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March 6, 2013

Docket Nos.: 50-424  
50-425

NL-13-0498

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D. C. 20555-0001

Vogtle Electric Generating Plant  
Request for Code Alternative for CVCS  
Three-Inch Class 1 RCPB Leakage Test

Ladies and Gentlemen:

Southern Nuclear Operating Company (SNC) by its letter NL-13-0286, dated February 14, 2013, requested NRC approval of the alternative to the requirements of Class 1 Leakage Test, IWA-5241(a) of the 2001 Edition of ASME Section XI with Addenda through 2003. SNC hereby withdraws that request and proposes this replacement request in accordance with the provisions of 10 CFR 50.55a(a)(3)(ii). This code alternative would be applied to eight three-inch check valves located in the Chemical and Volume Control Systems (CVCS), Normal and Alternate Charging piping of Plant Vogtle, Units 1 and 2.

The subject eight check valves (four per unit) function as isolation valves for the Reactor Coolant Pressure Boundary (RCPB). The applicable portions of the ASME Section XI Code requirements for the periodic visual examination of those RCPB valves cannot be performed in the current CVCS configuration due to access limitations resulting from installed encapsulation devices (seal caps). Removal of the seal caps to meet the leak test requirements of the ASME Code would result in certain hardships without a compensating increase in the level of inspection quality and plant safety.

Enclosure 1 of this letter provides a more detailed discussion of the need and justification for the use of an alternate approach for the Class 1 leakage testing of the subject CVCS three-inch check valves needed for conformance to IWA-5241(a) of the Code. An expedited approval of the use of the proposed alternative is requested by March 12, 2013, to support plant restart following the Plant Vogtle 2R16 Refueling Outage scheduled to begin March 10, 2013.

Please note the commitments to the NRC contained in this letter are tabulated in Enclosure 2. If you have any questions regarding this request, please contact Mr. G. K. McElroy at (205) 992-7369.

Respectfully submitted,



C. R. Pierce  
Regulatory Affairs Director

CRP/WEB

Enclosure: Request for Approval of Code Alternative

cc: Southern Nuclear Operating Company  
Mr. S. E. Kuczynski, Chairman, President, & CEO  
Mr. D. G. Bost, Executive Vice President & Chief Nuclear Officer  
Mr. T. E. Tynan, Vice President – Vogtle  
Mr. B. L. Ivey, Vice President – Regulatory Affairs  
RType: CVC7000

U. S. Nuclear Regulatory Commission  
Mr. V. M. McCree, Regional Administrator  
Mr. R. E. Martin, NRR Senior Project Manager – Vogtle  
Mr. L. M. Cain, Senior Resident Inspector – Vogtle

**Enclosure 1**  
**to NL-13-0498**

**Request for Approval of Code Alternative**

**SOUTHERN NUCLEAR OPERATING COMPANY  
VEGP-ISI-ALT-09, VERSION 2.0  
PROPOSED ALTERNATIVE IN ACCORDANCE WITH 10 CFR 50.55a(a)(3)(ii)**

**Plant Site-Unit:**

Vogtle Electric Generating Plant - Units 1 and 2

**Interval-Interval Dates:**

3rd ISI Interval, May 31, 2007 through May 30, 2017

**Requested Date for Approval and Basis:**

Approval is requested by March 8, 2013, in support of the Plant Vogtle 2R16 Refueling Outage scheduled to start on March 10, 2013.

**ASME Code Components Affected:**

There are currently eight (8) Chemical and Volume Control System (CVCS), Normal and Alternate Charging three-inch Check Valves affected; four (4) valves per unit. These valves function as isolation valves for the Reactor Coolant Pressure Boundary (RCPB).

11208-U6-035	21208-U6-035
11208-U6-036	21208-U6-036
11208-U6-037	21208-U6-037
11208-U6-038	21208-U6-038

**Applicable Code Edition and Addenda:**

ASME Section XI, 2001 Edition through the 2003 Addenda

**Applicable Code Requirements:**

Pressure testing of Class 1 components per Examination Category B-P, Item No. B15.10 at the conclusion of each Plant Vogtle Unit 1 and 2 refueling outage starting in spring 2013.

**Background and Reason for Request:**

The subject CVCS three-inch check valves function as isolation valves for the Reactor Coolant Pressure Boundary (RCPB). The body-to-bonnet interfaces of these valves were encapsulated by seal caps per a configuration option offered by Southern Nuclear's (SNC) Nuclear Steam Supply System (NSSS) vendor (also the valve supplier) to mitigate concerns with borated water leakage through the body-to-bonnet interface. These seal caps now pose two relatively recently identified concerns: the prohibition of access for compliance with the ASME Section XI Code requirement of periodic visual examination of these RCPB valves; and the issue of potential degradation of the valves' body-to-bonnet bolting due to stress corrosion cracking (SCC). This SCC may occur in

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bolts made of susceptible material due to adverse conditions within the encapsulation of a valve with leakage past its body-to-bonnet gasket. The first of these two issues (access for examination) is the reason for this proposed alternative. The later is addressed as a related matter to describe certain examinations of the subject valves and to describe the plans to modify/replace the valve bonnets with an enhanced design to resolve each of these two issues.

Regarding the first cited issue, the installed seal caps restrict accessibility to the bolted joint at the body-to-bonnet interface of each of these eight valves (the actual pressure boundary). With the seal caps in place, IWA-5241(a) of the 2001 Edition of ASME Section XI with Addenda through 2003 cannot be satisfied during the Class 1 Leakage Test. Recently, while considering the coincident matters of the possibility of SCC of the subject valves' body-to-bonnet bolting and the implications of ASME Code Committee's interpretation for Inquiry 12-1275 on August 16, 2012; SNC determined that the ASME Code is not being fully addressed, and that an ISI alternative would be highly advantageous for achieving compliance until permanent removal of the seal caps is accomplished.

In order to satisfy the unaltered Code requirement with the current valve design and configuration, the seal caps would need to be removed and remain removed during the Class 1 Leakage Test. Subsequently, they would have to either be re-installed at normal operating pressure and temperature (NOPT) after the Class 1 Leakage Test, or remain uninstalled. It is highly undesirable to leave the seal caps removed with the current valve design since it would possibly allow future uncontained leakage of reactor coolant past the gasket to the outside the RCPB. Such a condition could require a plant shutdown with draining to mid-loop level for repair of the gasket. Conversely, the additional work necessitated for the Code leakage test (specifically seal cap reinstallation, insulation reinstallation, and scaffold removal on all four valves while at the plant Mode 3 conditions required for the code leakage visual examination) is a detriment to personnel safety due to heat stress since these valves are located inside the bio-shield of containment. To return to cooler plant conditions such as present in Mode 5 to perform restoration of the seal caps following the Code leakage examination would introduce an undesirable delay in the refueling outage and impose additional thermal cycling of primary plant components.

Regarding the second issue, in April 2012, SNC personnel learned of a concern raised through the industry that valve bolting in this type of configuration could be susceptible to SCC if the bolting is exposed to hot oxygen-saturated water. This condition is possible if the bolted joint within the enclosure is leaking and eventually this leakage fills the enclosure. At that time, it was also learned that the PWROG Materials Subcommittee would issue guidance per the NEI 03-08 Materials Initiative protocol that would require utilities to perform examinations to determine if the applicable valve bolting was affected by SCC. This concern was documented in Plant Vogtle's Corrective Action Program, Condition Report (CR) 438268.

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Industry guidance on this matter was issued by PWROG on August 16, 2012, under letter OG-12-330. Pursuant to this guidance, the staggered removal of these seal caps on selected valves had been considered at Plant Vogtle. Initially, the decision was made to conduct an "OG-12-330" VT-3 and UT examination of valve 2-1208-U6-037's body-to-bonnet flange bolting following removal of the valve's seal cap. However, pursuant to discussions held with the NRC staff, in order to verify that significant leakage of reactor coolant has not accumulated within the remaining three Unit 2 subject encapsulation devices during the plant's operation since the last removal of the seal caps, an additional inspection will be conducted beyond the examination of valve 2-1208-U6-037. Specifically, an examination orifice will be drilled into the volume of the remaining three valves' seal caps to confirm that leakage from the bolted joint within the enclosure has not filled the enclosure thereby subjecting the bolting to the conditions that are postulated to possibly result in SCC of the bolting. Should fluid or wet boric acid residue be detected in any of these three valves by this procedure, that valve's seal cap would be removed and its bolting examined by VT-3 and UT. In the event dry boric acid residuals are found during this inspection through the drilled orifice, the condition will be documented, but no further corrective or inspection actions will be performed. Following this inspection for fluids, the orifices in the seal caps will be closed, and any removed seal caps reinstalled. The schedules for these actions are described in the attached Table 1.

This approach to examining the three valves (2-1208-U6-035, 2-1208-U6-036, and 2-1208-U6-038) provides a verification of bolting exposure to submersion in borated water that is beyond the scope of the PWROG's program schedule. This process is preferable to removal and re-installation of all four valves' seal caps due to the reduction in personnel radiation exposure and heat stress. Experience indicates that radiation fields with an approximate range of 30 to 80 mrem/hr (this rate a function of unit and other variables with the reactor shut down) can be experienced in this area during periods with the plant in Modes 3 through 6.

The relevance of the second cited issue (SCC of valve bolting) on the matter of Code compliance lies principally with the noted modification of the current subject valve bonnets by either joint rework or replacement with a redesigned bonnet. This modified bonnet will resolve each of these two issues with the Plant Vogtle subject check valves – the bolts will no longer be subject to an environment that could lead to SCC, and the pressure boundary of these valves body-to-bonnet interface will be accessible for Code leakage testing, obviating the need for this requested Code alternative.

A secondary beneficial aspect of the enhanced "OG-12-330" program conducted in the 2R16 outage will be the verification for all four Unit 2 subject valves' flange gaskets have not leaked to such an extent that fluids have collected and remain within the seal cap volume (see Table 1). While not a Code leakage test, the inspection does provide empirical evidence of the status

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of the body-to-bonnet gasket and lends assurance that the inspected valve's body-to-bonnet interface is not leaking. Further, the performance of the baseline UT examination on any uncapped valve also verifies the structural integrity of the valve's bolting.

SNC asserts that this ISI alternative, in combination with the enhanced implementation of the PWROG guidance outlined in Letter OG-12-330, adequately address the issue of Code leak tests for the subject valves for the specified timeframe needed for bonnet modification.

**Proposed Alternative and Basis for Use:**

In accordance with the provisions of 10 CFR 50.55a(a)(3)(ii), SNC proposes to perform the Plant Vogtle RCPB Class 1 Leakage Test at NOPT with the seal cap enclosures installed as an alternative to the Code examination requirements. The examinations will be performed at the valve's seal cap welds rather than at the pressure boundary at the bolted joint of the valve body to bonnet interface, and will follow the ASME Section XI Code requirements for accessibility to allow for examinations to be performed without removal of insulation. Such examinations will be performed following the conclusion of each refueling outage on Plant Vogtle Units 1 and 2 until each of the seal caps are permanently removed, and either the body to bonnet joint is reworked or until the valve bonnets are replaced with newly designed bonnets. One of these options to obviate the use of the seal caps is expected to be completed by 1R19 (Fall 2015) and 2R18 (Spring 2016) for Units 1 and 2, respectively. Use of the alternate examination method will be required only until one of these modifications described above has been completed on each subject RCPB check valve.

Additionally, SNC has implemented a program that exceeds the "Needed Requirements" of PWROG letter OG-12-330 for both Plant Vogtle units to address the concern for SCC of the bolting. During the previous Unit 1 refueling outage, 1R17 (Fall 2012), the 1-1208-U6-037 and 1-1208-U6-038 check valves had their respective seal caps removed and a VT-3 visual and UT examination were performed with no degradation or indications noted. During the upcoming 2R16 (Spring 2013) refueling outage, SNC will remove the seal cap from 2-1208-U6-037, and perform a VT-3 and a UT on the valve's body-to-bonnet bolting. Further, verification that there are no fluids entrapped within the seal cap volumes of valves 2-1208-U6-035, 2-1208-U6-036, and 2-1208-U6-038 will be provided by means of the aforementioned orifices. In the refueling outages following and until the seal caps are permanently removed, SNC will examine the subject bolting as described in Table 1 of this alternative.

To permanently address the lack of visual access to and the potential SCC concern for the valve bolting, SNC is implementing item 2.0 under section "Good Practice Recommendations" of PWROG letter OG-12-330, which states "A permanent resolution that eliminates the potential for SCC of encapsulation devices should be implemented." SNC is considering a design modification to

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install a new bonnet design that will allow the bonnet to be seal welded to the body of valve without enclosing or obstructing future visual examination of the valve bolting.

The newly designed bonnet and associated hardware would be available no earlier than the 1R18 refueling outage currently scheduled for the Spring of 2014 and the 2R17 refueling outage currently scheduled for the Fall of 2014. A proposal received from the NSSS vendor indicated that a lead-time of twenty weeks is required for the delivery of the associated hardware after receipt of order.

The permanent resolution of the issue had until recently followed a schedule commensurate with the PWROG guidance issued in August of 2012. It had been considered that by following the PWROG examination scope and schedule requirements specified for the short term bolting structural concerns, the permanent resolution could follow a longer-term course of action. With the favorable examination results of the examination of the valve bolting in 1R17 and the technical justification provided in the PWROG guidance considered, it was judged that the negative impact to the organization to obtain a new design by the 2R16 refueling outage (Spring 2013) was not warranted. It was not until the more recent determination following the August 2012 Code Inquiry that installation of the seal caps results in an inability to comply with the ASME Code visual VT-2 examination requirement that additional urgency to complete design activities and obtain required components was realized. Thus, the final design modification and procurement activities cannot be completed for the 2R16 (Spring 2013) outage.

Detection of failures of the welds joining the valves to their seal cap enclosures may be possible by identification of leaks from that interface. Any significant RCS leakage at this connection would be expected to clearly exhibit evidence of boric acid accumulation on the insulation applied to the valves (as indicated by water and boric acid crystals) and would be identified during the required VT-2 visual examinations.

In addition to the above examinations, SNC will continue to implement the guidance from the PWROG letter, OG-12-330 at Plant Vogtle until such a time when the seal caps are permanently removed and the valves' bolts are accessible for visual examination. Until then, during each unit's refueling outage beginning with 1R18 (Spring 2014) and 2R17 (Fall 2014), SNC will remove the seal caps on each valve that has a seal cap installed and perform a baseline UT and VT-3 examination on the bolting for those not previously examined in 1R17 or 2R16. Once a baseline UT has been performed for a valve, the UT examination would subsequently only be required in cases where borated water leakage is identified that could potentially affect the bolting.

In lieu of the ASME Code-required examination, SNC proposes implementing the examinations as described above. SNC further proposes to leave the seal caps installed on these eight valves during plant operation until the best option



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and schedule can be finalized and implemented for the long-term resolution of this issue. SNC will perform examination(s) of any Plant Vogtle seal cap removed as defined in the guidance contained in PWROG Letter OG-12-330. If any borated water leakage is observed in the course of the OG-12-330 examination, a UT will also be performed on the valve bolting per the PWROG guidance. These ongoing examinations provide reasonable and sufficient assurance that the valve bolting continues to perform its intended function based on the PWROG Letter OG-12-330 specified examination scope and frequency. Compliance with the cited requirements of the Section XI Code would result in hardship without a compensating increase in the level of quality and safety, therefore, approval of this alternative per 10 CFR 50.55a(a)(3)(ii) is justified.

**Alternative Duration:**

This ISI alternative will remain in effect until actions are taken to make the valve bolting accessible for visual examination through permanent removal of the seal caps; either with or without a modified bonnet design and/or configuration. SNC expects to complete these actions no later than the 1R19 (Fall 2015) and the 2R18 (Spring 2016) Plant Vogtle refueling outages.

**Precedents:**

None

**References:**

1. NRC Information Notice 2012-15, "Use of Seal Cap Enclosures to Mitigate Leakage from Joints That Use A-286 Bolts," date August 9, 2012 (ML121740012)
2. PWROG Letter OG-12-330, "Generic Guidance for Valves that have Seal Encapsulation Devices Installed," date August 16, 2012
3. ASME Inquiry 12-1275, "ASME BPVC, Section XI, IWA-1400(b), 1983 Edition with the Summer 1983 Addenda through the 20130 Edition," date August 16, 2012

**Status:**

Pending NRC approval.

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**Table 1**

	<b>1R17 (Fall 2012)</b>	<b>1R18 (Spring 2014) (6)</b>	<b>1R19 (Fall 2015) (5)(6)</b>
<b>UNIT 1</b>	Valves 1-1208-U6-037 and 1-1208-U6-038 were examined by VT-3 and UT.	VT-3 and UT examination for 1-1208-U6-035 and 1-1208-U6-036.  VT-3 examination for 1-1208-U6-037 and 1-1208-U6-038. <b>(1)</b>	VT-3 on all encapsulated valves. <b>(1)</b>
	<b>2R16 (Spring 2013)</b>	<b>2R17 (Fall 2014) (6)</b>	<b>2R18 (Spring 2016) (5)(6)</b>
<b>UNIT 2</b>	Minimum of 1 Valve will be examined by VT-3 and UT; 2-1208-U6-037 is scheduled for examination. <b>(2)</b>  The remaining 3 valves will have inspection orifices drilled to determine if valve bolting has been submerged in reactor coolant leakage. <b>(4)</b>	VT-3 and UT examination will be required on 3 valves (those not examined by UT in 2R16). <b>(3)</b>  The valve examined in 2R16 will be required to have a VT-3 performed. <b>(1)</b>	VT-3 on all encapsulated valves. <b>(1)</b>
<p style="text-align: center;"><b>Notes</b></p> <p><b>(1) Per PWROG Guidance in OG-12-330, a UT examination will be required if evidence of borated water leakage affecting the bolting is detected.</b></p> <p><b>(2) Per PWROG Guidance in OG-12-330, dependent upon examination results of the one valve, the remaining valves may require full seal cap removal and examination.</b></p> <p><b>(3) If all valves were examined in 2R16, then only a VT-3 examination will be required unless evidence of borated water leakage affecting the bolting is detected.</b></p> <p><b>(4) If fluid or wet boric acid residual is found inside the seal cap, the seal cap will be removed and bolting will be examined by VT-3 and UT.</b></p> <p><b>(5) Permanent removal of seal cap with or without a modified bonnet configuration will be implemented by this refueling outage.</b></p> <p><b>(6) If the modified bonnet is installed, new studs will be installed as well and no bolting examinations will be required.</b></p>			

**Enclosure 2**

**to NL-13-0286**

**List of Regulatory Commitments**

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**List of Regulatory Commitments**

The following table identifies those actions committed by Southern Nuclear Operating Company in this document for Vogtle Electric Generating Plant. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

<b>Commitment</b>	<b>Scheduled Completion Date</b>
The necessary modifications will be made such that the eight Plant Vogtle Units 1 and 2 three-inch check valves located in the Chemical and Volume Control Systems (CVCS), Normal and Alternate Charging piping, 11208-U6-035, 11208-U6-036, 11208-U6-037, 11208-U6-038, 21208-U6-035, 21208-U6-036, 21208-U6-037, and 21208-U6-038 will be in compliance with the Code of Record IWA-5241(a) requirements.	Unit 1: Prior to startup following Refueling Outage 19 (Fall 2015)  Unit 2: Prior to startup following Refueling Outage 18 (Spring 2016)