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Your ref: Docket No. 52-006
Our ref: DCP_NRC_002842

March 31, 2010

Subject: AP1000 Response to Proposed Open Item (Chapter 9)

Westinghouse is submitting the following responses to the NRC open item (OI) on Chapter 9. These proposed open item responses are submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in these responses 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 proposed Open Item(s):

OI-SRP9.1.4-SBPA-03 R1
OI-SRP9.1.5-SBPB-01 R1

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 Proposed Open Item (Chapter 9)

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NRD

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ENCLOSURE 1

AP1000 Response to Proposed Open Item (Chapter 9)

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: OI-SRP9.1.4-SBPA-03
Revision: 1

Question:

In the June 26, 2008 response to RAI-SRP9.1.4-SBPB-04, the applicant stated that a single failure proof hoist and the new fuel handling tool will be used to handle new fuel and a non single failure proof hoist and the spent fuel handling tool will be used to handle spent fuel. The applicant also stated that the single failure proof hoist may also handle spent fuel, but it would not have access to all spent fuel handling/storage locations. In a March 18, 2009 meeting between the staff and the applicant, the use of the FHM single failure proof hoist and non-single failure proof hoist was discussed in detail.

The applicant stated that the new FHM will handle new fuel and spent fuel. In the June 26, 2008 response to RAI-SRP 9.1.4-SBPB-03, the applicant also stated, "The fuel handling machine is restricted to raising a fuel assembly to a height at which the water provides a safe radiation shield," and in response to RAI-SRP 9.1.4-SBPB-04 the applicant stated that "each FHM hoist will have a mechanical limit based on maximum hoist up travel and spent fuel handling tool length." Since the new FHM will be moving both new fuel and spent fuel, and new fuel is handled above deck level when it is transferred to the new fuel racks and transferred from the new fuel storage vault into the spent fuel pool, the applicant did not state in the DCD how the same cranes that are restricted in hoist up travel can handle new fuel above deck level. Use of the FHM hoist for new fuel also apparently conflicts with the revised Table 2.1.1-1 item 5 of ITAAC, which states, "FHM hoists are limited such that the minimum required depth of water shielding is maintained."

The applicant provided the staff with Revision 1 to its response to RAI-SRP 9.1.4-SBPB-04 in a letter dated May 20, 2009 and Revision 1 to its response to RAI-SRP 9.1.4-SBPB-03 in a letter dated June 4, 2009. Both of the applicant's revised RAI responses contain the same additional paragraph which states that spent fuel handling is restricted to using the non-single failure proof hoist of the FHM. The single failure proof hoist of the FHM is used for handling new fuel and other loads, with the exception of spent fuel, throughout the fuel handling area. The single failure proof hoist in conjunction with the spent fuel handling tool is not capable of raising spent fuel to a height that clears the spent fuel racks, fuel transfer system fuel basket, spent fuel shipping cask, or the new fuel elevator. The staff finds that the applicant's Revision 1 responses to RAI-SRP 9.1.4-SBPB-03 and 04 still do not adequately address how the single failure proof crane of the FHM with hoist up travel restrictions can handle new fuel above the deck level. **This is identified as OI-SRP 9.1.4-SBPA-03**. To close out this item a description of the fuel movement (new and spent) process for both FHM hoists using their handling tools, and a discussion of their interlocks need to be provided by the applicant. Currently, the proposed lift height ITAAC for FHM is inconsistent with allowing the use of FHM to move new fuel.

Westinghouse Response:

(The above question is from the Chapter 9 SER with Open Items received 10/19/09. Westinghouse initially answered this Open Item with the RAI-SRP9.1.4-SBPB-03 R2 response, and considers this the Revision 1 OI response for tracking purposes.)

Additional questions were provided by phone conversation with the staff on 8/12/09. Westinghouse provided the RAI-SRP9.1.4-SBPB-03 R2 response via letter DCP/NRC2505 on 10/15/09, and also supported additional phone discussions to date with the staff. The topics requested in the OI have been covered, including intended use of each FHM hoist, safety interlocks, and fuel handling tools.

Westinghouse also received a email request from the staff on 2/2/10. It requested that Westinghouse incorporate into the DCD the additional paragraph mentioned above that was previously provided in the RAI responses. To close this issue, a DCD markup making this change is shown below.

Design Control Document (DCD) Revision:

Modify DCD Section 9.1.4.2.4, "Component Description," as follows:

9.1.4.2.4 Component Description

A. Fuel Transfer Tube

The fuel transfer tube penetrates the containment and spent fuel area and provides a passageway for the conveyor car during refueling. During reactor operation, the fuel transfer tube is sealed at the containment end and acts as part of the containment pressure boundary. See subsection 3.8.2.1.5 for discussion of the fuel transfer penetration.

B. Fuel Handling Machine

The fuel handling machine performs fuel handling operations in the new and spent fuel handling area. It also provides a means of tool support and operator access for long tools used in various services and handling functions. The fuel handling machine is equipped with two 2-ton hoists, one of which is single failure proof.

Spent fuel handling is restricted to using the non-single failure proof hoist. The single failure proof hoist is used for handling new fuel and other loads, with the exception of spent fuel, throughout the fuel handling area. The single failure proof hoist in conjunction with the spent fuel handling tool is not capable of raising spent fuel to a height that clears the spent fuel racks, fuel transfer system fuel basket, spent fuel shipping cask, or the new fuel elevator.

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to SER Open Item (OI)

OI Response Number: OI-SRP9.1.5-SBPB-01
Revision: 1

Additional Question:

This question is an additional concern regarding the 11/11/09 OI/RAI response [DCP NRC 002690, RAI-SRP9.1.5-SBPB-01 R2] that described the equipment hatch hoist as 'foot mounted on a platform supported by the containment structure.' There appears to be nothing in the DCD that would explain how the structural load on containment from the hoist was evaluated - though a seismic event could result in additional loading on the containment structure, based on the load being held in place.

Westinghouse should describe the design load combinations and acceptance criteria for the containment structure when the hoist is holding the critical load. Please identify the Westinghouse document containing the analysis.

Westinghouse Response:

(Westinghouse initially answered this Open Item with the RAI-SRP9.1.5-SBPB-01 R2 response, and considers this the Revision 1 OI response for tracking purposes.)

The equipment hatch hoist moves each equipment hatch (EH) between alternate supported positions. Each hatch is bolted to the CV when closed, and is supported by hanging hooks while open. These hooks are either supported directly by the vessel (Lower EH) or attached to the internal stiffener (Upper EH). Loads on the CV from the hatch cover in the open position on these hooks have been generated for Service Levels A, C, and D. These loads are incorporated into the CV Design Specification, and are under evaluation by the CV Supplier for these service levels.

The hatch hoist itself is analyzed and designed to the following requirements: The load combinations and allowable stress for the hoist are per ASME NOG-1 for seismic loading, using load combinations for Type 1 cranes. Seismic and abnormal events load cases and load combinations are based on ASME NOG-1, Sections 4136, 4140, and 5480 applicable to the Hatch Hoist, and allowable seismic stress is per Table NOG-4311-1, extreme environmental loading condition.

The equipment hatch hoist supports the equipment hatch during movement between the open and closed positions. CV Loads resulting from the hatch hoist while supporting the equipment hatch are being generated for Service Levels A, C, and D. These loads are to be incorporated into the CV Design Specification, and are to be evaluated by the CV Supplier for these service levels.

The acceptance criteria are that, after a seismic event occurs while the hoist is holding the critical load, the containment vessel will continue to perform its intended safety functions.

These final seismic analyses regarding the hatch hoist have not been completed at this time. Westinghouse will identify the applicable document(s) containing these analyses in a revised OI response.

Design Control Document (DCD) Revision: None

PRA Revision: None

Technical Report (TR) Revision: None