



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

JUL 3 1979

Those on Attached List

Gentlemen:

Subject: Transmittal of a "Memorandum for File"

Attached is a "Memorandum for File" on the subject of "Bounding Estimates of Damage to Zircaloy Fuel Cladding in the TMI-2 Core at Three Hours After the Start of the Accident, March 28, 1979." I have prepared this memorandum to explain and document the preliminary calculations I made in the month of April, 1979, concerning the maximum and minimum damage estimates to the core of TMI-2. The calculations are based on the information available to the Fuel Behavior Research Branch, RSR/RES/NRC as of about April 20, 1979, and are thus limited to our understanding of the accident scenario at that time. Other uncover scenarios may be used for estimates of the core damage by simply moving the appropriate temperature-time-elevation curves along the time axis to the positions desired.

Since this memorandum is being placed in the NRC Public Document Room, it may be referenced if you wish to do so.

Simplifying assumptions and an artificial core uncover scenario were used to allow calculations to be made by hand calculators and graphical solution methods. These are known to be in error, and these errors must be considered in evaluating and applying the calculations and conclusions reached. However, scoping calculations using better approximations, a greater heat loss from the fuel rods, and a scenario involving a more rapid uncover of the core indicate that the final estimates of damage to the core are not changed very much. Additionally, it is believed that a mechanism has been found to explain the survival of the in-core thermocouples, but more difficult calculations must be made before the validity of the mechanism can be established. These improved calculations will be completed as rapidly as permitted by present responsibilities.

Please realize that the calculations and conclusions contained herein refer to damage produced in the first three hours only. Later and longer uncover of the core undoubtedly produced more hydrogen, more fission product release, and more uncertainty as to the state of the core at the time natural circulation was attempted. The present calculations can not be extended past three hours at this time because there is insufficient information available to establish a reasonable scenario of events concerning the core uncover.

Sincerely,

M. L. Picklesimer  
Fuel Behavior Research Branch  
Division of Reactor Safety Research

Enclosure: As stated

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