July 16, 2010

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

SUBJECT: MASSACHUSETTS INSTITUTE OF TECHNOLOGY, REQUEST FOR ADDITIONAL INFORMATION REGARDING THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY RESEARCH REACTOR LICENSE RENEWAL (TAC NO. MA6084)

Dear Dr. Bernard:

The U.S. Nuclear Regulatory Commission is continuing the review of your application for renewal of Facility Operating License No. R-37 for the Massachusetts Institute of Technology Research Reactor dated July 8, 1999, as supplemented by letters dated May 8, 2000, January 29, 2004, February 22, May 29, August 15, August 21, August 26, October 6, October 7, November 7, and December 1, 2008, May 26, August 27, October 5, October 9, and November 19, 2009, and March 30, 2010. During our review, questions have arisen for which we require additional information and clarification. As agreed to during our phone conversation of July 13, 2010, please provide responses to the enclosed request for additional information no later than August 13, 2010. In accordance with Title 10 of the *Code of Federal Regulations,* Section 50.30(b), your response must be executed in a signed of the original under oath or affirmation.

If you have any questions regarding this review, please contact me at 301-415-2784 or by electronic mail at William.Kennedy@nrc.gov.

Sincerely,

**/RA/**

William B. Kennedy, Project Manager
Research and Test Reactors Licensing Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-020

Enclosure: As stated
cc w/ enclosure: See next page

cc:

City Manager
City Hall
Cambridge, MA 02139

Department of Environmental Protection
One Winter Street
Boston, MA 02108

Director
Radiation Control Program
Department of Public Health
90 Washington Street
Dorchester, MA 02121

Nuclear Preparedness Manager
Massachusetts Emergency Management Agency
40 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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OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR ADDITIONAL INFORMATION

REGARDING LICENSE RENEWAL FOR

THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY REACTOR

LICENSE NO. R-37

DOCKET NO. 50-020

The following request for additional information (RAI) pertains to the technical specifications (TS) proposed for the Massachusetts Institute of Technology research reactor by letter dated March 30, 2010. The response to this RAI may include replacement pages for Revision 5 of the TS submitted March 30, 2010, or a complete, revised copy of the TS.

1. Proposed TS 1.2.2, 3 and the basis for proposed TS 4.6 reference American National Standards Institute American Nuclear Society (ANSI/ANS) standard ANSI/ANS-15.1-1990. Revise the proposed TS to reference ANSI/ANS-15.1-2007, or provide justification for not updating the references.

2. Proposed TS 2.1.1 specifies safety limits for reactor operation with forced convection cooling based on reactor power, primary coolant outlet temperature, primary coolant height, and primary coolant flow. The reactivity transient analysis submitted by letter dated October 9, 2009, states that the transient results in a peak cladding temperature well below the cladding softening temperature of 450 degrees Celsius. However, the analysis does not specify that the transient results in a peak reactor power less than the safety limit specified in proposed TS 2.1.1 (for conditions of primary coolant outlet temperature, primary coolant height, and primary coolant flow at the most limiting values allowed by the proposed TS). Clarify whether or not the peak reactor power during the transient is greater than the safety limit established in proposed TS 2.1.1. If so, revise the transient analysis and/or the proposed TS, as appropriate, to show that the reactivity transient will not result in exceeding a safety limit.

3. The note to the response to RAI TS 3.3.6 dated March 30, 2010, states that the conductivity limit specified in proposed TS 3.3.6 was changed to 10 microsiemens from 5 microsiemens and that the higher value is still conservative. Provide justification for the statement that the higher value is still conservative, and update the basis to be consistent with the specification. Also, revise the basis for proposed TS 3.3.6 to include the basis for proposed TS 3.3.6.4.

4. Proposed TS 3.7.2.2 specifies that the cooling tower spray *should* be shutdown in the case of indication that the tritium concentration in the secondary coolant water is 1 microCurie per liter. Clarify whether the “should” should be changed to “shall” (note: the proposed TS submitted with the initial license renewal application contained the word “shall”). Also, clarify whether the specified tritium concentration should be greater than or equal to 1 microCurie per liter.

5. Proposed TS 4.7.1.1 requires channel checks of the area and effluent radiation monitors "on any day that the reactor is operating above 100 kilowatts for at least 12 hours." The response to RAI TS 4.7.1 dated March 30, 2010, states that the limit on reactor power above which the channel checks are required should be changed to 250 kilowatts. Revise proposed TS 4.7.1.1 to be consistent with the response to the RAI. Additionally, the RAI response explains that the channel checks can only be performed when the reactor has been operating at some appreciable power level. However, the proposed TS states that the channel checks shall be done "prior to any reactor startup, if the reactor has been shut down for more than 24 hours." This appears inconsistent with the explanation in the RAI response. Explain this apparent inconsistency, and revise the proposed TS as appropriate.

6. Proposed TS 6.6.2.1.3 states, "...an evaluation *will* be made..." Clarify whether the word "will" should be changed to "shall," and revise the proposed TS as appropriate.

7. Proposed TS 6.6.2.1.4 states, "...fueled region *are* filled..." Clarify whether the word "are" should be changed to "shall be," and revise the proposed TS as appropriate.

8. The last paragraph of the basis for proposed TS 6.7 on page 6-67 contains an explanation of why a limit on the initial amount of uranium-238 in fueled experiments is unnecessary. The explanation states that calculations yield a limit of 31 grams of uranium-238, as set by potential off-site radiation dose resulting from a release from an experiment. The limit of 31 grams appears to be inconsistent with the remainder of the basis explanation. Explain this apparent inconsistency, and revise the basis as appropriate.

9. Proposed TS 7.8.3 was revised to include TS 7.8.3.g to be consistent with the records retention requirements in Title 10 of the *Code of Federal Regulations* Section 50.36. Given the revision, proposed TS 7.8.3.f appears to be redundant with proposed TS 7.8.3.g. If proposed TS 7.8.3.f is redundant, consider removing it to eliminate the redundancy.