



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D. C. 20555-0001

April 28, 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

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 in order to complete its review. The additional information is needed on the shutdown analysis for the AP600 (Q720.272-Q720.275).^{*} Enclosed are the staff's questions. Please respond to this request by June 1, 1994 to support the staff's review of the probabilistic risk assessment for the AP600 design.

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.

^{*}The numbers in parentheses designate the tracking numbers assigned to the questions.

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Mr. Nicholas Liparulo

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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

Enclosure:
As stated

cc w/enclosure:
See next page

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Mr. Nicholas J. Liparulo
Westinghouse Electric Corporation

Docket No. 52-003
AP600

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**REQUEST FOR ADDITIONAL INFORMATION
ON THE WESTINGHOUSE AP600 DESIGN**

- 720.272 Q720.175 requested Westinghouse to show how maintenance unavailabilities were included in the shutdown PRA. The October 20, 1993 response states that the PRA credits both safety- and non-safety-related systems, as specified in the Technical Specifications. However, the Technical Specifications will not prevent a licensee from entering into the LCOs. The response referenced Appendix C of the PRA for specific maintenance unavailabilities. The staff could not find maintenance unavailabilities for dc power in Table C17-6. Table C13-8 of Appendix C states that the PRA modeled the NRHR pump as being maintained once every five years. The staff believes that this value is unrealistic and that Westinghouse should include reasonable maintenance unavailability estimates in the PRA based on operating experience. If unreasonable maintenance estimates are used, then the actual shutdown core damage risk incurred by a COL holder will be higher than estimated in the PRA because the system availabilities have been significantly underestimated. Address this concern.
- 720.273 Q720.175 requested Westinghouse to include loss of the NRHR and loss of the NRHR support systems as shutdown initiators. The October 20, 1993 response indicates that the loss of offsite power was the only way that the NRHR was postulated to fail, causing a loss of decay heat removal during normal and reduced inventory conditions. Include the loss of NRHR and the loss of NRHR support systems as potential shutdown initiators. When considering these initiators, include system maintenance and the extended mission times for which they must operate. These initiators should be included in the loss of decay heat removal event trees.
- 720.274 In Q720.178, the staff requested that a quantitative basis for excluding overdraining events be included in the shutdown PRA during reduced inventory conditions. The October 20, 1993 response referenced Appendix F.4.3 of the PRA. The staff believes that this response is insufficient to address the staff's concerns, and that Westinghouse should develop an event tree that includes overdraining of the reactor vessel during reduced inventory conditions. This event tree should include operator recovery. This event tree should also consider the adequacy of core cooling given that the hot leg is nearly or completely drained, and that the NRHR pumps continue to run. Westinghouse should consider that the hot leg level instrumentation provides input to the non-safety-related plant control system and provides input to the diverse actuation system, which will not be in Technical Specifications and could be out of service for maintenance.

Enclosure

720.275 The Westinghouse AP600 Plant Probabilistic Safety Study Guidebooks (WCAP-12699), based on THERP and expert judgement insights, indicate that human error probabilities (HEPs) fall above $1.0E-5$. However, the staff identified one shutdown HEP that was well below this value. Operator diversion of vessel inventory through the NRHR during shutdown is estimated to be $2.6E-6$. The staff believes that Westinghouse should not provide HEPs that are not supported by the AP600 PRA Guidebook or THERP. Re-analyze this human error probability using realistic values supported by these guidelines, or provide justification for this value. Discuss how this error could occur, and how this error will be prevented. Include references to applicable DAC or ITAAC that will assist the operator and prevent him from committing this error.