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Your ref: Docket No. 52-006
Our ref: DCP/NRC2207

July 18, 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-CIB1-01 and -11 as sent in an email from Mike Miernicki to Sam Adams dated April 2, 2008. This response completes five of twenty requests received to date for SRP Section 3.9.6. A response for RAI-SRP3.9.6-CIB1-05, -06, and -07 was submitted under letter DCP/NRC220 dated July 17, 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
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Enclosure

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

D063
NRO

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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)

RAI Response Number: RAI-SRP3.9.6-CIB1-01
Revision: 0

Question:

Provide a schedule for the availability of the procurement specifications for safety-related valves and dynamic restraints to be used in the AP1000 reactor for NRC staff audit. Subsection 3.9.3.2, "Pump and Valve Operability Assurance," in Chapter 3, "Design of Structures, Components, Equipment and Systems," of the AP1000 DCD Tier 2 refers to operational tests to verify that the valve opens and closes prior to installation. Subsection 3.9.3.2.2 of the AP1000 DCD Tier 2 specifies cold hydro tests, hot functional tests, periodic inservice inspections, and periodic inservice operations to be performed in situ to verify the functional capability of the valves. Subsection 5.4.8, "Valves," of Section 5.4, "Component and Subsystem Design," in Chapter 5, "Reactor Coolant System and Connected Systems," of the AP1000 DCD Tier 2 includes provisions regarding design and qualification, and preoperational testing of valves within the scope of Chapter 5, and refers to these activities for other safety-related valves. Subsection 5.4.8.1.2, "Motor-Operated Valves Design and Qualification," of the AP1000 DCD Tier 2 states that provisions are provided to reduce the susceptibility of the valve to bonnet overpressurization, pressure locking and thermal binding. Subsection 5.4.8.1.3, "Other Power-Operated Valves Including Explosively Actuated Valves Design and Qualification," of AP1000 DCD Tier 2 does not discuss resolution of potential pressure locking and thermal binding for other power-operated gate valves. Subsection 5.4.9, "Reactor Coolant System Pressure Relief Devices," of the AP1000 DCD Tier 2 includes provisions for design, testing, and inspection of relief devices in the reactor coolant system. Subsection 5.4.10, "Component Supports," of the AP1000 DCD Tier 2, includes provisions for design, testing, and inspection of component supports in the reactor coolant system. Subsection 5.4.16, "References," in proposed Revision 16 to the AP1000 DCD Tier 2 refers to the 2002 version (rather than the updated 2007 version) of American Society of Mechanical Engineers (ASME) Standard QME-1, "Qualification of Active Mechanical Equipment used in Nuclear Power Plants." During the March 26-27 public meeting, Westinghouse discussed its ongoing development of procurement specifications for safety-related valves and dynamic restraints for the AP1000 reactor design. Westinghouse stated that the procurement specifications will be available for NRC staff audit later in 2008. Based on the meeting discussion, the NRC staff believes that the procurement specifications will provide additional assurance that the functional design and qualification of safety-related valves and dynamic restraints meet the acceptance criteria in NRC Standard Review Plan (SRP) Section 3.9.6 and other applicable SRP sections in support of COL applicants referencing the AP1000 DCD. For example, the information in the procurement specifications may include:

(a) identification of all active ASME Code Class 1, 2, and 3 valves and dynamic restraints;
(b) presentation of the criteria to be employed in a test program, or a program consisting of tests and analysis, to ensure operability of valves that are required to open or close to perform a safety function during or after the specified plant event;

(c) discussion of features of the qualification program, including conditions of the test, scale effects (if appropriate), loadings for the specified plant event, transient loads, and other information pertinent to assurance of operability;
(d) design stress limits;
(e) provisions for valve testing at maximum flow rates;
(f) provisions for functional design and qualification of each safety-related valve that demonstrate its capability to perform its intended functions for a full range of system differential pressures and flows, and ambient temperatures, and available voltage (as applicable) from normal operating to design-basis conditions;
(g) qualification program for safety-related valves that demonstrates that these valves do not experience leakage from loading;
(h) provisions for functional design and qualification of dynamic restraints in safety-related systems and access for performing IST program activities, including the acceptance criteria in SRP Section 3.9.2;
(i) consideration of flow-induced loading in functional design and qualification to incorporate degraded flow conditions; and
(j) verification that solenoid-operated valves will meet their Class 1E electrical requirements for the appropriate electrical power supply amperage and voltage.

Westinghouse Response:

The safety-related design specifications and the safety-related valve equipment qualification are scheduled to be completed by the end of August 2008 and will be available for NRC review.

The following information is provided to identify where the requested information may be found:

a. Active valves are identified in DCD Tables 3.9-12 and 3.11-1. This information is also included in the appropriate design specifications (data sheets). The list of dynamic restraints is being developed as part of the effort to close the piping design acceptance criteria.

b. APP-GW-VP-010, "Equipment Qualification Methodology and Documentation Requirements for AP1000 Safety-Related Valves and Valve Appurtenances" identifies the requirements of a valve qualification program. This includes reference to requirements in ASME-QME-1. Specific functional requirements are identified in the valve data sheets. This document will be available for NRC review during the review of the valve design specifications.

c. APP-GW-VP-010 describes the features of the equipment and valve qualification programs. Information loadings and transients are discussed in the design specifications.

d. The limits on the design stresses are identified in the design specs.

e. Information on maximum flow rate for each valve is included in the data sheet for the valve. The information on valve qualification testing found in APP-GW-VP-010.

f. The functional design of valves is identified in the design specification. APP-GW-VP 010 summarizes the valve qualification requirements.

g. The requirements for valve qualification testing are identified in APP-GW-VP-010. These requirements are consistent with the recommendations of ASME QME-1. A Nozzle (End) Loading Test is included in the requirements for testing.

h. Functional design requirements and qualification requirements for dynamic restraints (snubbers) are identified in the design specification for piping supports (APP-PH02-Z0-001). Functional design requirements and qualification requirements are also included in the design specification for RCS component dynamic restraints (APP-PH04-Z0-001). Inservice testing conforms to the requirements of the ASME OM Code ISTD. Since snubbers are removed for testing, access requirements provide assurance that sufficient space is available for removal.

i. The valve design specifications include the evaluation of transient conditions.

j. The design electrical requirements for solenoid valves are found in the design specification for solenoid valves APP-PV13-Z0-001, "Solenoid Operated Globe Valves, ASME Boiler and Pressure Vessel Code Section III, Class 1, 2, and 3." These requirements are consistent with APP-GW-VP-010.

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)

RAI Response Number: RAI-SRP3.9.6-CIB1-11
Revision: 0

Question:

Update Note 31 of Table 3.9-16, "Valve Inservice Test Requirements," in AP1000 DCD Tier 2 to reflect planned changes to the AP1000 DCD discussed during the March 26-27 public meeting. Table 3.9-16 lists the valves in the IST Program for the AP1000 design. TR 134 modifies Table 3.9-16 to indicate the type of valve and actuator for power-operated valves.

Westinghouse Response:

Note 31 in DCD Table 3.9.6-16 will be revised to address the changes requested by the NRC as shown below. The MOV and AOV programs are expected to incorporate the attributes for a successful power-operated periodic verification program as discussed in Regulatory Issue Summary 2000-03, Resolution of Generic Safety Issue 158: Performance of Safety-related Power-Operated Valves under Design Basis Conditions.

Design Control Document (DCD) Revision:

Revise Note 31 to Table 3.9-16 as follows:

> 31 These valves ~~may be~~ are subject to operability testing per the requirements of 10 CFR 50.55a. See subsection 3.9.6.2.2 for the factors to be considered in the evaluation of operability testing and subsection 3.9.8.4 for the Combined License information item. ~~The specified frequency for operability testing is a maximum of once every 10 years.~~ The test frequency is the longer of every 3 refueling cycles or 5 years until sufficient data exists to determine a longer test frequency is appropriate in accordance with Generic Letter 96-05. Some of the valves will be tested the first time after a shorter period to provide for trending information. The specified frequency for operability testing is a maximum of once every 10 years provided there is sufficient experience to justify the longer interval.

PRA Revision:
None

Technical Report (TR) Revision:
None