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Your ref: Docket No. 52-006  
Our ref: DCP\_NRC\_002614

September 8, 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-SRP9.1.5-SBPB-08 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,

A handwritten signature in black ink, appearing to read 'Robert Sisk'.

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

/Enclosure

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

cc:	D. Jaffe	- U.S. NRC	1E
	E. McKenna	- U.S. NRC	1E
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	R. Kitchen	- Progress Energy	1E
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ENCLOSURE 1

Response to Request for Additional Information on SRP Section 9

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## Response to Request For Additional Information (RAI)

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RAI Response Number: RAI-SRP9.1.5-SBPB-08  
Revision: 2

### **Question:**

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:

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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.

### **Additional NRC question: (by phone August 12, 2009) (Revision 2)**

In Section 9.1.5.3, "Safety Evaluation", the text reads "Either redundancy or double design factor is provided for load bearing components such as the hoisting ropes, sheaves, equalizer assembly, hooks, and holding brakes." This could appear to allow for a substitution of redundancy for double design, or the reverse.

Clarify the statement indicating that a double design factor is provided for hooks, and that redundancy is provided for the remaining components in the list. Also, provide similar changes in the applicable portions of the ITAAC text.

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### **Westinghouse Response: (Revision 0)**

All of these changes, as proposed in TR-106 Rev.1, will be made in Revision 17 of the DCD.

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

All changes noted in the original RAI response and proposed in TR-106 Rev.1, have been incorporated into DCD Rev 17.

To clarify, it is the intent of Westinghouse that all hoisting equipment handling critical loads be governed by NUREG-0554 and supplemented by ASME NOG-1, as applicable. The standards CMAA 70 and ANSI B30.2 are also applicable.

### **Additional Westinghouse Response: (Revision 2)**

The above statement, "Either redundancy or double design factor is provided for load bearing components such as the hoisting ropes, sheaves, equalizer assembly, hooks, and holding brakes." is revised to read "A double design factor is provided for hooks where used as load bearing components. Redundancy is provided for load bearing components other than hooks, such as the hoisting ropes, sheaves, equalizer assembly, and holding brakes."

A similar modification is made of the applicable ITAAC portions.

See the DCD markup below.

### **Design Control Document (DCD) Revision: (Revision 1)**

As described in TR-106, Revision 1.

### **Design Control Document (DCD) Revision: (Revision 2)**

Modify DCD R17, Tier 1, Table 2.3.5-2, "Inspections, Tests, Analyses, and Acceptance Criteria" (Pages 2.3.4-4, -5, and -6) as follows:

<p>Table 2.3.5-2 Inspections, Tests, Analyses, and Acceptance Criteria</p>
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Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>3.a) The polar crane is single failure proof.</p>	<p><u>Validation of double design factors are provided for hooks where used as load bearing components.</u> Validation of redundant <del>or double design</del> factors are provided for load bearing components such as:</p> <ul style="list-style-type: none"> <li>• Hoisting ropes</li> <li>• Sheaves</li> <li>• Equalizer assembly</li> <li>• Hooks</li> <li>• Holding brakes</li> </ul> <p>The polar crane shall be static-load tested to 125% of the rated load.</p> <p>The polar crane shall lift a test load that is 100% of the rated load. Then it shall lower, stop, and hold the test load.</p>	<p>A report exists and concludes that the polar crane is single failure proof.</p>
<p>3.b) The cask handling crane is single failure proof.</p>	<p><u>Validation of double design factors are provided for hooks where used as load bearing components.</u> Validation of redundant <del>or double design</del> factors are provided for load bearing components such as:</p> <ul style="list-style-type: none"> <li>• Hoisting ropes</li> <li>• Sheaves</li> <li>• Equalizer assembly</li> <li>• Hooks</li> <li>• Holding brakes</li> </ul> <p>The cask handling crane shall be static-load tested to 125% of the rated load.</p> <p>The cask handling crane shall lift a test load that is 100% of the rated load. Then it shall lower, stop, and hold the test load.</p>	<p>A report exists and concludes that the cask handling crane is single failure proof.</p>

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<p>3.c) The equipment hatch hoist is single failure proof.</p>	<p><u>Validation of double design factors are provided for hooks where used as load bearing components.</u> Validation of redundant <del>or double design</del> factors are provided for load bearing components such as:</p> <ul style="list-style-type: none"> <li>• Hoisting ropes</li> <li>• Sheaves</li> <li>• Equalizer assembly</li> <li>• <del>Hooks</del></li> <li>• Holding brakes</li> </ul> <p>The equipment hatch hoist holding mechanism shall stop and hold the hatch.</p>	<p>A report exists and concludes that the equipment hatch hoist is single failure proof.</p>
<p>3.d) The maintenance hatch hoist is single failure proof.</p>	<p><u>Validation of double design factors are provided for hooks where used as load bearing components.</u> Validation of redundant <del>or double design</del> factors are provided for load bearing components such as:</p> <ul style="list-style-type: none"> <li>• Hoisting ropes</li> <li>• Sheaves</li> <li>• Equalizer assembly</li> <li>• <del>Hooks</del></li> <li>• Holding brakes</li> </ul> <p>The maintenance hatch hoist holding mechanism shall stop and hold the hatch.</p>	<p>A report exists and concludes that the maintenance hatch hoist is single failure proof.</p>

Modify DCD R17 Tier 2, Section 9.1.5.3, "Safety Evaluation" as follows:

(3 paragraphs unchanged)

The polar crane, the cask handling crane, the containment equipment hatch, and the maintenance hatch hoists are single failure proof. These systems stop and hold a critical load following the credible failure of a single component. A double design factor is provided for hooks where used as load bearing components. ~~Either r~~Redundancy or double design factor is provided for load bearing components other than hooks, such as the hoisting ropes, sheaves,



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equalizer assembly, hooks, and holding brakes. These systems are designed to support a critical load during and after a safe shutdown earthquake. The seismic Category I equipment and maintenance hatch hoist systems are designed to remain operational following a safe shutdown earthquake. The polar crane is designed to withstand rapid pressurization of the containment during a design basis loss of coolant accident or main steam line break, without collapsing.

**PRA Revision:**

None

**Technical Report (TR) Revision:**

None