

January 14, 1991

Docket No. 50-20

Dr. John Bernard, Director
of Reactor Operations
Nuclear Reactor Laboratory
Massachusetts Institute of Technology
138 Albany Street
Cambridge, Massachusetts 02139

Dear Dr. Bernard:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION

We are continuing our review of your application for amendment of Facility Operating License No. R-37 submitted on February 13, 1989 and as supplemented on July 6, 1990. During our review of your application for amendment, questions have arisen for which we require additional information and clarification. Please provide response to the enclosed Request for Additional Information within 60 days of the date of this letter, so that we may continue our evaluation of your application. If you have any question on this review please contact me at (301) 492-1128.

The reporting and/or record keeping requirements contained in this letter affect fewer than ten respondents: therefore, Office of Management and Budget clearance is not required under Public Law 96-511.

Sincerely,

Original signed by:

Marvin M. Mendonca, Senior Project Manager
Non-Power Reactors, Decommissioning and
Environmental Project Directorate
Division of Advanced Reactors
and Special Projects
Office of Nuclear Reactor Regulation

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Enclosure:
As stated

cc w/enclosure:
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

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Sincerely,

A handwritten signature in cursive script, appearing to read "Marvin M. Mendonca".

Marvin M. Mendonca, Senior Project Manager
Non-Power Reactors, Decommissioning and
Environmental Project Directorate
Division of Advanced Reactors
and Special Projects
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc w/enclosure:
See next page

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

REQUEST FOR ADDITIONAL INFORMATION

There are still some areas that need to be clarified and/or resolved concerning the MITR-11 request to extend fuel element fission density limit. The information supplied with the request to approve the extension notes that the oxide thickness will increase, but the consequences have not been reported. Specific questions associated with increased oxide are as follows:

1. Compare directly the predicted oxide thickness for extended burn-up with the oxide thickness assumed in the FSAR for the presently approved burn-up. Discuss whether the new predictions lead to fuel temperatures above limits previously analyzed and approved for normal operation.
2. Oxide thickness also affects reactor responses to rapid insertions of reactivity, and, perhaps, other MIT accident scenarios. Please review and re-analyze all potential accidents and discuss whether FSAR conclusions would remain valid with the projected increases in oxide thickness.
3. The increased oxide thickness will decrease the hydraulic diameter of the grooves. This will result in increased pressure losses due to friction and to decreased coolant velocities in the grooves. Please provide analyses of the impact of these changes on hot-channel factors, and assess to what extent the decreased coolant velocities affect the oxide build-up or other crud deposition in the grooves. Unless justification can be provided that grooves do not become clogged, please provide analyses of fuel temperature conditions both in steady state and potential accident scenarios with the grooves filled with oxide.
4. The thermal conductivity assumed for the oxide on the fuel plates appears to be inconsistent. The response to the request for information dated 11/28/89 states a thermal conductivity of 2.0 Btu/hr-°F-ft. The conductivity used will influence fuel plate temperatures, transient response to accidents, and additional oxide growth since the oxide-aluminum interface temperature controls oxide growth. Please justify the use of the 2.0 Btu/hr-°F-ft in your analyses, or re-analyze reactor behavior with the Griese value of 1.3 Btu/hr-°F-ft.

Massachusetts Institute of
Technology

Docket No. 50-20

cc: City Manager
City Hall
Cambridge, Massachusetts 02139

Assistant Secretary for Policy
Executive Office of Energy Resources
100 Cambridge Street, Room 1500
Boston, Massachusetts 02202

Department of Environmental
Quality Engineering
100 Cambridge Street
Boston, Massachusetts 02108