



Ronald A. Jones
Vice President
New Nuclear Operations

October 30, 2014
NND-14-0585
10 CFR 50.90

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Virgil C. Summer Nuclear Station (VCSNS) Units 2 & 3
Combined License Nos. NPF-93 and NPF-94
Docket Nos. 52-027 & 52-028

Subject: VCSNS Units 2 & 3 LAR 13-27: Request for License Amendment and
Exemption: Control Rod Drive Mechanism Motor Generator Set Field
Relay Change

In accordance with 10 CFR 50.90, South Carolina Electric & Gas Company (SCE&G), the Licensee for Virgil C. Summer Nuclear Station Units 2 & 3, requests an amendment to Combined License (COL) Numbers NPF-93 and NPF-94, for VCSNS Units 2 & 3, respectively. The requested amendment proposes changes to specify the use of latching control relays in lieu of breakers to open the control rod drive mechanism (CRDM) motor generator (MG) set generator field on a diverse actuation system (DAS) signal.

The description, technical evaluation, regulatory evaluation (including the No Significant Hazards Consideration determination), and environmental considerations for the proposed changes in this license amendment request are contained in Enclosure 1. Enclosure 2 provides the Exemption request for proposed changes to plant-specific Tier 1 material. Enclosure 3 provides the licensing basis markups depicting the requested changes for the VCSNS Units 2 & 3 Updated Final Safety Analysis Report, COL Appendix C and corresponding plant-specific Tier 1 material.

SCE&G requests staff approval of this license amendment by September 11, 2015 to support installation the CRDM Motor Generator Set for VCSNS Unit 2 and subsequent construction activities. SCE&G expects to implement the proposed amendment through incorporation into the licensing basis documents within 30 days of approval of the requested changes.

In accordance with 10 CFR 50.91, SCE&G is notifying the State of South Carolina of this LAR by transmitting a copy of this letter and its enclosures to the designated state official.

Should you have any questions about this letter, please contact April R. Rice, Manager, Nuclear Licensing, by telephone at (803) 941-9858, or by email at arice@scana.com.

This letter contains no regulatory commitments.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 30th day of October, 2014.

Sincerely,



Ronald A. Jones
Vice President
New Nuclear Operations

DK/RAJ/dk

- Enclosure 1: Virgil C. Summer Nuclear Station Units 2 & 3 –License Amendment Request: Control Rod Drive Mechanism Motor Generator Set Field Relay Change (LAR 13-27)
- Enclosure 2: Exemption Request Regarding Control Rod Drive Mechanism Motor Generator Set Field Relay Change (LAR 13-27)
- Enclosure 3: Proposed Changes to Licensing Basis Documents (LAR 13-27)

cc : Denise McGovern
Ravindra Joshi
David Jaffe
Tom Freddette
Patrick Donnelly
Victor McCree
Jim Reece
Stephen A. Byrne
Jeffrey B. Archie
Ronald A. Jones
Alvis J. Bynum
Kathryn M. Sutton
April Rice
Justin R. Bouknight
Matt Kunkle
Mory Diane
Bryan Barwick
Dean Kersey
Eve McGreevy
Margaret Felkel
Cynthia Lanier
Kristin Seibert
Neil Haggerty
Joel Hjelseth
Christopher Levesque
Pat Young
Tom Geer
Michael Frankle
AJ Marciano
Sean Burk
Zach Harper
Brian McIntyre
Brian Bedford
Joseph Cole
Chuck Baucom
Curt Castell
Ken Hollenbach
Susan E. Jenkins
William M. Cherry
Rhonda O'Banion
Dan Churchman
VCSummer2&3ProjectMail@cbi.com
vcsummer2&3project@westinghouse.com
DCRM-EDMS@SCANA.COM

South Carolina Electric & Gas Company

Virgil C. Summer Nuclear Station Units 2 & 3

NND-14-0585

Enclosure 1

License Amendment Request:

Control Rod Drive Mechanism

Motor Generator Set Field Relay Change

(LAR-13-27)

(This enclosure contains 10 pages, including this cover sheet)

Table of Contents

1. Summary Description
2. Detailed Description
3. Technical Evaluation
4. Regulatory Evaluation
 - 4.1. Applicable Regulatory Requirements/Criteria
 - 4.2. Precedent
 - 4.3. No Significant Hazards Consideration Determination
 - 4.4. Conclusions
5. Environmental Considerations
6. References

1. Summary Description

The proposed change would revise Combined Operating License (COL) numbers NPF-93 and NPF-94 for Virgil C. Summer Nuclear Station, Units 2 & 3, respectively, to specify the use of Control Rod Drive Mechanism (CRDM) latching control relays (referred to as control relays herein) in lieu of field breakers to open the CRDM motor generator (MG) set generator field on a diverse actuation system (DAS) signal.

The proposed activity requires changes to Updated Final Safety Analysis Report (UFSAR) information which, in turn, require changes to Appendix C of the COLs. Additionally Enclosure 2 of this letter requests corresponding departures from plant-specific DCD Tier 1 information. This enclosure requests approval of the license amendment necessary to implement this change.

2. Detailed Description

COL Appendix C, Subsection 2.5.1, and UFSAR Subsection 7.7.1.11 identify four nonsafety-related DAS functions. These functions include (1) automatic reactor trip on low wide-range steam generator water level, or on low pressurizer water level, or on high hot leg temperature, separate from the PMS; (2) automatic actuation of selected functions, as identified in COL Appendix C, Table 2.5.1-1, separate from the PMS; (3) reactor and turbine trip on low wide-range steam generator water level or low pressurizer water level or high hot leg temperature; and (4) manual initiation of reactor trip and selected functions, as identified in COL Appendix C, Table 2.5.1-3, separate from the PMS.

The DAS accomplishes these reactor trip functions through the actuation of the Control Rod Drive Mechanism (CRDM) Motor Generator (MG) sets. The CRDM MG sets provide electrical power to the CRDMs through the reactor trip switchgear. These MG sets are included in the plant control system (PLS) while the safety-related reactor trip switchgear is included in the plant protection and safety monitoring system (PMS). Currently, the UFSAR and COL Appendix C state that by opening the MG set generator field breakers, in response to a DAS reactor trip signal, the CRDM MG set generator field is de-energized, dropping the control rods.

The proposed Tier 2 departure replaces the generator field breakers with field control relays. Opening and closing of a circuit is a switching function, and breakers are designed for over current protection and should not normally be used as switches for a control function. Relays are a reliable type of electro-mechanical device designed to repeatedly open and close contacts making them more appropriate for use in this application.

The replacement of the CRDM MG set field breakers with field control relays requires a UFSAR Tier 2 departure that involves changes to COL Appendix C, Tables 2.5.1-4 and 3.7-1, along with corresponding departures from plant-specific DCD Tier 1 information. The use of generator field control relays in lieu of field breakers does not involve a change to any figures found in Tier 2, Tier 1, Technical Specification, or COL Appendix C as this component is below the level of detail in system drawings. The proposed amendment would result in a revision to the following information.

Proposed UFSAR Tier 2 Changes

The proposed changes to UFSAR Tier 2 are:

Revise Table 16.3-2, "Investment Protection Short-Term Availability Controls," SR 1.1.4, to require verification of MG set generator field control relays in lieu of field breakers.

Revise Table 17.4-1, "Risk-Significant SSCs Within the Scope of D-RAP", to specify MG set generator field control relays in lieu of field breakers.

Revise Table 19.59-18, "AP1000 PRA-Based Insights", to specify MG set generator field control relays in lieu of field breakers.

Proposed Changes to COL Appendix C (which correspond to plant-specific DCD Tier 1 departures identified in Enclosure 2):

The proposed COL Appendix C changes resulting from the use of CRDM MG set generator field control relays in lieu of generator field breakers to de-energize the generator field on a DAS signal are:

COL Appendix C, Table 2.5.1-4, "Inspections, Tests, Analyses, and Acceptance Criteria", ITAAC Nos. 2.5.01.02a and 2.5.01.02c.i acceptance criteria would be revised as follows.

Table 2.5.1-4 Inspections, Tests, Analyses, and Acceptance Criteria				
No.	ITAAC No.	Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
506	2.5.01.02a	2.a) The DAS provides an automatic reactor trip on low wide-range steam generator water level, or on low pressurizer water level, or on high hot leg temperature, separate from the PMS.	Electrical power to the PMS equipment will be disconnected and an operational test of the as-built DAS will be performed using real or simulated test signals.	The generator field breakers <u>control relays</u> of the control rod motor-generator sets open after the test signal reaches the specified limit.
508	2.5.01.02c.i	2.c) The DAS provides manual initiation of reactor trip, and selected functions, as identified in Table 2.5.1-2, separate from the PMS. These manual initiation functions are implemented in a manner that bypasses the control room multiplexers, if any; the PMS cabinets; and the signal processing equipment of the DAS.	Electrical power to the control room multiplexers, if any, and PMS equipment will be disconnected and the outputs from the DAS signal processing equipment will be disabled. While in this configuration, an operational test of the as-built system will be performed using the DAS manual actuation controls.	i) The generator field breakers <u>control relays</u> of the control rod motor-generator sets open after reactor and turbine trip manual initiation controls are actuated

COL Appendix C, Table 3.7-1, "Risk-Significant Components." Revise this table to indicate that the MG sets are designated risk-significant equipment via their generator field control relay components.

Table 3.7-1 (cont.) Risk-Significant Components	
Equipment Name	Tag No.
Rod Drive MG Sets (Field Breakers generator field control relays)	PLS-MG-01A/B

3. Technical Evaluation

The CRDM MG sets provide electrical power to the CRDMs through the reactor trip switchgear. These MG sets are included in the plant control system (PLS) and the safety-related reactor trip switchgear is included in the plant protection and safety monitoring system (PMS). Currently, the UFSAR, COL Appendix C, and plant-specific Tier 1 specify that MG set generator field breakers function to open on a DAS reactor trip signal demand to de-energize the CRDM MG set generator field allowing the control rods to drop. However, CRDM MG set detailed design activities identified that a breaker was not the correct device to de-energize the MG set generator excitation field. The 480 ac breaker rating was not compatible with the excitation field voltage, which is a low level dc voltage. In addition, a relay is designed to energize and de-energize a circuit via a switching function, whereas a breaker is designed for overcurrent protection. As a result, when completing the final design of the CRDM MG set generator field circuit, relays were incorporated for generator field control to facilitate the intended trip, requiring the proposed departure.

The DAS nonsafety-related design functions would continue to meet the current licensing basis with the proposed change to control relays in lieu of breakers for MG set generator field control. No change is made to the way in which DAS is controlled, and the control relays continue to meet the switching requirements in a functionally similar manner to the breakers while maintaining reliability. Consequently, this change to use a relay would have no adverse affect on the automatic or manual initiation of the DAS signal or the requirement for bypassing the control room multiplexers, if any; the PMS cabinets; and the signal processing equipment of the DAS.

The proposed activity would not adversely affect any safety-related structure, system, or component (SSC), function, design analysis or safety analysis, and would not adversely affect the function for CRDM MG set trip on a DAS signal. The AP1000 Probabilistic Risk Assessment (PRA) identified that field breakers were used for DAS reactor trip control. The generic DCD adopted the assumptions made in the AP1000 PRA on the use of breakers, requiring the changes proposed in this license amendment request. The PRA model, results, assumptions, and impacts were reviewed and it was determined that the use of relays would not alter the published and approved failure/demand calculations. Consistent with the AP1000 PRA, control relays are selected to meet the criteria “not to exceed 1.75E-03 failures/demand,” ensuring there are no changes to the assumptions made in the PRA. The use of relays would not change any method of control that could adversely affect the performance of a design function as described in the UFSAR or plant-specific Tier 1 material because control relays effectively perform the same function initially intended by the use of circuit breakers, but relays are designed for more open and close cycles, providing longer component life. Therefore, the

requested design change continues to provide an adequate level of safety and will not result in a decrease in the level of safety provided by the design.

This proposed change would not change any equipment qualification or fission product barrier. The change does not result in a new failure mode, malfunction or sequence of events that could affect safety or safety-related equipment. This activity 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. The proposed change is unrelated to any aspects of plant construction or operation that would introduce any changes to effluent types (e.g., effluents containing chemicals or biocides, sanitary system effluents, and other effluents) or affect any plant radiological or non-radiological effluent release quantities. Furthermore, the proposed change does not diminish the functionality of any design or operational features that are credited with controlling the release of effluents during plant operation.

The proposed change only affects equipment in areas of the plant that contain non-radioactive plant systems. Plant radiation zones would not be affected, and controls under 10 CFR 20 preclude a significant increase in occupational radiation exposure.

COL Appendix C ITAAC acceptance criteria would be revised to reflect generator field control relays of the control rod motor-generator sets opening after a test trip voltage signal is applied; however, the ITAAC acceptance criteria continue to be met with implementation of the proposed change.

The Final Safety Evaluation Report for the AP1000 Revision 19, NUREG-1793 Supplement 2, Section 7.8, discusses NRC review of the DAS including trip of the MG sets and the design commitment in plant-specific Tier 1 ITAAC Table 2.5.1-4. In this report, DAS acceptability was based in part on the design attributes (i.e., IEEE 603). However, acceptability was not explicitly based on the use of breakers for MG set trip/control, only that the design included the MG set trip function. The control relay switching function circuit configuration includes relays which latch out power to the MG set exciter field when called upon to do so by the DAS. This de-energizes the exciter field. By providing the same function as in the earlier described design, the proposed change to use field control relays would continue to satisfy the existing basis for NRC approval and continue to support compliance with the above regulatory requirements and industry standard.

The proposed change would not affect any safety-related design code, function, design analysis, safety analysis input or result, or design/safety margin. No safety analysis or design basis acceptance limit/criterion is challenged or exceeded by the requested change. The proposed change would not involve nor interface with any SSC accident initiator or initiating sequence of events. The change maintains the MG set trip function used to mitigate an accident and the accidents evaluated in the UFSAR are not affected.

Summary

The proposed change to use field control relays in lieu of field breakers for control of the MG sets' generator field results in changes to the UFSAR, COL Appendix C Tables 2.5.1-4 and 3.7-1 and corresponding changes to plant-specific Tier 1 material. This change maintains a consistent level of detail with the other information currently presented in these tables. It has also been determined that the proposed changes neither adversely impact the ability to meet the design function of the DAS initiation of reactor trip by tripping the MG sets, nor involve a decrease in the level of safety provided by the DAS initiation of reactor trip. The changes to information provided in COL Appendix C Sections 2.5.1 and 3.7 Design Description tables and

to Tier 1 material described in Enclosure 2 continue to provide the detail necessary to implement the corresponding ITAAC that address these tables.

4. Regulatory Evaluation

4.1 Applicable Regulatory Requirements/Criteria

10 CFR 52, Appendix D, Section VIII B.5.a requires prior NRC approval for departure from Tier 2 material, if the departure involves a change to Tier 1 information. This change affects COL Appendix C Tables 2.5.1-4 and 3.7-1 and corresponding elements in Tier 1 material. Because the proposed change involves Tier 1 material NRC approval is required.

10 CFR 52, Appendix D, VIII.A.4 requires that a design change requiring a Tier 1 change shall not result in a significant decrease in the level of safety otherwise provided by the design. The plant design change and its associated Tier 1 information change do not adversely affect any other safety-related SSC, function, design analysis or safety analysis, and do not adversely affect the function for CRDM MG set trip on a DAS signal. Therefore, the requested changes will not result in a decrease in the level of safety otherwise provided by the design.

10 CFR 50 Appendix A General Design Criterion (GDC) 22, 10 CFR 50.62, and IEEE 603 cover and specify the design attributes of independence, diversity, and defense-in depth. The proposed change maintains compliance with these requirements and standards by accomplishing the function in a similar manner as previously described.

4.2 Precedent

None.

4.3 No Significant Hazards Consideration Determination

The proposed change would revise the Combined License (COL) in regard to use of field control relays in lieu of field breakers to open the Control Rod Drive Mechanism (CRDMs) Motor Generator (MG) set generator field on a Diverse Actuation System (DAS) signal. This activity involves departures from the Updated Final Safety Analysis Report (UFSAR) Tier 2 information, and a departure from COL Appendix C with corresponding changes to plant-specific Tier 1 material as described in Enclosure 2.

An evaluation to determine whether or not a significant hazards consideration is involved with the proposed amendment was completed by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below.

4.3.1 Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

This proposed change to use field control relays in lieu of field circuit breakers to de-energize the Control Rod Drive Mechanism Motor Generator Set excitation field does not result in a change to the basic MG Set design function, which is to supply reliable electrical power to the CRDMs while providing a trip function on a

DAS signal, allowing the control rods to drop. The Probabilistic Risk Assessment (PRA) is not adversely affected. No safety-related structure, system, or component (SSC) or function is adversely affected. The change does not involve nor interface with any SSC accident initiator or initiating sequence of events, and thus, the probabilities of the accidents evaluated in the UFSAR are not affected. Because the change maintains the CRDM MG set trip function used to mitigate an accident, the consequences of the accidents evaluated in the UFSAR are not affected. Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of any accident previously evaluated.

4.3.2 Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

There is no safety-related SSC or function adversely affected by this proposed change to use control relays instead of breakers to de-energize the CRDM MG set generator field on demand. This proposed change does not change any equipment qualification or fission product barrier. The change does not result in a new failure mode, malfunction or sequence of events that could affect safety or safety-related equipment. This activity will 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. Therefore, the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

4.3.3 Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No

There is no safety-related SSC or function adversely affected by this proposed change to use relays instead of breakers to control the CRDM MG set generator field. The function to trip the MG set generator field on a DAS signal, allowing the control rods to drop, is not adversely affected by the use of relays as the device to de-energize the generator field. The proposed change does not affect any safety-related design code, function, design analysis, safety analysis input or result, or design/safety margin. No safety analysis or design basis acceptance limit/criterion is challenged or exceeded by the requested change, thus, no margin of safety is reduced. Therefore, the proposed amendment does not involve a significant reduction in a margin of safety.

4.4 Conclusions

Based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common

defense and security or to the health and safety of the public. The above evaluations demonstrate that the requested change can be accommodated without an increase in the probability or consequences of an accident previously evaluated, without creating the possibility of a new or different kind of accident from any accident previously evaluated, and without a significant reduction in a margin of safety. Having arrived at negative declarations with regard to the criteria of 10 CFR 50.92, this assessment determined that the requested change does not involve a Significant Hazards Consideration.

5. Environmental Consideration

Details of the proposed change are provided in Sections 2 and 3 of this license amendment request.

This review supports a request to amend Combined License (COL) numbers NPF-93 and NPF-94 to allow departure from various elements of the certification information in COL Appendix C, and Tier 2 material in the Updated Final Safety Analysis Report (UFSAR). This change also involves departure from corresponding plant-specific Tier 1 information identified in Enclosure 2. The proposed amendment would allow use of field control relays as in lieu of field breakers to open the Control Rod Drive Mechanism (CRDMs) Motor Generator (MG) set generator field on a Diverse Actuation System (DAS) signal. The proposed changes to COL Appendix C and plant-specific Tier 1 material identified in Enclosure 2 reflect changes to information in UFSAR Tier 2 material.

The Licensee has determined that the anticipated construction and operational effects of the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), in that:

(i) There is no significant hazards consideration.

As documented in Section 4.3, No Significant Hazards Consideration Determination, of this license amendment request, an evaluation was completed to determine whether or not a significant hazards consideration is involved by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment." The No Significant Hazards Consideration determined that (1) the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated; (2) the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated; and (3) the proposed amendment does not involve a significant reduction in a margin of safety. Therefore, it is concluded that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

(ii) There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

The proposed amendment to use relays as opposed to breakers to control the CRDMs MG set's generator field is unrelated to any aspects of plant construction or operation that would introduce any changes to effluent types (e.g., effluents containing chemicals or biocides, sanitary system effluents, and other effluents) or affect any plant radiological or non-radiological effluent release quantities. Furthermore, the proposed

change does not diminish the functionality of any design or operational features that are credited with controlling the release of effluents during plant operation. Therefore, it is concluded that the proposed amendment does not involve a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

The proposed amendment to use relays as opposed to breakers for control of the CRDMs MG set's generator field only affects areas of the plant that contain non-radioactive plant systems. Plant radiation zones are not affected, and controls under 10 CFR 20 preclude a significant increase in occupational radiation exposure. Consequently, these proposed changes have no effect on individual or cumulative occupational radiation exposure during plant operation. Therefore, the proposed amendment does not involve a significant increase in individual or cumulative occupational radiation exposure.

Based on the above review of the proposed amendment, it has been determined that anticipated construction and operational impact of the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental impact statement or environmental assessment of the proposed exemption and amendment is not required.

6. REFERENCES

None

South Carolina Electric & Gas Company

Virgil C. Summer Nuclear Station Units 2 & 3

NND-14-0585

Enclosure 2

Exemption Request Regarding

Control Rod Drive Mechanism

Motor Generator Set Field Relay Change

(LAR 13-27)

(This enclosure contains 7 pages, including this cover sheet)

1.0 Purpose

South Carolina Electric & Gas Company (SCE&G), the Licensee, requests a permanent exemption from the provisions of 10 CFR 52, Appendix D, Section III.B, "Design Certification Rule for the AP1000 Design, Scope and Contents," to allow a departure from elements of the certification information in Tier 1 of the plant-specific AP1000 Design Control Document (DCD). The regulation, 10 CFR 52, Appendix D, Section III.B, requires an applicant or licensee referencing Appendix D to 10 CFR Part 52 to incorporate by reference and comply with the requirements of Appendix D, including certified information in DCD Tier 1. Tier 1 includes inspections, tests, analyses, and acceptance criteria (ITAAC) that must be satisfactorily performed prior to fuel load. The design details to be verified by these ITAAC are specified in the text, tables, and figures that are referenced in each individual ITAAC. The Tier 1 information for which a plant-specific departure and exemption is being requested includes Tier 1 Table 3.7-1 "Risk Significant Components" and ITAAC acceptance criteria found in Tier 1 Table 2.5.1-4 "Inspections, Tests, Analyses, and Acceptance Criteria" to allow for the use of field control relays rather than field circuit breakers to control the generator field excitation of the Control Rod Drive Mechanism (CRDM) Motor Generator (MG) Sets.

This request for exemption will apply the requirements of 10 CFR 52, Appendix D, Section VIII.A.4 to allow the following departures from the afore mentioned plant-specific DCD Tier 1 tables:

- Tier 1 Table 2.5.1-4 Inspections, Tests, Analyses, and Acceptance Criteria: Revise ITAAC Nos. 2.a and 2.c as follows:
 - Change ITAAC No. 2.a acceptance criteria to indicate the use of generator field control relays rather than field breakers.
 - Change ITAAC No. 2.c acceptance criteria i to indicate the use of generator field control relays rather than field breakers.
- Tier 1 Table 3.7-1 Risk-Significant Components: Revise Equipment Name as follows:
 - Change "Equipment Name" field to indicate that the CRDM MG Sets are risk significant components via field control relays rather than field breakers.

This request will apply the provisions for granting exemptions from design certification information as specified in 10 CFR Part 52, Appendix D, Section VIII.A.4, 10 CFR 52.63, §52.7, and §50.12.

2.0 Background

The Licensee is the holder of Combined License (COL) Nos. NPF-93 and NPF-94, which authorize construction and operation of two Westinghouse Electric Company AP1000 nuclear plants, named Virgil C. Summer Nuclear Station (VCSNS) Units 2 & 3, respectively.

In the AP1000 certified design, Tier 1 Tables 2.5.1-4 and 3.7-1 indicate that the excitation fields of the two CRDM MG Sets (two sets per plant) are controlled by a field circuit breaker. As summarized in Enclosure 1, Section 3, detailed design finalization of VCSNS

Units 2 & 3 has indicated that a field control relay is a more appropriate electro-mechanical device for de-energizing the CRDM MG set excitation field when a reactor trip signal is received from the Diverse Actuation System (DAS). To depart from the certified design, the licensee is required by 10 CFR 52 Appendix D Section VIII.A.4 to request an exemption from the requirement that the CRDM MG sets employ field circuit breakers to de-energize their excitation fields.

A permanent exemption from elements of the plant-specific Tier 1 design information, described above, is requested to allow a departure to be taken from that Tier 1 information and the change implemented.

3.0 Technical Justification of Acceptability

This permanent exemption is requested to allow SCE&G to depart from AP1000 plant-specific Design Control Document (DCD) Tier 1 material found in ITAAC Table 2.5.1-4 and Risk Significant Components Table 3.7-1 as described above. The proposed departure would allow the use of field control relays in lieu of field breakers to de-energize the CRDM MG Set excitation fields. This change enables the Licensee to implement the correct electro-mechanical device for this application. The proposed change identified above does not adversely impact a design function of any structure, system, or component (SSC) nor does it involve a significant decrease in the level of safety provided by them. In addition, the proposed Tier 1 change continues to provide the detail necessary to implement the corresponding ITAAC.

Detailed technical justification for the proposed change from field breakers to field control relays in the CRDM MG sets is provided in Section 3 of Enclosure 1 in the accompanying License Amendment Request.

4.0 Justification of Exemption

10 CFR 52, Appendix D, Section VIII.A.4 and 10 CFR 52.63(b)(1) govern the issuance of exemptions from elements of the certified design information for AP1000 nuclear power plants. Because the Licensee has identified a change to the plant-specific Tier 1 information during detailed design of the CRDM MG sets, resulting in the need for a departure, an exemption from the certified design information within plant-specific Tier 1 material is required to implement it.

10 CFR 52, Appendix D, and 10 CFR 50.12, §52.7, and §52.63 state that the NRC may grant exemptions from the requirements of the regulations provided six conditions are met: 1) the exemption is authorized by law [§50.12(a)(1)]; 2) the exemption will not present an undue risk to the health and safety of the public [§50.12(a)(1)]; 3) the exemption is consistent with the common defense and security [§50.12(a)(1)]; 4) special circumstances are present [§50.12(a)(2)(ii)]; 5) the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption [§52.63(b)(1)]; and 6) the design change will not result in a significant decrease in the level of safety [Part 52, App. D, VIII.A.4].

1. This exemption is authorized by law

The NRC has authority under 10 CFR §§ 50.12, 52.7, and 52.63 to grant exemptions from the requirements of NRC regulations. Specifically, 10 CFR §§50.12 and 52.7 state that the NRC may grant exemptions from the

requirements of 10 CFR Part 52 upon a proper showing. No law exists that would preclude the changes covered by this exemption request. Additionally, granting of the proposed exemption does not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations.

Accordingly, this requested exemption is "authorized by law," as required by 10 CFR 50.12(a)(1).

2. This exemption will not present an undue risk to the health and safety of the public

The proposed exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow the Licensee to depart from elements of the plant-specific AP1000 Tier 1 design information. The plant-specific Tier 1 DCD will continue to reflect the approved licensing basis, and will maintain a consistent level of detail with that which is currently provided elsewhere in Tier 1 of the plant-specific DCD. Therefore, no adverse safety impact which would present any additional risk to the health and safety of the public is present. The affected design description in the plant-specific Tier 1 material will also continue to provide the detail necessary to support the performance of the associated ITAAC.

This change will not impact the ability of the SSCs to perform their design functions. Because the changes will not alter the operation of any plant equipment or systems, they do not present any undue risk from existing equipment or systems. The proposed 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 that are 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 fuel cladding failures. Accordingly, these changes do not present an undue risk from any new equipment or systems.

Therefore, the requested exemption from 10 CFR 52, Appendix D, Section III.B would not present an undue risk to the health and safety of the public.

3. The exemption is consistent with the common defense and security

The requested exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow the licensee to depart from elements of the plant-specific DCD Tier 1 design information. The proposed exemption does not alter the design, function, or operation of any structures or plant equipment that are necessary to maintain a safe and secure status of the plant. The proposed exemption has no impact on plant security or safeguards procedures.

Therefore, the requested exemption is consistent with the common defense and security.

4. Special circumstances are present

10 CFR 50.12(a)(2) list six “special circumstances” for which an exemption may be granted. Pursuant to the regulation, it is necessary for one of these special circumstances to be present in order for the NRC to consider granting an exemption request. The requested exemption meets the special circumstances of 10 CFR 50.12(a)(2)(ii). That subsection defines special circumstances as when “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 rule under consideration in this request for exemption is 10 CFR 52, Appendix D, Section III.B, which requires that a licensee referencing the AP1000 Design Certification Rule (10 CFR Part 52, Appendix D) shall incorporate by reference and comply with the requirements of Appendix D, including Tier 1 information. The VCSNS Units 2 & 3 COLs reference the AP1000 Design Certification Rule and incorporate by reference the requirements of 10 CFR Part 52, Appendix D, including Tier 1 information. The underlying purpose of Appendix D, Section III.B is to describe and define the scope and contents of the AP1000 design certification, and to require compliance with the design certification information in Appendix D.

The proposed changes to allow the use of field control relays in lieu of field circuit breakers maintain the design function of the CRDM MG Sets to de-energize the excitation field upon a DAS reactor trip signal. The changes do not impact the ability of any structures, systems, or components to perform their functions or negatively impact safety. Additionally, no new design functions are added and no current function is deleted while the more appropriate electro-mechanical device is employed for this application. Accordingly, this exemption from the certification information will allow SCE&G to safely construct and operate the AP1000 facility consistent with the design certified by the NRC in 10 CFR 52, Appendix D.

Accordingly, this departure from the plant-specific Tier 1 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 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, is not necessary to achieve the underlying purpose of the rule.

5. The special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption

Based on the nature of the proposed departure from the plant-specific DCD Tier 1 information it is likely that other AP1000 licensees will request this exemption. However, if this is not the case, the special circumstances continue to outweigh any decrease in safety from the reduction in standardization because the proposed change implements the correct electro-mechanical device for the application, which maintains the design function of the Diverse Actuation System to de-energize the CRDM MG set excitation field. This exemption request and the associated marked-up tables demonstrate that the applicable regulatory

requirements will continue to be met. Consequently, the safety impact that may result from any reduction in standardization is minimized.

Therefore, the special circumstances associated with the requested exemption outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption.

6. The design change will not result in a significant decrease in the level of safety.

This exemption proposes to revise the plant-specific DCD Tier 1 information by departing from the certified design in allowing the use of field control relays in lieu of field circuit breakers to de-energize the CRDM MG Set excitation field. The CRDM MG Sets and the field control relays continue to meet the design function to remove power from the generator, allowing the control rods to drop into the reactor. The design change associated with this exemption request does not introduce any new failure mode and the level of safety provided by the SSCs remains unchanged.

Because the proposed changes to the SSCs will not adversely affect their ability to perform their design functions, it is concluded that the changes associated with the proposed exemption will not result in a significant decrease in the level of safety.

5.0 Risk Assessment

A Risk Assessment was determined to be not applicable to address the acceptability of this request.

6.0 Precedent

None.

7.0 Environmental Consideration

A review has determined that the proposed exemption would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed exemption does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Specific justification is provided in Section 5 of the corresponding amendment request in Enclosure 1. Accordingly, the proposed exemption meets the eligibility criterion 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 is required for the proposed exemption.

8.0 Conclusion

The Licensee requests a permanent exemption from elements of the AP1000 design certification information within plant-specific Tier 1 material. The proposed departures are necessary to allow the use of field control relays in lieu of field circuit breakers in the CRDM MG sets. The field control relays would replace field circuit breakers as the electro-mechanical component used to de-energize the generator set excitation field, causing the control rods to drop into the reactor. This exemption request meets the requirements of 10 CFR 52.63, "*Finality of design certifications*," 10 CFR 52.7, "*Specific exemptions*," 10 CFR 50.12, "*Specific exemptions*," 10 CFR 51.22, and 10 CFR 52 Appendix D, "*Design Certification Rule for the AP1000*." Specifically, the exemption request meets the criteria of 10 CFR 50.12(a)(1) in that the request is authorized by law, presents no undue risk to public health and safety, and is consistent with the common defense and security. Furthermore, approval of this request does not result in a significant decrease in the level of safety, presents special circumstances, does not present a significant decrease in safety as a result of a reduction in standardization, and meets the eligibility requirements for categorical exclusion.

9.0 References

None.

South Carolina Electric & Gas Company

Virgil C. Summer Nuclear Station Units 2 & 3

NND-14-0585

Enclosure 3

Proposed Changes to

Licensing Basis Documents

(LAR 13-27)

(This enclosure contains 6 pages, including this cover sheet)

UFSAR Section 16.3, Table 16.3-2 *Investment Protection Short-Term Availability Controls* revise Surveillance 1.1.4 as shown below:

**Table 16.3-2 (Cont.)
Investment Protection Short-Term Availability Controls**

SURVEILLANCE REQUIREMENTS

SURVEILLANCE			FREQUENCY
SR	1.1.1	Perform CHANNEL CHECK on each required channel.	30 hours
SR	1.1.2	Perform CHANNEL OPERATIONAL TEST on each required channel.	92 days
SR	1.1.3	Perform CHANNEL CALIBRATION on each required channel.	24 months
SR	1.1.4	Verify that the MG set field breakers <u>control relays</u> open on demand.	24 months

NND-14-0585

Enclosure 3

Changes to Licensing Basis Documents for CRDM MG Set Field Relay Change (LAR 13-27)

UFSAR Section 17.4, Table 17.4-1, *Risk Significant SSCs Within the Scope of D-Rap* is revised as shown below:

Table 17.4-1(Sheet 2 of 8)
Risk-Significant SSCs Within the Scope of D-RAP

System, Structure, or Component (SSC) ⁽¹⁾	Rationale ⁽²⁾	Insights and Assumptions
Rod Drive MG Sets (Field Breakers Generator Field Control Relays) (PLS-MG-01AIB)	RAW	These breakers relays open on a DAS reactor trip signal demand to de-energize the control rod MG sets and allow the rods to drop.

UFSAR Section 19.59, Table 19.59-18 *AP1000 PRA-Based Insights* is revised as shown below:

**Table 19.59-18 (Sheet 9 of 25)
AP1000 PRA-Based Insights**

Insight	Disposition
<p>3. (cont.)</p> <p>The DAS reactor trip function is to trip the control rods by deenergizing the motor-generator set.</p> <p>In the PRA it is assumed the following eliminates the potential for common cause failures between automatic and manual DAS functions.</p> <ul style="list-style-type: none"> – DAS manual initiation functions are implemented in a manner that bypasses the signal processing equipment of the DAS automatic logic. <p>The DAS, including the M-G set field breakers <u>relays</u>, is included in the D-RAP.</p> <p>The DAS manual actuation cables are located within the nuclear island and, therefore, are protected from external hazards, such as high winds.</p>	<p>7.7.1.11</p> <p>Tier 1 Information</p> <p>17.4</p>

COL Appendix C, Section 2.5, Table 2.5.1-4, *Inspections, Tests, Analyses, and Acceptance Criteria* is revised as shown below:

(This change is also incorporated into the corresponding plant-specific Tier 1 table)

Table 2.5.1-4 Inspections, Tests, Analyses, and Acceptance Criteria				
No.	ITAAC No.	Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
505	2.5.01.01	1. The functional arrangement of the DAS is as described in the Design Description of this Section 2.5.1.	Inspection of the as-built system will be performed.	The as-built DAS conforms with the functional arrangement as described in the Design Description of this Section 2.5.1.
506	2.5.01.02a	2.a) The DAS provides an automatic reactor trip on low wide-range steam generator water level, or on low pressurizer water level, or on high hot leg temperature, separate from the PMS.	Electrical power to the PMS equipment will be disconnected and an operational test of the as-built DAS will be performed using real or simulated test signals.	The generator field breakers control relays of the control rod motor-generator sets open after the test signal reaches the specified limit.
507	2.5.01.02b	2.b) The DAS provides automatic actuation of selected functions, as identified in Table 2.5.1-1, separate from the PMS.	Electrical power to the PMS equipment will be disconnected and an operational test of the as-built DAS will be performed using real or simulated test signals.	Appropriate DAS output signals are generated after the test signal reaches the specified limit.
508	2.5.01.02c.i	2.c) The DAS provides manual initiation of reactor trip, and selected functions, as identified in Table 2.5.1-2, separate from the PMS. These manual initiation functions are implemented in a manner that bypasses the control room multiplexers, if any; the PMS cabinets; and the signal processing equipment of the DAS.	Electrical power to the control room multiplexers, if any, and PMS equipment will be disconnected and the outputs from the DAS signal processing equipment will be disabled. While in this configuration, an operational test of the as-built system will be performed using the DAS manual actuation controls.	i) The generator field breakers control relays of the control rod motor-generator sets open after reactor and turbine trip manual initiation controls are actuated.

NND-14-0585

Enclosure 3

Changes to Licensing Basis Documents for CRDM MG Set Field Relay Change (LAR 13-27)

COL Appendix C, Section 3.7, Table 3.7-1 *Risk-Significant Components*, is revised as shown below:

(This change is also incorporated into the corresponding plant-specific Tier 1 table)

Table 3.7-1 (cont.) Risk-Significant Components	
Equipment Name	Tag No.
Annex Building UPS Distribution Panels (provide power to DAS)	EDS1-EA-1, EDS1-EA-14, EDS2-EA-1, EDS2-EA-14
Rod Drive MG Sets (Field Breakers generator field control relays)	PLS-MG-01A/B