

August 29, 2016

Mr. Ronald A. Jones, Vice President  
New Nuclear Deployment  
P.O. Box 88  
Jenkinsville, SC 29065

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION UNITS 2 AND 3 – ALTERNATIVE TO  
TITLE 10 OF THE CODE OF FEDERAL REGULATIONS, SECTION 50.55a  
REGARDING PRESERVICE INSPECTION REQUIREMENTS FOR CORE  
MAKEUP TANKS (CAC NO. RG3005)

Dear Mr. Jones:

By letter dated May 3, 2016, (Agencywide Documents Access and Management System Accession No. ML16127A584), the South Carolina Electric & Gas Company (SCE&G or “the licensee”), submitted a request to use an alternative to the regulations for Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1). The licensee requested the alternative to the code of record, the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (B&PV Code), Section XI, 2007 Edition through 2008 Addenda, because it states that the B&PV Code does not describe the requirements for preservice inspection of the two Class 1 Core Makeup Tanks (CMTs), for each unit. The licensee requests that, as an alternative, the ASME B&PV Code, Section XI, 2007 through 2008 Addenda requirements stipulated for the pressurizer be used for the inspection of the CMTs.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the subject request and concludes that the licensee has demonstrated that the proposed alternative provides an acceptable level of quality and safety. Therefore, the NRC staff authorizes the proposed alternative of using the examination requirements stipulated for the pressurizer in ASME B&PV Code, Section XI, IWB-2500, for the preservice inspection of the CMTs, pursuant to 10 CFR 50.55a(z)(1) for VCSNS Units 2 and 3.

R. Jones

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If you have any questions, please contact Billy Gleaves, Senior Project Manager, at (301) 415-5848 or [Bill.Gleaves@nrc.gov](mailto:Bill.Gleaves@nrc.gov).

Sincerely,

*/RA/*

Jennifer Dixon-Herrity, Acting Chief  
Licensing Branch 4  
Division of New Reactor Licensing  
Office of New Reactors

Docket Nos.: 52-027 and 52-028

Enclosure:  
Safety Evaluation

cc: See next page

If you have any questions, please contact Billy Gleaves, Senior Project Manager, at (301) 415-5848 or [Bill.Gleaves@nrc.gov](mailto:Bill.Gleaves@nrc.gov).

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SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS  
REGARDING PRESERVICE INSPECTION REQUIREMENTS FOR CORE MAKEUP TANKS  
SOUTH CAROLINA ELECTRIC & GAS COMPANY  
SOUTH CAROLINA PUBLIC SERVICE AUTHORITY  
VIRGIL C. SUMMER NUCLEAR STATION UNITS 2 AND 3  
DOCKET NOS. 52-027 AND 52-028

**1.0 INTRODUCTION**

By letter dated May 3, 2016, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16127A584), the South Carolina Electric & Gas Company (SCE&G or “the licensee”), submitted a request to use an alternative to the regulations for Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1). The Alternative requested was to the requirements of the 2007 Edition, including the 2008 Addenda, of American Society of Mechanical Engineers (ASME) Section XI, IWB-2500, for VCSNS. Specifically, the licensee’s request would allow the use of ASME Section XI examination requirements stipulated for the pressurizer for preservice inspection of the AP1000 Core Makeup Tanks (CMTs).

**2.0 REGULATORY EVALUATION**

The regulations in 10 CFR 50.55a require that ASME Code Class 1 components (including their supports) meet the preservice examination requirements set forth in either the edition and addenda of ASME Section XI applied to the construction of the component or in subsequent editions and addenda that have been incorporated by reference in 10 CFR 50.55a. Per 10 CFR 50.55a(z), alternatives to the requirements of 10 CFR 50.55a may be used when authorized by the Commission. In proposing alternatives, the licensee must demonstrate that: (1) the proposed alternative would provide an acceptable level of quality and safety; or (2) compliance would result in hardship or unusual difficulty without a compensating increase in quality and safety.

In its letter dated May 3, 2016, the licensee determined that the 2007 Edition, including the 2008 Addenda, of ASME Section XI does not provide examination requirements for the AP1000 CMTs. To address this issue, pursuant to 10 CFR 50.55a(z)(1), the licensee proposes to use the examination requirements stipulated for the pressurizer in the 2007 Edition, including the 2008 Addenda, of ASME Section XI, Table IWB-2500-1, for preservice inspection of the CMTs.

### **3.0 EVALUATION OF THE ALTERNATIVE**

#### **3.1 Items for Which an Alternative is Requested**

The components affected by this request are the CMTs. The Westinghouse Electric Company's (Westinghouse) AP1000 design includes two CMTs per unit. The CMTs are vertical, cylindrical tanks with hemispherical upper and lower heads made of carbon steel, clad with stainless steel. They are located inside containment and their primary function is to provide makeup and boration to the reactor coolant system during events not involving loss of coolant when the normal makeup system is unavailable or insufficient. As indicated in the VCSNS Updated Final Safety Analysis Report (UFSAR), Revision 4, (ADAMS Accession No. ML16193A229), Tier 2, Table 3.2-3, the CMTs are classified as Safety Class A components and are constructed to ASME Section III, Class 1 requirements.

#### **3.2 Applicable Code Requirement**

The regulations in 10 CFR 50.55a require that ASME Code Class 1 components (including their supports) meet the preservice examination requirements set forth in either the edition and addenda of ASME Section XI applied to the construction of the component or in subsequent editions and addenda that have been incorporated by reference in 10 CFR 50.55a. The inspection requirements for Class 1 components in the 2007 edition, including the 2008 addenda, of the ASME Code are provided in ASME Section XI, Subsection IWB. ASME Section XI, Table IWB-2500-1 provides the required methods of examination for the components and parts of the ASME Class 1 pressure retaining boundary. To provide a baseline for subsequent inservice examinations, ASME Section XI, IWB-2200 requires that all examinations required by ASME Section XI, Table IWB-2500-1 (with the exception of Examination Category B-P, and the VT-3 examination of the internal surfaces of Categories B-L-2 and B-M-2) be performed prior to initial plant startup.

#### **3.3 Proposed Alternative**

The licensee proposes to use the examination requirements stipulated for the pressurizer in the 2007 Edition, including the 2008 Addenda, of ASME Section XI, IWB-2500, for preservice inspection of the CMTs prior to initial plant startup.

#### **3.4 Basis for the Alternative**

The licensee stated that the CMTs are new ASME Class 1 components specific to the Westinghouse AP1000 design and have not been previously addressed by the ASME Code. Consequently, the 2007 Edition, including the 2008 Addenda, of ASME Section XI, Table IWB-2500-1, does not describe the requirements for the examination of the CMTs. As such, the licensee proposed to use the examination requirements stipulated for the pressurizer for preservice inspection of the CMTs.

In its letter, the licensee stated that both the pressurizer and CMTs are Class 1 vessels designed, fabricated and examined in accordance with ASME Section III, Subsection NB requirements. In addition, both the pressurizer and CMTs are operated at reactor coolant system nominal operating pressure and are fabricated of similar materials. The licensee also stated that the application of the pressurizer preservice inspection requirements will assure the

pressure retaining integrity of the CMTs is maintained in accordance with ASME Section XI requirements and is consistent with the requirements of 10 CFR 50.55a. On this basis, the licensee concluded that the proposed examinations for the CMTs would provide an acceptable level of quality and safety.

To describe how the ASME Section XI requirements for the pressurizer would be applied to the CMTs, the licensee provided Table 1 (in the application), which describes the proposed examinations for the CMTs. The licensee also provided Figures 1 and 2 (in the application) to describe the locations of welds, bolting, and other items that would be subject to inspection using the ASME Section XI requirements stipulated for the pressurizer.

### **3.5 Staff Evaluation**

10 CFR 50.55a(g)(3) requires that ASME Code Class 1 components (including supports) must meet the preservice examinations set forth in the Editions and Addenda of ASME Section III or XI. ASME Section XI, Subsection IWB provides requirements for the preservice and inservice inspection of ASME Code components. As indicated by the licensee, the CMTs are classified as ASME Code Class 1 components. Therefore, the requirements of ASME Section XI, Subsection IWB must be applied. However, the examination requirements of ASME Section XI, Table IWB-2500-1 are itemized by component and do not include the CMTs. In addition, ASME Section XI, Subsection IWB does not provide any requirements for components not identified in Table IWB-2500-1. Therefore, the staff believes that it is appropriate for the licensee to pursue alternative examination requirements in order to ensure that the pressure retaining integrity of the CMTs is maintained throughout the operating life of the plant.

In the May 3, 2016 request for alternative, the licensee proposed to use the examination requirements stipulated for the pressurizer for preservice examination of the CMTs. The staff reviewed the VCSNS UFSAR, Tier 2, Section 5.2.3, "Reactor Coolant Pressure Boundary Materials," and confirmed that the materials of construction for the pressurizer and CMTs are similar. Both components are fabricated using low alloy steel and clad with austenitic stainless steel. The staff also reviewed VCSNS, UFSAR, Tier 2, Section 5.4, "Component and Subsystem Design," and confirmed that the pressurizer and CMTs are designed to similar operating pressures and temperatures. On this basis, the staff believes that it is appropriate to use the examination requirements stipulated for the pressurizer for preservice examination of the CMTs.

Lastly, the staff reviewed the information provided in VCSNS alternative to determine whether the licensee had appropriately applied the examination requirements stipulated for the pressurizer to the proposed preservice inspections to the CMTs. The ASME Section XI, Subsection IWB examination categories that are applicable to the pressurizer are Categories B-B, B-D, B-F, B-G-1, B-G-2, B-K, and B-P. The staff reviewed the VCSNS alternative, Figure 1 and Figure 2 to determine whether all of the aforementioned examination categories are applicable to the CMTs. The staff also reviewed VCSNS's alternative, Table 1 to verify that the proposed examinations for the CMTs were in accordance with the requirements stipulated for the pressurizer in ASME Section XI, IWB-2500-1. Based on the review described above, the staff determined that the following examination categories stipulated for the pressurizer in ASME Section XI are applicable to the VCSNS CMTs: Categories B-B, B-D, B-F, B-G-2, B-K, and B-P. The staff determined that Examination Category B-G-1 is not applicable to the CMTs because they do not have pressure retaining bolting greater than 2 inches in diameter. The

staff also determined that VCSNS's alternative, Table 1 identified the appropriate examination category, item number, and examination method for each weld, welded attachment, bolt, and nut contained in the VCSNS CMTs. On this basis, the staff finds that the licensee has appropriately applied the examination requirements stipulated for the pressurizer in ASME Section XI to the proposed preservice inspections to the CMTs.

Based on the review described above, the staff finds that the licensee has demonstrated that using the examination requirements stipulated for the pressurizer in ASME Section XI, IWB-2500, for the preservice inspection of the VCSNS CMTs provides an acceptable level of quality and safety. This finding is based on the fact that the pressurizer and CMTs are both constructed to ASME Code Class 1 rules, fabricated using similar materials, and designed to similar operating pressure and temperature. The finding is also based on the fact that the licensee has appropriately described, in detail, how the examination requirements stipulated for the pressurizer will be applied to the preservice inspection of the CMTs. This description provides a reasonable assurance that the pressure retaining integrity of the CMTs will be maintained.

#### **4.0 CONCLUSION**

The staff concludes that the proposed alternative to the requirements of the 2007 Edition, including the 2008 Addenda, of ASME Section XI, IWB-2500 is authorized for VCSNS, on the basis that the proposed alternative provides an acceptable level of quality and safety. All other requirements of ASME Section XI and 10 CFR 50.55a, for which an alternative has not been specifically requested and authorized, remain applicable.