March 17, 1997

Mr. Nicholas J. Liparulo, Manager
Nuclear Safety and Regulatory Analysis
Nuclear and Advanced Technology Division
Westinghouse Electric Corporation
P.O. Box 355
Pittsburgh, PA 15230

SUBJECT: FOLLOWON QUESTIONS REGARDING THE PROBABILISTIC RISK ASSESSMENT (PRA) FOR THE AP600

Dear Mr. Liparulo:

As a result of its review of the June 1992 application for design certification of the AP600, the staff has determined that it needs additional information. Specifically, the enclosure to this letter contains requests for additional information concerning the AP600 PRA.

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 these followon questions do 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 Nuclear Regulatory Commission Public Document Room.

If you have any questions regarding this matter, you may contact me at (301) 415-1132.

Sincerely,

original signed by:

Joseph M. Sebrosky, Project Manager
Standardization Project Directorate
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Docket No. 52-003

Enclosure: As stated

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Mr. Nicholas J. Liparulo
Westinghouse Electric Corporation

Docket No. 52-003
AP600

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AP600 PRA REVIEW
REQUEST FOR ADDITIONAL INFORMATION

RAI 720.384 and 720.385 are Related to DSER Open Item 19.1.3.1-2

720.384 The staff has asked Westinghouse (RAIs #2808 and #3258 in OITS and during the June 25, 1996, meeting) to explain how the contributions of spurious ADS valve actuations to the various LOCA initiating event frequencies were calculated. Westinghouse responded by (1) summarily describing a general approach for calculating the frequency of spurious actuation of ADS valves due to faults in I&C systems and (2) indicating that the requested information is provided in Chapters 3 and 26. However, the staff are still unable to find in the PRA adequate documentation explaining how the reported contributions to LOCA initiating event frequencies (i.e., 1.8E-8/yr to the intermediate LOCA, 1.1E-8/yr to the medium LOCA and 5.4E-5/yr to the large LOCA) were derived. Please explain. Also, please list the reason(s) the frequency of spurious actuation (by PMS or DAS) of two stage #4 ADS squib valves (which according to the criteria reported in Table 3-2 of PRA contributes to a large LOCA) is much higher than the frequency of spurious actuation of only one stage #4 squib valve (which contributes to the medium LOCA initiating event frequency).

720.385 In addition to I&C faults, electrical faults (e.g., hot shorts in cables somewhere between a protection logic cabinet and the operator of a squib valve) can cause spurious operation of squib valves. EPRI's Utility Requirements Document (pages A.A-12 and A.A-19; Revision 5.6) recommends a spurious actuation failure rate for explosive (squib) valves of 4E-7/hr. Please explain why this failure mechanism was not considered in the AP600 PRA.

RAI Related to DSER Open Items 19.1.3.1-4 and 19.1.3.1-6

720.386 Westinghouse responded to the staff's second follow-on RAIs (720.329 and 720.330), regarding DSER Open Items 19.1.3.1-4 and 19.1.3.1-6, by stating that post-24 hour risk is not significant without providing adequate supporting documentation. The staff had asked Westinghouse to identify accident sequences that require long-term cooling, the actions needed to be performed by the operators and the systems that must be available to perform these actions (including operational requirements).

Westinghouse states that risk associated with long-term cooling is not any different for AP600 than it is for operating reactors and that such risk has been addressed and accepted by the staff. Westinghouse's argument, however, is not consistent with the staff's position as documented in NUREG-1242 (NRC Review of EPRI's ALWR Utility Requirements Document, Vol. 2, Pt. 1, pages 1A.2-4

Enclosure

and 1A.2-5) or with the industry's position as documented in Section 2.10 (Revision 4) of EPRI's Utility Requirement Document (URD). EPRI's URD states that "mission time is only for calculation of equipment unreliabilities: actions that must be taken beyond 24 hours (e.g., changes in system alignment or replenishment of water sources) shall be considered explicitly." In response to comments from the staff, EPRI supplemented Section 2.10 in Revision 4 to require that (1) actions that must be taken beyond 24 hours be considered explicitly and (2) sensitivity of the results to selection of mission times be evaluated for systems that provide long-term core cooling and containment heat removal.

For an appropriate response, Westinghouse will need to address previous RAIs related to long-term cooling by (1) identifying and categorizing accident sequences which require long-term cooling, (2) assessing the frequency of each accident sequence category requiring long-term cooling (i.e., before long-term cooling failure probabilities are considered), (3) identifying and characterizing (for each of the accident sequence categories) the operator actions that need to be performed and the systems that must be available to perform these functions, and (4) identifying insights and potential operational requirements. Long-term cooling is an important part of PRA insights and should be addressed in both the baseline and the focused PRA.