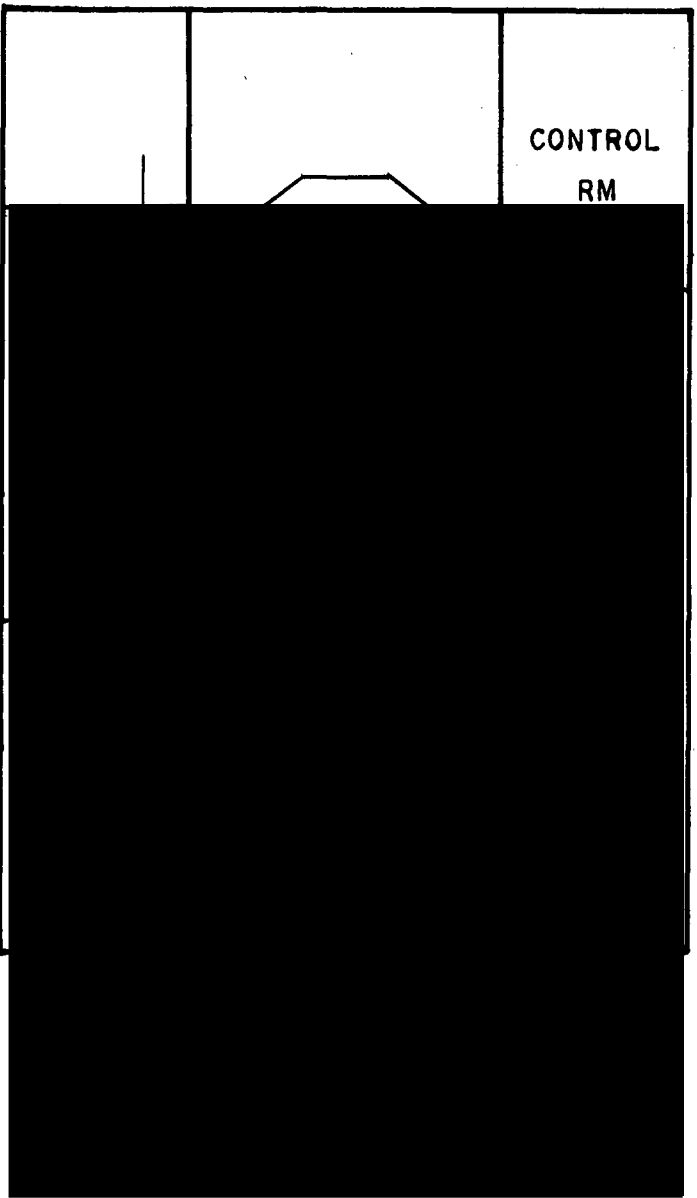


FIGURE 7.1:



MARYLAND UNIVERSITY TRAINING REACTOR
EMERGENCY PREPAREDNESS PLAN REVISION 12

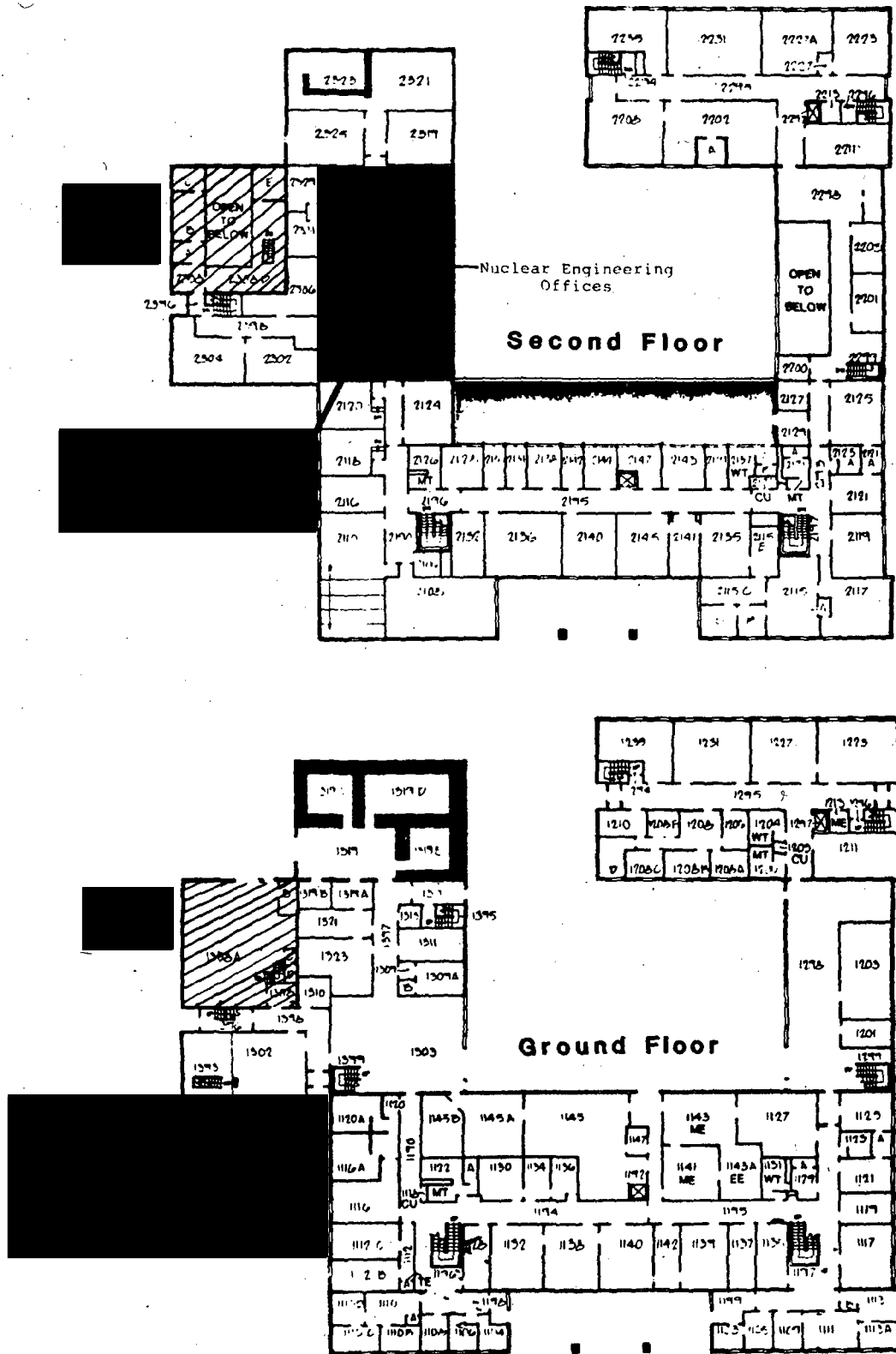


FIGURE 7.2:

ast Updated December 4, 1999

REVISED

7.4 ALERT (CLASS 2)

7.4.1 Activation of Emergency Organization

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7.4.4 Protective Actions

1. Evacuation

For a class 1 or higher emergency dictated by radiation/radiological conditions, the reactor building or affected areas within the building shall be evacuated by voice order and building evacuation alarm. All personnel are to evacuate the building immediately by the nearest safe exit

and assemble as shown on Figures 7.1 and 7.2. For a Class 2 emergency, the Chemical and Nuclear Engineering Building shall also be evacuated by using the fire alarm. In a Class 2 emergency, the primary assembly area shown in Figure 7.2 is not used, and personnel will assemble at the secondary assembly area shown in Figure 7.2.

2. Personnel Accountability

Personnel accountability shall be by direct observation of the affected area. If the emergency involves the release of radioactive materials, all evacuees shall be surveyed for contamination. Protective measures, including decontamination, shall be taken to avoid or limit the spread of contamination if personnel contamination is found.

3. Protective Measures

The type and severity of the emergency will dictate the protective measures for emergency personnel. Protective anti-contamination clothing, respirators, dosimetry equipment and radiation detection equipment will be provided to emergency personnel as necessary. All off-campus emergency personnel entering the reactor building will be provided with health physics office escorts as appropriate.

Guidance for emergency exposure limits to emergency personnel during rescue and recovery activities are described in Appendix B.

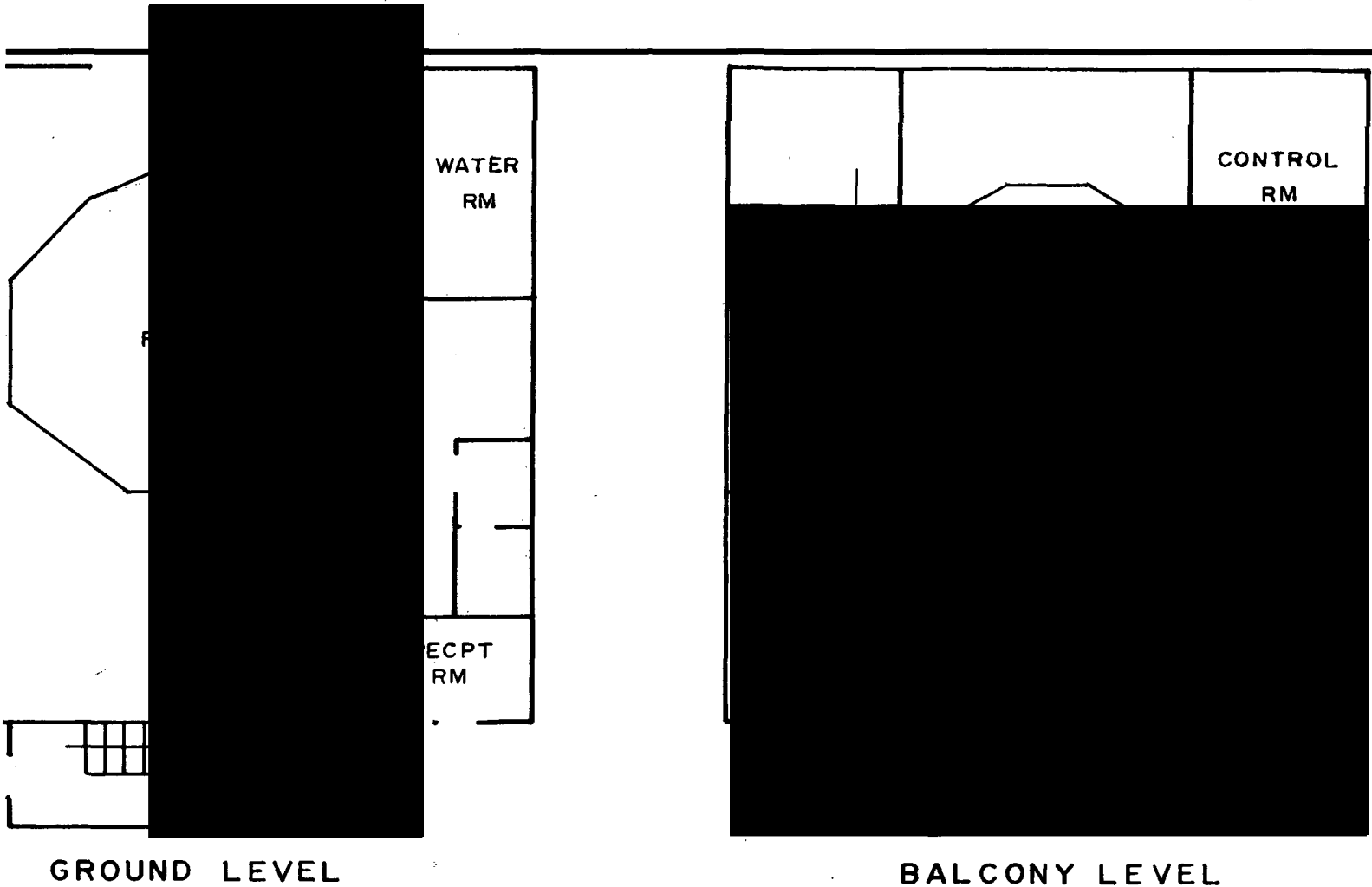
4. Access Control

To provide additional protection to emergency personnel and to minimize the spread of radioactive contamination, access to the evacuated areas (reactor building, affected areas within the reactor building, Chemical and Nuclear Engineering Building) shall be under the direct control of the Emergency Coordinator and approval for entry/reentry into such an evacuated area shall rest with the Emergency Director.

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FIGURE 7.1:



GROUND LEVEL

BALCONY LEVEL

