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Your ref: Docket No. 52-006
Our ref: DCP/NRC2299

November 26, 2008

Subject: AP1000 Response to Request for Additional Information (SRP15)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 15. This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in the response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

Enclosure 1 provides the response for the RAI-SRP15.4.6-SRSB-03.

Questions or requests for additional information related to the content and preparation of this response should be directed to Westinghouse. Please send copies of such questions or requests to the prospective applicants for combined licenses referencing the AP1000 Design Certification. A representative for each applicant is included on the cc: list of this letter.

Very truly yours,

Robert Sisk, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Enclosure

1. Response to Request for Additional Information on SRP Section 15

DO63
NRO

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ENCLOSURE 1

Response to Request for Additional Information on SRP Section 15

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP15.4.6-SRSB-03
Revision: 0

Question:

In Revision 17, DCD Section 15.4.6.2, as supplemented by APP-GW-GLR-080, Revision 0, "Mark-up of AP1000 Design Control Document Chapter 7" (TR80), the applicant proposes the following changes affecting dilution during Modes 3, 4, and 5, to be consistent with the Technical Specifications, DCD Section 9.3.6, "Chemical and Volume Control System," and the assumed conditions for the inadvertent boron dilution event:

	MODE 3		MODE 4		MODE 5	
	Changed From	**Changed To**	**Changed From**	**Changed To**	**Changed From**	**Changed To**
Reactor Coolant System Water Volume	7300 ft^3	7539.8 ft^3	2805 ft^3	7539.8 ft^3	2402 ft^3	2592.5 ft^3
Critical Boron Concentration	655 ppm	1281 ppm	898 ppm	1449 ppm	955 ppm	1483 ppm
Shutdown Boron Concentration	867 ppm	1509 ppm	1083 ppm	1649 ppm	1135 ppm	1675 ppm

The staff requests the applicant to provide the following information regarding the proposed changes above:

a) Provide the rationale for the changes in the RCS water volumes for different modes of operation. List water volumes in the reactor vessel (excluding upper head), reactor vessel upper head, hot leg, cold leg, steam generator, and normal RHR system. Justify that the water volumes used in the analysis are acceptable.

b) Provide the rationale for the changes in the critical and shutdown boron concentration, respectively, for different modes of operation and describe how the new values are obtained.

Westinghouse Response:

The RCS water volumes were recalculated using the latest geometric data available taking into consideration any design changes made to date. A breakdown of the volumes is as follows:

Mode 3	DCD Revision 16	DCD Revision 17	Delta
Vessel	2548.5 ft^3	2637.0 ft^3	+88.5 ft^3
Hot Legs	235.1 ft^3	228.1 ft^3	-7.0 ft^3
Steam Generators	3895.7 ft^3	4070.2 ft^3	+174.5 ft^3
Cold Legs	621.3 ft^3	604.4 ft^3	-16.9 ft^3
Total	7300.7 ft^3	7539.7 ft^3	+239.0 ft^3
Mode 5	**DCD Revision 16**	**DCD Revision 17**	**Delta**
Vessel	2145.8 ft^3	2335.2 ft^3	+189.4 ft^3
RNS	257.0 ft^3	257.0 ft^3	0.0 ft^3
Total	2402.8 ft^3	2592.2 ft^3	+189.4 ft^3

These refinements due to design changes resulted in a < 5% change for Mode 3 and < 8% for Mode 5. Also, the DCD Revision 16 analysis assumed the same volume in Mode 4 as was assumed for Mode 5 (i.e., drained to the mid plane of the hot legs). However, Technical Specification 3.4.8 has been changed to read, "At least one Reactor Coolant Pump (RCP shall be in operation with a total flow through the core of at least 3000 gpm" when in "Modes 3, 4, and 5, whenever the reactor trip breakers are open and with unborated water sources not isolated from the RCS." Thus, the plant can not be drained to the mid plane of the hot legs until after all unborated water sources are isolated. This ensures that a boron dilution can not occur in Mode 4 with the water level drained to the mid plane of the hot leg. As such, the RCS volume assumed in the Mode 4 boron dilution calculation is the same volume as was assumed in the Mode 3 boron dilution calculation. Note that no credit is taken for the upper head volume in the assumed active mixing volume in the Mode 3, 4 and 5 calculations.

In a boron dilution analysis, the ratio of the initial concentration over the critical concentration is the critical factor with the smaller ratio yielding the more limiting results. The RCS boron concentrations assumed in the Revision 17 analyses are more conservative than the concentrations assumed in Revision 16. The Westinghouse analysis philosophy is to perform bounding analyses and confirm on a cycle-by-cycle basis that the analyses remain conservative. The new assumed boron concentrations were originally based on calculated boron concentrations for a postulated reload cycle with a relatively long cycle length (approximately 20 months). The calculated boron concentrations were then further increased for additional conservatism. The conservatism of the initial and critical boron concentrations are routinely confirmed as part of the reload process. Use of more conservative boron concentrations will minimize the probability of future reload violations and subsequently reduce the probability that the DCD Chapter 15 boron dilution analysis will need to be revised.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None