GPU Nuclear

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September 27, 1985

TMI Program Office
Attn: Dr. W. D. Travers
Deputy Program Director
US Nuclear Regulatory Commission
c/o Three Mile Island Nuclear Station
Middletown, PA 17057

Dear Dr. Travers:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)
Operating License No. DPR-73
Docket No. 50-320
Seismic Design Criteria

Your letter dated July 29, 1985, forwarded comments concerning the GPU Nuclear Seismic Design Criteria Analysis which was transmitted by our letter dated April 16, 1985. The attachment restates each comment and provides a specific GPU Nuclear response.

Sincerely,

Thomas F. Demmitt
for F. R. Standerfer
Vice President/Director, TMI-2

FRS/RDW/eml

Attachment

cc: Program Director - TMI Program Office, Dr. B. J. Snyder

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Section 3.1.1.3(1)

NRC Comment: The referenced samples were from the core debris bed in the upper portion of the core. Do you consider this sample to be limiting and/or to be representative of all the core zones?

GPU Nuclear Response: The sample analysis documented in Reference 31 of the Seismic SER demonstrates that less than 1.5% of the core debris particulate matter is less than 45 µm at the H8A sample location. Analyses of ten (10) additional samples indicate that less than 1% of the particles are less than 30 µm. These samples were taken from varying depths in the loose core debris bed at two horizontal locations (H8 and E9). A report is currently being prepared by EG&G which documents the results of these additional sample analyses.

Though the size distribution at a particular "zone" may vary, GPU Nuclear considers the percentage of small particulates, i.e., less than 45 µm, cited in the SER as a representative characterization of the loose rubble bed region. Additionally, the lower reactor head region has been observed by video camera. Based on this observation, majority of the core material appears to be composed of relatively large pieces, i.e., golf ball size or larger.

NRC Comment: You indicate that only 1.5% of the material is less than 45 µm. Since particles larger than 45 µm (perhaps up to 100 µm) can be pyrophoric, what percentage of the core region is in this particle size range?

GPU Nuclear Response: There are no sample results to date which explicity identify the particulate fraction in the size range "less then 100 µm". However, inferences of this range can be gained from the samples referenced in the SER and the subsequent additional samples taken by EG&G.

The ten (10) samples analyzed by EG&G contained the following size ranges:

- less than 30 µm
- 30 to 74 µm
- 74 to 149 µm

One sample analyzed consisted of 3.7% particulates in the 30 to 74 µm range and 3.5% in the 74 to 149 µm range. These results were for the sample pulled from the lower hard stop probing limit of the debris bed. The remaining samples have less than 2.0% total of particles of a size less then 149 µm and less than 1.5% total for all particles less than 74 µm.

It is noteworthy that, other factors being equal, the larger the particle size, the less the chance for a pyrophoric reaction. Tests on the TMI-2 material (Reference 1) indicate no pyrophoric potential for any size range considered.

NRC Comment: Since portions of your detailed defueling strategy are not finalized, how will you assure that these activities will not 'generate significant additional quantities of fines in the size range of concern?' Such activities may include plasma arc cutting, mechanical breaking of the suspected fused zone, and core boring.

GPU Nuclear Response: GPU Nuclear believes that defueling operations will not generate a significantly higher percentage of small particulates. Our belief is based on the objective of defueling which is to remove large chunks of fuel and not to reduce the core to a size smaller than necessary for loading into fuel canisters. The first step in this process is a mechanical breaking and chipping process. Various cutting tools, e.g., plasma arc, abrasive water jets, may also used. These tools will clearly generate some particulate matter of varying sizes. However, the proportion of the fines generated from cut material, relative to the total mass of material cut, would be expected to remain small. Further, these fines will be regularly vacuumed or removed through the Defueling Water Cleanup System, which would tend to limit the fine fraction in the core.

Additionally, the possibility of concentrated fines in one location was considered in various accident sequences analyzed in the Seismic Safety Evaluation. For example, in Table 3.1 of sequence 23B, the Safety Evaluation analyzed the effects of a drop of a filter canister with its entire inventory assumed to be less than 10 μm.

Section 3.1.2.10

NRC Comment: What is the basis for the maximum inventory in the waste storage area? Is this controlled in some manner, i.e., by procedure?

GPU Nuclear Response: The waste storage areas discussed in Section 3.1.2.10 are located in the reactor building (RB), the auxiliary building and the fuel handling building (FHB).

The volume and isotopic inventory that was assumed for the reactor building is the same as has been used in previous submittals to the staff (Reference 2 and 3). The original calculation (Reference 4) for storage trash assumed that the entire designated trash area was covered with contaminated trash in bags filled 3 feet high. Furthermore, this trash area is bounded by physical barriers such as walls, elevator shaft, equipment, ropes and painted lines.

The larger inventory of the two RB storage areas, i.e., 6000 lbs., was assumed to apply to both the 305' elevation and 347' elevation areas. The isotopic inventory assumed was deduced from the average dose, i.e., 30 mR/hr, of a compacted radwaste drum and a parametric evaluation of TMI-2 radwaste for compliance with land disposal requirements. It is possible that a new type of compactible trash storage area, which will have a different isotopic distribution, will be defined for defueling operations. However, the consequences of a contaminated trash fire will remain bounded by other accident sequences analyzed in the Seismic Safety Analysis.

In the auxiliary building there is a waste storage area in the Spent Fuel Cooler Room which consists of open shelving. Using the total volume of this shelving could result in 1500 lbs. of contaminated trash. Similarly, using the total volume of the open storage bins in the FHB storage area, 2560 lbs. of contaminated trash could be accumulated. These contaminated trash volumes were the basis for calculations performed in Reference 3. Fifty-five gallon steel drums were also conservatively included in the vo[illegible] to make up the total capacity assumed in the Saf[illegible]ty Analysis, (e.g., 22,000 lbs.). These drums would typically be closed and isolated as a radionuclide source d[illegible]ng a fire. The radionuclide inventory was based on a typical radwaste trash inventory and assumed for conservatism, that a saturated HEPA filter bank was in the storage area and involved in the fire.

References

(1) GEND-043, "TMI-2 Pyrophoricity Studies, "V. F. Baston, et al., November, 1984.

(2) SER 15737-2-G07-107, "Removal of the Equipment Hatch," Revision 3, GPU Nuclear letter 4410-85-L-0006, F. R. Standerfer to Dr. B. J. Snyder dated January 18, 1985.

(3) Technical Specifications Change Request No. 49, GPU Nuclear letter 4410-85-L-0110, F. R. Standerfer to Dr. B. J. Snyder dated June 18, 1985.

(4) GPU Nuclear memorandum 9240-84-239, "Curie Controls of RB Radwaste Storage Area," H. K. Peterson to R. L. Rider, dated July 10, 1984.