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Your ref: Docket No. 52-006
Our ref: DCP_NRC_002656

October 15, 2009

Subject: AP1000 Response to Request for Additional Information (SRP 9)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 9. 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-SRP9.1.4-SBPB-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,

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

/Enclosure

1. Response to Request for Additional Information on SRP Section 9

D063
NRO

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ENCLOSURE 1

Response to Request for Additional Information on SRP Section 9

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP9.1.4-SBPB-03
Revision: 2

Question: (Revision 0)

Section 9.1.4.3.3 states that the fuel handling machine (FHM) "has the same design functions as the refueling machine (RFM) and includes the same safety features." DCD Revision 16, Sections 9.1.4.2.4 and 9.1.4.2.2.3 state that the RFM services the core including the function to latch and unlatch control rods. No such function is attributed to the FHM. Additionally, DCD Revision 16, Section 9.1.4.2.3 states that the FHM is used to load spent fuel into the shipping casks. No such function is attributed to the RFM. Additionally, the RFM operates exclusively in containment, whereas the FHM operates exclusively in the fuel handling area. Please explain how the FHM has the same design functions as the RFM.

Additional question per 8/12/09 phone call (Revision 2)

The current Westinghouse response(s) to RAI-SRP9.1.4-SBPB-03 states that the non-single failure proof crane moves the spent fuel assemblies, and the single-failure crane moves the new fuel. However, there is also mention of moving spent fuel with the single failure one also.

1. Clarify exactly what is intended to be used to move the spent fuel.
2. Provide clear descriptions of the positive stops.
3. Clarify the use of the tools as part of the fuel lift height restrictions.
4. Explain what prevents use of the wrong tool.

Westinghouse Response: (Revision 2)

1. The current design for the movement of spent fuel utilizes the non-single failure proof hoist and its associated spent fuel handling tool.

2. The positive mechanical stop is currently being incorporated into the design. In the event that the electrical control limits fail when raising the hoist, hoist motion will be stopped by a mechanical limit.

3. & 4. There are currently two tools associated with the handling of fuel in the auxiliary building, the spent fuel handling tool and the new fuel handling tool. The spent fuel handling tool is used with the non-single failure proof hoist as discussed previously. The new fuel handling tool is used with the single failure proof hoist to move new fuel. The spent fuel handling tool and the new fuel handling tool are manually operated tools and differ in length by approximately 30 feet. The single failure proof hoist does not have the lift height to raise a spent fuel assembly clear of the spent fuel racks, fuel transfer system fuel basket, spent fuel shipping cask, or the new fuel elevator when using the spent fuel handling tool. When

spent fuel is stored in the spent fuel racks, or other interim storage locations, spent fuel movement with either hoist would be physically impossible using the new fuel handling tool as the operating handle of the tool would be submerged in approximately 20 feet of water.

No additional DCD changes are provided in this response.

Westinghouse Response: (Revision 0)

A design change proposal (DCP) is being processed to change the FHM design from a "Sigma" type RFM to a bridge/gantry style handling machine with two 2-ton overhead hoists. The features of this bridge/gantry style handling machine are described in the proposed DCD markup below.

Additional Westinghouse Response based on NRC comments at 3/18/09 (Revision 1)

The staff has indicated that in W response to RAI-SRP9.1.4-SBPB-03 R0 (DCP/NRC2177 June 26, 2008, responses to RAI-SRP9.1.4-SBPB-01 to -04 R0, ML0818207240), the applicant stated that "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-SRP9.1.4-SBPB-04 R0 the applicant stated "each FHM hoist will have a mechanical limit based on maximum hoist up travel and spent fuel handling tool length." 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. 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 that the "FHM hoists are limited such that the minimum required depth of water shielding is maintained." The applicant needs to state in the DCD how the same cranes that are restricted in hoist up travel can handle new fuel above deck level.

This has been answered in the sixth paragraph of the Rev 1 response to RAI-SRP9.1.4-SBPB-04, provided via DCP/NRC2485, May 20, 2009. The applicable paragraph of the response is repeated here.

> 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.

No additional DCD changes are provided in this response.

Design Control Document (DCD) Revision: (Revision 0)

DCD Tier 2, Section 9.1.4.3.3, pg 9.1-34

Section 9.1.4.3.3 Fuel Handling Machine

~~The fuel handling machine has the same design functions as the refueling machine and includes the same safety features.~~

The fuel handling machine design includes the following provisions to provide for safe handling of fuel assemblies and other components within the spent fuel handling area:

A. Safety Interlocks

Operations which could endanger the operator or damage the fuel, designated below by an asterisk (*), are prevented by mechanical or failure tolerant electrical interlocks or by redundant electrical interlocks. Other interlocks are intended to provide equipment protection and may be implemented either mechanically or by electrical interlock and are not required to be fail safe.

Fail safe electrical design of a control system interlock is applied according to the following rules:

1. *Fail safe operation of an electrically operated brake is such that the brake engages on loss of power.*

2. *Fail safe operation of a relay is such that the de-energized state of the relay inhibits unsafe operation.*

3. *Fail safe operation of a switch, termination, or wire is such that breakage or high resistance of the circuit inhibits unsafe operation.*

Those parts of a control system interlock which are not or cannot be operated in a fail safe mode as defined in the preceding rules are supplemented by a redundant component or components to provide the requisite protection. Required fail safe operations are:

1. The fuel handling machine can only place a fuel assembly in the new fuel rack, spent fuel racks, fuel transfer system upender, new fuel elevator, spent fuel cask, fuel inspection/repair station or truck bay traveler.

*2. When the hoist load weighing system detects a load greater than the spent fuel assembly handling tool, the machine cannot traverse unless the hoist is at the up limit. For new fuel handling, the load is greater than a new fuel handling tool.

*3. Simultaneous traversing and hoisting operations are prevented.

*4. The fuel handling machine is restricted to raising a fuel assembly to a height at which the water provides a safe radiation shield.

*5. When a fuel assembly is raised or lowered, interlocks provide confidence that the fuel handling machine can only apply loads which are within safe operating limits.

*6. Lowering of the hoist is not permitted if slack cable exists.

*7. The fuel transfer system container is prevented from moving unless the fuel handling machine and the long handled tool and/or fuel assembly is out of the fuel transfer zone. An interlock is provided from the fuel handling machine to the fuel transfer system to accomplish this.

B. Bridge Hold-Down Devices

The fuel handling machine bridge is horizontally restrained on the rails by guide rollers on either side of the rail. Hold down devices are used to prevent the bridge from leaving the rails in the event of a seismic event.

C. Hoist Braking System

The hoists are equipped with solenoid activated motor brake. Brake is rated at 125 percent of the hoist design load.

D. Fuel Assembly Support System.

The hoists are supplied with redundant paths of load support such that failure of any one component will not result in free fall of the fuel assembly. When redundant paths are not practical, conservative safety factors shall be applied.

PRA Revision:

None

Technical Report (TR) Revision:
None