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NSD-NRC-96-4653
DCP/NRC0469
Docket No.: STN-52-003

February 26, 1996

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTENTION: T. R. QUAY

SUBJECT: WESTINGHOUSE RESPONSES TO NRC REQUESTS FOR ADDITIONAL
INFORMATION ON THE AP600

Dear Mr. Quay:

Enclosed are three copies of the Westinghouse responses to NRC requests for additional information on the W/GOTHIC computer code. Responses to RAIs 480.304 and 480.307 are included in this transmittal.

Please contact Brian A. McIntyre on (412) 374-4334 if you have any questions concerning this transmittal.

Brian A. McIntyre, Manager
Advanced Plant Safety and Licensing

/nja

Enclosures

cc: T. Kenyon, NRC (w/o enclosures)
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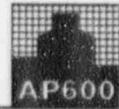
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NRC REQUEST FOR ADDITIONAL INFORMATION



Question 480.304

Re: WGOthic MODELS AND PHENOMENA

Does WEC agree that some LST data indicate that there is some stratification above the deck and Froude number scaling indicates that the tendency toward stratification could be greater in the AP600?

Response:

Stratification is defined as a stable vertical density gradient due to temperature and/or molecular weight differences. The LST tests, with the exception of Test 222.3 with an elevated horizontal jet, indicate that the above-deck region is stratified. The data also show the density difference from the top of the vessel to just below the elevation of the jet source is a small fraction of the total density. Thus, the above deck gas is stratified but deviates only a small amount from well mixed. The presence of the entrained gas volume in the above deck region of AP600 would drive the above deck volume to be reasonably well mixed.

The effects of stratification on internal heat sinks and PCS efficiencies are bounded in the evaluation model as discussed in the response to RAI 480.303 and Reference 480.304-1.

References:

- 480.304-1 NSD-NRC-96-4652, A Summary of a Systematic Approach to Determine the Effect of Mixing and Stratification on Heat Sink Utilization Inside the AP600 Containment During a Design Basis Accident, February 26, 1996.

SSAR Revision: NONE

NRC REQUEST FOR ADDITIONAL INFORMATION



Question 480.307

Re: WGOthic MODELS AND PHENOMENA

The LST experiments cannot in themselves resolve the issue of stratification reducing the effectiveness of internal heat sinks because the effect is primarily important for transients and the LST experiments did not closely simulate the reflood transient. In addition, the internal heat sink capacity in LST was underscaled relative to AP600, and the AP600 is expected to be more subject to stratification than the LST facility for some accident conditions. The effect of these issues on scaling LST results to the AP600 needs to be addressed.

Response:

The LST was designed to provide data to validate quasi-steady PCS heat and mass transfer correlations in an integral setting. Sufficient instrumentation was included in the LST to provide data used to confirm the physics of stratification in the AP600 passively-cooled containment design. The effect of stratification on internal heat sink efficiency, and thus on peak pressure, is bounded in the PCS DBA evaluation model (References 480.307-1 and 480.307-2).

References

- 480.307-1 Westinghouse Letter NTD-NRC-95-4545, "AP600 PCS Design Basis Accident Roadmaps," August 31, 1995
- 480.307-2 NSD-NRC-96-4652, A Summary of a Systematic Approach to Determine the Effect of Mixing and Stratification on Heat Sink Utilization Inside the AP600 Containment During a Design Basis Accident, February 26, 1996.

SSAR Revision: NONE