



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

March 24, 1994

Docket No. 52-003

Mr. Nicholas J. Liparulo
Nuclear Safety and Regulatory Activities
Westinghouse Electric Corporation
P.O. Box 355
Pittsburgh, Pennsylvania 15230

Dear Mr. Liparulo:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION ON THE AP600

The staff has reviewed Revision 0 of WCAP-13963, "Scaling Logic for the Core Makeup Tank Test," and has concluded that portions of the report adequately respond to the staff's request for additional information (RAI) Q440.52,* dated March 7, 1994. The staff agrees that Parts a and b of the RAI are sufficiently addressed by this version of the report. However, the staff does not agree that Part c of the RAI is adequately addressed. The staff still requests that Westinghouse provide a response to Part c. The following is additional information and clarification to Part c of Q440.52:

1. There appear to be errors in the final report. The text on page 2-12 still refers to use of the Dittus-Boelter equation, though that equation is not employed in the discussion that follows. There is also an inconsistency in the exponent on the Rayleigh (not Raleigh) number in Equations 2-37 and 2-39, and the term R in the denominator of Equation 2-37 is not defined (it appears to be a typographical error). Address these inconsistencies.
2. The staff questions the technical aspects of the approach used, both with regard to consistency of definitions and appropriateness of the heat transfer correlation employed. The Reynolds number based on diameter is employed to demonstrate that both the plant core makeup tank (CMT) and the test article are in turbulent flow. While the relatively small diameter of the test article may make it look like a pipe, the use of a diameter-based Reynolds number for the plant CMT appears to be inappropriate, due to its very large diameter and extremely low flow rate; a length-based Reynolds number may be more appropriate, which also changes the criterion for laminar-to-turbulent transition. Further, the staff concludes that both may not be in turbulent flow because (a) the value of Re (based on diameter) for the test article falls within what is generally considered to be a transition regime from laminar to turbulent flow, and (b) the very small aspect ratios of both the CMT (1.8/1) and the test article (about 6/1) would not allow the flow to become fully developed in any event. In light of the above reasoning, the use of length-based Grashof and Nusselt numbers (as in the correlation cited in Equation 2-37) appears

*The number designates the tracking number assigned to the question.

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to be appropriate, but it appears to be inconsistent with the use of diameter-based Reynolds numbers (including calculation of the Gr/Re^2 ratio) to determine the single-phase flow regimes. In addition, no information is included in the report to allow the staff to determine whether the correlation cited is appropriate for use over the range of thermal-hydraulic and geometric parameters characteristic of both the plant and test CMTs. The staff recommends that Westinghouse review this section of the report and reevaluate its approach to the question of wall-to-fluid heat transfer.

Please respond to these concerns within 90 days of the date of receipt of this letter.

You have requested that portions of the information submitted in the June 1992, application for design certification be exempt from mandatory public disclosure. While the staff has not completed its review of your request in accordance with the requirements of 10 CFR 2.790, that portion of the submitted information is being withheld from public disclosure pending the staff's final determination. The staff concludes that this request for additional information does not contain those portions of the information for which exemption is sought. However, the staff will withhold this letter from public disclosure for 30 calendar days from the date of this letter to allow Westinghouse the opportunity to verify the staff's conclusions. If, after that time, you do not request that all or portions of the information in the enclosures be withheld from public disclosure in accordance with 10 CFR 2.790, this letter will be placed in the NRC's Public Document Room.

This request for additional information affects nine or fewer respondents, and therefore, is not subject to review by the Office of Management and Budget under P.L. 96-511.

If you have any questions regarding this matter, you can contact me at (301) 504-1120.

Sincerely,

Original Signed By:

Thomas J. Kenyon, Project Manager
Standardization Project Directorate
Associate Director for Advanced Reactors
and License Renewal
Office of Nuclear Reactor Regulation

cc: See next page

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Mr. Nicholas J. Liparulo
Westinghouse Electric Corporation

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AP600

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