SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS

RELATED TO AMENDMENT NO. 73

TO THE COMBINED LICENSE NOS. NPF-93 AND NPF-94

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 September 29, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16273A557), South Carolina Electric and Gas Company (SCE&G) submitted a License Amendment Request (LAR) 15-11, "Request for License Amendment and Exemption: Boric Acid Storage Tank Suction Point ITAAC Changes," in which it proposed changes to the Virgil C. Summer Nuclear Station, Units 2 and 3 (Summer) Updated Final Safety Analysis Report (UFSAR) (ADAMS Accession No. ML16193A096) in the form of departures from a plant-specific Design Control Document (PS-DCD) Tier 2 figure and a combined license (COL) Appendix C inspections, tests, analyses, and acceptance criteria (ITAAC) table. Specifically, the LAR proposes changes to the boric acid storage tank (BAST) available volume at the suction point, chemical and volume control system (CVS) makeup flow rate, and BAST installation.

As described in UFSAR Subsection 9.3.6 (ADAMS Accession No. ML16193A100), one CVS function is to provide makeup at the proper boron concentration to the passive core cooling system accumulators, core makeup tanks, in-containment refueling water storage tank, and the spent fuel pool. Two centrifugal makeup pumps are provided in order to accomplish this function. These pumps are driven by alternating current motors and flow is controlled by positioning a control valve in the common discharge line downstream from the pumps. A cavitating venturi in the common discharge line limits the makeup flow and provides protection from excessive pump runout. A three-way valve in the suction header is positioned to provide a full range of borated water concentrations.

The borated water used in this makeup function is retained in the BAST. The BAST volume, as shown in UFSAR Table 9.3.6-2, is nominally 74,839 gallons, but in accordance with UFSAR Subsections 9.3.6.3.3 and 9.3.6.6.1.3, inspections verify that the tank volume can provide a minimum of 70,000 gallons of borated makeup water. The 70,000 gallons BAST volume is sufficient to allow one shutdown to cold shutdown, followed by a shutdown for refueling at the end of the fuel cycle. The BAST is vented to atmosphere and is located adjacent to the demineralized water storage tank in the plant yard.

The licensee has also requested an exemption from the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, Appendix D, "Design Certification Rule for the AP1000 Design," Section III.B, "Scope and Contents." This exemption request will allow a departure from the corresponding portions of the certified information in Tier 1 of the generic DCD.[1]

In order to modify the UFSAR (the plant-specific DCD) Tier 1 information, the NRC must find the licensee's exemption request included in its submittal for the LAR to be acceptable. The staff's review of the exemption request, and the LAR is included in this safety evaluation.

The NRC staff issued an initial *Federal Register* notice of opportunity to request a hearing and a proposed No Significant Hazard Determination on December 20, 2016 (81 FR 92870). No public comments have been received.

2.0 REGULATORY EVALUATION

As defined in Section II of Appendix D to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, Tier 1 information includes ITAAC and design descriptions, among other things. Therefore, a licensee referencing Appendix D incorporates by reference all Tier 1 information contained in the generic AP1000 DCD. The Tier 1 ITAAC and the design descriptions, along with the plant-specific ITAAC, were included in Appendix C of the COL at its issuance.

The regulation in 10 CFR Part 52, Appendix D, Section VIII.A.4, states that exemptions from Tier 1 information are governed by the requirements in 10 CFR 52.63(b)(1) and 10 CFR 52.98(f). It also states that the Commission will deny such a request if it finds that the design change will result in a significant decrease in the level of plant safety otherwise provided by the design.

The regulation in 10 CFR 52.63(b)(1) allows the licensee who references a design certification rule to request U. S. Nuclear Regulatory Commission (NRC) approval for an exemption from one or more elements of the certification information. The Commission may only grant such a request if it determines that the exemption will comply with the requirements of 10 CFR 52.7, which, in turn, points to the requirements listed in 10 CFR 50.12 for specific exemptions. In addition, the Commission must consider whether special circumstances, as required by 10 CFR 52.7 and 50.12, outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption. Therefore, any exemption from the Tier 1 information certified by Appendix D to 10 CFR Part 52 must meet the requirements of 10 CFR 50.12, 52.7, and 52.63(b)(1).

The regulation in 10 CFR 52.98(f) specifies that any modification to, addition to, or deletion from the terms and conditions of a COL including any modifications to, addition to, or deletion from the ITAAC contained in the license is a proposed amendment to the license. In LAR 15-11, SCE&G proposes changes to Summer, Units 2 and 3, COL Appendix C ITAAC, with corresponding changes to the associated plant-specific DCD Tier 1 information. Therefore, NRC approval is required prior to making the plant-specific proposed changes described in Summer, Units 2 and 3, LAR 15-11.

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[1] While the licensee describes the requested exemption as being from Section III.B of 10 CFR Part 52, Appendix D, the entirety of the exemption pertains to proposed departures from Tier 1 information in the generic DCD. In the remainder of this evaluation, the NRC will refer to the exemption as an exemption from Tier 1 information to match the language of Section VIII.A.4 of 10 CFR Part 52, Appendix D, which specifically governs the granting of exemptions from Tier 1 information.

The specific NRC technical requirements applicable to LAR 15-11 are the general design criteria (GDC) in Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities." In particular, these technical requirements include the following GDC:

GDC 29, "Protection against anticipated operational occurrences," requires that reactivity control systems be designed to assure an extremely high probability of accomplishing their safety functions in the event of anticipated operational occurrences.

Portions of the CVS are relied upon to provide negative reactivity addition and assure that specified acceptable fuel design limits (SAFDLs) will not be exceeded. NRC Standard Review Plan Section 9.3.4, "Chemical and Volume Control System (PWR) (Including Boron Recovery System)," (ADAMS Accession No. ML070160660) provides guidance for the NRC staff review of license applications regarding GDC 29 by specifying that the amount of boric acid stored in the CVS, such as a BAST, exceeds the amount required to borate the reactor coolant system to cold shutdown concentration, assuming that the control rod assembly with the highest reactivity worth is held in the fully withdrawn position, and to compensate for subsequent xenon decay during any part of core life.

The regulation in 10 CFR Part 52, Appendix D, Section III.B, requires a licensee referencing 10 CFR Part 52, Appendix D to incorporate by reference and comply with the requirements of Appendix D, including all Tier 1 information contained in the generic AP1000 DCD.

The regulation in 10 CFR Part 52, Appendix D, Section VIII.B.5.a, allows an applicant or licensee who references 10 CFR Part 52, Appendix D, to depart from Tier 2 information without prior NRC approval, unless the proposed departure involves a change to or departure from Tier 1 information, Tier 2* information, the Technical Specifications, or requires a license amendment under 10 CFR Part 52, Appendix D, Section VIII, paragraphs B.5.b or B.5.c. LAR 15-11 involves a departure from the plant-specific Tier 1 ITAAC information, so NRC approval is also required to change the Tier 2 UFSAR information.

3.0 TECHNICAL EVALUATION

3.1 EVALUATION OF EXEMPTION

The regulations in Section III.B of Appendix D to 10 CFR Part 52 require a licensee referencing Appendix D to 10 CFR Part 52 to incorporate by reference and comply with the requirements of Appendix D, including all Tier 1 information contained in the generic AP1000 DCD. As defined in Section II of Appendix D to 10 CFR Part 52, Tier 1 information includes ITAAC and design descriptions, among other things. Therefore, a licensee referencing Appendix D incorporates by reference all Tier 1 information contained in the generic AP1000 DCD. The Tier 1 ITAAC and the design descriptions, along with the plant-specific ITAAC, were included in Appendix C of the COL at its issuance. In LAR 15-11, SCE&G requests a permanent exemption from the provisions of 10 CFR Part 52, Appendix D, Section III.B, to allow a departure from elements of the certification information in Tier 1 of the generic AP1000 DCD. Because the changes to plant-specific Tier 1 information and corresponding changes to the associated COL Appendix C information, as identified by SCE&G, result in the need for a departure, an exemption from the certified design information is required.

The Tier 1 information for which a plant-specific departure and exemption is being requested includes changes to COL Appendix C Table 2.3.2-4, ITAAC No. 2.3.02.8a.ii, Acceptance Criteria ii), and associated plant-specific Tier 1 Table 2.3.2-4, Design Commitment 8.a), Acceptance Criteria ii) to revise the ITAAC Acceptance Criteria to state that the volume in the BAST is at least 70,000 gallons between the tank suction point and the tank overflow; and COL Appendix C Table 2.3.2-4, ITAAC No. 2.3.02.8a.iii, Acceptance Criteria iii) and associated plant-specific Tier 1 Table 2.3.2-4, Design Commitment 8.a), Acceptance Criteria iii) to revise ITAAC Acceptance Criteria to state that the total CVS makeup flow to the reactor coolant system (RCS) is less than or equal to 175 gallons per minute (gpm). The result of this exemption would be that SCE&G could implement modifications to Tier 1 information described and justified in LAR 15-11 if, and only if, the NRC approves LAR 15-11. This exemption is a permanent exemption limited in scope to the particular Tier 1 information specified.

As stated in Section VIII.A.4 of Appendix D to 10 CFR Part 52, an exemption from Tier 1 information is governed by the requirements of 10 CFR 52.63(b)(1) and 52.98(f). Additionally, Section VIII.A.4 of Appendix D to 10 CFR Part 52 provides that the Commission will deny an exemption request if it finds that the requested change to Tier 1 information will result in a significant decrease in the level of safety otherwise provided by the design. Pursuant to 10 CFR 52.63(b)(1), the Commission may grant exemptions from one or more elements of the certification information, so long as the criteria given in 10 CFR 52.7 which, in turn, references 10 CFR 50.12, are met and that the special circumstances, as defined by 10 CFR 50.12(a)(2), outweigh any potential decrease in safety due to reduced standardization.

Pursuant to 10 CFR 52.7, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 52. As 10 CFR 52.7 further states, the Commission's consideration will be governed by 10 CFR 50.12, "Specific exemptions," which states that an exemption may be granted when: (1) the exemptions are authorized by law, will not present an undue risk to public health and safety, and are consistent with the common defense and security; and (2) special circumstances are present. Specifically, 10 CFR 50.12(a)(2) lists six special circumstances for which an exemption may be considered. It is necessary for one of these special circumstances to be present in order for the NRC to consider granting an exemption request. SCE&G stated that the requested exemption meets the special circumstances of 10 CFR 50.12(a)(2)(ii). That subparagraph defines special circumstances as when "[a]pplication of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule." The NRC staff's analysis of each of these findings is presented below.

3.1.1 Authorized by Law

This exemption would allow SCE&G to implement approved revisions to COL Appendix C in the plant-specific DCD. This exemption is a permanent exemption limited in scope to particular Tier 1, Table 2.3.2-4 information. Subsequent changes to Tier 1, Table 2.3.2-4, or any other Tier 1 information would be subject to the exemption process specified in Section VIII.A.4 of Appendix D to 10 CFR Part 52 and the requirements of 10 CFR 52.63(b)(1). As stated above, 10 CFR Part 52, Appendix D, Section VIII.A.4 allows the NRC to grant exemptions from one or more elements of the Tier 1 information. Based on 10 CFR Part 52, Appendix D, Section VIII.A.4, the NRC staff has determined that granting of SCE&G's proposed exemption will not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations. Therefore, as required by 10 CFR 50.12(a)(1), the exemption is authorized by law.

3.1.2 No Undue Risk to the Public Health and Safety

The underlying purpose of Appendix D to 10 CFR Part 52 is to ensure that SCE&G will construct and operate the plant based on the approved information found in the DCD incorporated by reference into the SCE&G's licensing basis. These proposed changes would revise the ITAAC Acceptance Criteria in COL Appendix C Table 2.3.2-4, ITAAC No. 2.3.02.8a.ii to state that the volume in the BAST is at least 70,000 gallons between the tank suction point and the tank overflow; and COL Appendix C Table 2.3.2-4, ITAAC No. 2.3.02.8a.iii to state that the total CVS makeup flow to the RCS is less than or equal to 175 gpm. These changes will not adversely impact the ability of SCE&G to safely construct and operate the facility consistent with the performance of components for the AP1000 design certified by the NRC by updating the information mentioned above found in Tier 1, Table 2.3.2-4, of the DCD. These changes will not adversely impact the ability of the systems or equipment to perform their design function. These changes do not introduce any new industrial, chemical, or radiological hazards that would represent a public health or safety risk, nor do they modify or remove any design or operational controls or safeguards intended to mitigate any existing on-site hazards. Furthermore, the proposed changes would not allow for a new fission product release path, result in a new fission product barrier failure mode, or create a new sequence of events that would result in significant fuel cladding failures. Accordingly, these changes do not present an undue risk from any new equipment or systems. Therefore, as required by 10 CFR 50.12(a)(1), the NRC staff concludes that there is no undue risk to public health and safety.

3.1.3 Consistent with Common Defense and Security

The proposed exemption would allow changes to elements of the plant-specific Tier 1 DCD. This is a permanent exemption limited in scope to particular Tier 1, Table 2.3.2-4 information. Subsequent changes to Tier 1 information would be subject to full compliance by SCE&G as specified in Section VIII.A.4 of Appendix D to 10 CFR Part 52. The proposed changes will enable SCE&G to safely construct and operate the facility consistent with the performance of the components for the AP1000 design certified by the NRC by updating the information mentioned above found in Tier 1, Table 2.3.2-4, of the DCD. The changes do not alter or impede the design, function, or operation of any plant structures, systems, and components (SSCs) associated with the facilities physical or cyber security and, therefore, do not adversely affect any plant equipment that is necessary to maintain a safe and secure plant status. In addition, the changes have no impact on plant security or safeguards. Therefore, as required by 10 CFR 50.12(a)(1), the NRC staff concludes that the common defense and security is not impacted by this exemption.

3.1.4 Special Circumstances

Special circumstances, in accordance with 10 CFR 50.12(a)(2)(ii), are present whenever application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule. The underlying purpose of Section III.B of Appendix D to 10 CFR Part 52 is to ensure that SCE&G will construct and operate the plant based on the approved information found in the AP1000 DCD, which was incorporated by reference into the SCE&G's licensing basis. The proposed changes would revise the ITAAC Acceptance Criteria in COL Appendix C Table 2.3.2-4, ITAAC No. 2.3.02.8a.ii to state that the volume in the BAST is at least 70,000 gallons between the tank suction point and the tank overflow; and COL Appendix C Table 2.3.2-4, ITAAC No. 2.3.02.8a.iii to state that the total CVS makeup flow to the RCS is less than or equal to 175 gpm. These

proposed changes will enable SCE&G to safely construct and operate the AP1000 facility consistent with established acceptance criteria used in the design certified by the NRC.

Special circumstances are present in the particular circumstances discussed in LAR 15-11 because the application of Section III.B of Appendix D to 10 CFR Part 52 in this circumstance does not serve the underlying purpose of the rule. The proposed change implements changes to Tier 1 information. This exemption request and associated revisions to Tier 1 information demonstrate that the applicable regulatory requirements will continue to be met. Consequently, the safety impact that may result from any reduction in standardization is minimized because the proposed design change does not result in a reduction in the level of safety. Therefore, the NRC staff concludes that the special circumstances required by 10 CFR 50.12(a)(2)(ii) for the granting of an exemption from Section III.B of Appendix D to 10 CFR Part 52 exist.

3.1.5 Special Circumstances Outweigh Reduced Standardization

These proposed changes would revise the ITAAC Acceptance Criteria in COL Appendix C Table 2.3.2-4, ITAAC No. 2.3.02.8a.ii to state that the volume in the BAST is at least 70,000 gallons between the tank suction point and the tank overflow; and COL Appendix C Table 2.3.2-4, ITAAC No. 2.3.02.8a.iii to state that the total CVS makeup flow to the RCS is less than or equal to 175 gpm. This exemption would allow the implementation of changes to Tier 1 information as proposed in LAR 15-11.

The standardization of the measurement points for the 70,000 gallon volume allows for a more thorough understanding of the design by the NRC staff because that volume is in response to the operational needs of the AP1000. The proposed Summer, Units 2 and 3, specific measurement point changes account for BAST foundation settling effects by moving the location of the inlet/outlet line to the side of the tank, whereas the previous design did not. If the BAST foundation settles after construction, then additional stresses would incur on the under-tank inlet/outlet piping, which could possibly lead to piping failure and loss of the BAST function. The benefits of moving the inlet/outlet line location to prevent a possible piping failure from BAST settlement outweighs the reduced standardization.

The standard maximum CVS makeup flow rate allows for a more thorough understanding of the design by the NRC staff because it allows the same accident analyses to be applicable to multiple plants. The revision of the makeup flow rate to less than or equal to 175 gpm in the ITAAC aligns it with the most conservative value in the DCD that was reviewed and approved by the NRC in NUREG-1793, Volume 2, Supplement 2 (ADAMS Accession No. ML11293A073) and was approved for Summer, Units 2 and 3, in NUREG-2153, Volume 2 (ADAMS Accession No. ML13275A126). Having the most conservative CVS flow rate for Summer, Units 2 and 3, outweighs the reduced standardization.

The proposed changes will enable SCE&G to safely construct and operate the facility consistent with the performance of the components for the AP1000 design certified by the NRC by updating the information mentioned above found in Tier 1, Table 2.3.2-4, of the DCD. The design functions of the systems associated with this request are consistent with the current design of the plant in supporting the actual system functions. The design functions of these systems will continue to be maintained because the associated revisions to the Tier 1 information demonstrate that the applicable regulatory requirement will continue to be met. There is no safety impact from the proposed changes and the benefits of properly accounting for BAST foundation settling effects outweighs any reduction in standardization. Based on the foregoing reasons, as required by 10 CFR Part 52.63(b)(1), the NRC staff concludes that the

special circumstances outweigh the effects the departure has on the standardization of the AP1000 design.

3.1.6 No Significant Reduction in Safety

This exemption would allow the implementation of changes to Tier 1 information as proposed in LAR 15-11. The changes will not significantly impact the functional capabilities of the BAST or the CVS. The relocation of the BAST suction line does not alter the minimum volume verified by the ITAAC or the inspection requirements of UFSAR Subsection 9.3.6.6.1.3. The revision of the CVS flow rate is the most conservative value in UFSAR Section 15.4.6 and the makes no changes to the applicable codes and standards. The proposed changes will not adversely affect the ability of the BAST or CVS to perform their design functions and the level of safety provided by the current systems and equipment therein is unchanged. Therefore, based on the foregoing reasons and as required by 10 CFR Part 52, Appendix D, Section VIII.A.4, the NRC staff concludes that granting the exemption would not result in a significant decrease in the level of safety otherwise provided by the design.

3.2 EVALUATION OF PROPOSED CHANGES

The proposed changes would revise the Summer, Units 2 and 3, COLs in regard to the configuration of the BAST suction point and to align the Tier 1 CVS makeup flow rate with the previously approved underlying Tier 2 information.

The requested amendment requires changes to the UFSAR in the form of departures from the plant-specific Tier 2 information (as detailed in Enclosure 1, Section 2 of LAR 15-11), and involves changes to COL Appendix C and corresponding changes to plant-specific DCD Tier 1 information. SCE&G requests approval of the license amendment necessary to implement the UFSAR and COL Appendix C changes.

The specific change descriptions provided in the LAR are as follows:

a. COL Appendix C Table 2.3.2-4, ITAAC No. 2.3.02.8a.ii, Acceptance Criteria ii) and associated plant-specific Tier 1 Table 2.3.2-4, Design Commitment 8.a), Acceptance Criteria ii):

Revise the ITAAC Acceptance Criteria to state that the volume in the BAST is at least 70,000 gallons between the tank suction point and the tank overflow.

b. COL Appendix C Table 2.3.2-4, ITAAC No. 2.3.02.8a.iii, Acceptance Criteria iii) and associated plant-specific Tier 1 Table 2.3.2-4, Design Commitment 8.a), Acceptance Criteria iii):

Revise ITAAC Acceptance Criteria to state that the total CVS makeup flow to the RCS is less than or equal to 175 gpm.

c. UFSAR Figure 9.3.6-1 (Sheet 2 of 2)

Revise the line in the yard connecting to the BAST to enter the side of the tank, identify that a portion of pipe is buried, and add heat tracing.

As shown in UFSAR Figure 9.3.6-1 (Sheet 2), the current UFSAR-described design identifies that the common inlet/outlet piping for the BAST connects to the tank entirely through underground piping. Further, as described in UFSAR Table 3.2-3, the tank, CVS-MT-01, is

non-safety, AP1000 Equipment Class D, and is designed to Revision 1 of the 7th edition of the American Petroleum Institute (API) Standard 650, "Welded Steel Tanks for Oil Storage," (Reference 1) consistent with UFSAR Subsection 3.2.2.6. The associated inlet/outlet piping is 4 inches in diameter, nonsafety-related, and made of austenitic stainless steel.

While below the level of detail provided in the UFSAR, the design of the BAST has an under-tank nozzle design where the piping connects to the bottom of the tank. However, API 650, Appendix O, identifies that under-tank piping connections should only be used when no significant foundation settlement is expected. Given the contents, volume, and present piping configuration of the BAST, design improvements were evaluated to consider potential tank settling impacts.

To reduce the potential for impact due to settlement, SCE&G is proposing to relocate the inlet/outlet line for the BAST from the bottom of the tank to the side of the tank, using a gooseneck piping configuration with an anti-vortex device on the tank nozzle to minimize the unusable tank volume (see revised UFSAR Figure 9.3.6-1, Sheet 2 of 2, provided in the LAR). This reconfigured pipe is buried in a trench below grade, but exits before entering the tank. Heat tracing is also included to prevent potential freezing of the piping, as the piping may be located above the frost line.

This change to UFSAR Tier 2 information requires a change to COL Appendix C (and associated plant-specific Tier 1) information. Currently, the ITAAC Acceptance Criteria in COL Appendix C, Table 2.3.2-4, Item 2.3.02.08a.ii specifies that the volume of the BAST is at least 70,000 gallons between the tank outlet connection and the tank overflow. By relocating the outlet connection to the side of the tank above the new suction point, this volume as measured at the outlet connection would be less than 70,000 gallons despite having over 70,000 usable gallons. To correct this and to remain consistent with the ITAAC purpose, this proposed change updates the ITAAC to measure from the new suction point to the tank overflow.

During the design certification amendment review of the AP1000 reactor (DCD Revisions 15 through 19), the NRC staff evaluated an increase in the BAST usable volume of the tank from 264,979 liters (L) to 278,285 L (70,000 to 73,515 gallons) in accordance with NRC Standard Review Plan Section 9.3.4. The results of this evaluation were presented in Section 9.3.6 of the Final Safety Evaluation Report related to certification of the AP1000 standard plant design (NUREG-1793, Volume 2, Supplement 2). As presented in Section 9.3.6 of this Final Safety Evaluation Report, NRC staff determined the increased BAST volume would be sufficient to shut down an AP1000 unit (e.g., Summer, Units 2 and 3) from 100 percent power to Mode 6, along with having the volume needed for normal operation and operating margin. The increased volume was calculated with updated inputs that more accurately represent the AP1000 design. This increase of the BAST usable volume would allow SCE&G to maintain the 70,000 gallons required by the ITAAC with the proposed change of the lower measurement point.

As discussed in Section 3.1.5 of this safety evaluation, NUREG-1793, Volume 2, Supplement 2, presents the NRC staff evaluation for reducing the CVS maximum makeup flow from 200 gpm to 175 gpm. This maximum makeup flow was incorporated by reference into the Summer, Units 2 and 3, UFSAR Sections 9.3.6.6.1.2 and 15.4 (ADAMS Accession Nos. ML16193A100 and ML16193A106, respectively), which the NRC staff found to be acceptable in NUREG-2153, Volume 2.

GDC 29 requires that the CVS have an extremely high probability of accomplishing its safety function in the event of anticipated operational occurrences. Since the BAST is the component of the CVS that contains the boron for use in the RCS, the NRC staff reviewed the proposed changes to determine if the BAST will continue to function as designed during normal and anticipated operational occurrences, and remain in compliance with GDC 29. Specifically, the NRC staff reviewed the LAR to determine if it supported the ITAAC of 70,000 gallons at a CVS suction flow of 175 gpm with sufficient tank level remaining to prevent the occurrence of gas entrainment.

During the review, the NRC staff identified the need for additional information regarding the changes to the BAST and the anti-vortex device in order to complete its evaluation of the proposed changes. Specifically, the NRC staff needed additional information concerning the new piping arrangement with respect to the BAST's usable volume and to verify the new piping arrangement would prevent the potential negative effects on the CVS system (e.g., vortexes and gas entrainment into the CVS piping) once the BAST level approached the suction inlet internal elevation. Therefore, the NRC staff performed an audit from January 9-16, 2017, of SCE&G's supporting reports and calculations to verify that the proposed changes align with the requirements in the ITAAC and the underlying Tier 2 descriptions and analyses.

Based on the review of the documents in the audit, the NRC staff concluded that SCE&G provided the necessary documentation concerning the design, materials, fabrication, erection, inspection, and testing, and documentation in support of the design changes in LAR 15-11 for the BAST and the CVS system, including the vortex breaker. Additionally, NRC staff's audit concluded the appropriate design specifications (i.e., API Standard 650), environmental conditions, and the CVS testing plans (i.e., at a CVS suction flow of 175 gpm) were acceptable to support the LAR. The NRC staff's audit plan can be found at ADAMS Accession No. ML17009A350 and the audit report can be found at ADAMS Accession No. ML17045A758.

Based on the NRC staff's review of the LAR and the results from the audit, the NRC staff finds that SCE&G's analysis adequately demonstrated that the proposed changes to the BAST would support the ITAAC of 70,000 gallons at a CVS suction flow of 175 gpm with sufficient tank level remaining to prevent the occurrence of gas entrainment. Also, the NRC staff finds that the proposed design changes would not affect the function of the BAST to provide borated water for unit shutdown and refueling. Because no functional changes are proposed in the LAR and the components continue to perform their function as described in the UFSAR for both normal and anticipated operational occurrences, the NRC staff finds that there is no reduction in safety as a result of the change. Based on the discussion above, the NRC staff concludes that there is reasonable assurance that the BAST will perform the function set forth as described in the UFSAR and GDC 29 continues to be met, therefore, the proposed changes are acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations in 10 CFR 50.91(b)(3), the South Carolina State official was notified of the proposed issuance of the amendment on March 20, 2017. The State official had no comments on March 21, 2017.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, *Standards for Protection Against Radiation*. The NRC staff has determined that the amendment involves no

significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (81 FR 92870; published on December 20, 2016). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

Because the exemption is necessary to allow the changes proposed in the license amendment, and because the exemption does not authorize any activities other than those proposed in the license amendment, the exemption meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), as discussed in the above paragraph. Therefore, pursuant to 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the issuance of the exemption.

6.0 CONCLUSION

The NRC staff has determined that pursuant to Section VIII.A.4 of Appendix D to 10 CFR Part 52, the exemption (1) is authorized by law, (2) presents no undue risk to the public health and safety, (3) is consistent with the common defense and security, (4) presents special circumstances, (5) justifies that the special circumstances outweigh the potential decrease in safety due to reduced standardization, and (5) does not reduce the level of safety at the facility. Therefore, the NRC staff grants SCE&G an exemption from Tier 1 information requested by SCE&G.

The NRC staff has concluded, based on the considerations discussed in Section 3.2 of this safety evaluation, that there is reasonable assurance that: (1) the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public. Therefore, the NRC staff concludes the changes proposed in this license amendment to be acceptable.

7.0 REFERENCES

1. API Standard 650, "Welded Steel Tanks for Oil Storage," Seventh Edition, dated November 1980, Revision 1, dated February 1984.

2. AP1000 Design Control Document, Revision 19, dated June 13, 2011 (ADAMS Accession No. ML11171A500).

3. NUREG-1793, Supplement 2, Final Safety Evaluation Report Related to Certification of the AP1000 Standard Plant Design, dated August 5, 2011 (ADAMS Accession No. ML112061231).

4. Final Safety Evaluation Report for Combined Licenses for Virgil C. Summer Nuclear Station Units 2 and 3, dated August 2011 (ADAMS Accession No. ML110450305).

5. Virgil C. Summer Nuclear Station, Units 2 & 3 Updated Final Safety Analysis Report (UFSAR), dated July 1, 2016 (ADAMS Accession No. ML16193A096).

6. Audit Plan for Summer LAR 15-11 and Vogtle LAR 16-028 (Boric Acid Storage Tank Suction Point), January 9, 2017 (ADAMS Accession No. ML17009A350).

7. Virgil C. Summer Nuclear Station, Units 2 and 3, and Vogtle Electric Generating Plant, Units 3 and 4, - Report for the Audit Performed in Support of the Request for License Amendment and Exemption: Boric Acid Storage Tank, March 15, 2017 (ADAMS Accession No. ML17045A758).

8. Virgil C. Summer Nuclear Station, Units 2 & 3, License Amendment Request (LAR) 15-11, Request for License Amendment and Exemption: Boric Acid Storage Tank Suction Point ITAAC Changes, dated September 29, 2016 (ADAMS Accession No. ML16273A557)