AP1000DCDFileNPEm Resource

From: Loza, Paul G. [lozapg@westinghouse.com]
Sent: Friday, June 18, 2010 1:26 PM
To: Buckberg, Perry
Cc: Altmayer, Scott A; Morrow, Robert J.; Stipanovich, Steven M; Sanders, Mitchell P.
Subject: Draft version of RAI-TR44-01 R1B
Attachments: RAI-TR44-01 R1B SAA MS comments -NRC DRAFT.doc

Hi Perry,

Following up on your discussion with Scott, please find the draft of RAI-TR44-01 R1 attached for review. The proposed question and answer, and a supporting markup of the DCD, are provided for comment.

Thanks for your help,

Paul Loza

Hearing Identifier: AP1000_DCD_Review
Email Number: 421

Mail Envelope Properties (27265BDD489F164BAB98F1FFF63719725577D023)

Subject: Draft version of RAI-TR44-01 R1B
Sent Date: 6/18/2010 1:26:26 PM
Received Date: 6/18/2010 1:26:28 PM
From: Loza, Paul G.

Created By: lozapg@westinghouse.com

Recipients:
"Altmayer, Scott A" <altmaysa@westinghouse.com>
Tracking Status: None
"Morrow, Robert J." <morrowrj@westinghouse.com>
Tracking Status: None
"Stipanovich, Steven M" <stipansm@westinghouse.com>
Tracking Status: None
"Sanders, Mitchell P." <sandermp@westinghouse.com>
Tracking Status: None
"Buckberg, Perry" <Perry.Buckberg@nrc.gov>
Tracking Status: None

Post Office: SWEC9985.w-intra.net

Files	**Size**	**Date & Time**
MESSAGE	270	6/18/2010 1:26:28 PM
RAI-TR44-01 R1B SAA MS comments -NRC DRAFT.doc	58944	

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

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR44-01
Revision: 1A

Question: (Revision 0)

Section 2.8.5 indicates that both drop scenarios are from 36 inches above the top of the AP1000 New Fuel Storage Rack. Describe the fuel handling operation that leads to this drop height

New Additional Question: (Revision 1A)

During the June 2010 fuel rack technical audit, the NRC has questioned how the following limitation (that the fuel handling process precludes a fuel assembly from being dropped from a height in excess of 36" above the top of the New Fuel Storage Rack) is established in the DCD.

Westinghouse Response: (Revision 0)

Fuel handling operations associated with new fuel drop scenarios in Section 2.5 deal with receipt inspection of new fuel, moving new fuel into the new fuel rack or removing it to place in the spent fuel pool. These operations are performed by a new fuel handling crane. The conservative drop height of 36 inches is used, however it is unlikely that the drop height will ever be 36 inches as the top of the rack is only six inches below the floor elevation and the fuel assembly will be close to the floor. Administrative control will be put in place to prevent raising the fuel assembly over 36 inches over the New Fuel Storage Rack..

References:

1. APP-GW-GLR-026, Revision 0, "New Fuel Storage Rack Structural/Seismic Analysis," (Technical Report Number 44)
2. APP-FS02-Z0C-001, Revision 0,"Analysis of AP1000 Fuel Storage Racks Subjected to Fuel Drop Accidents"

Westinghouse Additional Response: (Revision 1A)

The drop of a new fuel assembly, control component, and/or the associated handling tool onto the new fuel rack in the new fuel storage pit is currently analyzed for a maximum credible height of 3 feet (36" inches) above the top of the new fuel rack. This is discussed in DCD Section 9.1.1.2.1 Item C. The top of the new fuel rack is also even with the fuel handling operating floor elevation of 135'-3".

Formatted: No underline, Font color: Blue
Formatted: No underline, Font color: Blue
Formatted: Font color: Blue
Formatted: Font color: Blue
Formatted: Font color: Blue
Formatted: Font color: Auto
Formatted: Font color: Auto
Formatted: Font: 11 pt, Font color: Auto
Formatted: Font: 12 pt

Westinghouse concludes that the current design of the FHM hoists indeed protects and safeguards new fuel in the fuel storage pit during handling or credible drop accidents using administrative controls, safety interlocks, fail safe design features, and/or component redundancy as discussed below for 1) normal hoist and 2) off-normal hoist use.

1) During normal use of the single failure proof (SFp) hoist the maximum height limit is controlled by design. This SFp hoist is required to operate over a large range of elevations and locations as specified in DCD Rev 17, Section 9.1.4.3.3, "Fuel Handling Machine" (FHM) which discusses safety interlocks, fail safe design features, and component redundancy to assure safe handling of fuel assemblies and other components within the auxiliary building fuel handling area. Operations that could endanger the operator or damage the fuel are prevented by mechanical or failure tolerant electrical interlocks, or by redundant electrical interlocks and are explicitly designated for clarity using an asterisk (*).

Specifically, Section 9.1.4.3.3, Part A, and Paragraph *2, requires that the hoist be raised to the maximum "up" limit before traversing to other locations in the fuel handling area:

"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 the new fuel handling tool."

With the SFp hoist at the maximum "up" limit, the bottom of a new fuel assembly has approximately 6-7 feet clearance over the top of the new fuel storage rack. Although this value is larger than the 36" value being discussed, dropping a load from this height (or any height) is a non-credible scenario for the following reasons:

a. The new fuel handling tool (NFHT) incorporates the same design features as the spent fuel handling tool (SFHT) such that the gripper assembly is designed to prevent opening while the weight of the fuel assembly and control component is suspended from the grippers.

b. The hoist is single failure proof with inherent redundancy

Therefore, changing tool handling design or crane limits is not needed or preferred. Safety is assured by redundancy and equipment design. For example, lengthening the NFHT to reduce the clearance down to 3 feet would lead to human performance issues associated with the handling of this tool. Lowering the hoist "up" limit would also lead to other undesirable conditions associated with the operation of this hoist throughout the fuel handling area.

Formatted: Font: 11 pt, Font color: Auto
Formatted: Font: Arial, 11 pt, Font color: Auto
Formatted: Font: 11 pt, Font color: Auto
Formatted: Font: Arial, 11 pt, Font color: Auto
Formatted: Font: 12 pt
Formatted: Font: 11 pt, Font color: Auto
Formatted: Bullets and Numbering
Formatted: Font: 11 pt, Font color: Auto
Formatted: Font: 12 pt
Formatted: Font: 11 pt, Font color: Auto
Formatted: Indent: Left: 0.5"
Formatted: Font: 12 pt
Formatted: Font: 11 pt
Formatted: Indent: Left: 1"
Formatted: Font: 12 pt
Formatted: Font: 11 pt, Font color: Auto
Formatted: Indent: Left: 0.5"
Formatted: Font: 12 pt
Formatted: Font: 11 pt, Font color: Auto
Formatted: Numbered + Level: 2 + Numbering Style: a, b, c, … + Start at: 1 + Alignment: Left + Aligned at: 0.75" + Tab after: 1" + Indent at: 1"
Formatted: Bullets and Numbering
Formatted: Font: 11 pt, Font color: Auto, Not Strikethrough
Formatted: Font: 11 pt, Font color: Auto
Formatted: Font: 11 pt, Font color: Auto
Formatted: Indent: Left: 0.25"
Formatted: Numbered + Level: 2 + Numbering Style: a, b, c, … + Start at: 1 + Alignment: Left + Aligned at: 0.75" + Tab after: 1" + Indent at: 1"
Formatted: Bullets and Numbering
Formatted: Font: 12 pt
Formatted: Font: 11 pt, Font color: Auto
Formatted: Indent: Left: 0.5"
Formatted: Font: 12 pt

2) During off-normal use of the non-single failure proof hoist over the new fuel pit, the 36" maximum height limit is controlled by operational restrictions. Specifically, to address the handling of new fuel using the non-single failure proof hoist, OI-SRP9.1.4-SBPB-03, Revision 2 (dated 5/19/10) states that the non-single failure proof hoist will be restricted from handling a load above the operating floor within 15 ft. of the spent fuel pool perimeter unless supported by future analysis.

To close this issue, a DCD markup making clarification changes is shown below.

Design Control Document (DCD) Revision: (Revision 1A)

Update DCD Section 9.1.1.2, "Facilities Description," as follows:

9.1.1.2 Facilities Description

(1 paragraph unchanged)

The dry, unlined, approximately 17-feet deep reinforced concrete pit is designed to provide support for the new fuel storage rack. The rack is supported by the pit floor. The walls of the new fuel pit are seismic Category I. The new fuel pit is normally covered to prevent foreign objects from entering the new fuel storage rack. ~~Since the only crane that can access the new fuel pit does not have the capacity to lift heavy objects, as defined in subsection 9.1.5,~~ The crane that is used to access the new fuel pit is the fuel handling machine. The fuel handling machine is equipped with a single failure proof hoist that is used to handle new fuel and control components and has a capacity of two tons. The new fuel pit cover is not designed to protect the fuel assemblies from the effects of dropped heavy objects. Dropped heavy objects are not credible due to the use of a single failure proof hoist. Figures 1.2-7 through 1.2-10 show the relationship between the new fuel storage facility and other features of the fuel handling area.

Formatted: Font: 11 pt, Font color: Auto

Formatted: Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Tab after: 0.5" + Indent at: 0.5"

Formatted: Bullets and Numbering

Formatted: Font: 11 pt, Font color: Auto

Formatted: Font: Arial, 11 pt, Not Italic, Underline, Font color: Auto

Formatted: Font: Not Bold, Underline, Font color: Auto

Formatted: Font: Not Bold

Formatted: Underline, Font color: Auto

Formatted: Font: (Default) Times New Roman, Not Bold

Formatted: Justified, Indent: Left: 0.75", Space After: 11 pt, Line spacing: At least 11 pt, Tab stops: 1.05", Left + 1.35", Left + 1.65", Left

Update Section 9.1.1.2.1, "New Fuel Rack Design," as follows:

C. Fuel Assembly Drop Accident Analysis

(3 paragraphs unchanged)

Although a 3 foot drop over the new fuel rack has been analyzed, no additional evaluations or restrictions are necessary for the drop of new fuel handled by the fuel handling machine single failure proof hoist."

Formatted: Font: (Default) Times New Roman, Font color: Black

Formatted: Indent(12), Space After: 11 pt, Line spacing: At least 11 pt, Keep lines together, Tab stops: 1.05", Left + 1.35", Left + 1.65", Left

PRA Revision:
None

Technical Report (TR) Revision:
None