

NUCLEAR REACTOR LABORATORY
AN INTERDEPARTMENTAL CENTER OF
MASSACHUSETTS INSTITUTE OF TECHNOLOGY



JOHN A. BERNARD
Director
Director of Reactor Operations
Principal Research Engineer

138 Albany Street, Cambridge, MA 02139-4296
Telefax No. (617) 253-7300
Tel. No. (617) 253-4202

Activation Analysis
Coolant Chemistry
Nuclear Medicine
Reactor Engineering

January 22, 1997

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Attn.: Document Control Desk

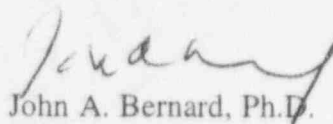
Subject: Comments on Preliminary Report AEOD Case Study "Non-Power Reactor Survey"

Gentlemen:

In its letter of 12 December 1996, the U.S. Nuclear Regulatory Commission requested comments on the preliminary Report AEOD Case Study "Non-Power Reactor Survey." This letter is submitted in response to that request. Comments were specifically solicited on errors of accuracy and completeness. Enclosed as an appendix to this letter is a compilation of such errors for the MIT Research Reactor. It should be noted that those errors are both extensive and significant.

The Massachusetts Institute of Technology has reviewed the letter prepared by Dr. Brian Dodd, Chairman, National Organization of Test, Research, and Training Reactors (TRTR). MIT concurs with and supports the comments contained in that letter.

Sincerely,


John A. Bernard, Ph.D.
Director
MIT Nuclear Reactor Laboratory

280064
JAB/CRM

cc: Chairman, TRTR

USNRC - Region I - Project Scientist,
Radiation Safety Branch

USNRC - Region I - Senior Project Manager,
Non-Power Reactors and Decommissioning Project Directorate

9701280379 970122
PDR ADOCK 05000020
P PDR

AD201

Appendix

Factual Errors Relative to MIT Research Reactor

in

Preliminary Report AEOD Case Study Non-Power Reactor Survey, Dec. 1996

COMPILATION OF ERRORS OF FACT RELATIVE TO MIT RESEARCH REACTOR

1. Page 3, Table 1 — For 1995, the table indicates that there were four (4) reactivity control, coolant leaks, or fuel-handling events at the MIT Research Reactor (MITR). The correct figure is three (3). Specifically, there were five reportable events at the MITR in 1995. These were:
(1) "Operation for One Week Without Documenting Required Testing Results of Emergency Battery," (2) "Operating with Fewer than the Required Number of <100 kW Nuclear Safety System Level Channels," (3) "Security Event - Receipt of a Bomb Threat," (4) "Operation with One Shim Blade Fully Inserted," and (5) "Malfunction of a Shim Blade Drive Mechanism." Clearly the battery surveillance and the security event do not concern reactivity control, coolant leaks, or fuel-handling. So, the entry in the table should be three (3). (Note: The total columns should therefore also be corrected.)
2. Page 12, Line 12 — The statement is made that "Loss of flow was not a concern at MIT." This is misleading and could easily be construed by someone unfamiliar with the MITR that loss of flow was not studied. A more accurate statement would be "Loss of flow was not a safety issue at MIT because the reactor's design incorporates passive features that establish natural circulation upon loss of forced flow." Specifically, the designers of the MITR created an innovative feature (natural circulation valves) so that natural circulation would be automatically established on loss of forced convection. This natural circulation flow is more than sufficient to remove decay heat following a scram on loss of forced flow.
3. Page 12, Lines 12-13 — The statement is made "Additionally, no pool drainage event which could lead to a LOCA was identified as a concern." Again, the statement is misleading and could be misconstrued as meaning that a LOCA was not studied. A more accurate statement would be, "Additionally, no pool drainage event which could lead to a LOCA was identified as a safety issue because of the use of passive safety features including: (1) the core tank is entirely contained within a second tank, (2) all tank penetrations are above the core, and (3) anti-siphon valves are installed to preclude siphoning should there be a break in the primary coolant inlet line. LOCAs are not an issue at MIT because of a passively-safe design."
4. Page 13, Lines 7-10 — A flow blockage at MIT is discussed. The text should be modified to mention that this is the Design Basis Accident (DBA). Such language was included in the following paragraph for the NIST Reactor.
5. Page 14, Lines 13-14 — The language here is reasonable. It says MIT "considered external events ... and decided that the facility would not be damaged for credible events." Contrast this language with that used on page 12 about loss of flow and LOCAs. There, the language could be easily construed to imply that MIT didn't even bother to think about the issues involved when in fact they were carefully considered and passive design features were incorporated to preclude them.
6. Page 16, Lines 12-14 — The statement is made that "at MIT, the reactor was operated with 2 of 3 power safety level channels inoperable and with four of six period and power safety channels improperly connected to the low voltage protection system (March 1989)". It should be noted that such operation was brief (28 minutes in the power range) and other alarmed power safety level channels were functional.

7. Page 30, Lines 6-8 — The e lines imply (without stating) that the "safety culture" at the MITR is deficient. Three events are cited to support this impression. The 1995 event never happened. (See item #9 and #10 below.) The 1993 event is incorrectly summarized. (See item #9 below.) In actuality, the 1993 event suggests a very positive "safety culture" because the problem was promptly identified and remedied. That leaves only the 1990 event. Does one event constitute a trend? No. Lines 6-22 of the report should be deleted.
8. Page 30, Lines 13-16 — Line 15 defies comprehension because of poor sentence construction. As written, the sentence is meaningless. Lines 13-14 create a very wrong impression. As explained in the report submitted by MIT, the licensed operator observed a lack of response on the channel and notified his supervisors. They immediately halted the work in progress and directed a shutdown of the reactor pending investigation. The scram occurred during the investigation. The actions taken were a very reasonable, safe response to an equipment failure.
9. Page 30, Lines 17-22 — These lines should be deleted. The MIT Reactor has NEVER been operated with less than the minimum number (two) of required core low flow scrams. Please see comments below on p. 41 of the AEOD report. (Item #10)
10. Page 41, MIT Event dated 01/25/95 — The MITR has NEVER been operated with less than the minimum number (two) of required core low flow scrams. The MIT Reactor is equipped with four flow scrams. These are: MP-6, MP-6A, MF-1, and MF-1 backup. MP-6 and MP-6A sense the hydraulic pressure across the downcomer region of the core tank. This difference correlates with primary flow. MF-1 is off a flow measuring device in the primary piping. MF-1 backup is also off such a device. The normal configuration is for MP-6, MP-6A and MF-1 to be functional. Thus, three loss-of-flow scrams are normally in service. This was the case on 01/25/95. On that day, an operator did momentarily deenergize the primary flow recorder. This affected MF-1. But both MP-6 and MP-6A remained fully functional.

The AEOD inspectors seemed unduly concerned by this "event" when it occurred. The NRL management did not understand their concern. Now, the reason is obvious. The AEOD inspectors thought the reactor had been operated without loss-of-flow protection. It hadn't. Incidentally, had such been the case, it most certainly would have been reportable and would have been reported. This so-called "event" should be deleted from the report in its entirety.

NRL management has repeatedly complained to AEOD and to NRC (Commissioners/ Executive Director) that the AEOD survey visits were improper because they were in fact inspections and yet they offered none of the usual protections against misconstrued conclusions (i.e., no entrance/exit interviews, no independent review of observations within NRC, etc.). The conclusions drawn here (event 01/25/95) clearly illustrate why such protections are necessary.