

**Southern Nuclear
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ND-10-0064

U.S. Nuclear Regulatory Commission
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Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4 Combined License Application
Response to Bellefonte Units 3 and 4 Safety Evaluation Report Open Items for Chapter 3

Ladies and Gentlemen:

By letter dated March 28, 2008, Southern Nuclear Operating Company (SNC) submitted an application for combined licenses (COLs) for proposed Vogtle Electric Generating Plant (VEGP) Units 3 and 4 to the U.S. Nuclear Regulatory Commission (NRC) for two Westinghouse AP1000 reactor plants, in accordance with 10 CFR Part 52. As a result of the NRC's detailed review of the initial AP1000 Reference COL application (Bellefonte Units 3 and 4), the NRC has written a safety evaluation report (SER) with open items for the subject chapter. VEGP addressed some of the items in a previous letter as indicated in the enclosure. VEGP is addressing additional open items identified in the SER in the enclosure to this letter as the new Reference COL applicant. For completeness, each open item is identified but responses are provided only for the items impacting standard information or otherwise resulting in standard changes for the AP1000 COL applications. The open items identified as plant specific will be addressed on the Bellefonte Units 3 and 4 docket by the Tennessee Valley Authority.

If you have any questions regarding this letter, please contact Mr. Wes Sparkman at (205) 992-5061 or Ms. Amy Aughtman at (205) 992-5805.

D092
NRD

Mr. M. K. Smith states he is the Nuclear Development Technical Support Director for Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY



Michael K. Smith

Sworn to and subscribed before me this 12th day of January, 2010

Notary Public: Deborah A. Javorska

My commission expires: October 24, 2012

MKS/BJS/dmw

Enclosure: Response to R-COLA SER with Open Items, Chapter 3



cc: Southern Nuclear Operating Company

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Mr. J. T. Gasser, Executive Vice President, Nuclear Operations (w/o enclosure)
Mr. D. H. Jones, Site Vice President, Vogtle 3 & 4 (w/o enclosure)
Mr. T. E. Tynan, Vice President - Vogtle (w/o enclosure)
Mr. D. M. Lloyd, Vogtle 3 & 4 Project Support Director (w/o enclosure)
Mr. C. R. Pierce, AP1000 Licensing Manager
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Mr. J. D. Williams, Vogtle 3 & 4 Site Support Manager
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Document Services RTYPE: AR01.1053
File AR.01.02.06

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Southern Nuclear Operating Company

ND-10-0064

Enclosure

Response to R-COLA SER with Open Items

Chapter 3

<u>Open Item</u>	<u>Response</u>
03.04-01	Plant-Specific – Bellefonte (not included)
03.06-01	Standard – Pending WEC OI submittal
03.09-01	Standard – See 12-14-2009 response
03.09-02	Standard – Pending WEC OI submittal
03.09-03	Standard – Pending WEC OI submittal
03.09-04	Standard – See 12-14-2009 response
03.09-05	Standard – See enclosed response
03.09-06	Standard – See 12-14-2009 response
03.10-01	Standard – not yet fully developed (later)
03.11-01	Standard – See 12-14-2009 response

Attachments / Enclosures

None

Pages Included

eRAI Tracking No. 0110

NuStart Qb Tracking No. 3950

NRC SER OI Number 03.09-02:

AP1000 DCD, Section 3.9.6.2.2 discusses valve testing in a section titled "Power-Operated Valve Operability Tests." For example, this AP1000 DCD section specifies 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. In RAI 3.9.6-8, the NRC staff requested that the applicant discuss the application of JOG MOV Periodic Verification Study, MPR-2524-A, referenced in BLN COL FSAR Section 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. In its response to this RAI, the applicant stated that the BLN COL FSAR would be revised to address this issue. Revision 1 to BLN COL FSAR Section 3.9.6.3, "Relief Requests," states that the BLN IST program utilizes ASME OM 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." Revision 1 to the BLN COL FSAR also states that the BLN IST program, as applicable, will follow the guidance in the JOG MOV Periodic Verification Program, including the recommendations in the NRC safety evaluation on the JOG MOV periodic verification program, dated September 2006, for periodic verification of the design-basis capability of safety-related MOVs. The applicant also stated that the BLN COL FSAR will be revised to address this issue as part of the response to RAI 3.9.6-11. The NRC accepts, with conditions, ASME OM Code Case OMN-1 (Revision 0) in RG 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code." The NRC staff has not updated RG 1.192 at this time to accept Revision 1 to ASME OM Code Case OMN-1. Further, RAI 3.9.6-11 applies to POVs other than MOVs. Therefore, the applicant needs to address RAI 3.9.6-8 with respect to MOVs. The applicant needs to submit a request to apply an alternative to the ASME OM Code to use ASME OM Code Case OMN-1 (Revision 1). Further, the applicant needs to update BLN COL FSAR Section 3.9.6 to be consistent with Revision 17 to the AP1000 DCD. For example, Revision 1 to the BLN COL FSAR refers to sentences in Section 3.9.6.2.2 of the AP1000 DCD that have been revised in Revision 17 to the DCD. This is Open Item 3.9-2.

SNC Response:

Westinghouse Electric Company (WEC) is currently developing their response to AP1000 DCD SER Open Item OI-SRP3.9.6-CIB1-04 which is directly related to this topic. Following the WEC submittal to address their SER open item, the need for additional COL application submittals will be determined and provided as appropriate.

This response is expected to be STANDARD for the S-COLAs.

Associated VEGP COL Application Revisions:

To be determined.

eRAI Tracking No. 0110

NuStart Qb Tracking No. 3951

NRC SER OI Number 03.09-03:

In light of the weaknesses in the IST provisions in the ASME OM Code for quarterly MOV stroke-time testing, the NRC issued GL 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. Further, 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 ensure that MOVs continue to be capable of performing their design-basis safety functions. In RAI 3.9.6-9, the NRC staff requested that the applicant clarify the paragraph titled "Active MOV Test Frequency Determination" in Section 3.9.6.2.2 of the BLN COL FSAR. In its response to this RAI, the applicant stated that the FSAR would be revised in response to this RAI. Revision 1 to BLN FSAR Section 3.9.6.2.2 indicates that the valve functional design and qualification requirements will be specified in procurement specifications. The FSAR references the guidance of the JOG MOV periodic verification program and the ASME OM Code Case OMN-1 requirements, following valve installation, to verify design-basis capability and to identify potential valve degradation impacts on functional margin. The FSAR states that the test frequency will be established using the guidance in ASME OM Code Case OMN-1. The NRC staff finds the provisions specified in Revision 1 to the BLN COL FSAR in response to this RAI to be acceptable, but not sufficient to fully describe the MOV Testing Operational Program. For example, several aspects of the RAI are not addressed in the FSAR, including: (a) use of ASME OM Code Case OMN-1 (Revision 0) as accepted in RG 1.192 in the BLN COL FSAR or request for an alternative to the ASME OM Code to implement ASME OM Code Case OMN-1 (Revision 1); (b) determination of MOV required capability for design-basis conditions on a periodic basis (such as by the JOG MOV periodic verification program); (c) determination of MOV output capability on a periodic basis; (d) how periodic testing 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; and (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. This is Open Item 3.9-3.

SNC Response:

Westinghouse Electric Company (WEC) is currently developing their response to AP1000 DCD SER Open Item OI-SRP3.9.6-CIB1-04 which is directly related to this topic. Following the WEC submittal to address their SER open item, the need for additional COL application submittals will be determined and provided as appropriate.

This response is expected to be STANDARD for the S-COLAs.

Associated VEGP COL Application Revisions:

To be determined.

eRAI Tracking No. 0110

NuStart Qb Tracking No. 3953

NRC SER OI Number 03.09-05:

Section 3.9.2, "Dynamic Testing and Analysis," in the AP1000 DCD, describes tests to confirm that piping, components, restraints, and supports have been designed to withstand the dynamic effects of steady-state FIV and anticipated operational transient conditions. Section 14.2.9.1.7, "Expansion, Vibration and Dynamic Effects Testing," in Chapter 14, "Initial Test Program," of the AP1000 DCD, 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. In RAI 3.9.6-14, the NRC staff requested that the applicant 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 BLN from hydraulic loading and acoustic resonance during plant operation. In its response to this RAI, the applicant referenced the provisions in the AP1000 DCD for vibration monitoring and testing to be implemented at the BLN Units 3 and 4. For example, the applicant referred to the pre-operational test program in AP1000 DCD Section 3.9.2.1, the reactor vessel internals vibration testing program in Section 14.2.9.1.9, and the expansion, vibration, and dynamic effects testing in Section 14.2.9.1.7. The applicant considered these testing programs to be adequate to meet regulatory guidance and requirements, and that no additional vibration monitoring or testing programs are planned. It is unclear how these programs will address FIV effects on valves and dynamic restraints within the BLN IST Program as part of the initial test program specified in Chapter 14 of the AP1000 DCD. This is Open Item 3.9-5.

SNC Response:

As discussed in response to NRC RAI 03.09.06-14 (TVA-RAI-LTR-007, ADAMS# ML081680127) SNC intends to use the overall Initial Test Program (which includes construction and installation testing, pre-operational testing, and start-up testing) to demonstrate that the plant has been constructed as designed and the systems perform consistent with design requirements. Tests that confirm safety-related piping, supports, and system components are properly installed and supported such that vibrations caused by steady-state or dynamic effects do not result in excessive stress or fatigue are performed.

DCD Section 3.9.2.1 "Piping Vibration, Thermal Expansion and Dynamic Effects," states the preoperational test program for the ASME Code, Section III, Class 1, 2, and 3 piping systems (including valves and dynamic restraints) simulates actual operating modes to demonstrate that the components comprising these systems meet functional design requirements and that piping vibrations are within acceptable levels. Preoperational testing programs are outlined in DCD Subsection 14.2.9. Piping systems are checked in a series of tests and inspections; construction tests (correct system installation), preoperational tests (proper system operation – cold and hot conditions), and Start-up tests (proper system performance - power range operation). One purpose of these tests is to verify that system piping, restraints, supports, and other system components are properly installed and have been designed to withstand vibration effects caused by steady state or dynamic effects without creating excessive stress or fatigue. DCD Section 3.9.2.1 also states provisions are made to verify the operability of essential snubbers and if vibration levels during testing exceed the acceptance standard, corrective measures will be taken.

The above referenced preoperational and startup tests are described in more detail in DCD Sections 14.2.9 and 14.2.10. DCD Section 14.2.9.1.7, "Expansion, Vibration and Dynamic Effects Testing," requires (in item 14.2.9.1.7(b)) testing at both cold and hot conditions to demonstrate steady state (flow-induced) vibrations are within acceptable limits. In item 14.2.9.1.7(c), testing for significant vibrations caused by dynamic effects is required to be performed during hot functional testing to confirm stress analyses under transient conditions are acceptable. DCD Section 14.2.10.4.18, "Dynamic Response," demonstrates during power range testing that the stress analysis for selected systems and components under transient conditions is within design functional requirements. The procedures implementing these testing requirements incorporate plant operating experience including resolution of generic issues as discussed in FSAR Section 13.5 and Subsection 14.2.5. Implementation milestones for these test programs are provided in FSAR Table 13.4-201.

The planned vibration testing program described in DCD Sections 14.2.9 and 14.2.10, coupled with the preservice and inservice testing programs described in DCD Sections 3.9.3.4.4 and 3.9.6, will confirm component installation in accordance with design requirements, and address the effects of steady-state (flow-induced) and transient vibration, therefore ensuring the operability of valves and dynamic restraints included in the BLN IST program.

This response is expected to be STANDARD for the S-COLAs.

Associated VEGP COL Application Revisions:

None.