



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS  
RELATED TO AN EXEMPTION AND AMENDMENT NO. 31  
TO THE COMBINED LICENSE NO. NPF-93  
AND LICENSE NO. NPF-94  
SOUTH CAROLINA ELECTRIC AND 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 February 7, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13042A005), South Carolina Electric & Gas (SCE&G/licensee) requested that the U.S. Nuclear Regulatory Commission (NRC) amend the combined licenses (COLs) for Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3, COL Numbers NPF-93 and NPF-94, respectively.

The proposed amendment provides for departure from the Tier 1 material included in Appendix C of each of the VCSNS Units 2 and 3 COLs. The proposed changes affect valves in the Component Cooling Water System (CCS), Chemical and Volume Control System (CVS), Passive Containment Cooling System (PCS), Passive Core Cooling System (PXS), Reactor Coolant System (RCS), Normal Residual Heat Removal System (RNS), and Main Control Room Emergency Habitability System (VES). The proposed amendment would allow changes in Appendix C to reconcile various valve descriptions and definitions in UFSAR Tier 1 and associated Tier 2 information.

SCE&G has also requested an exemption from the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, Appendix D, Section III.B, "Design Certification Rule for the AP1000 Design, Scope and Contents," to allow a departure from the elements of the certification information in Tier 1 of the generic Design Control Document (DCD).<sup>1</sup>

---

<sup>1</sup> 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.

This license amendment request (LAR) 13-04 revises Tier 1 information in COL Appendix C Tables 2.1.2-1, 2.2.1-1, 2.2.2-1, 2.2.3-1, 2.2.3-3, 2.2.5-1, 2.3.2-1, 2.3.2-3, and 2.3.6-1.

In letters dated July 19, 2013, November 21, 2013, February 6, 2014, February 20, 2014, May 12, 2014, September 22, 2014 and November 19, 2014 (ADAMS Accession Nos. ML13205A148, ML13329A723, ML14041A095, ML14052A379, ML14133A488, ML14266A014, and ML14323A333, respectively), the licensee provided additional information that supplemented the application. This information did not expand the scope of the application, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on October 29, 2013 (78 FR 64541).

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

## 2.0 REGULATORY EVALUATION

10 CFR 50, Appendix A, General Design Criterion (GDC) 14 states that the reactor coolant pressure boundary (RCPB) shall be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.

10 CFR 50, Appendix A, GDC 16 states that reactor containment and associated systems shall be provided to establish an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment and to assure that the containment design conditions important to safety are not exceeded for as long as postulated accident conditions require.

10 CFR 50, Appendix A, GDC 19 states that a control room shall be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a safe condition under accident conditions, including loss-of-coolant accidents (LOCAs). Adequate radiation protection shall be provided to permit access and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 5 rem whole body, or its equivalent to any part of the body, for the duration of the accident. Equipment at appropriate locations outside the control room shall be provided (1) with a design capability for prompt hot shutdown of the reactor, including necessary instrumentation and controls to maintain the unit in a safe condition during hot shutdown, and (2) with a potential capability for subsequent cold shutdown of the reactor through the use of suitable procedures.

10 CFR 50, Appendix A, GDC 32 states that components which are part of the RCPB shall be designed to permit (1) periodic inspection and testing of important areas and features to assess their structural and leaktight integrity, and (2) an appropriate material surveillance program for the reactor pressure vessel.

10 CFR 50, Appendix A, GDC 34 states, in part, that a system to remove residual heat shall be provided. The system safety function shall be to transfer fission product decay heat and other residual heat from the reactor core at a rate such that specified acceptable fuel design limits and the design conditions of the RCPB are not exceeded.

10 CFR 50, Appendix A, GDC 35 states, in part, that a system to provide abundant emergency core cooling shall be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reaction is limited to negligible amounts.

10 CFR 50, Appendix A, GDC 44 states, in part, that a system to transfer heat from structures, systems, and components (SSCs) important to safety, to an ultimate heat sink shall be provided. The system safety function shall be to transfer the combined heat load of these SSCs under normal operating and accident conditions.

10 CFR 50, Appendix A, GDC 55 states, in part, that each line that is part of the RCPB and that penetrates the primary reactor containment shall be provided with containment isolation valves, such as one automatic isolation valve inside and one automatic isolation valve outside containment.

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

10 CFR 52, Appendix D, Section VIII.B.5.a requires that an applicant or licensee who references this appendix may 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, or the Technical Specifications, or requires a license amendment under paragraphs B.5.b or B.5.c of this section.

10 CFR 52.63(b)(1) allows the licensee to request 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, and if the special circumstances present outweigh the potential decrease in safety due to reduced standardization. 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).

10 CFR 52.98(f) states that any modification to, addition to, or deletion from the terms and conditions of a COL including any modification to, addition to, or deletion from the inspections, tests, analyses, and acceptance criteria (ITAAC) contained in the license is a proposed amendment to the license. Appendix C of COLs NPF-93 and NPF-94 contain information which the licensee is proposing to modify. Therefore, the proposed change requires a license amendment.

### 3.0 TECHNICAL EVALUATION

#### 3.1 EVALUATION OF EXEMPTION

##### INTRODUCTION

The regulations in Section III.B of Appendix D to 10 CFR Part 52 require a holder of a COL referencing Appendix D to 10 CFR Part 52 to incorporate by reference and comply with the requirements of Appendix D, including certified information in Tier 1 of the generic AP1000 DCD.

As defined in Section II of Appendix D to 10 CFR Part 52, Tier 1 information includes, among other things, ITAAC and design descriptions. Therefore, a licensee referencing Appendix D

incorporates by reference all Tier 1 information contained in the generic DCD. The Tier 1 ITAAC and the design descriptions, along with the plant-specific ITAAC, were included in Appendix C of the VCSNS COL at its issuance. The proposed amendment would allow changes to Tier 1 tables and promote consistency with the UFSAR Tier 2 information. Since the proposed changes depart from Tier 1 information in the generic AP1000 DCD, Section VIII.A.4 of Appendix D to Part 52 requires the licensee to obtain an exemption.

This is a permanent exemption limited in scope to the particular Tier 1 information specified.

As stated in the above section, 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. 10 CFR 52.7 further states that the Commission's consideration will be governed by 10 CFR 50.12, 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 or safety, and are consistent with the common defense and security; and (2) special circumstances are present. 10 CFR 50.12(a)(2) lists six special circumstances for which an exemption may be granted. It is necessary for one of these special circumstances to be present in order for NRC to grant an exemption request. The licensee stated that the requested exemption meets the special circumstances of 10 CFR 50.12(a)(2)(ii), which states that "[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 staff's analysis of each of the findings the Commission must make under 10 CFR 50.12(a) is presented below.

### 3.1.1 AUTHORIZED BY LAW

This exemption would allow the licensee to implement approved changes to COL Appendix C, Tier 1 Tables 2.1.2-1, 2.2.1-1, 2.2.2-1, 2.2.3-1, 2.2.3-3, 2.2.5-1, 2.3.2-1, 2.3.2-3, and 2.3.6-1. This is a permanent exemption limited in scope to particular Tier 1 information, and subsequent changes to Tier 1 Tables 2.1.2-1, 2.2.1-1, 2.2.2-1, 2.2.3-1, 2.2.3-3, 2.2.5-1, 2.3.2-1, 2.3.2-3, and 2.3.6-1 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. The NRC staff has determined that granting of the licensee's proposed exemption will not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations because, 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. Therefore, as required by 10 CFR 50.12(a)(1), the exemption is authorized by law.

### 3.1.2 NO UNDUE RISK TO PUBLIC HEALTH AND SAFETY

Appendix D to 10 CFR Part 52 ensures that the licensee will construct and operate the plant based on the approved information found in the DCD incorporated by reference into the licensee's licensing basis. The changes proposed in licensee's amendment request will not impact the ability of the components to perform their design function because the changes will not alter the operation of any plant equipment or systems. As such, these changes to existing equipment or systems do not present an undue risk to the public health and safety. The proposed changes do not add any new equipment or system interfaces to the current plant design. The description 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, the proposed changes do not present an undue risk from any new equipment or systems. Therefore, as required by 10 CFR 50.12(a)(1), the staff finds that the exemption poses no undue risk to the public health and safety.

### 3.1.3 CONSISTENT WITH COMMON DEFENSE AND SECURITY

The proposed exemption would allow editorial and consistency changes to elements of the plant-specific Tier 1 DCD. This is a permanent exemption limited in scope to particular Tier 1 information. Subsequent changes to Tables 2.1.2-1, 2.2.1-1, 2.2.2-1, 2.2.3-1, 2.2.3-3, 2.2.5-1, 2.3.2-1, 2.3.2-3, and 2.3.6-1; or any other Tier 1 information would be subject to the exemption process in Section VIII.A.4 of Appendix D to 10 CFR Part 52. The proposed change does not alter or impede the design, function, or operation of any plant SSCs associated with the facility's physical or cyber security, and therefore does not 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 staff finds 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 purposes of the Tier 1 information is to ensure that the licensee will safely construct and operate the plant based on the certified information found in the AP1000 DCD, which was incorporated by reference into the licensee's licensing basis. The proposed change, to align various valve functions and tags with the underlying design, facilitates construction and safe operation by maintaining the design functions of these systems. This change does not impact the ability of any SSCs to perform their functions or negatively impact safety. These changes will enable the licensee to safely construct and operate the AP1000 facility consistent with the design certified by the NRC, by clarifying the information found in Tables 2.1.2-1, 2.2.1-1, 2.2.2-1, 2.2.3-1, 2.2.3-3, 2.2.5-1, 2.3.2-1, 2.3.2-3, and 2.3.6-1. Therefore, because the application of the specified Tier 1 information in this circumstance does not serve the underlying purpose of the rule, the staff finds that the special circumstances required by 10 CFR 50.12(a)(2)(ii) for the granting of an exemption from the Tier 1 information exist.

### 3.1.5 SPECIAL CIRCUMSTANCES OUTWEIGH REDUCED STANDARDIZATION

This exemption would allow the implementation of changes to Tables 2.1.2-1, 2.2.1-1, 2.2.2-1, 2.2.3-1, 2.2.3-3, 2.2.5-1, 2.3.2-1, 2.3.2-3, and 2.3.6-1 proposed in the LAR. The design functions of the systems associated with this request will continue to be maintained. Based on this, as required by 10 CFR Part 52.63(b)(1), the staff finds 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 Tables 2.1.2-1, 2.2.1-1, 2.2.2-1, 2.2.3-1, 2.2.3-3, 2.2.5-1, 2.3.2-1, 2.3.2-3, and 2.3.6-1 proposed in the LAR. The changes for consistency and clarity will not impact the functional capabilities of these components. The

proposed changes will not adversely affect the ability of the SSCs to perform their design functions and the level of safety provided by the SSCs is unchanged; therefore, as required by 10 CFR 52.63(b)(1), the staff finds 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 information presented by the licensee in this LAR was evaluated by NRC staff for its completeness, quality, and clarity. Technical review of the designated changes proposed to be modified by this LAR was performed. As part of this license amendment, VCSNS did not request any changes to design information; it requested changes to how the design information was described in Tier 1 and corrected inconsistencies. The following paragraphs describe the staff's approach to review the LAR.

The staff reviewed the proposed changes and determined there are no changes to the design, functional capabilities, method for performing a function, design analysis, or safety analysis, and thus, the requested Tier 1 and associated Tier 2 changes do not affect any design functions. The proposed changes do not involve a change to the method of evaluation for establishing design bases or safety analyses. Tests, experiments and procedures described in the licensing basis were not changed by these departures.

#### ***CCS Containment Isolation Relief Valve - Outlet Line IRC, CCS-PL-V220***

Valve CCS-PL-V220 is a 1-inch CCS Containment Isolation Relief valve and is shown in its system configuration in UFSAR Tier 2, Figure 9.2.2-2 (Sheet 2 of 5). This valve provides for containment isolation and overpressure protection due to thermal expansion of the contained fluid. In Tier 1, Table 2.2.1-1 and Tier 2, Table 3.2-3, the valve is incorrectly identified as CCS-PL-220.

The staff reviewed the proposed change:

Tier 1 Departure:

- Tier 1, Table 2.2.1-1 - Change valve tag number from "CCS-PL-220" to "CCS-PL-V220."

Associated Tier 2 Departure:

- Tier 2, Table 3.2-3 - Change valve tag number from "CCS-PL-220" to "CCS-PL-V220."

The requested change to correct the tag number reflects the Tier 2 information depicted in UFSAR Figure 9.2.2-2 (Sheet 2 of 5). These changes do not involve a physical change to the plant or changes to the original design function of the plant. The staff reviewed the updated information, and confirmed that it provides consistency throughout the UFSAR and COL Appendix C. The proposed change accurately reflects the design requirements for this valve and because of the editorial nature of the change, GDC 16, GDC 44, and GDC 55 continue to be met.

#### ***CVS Auxiliary Pressurizer Spray Line Check Valve, CVS-PL-V085***

The CVS Auxiliary Pressurizer Spray Line Valve, CVS-PL-V085, is a check valve, and can be seen in its system configuration in UFSAR Tier 2, Figure 9.3.6-1 (Sheet 1 of 2). The valve provides the function of preserving the RCPB by preventing backflow from the RCS when the

Auxiliary Pressurizer Spray Line Isolation Valve is open and no charging flow exists in the charging and spray path.

Tier 1 and COL Appendix C, Table 2.3.2-1 list CVS-PL-V085 as requiring Class 1E and Harsh Environment Qualification requirements; however, this requirement is inconsistent with other check valves. CVS-PL-V085 functions as a normal check valve as called out in UFSAR Tier 2, Table 3.9-16, "Valve Inservice Test Requirements." Check valves do not require power to function and are classified as mechanical equipment. In its response dated February 20, 2014, to the staff's request for additional information (RAI), the licensee confirmed that this valve does not have any Class 1E (or non-Class 1E) electrical equipment/connections. This check valve for the Auxiliary Pressurizer Spray Line Pressure Boundary is required to operate post-accident, but no remote position indication or other electrical equipment is provided. Thus, the Class 1E classification is incorrect and can be removed from Tier 1, Table 2.3.2-1. ITAAC 2.3.2-6a in Tier 1, Table 2.3.2-4 is specific for the environmental qualification of Class 1E electrical equipment and states, "The Class 1E equipment identified in [Tier 1] Table 2.3.2-1 as being qualified for a harsh environment can withstand the environmental conditions that would exist before, during, and following a design basis accident without loss of safety function for the time required to perform the safety function." This ITAAC is not applicable to CVS-PL-V085 because it does not contain Class 1E electrical equipment, as stated in the RAI response. However, valve CVS-PL-V085 is qualified to the harsh environment mechanical equipment program conditions as shown in UFSAR Tier 2, Table 3.11-1.

Actual check valve design requirements for CVS-PL-V085 are consistent with the other CVS Pressure Boundary Check Valves as listed in Tier 1, Table 2.3.2-1, such as valve CVS Purification Return Line Pressure Boundary Check Valve (CVS-PL-V082). The design functions and requirements as described in UFSAR Table 3.9-16 and Table 3.11-1 accurately reflect the AP1000 design requirements for CVS-PL-V085, and the correction of the Tier 1 information is necessary to consistently reflect the functional design requirements within the certified design.

The staff reviewed the proposed change:

Tier 1 Departure:

- Tier 1, Table 2.3.2-1 - Remove Class 1E and Harsh Environment Qualification requirements.

The classification of CVS-PL-V085 as Class 1E / Qualified for Harsh Environment is inconsistent with the valve's design and purpose. The proposed change to Table 2.3.2-1 for CVS-PL-V085 is consistent with other CVS Pressure Boundary Check Valves listed in Table 2.3.2-1.

The NRC staff notes that because CVS-PL-V085 is a mechanical component and located in a harsh environment, the valve is qualified to the harsh environment mechanical equipment program conditions as shown in UFSAR Tier 2, Table 3.11-1. The proposed change accurately reflects the design requirements for this valve and maintains compliance with GDC 14 by continuing to preserve the RCPB.



### ***CVS Demineralized Water Isolation Valves A/B, CVS-PL-V136A/B***

Valves CVS-PL-V136A and CVS-PL-V136B are CVS Demineralized Water Isolation valves. The valves are 3-inch butterfly valves powered by with air operators that fail closed on loss of instrument air and can be seen in their system configuration in UFSAR Tier 2, Figure 9.3.6-1 (Sheet 2 of 2). They are located outside containment in the line from the Demineralized Water Transfer and Storage System (DWS). The purpose of these valves is to prevent a boron dilution accident by closing either one of two of the valves from the DWS to the suction side of the Makeup Pumps, thus isolating the source of dilution water.

In Tier 1, Table 2.3.2-3, the valves are incorrectly identified as CVS-PL-136A and CVS-PL-136B. The valve tag numbers are correctly stated in UFSAR Tier 1, Table 2.3.2-1, and Tier 2, Tables 3.2-3, 3.9-12, 3.9-16, 3.11-1, 3.16-2, 3.16-3, 9.3.1-1 as CVS-PL-V136A and CVS-PL-V136B.

The staff reviewed the proposed change:

Tier 1 Departure:

- Tier 1, Table 2.3.2-3 - Change “136A” to “V136A” and “136B” to “V136B”

The change corrects the tag numbers to reflect the Tier 2 information depicted in UFSAR Tier 2 Tables 3.2-3, 3.9-12, 3.9-16, 3.11-1, 3.16-2, 3.16-3, 9.3.1-1, and Tier 1, Table 2.3.2-1. These changes do not involve a physical change to the plant or changes to the original design function of the plant. The staff reviewed the updated information, and confirmed that it provides consistency throughout the UFSAR and COL Appendix C. The proposed change accurately reflects the design requirements for these valves.

### ***PCS Makeup to SFS Isolation Valve, PCS-PL-V009***

The PCS Spent Fuel Pool Emergency Makeup Valve, PCS-PL-V009, is a 3-inch normally closed manual gate valve which is used to isolate flow to the spent fuel pool (SFP), and can be seen in its system configuration in UFSAR Figure 6.2.2-1 (Sheet 1 of 2). Opening this valve allows gravity flow of the Passive Containment Cooling Water Storage Tank (PCCWST) into the SFP.

This valve is a normally closed manual gate valve used to isolate flow to the SFP during normal operation. The safety function is to allow gravity flow of the PCCWST into the SFP. The valve must stay closed until needed, then open, and remain open, to fulfill the safety function of the line. This function is accurately described in UFSAR Tier 2, Table 3.9-16, which states the safety-related missions as Maintain Close, Transfer Open, and Maintain Open. The valve is not required to stop the flow once initiated, thus Transfer Close is not required as a safety function. Tier 1 and COL Appendix C, Table 2.2.2-1 list the active functions of valves, and for PCS-PL-V009 indicates “Transfer Close” as an active function. As discussed above, the valve does not have a Transfer Close function.

The staff reviewed the proposed change:

Tier 1 Departure:

- Tier 1, Table 2.2.2-1 - Remove "Transfer Close" as an active function from PCS-PLV009

The change is to accurately reflect the functional requirements of maintain close, transfer open, and maintain open. The safety function for PCS-PL-V009 is to allow gravity flow of the PCCWST into the SFP. The valve must stay closed until needed, then open, and remain open, to fulfill the safety function of the line. The valve is not required to stop the flow once initiated; thus, Transfer Close is not required as a safety function. The NRC staff notes that the inservice testing (IST) requirements for the valve specified in Tier 2, Table 3.9-16 are consistent with the safety-related missions as Maintain Close, Transfer Open, and Maintain Open. The proposed change accurately reflects the design requirements for this valve.

### ***PXS Accumulator A/B Discharge Isolation Valves, PXS-PL-V027A/B***

The PXS Accumulator Discharge Isolation Valves, PXS-PL-V027A and PXS-PL-V027B, are normally open motor-operated isolation valves and are shown in their system configuration in Tier 2, UFSAR Figure 6.3-1. These valves provide isolation capability for Accumulator A and B Discharge.

For the PXS Accumulator Discharge Isolation Valves, PXS-PL-V027A and PXS-PL-V027B, the system design indicates in the UFSAR that the valve position indication uses non-1E power, meaning the position indication is non-safety related. PXS-PL-V027A and PXS-PL-V027B are OM Code Class C valves, and are connected to the Nuclear Non Safety (NNS) power supplies and receive their signals from the plant control system (PLS). These valves are normally de-energized until receiving a confirmatory open signal upon a safeguards actuation as shown in the current AP1000 design.

The staff reviewed the proposed change:

Tier 1 Departure:

- Tier 1, Table 2.2.3-1 - Change safety related display from 'Yes' to 'No'

The original submittal also included a request for an associated Tier 2 Departure:

- Tier 2, Table 3.9-16 - Omit safety related position, so delete valve PXS-PL-V027A/B as no test requirements remain

In RAI 7380, Question 3.9.6-1, the NRC staff requested that the licensee provide additional information to demonstrate that plant programs will ensure that the PXS Accumulator A/B Discharge Isolation valves, PXS-PL-V027A and PXS-PL-V027B, will be in their safety position prior to plant startup and prior to returning to power operation following a refueling outage to allow the accumulators to be available to perform their safety function. In letters dated September 22, 2014, and November 19, 2014, the licensee withdrew the request to remove this information from Tier 2, Table 3.9-16. Therefore, Tier 2, Table 3.9-16 will continue to specify that these valves are included in the IST program and will receive remote position indication with exercising every 2 years, and, therefore, continues to meet GDC 32. The proposed change accurately reflects the design requirements for this valve as part of the emergency core cooling system and, therefore, continues to meet GDC 35.

### ***PXS Containment Recirculation Isolation Valves, PXS-PL-V117A/B***

Valves PXS-PL-V117A and PXS-PL-V117B are PXS Containment Recirculation Isolation valves. These valves are 8" normally open motor operated gate valves and are shown in their

system configuration in UFSAR Tier 2, Figure 6.3-2 (Sheet 2 of 2). These valves provide isolation capability for the containment recirculation pipe lines. Additionally, these valves open to allow for containment recirculation.

In Tier 1, Table 2.3.2-3, the valves are incorrectly identified as PXS-PL-V017A and PXS-PL-V017B. The valve tag numbers are correctly stated in UFSAR Tier 1, Table 2.3.2-4, and Tier 2, Tables 3.2-3, 3.9-16, 3.11-1, 3I.6-2 and 3I.6-3 as PXS-PL-V117A and PXS-PL-V117B.

The staff reviewed the proposed change:

Tier 1 Departure:

- Tier 1, Table 2.2.3-3 - Correct valve tag for Containment Recirculation A/B Isolation valves from “V017A/B” to “V117A/B.”

These changes do not involve a physical change to the plant or changes to the original design function of the plant. The staff reviewed the updated information, and confirmed that it provides consistency throughout the UFSAR and COL Appendix C. The proposed change accurately reflects the design requirements for this valve as part of the emergency core cooling system and, therefore, continues to meet GDC 35.

### ***RCS Reactor Vessel Head Vent Valves, RCS-PL-V150A/B/C/D***

Valves RCS-PL-V150A, RCS-PL-V150B, RCS-PL-V150C and RCS-PL-V150D are RCS Reactor Vessel Head Vent valves. These valves are 1" solenoid operated globe valves and are shown in their system configuration in UFSAR Tier 2, Figure 5.1-5 (Sheet 1 of 3) and Tier 2, Figure 5.4-8. The primary function of the reactor vessel head vent is for use during plant startup to properly fill the reactor coolant system and vessel head. The valves also can be opened to remove non-condensable gases or steam from the reactor vessel head to mitigate a possible condition of inadequate core cooling or impaired natural circulation through the steam generators resulting from non-condensable gas accumulation. If opened, the valves would transfer back to their normally closed position to support their intended functions and prevent propagation to a LOCA. Valve functions are identified as active functions if a change in state (e.g., open to closed) is performed to mitigate an accident. Therefore, these valves have active safety functions to “Transfer Open” and “Transfer Closed.”

As described above, the Transfer Closed function is a required design function for valves RCS-PL-V150A, RCS-PL-V150B, RCS-PL-V150C and RCS-PL-V150D; however, this function is not identified as an active function in Tier 1, Table 2.1.2-1, and Tier 2, Table 3.9-16.

The staff reviewed the proposed change:

Tier 1 Departure:

- Tier 1, Table 2.1.2-1 - Add “Transfer Closed” to Active Functions.

Associated Tier 2 Departure:

- Tier 2, Table 3.9-16 - Add “Transfer Close” to Safety-Related Missions.

The change is to modify the active function description to reflect the transfer close function. If opened, the valves would transfer back to their normally closed position to support their intended functions and prevent propagation to a LOCA. The proposed change accurately

reflects the design requirements for these valves, and continues to meet design function of the RCS. Tier 2, Table 3.9-16 reflects all of the safety-related missions for the valves and requires appropriate IST and, therefore, continues to meet GDC 32.

### ***RNS Discharge Containment Isolation Test Connection Valve, RNS-PL-V012***

Valve RNS-PL-V012 is a Normal Residual Heat Removal System (RNS) Discharge Containment Isolation Test Connection valve. The valve is a 1" manual globe valve locked closed to prevent it from inadvertently opening, and is shown in its system configuration in UFSAR Tier 2, Figure 5.4-7. RNS-PL-V012 is a containment isolation valve and is used as a test connection for containment isolation valve leak tests. Long-term containment inventory makeup can also be supplied through (containment penetration test connection) valve RNS-PL-V012. The valve will be manually returned to its normally closed position to provide for containment isolation after being opened to support long-term containment make-up as discussed in UFSAR Tier 2, Section 5.4.7.5.

The safety-related function of this valve is to maintain closed to provide containment isolation. This valve also has safety-related functions to transfer open, maintain open, and then transfer closed to fulfill the long-term containment makeup function.

As described above, the Transfer Closed function is a required design function for the valve; however, this function is not identified as an active function in Tier 1, Table 2.3.6-1, and Tier 2, Table 3.9-16.

The staff reviewed the proposed change:

Tier 1 Departure:

- Tier 1, Table 2.3.6-1 - Add "Transfer Closed" to Active Functions.

Associated Tier 2 Departure:

- Tier 2, Table 3.9-16 - Add "Transfer Close" to Safety-Related Missions.

Based on the above information, the NRC staff has determined that the licensee's proposal to add "Transfer Closed" to Active Functions in Tier 1, Table 2.3.6-1, and "Transfer Close" to Safety-Related Missions in Tier 2, Table 3.9-16, is acceptable. The transfer closed function is a required design function of the valve that was not identified as an active function. Adding the "Transfer Closed" will properly identify the transfer closed function of the valves. The NRC staff notes that the IST requirements for the valves specified in Tier 2, Table 3.9-16 are consistent with the Transfer Closed active function, and are acceptable.

In reviewing Tier 2, Table 3.9-16, the NRC staff noted that the safety-related mission does not identify "Maintain Open" as a safety-related function for valve RNS-PL-V012. By RAI 7380, Question 3.9.6-4, the NRC staff requested the licensee to explain the reason for omitting "Maintain Open" as a safety-related function for valve RNS-PL-V012 in Tier 2, Table 3.9-16. In response to RAI 7380 dated February 20, 2014, SCE&G stated the following:

The only associated Tier 2 change related to the Tier 1, Table 2.3.6-1 change adding the active function "Transfer Close", was adding the safety related mission of "Transfer Close" to Tier 2, Table 3.9-16. Adding the safety related mission "Maintain Open" is not considered an associated change with the Tier 1 change. The technical justification is corrected when indicating one of the safety related missions as Maintain Open to fulfill

the valves post accident containment makeup function, this is being added to Tier 2, Table 3.9-16 via a separate non-LAR departure.

The NRC staff considers this response acceptable because the licensee stated that the Maintain Open function for valve RNS-PL-V012 will be added to Tier 2, Table 3.9-16, via a separate non-LAR departure. The NRC staff agrees that adding the safety-related mission Maintain Open in Tier 2, Table 3.9-16, is not considered an associated Tier 1 change and, therefore, does not require prior NRC approval.

With this LAR change, the valves continue to provide containment isolation and, therefore, continue to meet GDC 16. Tier 2, Table 3.9-16, reflects all of the safety-related missions for the valves and requires appropriate IST and, therefore, continues to meet GDC 32. The proposed change accurately reflects the design requirements for these valves as part of the RNS system and, therefore, continues to meet GDC 34.

### ***RNS Pump Discharge Relief Valve, RNS-PL-V045***

The RNS Pump Discharge Relief Valve, RNS-PL-V045, is a 1" relief valve. This valve is located outside containment upstream of the Discharge Containment Isolation Valve (RNS-PL-V011) and is shown in its system configuration in UFSAR Figure 5.4-7. The valve protects the RNS against over-pressurization of piping and components due to any back-leakage from RCS boundary check valves and thermal expansion in the RNS piping.

In the current AP1000 design, the long term containment make-up function was moved from the RNS heat exchanger drain lines to the RNS discharge containment isolation test connection valve, RNS-PL-V012. This long term containment make-up function for RNS-PL-V012 is discussed in UFSAR Subsection 5.4.7.5 and shown in Figure 5.4-7. Therefore, in the currently approved design, the RNS pump discharge lines are not integral to the safety-related function of long term containment inventory makeup. RNS-PL-V045 does not perform any active function to mitigate an accident event, and thus is not considered an active valve. Also, the description is to be changed from "RNS Discharge Header Relief Valve" to "RNS Pump Discharge Relief" to match the UFSAR Tier 2, Table 3.2-3, 3.11-1 and 3.16-3 valve descriptions. The non-active function of this relief valve is consistent with the valve's functions currently assumed in accidents previously evaluated in the UFSAR.

The staff reviewed the proposed changes:

Tier 1 Departure:

- Tier 1 Table 2.3.6-1 - Remove active valve functions from table; Revise valve description to "RNS Pump Discharge Relief."

Associated Tier 2 Departure:

- Tier 2 Table 3.9-12 - Remove valve from table.
- Tier 2 Table 3.11-1 - Move valve to Non Active section of table.

The RNS pump discharge lines are not integral to the safety-related function of long term containment inventory makeup and RNS-PL-V045 does not perform any active function to mitigate an accident event. Therefore, the NRC staff finds it acceptable to remove the "Transfer Open/Transfer Closed" active valve functions from Tier 1, Table 2.3.6-1; remove the valve from Tier 2, Table 3.9-12 since this table is a list of ASME Class 1, 2, and 3 active valves; and move

the valve from the active section to the non-active section of Tier 2, Table 3.11-1 since its only function is listed as “pressure boundary.” The NRC staff also considers it acceptable to revise valve description from “RNS Discharge Header Relief Valve” to “RNS Pump Discharge Relief” because this is a more accurate description that is consistent with the descriptions in UFSAR Tier 2, Tables 3.2-3, 3.11-1 and 3I.6-3. The proposed change accurately reflects the design requirements for these valves as part of the RNS system and therefore continues to meet GDC34.

### **VES Air Tank Safety Relief Valves, VES-PL-V040A/B/C/D**

Valves VES-PL-V040A, VES-PL-V040B, VES-PL-V040C & VES-PL-V040D are Main Control Room (MCR) Emergency Habitability System (VES) Air Tank Relief Valves. These are 1" relief valves that are normally closed, but may transfer open to relieve pressure from the VES emergency air storage tanks. After opening to relieve tank pressure, these valves transfer to their normally closed position to preserve MCR habitability.

In the current AP1000 design, the VES Air Tank safety relief valves provide for overpressure protection during refilling operations, excessive temperature rises in tank rooms, and fires. The valves are normally closed, but may transfer open to relieve pressure from the VES emergency air storage tanks. If the VES-PL-V040A/B/C/D valves are needed to open for overpressure protection of the tanks, the valves must then transfer close to preserve MCR habitability. The valves are pressure relief valves, and as such, are designed to close after tank pressure drops below the design limit. Thus, the transfer close function is a required design function of the valves that should be classified as an active function in Tier 1, Table 2.2.5-1, and Tier 2, Table 3.9-16. Valve functions are classified as active functions if they have a change in state (e.g., open to closed or closed to open) that is performed to mitigate an accident. Returning the valves to their normally closed position preserves MCR habitability consistent with previously evaluated accidents. The IST requirements for the valves are consistent with the active functions provided by the valve; thus, the IST requirements support the required design functions of the valves and system. Therefore, these changes do not adversely affect the design function of the VES.

In addition, for consistency of terminology throughout the UFSAR, the tag numbers of the VES-PL-V041A/B in Tier 2 need to be corrected. The correct tag number should state VES-PL-V040C/D consistent with Tier 1. Also, the valve descriptions for VES-PL-V040C/D are to be corrected for consistency within the UFSAR and COL Appendix C.

The staff reviewed the proposed changes:

#### **VES-PL-V040A/B**

Tier 1 Departure:

- Tier 1, Table 2.2.5-1 - Add “Transfer Close” as Active Function.

Associated Tier 2 Departure:

- Tier 2 Table 3.9-16 - Add “Transfer Close” to Safety Related Missions.
- Tier 2, Table 3.11-1 - Change valve descriptions to “Air Tank Safety Relief Valve A/B.”
- Tier 2, Table 3I.6-3 - Change valve descriptions to “Air Tank Safety Relief Valve A/B.”

## VES-PL-V040C/D

### Tier 1 Departure:

- Tier 1, Table 2.2.5-1 - Add "Transfer Close" as Active Function.

### Associated Tier 2 Departure:

- Tier 2, UFSAR Table 3.9-12 - Change VES-PL-V041A/B valve tags to VES-PLV040C/D; Change valve descriptions to "Air Tank Safety Relief Valve C/D".
- Tier 2, UFSAR Table 3.9-16 - Change VES-PL-V041A/B valve tags to VES-PLV040C/D; Change valve descriptions to "Air Tank Safety Relief Valve C/D"; Add "Transfer Close" to Safety-Related Missions.
- Tier 2, Table 3.11-1 - Change valve descriptions to "Air Tank Safety Relief Valve C/D"
- Tier 2, UFSAR Table 3I.6-3 - Change VES-PL-V041A/B valve tags to VES-PLV040C/D. Change valve descriptions to "Air Tank Safety Relief Valve C/D."

Based on the above information, the NRC staff has determined that the licensee's proposal to add "Transfer Closed" to Active Functions in Tier 1, Table 2.2.5-1, and "Transfer Close" to Safety-Related Missions in Tier 2, Table 3.9-16 for valves VES-PL-V040A, VES-PL-V040B, VES-PL-V040C & VES-PL-V040D is acceptable. The transfer close function is a required design function of the valve that was not identified as an active function. Adding the "Transfer Close" will properly identify this active function of the valve. The NRC staff also determined that changing the valve tag numbers and valve descriptions in Tier 2, Tables 3.9-12, 3.9-16, and 3I.6-3 is an editorial change that is acceptable, and will make the tag numbers and valve descriptions consistent within the UFSAR and COL Appendix C.

Additionally, these changes have no adverse impact on the design functions of the valve or system with respect to control room habitability, as no design changes took place within the system.

Returning the valves to their normally closed position preserves MCR habitability consistent with previously evaluated accidents and, therefore, continues to meet GDC 19. Tier 2, Table 3.9-16 reflects all of the safety-related missions for the valves and requires appropriate IST and, therefore, continues to meet GDC 32.

The changes to the tag numbers in the UFSAR Tier 2 are consistent with Tier 1.

## 4.0 STATE CONSULTATION

In accordance with the Commission's regulations in 10 CFR 50.91(b)(2), the South Carolina State official was notified of the proposed issuance of the amendment. The State official had no comments.

## 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. 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 (78 FR 64541, published on October 29, 2013). 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 environmental consideration for the exemption is identical to that of the license amendment. Accordingly, the exemption meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 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) is a special circumstance that outweighs the reduction in standardization, and (5) does not significantly reduce the level of safety at the licensee's facility. Therefore, the staff grants the licensee an exemption from the Tier 1 information specified by the licensee.

The staff has concluded, based on the considerations discussed in Section 3.2 and confirming that these changes do not change an analysis methodology, assumptions, or the design itself, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that 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 staff finds the changes proposed in this license amendment acceptable.

## 7.0 REFERENCES

1. Request for License Amendment and Exemption 13-04: Reconciliation of Tier 1 Valve Differences, letter from South Carolina Electric & Gas, dated February 7, 2013 (ADAMS Accession No. ML13042A005).
2. LAR 13-04 Request for License Amendment and Exemption: Reconciliation of Tier 1 Valve Differences Supplement, letter from South Carolina Electric & Gas, dated July 19, 2013 (ADAMS Accession No. ML13205A148).
3. LAR 13-04 Request for License Amendment and Exemption: Reconciliation of Tier 1 Valve Differences Supplement 2, letter from South Carolina Electric & Gas, dated November 21, 2013 (ADAMS Accession No. ML13329A723).
4. Virgil C. Summer Nuclear Station Units 2 and 3: Request for Addition Information Letter No. 1 Regarding License Amendment Request 13-04: Reconciliation of Tier 1 Valve Differences, Letter dated January 6, 2014 (ADAMS Accession No. ML14006A398).



5. Schedule Update for SCE&G Response to NRC Request for Additional Information Related to LAR 13-04 Request for License Amendment and Exemption: Reconciliation of Tier 1 Valve Differences Supplement 2, letter from South Carolina Electric & Gas, dated February 6, 2014 (ADAMS Accession No. ML14041A095).
6. Response to NRC Request for Additional Information related to LAR 13-04 Request for License Amendment and Exemption: Reconciliation of Tier 1 Valve Differences Supplement 2, letter from South Carolina Electric & Gas, dated February 20, 2014 (ADAMS Accession No. ML14052A379).
7. Virgil C. Summer Nuclear Station Units 2 and 3: Request for Addition Information Letter No. 2 Regarding License Amendment Request 13-04: Reconciliation of Tier 1 Valve Differences, Letter dated March 27, 2014 (ADAMS Accession No. ML14086A758).
8. Response to NRC Request for Additional Information Letter No. 2 Related to LAR 13-04 Request for License Amendment and Exemption: Reconciliation of Tier 1 Valve Differences Supplement 2, letter from South Carolina Electric & Gas, dated May 12, 2014 (ADAMS Accession No. ML14133A488).
9. Virgil C. Summer Nuclear Station Units 2 and 3: Request for Addition Information Letter No. 3 Regarding License Amendment Request 13-04: Reconciliation of Tier 1 Valve Differences, Letter dated August 8, 2014 (ADAMS Accession No. ML14220A513).
10. SCE&G Response to NRC Request for Additional Information Letter No. 3 Related to LAR 13-04 Request for License Amendment and Exemption: Reconciliation of Tier 1 Valve Differences, letter from South Carolina Electric & Gas, dated September 22, 2014 (ADAMS Accession No. ML14266A014).
11. Request for License Amendment and Exemption: Reconciliation of Tier 1 Valve Differences Supplement 3, letter from South Carolina Electric & Gas, dated November 19, 2014 (ADAMS Accession No. ML14323A333).
12. Virgil C. Summer Nuclear Station (VCSNS) Updated Final Safety Analysis Report (UFSAR), Revision 2, dated June 26, 2014 (ADAMS Accession No. ML14183B265).
13. AP1000 Design Control Document, Revision 19, dated June 13, 2012 (ADAMS Accession No. ML11171A500).
14. Virgil C. Summer Nuclear Station, Final Safety Evaluation Report, dated August 17, 2011 (ADAMS Accession No. ML110450305).
15. Final Safety Evaluation Report Related to Certification of the AP1000 Standard Plant Design, NUREG-1793, Supplement 2, dated August 5, 2011 (ADAMS Accession No. ML112061231).