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Your ref: Docket No. 52-006
Our ref: DCP_NRC_002949

July 8, 2010

Subject: AP1000 Response to Request for Additional Information (SRP 15)

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 this 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 following RAI(s):

RAI-SRP15.0-SRSB-03 R2

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,

A handwritten signature in black ink, appearing to read "R. Sisk" followed by a flourish and the date "7/8/10".

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

/Enclosure

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

D063
NRD

cc:	D. Jaffe	- U.S. NRC	1E
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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-SRP15.0-SRSB-03
Revision: 2

Question:

In Revision 17 of DCD section 15.0.12.1, the following statement in the existing DCD regarding active failure is deleted:

“A single incorrect or omitted operator action in response to an initiating event is also considered as an active failure. The error is limited to manipulation of safety-related equipment and does not include thought process errors or similar error that could potentially lead to common cause or multiple errors.”

Confirm that no operator action is credited in the safety analyses of all the design basis transients and accidents in Chapter 15. For the events which are identified as having taken credit of operation action, provide justification for not considering an operator response error as an active failure in the safety analyses.

Westinghouse Response: (Revision 1, 2)

~~(As the Revision 0 of this RAI response is removed from the NRC docket with this Revision 1 RAI response transmittal letter, the previous version text is not included here)~~

With the exception of the Safety Analysis provided in DCD Section 15.6.2, no explicit operator actions are presented in DCD Chapter 15. The small line break outside containment event presented in DCD Section 15.6.2 assumes isolation at 30 minutes after the start of the event.

DCD Section 15.5.1, “Inadvertent Actuation of ~~the~~ Core Makeup Tanks During Power Operation” event, presents a case that is more limiting than cases where operator actions are assumed to occur 60 minutes after reactor trip. DCD Section 15.5.2, “Chemical and Volume Control System Malfunction That Increases Reactor Coolant Inventory,” presents a case that is more limiting than cases where operator actions are assumed to occur 30 minutes after reactor trip. For both of these events, the referenced scenarios that include operator action assume that the operators have recognized that a pressurizer filling event is occurring, and that they are ready to take corrective action within the specified time period. Numerous indications and alarms are available to indicate to the operators that an inventory increase event is occurring, including the high-2 pressurizer level, CVS Makeup Line Isolation signal, and the high-3 pressurizer level reactor trip signal. For the cases where operator action is modeled, the operator is assumed to open the safety grade reactor vessel head vent. No active failure is assumed for this operator action. For both of these events the operator action time is as long or longer than what is typically assumed in the design-basis analysis of RCS Inventory Increase Events for operating plants.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

The Chemical and Volume Control System Malfunction that Results in a Decrease in the Boron Concentration in the Reactor Coolant analysis for Mode 1 operation with automatic rod control (DCD Section 15.4.6) demonstrates that there is sufficient time for the operator to identify that a dilution is occurring, and terminate ~~it~~ the dilution source prior to a loss of shutdown margin. This analysis demonstrates that the operator has at least 328 minutes from the rod insertion limit low-low alarm until the required shutdown margin is lost. There are numerous alarms to indicate to the operator that a boron dilution event is occurring, including the rod insertion limit-low level alarm, rod insertion limit – low-low level alarm and the axial flux difference alarm (ΔI outside of the target band). The operator action times and actions associated with this event are consistent with what is currently assumed for operating plants design-basis analysis of Boron Dilution Events.

The operator actions modeled in the safety analyses for these events is consistent with the operator actions modeled in the safety analyses for operating plants. The operator action times modeled in the safety analyses for operating plants were used as the basis for ensuring that there is sufficient time for the operators to follow the appropriate Emergency Operating Procedures and take the appropriate action. In all cases where operator actions are credited, numerous alarms and indications are available to the operator to diagnosis the transient and ensure that the proper action is taken. For the Inventory Increase events the high-2 pressurizer level signal, the CVS Makeup Line Isolation signal, and the high-3 pressurizer level reactor trip will all be reached. For the Chemical and Volume Control System Malfunction that Results in a Decrease in the Boron Concentration, the operator will be alerted via the rod insertion limit- low level alarm, rod insertion limit – low-low level alarm and the axial flux difference alarm (ΔI outside of the target band). The times for operator actions assumed are modeled in the AP1000 safety analyses will be confirmed via the AP1000 simulator and operator training.

Design Control Document (DCD) Revision: (Revision 2)

None

While the Chapter 15 safety analyses do meet the intent of the statement in DCD section 15.0.12.1, the statement was originally removed to prevent confusion about the operator action assumptions made for in the DCD safety analyses. There were no changes to the safety analysis assumptions as a result of the removal of this statement. Based upon a review of the statement in DCD section 15.0.12.1, it is determined that the deleted statement will be returned to the DCD, with the punctuation of the statement updated as follows.

“A single incorrect or omitted operator action in response to an initiating event is also considered as an active failure; the error is limited to manipulation of safety-related equipment and does not include thought-process errors or similar errors that could potentially lead to common cause or multiple errors.”

PRA Revision:

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

None

Technical Report (TR) Revision:

None