

AP1000DCDFileNPEm Resource

From: Adams II, Samuel L. [adamssl@westinghouse.com]
Sent: Friday, May 23, 2008 11:04 AM
To: Perry Buckberg
Cc: Rhonda Carmon
Subject: FW: RAI-SRP 9.1.4-SBPB-04
Attachments: RAIs SRP 9.1.4 SBPB 5_22 update.doc

Hi Perry,

I acknowledge receipt of the attached updated RAI on SRP9.1.4.

We do not need a clarification call.

Our schedule for response remains the same (6/20/08).

Thanks.

Sam

From: Perry Buckberg [mailto:Perry.Buckberg@nrc.gov]
Sent: Thursday, May 22, 2008 11:48 AM
To: Adams II, Samuel L.
Cc: Eileen McKenna; Rhonda Carmon; David Jaffe
Subject: RAI-SRP 9.1.4-SBPB-04

Sam,

Attached is the Section 9.1.4 RAI sheet I sent to you a couple weeks ago - with one correction to RAI-SRP 9.1.4-SBPB-04. I lightened the text of the unaffected RAIs for clarity. Please use this version of RAI-SRP 9.1.4-SBPB-04.

Please acknowledge receipt of the attached and let me know ASAP if a phone conference will be needed.

Thanks,

Perry Buckberg

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From: Adams II, Samuel L.

Created By: adamssl@westinghouse.com

Recipients:

"Rhonda Carmon" <Rhonda.Carmon@nrc.gov>

Tracking Status: None

"Perry Buckberg" <Perry.Buckberg@nrc.gov>

Tracking Status: None

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RAIs for Section 9.1.4 of AP1000 DCD Revision 16

RAI-SRP 9.1.4-SBPB-01

Sections of the DCD Revision 16 (Sections 9.1.1.2.1.D and 9.1.2.2.1.E) state that “The new fuel handling crane is a seismic Category II component. The crane is evaluated to show that it does not collapse into the spent fuel pool as a result of a seismic event.” The new fuel handling crane handles new fuel and loads the new fuel into the spent fuel pool.

Regulatory Position C2 of Regulatory Guide 1.29, “Seismic Design Classification” and section 3.2.1.1.2. of the DCD Revision 16 describe the guidance for seismic Category II systems, structure and components (SSC). This guidance states, in part, that seismic Category II SSC are designed to preclude their structural failure during a safe shutdown earthquake or interaction with seismic Category I items which could degrade the functioning of a safety-related structure, system, or component to an unacceptable level.

Although the new fuel handling crane will not collapse into the spent fuel pool as stated above, DCD Sections 9.1.1.2.1.D and 9.1.2.2.1.E do not state that the new fuel handling crane will continue to hold its maximum load (not drop the load) during the seismic event. Considering the maximum load carried by the crane, please explain how this crane will meet seismic Category II criteria in that seismic Category II SSC are designed to preclude their structural failure during a safe shutdown earthquake or interaction with seismic Category I items which could degrade the functioning of a safety-related structure, system, or component to an unacceptable level.

RAI-SRP 9.1.4-SBPB-02

In APP-GW-GLN-106 Revision 1, Westinghouse reclassified the FHM and the spent fuel handling tool as non-safety related, seismic Category II. The non safety classification of FHM and the spent fuel handling tool is consistent with ANS 57.1, “Design Requirements for Light Water Reactor Fuel Handling Systems” which is invoked as acceptance criteria by SRP 9.1.4. The staff also concurs in the reclassification of the FHM and the spent fuel handling tool to seismic Category II, which is consistent with Regulatory Guide 1.29, Regulatory Position C1 and C2.

- a) However, AP1000 DCD Rev 16 in Table 3.2-3 calls out seismic category II and non seismic for FHS-FH-02. This is the only SSC in the Table 3.2-3 that has a dual seismic classification and no reason is given by the applicant. Please explain the dual seismic classification of the Fuel Handling Machine in Table 3.2-3 (Sheet 5 of 65).
- b) With the reclassification of the FHM from seismic category I to seismic category II, verify that the FHM and the spent fuel handling tool will continue to hold its design load, such that these SSCs are designed to 1) preclude their structural failure during a safe shutdown earthquake and 2) preclude interaction with seismic Category I items which could degrade the functioning of a safety-related SSC to an unacceptable level.

RAI-SRP 9.1.4-SBPB-03

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 RHM. 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.

RAI-SRP 9.1.4-SBPB-04

Section 9.1.4.3.7 of the DCD states, “The three fuel handling devices used to lift spent fuel assemblies are the refueling machine, fuel handling machine, and the spent fuel handling tool. Both the refueling machine and fuel handling machine contain positive stops which prevent the fuel assembly from being raised above a safe shielding height.”

Section 9.1.4.3.3 invokes the design of the refueling machine for the FHM, which in 9.1.4.3.1 states that “mechanical or failure tolerant electrical interlocks or redundant electrical interlocks” cause the “refueling machine is restricted to raising a fuel assembly or core component to a height at which the water provides a safe radiation shield.”

The implication of these statements is that when using the spent fuel handling tool there are no positive stops to prevent the fuel assembly from being raised above a safe shielding height. Use of the spent fuel handling tool with an auxiliary hoist will apparently be used for at least 25% of the SFP storage cells based on the information in TR-121. In TR-121, “Spent Fuel Pool Water Level and Dose,” APP-GW-GLN-121, Revision 0, states:

...due to the radius of the FHM manipulator mast and the proximity to the SFP walls, approximately 25% of the SFP storage cells cannot be serviced by the mast crane. Also, there are instances where fuel inspection and/or fuel repair require the fuel to be moved from the SFP storage racks to the designated fuel inspection or fuel repair workstation. These non-normal fuel transfer operations are performed using the Spent Fuel Handling Tool (SFHT). The SFHT is a long handled tool which latches onto the fuel assembly top nozzle via manually actuated grippers. Lifting of the SFHT and attached fuel assembly is performed using an auxiliary hoist on the FHM.

Regulatory Guidance:

Standard Review Plan 9.1.4 “Light Load Handling System (related to Refueling)” invokes GDC 61 for avoidance of excessive personnel radiation exposure. Acceptance criteria for meeting the relevant aspects of GDC 61 are based in part on the guidelines of ANSI/ANS 57.1-1992, Section 6.1.1 of this standard states:

Mechanical or electrical safety devices shall be designed into the system to prevent damage to fuel units and conditions that pose a radiation hazard or an unintentional radiation exposure risk to personnel.

Section 6.4.1.2 states:

The design shall include provisions to test mechanical safety features and controls to verify at least the following: devices are within specifications.
..... (4) The following applies to fuel preparation equipment only: (a) Check of mechanical stops to limit hoist travel when a fuel preparation machine is used for fuel preparation (e.g., stops to prevent a spent fuel unit from being raised above the recommended minimum water depth for shielding). (b) Check of special mechanical stops to limit hoist travel when equipment is used for spent fuel inspection and nondestructive testing.

ANSI/ANS 57.1-1992, Section 6.3 lists Safety Requirements for fuel handling systems, which include underload, overload, nonsimultaneous motion, et al to prevent fuel damage and to provide for personnel safety.

- 1) Please explain how you implement the requirements of ANSI/ANS 57.1-1992 (sections 6.1.1 and 6.4.1.2) which require you to have mechanical or electrical safety devices and mechanical stops to limit hoist travel to prevent unintentional radiation exposure, damage to fuel, and prevention of a spent fuel unit from being raised above the minimum water depth for shielding when you use the SFHT with the auxiliary hoist of the FHM.
- 2) Explain what ITAAC, similar to Design Commitments 4 and 5 of Table **2.1.1-1** ~~2.2.2-4~~ in Tier 1, will inspect, test and accept the function of the SFHT with the auxiliary hoist of the FHM when used to move a spent fuel assembly.
- 3) Explain how the Safety Requirements listed in ANSI/ANS 57.1-1992, Section 6.3 are met when using the auxiliary hoist of the FHM to move spent fuel.
- 4) Clarify why the use of the SFHT with the auxiliary hoist of the FHM to move spent fuel, as stated in TR-121, is not described in the DCD.