May 29, 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 AP600 LEVEL 2 PROBABILISTIC RISK ASSESSMENT (PRA)

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 Level 2 PRA treatment of anticipated transients without scram transients.

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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Enclosure to be distributed to the following addressees after the result of the proprietary evaluation is received from Westinghouse:

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FOLLOWON QUESTIONS REGARDING LEVEL 2 PRA TREATMENT OF ATWS

720.393 Provide additional information (calculation note) regarding the LOFTRAN analyses cited in Chapter 36 of the PRA. For each sequence analyzed, include a description of major assumptions in the analysis (e.g., initial conditions and systems available and unavailable), a chronology of major events, and plots of key results (e.g., reactor power, RCS pressure).

720.394 Confirm that the MTC assumed in the LOFTRAN analyses is a bounding value and that technical specifications or other operation constraints will assure that the plant will not be operated with a more severe MTC.

720.395 Provide justification that the LOFTRAN analyses are representative or conservatively bound the thermal hydraulic response for all Level 1 core melt sequences assigned to accident class 3A.

720.396 Based on the description in Section 6.4.9 and Table 9-1 of the PRA, fault tree CM2NL (referenced in the footnote of Table 36-1) deals with failure of the CMT subsystem injecting water to the RCS following an intermediate LOCA, where the safety injection S-signal automatically actuates CMT operation. Please justify why a fault tree associated with a LOCA is used to quantify the availability of the CMT for CET node DP, since success at DP assures that no LOCA will occur. Justify that the treatment of the safety injection S-signal in the fault tree is applicable to all Level 1 core melt sequences assigned to accident class 3A.

720.397 Based on the description in Tables 9-2i and 9-7, fault tree CM2NL includes operator actions CMN-MAN01 and LPM-MAN02. CMN-MAN01 addresses manual actuation of CMTs if automatic actuation fails during a LOCA (Section 30.6.16), and LPM-MAN02 addresses failure to recognize the need for RCS depressurization during LOCAs (Section 30.6.3). Justify why these actions can be credited in the focussed PRA, rather than using a different version of the fault tree (without operator actions) for the focussed PRA.

720.398 Based on the description in Section 6.4.25 and Table 26-2d.2 of the PRA, fault tree RCN (referenced in the footnote of Table 36-1) deals with failure to trip all four RCPs following an intermediate LOCA. Please justify why a fault tree associated with a LOCA is used to quantify the availability of RCP trip for CET node DP, since success at DP assures that no LOCA will occur.

Enclosure

720.399 Based on the description in Tables 26-d.2 and 26-8, fault tree RCN includes operator actions RCN-MAN01, REC-MANDAS, and LPM-MAN02. RCN-MAN01 addresses manual backup if automatic trip fails during a small LOCA or transient (Section 30.6.37), REC-MANDAS addresses failure to actuate manual DAS ESF functions using the cues provided by DAS (Section 30.6.58), and LPM-MAN02 addresses failure to recognize the need for RCS depressurization during LOCAs (Section 30.6.3). Justify why these actions can be credited in the focussed PRA, rather than using a different version of the fault tree (without operator actions) for the focussed PRA.

720.400 Provide the analysis (calculation note) that provides the basis for the 0.01 probability of consequential SGTR in ATWS events (OTH-SGTR).

720.401 The discussion of sequence 1AP-1 in Section 34.4.13.1 states that the temperatures of the hot leg and SG tubes were monitored for creep rupture potential based on the Larsen-Miller correlation, and the creep rupture of the SG tubes occurred first. Please provide: (1) plots of the accumulated damage (creep damage index) versus time for key RCS components, (2) clarification of the criteria used to determine when SG tube failure occurred.

720.402 Please provide additional information describing the quantification of CET node DP for accident class 6 sequences. Table 36-1 indicates that for accident class 6 sequences, CET node DP is quantified based on failure of operator to actuate ADS. However, no value for this failure rate is provided, and the fault trees or analyses used to determine the value are not identified or discussed.

720.403 Based on information in Chapter 24, each valve in the containment air filter supply line (valves V03 and V04) and exhaust line (valves V09 and V10) appears to be assigned a failure rate of 1E-6/h (for failure to reclose) based on the EPRI URD. However, the URD indicates somewhat higher failure rates (2.0E-6/h). Please justify that the valve failure rates used are: (1) applicable to the large diameter valves specified for AP600, (2) consistent with operating experience with valves of similar size and design, and (3) consistent with the stroking frequency assumptions in the URD and the stroking frequency specified in the AP600 design.

720.404 Although the probability of a pre-existing opening in containment (PO) was considered in the Level 1 success criteria for large LOCAs (Section 6.4.8), PO does not appear to have been considered in quantifying the probability of containment isolation in the Level 2 PRA. PO is not discussed in Chapter 37 or reflected in Table 37-1, and is not included within fault tree CIC. Please confirm this apparent omission, and provide a reassessment of Level 2 and 3 results given proper consideration of a pre-existing opening.

720.405 The quantification of CET node IS for accident class 1D is not described in Chapter 37. Documentation should be provided.

720.406 The quantification of CET node RFL for accident classes 1D, 3A, and 3C is not described in Chapter 38. Documentation should be provided.

DISTRIBUTION Letter to Mr. Nicholas J. Liparulo, Dated: May 29, 1997

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