



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

SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS

RELATED TO EXEMPTION AND AMENDMENT NOS. 121 AND 120

TO THE COMBINED LICENSE NOS. NPF-91 AND NPF-92, RESPECTIVELY

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MEAG POWER SPVM, LLC

MEAG POWER SPVJ, LLC

MEAG POWER SPVP, LLC

CITY OF DALTON, GEORGIA

VOGTLE ELECTRIC GENERATING PLANT UNITS 3 AND 4

DOCKET NOS. 52-025 AND 52-026

1.0 INTRODUCTION

By letter dated August 30, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17242A279), and supplemented by letter dated January 12, 2018 (ADAMS Accession No. ML18012A704), Southern Nuclear Operating Company (SNC) requested that the Nuclear Regulatory Commission (NRC) amend Vogtle Electric Generating Plant (VEGP) Units 3 and 4, Combined License (COL) Numbers NPF-91 and NPF-92, respectively. The license amendment request (LAR) 17-018 requested changes to the Updated Final Safety Analysis Report (UFSAR) in the form of departures from the incorporated plant-specific Design Control Document (DCD) Tier 2 information and changes to amend plant-specific DCD Tier 1 information, with corresponding changes to COL Appendix C. The proposed changes to Tier 1, Table 2.6.3-3, "Inspections, Tests, Analyses, and Acceptance Criteria," (ITAAC) ITAAC No. 4.i) relate to the Class 1E (safety-related) direct-current (dc) and uninterruptible power supply system (IDS) and Class 1E motor-operated valves (MOVs), and include performing analyses in addition to voltage tests.

Pursuant to the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 52.63(b)(1), SNC has also requested an exemption from the provisions of 10 CFR Part 52, Appendix D, "Design Certification Rule for the AP1000 Design," Section III.B, "Scope and Contents."

The requested exemption would allow a departure from the certified information in Tier 1 of the generic DCD.¹ In order to grant SNC's request to modify the UFSAR (the plant-specific design control document (PS-DCD)) Tier 1 information, the NRC must find the licensee's exemption request included in its submittal for the LAR to be acceptable. The staff's review of the exemption request, as well as the LAR, is included in this safety evaluation.

In a letter dated January 12, 2018, SNC provided additional information that clarified 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, published in the *Federal Register* on October 24, 2017 (82 FR 49239).

2.0 REGULATORY EVALUATION

Proposed COL Appendix C and Tier 1, Table 2.6.3-3, ITAAC No. 4.i changes:

SNC proposed the following changes to the Design Commitment (DC), Inspections, Tests, and Analysis (ITA), and Acceptance Criteria (AC) portions of Table 2.6.3-3, ITAAC No. 4.i).

The proposed DC changes "minimum specified voltage" to "minimum design voltage."

The proposed ITA changes the testing to measure the voltage at IDS battery and the MOV motor terminals. The proposed ITA also adds analysis to verify that the MOV terminal voltage is greater than or equal to the minimum design voltage of each MOV under design conditions with an IDS battery terminal voltage of 210 Volt-direct current (Vdc).

In the LAR, SNC stated that the proposed AC is changed to verify that IDS can provide a voltage at each MOV motor terminal that is greater than or equal to each MOV's minimum design voltage during valve stroking. A report will be generated and will ensure that an acceptable voltage is transferred when power is supplied under design conditions from IDS batteries with battery terminal voltage of 210 Vdc.

Proposed UFSAR Tier 2 Section 8.3.2.5.9 changes:

The title of UFSAR Tier 2, Section 8.3.2.5.9 is changed to add "Class 1E."

UFSAR Tier 2, Section 8.3.2.5.9, "Class 1E MOVs Terminal Voltage Testing," is changed to account for the Tier 1, Table 2.6.3-3, ITAAC No. 4.i changes described above.

The NRC staff considered the following regulatory requirements in reviewing LAR 17-018.

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

¹ While SNC 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 plant-specific 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.

10 CFR Part 52, Appendix D, Section VIII.B.5.a allows an applicant or licensee who references this appendix to depart from Tier 2 information, without prior NRC approval, unless the proposed departure involves a change to or departure from Tier 1 information, Tier 2* information, or the Technical Specifications, or requires a license amendment under Section VIII, paragraphs B.5.b or B.5.c.

10 CFR 52.63(b)(1) allows the licensee who references a design certification rule 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. In addition to the factors listed in 10 CFR 52.7, the Commission shall consider whether the special circumstances 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) requires NRC approval for any modification to, addition to, or deletion from the terms and conditions of a COL. LAR 17-018 involves a change to COL Appendix C Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) information, with corresponding changes to the associated PS-DCD Tier 1 and Tier 2 information. Therefore, NRC approval is required prior to implementation of the proposed changes as described in the LAR.

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 2, "Design Bases for Protection Against Natural Phenomena," requires, in part, that structures, systems, and components (SSCs) 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 capability to perform their safety functions. The design bases for these SSCs shall reflect: (1) appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated, (2) appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena, and (3) the importance of the safety functions to be performed.

GDC 4, "Environmental and Dynamic Effects Design Bases," requires, in part, that SSCs important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. These SSCs shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit.

GDC 17, "Electric Power Systems," requires, in part, that an onsite electric power system be provided to permit functioning of SSCs important to safety. The onsite electric power distribution system shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure.

GDC 18, "Inspection and Testing of Electric Power Systems," requires, in part, that electric power systems important to safety be designed to permit appropriate periodic inspection 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. The systems shall be designed with a capability to test periodically (1) the operability and

functional performance of the components of the systems, such as onsite power sources, relays, switches, and buses, and (2) the operability of the systems as a whole.

3.0 TECHNICAL EVALUATION

3.1 EVALUATION OF EXEMPTION

The regulations in Section III.B of Appendix D to 10 CFR Part 52 require a 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. Exemptions from Tier 1 information are governed by the change process in Section VIII.A.4 of Appendix D of 10 CFR Part 52. Because SNC has identified changes to PS-DCD Tier 1 information, with corresponding changes to the associated COL Appendix C information resulting in the need for an exemption from the certified design information within generic DCD Tier 1 material to implement the LAR.

The Tier 1 information for which a plant-specific departure and exemption was requested relates to the IDS. The result of this exemption would be that SNC could implement modifications to Tier 1 information to the UFSAR as well as departures from PS-DCD Tier 2 text in Subsection 8.3.2.5.9 and a COL Appendix C table and text. Pursuant to the provisions of 10 CFR 52.63(b)(1), an exemption from elements of the design as certified in the 10 CFR Part 52, Appendix D, design certification rule is requested for the involved Tier 1 information described and justified in LAR 17-018. This exemption is a permanent exemption limited in scope to the particular Tier 1 information specified.

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

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

3.1.1 Authorized by Law

The requested exemption would allow SNC to implement a revision to Tier 1, Subsection 2.6.3 and Table 2.6.3-3 in the PS-DCD. This exemption is a permanent exemption limited in scope to particular Tier 1 information. Subsequent changes to Tier 1 information would be subject to the exemption process specified in Section VIII.A.4 of Appendix D to 10 CFR Part 52 and the requirements of 10 CFR 52.63(b)(1). As stated above, 10 CFR Part 52, Appendix D, Section VIII.A.4 allows the NRC to grant exemptions from one or more elements of the Tier 1 information. The NRC staff has determined that granting of SNC'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 52.7 and 10 CFR 50.12(a)(1), the exemption is authorized by law.

3.1.2 No Undue Risk to the Public Health and Safety

The underlying purpose of Appendix D to 10 CFR 52 is to ensure that a licensee will construct and operate the plant based on the approved information found in the generic DCD incorporated by reference into a licensee's licensing basis. The changes proposed by SNC do not add or delete systems or equipment as described in Tier 1 of the generic DCD. These changes will not impact the ability of the systems or equipment to perform their design function. Because they will not alter the operation of any plant equipment or systems, these changes do not present an undue risk from existing equipment or systems. These 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, these changes do not present an undue risk from any new equipment or systems. Therefore, as required by 10 CFR 52.7 and 10 CFR 50.12(a)(1), the staff finds that the granting of the requested exemptions will not present an undue risk to public health and safety.

3.1.3 Consistent with Common Defense and Security

The proposed exemption would allow a change to testing of the IDS as presented in the system-based design ITAAC table and text in the PS-DCD Tier 1, thereby departing from the AP1000 certified (Tier 1) design information. The change does not alter or impede the design, function, or operation of any plant structures, systems, or components 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 52.7 and 10 CFR 50.12(a)(1), the staff finds that the requested exemptions are consistent with the common defense and security.

3.1.4 Special Circumstances

Special circumstances, in accordance with 10 CFR 50.12(a)(2), are present, in part, whenever application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule. The underlying purpose of the Tier 1 information is to ensure that IDS functionality supports the

actuation of Class 1E MOVs. The proposed changes will continue to support verification of the acceptability of the voltage drop across applicable IDS circuits supplying power to Class 1E MOVs and, therefore, provide the adequate voltage to meet the underlying purpose of the Tier 1 information. The proposed changes do not adversely affect any function or feature used for the prevention and mitigation of accidents or their safety analyses. No safety-related SSC or function is involved. The proposed changes do not involve nor interface with any SSC accident initiator or initiating sequence of events related to the accidents evaluated and therefore do not have an adverse effect on any SSC's design function. Accordingly, this exemption from the certification information will enable SNC to safely construct and operate the AP1000 facility consistent with the design certified by the NRC in 10 CFR Part 52, Appendix D.

As described above, special circumstances are present in the particular circumstances discussed in LAR 17-018 because the application of the specified Tier 1 information is not necessary to achieve the underlying purpose of the rule. The proposed change implements changes to the IDS testing and analysis as presented in a Tier 1 ITAAC table. This exemption requests revisions to Tier 1 Subsection 2.6.3 text and Table 2.6.3-3 that continue to demonstrate that the applicable regulatory requirements will be met. The changes to the IDS testing and analysis can be implemented in accordance with the purpose of the rule. Therefore, the staff finds that the special circumstances required by 10 CFR 52.7 and 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

Under 10 CFR 52.63(b)(1), “[i]n addition to the factors listed in § 52.7, 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.” This exemption would allow the implementation of changes to Tier 1 Subsection 2.6.3 text and Table 2.6.3-3 in the PS-DCD. The design functions of the system associated with this request will continue to be maintained because the associated revisions to Subsection 2.6.3 text and Table 2.6.3-3 demonstrate that the applicable regulatory requirements and the underlying purpose of the Tier 1 information will continue to be met. This exemption will allow changes to the UFSAR that do not contribute to the benefits of standardization. Consequently, the safety impact that may result from any reduction in standardization is minimal because the proposed changes to the IDS testing and analysis ensuring acceptability of the voltage drop across applicable IDS circuits supplying power to Class 1E MOVs will not affect the design functioning or purpose of the system, and is, therefore, consistent with the purposes of the rule. The proposed design change does not result in a reduction in the level of safety. Based on the foregoing reasons, as required by 10 CFR 52.7 and 10 CFR 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 Tier 1 Subsection 2.6.3 text and Table 2.6.3-3 in the PS-DCD. The exemption request proposes to depart from the certified design by allowing changes to testing of the IDS as presented in Tier 1 ITAAC table. The proposed changes will not impact the functional capabilities of this system or adversely affect the ability of the IDS to perform its design functions, and the level of safety provided by the current systems and equipment therein is unchanged. Therefore, based on the foregoing reasons and as required by 10 CFR 52.7, and 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

3.2.1 Proposed UFSAR and ITAAC changes:

In LAR 17-018, SNC proposed to make changes to testing of the IDS. The proposed changes would remove the requirement for the ITAAC to be completed by repeatedly reconfiguring the battery strings to provide a battery voltage not greater than 210Vdc for each specific valve stroke operation. Instead, the revised ITAAC would accomplish this necessary verification by a combination of testing and analyses that will demonstrate that adequate voltage is provided to each of the Class 1E powered MOVs to support operation.

The requested amendment requires changes to the UFSAR in the form of departures from the PS-DCD Tier 2 information, and involves changes to the PS-DCD Tier 1 information and corresponding changes to COL Appendix C.

The specific change descriptions provided in the LAR are as follows (deleted texts are lined-out and added texts are underlined):

1. COL Appendix C and UFSAR Tier 1, Subsection 2.6.3, Item 4.i), is revised as indicated below:
 - 4.i) The IDS supplies an operating voltage at the terminals of the Class 1E motor operated valves identified in Tier 1 Material subsections 2.1.2, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.3.2, 2.3.6 and 2.7.1 that is greater than or equal to the minimum design ~~specified~~-voltage.
2. COL Appendix C and UFSAR Tier 1, Table 2.6.3-3, Item 4.i), is revised as indicated below:

Table 2.6.3-3 Inspections, Tests, Analyses, and Acceptance Criteria		
Design Commitment	Inspections, Tests, and Analyses	Acceptance Criteria
***	***	***
4.i) The IDS supplies an operating voltage at the terminals of the Class 1E motor operated valves identified in Tier 1 Material subsections 2.1.2, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.3.2, 2.3.6, 2.7.1 that is greater than or equal to the minimum design specified voltage.	Testing will be performed by measuring the voltage during motor starting at both the IDS battery and motor-operated valve motor terminals while each motor-operated valve is stroked. Analyses will be performed to verify that the voltage at the motor-operated valve motor terminals is greater than or equal to the minimum design voltage of each motor-operated valve with an IDS battery terminal voltage of 210 Vdc. stroking each specified motor-operated valve and measuring the terminal voltage at the motor starter input terminals with the motor operating. The battery terminal voltage will be no more than 210 Vdc during the test.	A report exists and concludes that IDS can provide a voltage greater than or equal to each valve's minimum design voltage to the motor terminals of each motor-operated valves when power is supplied under design conditions from IDS batteries with battery terminal voltage at 210 Vdc while each motor-operated valve is stroked. The motor starter input terminal voltage is greater than or equal 200 Vdc with the motor operating.
***	***	***

3. UFSAR Tier 2, Subsection 8.3.2.5.9 is revised as indicated below:

8.3.2.5.9 Class 1E Motor-Operated Valves Terminal Voltage Testing

As-built testing and analysis representing design conditions are used to verify that a voltage is provided from the IDS batteries to the Class 1E motor-operated valve motor terminals that is greater than or equal to the minimum design voltage necessary for the valves to operate. Class 1E motor-operated valves are tested by measuring the voltage during motor starting at both the IDS battery and motor-operated valve motor terminals while each motor-operated valve is stroked. The results are compared in a voltage analysis which verifies that the voltage at the motor-operated valve motor terminals is greater than or equal to the minimum design voltage of each motor-operated valve with an IDS battery terminal voltage of 210 Vdc.

The operating voltage supplied to Class 1E motor-operated valves is measured to verify the motor starter input terminal voltage is above the minimum design value of 200 Vdc. The battery terminal voltage will be no more than 210 Vdc during the test to represent the conditions at the battery end of life.

3.2.2 Evaluation of UFSAR and ITAAC Changes

The NRC staff reviewed the proposed LAR including the Tier 1, Table 2.6.3-3, ITAAC No. 4.i) and Tier 2, Section 8.3.2.5.9 changes. Proposed Tier 1, Table 2.6.3-3, ITAAC No. 4.i) requires

tests and analyses to verify the MOV motor terminal voltages. Proposed Tier 1, Section 2.6.3, "Class 1E dc and Uninterruptible Power Supply System," states that the IDS supplies an operating voltage that is greater than or equal to the minimum design voltage at the terminals of the Class 1E MOVs. The list of MOVs is provided in Tier 1 Subsections 2.1.2, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.3.2, 2.3.6, and 2.7.1. Proposed UFSAR Tier 2, Section 8.3.2.5.9 states that testing and analysis under design conditions will be used to verify that a voltage is provided from the IDS batteries to the Class 1E MOV motor terminal that is greater than or equal to the minimum design voltage. In the LAR, SNC states that the plant design specifies minimum voltage of 180 Vdc or 185 Vdc for Class 1E MOVs.

Evaluation of the Proposed Tier 1, Table 2.6.3-3, ITAAC No. 4.i) DC, ITA, and AC Changes

In the LAR, SNC explained that the proposed DC will change the words "minimum specified voltage" to "minimum design voltage," because the DC does not clearly state where the minimum specified MOV voltage is found. The staff finds that the proposed changes are acceptable because the MOV minimum design voltages are specified in the LAR for the ITAAC verification.

During the review the staff found that the word "specified" in the ITA gave the impression that the testing would be performed on a subset of the total MOVs. Therefore, in Request for Additional Information (RAI) Question 08.03.02-3, dated December 1, 2017 (ADAMS Accession No. ML17338A464), the staff requested clarification regarding whether the testing described in the ITA was intended to test a subset of the MOVs. In the response to RAI Question 08.03.02-3, dated January 12, 2018, SNC stated that each of the MOVs identified in Tier 1 Subsections 2.1.2, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.3.2, 2.3.6, and 2.7.1 will be tested. SNC removed the word "specified" from both the ITA and AC portions of the ITAAC. Also, SNC stated that all of the MOVs identified in Tier 1 Subsections 2.1.2, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.3.2, 2.3.6, and 2.7.1 are selected for testing. The staff finds that the response to RAI Question 08.03.02-3 is acceptable because SNC eliminated the confusion by deleting the word "specified" from the ITA and AC portion of the ITAAC and clarified that testing would be performed on all of the MOVs in the Subsections identified above.

In the LAR, SNC explained that in the proposed ITA, the testing will be performed by measuring the voltage at the MOV motor terminals. The staff reviewed the UFSAR and found that measuring the voltage at the MOV motor terminal is consistent with periodic testing described in UFSAR Section 8.3.2.5, "Inspection and Testing," and ITAAC testing described in UFSAR Section 8.3.2.5.9. Therefore, the staff finds that the proposed change related to measuring the voltage at the MOV motor terminals is acceptable because measuring the MOV voltage at the MOV motor terminal is intended to verify that adequate voltage is available at the MOVs for operation. In addition, measuring the MOV voltage at the MOV motor terminal is consistent with the description in UFSAR Section 8.3.2.5, and UFSAR Section 8.3.2.5.9.

In the LAR, SNC explained that the proposed Tier 1, Table 2.6.3-3, ITAAC No. 4.i) AC is changed to verify that a report exists and concludes that IDS can provide a voltage greater than or equal to each valve's minimum design voltage. The AC requires that a report exists and concludes that the results from the performance of the ITA meet the DC. Because the report will conclude that the IDS can provide a voltage greater than each MOV's minimum design voltage necessary for operation of the MOVs, the staff finds that the IDS batteries and MOVs will perform its intended safety function for ITAAC completion purposes.

Evaluation of UFSAR Tier 2, Section 8.3.2.5.9 Changes

The staff reviewed the proposed changes to UFSAR Tier 2, Section 8.3.2.5.9. The changes to the title of UFSAR Tier 2, Section 8.3.2.5.9, to add “Class 1E,” is editorial, and the title change correctly identifies the MOVs as Class 1E. Therefore, the staff finds that this change is acceptable.

The proposed changes in UFSAR Tier 2, Section 8.3.2.5.9 are made to describe the MOV terminal voltage testing based on the proposed Tier 1, Table 2.6.3-3, ITAAC No. 4.i) changes. The staff finds that the proposed UFSAR Tier 2, Section 8.3.2.5.9, MOV terminal voltage testing description is consistent with the proposed Tier 1, Table 2.6.3-3, ITAAC No. 4.i), terminal voltage testing description and acceptable for the reasons described above for the proposed Tier 1 change.

Compliance with GDC 2

UFSAR Tier 2, Section 3.1.1, “Overall Requirements,” states that the safety-related SSCs are designed to withstand the effects of natural phenomena without loss of the capability to perform their safety-related functions. The staff finds that since there are no changes to the safety-related IDS and MOV design, the IDS and MOVs design continues to comply with the requirements of GDC 2.

Compliance with GDC 4

UFSAR Tier 2, Section 3.1.1, states that the safety-related SSCs are designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss of coolant accidents. The staff finds that since there are no changes to the safety-related IDS and MOVs design, the IDS and MOVs continues to comply with the requirements of GDC 4.

Compliance with GDC 17

The onsite electric distribution system shall have sufficient independence, redundancy, and testability to perform their safety functions, assuming a single failure. UFSAR Tier 2, Section 8.1.4.2, “Onsite Power System,” states that (1) the IDS meets the single failure criterion, and (2) separation criteria preserve the independence of redundant Class 1E circuits as described in UFSAR Tier 2, Section 8.3.2.4, “Independence of Redundant Systems,” and no single credible event is capable of disabling redundant safety-related systems.

The proposed Tier 1, Table 2.6.3-3, ITAAC No. 4.i), requires analyses to verify the MOV terminal voltages are greater than its minimum design voltage (180 Vdc or 185 Vdc) for an IDS battery terminal voltage of 210 Vdc. The Class 1E IDS batteries are rated at 250 Vdc and provide power to the Class 1E MOVs. Proposed UFSAR Tier 2, Section 8.3.2.5.9, explains that for MOV terminal voltage testing, the IDS battery terminal voltage will be no more than 210 Vdc during the test to represent the conditions at the battery end of life. In Section 2, “Detailed Description,” of the LAR, SNC stated that analyses have shown that minimum voltages required for MOV operation are provided. To ensure the IDS batteries and MOVs would perform their intended safety function, the staff determined that the review of the proposed analyses in Tier 1, Table 2.6.3-3, ITAAC No. 4.i) was necessary. Therefore, in RAI Question 08.03.02-2, dated December 1, 2017, the staff requested that SNC provide a summary of the analyses (e.g., voltage drop), including assumptions and methodology for Tier 1, Table 2.6.3-3, ITAAC No. 4.i).

In the letter dated January 12, 2018, SNC provided the response to RAI Question 08.03.02-2, which included Enclosures 4 and 5 as a supplement to the LAR. Enclosure 4 of the LAR supplement included a summary of the assumptions and methodology used in determining the Class 1E MOV motor terminal voltages when the Class 1E IDS battery is at 210 Vdc. In the January 12, 2018, letter, SNC stated that Enclosure 5 contains a revised UFSAR markup to reflect the changes described in the response to RAI Question 08.03.02-03. Enclosures 1, 2, and 3 were submitted in the LAR in letter dated August 30, 2017. However, the response to RAI Question 08.03.02-2, and LAR supplement did not include a summary of the analyses. Therefore, the staff conducted an audit to review the analyses.

The staff completed the audit on February 16, 2018. The audit's documentation includes the audit plan and audit summary (ADAMS Accession No. ML18058A331). During the audit the staff reviewed the analyses, in addition to the assumptions, methodology, and associated calculations for the proposed ITAAC. The audited documents showed that the calculated MOV terminal voltages were greater than the minimum design voltages (180 Vdc or 185 Vdc) for an IDS battery supplying a voltage at 210 Vdc, which demonstrates that the IDS battery can support each MOV at design-basis conditions. The staff found that the assumptions and methodology for the calculations, and analyses were acceptable, as documented in the audit summary. The staff also found that SNC's approach and methodology pertaining to the analyses are acceptable because MOV terminal voltages were calculated by voltage drop analysis from the IDS battery to the MOVs.

Since the analyses audited by the staff showed that the MOV terminal voltages were greater than the minimum required for MOV operation, the issue in RAI Question 08.03.02-2, as to whether the analyses will show that minimum MOV voltages for MOV operation are provided, is resolved. Therefore, the staff finds the response to RAI Question 08.03.02-2 acceptable since the analyses showed that when the IDS battery supplies 210 Vdc, the MOVs would receive greater than the minimum design voltage of 180 or 185 Vdc. As a result, the successful completion of the ITAAC will demonstrate that the Class 1E IDS batteries and MOVs will continue to comply with the requirements of GDC 17, as it pertains to the functioning of SSCs important to safety.

The analysis to support the testing during ITAAC completion resides in the field testing calculation. The testing described in Tier 1, Table 2.6.3-3, ITAAC 4.i), is performed to verify the voltage at the IDS battery and MOV motor terminals while the MOVs are stroked, with the IDS battery voltage at 250 Vdc. During field testing, the IDS batteries are tested at 250 Vdc for conditions present during the time of ITAAC completion. In Enclosure 4 of the LAR supplement, SNC indicated that the voltage analysis converts the voltage drop results obtained during testing into a related IDS voltage drop at design-basis conditions.

In the LAR supplement, SNC provided a summary of the assumptions and methodology for the voltage drop analysis used in determining the MOV motor terminal voltages for the field testing calculations. The voltage drop analysis associated with the field testing calculations were not provided in the LAR supplement. During the audit, the staff reviewed the voltage drop analyses, in addition to the assumptions, methodology, and calculations for the field testing calculation used in determining the MOV terminal voltages during testing. The staff found that the assumptions associated with the field testing calculations were acceptable because 1) the equipment and cable resistance values can be adjusted based on actual temperatures, and 2) the minimum acceptable voltage can be adjusted based on actual measured battery voltage. The staff also found that SNC's approach pertaining to the testing was acceptable because the MOV terminal voltage field testing calculations were determined by voltage drop analysis.

The staff verified that the voltage drop analysis associated with the field testing calculations showed that MOV terminal voltages were greater than the minimum design voltages of the MOVs. The staff finds that the field testing calculation showed that the MOVs important to safety will receive adequate voltage (i.e., greater than the minimum design voltage) to perform their intended function, for ITAAC completion purposes.

In summary, the staff finds that the proposed changes associated with proposed Tier 1, Table 2.6.3-3, ITAAC No. 4.i), are acceptable because (1) the voltage drop analysis for IDS battery at 210 Vdc, and (2) the voltage drop analysis for IDS battery at 250 Vdc (field testing calculation) for the ITA showed that adequate voltages will be provided at the MOV motor terminals. Thus, the staff finds that the analyses show that the MOVs would receive greater than minimum design voltage during the completion of ITAAC No. 4.i) as well as during design-basis conditions. The staff also finds that the proposed changes do not change the safety-related IDS and MOVs design. Therefore, the Class 1E IDS and MOVs will continue to comply with the requirements of GDC 17, as it pertains to the functioning of SSCs important to safety.

Compliance with GDC 18

UFSAR, Tier 2, Section 8.1.4.2.1, "Safety Design Basis," states that the Class 1E systems and equipment are designed to permit periodic inspection and testing to satisfy GDC 18. In the LAR, SNC stated "the proposed change to ITAAC used to verify the acceptability of the IDS voltage transfer across the as-built system does not affect the ability to perform periodic inspection and testing of important areas and features related to IDS. Therefore, the proposed changes comply with the requirements of GDC 18." The staff finds that the IDS and MOV design continues to comply with GDC 18 since there are no changes to the system or any changes to the periodic inspection and testing of the system.

3.3 SUMMARY

In LAR 17-018, SNC proposed to make changes that would affect COL Appendix C, the corresponding PS-DCD Tier 1 information, as well as the UFSAR Tier 2 information. The proposed changes do not adversely affect any safety-related equipment or function, design function, radioactive material barrier, or safety analysis. The staff documented its review of the above changes in Section 3.2 of this safety evaluation and finds the changes are acceptable in accordance with 10 CFR Part 50, Appendix A, GDCs 2, 4, 17, and 18.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations in 10 CFR 50.91(b)(2), the Georgia State official was notified of the proposed issuance of the amendment on October 31, 2017. 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. Also, there is no significant increase in individual or cumulative occupational radiation exposure because the proposed changes do not impact radiation

exposure or dose rates, and because plant radiation zones, radiation controls, and the expected amounts and types of radioactive materials are not affected by the proposed changes. 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 (82 FR 49239, published on October 24, 2017). 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 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, and (4) presents special circumstances. In addition, the staff has determined that the special circumstances outweigh the minimal reduction of standardization. Therefore, the staff grants the exemptions from the Tier 1 information requested by SNC.

The staff concludes, based on the considerations discussed in Section 3.2 and confirming that these changes do not change an analysis methodology, assumption, or the design itself, that there is reasonable assurance that: (1) the health and safety of the public will not be endangered by construction and operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public. Therefore, the staff finds the changes proposed in this license amendment acceptable.

7.0 REFERENCES

1. Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, "Request for License Amendment and Exemption: Class 1E Motor-Operated Valve Terminal Voltage Testing (LAR-17-018)," August 30, 2017 (ADAMS Accession No. ML17242A279).
2. Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, "Supplement to Request for License Amendment and Exemption: Class 1E Motor-Operated Valve Terminal Voltage Testing (LAR-17-018S1)," January 12, 2018 (ADAMS Accession No. ML18012A704).
3. Request for Additional Information (RAI) Transmittal for VEGP Units 3 and 4 LAR 17-018, December 1, 2017 (ADAMS Accession No. ML17338A464).
4. Audit Plan, VEGP Units 3 and 4 Request for License Amendment and Exception: Class 1E

Motor-Operated Valve Terminal Voltage Testing (LAR 17-018), December 6, 2017 (ADAMS Accession No. ML17333A108).

5. Audit Summary, Staff Review of Documentation Associated with the Testing and Analyses for VEGP Units 3 and 4 Request for License Amendment and Exception: Class 1E Motor-Operated Valve Terminal Voltage Testing (LAR 17-018), Tier 1, Table 2.6.3-3, ITAAC 4.i, March 27, 2018 (ADAMS Accession No. ML18058A331).
6. VEGP Units 3 and 4, Updated Final Safety Analysis Report, Revision 6, June 15, 2017 (ADAMS Accession No. ML17172A218).
7. NUREG 2124, Final Safety Evaluation Report for Combined Licenses for Vogtle Electric Generating Plant Units 3 and 4, August 2011 (ADAMS Accession No. ML120460976).
8. AP1000 Design Control Document, Revision 19, June 13, 2011 (ADAMS Accession No. ML11171A500).
9. Combined License NPF-91 for Vogtle Electric Generating Plant Unit 3, Southern Nuclear Operating Company (ADAMS Accession No. ML14100A106).
10. Combined License NPF-92 for Vogtle Electric Generating Plant Unit 4, Southern Nuclear Operating Company (ADAMS Accession No. ML14100A135).