AP1000DCDFileNPEm Resource

From: Altmayer, Scott A [altmaysa@westinghouse.com]
Sent: Tuesday, July 06, 2010 8:48 PM
To: Buckberg, Perry
Cc: Sanders, Mitchell P.; Stipanovich, Steven M; Ritterbusch, Stanley E; Loza, Paul G.
Subject: OI-914-03 R3A
Attachments: OI-SRP9 1 4-SBPB-03 R3 draft mps 7-5-10-scott.doc

Perry,

Here's the revised draft OI covering the FH issues near the SFP and new fuel elevator and questions we've discussed with NRC over the last week telecoms.
Tech inputs and insights are from Mitch and Steve.
I assembled it as discussed by telecom today….since this is a bit different than the RAIs for TR44.
We will issue this OI formally after we receive your comments and inputs.

This should decouple FH issues from the TR44 new fuel/rack drop height issue.
We are aiming to discuss/close both issues this week.

Please contact me if you have any questions.
Thank you.

--SCOTT ALTMAYER--
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Hearing Identifier: AP1000_DCD_Review
Email Number: 475

Mail Envelope Properties (EF1E2C8A89BEC84D80BBDC48E17396EEE8C66B8B)

Subject: OI-914-03 R3A
Sent Date: 7/6/2010 8:47:36 PM
Received Date: 7/6/2010 8:47:42 PM
From: Altmayer, Scott A

Created By: altmaysa@westinghouse.com

Recipients:
"Sanders, Mitchell P." <sandermp@westinghouse.com>
Tracking Status: None
"Stipanovich, Steven M" <stipansm@westinghouse.com>
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"Loza, Paul G." <lozapg@westinghouse.com>
Tracking Status: None
"Buckberg, Perry" <Perry.Buckberg@nrc.gov>
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Files	**Size**	**Date & Time**
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OI-SRP9 1 4-SBPB-03 R3 draft mps 7-5-10-scott.doc	234560	

Options
Priority: Standard
Return Notification: No
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AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: OI-SRP9.1.4-SBPA-03
Revision: ~~2~~3A (7/6/10)

Question: (Revision 1)

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.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

Additional Question: (Revision 2)

Westinghouse indicates that in the past the operators were required to verify hoist up limits, indicating lights, etc…prior to translating, which is acceptable while using the correct hoist. However by using the incorrect crane, even with the hoist up limits or indicating lights, will allow inadvertently traversing (translating) of the hoists in the configuration where the bottom of a fuel assembly does not have adequate clearance from the spent fuel racks. This could result in fuel damage if traversing movement is allowed.

1. How does Westinghouse intend to address the issue above?

2. Elaborate on the comment, "[(from a previous W email discussion) Past fuel handling procedures require operators to verify hoist up limits via hoist position, indicating lights, etc., prior to clearing bridge-trolley interlocks and translating with a fuel assembly.] Being that there is approximately 20" difference between the two hook up limits, this condition should be detected by the operator." It is not clear to the staff how the operator would detect this.

3. What is their intended use of single and non-single failure proof hoists?

4. Which crane will carry what over the SFP and in fuel handling areas?

~~Additional~~ New Questions: (Revision 3A) Formatted: Font color: Blue

As a result of telephone conferences between NRC and Westinghouse on 6/25/10, 6/29/10 and 7/2/10 regarding fuel handling operations, the following additional questions are provided:

1. There are no provisions in the DCD that prevent the use of the non-single failure proof hoist from handling new fuel above the operating floor. How does Westinghouse intend to address this issue?

2. A specific location of the new fuel elevator shall be provided (with sketch in the response). A DCD change to include either a detailed description of the location or a drawing of the location shall be provided in this response.

3. Clarify whether any new fuel is capable of passing over spent fuel, and describe preventative measures (interlocks) included to restrict travel over spent fuel. A DCD change shall include a description of the interlock(s).

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Westinghouse Response: (Revision 1)

(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.

Westinghouse Additional Response: (Revision 2)

1. The control console for the fuel handling machine has a selector switch that is positioned to select either the South Hoist (Single Failure Proof) or North Hoist (non-Single Failure Proof). With North Hoist selected, the single failure proof hoist is locked out, incapable of movement. Warnings requiring operator acknowledgement will be built in to the fuel handling machine software such that if a load was suspended from the single failure proof hoist and bridge movement approached the spent fuel racks, the operator would be alerted that spent fuel is not to be raised using the spent fuel handling tool. Operating procedures will also be prepared with this precaution.

2. In the event that an operator set the abovementioned selector switch to South Hoist (Single Failure Proof), picked up the spent fuel handling tool with the single failure proof hoist and raised the hoist to the uplimit, the digital hoist position indication would not meet the predetermined setpoint for the hoist up limit for handling spent fuel. (The bail on the handling tool would not have been at the expected elevation either.) Even though the hoist up limit light would be activated, the error in hoist position would be identified administratively by the verification of proper hoist up digital position readout. Operating procedures will be prepared with this requirement.

3. The single failure proof hoist will be used for;

   - primarily handling new fuel
   - the movement of loads <4000 lbs in the fuel handling area of the auxiliary building
   - a redundant hoist over the spent fuel pool for the handling of control components

The non-single failure proof hoist will be used for;

- handling fuel and control components in the spent fuel pool
- the hoist shall be restricted from handling a load above the operating floor within 15 ft. of the spent fuel pool unless supported by future analysis

4. The non-single failure proof hoist is primarily used for submerged handling activities. However, there are areas in the fuel handling area of the auxiliary building that the single failure proof hoist is not capable of accessing due to travel limitations. Therefore it is necessary for the non-single failure proof hoist to be used in areas other than the spent fuel pool. As mentioned above, 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 unless supported by future analysis.

   The single failure proof hoist will be capable of handling loads in the new fuel handling area and the spent fuel handling area with operator warnings associated with the handling of spent fuel.

   The previously supplied DCD markup wording is revised below to reflect the above answers.

Westinghouse New Response: (Revision 3A) Formatted: Font color: Blue

(New Question 1 Response) Formatted: Font color: Blue

The following clarification (which removes the option for future analysis and further restricts operation of the single failure proof hoist) is changed in the response to Revision 2 (questions 3 & 4) as noted below by strikeout and underline: Formatted: Font color: Blue Formatted: Font color: Blue

3. The single failure proof hoist will be used for;

- primarily handling new fuel
- the movement of loads <4000 lbs in the fuel handling area of the auxiliary building
- a redundant hoist over the spent fuel pool for the handling of control components

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The non-single failure proof hoist will be used for;

- handling fuel and control components in the spent fuel pool
- the hoist shall be restricted from handling a load above the operating floor within 15 ft. of the spent fuel pool ~~unless supported by future analysis~~

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4. The non-single failure proof hoist is primarily used for submerged handling activities. However, there are areas in the fuel handling area of the auxiliary building that the single failure proof hoist is not capable of accessing due to travel limitations. Therefore it is necessary for the non-single failure proof hoist to be used in areas other than the spent fuel pool. As mentioned above, 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. ~~unless supported by future analysis.~~ The non-single failure proof hoist is also restricted from handling new fuel above the operating floor.

   The single failure proof hoist will be capable of handling loads in the new fuel handling area and the spent fuel handling area with operator warnings associated with the handling of spent fuel.

(New Question 2 Response)

The new fuel elevator fuel carrier is located in the tool storage area of the spent fuel pool. The fuel carrier centerline is approximately 24 inches south of the centerline of the southern most row of storage rack A1. See revised Figure 9.1-4 in the attached DCD markup for general placement.

(New Question 3 Response)

New fuel above the operating floor is not capable of transport over the spent fuel racks. An additional interlock will be provided to DCD Section 9.1.4.3.3, "Fuel Handling Machine", Item A, "Safety Interlocks", to prevent the passage of new fuel over the spent fuel racks.

Design Control Document (DCD) Revision: ~~(Revision 1, 2)~~

DCD Changes: (Revision 1, 2)

Modify DCD Section 9.1.4.2.4, "Component Description," Item B, "~~Item B~~Fuel handling Machine", as follows by adding the last two paragraphs in italics below:

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.

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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.

The non-single failure proof hoist is primarily used for submerged handling activities. However, there are areas in the fuel handling area of the auxiliary building that the single failure proof hoist is not capable of accessing due to travel limitations. Therefore it is necessary for the non-single failure proof hoist to be used in areas other than the spent fuel pool. 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 unless supported by future analysis.

The single failure proof hoist will be capable of handling loads in the new fuel handling area and the spent fuel handling area with operator warnings associated with the handling of spent fuel.

DCD Changes: (Revision 3A)

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The following additional DCD changes are provided to address new NRC questions 1, 2 & 3.

Modify DCD Section 9.1.4.2.4, "Component Description," Item B, "Fuel handling Machine", as follows by replacing the second to last paragraph as follows:

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~~**PRA Revision:**~~
~~None~~

~~**Technical Report (TR) Revision:**~~
~~None~~

~~***Westinghouse Additional Response: (Revision 3)***~~

~~**(Question 1 Response)**~~

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~~The following clarification is provided to the response in Revision 2, questions 3 & 4.~~

~~3. The single failure proof hoist will be used for;~~

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~~primarily handling new fuel~~

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- the movement of loads <4000 lbs in the fuel handling area of the auxiliary building
- a redundant hoist over the spent fuel pool for the handling of control components

The non-single failure proof hoist will be used for:

- handling fuel and control components in the spent fuel pool
- the hoist shall be restricted from handling a load above the operating floor within 15 ft. of the spent fuel pool unless supported by future analysis.

4. The non-single failure proof hoist is primarily used for submerged handling activities. However, there are areas in the fuel handling area of the auxiliary building that the single failure proof hoist is not capable of accessing due to travel limitations. Therefore it is necessary for the non-single failure proof hoist to be used in areas other than the spent fuel pool. As mentioned above, 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. unless supported by future analysis. The non-single failure proof hoist is also restricted from handling new fuel above the operating floor.

The single failure proof hoist will be capable of handling loads in the new fuel handling area and the spent fuel handling area with operator warnings associated with the handling of spent fuel.

(Question 2 Response)

The new fuel elevator fuel carrier is located in the tool storage area of the spent fuel pool. The fuel carrier centerline is approximately 24 inches south of the centerline of the southern most row of storage rack A1. See new figure 9.1.4 in the attached DCD markup.

(Question 3 Response)

New fuel above the operating floor is not capable of transport over the spent fuel racks. An interlock will be provided to prevent the passage of new fuel over the spent fuel racks.

Design Control Document (DCD) Revision: (Revision 1, 2, 3)

Modify the response in Revision 2, DCD Section 9.1.4.2.4, "Component Description," as follows:

-"*The non-single failure proof hoist is primarily used for submerged handling activities. However, there are areas in the fuel handling area of the auxiliary building that the single failure proof hoist is not capable of accessing due to travel limitations. Therefore it is necessary for the non-single failure proof hoist to be used in areas other than the spent fuel pool. The non-single failure proof hoist will be restricted from handling a load above the operating floor within 15 ft.*

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of the spent fuel pool ~~unless supported by future analysis.~~ The non-single failure proof hoist is also restricted from handling new fuel above the operating floor."

~~**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.~~

~~*The non-single failure proof hoist is primarily used for submerged handling activities. However, there are areas in the fuel handling area of the auxiliary building that the single failure proof hoist is not capable of accessing due to travel limitations. Therefore it is necessary for the non-single failure proof hoist to be used in areas other than the spent fuel pool. 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. unless supported by future analysis. The non-single failure proof hoist is also restricted from handling new fuel above the operating floor.*~~

~~*The single failure proof hoist will be capable of handling loads in the new fuel handling area and the spent fuel handling area with operator warnings associated with the handling of spent fuel.*~~

~~The following additional DCD changes are provided to address questions 2 & 3.~~

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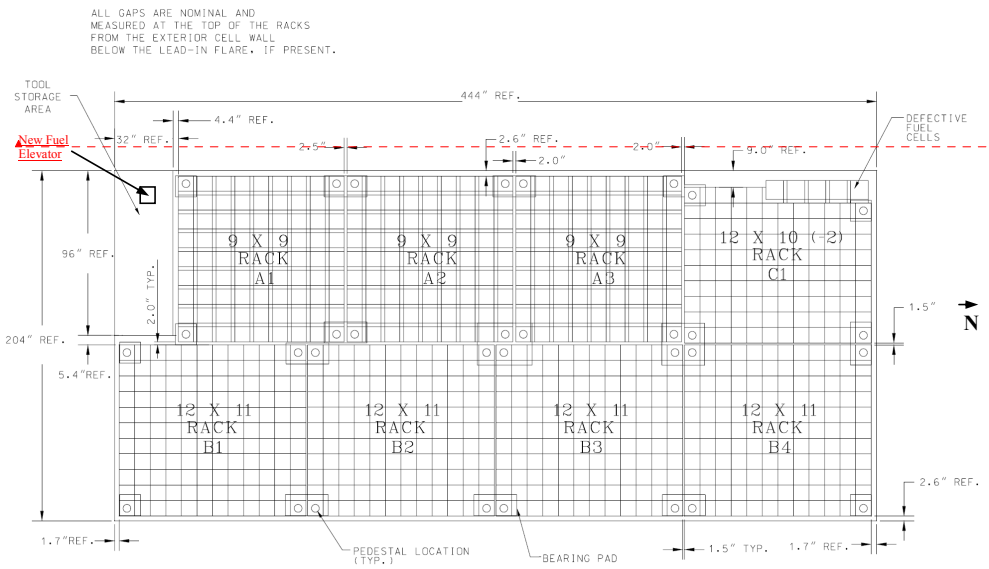
Revise DCD Figure 9.1-4 to add the location of the new fuel elevator and the "northing" orientation arrow as shown below.



Revise DCD Section 9.1.4.3.3, "Fuel Handling Machine", Item A, "Safety Interlocks", by adding a new restricted operational control for Item *8 as follows:

~~9.1.4.3.3 Fuel Handling Machine~~

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

~~A. Safety Interlocks~~

~~Operations that 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~~

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~~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 that 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 as follows:~~

~~*1. The fuel handling machine, and its associated fuel handling tool, can only place a fuel assembly in the new fuel rack, spent fuel racks, fuel transfer system, new fuel elevator, spent fuel cask, fuel inspection/repair station, or rail car 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 hoist up travel stops at a predetermined height to prevent a spent fuel assembly from being raised above the minimum water depth for shielding.~~

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

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

~~*7. The fuel handling machine hoist is prevented from moving in the transfer machine zone unless the fuel transfer machine upender is vertical. An interlock is provided from the fuel transfer system to the fuel handling machine to accomplish this.~~

~~*8. The fuel handling machine is prevented from transporting new fuel above the operating floor over the spent fuel racks.~~

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AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

PRA Revision:
None

Technical Report (TR) Revision:
None

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