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Your ref: Docket Number 52-006
Our ref: DCP/NRC2085

February 8, 2008

Subject: AP1000 COL Responses to Requests for Additional Information (TR 138)

In support of Combined License application pre-application activities, Westinghouse is submitting responses to the NRC requests for additional information (RAIs) on AP1000 Standard Combined License Technical Report 138, APP-GW-GLN-138, "In-service Testing and In-service Inspection Requirements". These RAI responses are submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in the responses is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

Responses are provided for RAI-TR138-CIB2-01 and -02(a-d) as sent in an email from NRC (Dave Jaffe) to Westinghouse (Sam Adams) on January 10, 2008. These responses complete all requests received to date for Technical Report 138.

Pursuant to 10 CFR 50.30(b), the responses to the requests for additional information on Technical Report 138 are submitted as Enclosure 1 under the attached Oath of Affirmation.

Questions or requests for additional information related to the content and preparation of these responses 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.

Westinghouse would appreciate the opportunity to meet with the staff to discuss the In-service Testing (IST) Program outlined in the AP1000 Design Control Document. The questions included in the enclosed RAIs indicate that a meeting to discuss and explain the program would be useful.

D063
NRO

Very truly yours,

A. Sterdis, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Attachment

1. "Oath of Affirmation," dated February 8, 2008

/Enclosure

1. Responses to Requests for Additional Information on Technical Report No. 138

cc:	D. Jaffe	-	U.S. NRC	1E	1A
	E. McKenna	-	U.S. NRC	1E	1A
	P. Ray	-	TVA	1E	1A
	P. Hastings	-	Duke Energy	1E	1A
	R. Kitchen	-	Progress Energy	1E	1A
	A. Monroe	-	SCANA	1E	1A
	J. Wilkinson	-	Florida Power & Light	1E	1A
	C. Pierce	-	Southern Company	1E	1A
	E. Schmiech	-	Westinghouse	1E	1A
	G. Zinke	-	NuStart/Entergy	1E	1A
	R. Grumbir	-	NuStart	1E	1A
	D. Lindgren	-	Westinghouse	1E	1A

ATTACHMENT 1

"Oath of Affirmation"

ATTACHMENT 1

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:	)
AP1000 Design Certification Amendment Application	)
NRC Docket Number 52-006	)

APPLICATION FOR REVIEW OF
"AP1000 GENERAL COMBINED LICENSE INFORMATION"
FOR DESIGN CERTIFICATION AMENDMENT APPLICATION REVIEW

W. E. Cummins, being duly sworn, states that he is Vice President, Regulatory Affairs & Standardization, for Westinghouse Electric Company; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission this document; that all statements made and matters set forth therein are true and correct to the best of his knowledge, information and belief.

W. E. Cummins
Vice President
Regulatory Affairs & Standardization

Subscribed and sworn to
before me this 8th day
of February 2008.

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Patricia S. Aston, Notary Public
Murrysville Boro, Westmoreland County
My Commission Expires July 11, 2011
Member, Pennsylvania Association of Notaries

Notary Public

ENCLOSURE 1

Responses to Requests for Additional Information on Technical Report No. 138

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR138-CIB2-01
Revision: 0

Question:

By a letter dated October 19, 2007, Westinghouse submitted Revision 0 to AP1000 Combined License (COL) Standard Technical Report APP-GLN-138 (TR 138), "Inservice Testing and Inservice Inspection Requirements." In the cover letter, Westinghouse states that the technical report was submitted to supplement the Inservice Testing (IST) Information provided in Revision 16 to the AP1000 Design Control Document (DCD) to support COL application (COLA) content and standardization. Westinghouse also states the report is submitted as part of the NuStart Bellefonte COL Project, but considers the information to be generic and to apply to all COL applications referencing the AP1000 Design Certification. (However, the recent Bellefonte COLA does not appear to rely on TR 138 in its FSAR Section 3.9.6.) Section II, "Technical Description and Justification," of the AP1000 Licensing Design Change Document for TR 138 indicates that some of the proposed changes to AP1000 DCD Revision 16 specified in TR 138 are intended to achieve conformance with Regulatory Guide (RG) 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)." Based on the staff's review, the information contained TR 138 and AP1000 DCD Revision 16 does not satisfy the guidance in RG 1.206 for COL applications. For example, Paragraph C.III.3.9.6.3.1, "Inservice Testing Program for Motor-Operated Valves," of RG 1.206 requests that the COL applicant describe the IST program that periodically verifies the design-basis capability of safety-related motor-operated valves (MOVs), including (1) showing how periodic testing (or analysis combined with test results where testing is not conducted as design-basis conditions) objectively demonstrates continued MOV capability to open and/or close under design-basis conditions; and (2) justifying any IST intervals that exceed either 5 years or three refueling outages, whichever interval is longer. Paragraph C.III.3.9.6.3.1 also requests that the COL applicant show how successful completion of the preservice and IST of MOVs demonstrates that the following criteria are met: (1) valve fully opens and/or closes as required by its safety function; (2) adequate margin exists and includes consideration of diagnostic equipment inaccuracies, degraded voltage, control switch repeatability, load-sensitive MOV behavior, and margin for degradation; and (3) maximum torque and/or thrust (as applicable) achieved by the MOV (allowing sufficient margin for diagnostic equipment inaccuracies and control switch repeatability) does not exceed the allowable structural and undervoltage motor capability limits for the individual parts of the MOV. This information is not provided in TR 138 or AP1000 DCD Revision 16. If the intent of TR 138 combined with AP1000 DCD Revision 16 is to satisfy the RG 1.206 recommendations, Westinghouse is requested to address in its proposed TR 138 each provision of Section C.III.3.9.6 in RG 1.206.

Westinghouse Response:

The Bellefonte COLA does include the information in APP-GW-GLN-138 (TR-138) by reference in the FSAR. The principal reference to the AP1000 Design Control Document in the FSAR is found in Section 1.1 and includes the following discussion of what "referenced DCD" means "Throughout this FSAR, the "referenced DCD" is the AP1000 DCD submitted by Westinghouse as Revision 16 including any supplemental material as identified in Table 1.6-201." Included in

Table 1.6-201 is Technical Report APP-GW-GLR-134 (TR-134). TR-134 includes the DCD changes required to support the Bellefonte FSAR and COL application that were identified since DCD Revision 16 was published. TR-134 does include the changes to DCD Subsection 3.9.6 identified in TR-138.

Regulatory Guide 1.206 was prepared to provide guidance for the preparation of COL applications. It does not strictly apply to design control documents for certified designs. Nevertheless guidance from Regulatory Guide 1.206 was incorporated into the DCD changes in TR-138 when appropriate. This was done to minimize departures from the DCD that otherwise would have to be included in the FSAR. For example the valve and actuator types and the AMSE Code Classification were added to Table 3.9-16 to address guidance in Regulatory Guide 1.206. This information previously was provided in other DCD sections but was not included in Subsection 3.9.6. Some of the information requested in Regulatory Guide 1.206 is more appropriately provided in the FSAR for the specific plant since it is programmatic information that may change over time or from plant to plant. For example the ASME Code edition and addenda used is different for the certified design than the COL application because the base year is different. The FSAR also addresses use of ASME Code Case OMN-1 that is not included in the DCD. Finally, some of the guidance in Regulatory Guide 1.206 would require information beyond a program description that is the requirement for the DCD and FSAR. For example some of the guidance requests information that can not be supplied until a specific design and valve manufacturer is selected.

The determination of whether the periodic testing identified in Table 3.9-16 is appropriate to demonstrate continued MOV capability to open and/or close under design-basis conditions was addressed as part of the Design Certification review of the AP1000 as documented in FSER Sections 3.9.6.2 and 3.9.6.4. It is not required to review this information again. The basis for the validity of the testing specified in Subsection 3.9.6 including Table 3.9-16 relies largely on the experience and evaluations used to develop the ASME OM Code.

Justification for the frequency of testing and intervals between inservice testing was addressed during the review of the AP1000 design certification and does not need to be repeated for the COL application. The frequency and intervals between testing is consistent with the requirements of the ASME OM Code industry programs and regulatory guidance. Where frequency and test intervals have been altered in TR-138, the change was made to be consistent with criteria in the ASME OM Code and NRC Generic Letter 96-05. For example the interval for testing of manual valves was changed from quarterly to 2 years to be consistent with the limitations and modifications for 10 CFR 50.55a. Note 31 of Table 3.9-16 requires for operability testing a test frequency of 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. This data collection requires operating experience therefore the initial testing interval for the COL is the longer of every 3 refueling cycles or 5 years. Justification of this interval is not required for the COL application.

In Table 3.9-16 in the column labeled "Inservice Testing Type and Frequency" the requirement for exercise testing for power operated valves including motor operated valves is specified as full stroke exercise when required. This information was reviewed as part of the review of the

AP1000 design certification. In Section 3.9.6.4 of the FSER the staff noted that an IST program based on the IST requirements outlined in DCD Section 3.9.6 and Table 3.9-16 is acceptable. No further review of this testing or demonstration of the sufficiency of the testing is required as part of the COL review.

Determination of margin and consideration of diagnostic equipment inaccuracies, degraded voltage, control switch repeatability, load-sensitive MOV behavior, and margin for degradation requires the selection of specific valve designs and manufacturers and procurement of valves, actuators, and test equipment. This information is beyond the level of detail required for the program description required of DCDs and FSARs. This information will be included in the completed program consistent with the implementation schedule.

Determination of maximum torque and thrust achieved by an MOV requires the selection of specific valve designs and manufacturers and procurement of valves, actuators, and test equipment. Evaluation of the effect of maximum torque and thrust on valve parts also requires the selection of specific valve designs and manufacturers and procurement of valves, actuators, and test equipment. This information is beyond the level of detail needed for the program description required of DCDs and FSARs. This information will be included in the completed program consistent with the implementation schedule.

Reference(s):

APP-GW-GL-700, AP1000 Design Control Document
APP-GW-GLR-134, AP1000 DCD Impacts to Support COLA Standardization

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-TR138-CIB2-02a
Revision: 0

Question:

In TR 138, Westinghouse proposes specific changes to AP1000 DCD Revision 16 to support COL application content and standardization. Some of the proposed changes to AP1000 DCD Revision 16 specified in TR 138 do not appear consistent with language in the AP1000 DCD, IST regulatory requirements, or operating experience from implementation of IST and power-operated valve programs at nuclear power plants. Westinghouse is requested to ensure that the proposed changes to AP1000 DCD Revision 16 in TR 138 are appropriate. Examples of information in TR 138 that should be addressed are as follows:

a. New Subsection 3.9.3.4.4, "Inspection, Testing, Repair and/or Replacement Snubbers," proposed in TR 138 states in the third paragraph that details of the inservice examination and testing program, including test schedules and frequencies, are reported in the inservice inspection and testing plan included in the IST program required by Subsection 3.9.8.3, "Snubber Operability Testing. AP1000 DCD Revision 16 states in Subsection 3.9.8.3 that COL applicants referencing the AP1000 design will develop a program to verify operability of essential snubbers as outlined in subsection 3.9.3.4.3. If the intent of TR 138 is to supplement AP1000 DCD Revision 16 such that no additional information is needed from the COL applicant for the snubber program, then TR 138 needs for fulfill the provision in subsection 3.9.3.4.3 of AP1000 DCD Revision 16.

Westinghouse Response:

The revision of Subsection 3.9.3.4.3 and the addition of Subsection 3.9.3.4.4 as identified in APP-GW-GLN-138 (TR-138) were in response to a comment from the NRC that the DCD should include a discussion of the IST program for dynamic restraints. The information added provides general DCD level information to describe the inservice testing program for the dynamic restraints. The COL applicants referencing the AP100 Design Certification will provide any additional required information for the program description for the inservice testing program for dynamic restraints as part of their COL application. Generally design issues are addressed in the DCD and programmatic issues are addressed in the COL applications.

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-TR138-CIB2-02b
Revision: 0

Question:

In TR 138, Westinghouse proposes specific changes to AP1000 DCD Revision 16 to support COL application content and standardization. Some of the proposed changes to AP1000 DCD Revision 16 specified in TR 138 do not appear consistent with language in the AP1000 DCD, IST regulatory requirements, or operating experience from implementation of IST and power-operated valve programs at nuclear power plants. Westinghouse is requested to ensure that the proposed changes to AP1000 DCD Revision 16 in TR 138 are appropriate. Examples of information in TR 138 that should be addressed are as follows:

b. TR 138 proposes to revise the third, fourth, and fifth paragraph of Section 3.9.6.2 in AP1000 DCD Revision 16 to state that the testing of power-operated valves utilizes the guidance from Generic Letter (GL) 96-05 and the Joint Owners Group MOV Periodic Verification study. TR 138 states that the following will be performed to demonstrate the acceptability of the functional performance of power operated valves other than motor-operated valves: (1) periodically assess the diagnostic methods used in the verification of valve function; and (2) evaluation of lessons learned through other related programs such as GL 89-10 and GL 96-05 programs. These general statements in TR 138 do not describe the IST program for power operated valves.

Westinghouse Response:

The paragraph identified for changes in APP-GW-GLN-138 (TR-138) do not provide all of the In-Service Testing (IST) program description for power operated valves. Paragraphs that were not changed from the AP1000 DCD Revision 16 are not included in TR-138. Specific requirements for power operated valves, other than motor-operated valves, in-service testing are provided in the ASME OM Code, ISTC 3500 and ISTC-5100. This testing required by the Code includes periodic valve exercising along with measurement of valve stroke time. Section 3.9.6.2.2 of DCD Revision 16 as amended by TR138 outlines requirements for inservice testing of power operated valves included in the IST Program:

There is considerable additional information about in-service testing for power operated valves not only in the balance of 3.9.6.2 but also in 3.9.6.2.2. Revision 16 of the DCD added information about risk ranking and determining functional margin. Also the reference (Bellefonte) COLA FSAR adds information about the IST program in this area including information on operability tests for other power-operated valves. In particular the COLA FSAR adds information about implementation milestones and guidance to be used for the testing.

The changes to DCD Subsection 3.9.6 included in TR-138 were developed with help from industry personnel experienced in in-service testing, including personnel who are involved in the development of the Bellefonte in-service testing program. The information included in DCD

Revision 16, the generic changes in TR-138, and supplementary information included in the Bellefonte COLA FSAR is sufficient to describe the IST program for power operated valves.

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-TR138-CIB2-02c
Revision: 0

Question:

In TR 138, Westinghouse proposes specific changes to AP1000 DCD Revision 16 to support COL application content and standardization. Some of the proposed changes to AP1000 DCD Revision 16 specified in TR 138 do not appear consistent with language in the AP1000 DCD, IST regulatory requirements, or operating experience from implementation of IST and power-operated valve programs at nuclear power plants. Westinghouse is requested to ensure that the proposed changes to AP1000 DCD Revision 16 in TR 138 are appropriate. Examples of information in TR 138 that should be addressed are as follows:

c. TR 138 proposes to revise Subsection 3.9.6.2.1, "Valve Function Tested," in AP1000 DCD Revision 16 to state that the throttling function is included in the AP1000 IST program but that the testing of throttling (pressure regulation) is not required in the ASME OM Code. TR 138 should not specify the scope of the ASME OM Code.

Westinghouse Response:

The subject revision follows a list of functions included in the test program. This list included the throttling function shown as follows:

- Throttle flow (active function)

The sentence added as the revision is as follows:

> Although the throttling function is included in the AP1000 inservice testing program, testing of throttling (pressure regulation) is not required in the ASME OM Code.

This added sentence is not intended to specify the scope of the ASME Code. This sentence was added as result of internal review comments that indicated some confusion about why a function that is not included in the ASME OM Code is included in the inservice testing program description. The valves tested for the throttling function are the pressure regulation valves in the system that supplies air from compressed air tanks to the control room. The added sentence provides an affirmative acknowledgement that although testing of the throttling functions is not required by the ASME OM Code; it is required in the AP1000 inservice testing program.

Design Control Document (DCD) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR138-CIB2-02d
Revision: 0

Question:

In TR 138, Westinghouse proposes specific changes to AP1000 DCD Revision 16 to support COL application content and standardization. Some of the proposed changes to AP1000 DCD Revision 16 specified in TR 138 do not appear consistent with language in the AP1000 DCD, IST regulatory requirements, or operating experience from implementation of IST and power-operated valve programs at nuclear power plants. Westinghouse is requested to ensure that the proposed changes to AP1000 DCD Revision 16 in TR 138 are appropriate. Examples of information in TR 138 that should be addressed are as follows:

d. TR 138 proposes to revise Subsection 3.9.6.2.3, "Valve Disassembly and Inspection," in AP1000 DCD Revision 16 to specify that if the ASME OM Code test methods are impractical for check valves, or sufficient flow cannot be achieved or verified, a sample disassembly examination program shall be used to verify valve obturator movement. TR138 should describe the check valve sampling program, such as through the implementation of a condition monitoring program in accordance with the ASME OM Code.

Westinghouse Response:

The AP1000 has been designed to facilitate the testing required to satisfy the current requirements of the ASME OM Code. The inservice testing program described in Subsection 3.9.6 of the DCD and FSAR includes testing deferrals allowed by the ASME OM Code and discussion of relief requests for testing methods alternatives, but no check valves are expected to require valve disassembly and inspection as an alternative to testing. The subsection on valve disassembly and inspection is included to describe the program to be used if future ASME OM Code testing requirements are added that cannot be accomplished with the AP1000 design.

Subsection 3.9.6.2.3 provides sufficient information to constitute a program description of the valve disassembly and inspections program. The final sentence of the first paragraph: "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." provides a description of the sampling program for check valves. The second paragraph "Disassembly and inspection of other types of valves will be performed based on information from inservice testing, or other program requirements, as noted below:" provides a description of the sampling program for other valves.

Design Control Document (DCD) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

PRA Revision:
None

Technical Report (TR) Revision:
None