Docket File

52-003



UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D.C. 20, 2-0001

November 17, 1997

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

SUBJECT: AP600 PASSIVE CONTAINMENT COOLING SYSTEM (PCS) WATER COVERAGE ACCEPTANCE CRITERIA

Dear Mr. Liparulo:

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As a result of the staff's continuing review of the AP600 design certification application, the Containment Systems and Severe Accident Branch (SCSB) has identified concerns regarding the Westinghouse position on water coverage testing for the AP600 PCS and the use of that information to support the WGOTHIC computer program for design certification.

This issue if further compounded because it spans a number of review areas: (1) the assumptions used in the water coverage model developed for use in <u>W</u>GOTHIC, (2) the initial test and acceptance criteria (ITAAC), (3) the initial test program (ITP), (4) the technical specification: (TS) and (5) the SSAR.

The limited experimental data available to support water coverage comes from the cold Water Distribution Test (WDT) facility, with some additional support from the Large-Scale Test (LST) facility. The water coverage area fractions used in the water coverage model, as a function of PCS flow rate, are based on the WDT. The vertical section of this test is 4 feet, as compared to about 90 feet in the AP600. The LST has a vertical height of about 12 feet. The PCS has three flow stages during the 72 hour draindown time for the passive containment cooling water storage tank (PCCWST): 442 gpm for the first 3 hours; then as the first standpipe uncovers the flow drops to 122 gpm for about 27 hours; followed by the uncovery of the second standpipe and a flow of 71.5 gpm to the 72 hour draindown time. Each PCS flow stage has its own unique water coverage area fraction, based on the WDT observations.

In SSAR Section 6.2.2.4.2, "Preoperational Testing," it is stated that "With a water level of 6.2±0.25 feet above the bottom standpipe the containment shell wetted coverage will exceed the amount predicted by the wetting coverage methodology used in the safety analysis." This is not consistent with ITAAC 2.2.2, "Passive Containment Cooling System," item 8.b), Certified Design Material (CDM) Revision 3, dated May 12, 1997, which requires "equal to or greater than" the amount predicted by the wetting coverage methodology used in the safety analysis.

In SSAR Section 6.2.2.4.3, "Operational Testing," it is stated that "Operational testing is performed to ... verify water flow delivery, consistent with the accident analysis." This is further clarified in a response to SCSB comment 47(b) (Westinghouse letter NSD-NRC-97-5263, dated August 19, 1997), which states that "SSAR Table 3.9-17 commits to verifying the PCS flow rate

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from each PCS drain line. This test will confirm the cooling water flow profile with time remains consistent with the accident analysis. An additional test has been added to the System Level Inservice Testing Program to confirm the wetted water coverage of the containment shell is equal to or greater than the amount predicted by the wetting coverage methodology used in the safety analysis.⁶

The Westinghouse position to verify the wotted coverage area for only the minimum PCS flow rate is unacceptable. Further it not known what is meant by "the amount predicted by the wetting coverage methodology used in the safety analysis," or "consistent with the accident analysis." These phrases are too ambiguous and are also unacceptable.

The staff position is that the wetting coverage area must be verified for each of the three PCS flow rates, in addition to the verification of the actual flow rates leaving the PCCWST. Verification is required during preoperational testing (ITP), and the acceptable values must be incorporated into the ITAAC. These values must then be verified at the first refueling outage and at subsequent 10 year intervals (TS). Further, the verification must confirm that the wetting coverage area is uniform along the vertical height as well as around the containment vessel circumference as observed near the upper annulus drain elevation. The performance of the PCS is based on the expectations arising from the WDT (and to a lesser extent, the LST). The acceptable values for the wetted coverage area are equal to or greater than the values observed in the WDT. These WDT values are an integral part of the wetting coverage methodology used by Westinghouse and are an integral part of the staff's overall understanding of the conservatism in the design certification review. Direct measurement of the expected performance of the water distribution system under conditions similar to the WDT is the only acceptable means for verifying the PCS water coverage.

The AP600 SSAR needs to be updated to reflect the required ITAAC and TS identified above. Also, the information provided must emphasize both the water flow rates and the wetted coverage area of the PCS. This has been identified as Open Item 480.1084 F. If you have any questions regarding this issue, please call Dino Scaletti at (301) 415-1104.

Sincerely,

original signed by:

Theodore R. Quay, Director Standardization Project Directorate Division of Reactor Program Management Office of Nuclear Reactor Regulation

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cc: See next page

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