AP1000DCDFileNPEm Resource

From: Adams II, Samuel L. [adamssl@westinghouse.com]
Sent: Wednesday, April 30, 2008 2:34 PM
To: Perry Buckberg
Cc: Rhonda Carmon
Subject: FW: RAI-SRP 9.1.5-SBPB-01 to 02
Attachments: RAI SRP 9.1.5 SBPA 01_08.doc

Hi Perry,

I acknowledge receipt of the attached RAIs on SRP Section 9.1.5, I will let you know as soon as possible if a clarification call is necessary.

thanks.

Sam

From: Perry Buckberg [mailto:Perry.Buckberg@nrc.gov]
Sent: Tuesday, April 29, 2008 11:35 AM
To: Adams II, Samuel L.
Cc: Rhonda Carmon; Eileen McKenna; David Jaffe
Subject: RAI-SRP 9.1.5-SBPB-01 to 02

Sam,

Attached are DCD RAIs RAI-SRP 9.1.5-SBPB-01through 08. Please acknowledge receipt of the attached and let me know ASAP if a phone conference will be needed.

Thanks,

Perry Buckberg
Senior Project Manager
Nuclear Regulatory Commission
Office of New Reactors
phone: (301)415-1383
fax: (301)415-6350
perry.buckberg@nrc.gov

Hearing Identifier: AP1000_DCD_Review
Email Number: 18

Mail Envelope Properties (9950B72C4C6D8D43958795C414DE477A05DBB574)

Subject: FW: RAI-SRP 9.1.5-SBPB-01 to 02
Sent Date: 4/30/2008 2:33:55 PM
Received Date: 4/30/2008 2:34:54 PM
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

Post Office: SWEC9910.w-intra.net

Files	**Size**	**Date & Time**
MESSAGE	788	4/30/2008 2:34:54 PM
RAI SRP 9.1.5 SBPA 01_08.doc	53312	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

RAI-SRP 9.1.5-SBPB-01

In AP1000 DCD Revision 16 it is stated on page 9.1-38 under section 9.1.5.1.2, "Codes and Standards," that the polar crane and cask handling cranes are designed according to NUREG-0554 supplemented by ASME NOG-1 for a Type I single failure proof (SFP) crane. This complies with SRP 9.1.5. Detailed descriptions of the polar crane and cask handling crane are also given in DCD Revision 16 section 9.1.5.

On page 9.1-37 of DCD Revision 16 under section 9.1.5.1.1, "Safety Design Basis," it is stated that the containment equipment hatch hoist and containment maintenance hatch hoist are SFP systems and are classified as seismic Category I. It is also stated that the components of SFP systems necessary to prevent uncontrolled lowering of a critical load are classified as safety-related. On page 9.1-38 of DCD Revision 16 under section 9.1.5.2, "System Description," it is stated that the containment equipment hatch hoist and maintenance hatch hoist incorporate SFP features based on NUREG-0612 guidelines. Additionally, Section 9.1.5.1.2 states that hoists are designed according to ASME NOG-1 and to the applicable ANSI standard. Table 3.2-3 lists the principle design code for MHS-MH-06 and 06 as manufacturers' standard. Unlike the polar crane and cask handling crane, there are no detailed descriptions of the containment equipment hatch hoist and maintenance hatch hoist in DCD section 9.1.5. nor are the design requirements as explicit as they are for the polar and cask handling cranes. Since the equipment and maintenance hatch hoists are SFP, they should have more specific design criteria similar to what is specified for the polar crane and cask handling cranes.

A) ASME NOG-1 for Type I cranes describes design details for SFP hoists. Explain why the DCD does not require the design requirements that are specified for single failure hoists in ASME NOG 1 for a Type 1 cranes to be implemented for the single failure proof equipment and maintenance hatch hoists.

B) Describe the design of the containment equipment hatch hoist and maintenance hatch hoist and the single failure proof features that make them single failure proof systems. Explain if any and which components of these two single failure proof systems prevent uncontrolled lowering of a critical load and are classified safety-related.

RAI-SRP 9.1.5-SBPB-02

In AP1000 DCD Revision 16 on page 9.1-40 in the second paragraph under the heading Lifting Devices Not Specially Designed (for the Polar Crane) it is stated that for the handling of critical loads, dual or redundant slings are used, or a sling having a load rating twice that required for a non-critical load is used. On page 9.1-43 of the DCD in the second paragraph under the heading Lifting Devices Not Specially Designed (for the Cask Handling Crane) the same statement is made. This statement is meant to meet the criteria of NUREG-0612 paragraphs 5.1.6(1)(b)(i) and (ii). Explain how the statements are in compliance with the NUREG-0612 criteria when a sling having a load rating twice that required for a non-critical load is used instead of a load rating twice that required for a critical load.

RAI-SRP 9.1.5-SBPB-03

NUREG-0800 section 9.1.5 revision 1, "Overhead Heavy Load Handling Systems," states in paragraph III.4.C.ii.(2) that slings should satisfy the criteria of ASME B30.9 and be constructed of metallic material (chain or wire rope). In AP1000 DCD Revision 16 it is stated on pages 9.1-40 and 9.1-43 under the headings Lifting Devices Not Specially Designed in the first paragraph that slings or other lifting devices not specially designed are selected in accordance with ANSI B30.9, except that the load rating is based on the combined maximum static and dynamic loads that could be imparted to the sling. The two separate headings are associated with the polar crane and cask handling crane, respectively.

A) Explain if Lifting Devices Not Specially Designed are used with the containment equipment hatch hoist, containment maintenance hatch hoist and other heavy load handling systems in the nuclear island.

B) Although it is stated in the DCD that slings and other lifting devices not specially designed are selected in accordance with ANSI B30.9, explain how the criteria that slings for SFP cranes and hoists be constructed of metallic material (chain or wire rope) is satisfied for the DCD Revision 16.

RAI-SRP 9.1.5-SBPB-04

In AP1000 DCD Revision 16 on page 9.1-43 under the heading "Special Lifting Devices" (for the cask handling crane) it is stated that the special lifting devices used for the handling of critical loads are listed in Table 9.1.5-2. A review of Table 9.1.5-2 finds only special lifting devices for the polar crane and none for the cask handling crane. Existing plant operating experience demonstrates that a special lifting device is normally used between a cask and the cask handling crane hook due to the shape and size of the cask.

Explain if a special lifting device will be used between the cask and cask handling crane hook for the AP1000 design and if so, why it is not listed in Table 9.1.5-2. If a special lifting device is not used, explain the anticipated rigging of the cask to the cask handling crane hook.

RAI-SRP 9.1.5-SBPB-05

SRP 9.1.5 and NUREG 0612 provide guidance that state that safe load paths should be defined for movement of heavy loads to minimize the potential to impact irradiated fuel in the reactor vessel and in the spent fuel pool and safe shutdown equipment. These load paths should be defined in procedures, and shown on equipment layout drawings.

a) Please explain where equipment layout drawings are provided in the DCD that show safe load paths for moving heavy loads
b) A COL Action item should be developed to ensure that the COL applicant will provide procedures that define safe load paths.

RAI-SRP 9.1.5-SBPB-06

SRP 9.1.5 and NUREG 0612 provide guidance for applicants to describe a heavy load handling program for design, operation, testing, maintenance and inspection of heavy load handling systems.

A COL Action item should be developed to ensure that the COL applicant will provide such a heavy load handling program.

RAI-SRP 9.1.5-SBPB-07 - Clarification Questions

a) TR-106, "AP1000 Licensing Design Changes for Mechanical System and Component Design Updates," APP-GW-GLN-106, Revision 1, Section II, on page 9 of 57 under design change subsection 2.i (Design Change 241, Cask Handling Crane Design) states:

> This change is to allow for the Cask Handling Crane to be operated by radio remote control, vice operator's cab, to allow for an unobstructed view of the load at all times.

However, further down in design change subsection 2.i it is also stated:

> The remote and pendant control station shall each have an emergency stop switch that stops all crane motions by removing power.

In AP1000 DCD Revision 16 on page 9.1-42, in the second paragraph under section 9.1.5.2.2.1, System Operation (for the Cask Handling Crane), it is stated:

> Movements of the bridge, trolley, main, and auxiliary hoists can be controlled from a radio remote control or from a pendant suspended from the crane.

Clarify if the cask handling crane is to be operated by radio remote control and from the operator's cab or by radio remote control and from a pendant suspended from the crane.

b) TR-106, "AP1000 Licensing Design Changes for Mechanical System and Component Design Updates," APP-GW-GLN-106, Revision 1, Section IV, on page 45 of 57 under design change subsection 2.k (Design Change 256, Maintenance Hatch Hoist Design) states:

> To be consistent with the changes to DCD Tier 2 regarding the description of the cask handling crane, the following sections of the FSER will need to be revised: Section 9.1.5. This design change does not affect the conclusion in the FSER that the AP1000 cask handling crane complies with the requirements of:

Explain why the above discussion, under the design change subsection 2.k titled, "Design Change 256, Maintenance Hatch Hoist Design," is for the cask handling crane instead of the containment maintenance hatch hoist.

c) In AP1000 DCD Revision 16 on page 9.1-38, in the paragraph under section 9.1.5.2, System Description, it is stated:

> Based on the conservative design of these heavy load handling systems and associated special lifting devices, slings, and load lift points (see subsection 9.1.5.2.3), a load drop of the critical loads handled by the polar crane, cask handling crane, containment equipment hatch hoist, and maintenance hatch hoist and is unlikely.

Provide the correct subsection which a reader is referred to since subsection 9.1.5.2.3 does not exist.

d) TR-106, "AP1000 Licensing Design Changes for Mechanical System and Component Design Updates," APP-GW-GLN-106, Revision 1, Section II, on page 6 of 57 under design change subsection 2.c (Design Change 170, Polar Crane Design) states:

> The critical lift for the Polar Crane is the lifting of the Integrated Head Package from the Reactor Vessel Head to the in-containment storage stand during a refueling outage.

Clarify if the Integrated Head Package is lifted by the Polar Crane from the Reactor Vessel Head or from the Reactor Vessel. Clarify which components comprise the Integrated Head Package. Clarify if the Integrated Head Package and Reactor Vessel Head are two separate lifts by the polar crane.

e) The Title for Section 9.1.6.5 should include Overhead Heavy Load Handling System

f) In tier 1 Section 2.3.5, Item number 4: The cask handling crane is still called the spent fuel shipping cask crane.

<u>RAI-SRP 9.1.5-SBPB-08 – DCD Verification Questions</u>

TR-106, "AP1000 Licensing Design Changes for Mechanical System and Component Design Updates," APP-GW-GLN-106, Revision 1, Section V describe Post AP1000 DCD Revision 16 changes that were not in TR 134. Please verify that the following changes will be documented in the DCD:

a) Post AP1000 DCD Revision 16 changes have been made to Table 9.1.5-3, Polar Crane Component Data in TR-106, "AP1000 Licensing Design Changes for Mechanical System and Component Design Updates," APP-GW-GLN-106, Revision 1 . DCD Revision 16 Table 9.1.5-3 provides design information for the polar crane bridge, trolley, main hoist and auxiliary hoist. Changes were made to Table 9.1.5-3 to align the DCD with ASME NOG-1 for single failure proof cranes. To align the DCD better with ASME NOG-1, **the description of the braking systems for the bridge, trolley, main hoist and auxiliary hoist were changed in Table 9.1.5-3 to address ASME NOG-1 braking requirements for single failure proof cranes.** These Table 9.1.5-3 post DCD Revision 16 changes are documented in Westinghouse TR-106, but are not documented in TR-134, "AP1000 Impacts to Support COLA Standardization," APP-GW-GLR-134, Revision 4..

b) Post AP1000 DCD Revision 16 changes to the polar crane description have been made to DCD Revision 16 page 9.1-41 in the first sentence in the second paragraph from the top. These changes are under section 9.1.5.2.1.3, "Instrumentation Applications." TR-106, revision 1 has changed the sentence from:

The secondary protection for each hoist in the raising direction is a block-actuated limit switch which directly interrupts power to the hoist motor **and the hoist brakes, causing** the brakes to set.

To:

The secondary protection for each hoist in the raising direction is a block-actuated limit switch which directly interrupts power to the hoist motor **and causes** the brake(s) to set.

These post DCD Revision 16 changes are documented in Westinghouse TR-106, "AP1000 Licensing Design Changes for Mechanical System and Component Design Updates," APP-GW-GLN-106, Revision 1, but are not documented in TR-134.

c) Post AP1000 DCD Revision 16 changes to the cask handling crane description have been made to DCD Revision 16 page 9.1-43 in the first sentence in the last paragraph from the bottom. These changes are under section 9.1.5.2.2.3, "Instrumentation Applications." TR-106, revision 1 has changed the sentence from:

The secondary protection for each hoist in the raising direction is a block-actuated limit switch, which is mechanically and electrically independent of the primary limit switch and interrupts power to the hoist motor and **the hoist brakes, causing** the brakes to set.

To:

The secondary protection for each hoist in the raising direction is a block-actuated limit switch, which is mechanically and electrically independent of the primary limit switch and interrupts power to the hoist motor and **causes** the brake(s) to set.

These post DCD Revision 16 changes are documented in Westinghouse TR-106, "AP1000 Licensing Design Changes for Mechanical System and Component Design Updates," APP-GW-GLN-106, Revision 1, but are not documented in TR-134.

d) Post AP1000 DCD Revision 16 changes to the safety evaluation for the single failure proof cranes have been made to DCD Revision 16 page 9.1-44 in the third sentence in the third paragraph from the bottom under section 9.1.5.3, "Safety Evaluation." TR-106, revision 1 has changed the sentence from:

Redundancy is provided for load bearing components such as the hoisting ropes, sheaves, equalizer assembly, hooks, and holding brakes.

To:

Either redundancy **or double design factor** is provided for load bearing components such as the hoisting ropes, sheaves, equalizer assembly, hooks, and holding brakes.

These post DCD Revision 16 changes are documented in Westinghouse TR-106, "AP1000 Licensing Design Changes for Mechanical System and Component Design Updates," APP-GW-GLN-106, Revision 1, but are not documented in TR-134.