PMBelCOL PEmails

From: Ravindra Joshi
Sent: Wednesday, April 30, 2008 8:07 AM
To: andrea sterdis; Eddie R Grant; Hastings, Peter S; Ray, Phillip M; rgrumbir@gmail.com
Cc: Joseph Sebrosky; PMBelCOL PEmails
Subject: RAI Letter No.007 related to SRP Section 3.9.6 for the Bellefonte Units 3 and 4
Attachments: ML0812005061.pdf

To All,
Attached is RAI Letter No. 007.

Ravi Joshi
Project Manager
NRO/DNRL/NWE1
US NRC
301-415-6191

Hearing Identifier: Bellefonte_COL_Public_EX
Email Number: 160

Mail Envelope Properties (CEEA97CC21430049B821E684512F6E5E60199735A4)

Subject: RAI Letter No.007 related to SRP Section 3.9.6 for the Bellefonte Units 3 and 4
Sent Date: 4/30/2008 8:07:14 AM
Received Date: 4/30/2008 8:07:16 AM
From: Ravindra Joshi

Created By: Ravindra.Joshi@nrc.gov

Recipients:
"Joseph Sebrosky" <Joseph.Sebrosky@nrc.gov>
Tracking Status: None
"PMBelCOL PEmails" <PMBelCOL.PEmails@nrc.gov>
Tracking Status: None
"andrea sterdis" <alsterdis@tva.gov>
Tracking Status: None
"Eddie R Grant" <erg-xl@cox.net>
Tracking Status: None
"Hastings, Peter S" <pshastings@duke-energy.com>
Tracking Status: None
"Ray, Phillip M" <pmray@tva.gov>
Tracking Status: None
"rgrumbir@gmail.com" <rgrumbir@gmail.com>
Tracking Status: None

Post Office: HQCLSTR01.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	130	4/30/2008 8:07:16 AM
ML0812005061.pdf	117891	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

April 28, 2008

Ms. Andrea L. Sterdis
Manager, Nuclear Licensing & Industry Affairs
Nuclear Generation Development & Construction
Tennessee Valley Authority
1101 Market Street
Chattanooga, Tennessee 37402-2801

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 007 RELATED TO SRP SECTION 03.09.06 FOR THE BELLEFONTE UNITS 3 and 4 COMBINED LICENSE APPLICATION

Dear Ms. Sterdis:

By letter dated September 30, 2007, as supplemented by letters dated November 2, 2007, January 8, 2008 and January 14, 2008, Tennessee Valley Authority (TVA) submitted its application to the U. S. Nuclear Regulatory Commission (NRC) for a combined license (COL) for two AP1000 advance passive pressurized water reactors pursuant to 10 CFR Part 52. The NRC staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed application.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter.

To support the review schedule, you are requested to respond within 45 days of the date of this letter. If changes are needed to the final safety analysis report, the staff requests that the RAI response include the proposed wording changes.

If you have any questions or comments concerning this matter, you may contact me at 301-415-6191 or you may contact Joesph Sebrosky, the lead project manager for the Bellefonte combined license at 301-415-1132.

Sincerely,

/RA/

Ravindra G. Joshi, Project Manager
AP1000 Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-014
52-015

Enclosure:
Request for Additional Information

CC: see next page

If you have any questions or comments concerning this matter, you may contact me at 301-415-6191 or you may contact Joesph Sebrosky, the lead project manager for the Bellefonte combined license at 301-415-1132.

Sincerely,

/**RA**/

Ravindra G. Joshi, Project Manager
AP1000 Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-014
52-015
eRAI Tracking No. 110

Enclosure:
Request for Additional Information

Distribution:

Public	DTerao	BHughes
RidsNroDnrlNwe1	SCoffin	MComar
RidsNroLAKGoldstein	TSimms	AHodgdon
RidsOgcMailCenter	BAnderson	TScarbrough
RidsAcrsAcnwMailCenter	SSanders	
RidsRgn2MailCenter	JMazza	
JSebrosky	PMoulding	

ADAMS Accession No. ML081200506 NRO-002

OFFICE	CPIB/BC		NWE1/PM	OGC	NWE1/L-PM
NAME	DTerao*		RJoshi*	PMoulding*	JSebrosky*
DATE	4/04/08		4/22/08	4/24/08	4/28/08

*Approval captured electronically in the electronic RAI system.

OFFICIAL RECORD COPY

Request for Additional Information
Bellefonte Units 3 and 4
Tennessee Valley Authority
Docket Nos.52-014 and 52-015
SRP Section: 03.09.06 - Functional Design Qualification and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints
Application Section: 3.9.6

QUESTION from Component Integrity, Performance & Testing Branch 1

03.09.06-2

Confirm the agreement at the public meeting on March 26-27, 2008, that Westinghouse will provide the additional information on the functional design and qualification of safety-related valves and dynamic restraints within the scope of the AP1000 Design Control Document (DCD) as part of procurement specifications (to be available later in 2008) that will be applicable to the combined license (COL) application for Bellefonte Units 3 and 4. The above request for additional information (RAIs) and the following RAIs in this review area are needed by the NRC staff to complete its review of the Bellefonte inservice testing (IST) and motor-operated valve (MOV) testing program descriptions and their implementation using the guidance in NRC Standard Review Plan (SRP) 3.9.6, "Functional Design, Qualification, and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints." These RAIs are being directed to the Tennessee Valley Authority (TVA) based on the results of the public meeting between TVA, Westinghouse, and the NRC staff on March 26-27, 2008, in Rockville, MD, to discuss IST-related issues.

03.09.06-3

The Bellefonte Final Safety Analysis Report (FSAR) incorporates by reference Subsection 3.9.3.4, "Component and Piping Supports," of the AP1000 DCD Tier 2, and adds new Subsection 3.9.3.4.4, "Inspection, Testing, Repair and/or Replacement of Snubbers." Bellefonte FSAR Subsection 3.9.3.4 does not provide a list of snubbers, but indicates that the list will be included as part of the testing program after the piping analysis is completed. The subsection describes the pre-service examination of snubbers, but not the inservice examination and testing program. Provide or reference the following information, or indicate the status of and schedule for its availability, on the inservice testing (IST) program for safety-related dynamic restraints: (a) identification of safety-related components that use snubbers in their support systems; (b) test frequency and duration and examination methods to be used in the IST program related to visual inspections and functional testing of dynamic restraints and basis for testing; and (c) specification of accessibility provisions for maintenance, IST and testing, and repair and replacement of snubbers.

03.09.06-4

Section 3.9.6, "Inservice Testing of Pumps and Valves," in AP1000 DCD Tier 2 specifies the 1995 Edition with the 1996 Addenda of the ASME OM Code as the basis for developing the IST plan for the AP1000 Design Certification. Section 3.9.6, "Inservice Testing of Pumps and Valves," in the Bellefonte FSAR states that the description of the IST program for Bellefonte is based on the ASME OM Code 2001 Edition through 2003 Addenda. Identify any requests for relief from ASME Code requirements that TVA considers necessary in order for it to meet revisions to the ASME OM Code from the 1995

Edition/1996 Addenda to the 2001 Edition/2003 Addenda. If no relief requests are needed, please state so in the Bellefonte FSAR.

03.09.06-5

Describe TVA's implementation of the optional provisions and guidance indicated in the AP1000 DCD for the IST program. The third paragraph of Subsection 3.9.6.2, "Inservice Testing of Valves," in the AP1000 DCD Tier 2, indicates that DCD Table 3.9-16 includes the type of testing to be performed and the frequency at which the testing should be performed. This paragraph states that the test program conforms to the requirements of ASME OM, Subsection ISTC, to the extent practical. This paragraph also states that the guidance in NRC Generic Letters, AEOD reports, and industry and utility guidelines (including NRC Generic Letter 89-04) is considered in developing the test program.

03.09.06-6

TR 134 modifies the third paragraph in Subsection 3.9.6.2 of Revision 16 to AP1000 DCD Tier 2 by including a statement that POV testing utilizes guidance from Generic Letter 96-05 and the JOG MOV periodic verification study, MPR 2524-A (November 2006). TR 134 also includes a statement that during the IST period, the following are performed to demonstrate the acceptability of the functional performance of POVs other than MOVs: (1) periodically assess the diagnostic methods used in the verification for valve function; and (2) evaluation of lessons learned through other related programs such as MOV GL 89-10 and 96-05 Programs. Clarify the implementation of the provisions in TR 134 as applicable to Bellefonte by describing: (a) testing of POVs to be implemented at Bellefonte to satisfy the general statement in the AP1000 DCD that the testing utilizes guidance from Generic Letter 96-05 and the Joint Owners Group (JOG) MOV periodic verification study; and (b) plans to periodically assess the diagnostic methods used in the verification of valve function for POVs other than MOVs at Bellefonte.

03.09.06-7

The Bellefonte FSAR incorporates by reference Subsection 3.9.6.2.2, "Valve Testing," of the AP1000 DCD Tier 2 with supplemental information. Table 3.9-16, "Valve Inservice Test Requirements," in AP1000 DCD Tier 2 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. Provide or reference the following information, or indicate the status of and schedule for its availability, on the IST program for valves: (a) development of test requirements, procedures, and acceptance criteria for valve preservice tests, valve replacement, valve repair and maintenance, and indication of valve position consistent with the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) used as a basis for the Bellefonte IST program in the COL application; (b) methods for measuring the reference values and IST values for power-operated valves (POVs), including motor-operated valves (MOVs), air-operated valves, hydraulic-operated valves, and solenoid-operated valves; and (c) development of valve test procedures and schedules.

03.09.06-8

Subsection 3.9.6.2.2, "Valve Testing," in the AP1000 DCD Tier 2 discusses valve testing in a subsection titled "Power-Operated Valve Operability Tests." TR 134 includes a revision to this subsection that operability testing as required by 10 CFR 50.55a(b)(3)(ii) is performed on MOVs in the ASME OM Code IST Program to demonstrate that the MOVs are capable of performing their design-basis safety functions. Discuss the application of JOG MOV Periodic Verification Study, MPR-2524-A, referenced in Bellefonte FSAR Subsection 3.9.6.2.2, and the NRC safety evaluation on the JOG

program, dated September 2006, for periodic verification of the design-basis capability of safety-related MOVs, and plans regarding other POVs.

03.09.06-9

In light of the weaknesses in the IST provisions in the ASME Code for quarterly MOV stroke-time testing, the NRC issued Generic Letter 96-05 to request that nuclear power plant licensees establish programs to assure the capability of safety-related MOVs to perform their design-basis functions over the long term. The NRC revised 10 CFR 50.55a to require that nuclear power plant licensees supplement the MOV stroke-time testing specified in the ASME OM Code with a program to periodically verify the design-basis capability of safety-related MOVs. Clarify the paragraph titled "Active MOV Test Frequency Determination" in Subsection 3.9.6.2.2 of the Bellefonte FSAR. The clarified paragraph should discuss: a. Implementation of ASME OM Code Case OMN-1 for verifying MOV design-basis capability on a periodic basis. b. Determination of MOV required capability for design-basis conditions, including uncertainties. c. Determination of MOV output capability for design-basis conditions, including uncertainties. d. How periodic testing (or analysis combined with test results where testing is not conducted at design-basis conditions) objectively demonstrates continued MOV capability to open and/or close under design-basis conditions. e. Justification of approach for any IST intervals that exceed either 5 years or three refueling outages, whichever interval is longer. f. How successful completion of the preservice and IST of MOVs demonstrates that the following criteria are met: (i) valve fully opens and/or closes as required by its safety function; (ii) adequate margin exists and includes consideration of diagnostic equipment inaccuracies, degraded voltage, control switch repeatability, load-sensitive MOV behavior, and margin for degradation; and (iii) 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.

03.09.06-10

In addition to incorporating by reference Subsection 3.9.6.2.2 of the AP1000 DCD Tier 2, the Bellefonte FSAR includes a paragraph titled "Design Basis Verification Test," which states that a design-basis verification (operability) test will be performed on each MOV so as to verify the capability of each valve to meet its safety-related design requirements prior to power operation, and that this test will be performed at conditions that are as close to design-basis conditions as practicable. Nuclear power plant operating experience revealed weaknesses in the design-basis qualification of safety-related MOVs that were addressed through industry programs developed in response to Generic Letters 89-10 and 96-05. ASME Standard QME-1-2007, "Qualification of Active Mechanical Equipment used in Nuclear Power Plants," incorporates lessons learned for functional qualification of MOVs and other POVs to be used at nuclear power plants. Clarify the discussion of MOV design-basis verification testing in the paragraph titled "Design Basis Verification Test," in Subsection 3.9.6.2.2 of the Bellefonte FSAR. The paragraph should reflect the improvements in industry methods for MOV functional design and qualification, and periodic verification of MOV design-basis capability as required by 10 CFR 50.55a.

03.09.06-11

Clarify the program description for safety-related POVs other than MOVs in the paragraph titled "Other Power-Operated Valve Operability Tests," in Subsection 3.9.6.2.2 of the Bellefonte FSAR. In addition to incorporating by reference Subsection 3.9.6.2.2 of the AP1000 DCD Tier 2, the Bellefonte FSAR includes a paragraph titled "Other Power-Operated Valve Operability Tests," which states that POVs other than active MOVs are exercised quarterly in accordance with ASME OM Code, Section ISTC, unless justification is provided in the IST program for testing these valves at other Code mandated

frequencies. Lessons learned from the resolution of weaknesses in the design, qualification, and testing of MOVs are also applicable to other POVs used at nuclear power plants. In discussing the MOV lessons learned applicable to other POVs in Regulatory Issue Summary (RIS) 2000-03, the NRC staff notes that the regulations require verification of the design-basis capability of safety-related POVs. The "Other Power-Operated Valve Operability Tests" paragraph in the Bellefonte FSAR should describe the incorporation of lessons learned from MOV analysis and tests performed in response to Generic Letters 89-10 and 96-05 into the IST program for other POVs.

03.09.06-12

Clarify whether NRC approval is requested for the three items specified Subsection 3.9.6.3, "Relief Requests," in the Bellefonte FSAR as part of the COL application review. The Bellefonte FSAR incorporates by reference Subsection 3.9.6.3, "Relief Requests," of the AP1000 DCD Tier 2 with three specific items of discussion. First, the Bellefonte FSAR indicates that the IST Program described in the FSAR utilizes Code Case OMN-1, Revision 1, "Alternative Rules for the Preservice and Inservice Testing of Certain Electric Motor-Operated Valve Assemblies in Light Water Reactor Power Plants." Second, the Bellefonte FSAR indicates that a relief request will be necessary for containment leak testing of the normal residual heat removal system containment penetration relief valve (RNS-V021) and containment isolation MOV (RNS-V023) by pressurizing the lines in the reverse direction to the flow of a containment leak. Third, the Bellefonte FSAR indicates that a relief request will be necessary for a timed slow closure of the main steam isolation valves and main feedwater isolation valves (SGS-V040A/B, V057A/B). The Bellefonte COL applicant is requested to clarify which of these items a) involve relief from the ASME Code because of design impracticality for satisfying the Code requirements, b) are alternatives to the Code that provide an acceptable level of quality and safety, or c) are being requested because compliance with the Code would result in hardship or unusual difficulty. If NRC approval of such a relief request is requested as part of the COL application, the Bellefonte COL applicant should (a) identify the component by name and number, component functions, ASME Section III Code class, valve category, and pump group; (b) identify the applicable ASME Code section; (c) for relief pursuant to 10 CFR 50.55a(f)(6)(i) or (g)(6)(i), specify the basis under which relief is requested and explain why complying with the ASME OM Code is impractical or should otherwise not be required; (d) for an alternative pursuant to 10 CFR 50.55a(a)(3), provide details regarding the proposed alternative demonstrating that (i) the proposed IST provides an acceptable level of quality and safety, or (ii) compliance with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; and (e) describe the implementation of the proposed relief or alternative, including milestones.

03.09.06-13

Clarify when the Preservice Testing Program and MOV Testing Program would commence. Bellefonte FSAR Section 13.4, "Operational Programs," indicates that FSAR Table 13.4-201, "Operational Programs Required by NRC Regulations," lists each operational program, the regulatory source for the program, the FSAR section in which the operational program is described, and the associated implementation milestones. FSAR Table 13.4-201 specifies the implementation milestone for the Preservice Testing Program and the MOV Testing Program as "prior to initial fuel load." Section 3, "Operational Program Implementation," in Part 10 of the Bellefonte COL application provides proposed license conditions specifying the implementation milestones for the Preservice Testing Program and MOV Testing Program. Clarify how these proposed license conditions establish the commencement of the Preservice Testing Program and MOV Testing Program. For example, will commencement of these programs be tied to the completion of construction activities for the component, system, or elevation?

03.09.06-14

Section 3.9.2, “Dynamic Testing and Analysis,” in the AP1000 DCD Tier 2, describes tests to confirm that piping, components, restraints, and supports have been designed to withstand the dynamic effects of steady-state flow-induced vibration (FIV) and anticipated operational transient conditions. Subsection 14.2.9.1.7, “Expansion, Vibration and Dynamic Effects Testing,” in Chapter 14, “Initial Test Program,” of the AP1000 DCD Tier 2 states that the purpose of the expansion, vibration and dynamic effects testing is to verify that the safety-related, high energy piping and components are properly installed and supported such that, in addition to other factors, vibrations caused by steady-state or dynamic effects do not result in excessive stress or fatigue to safety-related plant systems. Nuclear power plant operating experience has revealed the potential for adverse flow effects from vibration caused by hydrodynamic loads and acoustic resonance on reactor coolant, steam, and feedwater systems. Discuss the planned implementation of the program indicated in the AP1000 DCD to address potential adverse flow effects on safety-related valves and dynamic restraints within the IST program in the reactor coolant, steam, and feedwater systems at Bellefonte from hydraulic loading and acoustic resonance during plant operation.

03.09.06-15

Subsection 3.9.8.4 in the AP1000 DCD Tier 2 specifies that COL applicants referencing the AP1000 design will develop an IST program in conformance with the valve IST requirements outlined in Section 3.9.6 and Table 3.9-16. Subsection 3.9.8.4 also states that the COL applicant will complete an evaluation as identified in DCD Subsection 3.9.6.2.2 to determine the frequency of POV operability testing. Discuss implementation of the provisions in Subsection 3.9.8.4, “Valve Inservice Testing,” of Section 3.9.8, “Combined License Information,” in the AP1000 DCD Tier 2.

03.09.06-16

Clarify the references for the IST program in the Bellefonte Technical Specifications to the ASME OM Code 2001 Edition through the 2003 Addenda. In Part 4, “Technical Specifications,” of the Bellefonte COL application, several sections (for example, Section 5.5.3, “Inservice Testing Program,”) refer to Section XI of the ASME Boiler and Pressure Vessel Code when discussing the IST program although Bellefonte FSAR Section 3.9.6 specifies the ASME OM Code 2001 Edition/2003 Addenda for use in developing the IST program.