April Rice
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July 6, 2015
NND-15-0383
10 CFR 50.90
10 CFR 52.63

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

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

Subject: Request for License Amendment and Exemption: Addition of Instruments to Design Reliability Assurance Program (D-RAP) (LAR 14-10)

Reference: 1. Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, Request for License Amendment and Exemption: Addition of Instruments to Design Reliability Assurance Program (D-RAP) (LAR-14-006) (ND-14-0892) (ML14280A391)

In accordance with the provisions of 10 CFR 50.90, South Carolina Electric & Gas Company (SCE&G), the licensee for Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3, hereby requests an amendment to the combined licenses (COLs) for VCSNS Units 2 and 3, COL Numbers NPF-93 and NPF-94, respectively.

The requested amendment requires changes to the Updated Final Safety Analysis Report (UFSAR) in the form of departures from the incorporated plant-specific Design Control Document (PS-DCD) Tier 2 information, and involves changes to related plant-specific Tier 1 information, with corresponding changes to the associated COL Appendix C information. Enclosure 1 requests approval of the license amendment necessary to implement the Tier 2 and COL changes. Pursuant to the provisions of 10 CFR 52.63(b)(1), Enclosure 2 requests an exemption from elements of the design as certified in the 10 CFR Part 52, Appendix D, design certification rule for the plant-specific Tier 1 material departures.

The requested departures are necessary to allow the feedwater controller program to respond as required to various plant transients while minimizing the potential for undesired actuation. The description, technical evaluation, regulatory evaluation (including the Significant Hazards Consideration determination), and environmental considerations for the proposed changes in the LAR are contained in Enclosure 1 to this letter. The background and supporting basis for the requested exemption are contained in Enclosure 2. The proposed markups depicting the requested changes to the plant-specific licensing basis documents are contained in Enclosure 3. The requested amendment and exemption are identical in content to Southern Nuclear Operating Company's LAR, dated October 7, 2014 (Reference 1).

This letter contains no regulatory commitments.

SCE&G requests staff approval of the license amendment and exemption by May 13, 2016, to support completion of Design Reliability Assurance Program (D-RAP) Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC). Delayed approval of this license amendment and exemption could result in a delay of this activity and subsequent dependent activities.

SCE&G expects to implement the proposed amendment (through incorporation into the licensing basis documents; e.g., the plant-specific DCD and COL Appendix C) 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 enclosures to the designated State Official.

Should you have any questions, please contact Justin Bouknight by telephone at (803) 941-9828, or by email at justin.bouknight@scana.com.

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

Executed on this 6th day of July, 2015.

Sincerely,

April Rice
Manager
New Nuclear Licensing

BB/ARR/bb

Enclosures:

Enclosure 1: Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 - Request for License Amendment Regarding Addition of Instruments to D-RAP - (LAR 14-10)
Enclosure 2: Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 - Exemption Request Regarding Addition of Instruments to D-RAP (LAR 14-10)
Enclosure 3: Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 - Licensing Basis Documents - Proposed Changes Regarding Addition of Instruments to D-RAP (LAR 14-10)

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South Carolina Electric & Gas Company

NND-15-0383

Enclosure 1

Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3

Request for License Amendment
Regarding Addition of Instruments to D-RAP
(LAR 14-10)

(Enclosure 1 consists of 15 pages, including this cover page)

Table of Contents

Pursuant to 10 CFR 50.90, South Carolina Electric & Gas Company (SCE&G) hereby requests an amendment to Combined License (COL) Nos. NPF-93 and NPF-94 for Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3, respectively.

1. Summary Description

This license amendment request proposes to modify the existing feedwater controller logic to allow the controller program to respond as required to various plant transients while minimizing the potential for false actuation. The current configuration of the feedwater control system allows the startup feedwater (SFW) pumps to start upon initiation of a reactor trip. This proposed change will align the feedwater controller logic with the guidance in the Advanced Light Water Reactor Utility Requirements Document (ALWR URD) which states in Volume 3, Chapter 1, Requirement 3.5.3 that, "Reactor trips not complicated by failures beyond those that caused the trip shall not result in initiation of the backup feedwater system, presuming that the feedwater system did not cause the trip."

The proposed changes will revise the Combined License (COL) to modify the control logic for actuation of the startup feedwater (SFW) pumps to support their defense-in-depth function of core decay heat removal. The changes will require a change to the Updated Final Safety Analysis Report (UFSAR) as a departure from the incorporated plant-specific Design Control Document (PS-DCD) Tier 2 information (see Section 2 for details), and involves a change to the plant-specific Tier 1 information (see Section 2 for details), with corresponding changes to COL Appendix C (as applicable with Tier 1 changes). This enclosure requests approval of the license amendment necessary to implement the Tier 2 and COL changes.

2. Detailed Description

The Main and Startup Feedwater System (FWS) supplies feedwater to the steam generators in order to maintain water inventory for the removal of heat from the Reactor Coolant System (RCS) by secondary side steam release. Depending on whether the plant is in startup, normal standby/operation/shutdown, or transient conditions, the main feedwater (MFW) pumps or startup feedwater (SFW) pumps will be employed.

The MFW pumps are designed to supply the steam generators with adequate feedwater during all modes of plant operation including transient conditions. Three parallel trains of main feedwater pumps (FWS-MP-02A/B/C) provide the motive power for MFW flow, with each pump train being identical in capacity and characteristics. During normal full load operation, each train provides 33.3% of the total feedwater flow. However, with one train out of service, the other two trains can provide sufficient flow to maintain power operation at up to 70% full load power.

The SFW pumps supply feedwater to the steam generators during plant startup, hot standby, shutdown, low power operation, and in the event of MFW unavailability. Two startup feedwater pumps (FWS-MP-03A/B) are provided, with a single pump capable of satisfying the SFW flow demand for decay heat removal. These pumps automatically start, upon a signal generated by the plant control system (PLS), and maintain steam generator water level when the MFW pumps are unavailable. This defense-in-depth capability provides a supplemental core cooling mechanism in addition to the passive residual heat removal (PRHR) heat exchanger for non-loss of coolant accidents and steam generator tube ruptures. This non-safety power generation design basis function of the startup feedwater system is described in UFSAR Subsection 10.4.9.1.2. The instrumentation involved in SFW pump actuation for defense-in-depth functionality as part of the current design includes the wide range main feedwater flow transmitters (FWS-JE-FT050B/D/F, FWS-JE-FT051B/D/F) and the narrow range steam generator level transmitters (SGS-JE-LT001 through SGS-JE-LT008). These instruments are also summarized below in Table 1.

The criteria for automatic actuation of the SFW pumps are described in UFSAR Subsection 10.4.9.2.3.4 which states that "An automatic pump start signal is generated by the plant control system (PLS). The signal is generated on low main feedwater flow coincident with low steam generator level. As a backup to this logic, it is also initiated on steam generator level alone, at a setpoint below the low steam generator level setpoint."

Consistent with UFSAR Subsection 10.4.9.2.3.4, the current design control logic for SFW pump actuation for their defense-in-depth function was accomplished by one of two means as shown below in Table 1.

Table 1: Current Design Inputs for SFW Pump Actuation

		Instrumentation Involved
Primary Logic Inputs	Wide-Range MFW Flow	FWS-JE-FT050B/D/F, FWS-JE-FT051B/D/F
	Narrow-Range SG Level	SGS-JE-LT001 through SGS-JE-LT008
Backup Logic Inputs	Narrow-Range SG Level	SGS-JE-LT001 through SGS-JE-LT008

This logic, however, could lead to SFW pump actuation on a reactor trip. Steam generator narrow range level response on a reactor trip from full power reaches a low point of approximately 5%. Per the current design, narrow range low level trips alone would actuate SFW pumps. To avoid actuation of the SFW pumps, the narrow range low level trip setpoint would need to be lower than 5%, which does not allow for sufficient margins to appropriately adjust the actuation setpoint when necessary.

SFW pump actuation on a reactor trip would be inconsistent with the guidance presented in the Advanced Light Water Reactor Utility Requirements Document (ALWR URD), Volume 3, Chapter 1, Requirement 3.5.3 which states in part that reactor trips not complicated by failures beyond those that caused the trip should not result in the initiation of the backup feedwater system. Additionally, the UFSAR Tier 2 Subsection 10.4.9.2.3.4 states that "Following a reactor trip that is not the result of a main feedwater system malfunction and in which the main feedwater system remains available, the startup feedwater pumps do not automatically start."

The design change being proposed will modify the existing feedwater controller logic, so that the primary automatic actuation logic for the SFW pumps will initiate as a result of the following signal inputs: Low-Range MFW Flow, SFW Flow and Narrow-Range SG Level. The Low-Range MFW Flow and SFW Flow signals will be used to determine the total MFW flow aligned to the SGs. This resulting signal coincident with a Narrow-Range SG Level signal will initiate the automatic actuation logic for the SFW pumps.

This design change will also modify the backup automatic actuation logic for the SFW pumps, so that they initiate on a Wide-Range SG level signal. This single signal input actuation was previously initiated by the Narrow-Range SG level instrumentation. The use of the Wide-Range SG level instrumentation will allow the normal SG level transient following a reactor trip to occur without causing the undesired actuation of the SFW pumps. This change will allow the SFW pumps to maintain their defense-in-depth function for SG level control, and will maintain consistency with UFSAR Subsection 10.4.9.2.3.4. The proposed changes to the automatic actuation logic for the SFW pumps is summarized in Table 2.

Table 2: Proposed Design Inputs for SFW Pump Actuation

		Instrumentation Involved
Primary Logic Inputs	Low-Range MFW Flow	FWS-JE-FT050A/C/E, FWS-JE-FT051A/C/E
	SFW Flow	SGS-JE-FT055C/D/E, SGS-JE-FT056C/D/E
	Narrow-Range SG Level	SGS-JE-LT001 through SGS-JE-LT008
Backup Logic Inputs	Wide-Range SG Level	SGS-JE-LT011 through SGS-JE-LT018

The proposed control logic modifications still meet the description of automatic SFW pump actuation in Subsection 10.4.9.2.3.4 of the UFSAR and enable the SFW pumps to perform their defense-in-depth function without the potential for undesired actuation on reactor trip. No new input signals are needed for the change, as the instrumentation already exist as a part of the current design.

Plant-specific Tier 1 Table 3.7-1 and Tier 2 Table 17.4-1 provide a list of the “Risk-Significant Components” and “Risk-Significant Systems, Structures, or Components (SSCs) Within the Scope of the AP1000 Design Reliability Assurance Program (D-RAP).” Due to the importance of the SFW defense-in-depth functions, the instrumentation associated with SFW pump actuation is within the scope of D-RAP. The changes described above necessitate that the instrumentation proposed be associated with SFW pump actuation and be included in both D-RAP Risk-Significant Components Tier 1 Table 3.7-1 and Tier 2 Table 17.4-1 as described below, and that the instrumentation for the current logic be removed/revised in Tier 1 Table 3.7-1 and Tier 2 Table 17.4-1.

It is also noted that although SGS-JE-FT055A/B and SGS-JE-FT056A/B are included in various other locations within the licensing basis documents, SGS-JE-FT055C/D/E and SGS-JE-FT056C/D/E do not need to be added everywhere the A/B instrumentation are currently shown. The A/B instruments support passive residual heat removal heat exchanger actuation and so are safety-related, whereas the C/D/E instruments support defense-in-depth actuation of the SFW pumps and so are non safety-related instruments, which are not required to be listed in the other locations within the licensing basis documents. For example, it is not appropriate to show C/D/E within the steam generator

system (SGS) Tier 1 Table 2.2.4-1, as they are non safety-related and do not require safety-related displays.

Licensing Basis Change Descriptions:

Licensing Basis changes to reflect the modification of control logic associated with SFW pump actuation for their defense-in-depth functions are shown on the following pages.

Key:
Added text
~~Deleted text~~

Tier 1: It is proposed that Table 3.7-1 be updated as follows:

Table 3.7-1 (cont.) Risk-Significant Components	
Equipment Name	**Tag No.**
…	…
General I&C	
…	…
Main Feedwater ~~Wide~~**Low**-Range Flow Sensors	FWS-050**A/C/E** ~~B/D/F~~, -051**A/C/E** ~~B/D/F~~
Startup Feedwater Flow Sensors	SGS-055A/B**/C/D/E**, -056A/B**/C/D/E**

Tier 2: It is proposed that Table 17.4-1 (Sheets 2,3 of 8) be updated as follows:

Table 17.4-1 (Sheets 2,3 of 8) **Risk-Significant SSCs Within the Scope of D-RAP**		
System, Structure, or Component (SSC)(1)	**Rationale(2)**	**Insights and Assumptions**
…	…	…
System: General I&C(4)		
…	…	…
High Pressure/DP Sensors - RCS Hot Leg Level (RCS-160A/B) … - Main Feedwater ~~Wide~~ **Low**-Range Flow (FWS-050**A/C/E** ~~B/D/F~~, -051**A/C/E** ~~B/D/F~~) - Startup Feedwater Flow (SGS-055A/B**/C/D/E**, -056A/B**/C/D/E**)	RAW/CCF/EP	The following sensors are included in this group. These sensors support PMS and PLS functions. They are used in reactor trip and ESF functions, and provide indications to the operator. Main feedwater **and nonsafety-related startup feedwater** flow sensors support startup feedwater actuation and **other safety-related** startup feedwater flow sensors support PRHR actuation. The hot leg level sensors automatically actuate the IRWST injection and automatic depressurization system (ADS) valves during shutdown conditions.

3. Technical Evaluation

The AP1000 plant does not have a safety-related auxiliary feedwater system but instead includes nonsafety-related startup feedwater (SFW) pumps, which for defense-in-depth functionality, are used to supply feedwater to the steam generators during a loss of main feedwater. Upon actuation, the SFW pumps supply feedwater to the steam generators during non-power operation to provide a supplemental core cooling mechanism in addition to the PRHR heat exchanger for non-loss of coolant accidents and steam generator tube ruptures.

Currently, the plant control system (PLS) automatically actuates the two nonsafety SFW pumps upon loss of MFW and automatically controls feedwater flow to the steam generators. The SFW pumps automatically start on either a low Wide-Range main feedwater flow coincident with low Narrow-Range steam generator level, or as a backup to the primary logic, on low Narrow-Range steam generator level alone at a setpoint below the

low Narrow-Range steam generator level setpoint. The PLS uses nonsafety control and instrumentation equipment to control feedwater flow, which are operated from the main control room or a remote shutdown room.

Due to the importance of this SFW defense-in-depth function, the instrumentation associated with SFW pump actuation has been included within the scope of the AP1000 Design Reliability Assurance Program (D-RAP). The D-RAP includes a design evaluation of the AP1000 and identifies the aspects of plant operation, maintenance, and performance monitoring pertinent to risk-significant systems, structures, and components (SSCs). The AP1000 probabilistic risk assessment (PRA) was used to identify these SSCs.

The objective of the D-RAP is to design reliability into the plant and to maintain the AP1000 reliability consistent with the established PRA safety goals. Furthermore, one of the goals of D-RAP is to provide reasonable assurance that the AP1000 is designed, procured, constructed, maintained, and operated in a manner consistent with the assumptions and risk insights in the AP1000 PRA for these risk-significant SSCs, regardless of whether they are safety or nonsafety-related. The D-RAP therefore provides a mechanism for establishing baseline reliability values for risk-significant SSCs identified by the risk determination methods and used to implement the Maintenance Rule (10 CFR 50.65), consistent with PRA reliability and availability design basis assumptions used for the AP1000 design.

The SSCs within the D-RAP include enhanced quality assurance (QA) requirements for the regulatory treatment of nonsafety systems (RTNSS). The requirement to provide a reliability assurance program, as described in SECY 95-132, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems (RTNSS) in Passive Plant Designs (SECY 94-084)", is codified by incorporation within the design-specific rulemaking and becomes part of a COL that references that certified design. RTNSS is a subset of Equipment Class D as defined by NRC Regulatory Guide 1.26 as an intermediate, nonsafety-related equipment classification. It should be noted that applying these supplemental QA requirements to equipment classes A, B, or C components is not necessary since those components are "safety-related" and therefore already have a higher level of QA (10 CFR 50 Appendix B). The D-RAP therefore satisfies the requirement to apply supplemental QA to RTNSS components.

As described in Section 2, it is necessary to modify the current design control logic for actuation of the startup feedwater (SFW) pumps for consistency with the ALWR URD and the UFSAR. The proposed control logic uses different instrument tag numbers than the current design. However, the instruments used for the actuation of this function already exist as a part of the current design and so this change does not require any additional input signals. These instruments, to be included as part of the D-RAP, will be held to the same enhanced QA requirements as the current instruments and therefore neither safety, performance, nor reliance will be reduced as a part of this proposed change. Furthermore, since the D-RAP ensures consistency with the PRA, the changes do not impact the PRA.

The proposed change requires that these new functional logics be programmed into the plant control system. As described in Tier 1 Subsection 2.5.3, Tier 1 Tables 2.5.3-1 and 2.5.3-2, and Tier 2 Subsection 14.2.9.2.2, an operational test of SFW pumps and the PCS, which supports actuation of the SFW defense-in-depth functions, will be performed using

simulated input signals. System outputs and component operations will be monitored to determine the operability of the control functions. The testing will demonstrate that the SFW functions as described in Tier 2 Subsections 10.4.7 and 10.4.9. Therefore, the defense-in-depth functionality of the SFW pumps will be ensured prior to power operation of the plant.

A startup feedwater system component failure analysis has been performed, with the results identified in Tier 2 Table 10.4.9-1. This table lists several cases in which startup feedwater flow was not available to the steam generator. The analysis indicates that any failure of the startup feedwater supply has no effect on the function of the RCS.

In the event of loss of offsite power that results in a loss of MFW supply, the SFW pumps automatically supply feedwater to the steam generators to cool down the reactor under emergency shutdown conditions. The standby source motor control center circuit powers each of the two SFW pumps and their associated instruments and valves. The pump discharge isolation valves are motor-operated and are normally closed and interlocked with the SFW pumps. In the event of loss of offsite power, the onsite standby power supply diesel generators will power the SFW pumps. If both the normal ac power and the onsite standby ac power are unavailable, these valves will fail “as-is.” The pump suction header isolation valves are pneumatically actuated. The FWS also has temperature instrumentation in the pump discharge that would permit monitoring of the SFW temperature. This change therefore has no impact on the ability of the AP1000 plant to cool down under emergency shutdown conditions or during a loss of offsite power event.

The SSCs affected by this licensing amendment request are not used to contain, control, channel, monitor, process, or release radioactive or non-radioactive materials. The types and quantities of expected effluents are not changed, and no effluent release path is affected by the proposed changes. Therefore, radioactive or non-radioactive material effluents are not affected by the proposed changes.

Although there are Tier 1 changes involved with the amendment to Tier 2 information, the resulting changes do not cause a reduction in safety. All system and plant responses associated with SG level control have been reviewed, and no adverse impacts have been identified as a result of this change. The controls and associated protective logic used to monitor and mitigate accidents which could be affected by or result from SG level have been verified to ensure that no adverse impacts have been imposed by this change. It is concluded that the above-proposed changes would not adversely affect any design function, safety-related equipment or function, safety analysis, or radioactive material barrier.

4. Regulatory Evaluation

4.1 Applicable Regulatory Requirements/Criteria

10 CFR 52.98(f) requires NRC approval for any modification to, addition to, or deletion from the terms and conditions of a COL. This activity involves a departure from COL Appendix C information and a corresponding change to plant-specific Tier 1 information; therefore, this activity requires an amendment to the COL. Accordingly, NRC approval is required prior to making the plant-specific changes in this license amendment request.

10 CFR 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 paragraphs B.5.b or B.5.c of the section. The proposed change involves a revision to plant-specific Tier 1 information (and corresponding COL Appendix C information), and thus requires NRC approval for the Tier 2 and involved Tier 1 departures.

10 CFR 50.34(f)(2)(D)(xiii) requires that combined licenses under 10 CFR Part 52 meet requirements to provide automatic and manual auxiliary feedwater (AFW) system initiation, and provide auxiliary feedwater system flow indication in the control room. Although the AP1000 plant does not have a safety-related auxiliary feedwater system, non-safety-related startup feedwater pumps are used to supply feedwater to the steam generators during startup, hot standby, cooldown, and the unavailability of main feedwater pumps which meets the intent of 10 CFR 50.34(f)(2)(D)(xiii). The proposed change will revise the Combined License (COL) to modify the control logic for actuation of the startup feedwater (SFW) pumps to support their defense-in-depth function of core decay heat removal. This change does not impact functionality of the main and startup feedwater system (FWS) and so the intent of requirement 10 CFR 50.34(f)(2)(D)(xiii) continues to be met.

10 CFR 50.62(c) requires that combined licenses under 10 CFR Part 52 meet requirements to provide equipment from sensor output to final actuation device, that is diverse from the reactor trip system, to automatically initiate the auxiliary (or emergency) feedwater system and initiate a turbine trip under conditions indicative of a ATWS. The AP1000 design includes a control-grade diverse actuation system (DAS) to provide an alternate turbine trip signal and alternate actuation signal of the passive residual heat removal heat exchanger for decay heat removal, which are separate and diverse from the reactor trip system and passive residual heat removal heat exchanger normal actuation signals. The proposed changes do not impact DAS and so the requirements of 10 CFR 50.62(c) continue to be met.

4.2 Precedent

No precedent is identified.

4.3 Significant Hazards Consideration Determination

The proposed changes will revise the Combined License (COL) to modify the control logic for actuation of the startup feedwater (SFW) pumps to support their defense-in-depth function of core decay heat removal.

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

The proposed changes will modify the control logic for actuation of the startup feedwater (SFW) pumps to support their defense-in-depth function of core decay heat removal. The instrumentation used for actuation of the SFW pumps in their defense-in-depth function are not initiators of any accident. The proposed control logic uses different instrument tag numbers than the current design. The instruments used for the actuation of this function exist as a part of the current design; therefore this proposed change does not require any additional instrumentation. These instruments, to be included as part of the Design Reliability Assurance Program (D-RAP), will be held to the same enhanced quality assurance (QA) requirements as the current instruments and therefore neither safety, performance, nor reliance will be reduced as a part of this change.

Additionally, the proposed changes do not adversely affect any accident initiating event or component failure, thus accidents previously evaluated are not adversely affected. In the event of loss of offsite power that results in a loss of main feedwater (MFW) supply, the SFW pumps automatically supply feedwater to the steam generators to cool down the reactor under emergency shutdown conditions. The standby source motor control center circuit powers each of the two SFW pumps and their associated instruments and valves. The pump discharge isolation valves are motor-operated and are normally closed and interlocked with the SFW pumps. In the event of loss of offsite power, the onsite standby power supply diesel generators will power the SFW pumps. If both the normal ac power and the onsite standby ac power are unavailable, these valves will fail “as-is.” The pump suction header isolation valves are pneumatically actuated. The main and startup feedwater system (FWS) also has temperature instrumentation in the pump discharge that would permit monitoring of the SFW temperature. This proposed change therefore has no impact on the ability of the AP1000 plant to cool down under emergency shutdown conditions or during a loss of offsite power event.

No function used to mitigate a radioactive material release and no radioactive material release source term is involved, thus the radiological releases in the accident analyses are not adversely affected.

Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of an 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

The proposed changes will modify the control logic for actuation of the startup

feedwater (SFW) pumps to support their defense-in-depth function of core decay heat removal. The instrumentation used for actuation of the SFW pumps in their defense-in-depth function are not initiators of any accident. The proposed control logic uses different instrument tag numbers than the current design. However, the instruments used for the actuation of this function already exist as a part of the current design and so this change does not require any additional instrumentation. These instruments, to be included as part of the D-RAP, will be held to the same enhanced QA requirements as the current instruments and so neither safety, performance, nor reliance will be reduced as a part of this change. Furthermore, since the D-RAP ensures consistency with the Probabilistic Risk Assessment (PRA), the changes do not impact the PRA. The proposed changes would not introduce a new failure mode, fault, or sequence of events that could result in a radioactive material release. The proposed change does not alter the design, configuration, or method of operation of the plant beyond standard functional capabilities of the equipment.

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

The proposed changes will modify the control logic for actuation of the startup feedwater (SFW) pumps to support their defense-in-depth function of core decay heat removal. These changes will have no negative impacts on the safety margin associated with the design functions of the SFW pumps. The proposed logic changes will only resolve the current conditions associated with undesired start up signals for the SFW pumps. The changes set forth in this amendment correct the actuation logic of the SFW pumps, so that the feedwater controller logic is now aligned with the guidance provided in the Advanced Light Water Reactor Utility Requirements Document (ALWR URD). In addition, the operation of the startup feedwater system function is not credited to mitigate a design-basis accident. Since there is no change to an existing design basis limit/criterion, design function, or regulatory criterion 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 proposed changes 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. It is therefore 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.

5. Environmental Considerations

The proposed changes would revise the combined licenses (COLs) by making changes to COL Appendix C information. The proposed changes would modify the control logic for actuation of the startup feedwater (SFW) pumps consistent with information in the Updated Final Safety Analysis Report (UFSAR) portion of the incorporated plant-specific Design Control Document (DCD) Tier 2 information. The Tier 2 changes also involve proposed changes to corresponding information in plant-specific Tier 1 information and the COL Appendix C.

This review has determined that the proposed departure would require an amendment to the COL; however, a review of the anticipated construction and operational effects of the proposed amendment has determined that 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, 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 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 difference 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 would not adversely affect the design or function of any structure, system, or component (SSC), but instead provides the control logic for automatic actuation of the SFW pumps without the potential for undesired actuation during a reactor trip, consistent with industry guidance and regulations. The proposed changes are unrelated to any aspect of plant construction or operation that would introduce any change to effluent types (e.g., effluents containing chemicals or biocides, sanitary system effluents, and other effluents), or adversely affect any plant radiological or non-radiological effluent release quantities. Furthermore, the proposed

changes do not adversely affect any effluent release path or 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 would not adversely affect the design or function of any radioactive structure, system, or component (SSC), but instead provides the control logic for automatic actuation of the SFW pumps without the potential for undesired actuation during a reactor trip. Plant radiation zones are not affected, and controls under 10 CFR 20 preclude a significant increase in occupational radiation exposure. 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 effects of the proposed amendment do 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 amendment is not required.

6. References

None

South Carolina Electric & Gas Company

NND-15-0383

Enclosure 2

Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3

Exemption Request
Regarding Addition of Instruments to D-RAP
(LAR 14-10)

(Enclosure 2 consist 7 pages, including this cover page)

1.0 Purpose

South Carolina Electric & Gas Company (SCE&G) 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 plant-specific departure from elements of the certification information in Tier 1 of the generic 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 the generic DCD Tier 1 information. The Tier 1 information for which a plant-specific departure and exemption is being requested is related to main and startup feedwater system (FWS) controller logic information specified in Tier 1 Tables.

This request for exemption will apply the requirements of 10 CFR 52, Appendix D, Section VIII.A.4 to allow departures from Tier 1 information due to the following proposed changes to the system-based design descriptions:

- Tier 1 Table 3.7-1
    - Revise equipment name of Main Feedwater Wide-Range Flow Sensors to Main Feedwater Low-Range Flow Sensors.
    - Revise tag number for Main Feedwater Low-Range Flow Sensors from FWS-050B/D/F, FWS-051B/D/F to FWS-050A/C/E and FWS-051A/C/E
    - Revise tag number for Startup Feedwater Flow Sensors from SGS-055A/B and SGS-056A/B to SGS-055A/B/C/D/E and SGS-056A/B/C/D/E

This request will provide for the application of the requirements 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

SCE&G is the holder of Combined License 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 and 3, respectively.

During the detailed design finalization of the main and startup feedwater system controller logic, departures from the details identified in Tier 1 information were determined necessary to improve the functionality of the system consistent with the actual design functions described in the plant-specific DCD Tier 2 information. This activity requests exemption from the Generic DCD Tier 1 tables, which support the associated COL Appendix C Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC).

An exemption from elements of the AP1000 certified (Tier 1) design information to allow a departure from the design description is requested.

3.0 Technical Justification for Proposed Exemption

An exemption is requested to depart from AP1000 generic DCD Tier 1 material in regard to the AP1000 by revising the controller logic information, including equipment name and tag numbers for the main and startup feedwater system identified in the Tier 1 table of risk-significant components. The proposed exemption would allow a change to the plant-specific Tier 1 system-based ITAAC information consistent with concurrent revisions proposed for the plant-specific DCD Tier 2 information descriptions.

The proposed changes to the description information presented in plant-specific Tier 1 are at a level of detail that is consistent with the information currently provided therein. The proposed changes neither adversely impact the ability to meet the design functions of the components nor involve a significant decrease in the level of safety provided by the components. The proposed changes to information in plant-specific Tier 1 continue to provide the detail necessary to implement the corresponding ITAAC. Further, application of the current generic certified design information in Tier 1 as required by 10 CFR Part 52, Appendix D, Section III.B, in the particular circumstances discussed in this request would not serve the underlying purpose of the rule since it could be read to be inconsistent with the existing design information provided in Tier 2 of the plant-specific DCD.

4.0 Justification for Proposed Exemption

10 CFR Part 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. Since SCE&G has identified changes to the Tier 1 information related to the components, as a result of further design review activities, an exemption to the certified design information in Tier 1 is needed.

10 CFR Part 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.1].

The requested exemption to allow changes to the description of the components satisfies the criteria for granting specific exemptions, as described below.

1. **This exemption is authorized by law**

   The NRC has authority under 10 CFR 52.63, §52.7, and §50.12 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 plant-specific elements of the Tier 1 information to depart from the AP1000 certified design information. The plant-specific DCD Tier 1 information will reflect the approved licensing basis for VCSNS Units 2 and 3, and will maintain a consistent level of detail with that which is currently provided elsewhere in the Tier 1. Therefore, the affected ITAAC in the plant-specific Tier 1 information will serve its required purpose.

These changes will not impact the ability of the components to perform their design functions, which include automatic start of the startup feedwater pumps. Because the changes will not alter the operation of any plant equipment or system's ability to perform their design function, these changes do not present an undue risk to existing equipment or systems. 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 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 significant 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 exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow changes to the existing feedwater controller logic equipment name and tag number descriptions as presented in the plant-specific Tier 1 table, thereby departing from the AP1000 certified design information. The proposed exemption will enable performance of the ITAAC associated with these changed elements, by reflecting the current design information in the text, and tables that are referenced in these ITAAC. The exemption does not alter or impede the design, function, or operation of any plant structures, systems, or components (SSCs) associated with the facility's physical or cyber security, and therefore does not affect any plant equipment that is necessary to maintain a safe and secure plant status. The proposed exemption has no impact on plant security or safeguards.

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

4. Special circumstances are present

10 CFR 50.12(a)(2) lists 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 “[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 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 and 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 change to the main and startup feedwater system (FWS) controller logic information align this function with automatic start descriptions in the Updated Final Safety Analysis Report (UFSAR). This change does not impact the ability of any SSCs to perform their functions or negatively impact safety. Accordingly, this exemption from the certification information will enable the licensee to safely construct and operate the AP1000 facility consistent with the design certified by the NRC in 10 CFR 52, Appendix D. Therefore, special circumstances are present, because application of the current generic certified design information in Tier 1 as required by 10 CFR Part 52, Appendix D, Section III.B in the particular circumstances discussed in this request 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 changes to the plant-specific Tier 1 information and the understanding that these changes support the actual system functions, 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 design functions of the systems associated with this request will continue to be maintained. The changes are minor departures from tables and text in the generic AP1000 DCD. These changes reconcile information related to the main and startup feedwater system controller logic in Tier 1 for consistency with the automatic start description in the UFSAR. Furthermore, the justification provided in the license amendment and this exemption and the associated mark-ups demonstrate that there is a limited change from the standard information provided in the generic AP1000 DCD, which is offset by the special circumstances identified above.

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.**

The proposed exemption would allow changes to the main and feedwater system controller logic as presented in the plant-specific Tier 1 information. The change to the equipment name and tag numbers in support of the system control logic for consistency with the automatic start description in the UFSAR will not impact the functional capabilities of these components.

Because the design changes associated with this exemption request will not adversely affect the ability of any systems or equipment to perform their design functions, there are no new failure modes introduced by these changes and the level of safety provided by the current systems and equipment. It is concluded that the design change associated with this proposed exemption will not result in a significant decrease in the level of safety.

5.0 Risk Assessment

A risk assessment was not determined to be applicable to address the acceptability of this proposal.

6.0 Precedent Exemptions

None identified.

7.0 Environmental Consideration

A review has determined that the proposed amendment 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 license amendment request. 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 need be prepared in connection with the proposed exemption.

8.0 Conclusion

The proposed changes to Tier 1 are necessary to revise information in design descriptions in plant-specific Tier 1 information. The exemption request meets the requirements of 10 CFR 52.63, 10 CFR 52.7, 10 CFR 50.12, 10 CFR 51.22 and 10 CFR 52 Appendix D. 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

NND-15-0383

Enclosure 3

Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3

Licensing Basis Documents - Proposed Changes
Regarding Addition of Instruments to D-RAP
(LAR 14-10)

Note: Added text is **Blue Underline**
Deleted text is **~~Red Strikethrough~~**

(Enclosure 3 consist of 3 pages, including this cover page)

Tier 1, Section 3.7, Design Reliability Assurance Program

Table 3.7-1

(This change also applies to VCSNS Unit 2 and Unit 3 COLs, Appendix C)

[VCSNS Unit 2 COL, Appendix C]

[VCSNS Unit 3 COL, Appendix C]

(Excerpts from) **Table 3.7-1 (cont.)** **Risk-Significant Components**	
Equipment Name	**Tag No.**
…	…
Main and Startup Feedwater System (FWS)	
...	...
General I&C	
…	…
Main Feedwater ~~Wide~~ Low-Range Flow Sensors	FWS-050A/C/E ~~B/D/F~~, -051A/C/E ~~B/D/F~~
Startup Feedwater Flow Sensors	SGS-055A/B/C/D/E, -056A/B/C/D/E
...	...

UFSAR Subsection 17.4.7, D-RAP

Table 17.4-1

(Excerpts from) Table 17.4-1

RISK-SIGNIFICANT SSCS WITHIN THE SCOPE OF D-RAP

System, Structure, or Component (SSC)(1)	**Rationale (2)**	**Insights and Assumptions**
…	…	…
System: Main and Startup Feedwater System (FWS)		
...	...	...
System: General I&C(4)		
…	…	…
High Pressure/DP Sensors - RCS Hot Leg Level (RCS-160A/B) … - Main Feedwater ~~Wide~~ **Low**-Range Flow (FWS-050 **A/C/E** ~~B/D/F~~, 051 **A/C/E** ~~B/D/F~~) - Startup Feedwater Flow (SGS-055A/B**/C/D/E**, -056A/B**/C/D/E**)	RAW/CCF/EP	The following sensors are included in this group. These sensors support PMS and PLS functions. They are used in reactor trip and ESF functions, and provide indications to the operator. Main feedwater **and nonsafety-related startup feedwater** flow sensors support startup feedwater actuation and **other safety-related** startup feedwater flow sensors support PRHR actuation. The hot leg level sensors automatically actuate the IRWST injection and automatic depressurization system (ADS) valves during shutdown conditions.
...	...	...