



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

FEB 21 1990

NOTE TO: R. Vollmer

FROM: J. Voglewede

SUBJECT: REVISED RESPONSE TO QUESTION ON TMI-2 DAMAGE ESTIMATES

Attachment 1 to this note is Congressman Dingle's question on the extent of reactor and core damage at TMI-2 with a response written by Jay Lee of the TMI-Support group (in collaboration with me). Attachment 2 is a revised response to the same question but reflecting Chairman Ahearne's comments on the original response.

A handwritten signature in cursive script, reading "John C. Voglewede", is positioned above the typed name.

John C. Voglewede  
Core Performance Branch

cc: J. Lee  
P. Di Benedetto

Date 2/19/80

2/21/80

Question 21. (c) What is the present estimate of the nature and extent of the damage to the reactor and its core?

Answer.

The extent of damage to the reactor and its core cannot be estimated with any degree of accuracy prior to entry into the TMI-2 containment building and an examination of and opening of the reactor vessel and examination of the core.

However, the reactor core is believed to be extensively and seriously damaged so that most internals of the reactor core will have to be replaced. The initial NRC staff estimate on the reactor core damage can be found in NUREG-0557 "Evaluation of Long-Term Post-Accident Core Cooling of Three Mile Island, Unit 2", May 1979. The more recent staff estimate on the reactor core damage is described in Section II.C.2, Volume II, Part 2, of Rogovin Report "Three Mile Island, a report to the Commissioners and to the public."

} can't these be  
briefly sum

*Shaw*

Question 21. (c) What is the present estimate of the nature and extent of the damage to the reactor and its core?

Answer:

The damage to the TMI-2 facility cannot be estimated with any degree of accuracy prior to entry into the containment building and an examination of the reactor vessel and other equipment. Most of this equipment has been subjected to flooding, the hydrogen burn, and other effects of the accident. It is not known what damage resulted from these effects.

However, the reactor core is believed to be extensively damaged and most of the vessel internals will have to be replaced. The initial NRC staff estimate of the reactor core damage can be found in NUREG-0557 "Evaluation of Long-Term Post-Accident Core Cooling of Three Mile Island Unit 2," May 1979. A more recent estimate of the reactor core damage is described in Section II.C.2, Volume 2, Part 2 of the Rogovin Report "Three Mile Island, A Report to the Commissioners and to the Public," January 1980.

Both of these studies conclude that all of the fuel rods in the core burst, releasing a large fraction of the available fission gases to the reactor coolant and containment atmosphere. Approximately one-third of the Zircaloy metal cladding in the core reacted with the coolant water to form an oxide, generating additional gas in the form of hydrogen. It is believed that a bed of debris consisting of oxidized cladding and fuel pellet fragments from the upper section of the core is now resting on the lower and less seriously damaged part of the core. This debris bed extends from one side of the core to the other and is estimated to be several feet thick. It may be "glued" together by an oxidized cladding-fuel mixture and will be difficult to remove without disturbing vessel internals which may have remained intact.