NUCLEAR REACTOR LABORATORY

AN INTERDEPARTMENTAL CENTER OF MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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August 21, 2008

U.S. Nuclear Regulatory Commission
Attn: Document Control Room
Washington, DC 20555

Re: Massachusetts Institute of Technology – Request for Additional Information License Renewal Request (TAC No. MA6084); License No. R-37; Docket No. 50-20

Dear Sir or Madam:

The Massachusetts Institute of Technology hereby provides the response for #14.1.

Please contact the undersigned with any questions.

Sincerely,

John Bernard, Ph.D., PE, CHP
Director of Reactor Operations

I declare under the penalty of perjury that the foregoing is true and correct.

Executed on 8-21-08 (Date) _____ (Signature)

cc:

w/enclosures	Stephen Pierce, Project Manager Research and Test Reactors Branch A Division of Policy and Rulemaking Office of Nuclear Reactor Regulation
w/ enclosures	Senior Project Manager Research and Test Reactors Branch A Division of Policy and Rulemaking Office of Nuclear Reactor Regulation
w/ enclosure	Senior Reactor Inspector Research and Test Reactors Branch B Division of Policy and Rulemaking Office of Nuclear Reactor Regulation
w/o enclosure	Document Control Desk

14.1 The surveillance requirements that are contained in TS 3.3.5 will be relocated to TS 4.3 and deleted from TS 3.3.5. Thus,

a) Specification 4 of TS 4.3 will be revised to read:

4. Analysis of the primary, D_2O, and secondary coolant for radioactivity shall be as follows:

Analyses	Frequency
Primary gross activity	Weekly during any week that the reactor is operating above 1 MW continuously for at least 24 hours and at least quarterly.
Primary isotopic identification	Quarterly
D_2O gross activity	Quarterly
D_2O tritium	Quarterly
Secondary gross activity	Daily any day that the reactor is operating or that secondary flow is supplied to a D_2O exchanger.
Secondary tritium	Daily any day that the reactor is operating or that secondary flow is supplied to a D_2O exchanger.

See Appendix H for the revised version of TS3.3.5

NOTE: We are considering purchase and installation of an online monitor for tritium. If we do so, the above requirements for secondary gross activity and for tritium would be changed from daily to weekly provided that the monitor was operational.

Appendix H

- TS #3.3.5 – "Coolant Radioactivity Limits

3.3.5 Coolant Radioactivity Limits

Applicability

The specification is applicable to the primary, D_2O, and secondary coolants.

Objective

To assure detection of deterioration of components in the reactor coolant systems and to identify leakage in heat exchangers.

Specification

1. The primary coolant shall be analyzed for gross activity and for identification. If the primary coolant activity exceeds 3 times the nominal fission product activity, primary coolant sampling frequency shall be increased and action shall be initiated in accordance with Specification 3.1.6 to determine if any in-core fuel element is damaged and with specification 3.3.6 to determine if water chemistry requirements are being meet. Reactor operation may continue if the cause of the problem is known and if such operation is allowed pursuant to specifications 3.1.6 and 3.3.6

2. The D_2O reflector coolant shall be analyzed for gross activity and tritium. The radioactivity of the tritium in the D_2O coolant should not exceed 5 mCi/ml. If the radioactivity of the tritium in the D_2O coolant approaches this guideline limit, preparations shall be initiated to replace the D_2O coolant. Reactor operation may continue while these preparations are in progress, provided that tritium concentration does not exceed 6 mCi/ml.

3. The secondary coolant shall be analyzed for gross activity and for tritium. The tritium activity shall be in accordance with Specification 3.7.2(b). If not, action shall be taken as required by the specification. In addition, the presence of other detectable activity in excess of 10 CFR 20 limits in the secondary coolant shall require isolation of the affected heat exchanger. Reactor operation may be continued only as necessary to identify the affected heat exchanger.

Basis

The basis of this specification is given in Sections 5.2.1.11, 5.3.1.11, 5.4.1.11 and 5.5.1.5 of the SAR. Core performance is monitored continuously by the core purge detector which is addressed by Specification 3.7.1.3. The primary coolant sample analysis serves as a backup to the indication provided by that monitor. Also, it provides a means for the detection of trends. An elevated activity level could be the result of a damaged fuel or it could be the result of an activated impurity. The former would require a reactor shutdown. The latter would require verification that the primary cleanup system was functional. Accordingly, if the guideline limit is exceeded, the actions required by Specifications 3.1.6 and 3.3.6 will be initiated. Also, the primary ion column will be evaluated for operability.

The principal concern of the D_2O reflector coolant system is tritium which builds up slowly over many years. The system is closed and hence the tritium that is contained within it does not pose a hazard during normal operation. However, the radiological controls needed to perform maintenance activities become greater as the activity levels increases. Accordingly, a guideline tritium activity limit of 5 mCi/ml is established along with requirement to initiate preparations for changing the reflector coolant if the tritium activity approaches this guideline limit. Reactor operation may continue while preparations, which can take many months, are progressing.

The secondary coolant is continuously monitored for activity by on-line detectors (Specification 3.7.1.6). These detectors do not sense tritium because it emits a very low energy beta particle. Accordingly, a daily analysis is done for tritium if secondary coolant is supplied to a D_2O heat exchanger (main or cleanup). If tritium levels exceed that permitted by Specification 3.7.2.1(b), corrective action is to be in accordance with that specification. In addition, if other detectable activity in excess of 10 CFR 20 limits is identified, the affected heat exchanger will be identified and removed from service.