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DCP/NRC0897
Docket No.: STN-52-003

June 6, 1997

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: T. R. QUAY

SUBJECT: SUBMITTAL OF WCAP-14837 REVISION 1 AND RESPONSE TO NRC
SHUTDOWN RISK ASSESSMENT QUESTION RECEIVED 1/21/97

- References:
1. Letter DCP/NRC0809, "AP600 SHUTDOWN EVALUATION REPORT (WCAP-14837) AND RESPONSE TO RAI 440.53", dated 4/15/97.
 2. Letter from NRC to Westinghouse, "NRC COMMENTS ON THE AP600 STANDARD SAFETY ANALYSIS REPORT (SSAR) CHAPTER 15 ACCIDENT ANALYSES", dated 1/21/97.

Dear Mr. Quay:

Enclosure 1 is Revision 1 of WCAP-14837, "The AP600 Shutdown Evaluation Report," for NRC review. As noted in Reference 1, this report is updated to include:

1. Section 4.8.5 for loss of normal residual heat removal system (RNS) scenarios.
2. Changes to sections 2.1.2.2 and Table 8.2-1 to reflect the addition of actuating fourth-stage ADS valves on low (empty) RCS hot leg level on a two out-of-two basis (this change was a result of the loss of RNS analysis).
3. Changes to page 4.10-3 to reflect the change of IRWST gutter drain return from nonsafety-related to safety-related.
4. Changes to Section 8.1 to reflect references 8.1-8 and 8.1-9, issuing RAI 440.120 response Revision 1 and responding to NRC question number 53 of Reference 1 regarding shutdown risk assessment

That response is attached for NRC review and completes Westinghouse action related to NRC requests for 1) analyses and procedures addressing inadvertent isolation of the normal residual heat removal system (RNS) which could be caused by spurious containment high radiation signal resulting from radiation release spikes during outage activities and 2) explanation of how an RNS pipe break outside containment is mitigated if the containment radiation isolation signal does not actuate to isolate RNS and terminate the break.

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This submittal completes the Westinghouse action related to Open Item Tracking System items 2295, 2296, 3007, and 4185 related to completion of WCAP-14837 Revision 1 and item 4524 for the response to Question 53 of Reference 1. The NRC is requested to review this Shutdown Evaluation Report revision and the attached response to Question 53.

Please contact Robin K. Nydes (412-374-4125) if you have any questions regarding this transmittal.

Susan V. Fanto for

Brian A. McIntyre, Manager
Advanced Plant Safety and Licensing

jml

Attachment
Enclosure

cc: William Huffman, NRC (5L, 5E)
Summer Sun, NRC (1L, 1E)
Marie Pohida, NRC (1L, 1E)
Gene Hsui, NRC (2L, 2E)
Nicholas J. Liparulo, Westinghouse (w/o Enclosure)

NRC Question 53

To address Open Item 1002 in the DSER regarding the need of automatic containment isolation for non-safety related penetrations, Westinghouse responded, in a letter dated October 10, 1996, that normal RHR and CVS charging isolation valves will isolate on a containment radiation signal permitting these non-safety systems to continue to operate when in service unless there is an elevated radiation level present. The staff is concerned that a spurious containment high radiation signal caused by radiation release spikes during outage activities may inadvertently isolate the normal RHR. Westinghouse is requested to discuss its analysis and/or plant procedures to justify the mitigation strategies for this inadvertent isolation of the RHR event during the refueling outage.

For a postulated RHR pipe break outside the containment, the containment radiation isolation signal will not actuate to isolate the RHR and terminate the break. Explain how this LOCA outside the containment is mitigated and discuss the need for automatic isolation of the RHR based on a low reactor water level signal.

Westinghouse Response

The signal that isolates the normal residual heat removal system (RNS) lines which penetrate containment on a high-2 containment radiation signal is manually blocked below the P-11 pressure interlock prior to the RNS being placed into service for shutdown decay heat removal. This minimizes the probability of a spurious signal that could cause a loss of shutdown cooling. In the unlikely event of a loss of RNS during shutdown, the passive safety systems are designed to mitigate the consequences of the event as shown in section 4.8.5 of the Shutdown Evaluation Report (WCAP-14837 Revision 1).

A postulated break of RNS piping outside containment is not a credible event. The AP600 RNS design pressure is 900 psig, with an ultimate rupture strength greater than the normal RCS operating pressure. The maximum expected operating pressure for the RNS is 450 psig, and for the majority of the time when the system operates (>90%), the RCS pressure is at atmospheric conditions. Due to the low pressures associated with RNS operation and the high design pressure of the system, a break of the RNS piping is not credible.

In the event of a leak in the RNS piping outside containment, the operators would be alerted to the leak outside containment by the presence of high radiation alarms in the auxiliary building. The operators would follow the guidance similar to that provided in Emergency Response Guideline AECA-1.1, LOCA Outside Containment, to identify and isolate the leak by manually isolating the RNS. Offsite doses resulting from such a leak would be bounded by those for the analyses provided in SSAR Section 15.7, Radioactive Releases from a Subsystem or Component. The passive safety systems would be available to provide safety-related core cooling and decay heat removal as required.