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Writer's Direct Dial Number

April 24, 1981
LL2-81-0111

1981 APR 27 AM 8 23

U.S. NUCLEAR
REGULATORY COMMISSION

TMI Program Office
Attn: Mr. Lake Barrett, Deputy Director
U. S. Nuclear Regulatory Commission
c/o Three Mile Island Nuclear Station
Middletown, Pennsylvania 17057

Dear Sir:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)
Operating License No. DPR-73
Docket No. 50-320
Submerged Demineralizer System

During discussions with members of your staff, you requested that we review the potential for the generation of explosive mixtures in the spent SDS ion exchange vessels. This letter responds to that request.

The potential of an explosive gas mixture can come about as a result of the dissociation of water under a radiation field. Calculations show that the SDS zeolite vessels will remain structurally sound even in the event of a hydrogen detonation. The vessels, designed and tested for 24.8 atm. service pressure, will be continuously vented at one atmosphere to the SDS offgas system. The maximum pressure pulse for any hydrogen explosion (initiated at one atmosphere) is 18.05 atm.¹

Furthermore, it is improbable that an explosive hydrogen mixture will develop. Available water radiolysis data for irradiated zeolite systems indicate that recombination will occur and subsequent hydrogen/oxygen concentrations would be non-explosive.

We believe that this response fully addresses your concern. Should you wish to discuss this matter further, please contact Mr. L. J. Lehman, Jr. of my staff.

Sincerely,

G. K. Hovey
Vice-President and Director TMI-2

GKH:LJL:vjf
cc: B. J. Snyder, Program Director, TMI Office

¹ Handbook of Tables for Applied Engineering Science, CRC Press, Table 3-53, "Detonation Velocities for Various Gas Mixtures", 2nd Ed., 1973.

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