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

May 16, 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 in the areas of reactor systems (Q440.122, Q440.157-Q440.166)* and dose calculations (470.16). Enclosed are the staff's questions. Please respond to this request by June 30, 1994, to support the staff's review of 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.

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

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 Directorate 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

cc: Mr. B. A. McIntyre
Advanced Plant Safety & Licensing
Westinghouse Electric Corporation
Energy Systems Business Unit
P.O. Box 355
Pittsburgh, Pennsylvania 15230

Mr. John C. Butler
Advanced Plant Safety & Licensing
Westinghouse Electric Corporation
Energy Systems Business Unit
Box 355
Pittsburgh, Pennsylvania 15230

Mr. M. D. Beaumont
Nuclear and Advanced Technology Division
Westinghouse Electric Corporation
One Montrose Metro
11921 Rockville Pike
Suite 350
Rockville, Maryland 20852

Mr. Sterling Franks
U.S. Department of Energy
NE-42
Washington, D.C. 20585

Mr. S. M. Modro
EG&G Idaho Inc.
Post Office Box 1625
Idaho Falls, Idaho 83415

Mr. Steve Goldberg
Budget Examiner
725 17th Street, N.W.
Room 8002
Washington, D.C. 20503

Mr. Frank A. Ross
U.S. Department of Energy, NE-42
Office of LWR Safety and Technology
19901 Germantown Road
Germantown, Maryland 20874

Mr. Victor G. Snell, Director
Safety and Licensing
AECL Technologies
9210 Corporate Boulevard
Suite 410
Rockville, Maryland 20850

Mr. Raymond N. Ng, Manager
Technical Division
Nuclear Management and
Resources Council
1776 Eye Street, N.W.
Suite 300
Washington, D.C. 20006-3706

REQUEST FOR ADDITIONAL INFORMATION
ON THE WESTINGHOUSE AP600 DESIGN

REACTOR SYSTEMS

440.122 Section 9.3.6.1.1 of the SSAR states that the safety functions provided by the chemical and volume control systems (CVCS) are limited to containment isolation of the CVCS lines penetrating the containment, termination of inadvertent reactor coolant system boron dilution, isolation of makeup on a steam generator or pressurizer high level signal, and preservation of the RCS pressure boundary. For termination of inadvertent boron dilution, Section 9.3.6.4.5.1 of the SSAR states that following a reactor trip signal, the demineralized water system (DWS) line is isolated by closing two remotely-operated DWS isolation valves, and the three-way pump suction control valve aligns to take suction from the boric acid tank. In Technical Specification (TS) Table 3.3.2-1, "Engineered Safeguards Actuation System Instrumentation," in Chapter 16 of the SSAR, it is not clear how and what actuation logic or signal is used to accomplish the DWS makeup isolation in an inadvertent boron dilution event occurring during various modes of plant operation. Provide this information.

440.157 For refueling operations, TS LCO 3.9.2 in Chapter 16 of the SSAR specifies that each valve used to isolate unborated water sources shall be secured in the closed position, whereas Section 9.3.6.4.5.1 of the SSAR states that administrative controls are used to prevent boron dilutions by verifying the valves in the line from the demineralized water system are closed and locked. Clarify whether technical specifications or administrative controls are used to ensure that these valves are closed.

440.158 What are the design pressures of the CVCS letdown line, including the letdown orifice, the containment isolation valves, and various systems and components in the makeup pumps suction lines? Do they meet the criterion specified for interfacing system LOCA? If not, what is the justification for deviating from this criteria, and what compensating measures are being proposed to address this concern (Section 9.3.6 of the SSAR)?

440.159 Section 1.2.1.2 of the SSAR states that the spring loaded pressurizer safety valves that discharge to the containment atmosphere are provided for overpressure protection of the RCS. How does the design of these valves address the concern of TMI Action Item II.K.3.2 regarding the probability of a small break LOCA caused by a stuck open safety relief valve?

440.160 Item (2)(XI), "Valve Position Indication," of Section 1.9.3 of the SSAR indicates that direct indication of relief and safety valve position is provided in the control room. In addition to this requirement, TMI Action Item II.D.3 requires relief and safety valves to have appropriate power sources and quality assurance. Describe the valve indication, alarm, quality classification, power source, and quality assurance requirements per TMI Action Item II.D.3 for all safety and relief valves in the AP600 design, such as pressurizer safety valves, the relief valve in the normal residual heat removal system, and the main steam safety and relief valves. Identify the sections of the SSAR that address the valves discussed in the response to this question.

440.161 Section 6.3.2.1.1 of the SSAR states that there are provisions in the passive RHR heat exchanger to allow the operators to open the shielded manual valves to locally vent noncondensable gases collected in the PRHR heat exchangers. 10 CFR 50.44(c)(3)(iii) requires that high point vents for the reactor vessel head and other systems required to maintain adequate core cooling should be remotely operated from the control room.

a. Discuss conformance of the PRHR HX high point vents to 10 CFR 50.44(c)(3)(iii).

b. What is the quality classification of valves, piping, and equipment for the PRHR HX discharge return line to the IRWST? Justify this classification.

440.162 The staff reviewed EPRI's ALWR Utility Requirements Document for passive plants and concluded that ALWR designs should have a reactor vessel level indication system (RVLIS) to provide an unambiguous indication of inadequate core cooling, as required in TMI Action Item II.F.2, and that each ALWR PWR designer should identify system design and performance criteria, including the system's potential accident management role and the resulting severe environment it may be subjected to. The AP600 design does not have a RVLIS. Address conformance of the AP600 design to this position.

440.163 Provide a discussion of the conformance of the AP600 design with the following TMI Action Items, including the proposed resolution or disposition, and references to the sections of the SSAR where these items are addressed.

a. II.K.1(4)(d), "Review Operating Procedures and Training Instructions," which states that operators should be instructed not to rely on level indication alone in evaluating plant conditions.

b. II.K.1(27), "Provide Analyses and Develop Guidelines and Procedures For Inadequate Core Cooling Conditions."

c. II.K.3(5), "Automatic Trip of Reactor Coolant Pumps during LOCA."

d. II.K.3(6), "Instrumentation To Verify Natural Circulation."

440.164 Revision 1 to Regulatory Guide (RG) 1.133, "Loose-Part Detection Program for the Primary System Light-Water-Cooled Reactors," was issued as part of resolution of TMI Task Action Plan Items B-60, "Loose Parts Monitoring Systems," and C-12, "Primary System Vibration Assessment." Provide a discussion of compliance of the AP600 design with the guidance of RG 1.133 regarding a loose parts monitoring system.

440.165 GSI 125.11.7 addresses the need for plant owners to assess the benefit of automatic isolation of the emergency feedwater (EFW) system after a secondary line break against the potential disadvantages of automatic isolation of the EFW where the secondary heat sink may be lost if the EFW is lost and the main steam isolation valve is closed. From the regulatory analysis, the staff determined that, for a new plant, the design need not include automatic isolation of the EFW system following a steamline or feedwater line break provided that the results of the analyses of the secondary side line break and the containment analysis meet the applicable design criteria. For the AP600 design, the startup feedwater (SFW) control valves (SFCV) serve the dual purpose of controlling SFW flow rate and providing isolation of the SFW. The SFW isolation valve (SFIV) is used to prevent uncontrolled blowdown from more than one steam generator in the event of a feedwater rupture.

a. Clarify whether the isolation of the SFW in the event of a secondary line break is automatic or manual.

b. Provide the evaluation of the automatic isolation of the SFW with respect to the concern of GSI.125.11.7.

c. Confirm that automatic isolation of the SFW is not assumed in the analyses of a feedwater line break (Section 15.1.2 of the SSAR) and a steam system piping failure (Section 15.1.5 of the SSAR), and the mass and energy release analysis for postulated secondary system pipe rupture inside containment (Section 6.2.1.4 of the SSAR). In addition, NRC IE Bulletin 80-04 states that the analyses of a steamline break and containment overpressure event should include an assumption of continued addition of startup feedwater. Confirm that this assumption is made in these analyses.

440.166 Provide a discussion of the conformance of the AP600 design with the following generic safety issues (GSI), including proposed resolutions or dispositions, and references to the sections of the SSAR where these items are addressed.

a. GSI-129, "Valve Interlocks to Prevent Vessel Drainage During Shutdown Cooling"

b. GSI-137, "Refueling Cavity Seal Failure"

DOSE CALCULATIONS

470.16 Provide an assessment of the control room operator doses from the accidents postulated for the AP600 using the guidance of Murphy-Campe and Section 6.4 of the SRP. Provide the basis for the analysis presented in the February 3, 1994, response for Q470.9, that deviates from this guidance.