GPU Nuclear

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June 25, 1982
5211-82-151

Office of Nuclear Reactor Regulation
Attn: R. W. Reid, Chief
Operating Reactors Branch No. 4
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
Asymmetric LOCA Loads (ALL)

References:
1. BAW 1621 - July 1980
2. BAW 1621 Supplement 1, June 1981, document No. 77-1126594-00, Effects of Asymmetric LOCA Loadings - Phase II Analysis - Response to NRC Questions
3. H. D. Hukill (Met-Ed) to R. W. Reid (NRC) March 26, 1981 (L1L 078)
4. D. O. Harris "An Analysis of the Probability of Pipe Rupture at Various Locations in the Primary Loop of B&W 177 FA Pressurized Water Reactor - Including the Effects of Periodic Inservice Inspection", SAI-050-77-PA, November, 1977.

By transmittal of this letter, GPUNC endorses BAW 1621 and Supplement 1 (Ref. 1 & 2 above). The following attached addendum revises the report in response to question TMI-1 2-1. Attachment 2 is the TMI-1 Asymmetric LOCA Loads evaluation status summary.

As indicated in both reference 2 and 3, GPUNC initiated a program to evaluate the conservatisms remaining within the analysis of Asymmetric LOCA Loads. The results of our analysis demonstrate that the existing (i.e., unmodified) TMI-1 hot leg restraints limit hot leg break opening area within acceptable, analyzed values. Therefore, the analysis justifies the continued operation of TMI-1 without additional modifications.

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Sincerely,

H. D. Hukill
Director, TMI-1

HDH:LCL:vjt
Attachments

Attachment 1

Structural Acceptability by Analysis -

A factor of safety greater than 1.00 can be identified for the pipe restraint bracket attachment using maximum stresses from NRC SRP 3.6.2 and the methods of load factor design. (Fisher, J.W. and Struik, J., Guide to Design Criteria for Bolted and Riveted Joints, Wiley, 1974.)

A separate calculation using load and resistance factor design also shows that the bracket attachment will not fail. An additional margin of strength can be identified.* The method used is similar to that described in NRC SRP 3.8.3.

*This calculation was reviewed by J.W. Fisher, Professor of Civil Engineering, Lehigh University.

ATTACMENT 2

A summary of the TMI-1 Asymmetric LOCA Loads Evaluation is as follows:

1. The limiting break size for TMI-1 is a 1.39A hot leg break, the load history was analyzed using a 1.5A hot leg break.

2. All components met the acceptance criteria proposed in BAW 1538, Rev. 1 except the following:

   a. The reactor vessel skirt, has a load ratio of 1.32. The skirt was reanalyzed using non-linear analysis (as described in Reference 1, Section 12.4). Vessel stability was demonstrated, therefore, the loading from the unmodified restraint is acceptable.

   b. The control rod drive mechanism housing (CRDM) has a load ratio of 1.42. Reanalysis has not been performed for several reasons. First, control rod insertion is not required to mitigate a double ended LOCA. Second, use of a distributed mass versus lumped mass model of the CRDM's is expected to greatly reduce the overstress (note that all other components which have been reanalyzed using less conservative techniques have been shown to be acceptable). Third, the event in question (i.e., guillotine rupture at the vessel nozzle) has been shown to have low probability of occurrence relative to guillotine ruptures at other locations with the RCS (see Reference 4). Finally, investigations of "leak-before-break" indicate that the entire mechanism for the Asymmetric LOCA Loading phenomenon (i.e. guillotine ruptures) may not occur since guillotine ruptures may not propogate in the time frame required for the propagation of assymmetirc loads.

3. TMI-1 can tolerate the loads associated with the ALL event.