

SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS

RELATED TO EXEMPTION AND AMENDMENT NO. 19

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 October 2, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13283A166), and supplemented by letter dated February 28, 2014 (ADAMS Accession No. ML14059A226), South Carolina Electric & Gas (SCE&G/licensee) submitted a request for a license amendment and an exemption for the Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3. The proposed license amendment request would depart from the plant-specific Design Control Document (DCD) Tier 1 and Tier 2 material by making changes to the Non-Class 1E DC and Uninterruptible Power Supply System (EDS) and Class 1E DC and Uninterruptible Power Supply System (IDS) and making changes to the corresponding Tier 1 information in Appendix C to the combined license. The proposed changes would:

- (1) Increase EDS total equipment capacity, component ratings, and protective device sizing to support increased load demand;
- (2) Relocate equipment and move the Turbine Building (TB) first bay EDS Battery Room and Charger Room. The floor elevation 148'-0" increases to elevation 148'-10" to accommodate equipment cabling associated with this activity; and
- (3) Remove the Class 1E IDS Battery back-up tie to the Non-Class 1E EDS Battery.

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, Section III.B, "Design Certification Rule for the AP1000 Design, Scope and Contents," to allow for a departure from the elements of the certification information in Tier 1 of the generic DCD.

In order to modify the VCSNS Units 2 and 3, Tier 1 information, 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 LAR is included in this Safety Evaluation.

By letter dated February 28, 2014 (ADAMS Accession No. ML14059A226), the licensee provided supplemental information that clarified the application, did not expand the scope of the application as originally noticed and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on November 26, 2013 (78 FR 70589).

2.0 REGULATORY EVALUATION

Tier 1 Information is defined in 10 CFR 52, Appendix D, Section II.D. 10 CFR 52, Appendix D, Section II.D.3 lists inspections, tests, analyses, and acceptance criteria (ITAAC) as part of the definition for Tier 1 information. An exemption from elements of the AP1000 certification (Tier 1) design information is requested and includes changes to the onsite power system description. The proposed departure would allow the increase in the EDS total equipment capacity, component ratings, and protective sizing to support increased load demand and remove the class 1E IDS Battery-up tie to the Non-class 1E EDS battery. The licensee is requesting to change Tables 2.6.2-1, 2.6.2-2, 2.6.3-1, and 2.6.3-4 and Figure 2.6.2-1 (Collectively Tier 1 information) that is part of the ITAAC. The proposed changes included in the LAR/exemption request are required to meet the following requirements:

- 10 CFR 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). It also states that the Commission will deny such a request if the design change causes a significant reduction in plant safety otherwise provided by the design.
- 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 grant such a request only if it determines that the exemption will comply with the requirements of 10 CFR 52.7. Section 52.7 states that the Commission's consideration of an exemption request will be governed by 10 CFR 50.12 unless other criteria are provided for in Part 52. The Commission shall consider whether the special circumstances that Section 52.7 requires to be present 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).
- 10 CFR 52.98(f) states that any modification to, addition to, or deletion from the terms and conditions of a combined license, including any modification to, addition to, or deletion from the ITAAC contained in the license is a proposed amendment to the license. Appendix C of SCE&G's license, which contains the ITAAC of COLs

NPF-93 and NPF-94, contains Tables 2.6.2-1, 2.6.2-2, 2.6.3-1, and 2.6.3-4 and Figure 2.6.2-1 (Collectively Tier 1 information). The licensee is proposing to modify Tier 1 information as defined in Appendix D to Part 52. Therefore, the proposed changes constitute a license amendment.

- 10 CFR 52, Appendix D, VIII.A.4 requires that, for an exemption to be granted, a design change requiring a Tier 1 change not result in a significant decrease in the level of safety otherwise provided by the design.
- 10 CFR Part 52, Appendix D, Section VIII.B.5.a requires prior NRC approval for Tier 2 departures that involve changes to Tier 1 information. The proposed changes to SCE&G's COL affect Tier 1 information and associated Tier 2 and Tier 2* Tables, text and figures.
- 10 CFR 52, Appendix D, Section VIII.B.6.b, requires prior NRC approval for changes to Tier 2* information.
- 10 CFR 50.48 requires a fire protection plan that satisfies 10 CFR 50, Appendix A, General Design Criterion (GDC) 3 – Fire Protection. GDC 3 requires that structures, systems and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions.
- 10 CFR 50 Appendix A, GDC 17 – Electric power systems. GDC 17 requires that an onsite electric power system and an offsite electric power system shall be provided to permit functioning of structures, systems, and components important to safety.
- 10 CFR 50 Appendix A, GDC 18 – Inspection and testing of electric power systems. GDC 18 requires that electric power systems important to safety shall be designed to permit appropriate periodic inspections and testing of important areas and features, such as wiring, insulation, connections, and switchboards, to assess the continuity of the systems and the condition of their components.
- 10 CFR 50.150, Aircraft impact assessment: (a) Assessment requirements - Requires a design-specific assessment of the effects on the facility of the impact of a large commercial aircraft to identify design features and functional capabilities that demonstrate with reduced use of operator actions: (i) the reactor core remains cooled, the containment remains intact, and (ii) spent fuel pool integrity is maintained.
- Regulations in 10 CFR Part 50, Appendix A, GDC 2, “Design bases for protection against natural phenomena.” GDC 2 requires that structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capabilities to perform their safety functions.
- 10 CFR Part 50, Appendix S, “Earthquake Engineering Criteria for Nuclear Power Plants,” requires that nuclear power plants shall be designed so that, if the Safe Shutdown Earthquake (SSE) Ground Motion occurs, certain structures, systems and components will remain functional and within applicable stress, strain, and deformation limits. The required safety functions of structures, systems, and components must be

assured during and after the vibratory ground motion associated with the SSE Ground Motion through design, testing, or qualification methods.

3.0 TECHNICAL EVALUATION

3.1 EVALUATION OF EXEMPTION

The regulations in Section III.B of Appendix D to 10 CFR 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 ITAAC. Therefore, a licensee referencing Appendix D incorporates by reference all the ITAAC contained in the generic DCD. These ITAAC, along with the plant-specific ITAAC, were enumerated in Appendix C of the COL at its issuance. During the detailed design phase of the onsite power system, the licensee determined that departures from AP1000 generic DCD Tier 2 information are necessary to continue to maintain the existing UFSAR system design functions to provide DC and uninterruptible AC electrical power to nonsafety-related loads during normal and off-normal conditions.

Therefore, the licensee proposed an exemption from the elements of the AP1000 certified design information (Tier 1) to allow a departure from the electrical design description (Tables 2.6.2-1, 2.6.2-2, 2.6.3-1, and 2.6.3-4 and Figure 2.6.2-1 (Collectively Tier 1 information)). The proposed departure would allow an increase in the EDS total equipment capacity, component ratings, and protective sizing to support increased load demand and remove the Class 1E IDS Battery Back-up tie to the Non-Class 1E EDS Battery.

In summary, if the NRC approves LAR 13-14, the licensee could implement modifications to Tier 1 information, namely, Appendix C to License Nos. NPF-93 and NPF-94, Tables 2.6.2-1, 2.6.2-2, 2.6.3-1, and 2.6.3-4 and Figure 2.6.2-1, in so far as the LAR describes and justifies these modifications. This is a permanent exemption limited in scope to particular Tier 1 information.

As stated in Section VIII.A.4 of Appendix D to 10 CFR 52, an exemption from Tier 1 information is governed by the requirements of 10 CFR 52.63(b)(1) and 52.98(f). Additionally, 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 safety. The Commission may grant such a request only if it determines that the exemption will comply with the requirements of 10 CFR 52.7. Section 52.7 states that the Commission's consideration of an exemption request will be governed by 10 CFR 50.12 unless other criteria are provided for in Part 52. The Commission shall consider whether the special circumstances that § 52.7 requires to be present outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption.

The requirements of 10 CFR 50.12(a)(2) list 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 consider granting an exemption request. The licensee stated that the requested exemption meets the special circumstances of 10 CFR 50.12(a)(2)(ii). That subsection

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 staff’s analysis of each of these findings is presented below.

3.1.1 AUTHORIZED BY LAW

This exemption would allow the licensee to implement approved changes to Tier 1 information. This is a permanent exemption limited in scope to particular Tier 1 information, and subsequent changes to this Tier 1 information or any other Tier 1 information would be subject to full compliance by the licensee as specified in Section III.B of Appendix D to 10 CFR 52. As stated above, 10 CFR 52.63(b)(1) allows the NRC to grant exemptions from one or more elements of the certification information, namely, the requirements of Section III.B of Appendix D to 10 CFR 52. As explained in more detail below in the context of the amendment request associated with the requested exemption, 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. 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

The underlying purpose of Section III.B of Appendix D to 10 CFR 52 is to ensure 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 plant-specific Tier 1 DCD will continue to reflect the approved licensing basis for VCSNS Units 2 and 3 and will maintain a consistent level of detail with that which is currently provided elsewhere in Tier 1 of the plant-specific DCD. These proposed LAR changes are evaluated and found to be acceptable in Section 3.2 of this Safety Evaluation. The change would allow the licensee to implement modifications to Tier 1 information described and justified in the LAR. Therefore, as required by 10 CFR 50.12(a)(1), the staff finds 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 the licensee to implement modifications to the Tier 1 information requested in the LAR. This is a permanent exemption limited in scope to particular Tier 1 information. Subsequent changes to this Tier 1 information or any other Tier 1 information would be subject to full compliance by the licensee as specified in Section III.B of Appendix D to 10 CFR 52. This LAR involves systems not related to physical security systems. 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 purposes 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 52 is to ensure 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 licensee achieves this

purpose in part when it provides ITAAC that accurately reflect the plant design and are adequate to verify the construction of the approved design. The requested exemption asks for the licensee to be allowed to implement the changes proposed in the LAR to the VCSNS Units 2 and 3, Tier 1 information. The requested change will facilitate plant construction and maintain or enhance future safe plant operation and maintenance, while supporting the ability of the onsite power system to perform its design functions. Accordingly, this change to the certified information will enable the licensee to safely construct, maintain, and operate the AP1000 facility consistent with the design certified by the NRC in 10 CFR Part 52, Appendix D. Therefore, special circumstances are present, because application of the current generic certified design information in Tier 1 as required by 10 CFR Part 52, Appendix D, Section III.B, in the particular circumstances discussed in this request would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule. Therefore, because the application of Section III.B of Appendix D to 10 CFR 52 in this circumstance does not serve the underlying purpose of the rule, the staff finds 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 52 exist.

3.1.5 SPECIAL CIRCUMSTANCES OUTWEIGH REDUCED STANDARDIZATION

This exemption would allow the implementation of changes to VCSNS Units 2 and 3, Tier 1 information proposed in the LAR. Based on the nature of the proposed changes to the generic Tier 1 information and the understanding that these changes were identified during the design finalization process for the AP1000, this exemption may be requested by other AP1000 licensees and applicants. However, a review of the reduction in standardization resulting from the departure from the standard DCD determined that even if other AP1000 licensees and applicants do not request this same departure, the special circumstances will continue to outweigh any decrease in safety from the reduction in standardization because the key design functions of the onsite power system associated with this request will continue to be maintained. This exemption request and the associated changes to VCSNS Units 2 and 3, Tier 1, information demonstrate that there is a minimal change from the standard information provided in the generic AP1000 DCD, which is offset by the special circumstances identified above. The changes have no effect on any systems, structures or components meeting their design function. Based on this, as required by 10 CFR 52.63(b)(1), the staff finds that the special circumstances outweigh the potential decrease in safety due to reduced standardization of the AP1000 design.

3.1.6 NO SIGNIFICANT REDUCTION IN SAFETY

The proposed exemption would allow changes to the onsite power system as presented in VCSNS Units 2 and 3, Tier 1 information proposed in the LAR. The proposed changes to the onsite power system design will not adversely affect the ability of the onsite power system functions and the level of safety provided by the systems and equipment contained therein is unchanged. Therefore, as required by 10 CFR Part 52, Appendix D, Section VIII.A.4, 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 NRC staff has evaluated various aspects of the proposed changes included in the LAR. The proposed changes consist of:

1. Increase EDS total equipment capacity, component ratings, and protective device sizing to support increased load demand,
2. Relocate equipment and move the Turbine Building (TB) first bay EDS Battery Room and Charger Room. The floor elevation 148'-0" increases to elevation 148'-10" to accommodate equipment cabling associated with this activity, and
3. Remove the Class 1E IDS Battery back-up tie to the Non-Class 1E EDS Battery.

The staff's evaluations are contained in the following sections:

3.2.1 STRUCTURAL ENGINEERING EVALUATION

The Turbine Building (TB) is a non-safety related structure that houses the main turbine generator and the power conversion cycle equipment and auxiliaries. There is no safety-related equipment in the TB. It is comprised of two independent superstructures, namely the first bay and the main area, both supported on a common reinforced concrete basemat and separated from the nuclear island (NI). The first bay is classified as a seismic Category II structure due to its immediate proximity to the auxiliary building. As such, the turbine building first bay is designed so that the safe shutdown earthquake (SSE) does not cause unacceptable structural failure of or interaction with adjacent seismic Category I structures, systems, and components (SSCs). Concrete structures in the first bay are designed in accordance with the American Concrete Institute (ACI) code, ACI-349, "Building Code Requirements for Nuclear Safety Related Structures," and steel structures are designed in accordance the American Institute of Steel Construction (AISC) code, AISC-N690, "Specification for the Design, Fabrication and Erection of Steel Safety Related Structures for Nuclear Facilities."

In the LAR, the licensee proposed to depart from the UFSAR Tier 2 information by requesting to increase the TB first bay floor elevation from 148'-0" to 148'-10" (i.e., a 10-in. height increase) to accommodate EDS Battery Room and Charger Room overhead cabling routed from the floor below (i.e., elevation 135'-3"). To perform the technical evaluation of the proposed change, the NRC staff considered Sections 1.2, "General Plant Description," 3.2, "Classification of Structures, Systems, and Components," 3.7, "Seismic Design," and Appendix 19F, "Malevolent Aircraft Impact," of the UFSAR. The staff also examined portions of NUREG-1793, Supplement 2, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Plant Design," ADAMS Accession No. ML112061231) and NUREG-2153, "Final Safety Evaluation Report Related to the Combined Licenses for Virgil C. Summer Nuclear station, Units 2 and 3," (ADAMS Accession No. ML13275A125). Further, the staff considered the guidance of the Standard Review Plan Section 3.7. The staff focused its review in evaluating the impact of the requested UFSAR changes on (1) TB Design Approach and Commitments, (2) Seismic Category II Requirements, and (3) Aircraft Impact Assessment. The staff's evaluation is summarized below.

A. TB Design Approach and Commitments

The LAR states that the design of the TB structure, including the TB first bay floor elevation increase above the EDS battery room and charger room would continue to meet the same regulatory acceptance criteria and structural codes and standards as stated in the UFSAR.

Additionally, the LAR states that analysis, encompassing cumulative structural changes has confirmed continued satisfaction of TB design functions identified in Section 1.2.8 of the UFSAR. Similarly, independent staff calculations indicated that the proposed change had a negligible impact on the structural dynamic properties of the TB First Bay and therefore it resulted in a negligible impact to its seismic design demands.

The staff review of Section 1.2.8, of the UFSAR, confirms that the implementation of the proposed structural changes would continue to satisfy the TB functions identified in the UFSAR. Further, the staff review of the proposed structural changes finds that the first bay will continue to be designed in accordance with the American Concrete Institute (ACI) standard ACI-349 for concrete features and the American Institute of Steel Construction (AISC) standard AISC-N690 for steel features. These two standards continue to be acceptable to the staff for the design of safety-related structures. On this basis, the staff concludes that the design will continue to meet the requirements of GDC 2 of Appendix A to 10 CFR Part 50, as well as Appendix S to 10 CFR Part 50. Therefore, the staff finds the proposed changes do not adversely impact the TB design approach and commitments.

B. Seismic Category II Requirements

The first bay, which is immediately adjacent to the auxiliary building, is classified as a seismic Category II structure and as such it is designed so that the SSE does not cause unacceptable structural failure of or interaction with adjacent seismic Category I SSCs.

The LAR states that the proposed floor elevation changes and movement of equipment does not change the first bay design function or its ability to continue to satisfy the seismic Category II requirements. Further, the LAR states that physical separation would continue to be provided between the structural elements of the TB and the nuclear island structure such that it would continue to permit horizontal motion of the buildings during an SSE without impact between structural elements of the buildings.

Staff's review of the proposed changes finds that the seismic modeling and analysis methods for seismic Category II would continue to apply to the TB first bay structure. Additionally, the staff's confirmatory analysis determined that changes to the mass and geometry of the TB first bay are minor and as such the changes have an immaterial effect on the seismic response of the first bay. On this basis, the staff concludes that the seismic Category II requirements applicable to the TB first bay would continue to be satisfied.

C. Aircraft Impact Assessment

The LAR states that the proposed changes do not affect the aircraft impact assessment (AIA), because they do not affect any key design features credited in the Aircraft Impact Assessment as described in UFSAR Appendix 19F.

Section 19F.4.2 of the UFSAR, identifies the design of the wall along the south end of the TB at Column Line 11.2, as a key design feature for the protection of the auxiliary building from the impact of a large commercial aircraft.

Staff review of UFSAR Section 19F.4.2 finds that the description of the TB first bay design feature remains valid because the proposed structural changes to the TB first bay do not alter the protective function of the TB wall at Column Line 11.2. On this basis, the staff concludes that the proposed structural changes do not impact the licensee's AIA and therefore the design will continue to satisfy the requirements in 10 CFR Part 50.150.

Conclusions

The NRC staff has reviewed the licensee's assessment provided in the LAR. Based on its technical evaluation, the staff concludes the following:

1. The floor elevation increase from 148'-0" to elevation 148'-10" in the first bay of the TB will not materially alter the building's mass and geometry and will not impact the licensee's commitment to carry out the detailed design in accordance with acceptable codes and standards, i.e., AISC N690 and ACI 349 code provisions.
2. The changes to the mass and geometry of the TB first bay are minor and as such the changes have an immaterial effect on the seismic response of the first bay.
3. The seismic modeling and analysis methods for seismic Category II structures will continue to apply to the TB first bay structure, therefore the seismic Category II requirements applicable to the TB first bay would continue to be satisfied.
4. The proposed structural changes will not affect the licensee's AIA.

For the reasons specified above, the NRC staff concludes that there is reasonable assurance that the requirements of Appendix A GDC 2 to 10 CFR Part 50, Appendix S to 10 CFR Part 50, and 10 CFR Part 50.150 are satisfied. Therefore, the staff finds the proposed changes acceptable.

3.2.2 ELECTRICAL EVALUATION

The electrical engineering review of this LAR concerns the changes related to the onsite power system, specifically the Non-Class 1E direct current (DC) and Uninterruptible Power Supply System (EDS) and Class 1E DC and Uninterruptible Power Supply System (IDS).

The EDS provides DC and uninterruptible alternating current (AC) electrical power to non-safety-related loads during normal and off-normal conditions. To accomplish this function and support the non-safety-related loads, the EDS has multiple non-Class 1E DC power buses.

EDS also provides AC power using equipment such as stationary batteries, chargers, inverters, regulating transformers, switch boards, and monitoring and protection devices. EDS provides non-Class 1E power to multiple systems and instrumentation that perform defense-in-depth (DID) functions (e.g., hydrogen igniters, diverse actuation system to support anticipated transients without scram (ATWS) mitigation, engineered safety feature actuation system

(ESFAS) to provide probabilistic risk assessment (PRA) sensitivity study margin). EDS provides non-Class 1E power for many post-accident monitoring (PAM) functions.

The current onsite power system design description provides a Class 1E battery back-up tie to the non-Class 1E batteries. This back-up tie is from the IDS back-up battery, which is also identified as the IDS Spare (IDSS) battery. The IDS provides DC and uninterruptible AC electrical power for safety-related equipment during normal and off-normal conditions. The IDS provides power for the safety-related equipment required for the plant instrumentation, control, monitoring and other vital functions needed for shutdown of the plant. Under the current design, the IDSS has sufficient battery capacity to provide battery back-up for any one of the EDS (1, 2, 3, 4 or 5) batteries, or battery back-up for any one of the IDS batteries.

Specifically, the changes proposed in this LAR are (1) increasing EDS total equipment capacity, component ratings, and protective device sizing to support increased load demand, and (2) removing the Class 1E IDS Battery Back-up tie to the Non-Class 1E EDS Battery.

A. Increasing EDS Total Equipment Capacity, Component Ratings, and Protective Device Sizing to Support Increased Load Demand

Total capacity equipment increases have been proposed for EDS to provide sufficient DC and AC power for the connected non-Class 1E loads during normal and off-normal conditions. This proposed increase in capacity results from detailed design changes requiring additional power. To support EDS protective device coordination, equipment component ratings, and protective device sizing were also proposed by the licensee. These proposed changes include EDS configuration changes which would eliminate the EDS (1, 2, 3, and 4)-DS-11 switchboards, combining them into the EDS (1, 2, 3, and 4)-DS-1 switchboards. Also proposed is the deletion of the stand-alone spare EDS charger (EDSS-DC-1), which is not necessary because of the addition of the new EDS Spare (EDSS) battery, chargers and fused transfer switch box.

The staff review of all the changes to the FSAR sections included in Enclosure 1 and corresponding FSAR mark-up in Enclosure 3 of the LAR, confirm that the description of the proposed non-safety onsite power system changes in this LAR are documented in the FSAR, and that there is no impact to the function of the IDS. Increased capacity of the EDS system results from the increased sizing of the existing EDS spare batteries, chargers, switchgear, and UPS for all four divisions of the EDS. In addition, a new spare non-class 1E DC system, EDSS, has been proposed, further increasing the availability of more capacity to the EDS system. The proposed EDS design changes to increase the total capacity of the EDS equipment would continue to achieve the existing UFSAR system design functions, including DC and UPS power for the operation of the DAS and turbine trip systems, and the ATWS requirements, to provide DC and uninterruptible AC electrical power to non-safety-related loads during normal and off-normal conditions. Therefore, the onsite power system continues to be designed with sufficient capacity and capability as required by GDC 17, inspection and testing requirements of the IDS would still be satisfied as required by GDC 18, and the EDS continues to provide the ATWS requirements as required by 10 CFR 50.62.

B. Removing the Class 1E IDS Battery Back-up Tie to the Non-Class 1E EDS Battery

This proposed change includes removal of the tie between the Class 1E IDSS and the non-Class 1E batteries (EDS1 through 5), and the addition of a larger capacity spare EDS battery, chargers and fused transfer switch box to perform the same function. The proposed removal of the interface tie with the Class 1E IDSS battery would remove the interface switch (i.e., 125/250 V DC Disconnect Switch IDSS-SW-1), spare termination box (i.e., IDS Spare Termination Box IDSS-DF-6) and cabling from the Auxiliary Building to the Annex Building and Turbine Building. This IDSS equipment would become non-functional and unnecessary spare equipment; therefore, it would be removed.

In Enclosure 3, pages 11 and 12 of the LAR, the licensee discusses the single spare battery bank with spare battery charger for the Class 1E and non-Class 1E DC systems. It was not clear whether the spare battery banks discussed in this LAR submittal were the same equipment or different pieces of equipment. Therefore, the staff requested the licensee to clarify the equipment identification as discussed in Enclosure 3, pages 11 and 12 of the LAR (RAI 08.03.02-1). In its response dated February 28, 2014, the licensee identified equipment discussed in the markup for Sections 8.1.2 and 8.3.2.1.2 of the UFSAR with equipment specific labels. The response identified that a safety-related spare charger will provide power to loads on the safety-related system, and that the EDS spare battery bank will provide power to non-Class 1E loads. This confirms that the IDS and EDS systems are completely independent and not connectable. The staff found the response acceptable and the issue resolved.

The staff review of all the changes to the FSAR sections included in Enclosure 1 of the LAR, and FSAR markups in Enclosure 3 of the LAR, confirm that the removal of the tie between the Class 1E IDSS and the non-Class 1E batteries (EDS1 through 5), and the addition of a larger capacity spare EDS battery, chargers and fused transfer switch box are documented in the FSAR, and that there is no impact to the function of the Class 1E DC and IDS. The removal of this tie isolates the safety-related Class 1E DC system, IDS, from the non-safety-related DC system, EDS. The tie previously existed for providing power from the safety-related spare charger, IDSS, to the loads on the EDS system. Since the loads powered by the EDS system increased, they exceeded the capacity of the IDSS system, and the IDSS system would have been unable to supply the loads powered by the EDS system. Therefore, the licensee proposed to install increased capacity in the existing EDS system and a new spare non-Class 1E DC system, namely EDSS that includes a battery, chargers and fused transfer switch box.

The proposed EDS design changes to delete the tie between the EDS system and the IDS spare battery does not impact the design functions of the EDS and IDS systems in the existing UFSAR; the separation of the IDS spare back-up battery from any interface with the non-Class 1E EDS batteries provides further isolation of both systems precluding the IDS system from external failure potential from the EDS interface. Therefore, the onsite power system continues to be designed with sufficient capacity and capability as required by GDC 17, and inspection and testing requirements of IDS would still be satisfied as required by GDC 18. Consequently, the staff finds the proposed change acceptable.

3.2.3 FIRE PROTECTION EVALUATION

The fire protection review of this LAR concerns changes to certain fire areas within the Turbine Building. The primary purpose of these fire areas is to confine the effects of fires to a single compartment, thereby minimizing the potential for adverse effects from fires on SSCs important to safety. The proposed changes revise the COL regarding the plant structures and layouts by:

- A. Relocating the EDS Battery Room and Charger Room
- B. Relocating Two Reactor Coolant Pump Variable Frequency Drives
- C. Relocating Air Handling Units 03A/B from the Roof to Room 21480

A. Relocating the EDS Battery Room and Charger Room

In the current design, as depicted in the UFSAR Figure 9A-2, Sheet 2 the EDS Battery Room and Charger Room are located on Elevation 117'-6". The proposed change would move these two rooms to the 135'-3" elevation as depicted in the LAR Enclosure 4, page 6 of 8. In order to accommodate the new EDS Battery Room and Charger Room overhead cabling, the floor elevation of Room 21583 will be raised from 148'-0" to elevation 148'-10" as depicted in the LAR Enclosure 4, page 4 of 8.

In the LAR, the licensee stated that the fire protection system would continue to detect and suppress fires in the Turbine Building. A fire in the Turbine Building would not affect safe shutdown capability. Fire areas located in the Turbine Building would continue to be separated from the safety-related areas of the nuclear island by a 3-hour fire barrier wall. Consistent with the existing design, neither a fire nor fire suppression activities in Turbine Building fire areas would affect the safe shutdown capability of components located in other fire areas. As depicted in the LAR figures and stated by the licensee, the relocated Battery and Charger Rooms will have the same fire barrier rating as the existing design.

The NRC staff reviewed the licensee's analysis provided in the LAR and finds that relocating the Battery and Charger Rooms meets the guidance in Regulatory Guide 1.189, Revision 2, "Fire Protection for Nuclear Power Plants," because the relocated rooms will have the same fire rating as the original design.

B. Relocating Two Reactor Coolant Pump Variable Frequency Drives

The proposed change would move two Reactor Coolant Pump (RCP) Variable Frequency Drives (VFDs) from elevation 135'-3" to elevation 148'-10" (Room 21583) and locate them with two existing RCP VFDs and consolidate the four RCP VFDs and associated equipment at this location.

In the LAR, the licensee stated that the combustible loading for Room 21583 in UFSAR Fire Hazard Analysis Table 9A-3 "Fire Protection Summary," would be updated from 1770 Btu/ft² to 1000 Btu/ft² with this proposed change.

The NRC staff reviewed the licensee's changes provided in the LAR to the Fire Hazard Analysis Table 9A-3 "Fire Protection Summary," and finds them acceptable because the

changes follow guidance in Regulatory Guide 1.189, Revision 2, for performing a fire hazard analysis, and demonstrates that the plant will maintain the ability to safely shutdown in the event of a fire.

C. Relocating Air Handling Units 03A/B from the Roof to Room 21480

The proposed change would move Air-Handling Units 03A/B from the roof to Room 21480 which is located on elevation 117'-6".

In the LAR, the licensee stated that location and room combustible loading in the UFSAR Fire Hazard Analysis, Table 9A-3 "Fire Protection Summary," for the fire area in which Room 21480 is located would not change. This is because the location of this air handling equipment was previously in this same room. The original combustible loading in Table 9A-3 was never changed when these air handling units were moved from Room 21480 to the roof. Therefore, there is no information to change now that the air handling units have returned to the original location.

Conclusion

The NRC staff has reviewed the licensee's analysis provided in the LAR and finds that:

- The proposed relocation of the EDS Battery Room and Charger Room, and proposed relocation of the two Reactor Coolant Pump Variable Frequency Drives meets the guidance in Regulatory Guide 1.189 Revision 2 and demonstrates that the plant will maintain the ability to safely shutdown in the event of a fire.
- There is no change to the UFSAR Fire Hazard Analysis required by the proposed relocation of air handling Units 03A/B from the roof to Room 21480 because the Fire Hazard Analysis was not updated when the air handling units were moved from Room 21480 to the roof.

Based on these findings the NRC staff concludes that there is reasonable assurance that the requirements of 10 CFR 50.48 will continue to be met. Therefore, the NRC staff finds the proposed changes acceptable.

3.2.4 AIRCRAFT IMPACT ASSESSMENT – FIRE PROTECTION

A. Relocating the EDS Battery Room and Charger Room

In the LAR, the licensee states that the proposed changes do not affect the Aircraft Impact Assessment, because they do not affect any key design features (UFSAR Subsection 19F.4.2) credited in the Aircraft Impact Assessment as described in UFSAR Appendix 19F.

The NRC staff reviewed the UFSAR Subsection 19F.4.2, "Site Arrangement," and finds that the relocation of the EDS Battery Room and Charger Room does not affect any key design features credited in the aircraft impact assessment.

B. Relocating Two Reactor Coolant Pump Variable Frequency Drives

In the LAR, the licensee states that the proposed changes do not affect the Aircraft Impact Assessment, because they do not affect any key design features (UFSAR Subsection 19F.4.2) credited in the Aircraft Impact Assessment as described in UFSAR Appendix 19F.

The NRC staff reviewed the AP1000 UFSAR Revision 19 Subsection 19F.4.2, "Site Arrangement," and finds that the relocation of the two Reactor Coolant Pump Variable Frequency Drives does not affect any key design features credited in the aircraft impact assessment.

Conclusion

The NRC staff has reviewed the licensee's analysis provided in the LAR and finds that:

- The proposed relocation of the EDS Battery Room and Charger Room, and proposed relocation of the two Reactor Coolant Pump Variable Frequency Drives does not affect any key design features credited in the aircraft impact assessment.

Based on these findings the NRC staff concludes that there is reasonable assurance that the requirements of 10 CFR 50.150 will continue to be met. Therefore, the NRC staff finds the proposed changes acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations 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, "*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 (*Federal Register*, 78 FR 70589, dated November 26, 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 issuing 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 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 staff has determined that pursuant to Section VIII.A.4 of Appendix D to 10 CFR 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) has special circumstances that outweigh the potential decrease in safety due to reduced 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 requirements of 10 CFR 52, Appendix D, Section III.B, to allow a departure from elements of the certification information in Tier 1 of the generic DCD associated with the VCSNS Units 2 and 3 Tables 2.6.2-1, 2.6.2-2, 2.6.3-1, and 2.6.3-4 and Figure 2.6.2-1 (Collectively Tier 1 information).

The staff has concluded, based on the considerations discussed above, 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 the common defense and security or 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 – Turbine Building Battery Room and Electrical Changes (LAR-13-14) letter from South Carolina Electric and Gas Company, letter dated October 2, 2013 (ADAMS Accession No. ML13283A166), and supplemented by letter dated February 28, 2014 (ADAMS Accession No. ML14059A226).
2. Virgil C. Summer Nuclear Station, Units 2 and 3, Updated Final Safety Analysis Report (UFSAR), Revision 1, dated June 26, 2013 (ADAMS Accession No. ML13200A269).
3. AP1000 Design Control Document, Revision 19, dated June 13, 2011 (ADAMS Accession No. ML11171A500).
4. U.S. Nuclear Regulatory Commission, "Final Safety Evaluation Report Related to the Combined Licenses for Virgil C. Summer Nuclear Station, Units 2 and 3," Volume 1, NUREG-2153, dated September, 2013 (ADAMS Accession No. ML13275A125).
5. U. S. Nuclear Regulatory Commission "Final Safety Evaluation Report-NUREG-1793," Supplement 2, AP1000 Design Certification Amendment, dated August 5, 2011 (ADAMS Accession No. ML112061231).