August 10, 1999

Dr. John A. Bernard, Director
Nuclear Reactor Laboratory
Massachusetts Institute of Technology
138 Albany Street
Cambridge, MA 02139-4296

SUBJECT: TECHNICAL SPECIFICATION BASES CHANGES - MASSACHUSETTS INSTITUTE OF TECHNOLOGY RESEARCH REACTOR (TAC NO. MA6156)

Dear Dr. Bernard:

By letter dated July 30, 1999, the Massachusetts Institute of Technology (MIT) submitted changes to Amended Facility Operating License No. R-37, Appendix A, "Technical Specifications for the Massachusetts Institute of Technology Research Reactor." The changes involved Technical Specification (TS) bases Section 3.10, "Fuel Element and Core Component Handling and Storage." MIT made changes to this basis section to correct typographical errors.

TS 3.10-3.e. refers to irradiated fuel storage in the fuel element transfer flask or other proper shield within the controlled area. However, the basis of the TS did not discuss this storage location. MIT stated that it is believed that the omission was a typographical error that dates to the issuance of this TS in 1982. MIT updated the basis of the TS to reference TS 3.10-3.e. in the appropriate part of the basis.

MIT has performed these changes pursuant to 10 CFR 50.59. These changes correct typographical errors in Bases Section 3.10. The staff has no objection to these Bases changes. Revised TS page 3-39 is enclosed.

Sincerely,

Original signed by

Alexander Adams, Jr., Senior Project Manager
Events Assessment, Generic Communications
and Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-20

Enclosure: Revised TS Page 3-39

cc w/enclosure:
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Docket No. 50-20

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It has been calculated that fuel elements when stored in the locations specified in 2b, 2c, 2d, 3b, 3c, 3d, and 3e will have a calculated effective multiplication ($k_{eff}$) factor of less than 0.9 under optimum conditions of water moderation.

These specifications are also conservative for criticality safe handling of MITR-I fuel alone or in combination with MITR-II fuel.

The chief additional problems with spent fuel are those of shielding personnel from the emitted fission product gamma rays and preventing melting from afterheat. The shielding requirement is met by utilizing a shielded transfer flask (item 3e) for movements and temporary storage and more permanent shielding as indicated in 3a, b, c, and d. The requirement to prevent melting is met by specifying that four days elapse between use of the fuel element in a core operating above 100 kW and removal of the element from the reactor pool. This decay time was determined from experience with the MITR-I combined with a conservative assumption of doubling the power density for the MITR-II.

The specification on removal of control element provides that the stuck rod criteria will always be met, even when one blade is removed for repair. Thus, the reactor still would not go critical on the removal of a second control element.



Issued by letter dated
August 10, 1999