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Your ref: Docket No. 52-006  
Our ref: DCP/NRC2213

July 24, 2008

Subject: AP1000 Response to Request for Additional Information (SRP3.9.6)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 3.9.6. This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in the response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

A response is provided for RAI-SRP3.9.6-CIB1-13 through -19 as sent in an email from Mike Miernicki to Sam Adams dated April 23, 2008. This response completes twelve of twenty requests received to date for SRP Section 3.9.6. A response for RAI-SRP3.9.6-CIB1-01 and -11 was submitted under letter DCP/NRC2207 dated July 18, 2008. A response for RAI-SRP3.9.6-CIB1-05, -06, and -07 was submitted under letter DCP/NRC2200 dated July 14, 2008.

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,

*for John DeBlasio*

Robert Sisk, Manager  
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/Enclosure

1. Response to Request for Additional Information on SRP Section 3.9.6

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ENCLOSURE 1

Response to Request for Additional Information on SRP Section 3.9.6

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

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RAI Response Number: RAI-SRP3.9.6-CIB1-13  
Revision: 0

**Question:**

TR-134 modifies Subsection 3.9.6.2.2 of the AP1000 DCD and states that position indication testing requirements for passive valves is identified in Table 3.9-16. Prior to this statement the DCD states that valves that are included in the inservice testing program that have position indication will be observed locally during valve exercising to verify proper operation of the position indication and that the frequency for this test is once every two years, unless otherwise justified. Will passive valves be observed locally during valve exercising to verify proper operation of valve position indication? Are all passive valves included in Table 3.9-16?

**Westinghouse Response:**

- a. Passive valves with remote position indication will be locally observed to verify that the remote position indication accurately reflects valve position. All valves requiring position indication verification will be exercised during the position indication test such that the open and closed positions can be verified. The frequency of this test is once every two years. Passive valves do not require additional exercising.
- b. All passive valves with test requirements are included in the Table 3.9-16. Passive valves without test requirements are not listed.

Reference(s):

**Design Control Document (DCD) Revision:**  
None

**PRA Revision:**  
None

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

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

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RAI Response Number: RAI-SRP3.9.6-CIB1-14  
Revision: 0

### **Question:**

Subsection 3.9.6.2.2 of the AP1000 DCD under Manual/Power-Operated Valve Tests states the inservice testing requirements for measuring stroke time for valves in AP1000 will be completed in conjunction with a valve exercise test and that the stroke time test is not identified as a separate test. Westinghouse is requested to provide the following information:

- a. Discuss why stroke time testing is not identified as a separate inservice test.
- b. Identify the stroke time testing requirements (stroke time open, stroke time close) for valves listed in Table 3.9-16.

### **Westinghouse Response:**

- a. Stroke time testing is not identified as a separate test since each power operated valve is stroke time tested when the full stroke exercise test is performed. This is consistent with industry practices.
- b. Safety-Related Missions are identified for each active, power operated valve listed in Table 3.9-16. The stroke time open or closed is intended to match the safety-related mission i.e., transfer open or closed. It is understood that all active power operated valves are required to be full stroke exercised to both positions.

Reference(s):

**Design Control Document (DCD) Revision:**  
None

**PRA Revision:**  
None

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

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

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RAI Response Number: RAI-SRP3.9.6-CIB1-15  
Revision: 0

### **Question:**

Subsection 3.9.6.2.2 of the AP1000 DCD under Manual/Power-Operated Valve Tests states safety related valves that fail to the safety related actuation position are subject to a valve exercise inservice test and that the fail safe test is not identified as a separate test. Westinghouse is requested to provide the following information:

- a. Provide justification why fail safe testing is not identified as a separate inservice test.
- b. Identify the fail safe testing requirements (fail open, fail close) for valves listed in Table 3.9-16.

### **Westinghouse Response:**

- a. In cases where normal valve operator action moves the valve to the open or closed position by de-energizing the operator electrically, by venting air, or both, the exercise test will satisfy the fail safe test requirements and an additional test specific for fail safe testing will not be performed.

Remote position indication is used as applicable to verify proper fail safe operation, provided that the indication system for the valve is periodically verified in accordance with ISTC-3700.

The AP1000 Inservice Testing Program valves that fail open or closed upon loss of actuator power use the fail safe mechanism to stroke the valve to its safety position. For example, an air operated valve that fails closed may use air to open the valve against spring force. When the actuator control switch is placed in the closed position, air is vented from the diaphragm and the spring moves the obturator to the closed position.

- b. The valves listed in Table 3.9-16 with an Active to Failed Safety Function are inherently designed for only one safety related mission direction. The active mission for these valves is to transfer to their safe position. Therefore the transfer open or transfer close position is the fail position.

Reference(s):

**Design Control Document (DCD) Revision:**  
None



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**PRA Revision:**

None

**Technical Report (TR) Revision:**

None

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## Response to Request For Additional Information (RAI)

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RAI Response Number: RAI-SRP3.9.6-CIB1-16  
Revision: 0

### **Question:**

TR 134 modifies Subsection 3.9.6.2.2 of the AP1000 DCD under Check Valve Exercise Tests and states if exercise testing during a refueling outage is not practical, then "an another" means is provided. Other means include nonintrusive diagnostic techniques or valve disassembly and inspection. Westinghouse is requested to provide the following information:

- a. Revise DCD to delete typographical error "an another."
- b. Describe the types of nonintrusive diagnostic techniques to be utilized if exercise testing during a refueling outage is not possible.
- c. Identify the check valves that will require disassembly and inspection in lieu of exercising and discuss the system design constraints that prevent exercise testing of the valves.

### **Westinghouse Response:**

- a. The typographical error will be corrected as shown below.
- b. If check valves are identified for which exercise tests are recommended but are not practical due to operational issues or changes in the ASME OM Code, it will be the responsibility of the license holder to define types of nonintrusive diagnostic techniques to be utilized
- c. No check valves for which exercise tests are recommended have been identified which cannot be full stroke exercised. Therefore neither non-intrusive techniques nor disassembly/inspection is required and are not identified as part of the AP1000 Certified Design.

Reference(s):

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

Revise the third paragraph under Check Valve Exercise Tests in 3.9.6.2.2 as follows:

The ASME Code specifies a quarterly valve exercise frequency. The AP1000 test frequencies are identified in Table 3.9-16. In some cases, check valves are tested on a less frequent basis because it is not practical to exercise the valve during plant operation. If quarterly exercise testing is not practicable, then exercise testing is performed during cold shutdown on a frequency not more often than quarterly. If this is not practical, the exercise testing is

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performed during each refueling outage. If exercise testing during a refueling outage is not practical; then ~~an~~ another means is provided. Other means include nonintrusive diagnostic techniques or valve disassembly and inspection. The check valves included in the inservice testing program outlined in Table 3.9-16 do not require another means as an alternate to exercise testing based on the ASME OM Code used to develop the inservice testing plan for the AP1000 Design Certification

**PRA Revision:**

None

**Technical Report (TR) Revision:**

None

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RAI Response Number: RAI-SRP3.9.6-CIB1-17  
Revision: 0

### **Question:**

Subsection 3.9.6.2.2 of the AP1000 DCD under Check Valve Low Differential Pressure Tests identifies low differential pressure testing as an inservice test that is performed in addition to exercise inservice tests once each refueling cycle. Westinghouse is requested to provide the following information:

- a. Identify the OM Code requirement that requires low differential pressure tests.
- b. If not required by the OM Code, identify the regulatory requirement (Technical Specification, License Amendment, etc) that requires low differential pressure testing.
- c. The identified test frequency is once each refueling cycle in Subsection 3.9.6.2.2 and Table 3.9-16 states the frequency is 2 years. Provide clarification as to the actual test frequency.

### **Westinghouse Response:**

- a. There is no OM Code requirement that requires low differential pressure tests. This should be considered a part of the augmented inspection.
- b. The PXS utilizes check valves which must operate at low differential pressure during gravity driven injection. During the review of the AP600 the NRC staff had a concern over the performance of check valves that have been held shut for an extended period of time with a high differential pressure and high temperature (as could be the case for the PXS check valves).

In the AP600 SSAR Westinghouse committed to perform periodic testing under low differential pressure for safety-related check valves that have a safety function to open under low differential pressure. This testing is performed in addition to the forward and reverse flow check valve IST. Although the AP1000 PXS design includes check valves in series with the squib valves which eliminate the high closing differential pressure the requirement to test for the low opening differential pressure has been retained in the AP1000 IST program.

- c. Table 3.9-16 will be changed to have a frequency for these low differential pressure tests of once a refueling cycle.

Reference(s):

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### Design Control Document (DCD) Revision:

In Subsection 3.9.6.2.2 Revise the second paragraph under the heading **Check Valve Low Differential Pressure** Tests as follows:

The intent of this inservice test is to determine the pressure required to initiate flow. This differential pressure will verify that the valve will initiate flow at low differential pressure. This low pressure differential inservice test is performed in addition to exercise inservice tests. These tests are not required by ASME OM Code and are considered part of an augmented inspection program.

In DCD Table 3.9-16 revise the entry under Inservice Testing Type and Frequency for valves PXS-PL-V119A, PXS-PL-V119B, PXS-PL-V122A, PXS-PL-V122B, PXS-PL-V124A, and PXS-PL-V124B as follows:

Remote Position Indication, Exercise/2 Years  
Check\_Initial\_Open Differential Pressure/~~2-Years~~Refueling  
Check Exercise/Refueling Shutdown

### PRA Revision:

None

### Technical Report (TR) Revision:

None

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## Response to Request For Additional Information (RAI)

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RAI Response Number: RAI-SRP3.9.6-CIB1-18  
Revision: 0

### **Question:**

Subsection 3.9.6.2.2 of the AP1000 DCD under Pressure/Vacuum Relief Devices states that the frequency for this inservice test is every 5 years for ASME Class 1 and main steam line safety valves or every 10 years for ASME Classes 2 and 3 devices. The ASME OM Code also requires that 20 percent of the valves from each valve group be tested within any 24 month interval for Class 1 and main steam safety valves and within any 48 month interval for Class 2 and 3 devices. Westinghouse is requested to discuss the requirement to test 20 percent of each valve group within the OM Code required interval.

### **Westinghouse Response:**

The requirement that 20 percent of the valves from each valve group be tested within any 24 month interval for Class 1 and main steam safety valves and within any 48 month interval for Class 2 and 3 devices is included in Table 3.9-16 in the **Inservice Testing Type and Frequency** column. This will be added to the text as shown below.

Reference(s):

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

Revise the second paragraph under the heading **Pressure/Vacuum Relief Devices** of Subsection 3.9.6.2.2 as follows:

The periodic inservice testing include visual inspection, seat tightness determination, set pressure determination, and operational determination of balancing devices, alarms, and position indication as appropriate. The frequencies for this inservice test is every 5 years for ASME Class 1 and main steam line safety valve or every 10 years for ASME Classes 2 and 3 devices. 20 percent of the valves from each valve group are tested within any 24 month interval for Class 1 and main steam safety valves and within any 48 month interval for Class 2 and 3 devices. Nonreclosing pressure relief devices are inspected when installed and replaced every 5 years unless historical data indicate a requirement for more frequent replacement.

### **PRA Revision:**

None

### **Technical Report (TR) Revision:**

(None or proposed mark-up of TR as applicable)

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

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RAI Response Number: RAI-SRP3.9.6-CIB1-19  
Revision: 0

**Question:**

TR 134 modifies Subsection 3.9.6.2.3 of the AP1000 DCD to state the sample disassembly examination program shall group check valves of similar design, application, and service condition and require a periodic examination of one valve from each group. Westinghouse is requested to identify the check valves that will require disassembly and inspection in lieu of exercising, discuss the system design constraints that prevent exercise testing of the valves and provide the technical justification to be used to group check valves and an overview of the program.

**Westinghouse Response:**

All check valves in the AP1000 inservice testing Program outlined in Table 3.9-16 are capable of being full stroke exercise tested based on the ASME OM Code used (1995 Edition and 1996 Addenda) to develop the inservice testing plan for the AP1000 Design Certification.

If check valves are identified for which exercise tests are recommended but are not practical due to operational issues or changes in the ASME OM Code, It will be the responsibility of the license holder to define the requirements of the disassembly and inspection program.

Reference(s):

**Design Control Document (DCD) Revision:**  
None

**PRA Revision:**  
None

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