52-003

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 26, 1996

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

SUBJECT: OPEN ITEMS AND FOLLOWON QUESTIONS RELATED TO VARIOUS STANDARD SAFETY ANALYSIS REPORT (SSAR) SECTIONS IN CHAPTERS 9 AND 10

Dear Mr. Liparulo:

To support the Nuclear Regulatory Commission (NRC) Plant Systems Branch (SPLB) safety evaluation effort, the staff has enclosed updates to open items and followon questions concerning Chapters 9 and 10 up to and including Revision 4. Enclosure 1 provides additional information to the recent March 5, 1996, letter regarding the status of open items. It is intended that this letter clarify the concerns and/or identify resolution paths for the open items that were revised to "active" as a result of recent reviews. Enclosure 2 provides requests for additional information (RAIs) concerning design changes that are not currently in the open items tracking system (OITS). Comments on open items related to Radioactive Waste Management (SSAR Chapter 11) are in progress.

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 attachments be withheld from public disclosure in accordance with 10 CFR 2.790, this letter will be placed in the NRC Public Document Room.

These followon questions affect nine or fewer respondents, and therefore is not subject to review by the Office of Management and Budget under P.L. 96-511.

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If you have any questions regarding this matter, you can contact me at (301) 415-8548.

Sincerely,

original signed by:

Diane T. Jackson, Project Manager
Standardization Project Directorate
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Docket No. 52-003

Enclosures: As stated

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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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Comments on Open Items

I. Comments for OITS Items

Open Item No. 3 (Draft Safety Evaluation Report (DSER) Section 9.2.10):

The response to RAI Q410.261 needs to be updated due to the design changes of the hot water heating system.

Open Item No. 4 (DSER Section 9.2.7):

In OITS, Westinghouse referred this item to the response to RAI Q410.262 and stated that the RAI was addressed by BCP/DCP0091 dated October 14, 1994. However, Westinghouse has not provided the response to Q410.262 nor the referenced document to the staff.

Open Item No. 226 (DSER Section 9.2.1):

RAI Q410.110 concerned radioactive leakage into and out of the Service Water System (SWS). The staff has reviewed SSAR Revision 3, Section 9.2.1 and finds that Westinghouse has not adequately included all the information in the response to RAI Q410.110. For example, the provisions for taking local fluid samples and isolation by remote manual control are not discussed in the revised SSAR. The response to Q410.110 is acceptable, but the revised SSAR is incomplete.

Open Item No. 229 (DSER Section 9.2.1):

In response to Q410.115, Westinghouse explained how the SWS designs minimized the potential for water hammer. The staff found the response to Q410.115 acceptable pending SSAR revision to include the additional information. The staff has reviewed Section 9.2.1.2.2 of the SSAR Revision 3 and finds it inadequate and inconsistent with the response to Q410.115 in addressing how the AP600 SWS is designed to minimize the potential for water hammer.

Open Item No. 311 (DSER Section 9.5.1):

This issue deals with the fire protection remote shutdown station. In OITS, Westinghouse states that the issue is closed per SSAR Revision 3 Section 9.5.1.2.1.1. The staff can not find the promised information in the referenced SSAR Section.

Open Item No. 367 (DSER Section 10.4.2):

WCAP-13054 indicates that RG 1.33, "Quality Assurance Program Requirements (Operation)," is not applicable for AP600 design certification, because it applies only to operational phase of nuclear power plants. Therefore, the staff will review Combined Operating License (COL) applications to ensure their conformance with Regulatory Guide (RG) 1.33. A COL applicant referencing the AP600 certified design should demonstrate compliance with RG 1.33. Westinghouse should include this COL Action Item in the SSAR.

Open Item No. 368 (DSER Section 10.4.2):

This is an open item because Westinghouse takes a position that deviates from RG 1.26 without justification.

In RAI Q410.257, the staff questioned the compliance with RG 1.26 as related to main condenser evacuation system (CMS) quality group classification. In response, Westinghouse, referring to SSAR Sections 3.2.2.6 and 3.2.2.7, indicated that the CMS is Class E according to AP600 classification, which defines systems and components that have potential to be contaminated with radioactive fluids but do not normally contain radioactive fluids as Class E. The staff has reviewed SSAR Section 3.2.2.6 and 3.2.2.7, but has not found sufficient justification for Westinghouse's position of using Class E for CMS. The referenced SSAR sections simply stated Westinghouse's position, but did not identify it as a deviation from RG 1.26 nor provide any justification for its deviation. Simply satisfying "AP600 classification" does not mean it meets NRC regulations.

In a meeting of February 22 and 23, 1995, Westinghouse agreed this was a deviation from RG 1.26, and committed to revise WCAP-13054 to identify it as a deviation from RG 1.26 for document consistency. Meanwhile, the staff evaluated the acceptability of Class E for CMS and found Westinghouse's position inconsistent with RG 1.26 and Section 10.4.2 of the SRP. RG 1.26 Position C.3 states that Quality Group D should be applied to components and systems that contain or may contain radioactive material but are not part of reactor coolant system (RCS) or included in quality Groups B or C. Radioactive contaminants in CMS can be obtained through primary-to-secondary system leakage resulting from steam generator tube leakage. The staff can not find specific AP600 design differences that would justify Westinghouse's position. This is an open item.

Open Item No. 369 (DSER Section 10.4.3):

Same comment as OITS Item No. 367 applies.

Open Item No. 370 (DSER Section 10.4.2):

Same comments as Open Item No. 368 apply to the turbine steam sealing system.

Open Item No. 1113 (DSER Section 9.5.1.2-1):

Same comment as Open Item No. 311 applies.

Open Item No. 1151 (DSER Section 10.4.2):

This item will be resolved when Item Nos. 367 and 368 are resolved.

Open Item No. 1152 (DSER Section 10.4.3):

This item will be resolved when Item Nos. 369 and 370 are resolved.

II. Requests for Additional Information:

SSAR Section 9.4

410.276 SSAR Section 9.4.1, Nuclear Island Nonradioactive Ventilation System

Table 9.4.1-1 of the SSAR identifies assumed in-leakages through the Main Control Room (MCR) access doors and the MCR/Technical Support Center (TSC) equipment ductwork (operating) and out leakages through the MCR structure and the through MCR/TSC Heating, Ventilation and Air Conditioning (HVAC) equipment and ductwork (operating). Westinghouse should state that during abnormal operation with high airborne radioactivity conditions, the MCR/TSC HVAC subsystem can limit the doses to the control room operators to General Design Criteria (GDC) 19 dose limits given the assumed in- and out-leakages.

410.277 Westinghouse should revise SSAR text and table as follows:

a. Revise SSAR Table 3.2-3 and SSAR text and table in Section 9.4.2 to include component and Code data for the steam humidifier, hot water unit heaters, and electrical reheat coils.

b. Revise SSAR Table 3.2-3 and SSAR text and tables in Section 9.4.3 to include component and Code data for steam humidifier, hot water unit heaters, and electrical reheat coil.

410.278 SSAR Section 9.4.8, Radwaste Building HVAC System

Westinghouse should state in Section 9.4.8 of the SSAR that (1) fire dampers are provided at duct penetrations through fire barriers to maintain the fire resistance ratings of the barriers and to meet the design and installation requirements of UL-555 (1990), (2) VRS (radwaste building ventilation system) mobile filtration units, including HEPA filters, conform to the guidance of RG 1.140, Positions C.1 and C.2, (3) the supply and exhaust air system ductwork is designed, fabricated and installed to conform with the requirements of Sheet Metal and Air Conditioning Contractors National Association (SMACNA) standards, and (4) shielding of components and personnel during normal plant operation is commensurate with radiation sources in the vicinity of the VRS equipment.

SSAR Section 9.3.5

410.279 Why were the curbs around the sumps used to keep out debris removed from the design in Revision 4 to SSAR Section 9.3.5?

410.280 SSAR Section 9.3.5.2.2 states that the drain tanks are vented to the atmosphere. Since these tanks could become contaminated, what would prevent the release of airborne radioactivity to the atmosphere?

410.281 Why was the sentence "Each sump is provided with two pumps" removed in Revision 4 to SSAR Section 9.3.5?

SSAR Sections 9.2.4, 9.2.7, 9.2.10, and 10.4.9

410.282 The demineralized water transfer and storage system was designed with three 50-percent capacity motor-driven centrifugal horizontal pumps to provide the plant demineralized water system pressure and capacity. In Revision 3 of the SSAR, Westinghouse reduced the number of pumps to two of the same capacity and same type pumps to perform the same function as the three pumps. Discuss the reason for reducing the number of pumps.

410.283 Section 9.2.4.1.2 of the SSAR (Revision 3), paragraph 4 states that the condensate storage tank provides a backup water supply for the startup feedwater pumps and the normal source of water for the startup feedwater pumps is the deaerator storage tank. However, in Section 10.4.9.1.2 of the SSAR (Revision 4), it states that the startup feedwater system uses the condensate storage tank as a water supply source. Explain the inconsistency between the two SSAR sections.

410.284 Section 9.2.7.2.1 of the SSAR (Revision 3) states that the high capacity subsystem consists of two chilled water pumps, two water-cooled chillers, a chemical feed tank, and an expansion tank. An air separator was eliminated from the previous SSAR revision. However, each of the two loops of the low capacity subsystem still contains an air separator and other components that are similar to the high capacity subsystem. Explain why the air separator is not required in the high capacity subsystem.

410.285 In Revision 3 of the SSAR, Westinghouse changed the design of the waste water system by collecting the low volume wastes in the drain tanks rather than in the turbine building sumps and changed the waste water collection systems for the auxiliary building, diesel generator building, and diesel fuel oil storage area. Explain the reason for and advantages of these changes. Will the drain tanks replace the sumps in the design change?

410.286 The hot water heating system was initially designed with two 100-percent capacity pumps to distribute hot water to the various systems. In Revision 3 of the SSAR, Westinghouse changed the design to two 50-percent capacity pumps. Provide reasons for reducing the pump capacity.

410.287 Section 9.2.10.3 of the SSAR (Revision 3) states that the hot water heating system (VYS) is a high energy system and has no safety-related function. Provide information regarding the system pressure and temperature and verify that any failure of the VYS piping or equipment will not directly or indirectly result in loss of required redundancy in any portion of the systems or equipment in the safety-related areas. Also, explain why the system was changed to a high-energy system from a moderate-energy system.

410.288 Section 9.2.10.2.1 of the SSAR (Revision 3) states that the hot water heating system uses a steam source from the high-pressure turbine cross under piping or the auxiliary boiler to heat water. In Table 9.2.10-1 of the SSAR (Revision 3), the shell side fluid temperatures of the heat exchangers are 368 ^{0}F (in) and 250 ^{0}F (out) for the high-pressure turbine extraction and 386 ^{0}F (in) and 250 ^{0}F (out) for the auxiliary steam. However, the tube side fluid temperatures are 300 ^{0}F (in) and 220 ^{0}F (out)? What is the heat transfer process in the heat exchangers. How are the piping design temperature of 320 ^{0}F and pressure of 200 psig in the table related to the tube side fluid condition of the heat exchangers?

410.289 The staff has previously requested additional information on the hot water heating system (RAI Q410.261) regarding the information on (1) the pressures and temperatures of the hot water system piping that supply hot water to major areas of the plant, (2) the system line routed into the containment, (3) the potential consequences of a break of the system piping and the protection measures, and (4) whether the system lines run over or through the control room. The response to the RAI from Westinghouse was reviewed. Explain whether the response is still valid following the design changes as addressed in Revision 3 of the SSAR. Provide an updated response for RAI Q410.261 if needed (see Open Item No. 3 in AP600 Open Item Tracking System Database Executive Summary).

410.290 Section 9.2.10.5 of the SSAR (Revision 3) states that instruments are provided for monitoring system parameters. Essential system parameters are monitored in the main control room via information taken from the hot water heating system through the plant data display and processing system. What are the essential system parameters related to the hot water heating system. The instruments for the heat exchanger and pumps were initially designed locally on the piping system. Do these instruments provide indication in the control room for the hot water heating system after the design change?

410.291 In Revision 4 of Section 10.4.9.1.2 of the SSAR, Item G, Westinghouse changed the statement to state that the startup feedwater system uses the condensate storage tank as a water supply source and deleted the statement "uses either the plant deaerator or the condensate storage tank as a water supply source" and replaced "deaerator" with "condensate storage tank" in all other related

statements. However, Section 10.4.9.2.2 of the SSAR (Revision 4) states, in part, that the startup feedwater pumps take suction from either the deaerator storage tank or condensate storage tank. Explain the inconsistency in the design changes between the two sections of the SSAR.

410.292 In Section 10.4.9.2.1 of the SSAR (Revision 4), Westinghouse changed the pump capacity of the startup feedwater system to two 50-percent from two 100-percent pumps. Section 10.4.9.1.2 of the SSAR, Item H, states that two startup feedwater pumps are provided with a single pump capable of satisfying the startup feedwater system flow for decay heat removal. Justify how a single 50-percent capacity pump (with one pump in standby) can satisfy the flow demand and redundancy requirements.

410.293 Section 10.4.9.1.1 of the SSAR (Revision 4) states, in part, that the startup feedwater control valves (SFCVs) and startup feedwater isolation valves (SFIVs) are designed to close on an appropriate engineered safety signal (startup feedwater isolation signal) and the SFIV also serves as a containment isolation valve. Before the design change, Section 10.4.7.1.1 of the SSAR stated that the SFIV serves as a containment isolation valve and closes on a containment isolation signal. Explain why the SFIV should not close on a containment isolation signal. Containment isolation provisions require auxiliary feedwater isolation valves to have a remote manually close feature whenever containment isolation is required.

410.294 Section 10.4.9 of the SSAR (Revision 4) does not address the water hammer problem in the startup feedwater system. Westinghouse added a paragraph in Section 5.4.2.2 of the SSAR (Revision 4) to address the design change by using a separate startup feedwater delivery system connected to the steam generator. However, the information provided in the section regarding water hammer occurrence in the startup feedwater piping is not adequate. Section 5.4.2.2 states, in part, that prevention and mitigation of feedline-related water hammer has been accomplished through an improved design and the layout of the startup feedwater piping includes the same features as the main feedwater line to minimize the potential for water hammer. Provide information on the improved design and design features for water hammer prevention for the startup feedwater system.