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December 6, 2016
NND-16-0512
10 CFR 50.90
10 CFR 52.63

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: LAR 16-20: VCSNS Units 2&3 Request for License Amendment and Exemption: IRWST Volume Changes

Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, South Carolina Electric & Gas Company (SCE&G), acting on behalf of itself and South Carolina Public Service Authority (Santee Cooper), the licensees for Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3, request an amendment to Combined License (COL) Numbers NPF-93 and NPF-94, for VCSNS Units 2 and 3, respectively.

The requested amendment requires changes to the Updated Final Safety Analysis Report (UFSAR) in the form of departures from a plant-specific Design Control Document (PS-DCD) Tier 2 table, COL Appendix A Technical Specifications, and a COL Appendix C table. Pursuant to the provisions of 10 CFR 52.63(b)(1), an exemption from elements of the design as certified in the 10 CFR Part 52, Appendix D, design certification rule is also requested for the involved Tier 1 information.

The proposed departures consist of in-containment refueling water storage tank (IRWST) minimum volume changes in plant-specific UFSAR Table 14.3-2, COL Appendix A Technical Specifications 3.5.6, 3.5.7 and 3.5.8 and Surveillance Requirements 3.5.6.2 and 3.5.8.2, COL Appendix C Table 2.2.3-4, and Tier 1 Table 2.2.3-4. The proposed changes restore consistency of these sections with the UFSAR IRWST minimum volume value in other locations.

The description, technical evaluation, regulatory evaluation (including the Significant Hazards Consideration determination), and environmental considerations for the proposed changes in this license amendment request (LAR) are contained in Enclosure 1. Enclosure 2 provides the background and supporting basis for the requested exemption. Enclosure 3 identifies the requested changes and provides markups depicting the requested changes to the plant-specific UFSAR Tier 2 table, COL Appendix A Technical Specifications, and COL Appendix C and Tier 1 table.

In order to support the VCSNS Unit 2 construction schedule, SCE&G requests NRC staff review and approval of the license amendment no later than June 12, 2017. Approval by this date will allow sufficient time to implement licensing basis changes prior to affected construction activities. SCE&G expects to implement this proposed amendment (through incorporation into the licensing basis documents; e.g., the UFSAR) within 30 days of approval of the requested changes. Southern Nuclear Operating Company (SNC) has stated that the current requested approval date for Vogtle Electric Generating Plant Unit 3 will be July 6, 2017.

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 Mr. Nick Kellenberger by telephone at (803) 941-9834, or by email at nicholas.kellenberger@scana.com.

This letter contains no regulatory commitments.

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

Executed on this 6th day of December 2016.

Sincerely,

April R. Rice
Manager, Nuclear Licensing
New Nuclear Deployment

ARR/gt

Enclosure 1: Request for License Amendment, IRWST Volume Changes (LAR 16-20)

Enclosure 2: Request for Exemption, IRWST Volume Changes (LAR 16-20)

Enclosure 3: Proposed Changes to the Licensing Basis Documents (LAR 16-20)

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South Carolina Electric & Gas Company

Virgil C. Summer Nuclear Station Units 2 and 3

NND-16-0512

Enclosure 1

Request for License Amendment,
IRWST Volume Changes
(LAR 16-20)

(This enclosure contains 16 pages including this cover page)

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Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, South Carolina Electric & Gas Company (SCE&G), acting on behalf of itself and South Carolina Public Service Authority (Santee Cooper), the licensees for Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3, request an amendment to Combined License (COL) Numbers NPF-93 and NPF-94, for VCSNS Units 2 and 3, respectively.

1. SUMMARY DESCRIPTION

This activity addresses inconsistencies in the Updated Final Safety Analysis Report (UFSAR) and the Combined License (COL) Appendix A Technical Specifications for the specification of the passive core cooling system (PXS) required in-containment refueling water storage tank (IRWST) minimum water volume. The required IRWST minimum water volume is 73,100 ft^3. UFSAR Table 6.3-2 specifies the required IRWST minimum water volume as 73,100 ft^3. Combined License (COL) Appendix A Technical Specifications 3.5.6, 3.5.7, and 3.5.8, specify the required IRWST minimum water volume as greater than 73,100 ft^3. UFSAR Table 14.3-2 specifies an IRWST minimum required water volume of 73,900 ft^3, and COL Appendix C and plant-specific Design Control Document (DCD) Tier 1 Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Table 2.2.3-4 Acceptance Criteria 8.c)vi), specify a required IRWST minimum tank volume of 73,900 ft^3.

The results of the UFSAR Chapter 15 accident analyses are acceptable assuming a required IRWST minimum water volume of 73,100 ft^3. Therefore, the required IRWST minimum water volume listed in UFSAR Table 14.3-2 is reduced from 73,900 ft^3 to 73,100 ft^3, and the calculated volume of the IRWST between the tank outlet connection and the tank overflow stated in COL Appendix C ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi) is reduced from ≥ 73,900 ft^3 to ≥ 73,100 ft^3, with corresponding changes to the associated plant-specific DCD Tier 1 information. COL Appendix A Technical Specifications 3.5.6, 3.5.7, 3.5.8 include changes to the IRWST minimum volume from > 73,100 ft^3 to ≥ 73,100 ft^3 (and the associated Surveillance Requirements from ≤ 73,100 and > 70,907 ft^3 to < 73,100 and ≥ 70,907 ft^3) to be consistent throughout the license basis.

The requested amendment proposes changes to the UFSAR in the form of departures from the plant-specific DCD Tier 2 information (as detailed in Section 2), and involves changes to related plant-specific DCD Tier 1 information, with corresponding changes to the associated COL Appendix A and COL Appendix C information. This enclosure requests approval of the license amendment necessary to implement the UFSAR Tier 2, COL Appendix A, and COL Appendix C changes. Enclosure 2 requests the exemption necessary to implement the involved changes to the plant-specific DCD Tier 1 information.

2. DETAILED DESCRIPTION

The required IRWST minimum water volumes are not stated consistently in the current licensing basis. The required IRWST minimum water volume is 73,100 ft^3. UFSAR Table 6.3-2 specifies the required IRWST minimum water volume as 73,100 ft^3.

The following references specify a required IRWST minimum water volume of 73,900 ft^3:

1. UFSAR Table 14.3-2 lists the required IRWST minimum water volume as 73,900 ft^3.

2. COL Appendix C and plant-specific DCD Tier 1 ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi) states the required calculated volume of the as-built IRWST as ≥ 73,900 ft^3 between the tank outlet connection and the tank overflow.

COL Appendix A Technical Specifications for IRWST volumes states the minimum IRWST volume is greater than 73,100 ft^3 (versus "equals" 73,100 ft^3). The Technical Specifications refer to the volume of the IRWST as follows:

1. COL Appendix A Technical Specifications 3.5.6 Condition D specifies required actions with an IRWST borated water volume ≤ 73,100 ft^3 and > 70,907 ft^3.
2. COL Appendix A Technical Specifications Surveillance Requirement (SR) 3.5.6.2 requires verification that the IRWST borated water volume is > 73,100 ft^3.
3. COL Appendix A Technical Specifications 3.5.7 Condition D specifies required actions with an IRWST borated water volume ≤ 73,100 ft^3 and > 70,907 ft^3.
4. COL Appendix A Technical Specifications 3.5.8 Condition D specifies required actions with an IRWST and refueling cavity borated water volume ≤ 73,100 ft^3 and > 70,907 ft^3.
5. COL Appendix A Technical Specifications SR 3.5.8.2 requires verification that the IRWST and refueling cavity water total borated water volume is > 73,100 ft^3.

Therefore, UFSAR Table 14.3-2, COL Appendix A Technical Specifications 3.5.6, 3.5.7, and 3.5.8, and COL Appendix C ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi), with corresponding changes to the associated plant specific DCD Tier 1 information, are revised to resolve inconsistencies in the presentation of IRWST design details consistent with the required IRWST minimum water volume provided in UFSAR Table 6.3-2. This reflects the correct value of 73,100 ft^3 verified to be acceptable as the IRWST minimum water volume in the safety analyses, as further described in Section 3.

Licensing Basis Change Descriptions

The following licensing basis changes are proposed:

1. UFSAR Table 14.3-2 is revised to reduce the required IRWST minimum water volume from 73,900 ft^3 to 73,100 ft^3.

2. COL Appendix A Technical Specifications 3.5.6 Condition D is revised to specify required actions with an IRWST borated water volume < 73,100 ft^3 and ≥ 70,907 ft^3.

3. COL Appendix A Technical Specifications Surveillance Requirement (SR) 3.5.6.2 is revised so that the IRWST borated water volume is ≥ 73,100 ft^3.

4. COL Appendix A Technical Specifications 3.5.7 Condition D is revised to specify actions with an IRWST borated water volume < 73,100 ft^3 and ≥ 70,907 ft^3.

5. COL Appendix A Technical Specifications 3.5.8 Condition D is revised to specify actions with an IRWST and refueling cavity borated water volume < 73,100 ft^3 and ≥ 70,907 ft^3.

6. COL Appendix A Technical Specifications SR 3.5.8.2 is revised so that the IRWST and refueling cavity water total borated water volume is ≥ 73,100 ft^3.

7. COL Appendix C ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi) is revised to reduce the acceptance criteria for the calculated volume of the IRWST between the tank outlet connection and the tank overflow from ≥73,900 ft^3 to ≥73,100 ft^3, with corresponding changes to the associated plant-specific DCD Tier 1 information.

3. TECHNICAL EVALUATION

As described in UFSAR Subsection 6.3.1.1, the seismic Category I, safety-related PXS provides emergency core cooling during design basis events. The PXS has the following safety-related functions and performance criterion:

1. The PXS provides core decay heat removal during transients or accidents, or whenever the normal heat removal paths are lost. The passive residual heat removal (PRHR) heat exchanger provides core decay heat removal during design basis events. This heat removal function is available at reactor coolant system (RCS) conditions including shutdowns. During refueling operations, when the IRWST is drained into the refueling cavity, other passive means of core decay heat removal are utilized.

2. The PXS provides RCS makeup and boration during transients or accidents when the normal RCS makeup supply from the chemical and volume control system (CVS) is unavailable or is insufficient.

3. The PXS provides safety injection to the RCS to provide adequate core cooling for the complete range of loss-of-coolant accidents (LOCAs), up to and including the double-ended rupture of the largest primary loop RCS piping. The core makeup tanks (CMTs), accumulators, IRWST, and containment recirculation provide RCS makeup, boration, and safety injection during design basis events.

4. The PXS provides for chemical addition to the containment during post-accident conditions to establish floodup chemistry conditions that support radionuclide retention with high radioactivity in containment and to prevent corrosion of containment equipment during long-term floodup conditions.

5. As a performance criterion, the PXS has the capability to bring the plant to a stable condition using the PRHR heat exchanger for events not involving a loss of coolant. For these events, the PXS, in conjunction with the passive containment cooling system, has the capability to establish safe shutdown conditions, cooling the RCS to about 420°F in 36 hours, with or without the reactor coolant pumps operating.

The PXS is designed to operate without the use of active equipment such as pumps and ac power sources. The PXS depends on reliable passive components and processes such as gravity injection and expansion of compressed gases. The PXS does require a one-time alignment of valves upon actuation of the specific components.

The IRWST, as a component part of the PXS, provides a quench volume for the automatic depressurization system (ADS) Stage 1, 2, and 3 discharges. The IRWST is the heat sink for the PRHR heat exchanger (HX) for decay heat removal during design basis events. The IRWST collects condensation from the containment interior for passive core cooling and the IRWST provides a source of cold, borated water for injection into the RCS.

For LOCAs and other postulated events where ac power sources are lost, or when the CMT levels reach the automatic depressurization system (ADS) actuation setpoint, the ADS initiates. This results in injection from the accumulators and subsequently from the IRWST, once the RCS is nearly depressurized. For these conditions, the RCS depressurizes to saturated conditions at about 250°F within 24 hours. The PXS can maintain this safe shutdown condition indefinitely for the plant.

As described in COL Appendix C and plant-specific DCD Tier 1 Subsection 2.1.2, the current design requirements for the RCS include the following:

1. The RCS provides automatic depressurization during design basis events. The centerline of the connection of the sparger arms to the sparger hub is ≤ 11.5 feet below the IRWST overflow level. [ITAAC Acceptance Criteria 8.d)viii)]

As described in COL Appendix C and plant-specific DCD Tier 1 Subsection 2.2.3, the current design requirements for the PXS include the following:

1. The seismic Category I equipment identified in Table 2.2.3-1 can withstand seismic design basis loads without loss of safety function. [ITAAC Design Commitment 5.a)]
2. The PXS provides RCS makeup, boration, and safety injection during design basis events. The elevation of the bottom inside IRWST surface is higher than the direct vessel injection nozzle centerline by ≥ 3.4 ft. [ITAAC Design Commitment 8.c and Acceptance Criteria 8.c)v)]
3. The PXS provides RCS makeup, boration, and safety injection during design basis events. The calculated volume of the IRWST is ≥ 73,900 ft^3 between the tank outlet connection and the tank overflow. [ITAAC Design Commitment 8.c and Acceptance Criteria 8.c)vi)]

As described in UFSAR Subsection 6.3.2.1.3, the IRWST is located in the containment at an elevation slightly above the RCS loop piping. RCS injection is possible only after the RCS has been depressurized by the ADS or by a loss of coolant accident. Squib valves in the IRWST injection lines open automatically on a fourth stage automatic depressurization signal. Check valves, arranged in series with the squib valves, open when the reactor pressure decreases to below the IRWST injection head.

After the accumulators, CMTs, and the IRWST inject, the containment is flooded up to a level sufficient to provide recirculation flow through the gravity injection lines back into the RCS.

The time that it takes until the initiation of containment recirculation flow varies greatly, depending on the specific event. With a break in a direct vessel injection line, the IRWST spills out through the break and floods the containment, along with RCS leakage, and recirculation can occur in several hours. In the event of automatic depressurization without a RCS break and with condensate return, the IRWST level decreases very slowly. Recirculation may not initiate for several days.

Containment recirculation initiates when the recirculation line valves are open and the containment floodup level is sufficiently high. When the IRWST level decreases to a low level, the containment recirculation squib valves automatically open to provide redundant flow paths from the containment to the reactor.

These recirculation flow paths can also provide a suction flow path from the containment to the normal residual heat removal pumps, when they are operating after containment flood up. In addition, the squib valves in the recirculation paths containing normally open motor operated valves can be manually opened to drain the IRWST intentionally to the reactor cavity during severe accidents. This action is modeled in the AP1000 probabilistic risk assessment (PRA).

As described in UFSAR Table 15.0 6, the IRWST injection and recirculation functions (or the supported PRHR or ADS functions) are available to mitigate the following transient and accident conditions:

1. For UFSAR Section 15.2 events (Decrease in heat removal by the secondary system):
   - Loss of nonemergency ac power to the station auxiliaries (PRHR),
   - Loss of normal feedwater flow (PRHR), and
   - Feedwater system pipe break (PRHR).
2. For UFSAR Section 15.5 events (Increase in reactor coolant inventory):
   - Inadvertent operation of the CMT during power operation (PRHR), and
   - CVS malfunction that increases reactor coolant inventory (PRHR).
3. For UFSAR Section 15.6 events (Decrease in reactor coolant inventory):
   - Inadvertent opening of a pressurizer safety valve or ADS path (ADS),
   - Steam generator tube rupture (PRHR), and
   - LOCAs resulting from the spectrum of postulated piping breaks within the reactor coolant pressure boundary (IRWST injection and recirculation, PRHR, and ADS).

Further details of the availability and requirements for the IRWST for these design basis events are provided in the associated UFSAR Chapter 15 sections.

The results of the UFSAR Chapter 15 accident analyses are acceptable assuming a required IRWST minimum water volume of 73,100 ft^3. This includes the following analyses:

1. Small-break LOCA analyses, using the NOTRUMP AP1000 model, are conservative in relation to a required IRWST minimum water volume of 73,100 ft^3. The NOTRUMP AP1000 model does not directly model the IRWST water volume. Instead, the model uses the IRWST tank volume and subtracts the volume of components within the tank (spargers, PRHR heat exchanger, etc.). The actual IRWST water volume modeled is less than 73,100 ft^3 (~73,077 ft^3).
2. Large-break LOCA analyses, using the ASTRUM AP1000 model, do not model IRWST injection, and a required IRWST minimum water volume is not required to be considered.
3. Long-term core cooling analyses, using the WCOBRA/TRAC AP1000 model, include IRWST drain-down input from the small-break LOCA analyses described in Item 1. Therefore, using the conservative small-break LOCA analyses input supports a required IRWST minimum water volume of 73,100 ft^3.

4. Containment analyses, using the WGOTHIC AP1000 model, use an IRWST water volume of 73,100 ft^3. Therefore, there is no impact on these analyses.
5. Transient analyses, using the LOFTRAN AP1000 model, have been updated to use an IRWST water volume of 73,100 ft^3. In addition, the LOFTRAN model also conservatively subtracts all of the water volume below the PRHR heat exchanger due to lack of documentation showing adequate mixing to credit heat transfer below this elevation in the IRWST, and there is a small percentage of nonconservatism in the volume itself (~1%). Based upon these conservative assumptions in the LOFTRAN AP1000 model, it is concluded that the IRWST water volume is adequately modeled based on an IRWST minimum water volume of 73,100 ft^3.

NUREG 1793, Final Safety Evaluation Report (FSER), Volume 1, Section 3.7, Seismic Design, lists the design parameters, including structural dimensions that will affect the seismic analysis and design of any structure, system, or component (SSC), and states that the minimum water volume of the IRWST is 78,900 ft^3. This value is from WCAP 15612, "AP1000 Plant Description and Analysis Report," which summarized all the design changes made to convert the AP600 standard plant to the AP1000 standard plant. The actual water volume used in the seismic design analyses is 76,800 ft^3, which is conservative with respect to a minimum water volume of 73,100 ft^3. Therefore, there is no impact to the conclusions of the FSER concerning the seismic analyses.

NUREG 1793, FSER, Volume 1, Subsection 6.2.8, In-Containment Refueling Water Storage Tank Hydrodynamic Loads, states that the minimum water volume of the IRWST is 73,900 ft^3. The actual water volume used in the structural design analyses is 76,800 ft^3, which is conservative with respect to a minimum water volume of 73,100 ft^3. Therefore, there is no impact to the conclusions of the FSER concerning the structural design analyses, including hydrodynamic loads.

NUREG 1793, FSER, Supplement 2, Subsection 16.4.3.5, Emergency Core Cooling Systems, states that the applicant proposed to replace the preliminary bracketed value of 73,900 ft^3 for the minimum volume of borated water in the IRWST in DCD Tier 2 Chapter 16 Technical Specifications 3.5.6 and 3.5.8 with a new final value of greater than 73,100 ft^3. The reason for this change was stated to be based on evolving IRWST design details, is consistent with the updated IRWST volume provided in DCD Table 6.3 2 (Sheet 2), and reflects a more conservative water volume that was appropriately used in safety analyses. The actual water volumes used in the safety analyses are described above, with the results of the UFSAR Chapter 15 accident analyses demonstrated to be acceptable assuming a required IRWST minimum water volume of 73,100 ft^3. Therefore, there is no impact to the conclusions of the FSER concerning use of a required IRWST minimum water volume of 73,100 ft^3.

The proposed changes to UFSAR Table 14.3-2 do not adversely affect the design functions of the PXS and the IRWST described above. The proposed changes are acceptable as they address inconsistencies in the current licensing basis. The proposed changes to COL Appendix A Technical Specifications 3.5.6, 3.5.7, and 3.5.8, COL Appendix C ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi), and corresponding changes to the associated plant specific DCD Tier 1 information are consistent with these changes. The IRWST continues to meet the same regulatory acceptance criteria, codes, and industry standards specified in the UFSAR. The physical design and operation of the IRWST, including as installed inspections, testing, and maintenance requirements, as described in the UFSAR are not changed. The

proposed changes comply with the requirements of 10 CFR 50 Appendix A, General Design Criteria (GDC) 2, 4, 35, 36, and 37 as stated in the UFSAR.

The proposed changes do not require a change to procedures or method of control that adversely affects the performance of the PXS and IRWST safety-related or nonsafety-related design functions as described in the UFSAR. The physical design and operation of the IRWST, including as installed inspections, testing, and maintenance requirements, as described in the UFSAR are not changed, and thus there are no changes to procedures or method of control required to address the proposed changes to the licensing basis. The proposed changes maintain the design functions of the IRWST injection and recirculation functions (or the supported PRHR or ADS functions) to be available to mitigate the required transient and accident conditions.

An impact review determined these proposed changes do not affect or require any change to the AP1000 PRA, including the Fire PRA, presented in UFSAR Chapter 19 results and insights (e.g., core damage frequency and large release frequency). The physical design and operation of the IRWST, including as installed inspections, testing, and maintenance requirements, as described in the UFSAR are not changed, and thus there are no changes to the AP1000 PRA required to address the proposed changes to the licensing basis. There are no new postulated failures of the IRWST required in the PRA model. Therefore, there are no changes required to initiating event frequencies and system logic models of the PRA, including the Seismic Margins Analysis. The existing PRA risk significance investment protection determination for the IRWST is not affected.

There are no radiation zone changes or radiological access control changes required because of these proposed changes. The physical design and operation of the IRWST, including as installed inspections, testing, and maintenance requirements, as described in the UFSAR are not changed, and thus there are no changes required to the radiation protection design features described in UFSAR Section 12.3.

There are no fire area changes required because of these proposed changes. The physical design and operation of the IRWST, including as installed inspections, testing, and maintenance requirements, as described in the UFSAR are not changed, and thus there are no changes required to the fire protection analysis described in UFSAR Appendix 9A.

There is no change to the risk significant designation of SSCs within the Design Reliability Assurance Program as described in UFSAR Table17.4 1, as the physical design and operation of the IRWST, including as installed inspections, testing, and maintenance requirements, as described in the UFSAR are not changed.

The proposed changes do not affect the containment, control, channeling, monitoring, processing or releasing of radioactive and non-radioactive materials. No effluent release path is affected. The types and quantities of expected effluents are not changed. Therefore, radioactive or non-radioactive material effluents are not affected.

The proposed changes do not affect plant radiation zones, controls under 10 CFR 20, and expected amounts and types of radioactive materials, as the physical design and operation of the IRWST, including as installed inspections, testing, and maintenance requirements, as described in the UFSAR are not changed. Therefore, individual and cumulative radiation exposures do not change.

The proposed changes do not affect the results of the aircraft impact assessment described in UFSAR Subsection 19F.4.

Summary

The proposed changes affect the COL concerning the ITAAC for the IRWST. The proposed changes revise COL Appendix C ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi), with corresponding changes to the associated plant-specific DCD Tier 1 information, for inspections of the as-built IRWST to determine the calculated volume of the IRWST between the tank outlet connection and the tank overflow. The proposed changes clarify the necessary information to verify that the IRWST is constructed in accordance with the design certification as verified by COL Appendix C and plant-specific DCD Tier 1 ITAAC.

The proposed changes maintain the design functions of the IRWST injection and recirculation functions (or the supported PRHR or ADS functions) to be available to mitigate the required transient and accident conditions. Therefore, the previously evaluated and approved PXS safety-related and nonsafety-related design functions described in the UFSAR, and the results and consequences of the small-break LOCA transient analyses, large-break LOCA analyses, non-LOCA transient and event analyses, and containment analyses described in the UFSAR, are not adversely affected by these proposed changes to COL Appendix C (and plant-specific DCD Tier 1) Subsection 2.2.3.

Although there are COL Appendix C (and plant-specific DCD Tier 1) changes, the resulting reduction in standardization caused by these changes does not cause a decrease in safety.

The proposed changes do not adversely affect any safety-related equipment or function, design function, radioactive material barrier, or safety analysis.

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 Combined License (COL). These activities involve a change to COL Appendix C Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) information, with corresponding changes to the associated plant specific Design Control Document (DCD) Tier 1 information. Therefore, NRC approval is required prior to making the plant specific proposed 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 changes for the in-containment refueling water storage tank (IRWST) include changes to Updated Final Safety Analysis Report (UFSAR) Table 14.3-2, COL Appendix A Technical Specifications (TS) 3.5.6, 3.5.7, and 3.5.8, COL Appendix C ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi), and corresponding changes to the associated plant specific DCD Tier 1 information. Therefore, NRC approval is required for the Tier 2 and involved Tier 1 departures.

10 CFR 52, Appendix D, VIII.C.6 states that after issuance of a license, “Changes to the plant specific TS (Technical Specifications) will be treated as license amendments under 10 CFR 50.90.” 10 CFR 50.90 addresses the applications for amendments of licenses, construction permits and early site permits. As discussed above, changes to Technical

Specifications are requested, and thus a license amendment request (LAR) (as supplied herein) is required.

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 2 requires that structures, systems and components important to safety be designed to withstand the effects of natural phenomena, such as earthquakes. The proposed changes for the IRWST, which include changes to UFSAR Table 14.3-2, COL Appendix A TS 3.5.6, 3.5.7, and 3.5.8, COL Appendix C ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi), and corresponding changes to the associated plant specific DCD Tier 1 information, do not change the physical design and the existing seismic Category I design requirements for the IRWST. The proposed changes do not involve physical modifications or addition of systems, structures, and components, and do not affect the existing seismic design requirements. Therefore, the proposed changes comply with the requirements of GDC 2.

10 CFR Part 50, Appendix A, GDC 4 requires that systems, structures, and components can withstand the dynamic effects associated with missiles, pipe whipping, and discharging fluids, excluding dynamic effects associated with pipe ruptures, the probability of which is extremely low under conditions consistent with the design basis for the piping. The proposed changes for the IRWST, which include changes to UFSAR Table 14.3-2, COL Appendix A TS 3.5.6, 3.5.7, and 3.5.8, COL Appendix C ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi), and corresponding changes to the associated plant specific DCD Tier 1 information, maintain the physical design capability of the IRWST to withstand dynamic effects associated with missiles, pipe whipping, and discharging fluids as required by this criterion. The proposed changes do not change the requirements for anchoring safety-related components and supports to seismic Category I structures. Therefore, the proposed changes comply with the requirements of GDC 4.

10 CFR Part 50, Appendix A, GDC 35 requires that a system to provide abundant emergency core cooling be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal water reaction is limited to negligible amounts. The proposed changes for the IRWST, which include changes to UFSAR Table 14.3-2, COL Appendix A TS 3.5.6, 3.5.7, and 3.5.8, COL Appendix C ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi), and corresponding changes to the associated plant specific DCD Tier 1 information, maintain the physical design capability of the IRWST to perform the safety-related design functions of the PXS. Use of a required IRWST minimum water volume of 73,100 ft^3 is shown to provide the necessary water volume required for IRWST injection and recirculation functions following a design basis accident. Therefore, the proposed changes comply with the requirements of GDC 35.

10 CFR Part 50, Appendix A, GDC 36 requires that the emergency core cooling system be designed to permit appropriate periodic inspection of important components, such as spray rings in the reactor pressure vessel, water injection nozzles, and piping, to assure the integrity and capability of the system. The proposed changes for the IRWST, which include changes to UFSAR Table 14.3-2, COL Appendix A TS 3.5.6, 3.5.7, and 3.5.8, COL Appendix C ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi), and corresponding changes to the associated plant specific DCD Tier 1 information, maintain the capability

to inspect the IRWST in compliance with regulatory requirements. Therefore, the proposed changes comply with the requirements of GDC 36.

10 CFR Part 50, Appendix A, GDC 37 requires that the emergency core cooling system be designed to permit appropriate periodic pressure and functional testing to assure (1) the structural and leaktight integrity of its components, (2) the operability and performance of the active components of the system, and (3) the operability of the system as a whole and, under conditions as close to design as practical, the performance of the full operational sequence that brings the system into operation, including operation of applicable portions of the protection system, the transfer between normal and emergency power sources, and the operation of the associated cooling water system. The proposed changes for the IRWST, which include changes to UFSAR Table 14.3-2, COL Appendix A TS 3.5.6, 3.5.7, and 3.5.8, COL Appendix C ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi), and corresponding changes to the associated plant specific DCD Tier 1 information, maintain the capability to test the IRWST in compliance with regulatory requirements. Therefore, the proposed changes comply with the requirements of GDC 37.

4.2 Precedent

No precedent is identified.

4.3 Significant Hazards Consideration Determination

South Carolina Electric & Gas Company (SCE&G), acting on behalf of itself and South Carolina Public Service Authority (Santee Cooper) (the licensees) are requesting an amendment to Combined License (COL) Nos. NPF-93 and NPF-94 for Virgil C. Summer Nuclear Station Units 2 and 3, respectively. The proposed changes affect the COL concerning the Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) for the in-containment refueling water storage tank (IRWST).

The requested amendment requires changes to Updated Final Safety Analysis Report (UFSAR) Tier 2 Table 14.3-2, COL Appendix A Technical Specifications 3.5.6, 3.5.7, and 3.5.8, COL Appendix C ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi), and corresponding changes to the associated plant-specific Design Control Document (DCD) Tier 1 information, for inspections of the as-built IRWST to determine the calculated volume of the IRWST between the tank outlet connection and the tank overflow.

The proposed changes for the IRWST are consistent with the required IRWST minimum water volume provided in references elsewhere in the UFSAR, and maintain the physical design capability of the IRWST to perform the safety-related design functions of the passive core cooling system (PXS). A required IRWST minimum water volume of 73,100 ft^3 provides the necessary water volume required for IRWST injection and recirculation functions following a design basis accident.

An evaluation to determine whether a significant hazards consideration is involved with the requested 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 do not affect the operation of any systems or equipment that initiate an analyzed accident or alter any structure, system, or component (SSC) accident initiator or initiating sequence of events. The proposed changes do not affect the physical design and operation of the IRWST, including as-installed inspections, testing, and maintenance requirements, as described in the UFSAR. Therefore, the operation of the IRWST is not affected. There are no inadvertent operations or failures of the IRWST considered as accident initiators or part of an initiating sequence of events for an accident previously evaluated. Therefore, the probabilities of the accidents previously evaluated in the UFSAR are not affected.

The proposed changes do not adversely affect the ability of the IRWST to perform its design functions. The design of the IRWST continues to meet the same regulatory acceptance criteria, codes, and standards as required by the UFSAR. In addition, the proposed changes maintain the capabilities of the IRWST to mitigate the consequences of an accident and to meet the applicable regulatory acceptance criteria. The proposed changes do not affect the prevention and mitigation of other abnormal events, e.g., anticipated operational occurrences, earthquakes, floods and turbine missiles, or their safety or design analyses. Therefore, the consequences of the accidents evaluated in the UFSAR are not affected.

Therefore, the requested 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 do not affect the operation of any systems or equipment that may initiate a new or different kind of accident, or alter any SSC such that a new accident initiator or initiating sequence of events is created. The proposed changes do not affect the physical design and operation of the IRWST, including as-installed inspections, testing, and maintenance requirements, as described in the UFSAR. Therefore, the operation of the IRWST is not affected. These proposed changes do not adversely affect any other SSC design functions or methods of operation in a manner that results in a new failure mode, malfunction, or sequence of events that affect safety-related or nonsafety-related equipment. Therefore, this activity does 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 results in significant fuel cladding failures.

Therefore, the requested 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 maintain existing safety margins. The proposed changes maintain the capabilities of the IRWST to perform its design functions. The proposed changes maintain existing safety margin through continued application of the existing requirements of the UFSAR, while updating the acceptance criteria for verifying the design features necessary to ensure the IRWST performs the design functions required to meet the existing safety margins in the safety analyses. Therefore, the proposed changes satisfy the same design functions in accordance with the same codes and standards as stated in the UFSAR. These changes do not adversely affect any 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 proposed changes, and no margin of safety is reduced. Therefore, the requested 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. Therefore, it is concluded that the requested 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 CONSIDERATION

The proposed changes affect the Combined License (COL) concerning the Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) for the in-containment refueling water storage tank (IRWST).

The requested amendment requires changes to Updated Final Safety Analysis Report (UFSAR) Tier 2 Table 14.3-2, COL Appendix A Technical Specifications 3.5.6, 3.5.7, and 3.5.8, COL Appendix C ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi), and corresponding changes to the associated plant-specific Design Control Document (DCD) Tier 1 information, for inspections of the as-built IRWST to determine the calculated volume of the IRWST between the tank outlet connection and the tank overflow. The proposed changes for the IRWST are consistent with the required IRWST minimum water volume provided elsewhere in the UFSAR, and maintain the physical design capability of the IRWST to perform the safety-related design functions of the passive core cooling system (PXS), including IRWST injection and recirculation functions following a design basis accident.

A review has determined that the requested 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 Part 20, or would change an inspection or surveillance requirement. However, facility construction and operation following implementation of the requested amendment 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. Accordingly, the requested 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, 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 requested amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated; (2) the requested amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated; and (3) the requested amendment does not involve a significant reduction in a margin of safety. Therefore, it is concluded that the requested 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 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 affect any plant radiological or non-radiological effluent release quantities. Furthermore, the proposed changes do not affect any effluent release path or diminish the design functions or operational features credited with controlling the release of effluents during plant operation. Therefore, the requested 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 changes do not adversely affect walls, floors, or other structures that provide shielding. Plant radiation zones are not affected, and there are no changes to the controls required by 10 CFR Part 20 that preclude a significant increase in occupational radiation exposure. Therefore, the requested amendment does not involve a significant increase in individual or cumulative occupational radiation exposure.

Based on the above review of the requested amendment, it has been determined that anticipated construction and operational impacts of the requested 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 requested 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), no environmental impact statement or environmental assessment need be prepared in connection with the requested amendment and proposed exemption.

6. REFERENCES

None

South Carolina Electric & Gas Company

Virgil C. Summer Nuclear Station Units 2 and 3

NND-16-0512

Enclosure 2

Request for Exemption, IRWST Volume Changes (LAR 16-20)

(This enclosure contains 7 pages including this cover page)

1.0 Purpose

South Carolina Electric & Gas Company (SCE&G), acting on behalf of itself and South Carolina Public Service Authority (Santee Cooper) (the Licensees) request 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 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 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 tables that are referenced in each individual ITAAC. The Tier 1 information for which a plant-specific departure and exemption is being requested includes system based design ITAAC information, including changes to the in-containment refueling water storage tank (IRWST) minimum volume.

This request for exemption will apply the requirements of 10 CFR 52, Appendix D, Section VIII.A.4 to allow changes to Tier 1 information due to the following proposed changes to the passive core cooling system (PXS) based design ITAAC table:

- Tier 1 Table 2.2.3-4 revise the IRWST volume information as follows:

  Revise ITAAC Design Commitment 8.c), Acceptance Criteria vi), to reduce the acceptance criteria for the calculated volume of the IRWST between the tank outlet connection and the tank overflow from ≥ 73,900 ft^3 to ≥ 73,100 ft^3.

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

The Licensees are the holders of Combined Licenses (COLs) 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. The proposed changes would revise the COLs to align the Tier 1 IRWST volume with other Updated Final Safety Analysis Report (UFSAR) information.

Currently, the ITAAC Acceptance Criteria in Tier 1 Table 2.2.3-4 specifies that the calculated volume of the IRWST is ≥ 73,900 ft^3 between the tank outlet connection and the tank overflow. Reducing the acceptance criteria for the calculated volume of the IRWST between the tank outlet connection and the tank overflow from ≥ 73,900 ft^3 to ≥ 73,100 ft^3 provides consistency with the required IRWST minimum water volume stipulated elsewhere in the UFSAR. To remain consistent with the ITAAC purpose, this proposed change will update the ITAAC accordingly while still maintaining the physical design capability of the IRWST to perform the safety-related design functions of the PXS, including IRWST injection and recirculation functions following a design basis accident.

An exemption from elements of the AP1000 certified (Tier 1) design information is requested to allow plant-specific departures to be taken from the PXS based design description in ITAAC Table 2.2.3-4.

3.0 Technical Justification of Acceptability

An exemption is requested to depart from AP1000 generic Design Control Document (DCD) Tier 1 material by departing from the description of the IRWST volume in Tier 1 Table 2.2.3-4.

The proposed changes revise COL Appendix C ITAAC Table 2.2.3-4 Acceptance Criteria 8.c)vi), with corresponding changes to the associated plant-specific DCD Tier 1 information, for inspections of the as-built IRWST to determine ≥ 73,100 ft^3 (versus ≥ 73,900 ft^3) as the calculated volume of the IRWST between the tank outlet connection and the tank overflow. The proposed changes clarify the necessary information to verify that the IRWST is constructed in accordance with the design certification as verified by COL Appendix C and plant-specific DCD Tier 1 ITAAC.

The proposed changes maintain the design functions of the IRWST injection and recirculation functions (or the supported passive residual heat removal (PRHR) or automatic depressurization system (ADS) functions) to be available to mitigate the required transient and accident conditions. Therefore, the previously evaluated and approved PXS safety-related and nonsafety-related design functions described in the UFSAR, and the results and consequences of the small-break LOCA transient analyses, large-break LOCA analyses, non-LOCA transient and event analyses, and containment analyses described in the UFSAR, are not adversely affected by these proposed changes to COL Appendix C (and plant-specific DCD Tier 1) Subsection 2.2.3.

The proposed changes do not adversely impact the design functions of the IRWST, as a component part of the PXS, to provide a quench volume for the ADS Stage 1, 2, and 3 discharges; provide a heat sink for the PRHR heat exchanger (HX) for decay heat removal during design basis events; collect condensation from the containment interior for passive core cooling; and provide a source of cold, borated water for injection into the reactor coolant system (RCS). Therefore, the IRWST will continue to meet its required functionality following implementation of the proposed changes.

Detailed technical justification supporting this request for exemption is provided in Sections 2 and 3 of the associated License Amendment Request in Enclosure 1 of this letter.

4.0 Justification of 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. Because the Licensees have identified changes to the Tier 1 information related to the IRWST volume as a result of further design finalization 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.4].

The requested exemption to change the IRWST volume 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 changes to elements of the plant-specific DCD Tier 1 information to depart from the AP1000 certified design information. The plant-specific DCD Tier 1 information will continue to reflect the approved licensing basis for VCSNS Units 2 and 3, and will maintain a consistent level of detail with that which is currently provided elsewhere in Tier 1 of the DCD. Therefore, the affected plant-specific DCD Tier 1 ITAAC will continue to serve its required purpose.

The changes to the PXS do not represent any adverse impact to design functions or the systems, structures and components therein and will continue to protect the health and safety of the public in the same manner. The IRWST volume changes do not introduce any new industrial, chemical, or radiological hazards that would represent a public health or safety risk, nor does it modify or remove any design or operational controls or safeguards intended to mitigate any existing on-site hazards. Furthermore, the proposed changes would not allow for a new fission product release path, result in a new fission product barrier failure mode, or create a new sequence of events that would result in fuel cladding failures. Accordingly, these changes do not present an undue risk from any existing or proposed 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 a change to elements of the PXS as presented in the system based design ITAAC table in the plant-specific DCD Tier 1, thereby departing from the AP1000 certified (Tier 1) 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, tables, and figures that are referenced in the ITAAC. The exemption does not

adversely impact the design, function, or operation of any plant structure, system, or component (SSC) associated with the facility's physical or cyber security, and therefore does not adversely affect any plant equipment that is necessary to maintain a safe and secure plant status. The proposed exemption has no adverse 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 "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 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 exemption would allow changes to the IRWST volume, aligning the ITAAC for the minimum IRWST volume with other UFSAR descriptions and analyses, and enhancing the accuracy of details presented in a Tier 1 ITAAC table.

The proposed changes maintain the design function of the PXS. The changes do not impact the ability of any SSCs to perform their functions or negatively impact safety. Accordingly, these changes to the certified information will enable the licensees to safely construct, maintain, and operate the AP1000 facility consistent with the design certified by the NRC in 10 CFR Part 52, Appendix D.

Therefore, special circumstances are present, because application of the current generic certified design information in Tier 1 as required by 10 CFR Part 52, Appendix D, Section III.B, in the particular circumstances discussed in this request 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

This exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would change elements of the plant-specific DCD Tier 1 by departing from standard AP1000 certified (Tier 1) design information. This exemption would allow changes to the system based ITAAC tables. Based on the nature of the proposed changes to the generic Tier 1 information and the understanding that these changes support the actual system functions, it is expected that this exemption will be requested by other AP1000 licensees

and applicants. However, even if other AP1000 licensees and applicants do not request this same departure, the special circumstances will continue to outweigh any decrease in safety from the reduction in standardization because the key design functions of the PXS associated with this request will continue to be maintained. Furthermore, the justification provided in the license amendment request and this exemption request 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 minimum IRWST volume as presented in a Tier 1 ITAAC table. The proposed changes do not affect the ability of the PXS to perform its design functions including

The proposed changes do not adversely impact the design functions of the IRWST, as a component part of the PXS, to provide a quench volume for the automatic depressurization system (ADS) Stage 1, 2, and 3 discharges; provide a heat sink for the PRHR heat exchanger (HX) for decay heat removal during design basis events; collect condensation from the containment interior for passive core cooling; and provide a source of cold, borated water for injection into the RCS.

As a result of the limited-scope and nature of the proposed changes associated with this exemption request, no systems or equipment will be adversely impacted such that there are new failure modes introduced by these changes and the level of safety provided by the current PXS and equipment contained therein will be maintained.

Because the proposed changes to the IRWST volume will not adversely affect the ability of the PXS to perform its design functions, and the level of safety provided by the current PXS and equipment contained therein is unchanged, it is concluded that the design 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 not determined to be applicable to address the acceptability of this proposal.

6.0 Precedent Exemptions

None

7.0 Environmental Consideration

The Licensees request a departure from elements of the certified information in Tier 1 of the generic AP1000 DCD. The Licensees have determined that the proposed departure would require a permanent exemption from the requirements of 10 CFR 52, Appendix D, Section III.B, “Design Certification Rule for the AP1000 Design, Scope and Contents” with respect to installation or use of facility components located within the restricted area, as defined in 10 CFR Part 20, or which changes an inspection or a surveillance requirement; however, the Licensee evaluation of the proposed exemption has

determined that the proposed exemption meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9).

Based on the above review of the proposed exemption, the Licensees have determined that the proposed activity 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 exemption meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental impact statement or environmental assessment of the proposed exemption is not required.

Specific details of the environmental considerations supporting this request for exemption are provided in Section 5 of the associated License Amendment Request provided in Enclosure 1 of this letter.

8.0 Conclusion

The Licensees request a permanent exemption for elements of AP1000 design certification information reflected in Tier 1. The proposed changes to Tier 1 are necessary to revise a table in the plant-specific DCD Tier 1 to reflect proposed plant-specific design. The proposed exemption would allow departure from AP1000 generic Tier 1 DCD information by altering the minimum IRWST volume, aligning the ITAAC for the IRWST with other UFSAR descriptions and analyses, and enhancing the accuracy of details presented in a Tier 1 ITAAC table.

The 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,” 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, satisfies the underlying purpose of the AP1000 Design Certification Rule, and does not present a significant decrease in safety as a result of a reduction in standardization.

9.0 References

None

South Carolina Electric & Gas Company

Virgil C. Summer Nuclear Station Units 2 and 3

NND-16-0512

Enclosure 3

Proposed Changes to the Licensing Basis Documents

(LAR 16-20)

(This enclosure contains 8 pages including this cover page)

UFSAR Table 14.3-2 (Sheet 7 of 17), Design Basis Accident Analysis

Revise Tier 2 information by changing the IRWST volume as shown below:

Table 14.3-2 (Sheet 7 of 17)
Design Basis Accident Analysis

Reference		Design Feature	Value
Section	6.3.6.1.3	The bottom of the in-containment refueling water storage tank is located above the direct vessel injection nozzle centerline (ft).	≥ 3.4
Section	6.3.6.1.3	The pH baskets are located below plant elevation 107′ 2″.	
Figure	6.3-1	The passive core cooling system has two direct vessel injection lines.	
Table	6.3-2	The passive core cooling system has two core makeup tanks, each with a minimum required volume (ft^3).	2500
Table	6.3-2	The passive core cooling system has two accumulators, each with a minimum required volume (ft^3)	2,000
Table	6.3-2	The passive core cooling system has an in-containment refueling water storage tank with a minimum required water volume (ft^3)	~~73,900~~73,100
Section	6.3.2.2.3	The containment floodup volume for a LOCA in PXS room B has a maximum volume (ft^3) (excluding the IRWST) below a containment elevation of 108 feet.	73,500
Table	6.3-2	Each sparger has a minimum discharge flow area (in^2).	≥ 274
Table	6.3-2	The passive core cooling system has four pH adjustment baskets with a total minimum required volume (ft^3).	560
Section	14.2.9.1.3f	The passive residual heat removal heat exchanger minimum natural circulation heat transfer rate (Btu/hr) – With 520°F hot leg and 80°F IRWST – With 420°F hot leg and 80°F IRWST	 ≥ 1.78 E+08 ≥ 1.11 E+08
Section	6.3.6.1.3	The centerline of the HX's upper channel head is located above the HL centerline (ft).	≥ 26.3
Section	6.3.7.4.1	The CMT level sensors (PXS-11A/B/C/D, -12A/B/C/D, -13A/B/C/D, and -14A/B/C/D) upper level tap line has a downward slope of ≥ 2.4 degrees from the centerline of the connection to the CMT to the centerline of the connection to the standpipe.	≥ 2.4 degrees
Figure	6.3-1	The CMT inlet lines (cold leg to high point) have no downward sloping sections.	
Figure	6.3-1	The maximum elevation of the CMT injection lines between the connection to the CMT and the reactor vessel is the connection to the CMTs.	
Figure	6.3-2	The PRHR inlet line (hot leg to high point) has no downward sloping sections.	

Technical Specifications 3.5.6 In-containment Refueling Water Storage Tank (IRWST) - Operating

Revise VCSNS Unit 2 COL, Appendix A, page 3.5.6-2 and VCSNS Unit 3 COL, Appendix A, page 3.5.6-2 information by changing the IRWST volume as shown below:

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. IRWST boron concentration not within limits. OR IRWST borated water temperature not within limits. OR IRWST borated water volume ~~≤~~ < 73,100 cu. ft and ~~>~~ ≥ 70,907 cu. ft.	D.1 Restore IRWST to OPERABLE status.	8 hours
E. One motor operated IRWST isolation valve not fully open. OR Power is not removed from one or more motor operated IRWST isolation valves.	E.1 Restore motor operated IRWST isolation valve to fully open condition with power removed from both valves.	1 hour
F. Required Action and associated Completion Time of Condition A, B, C, D, or E not met. OR LCO not met for reasons other than Condition A, B, C, D, or E.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours

Technical Specifications 3.5.6 In-containment Refueling Water Storage Tank (IRWST) - Operating

Revise VCSNS Unit 2 COL, Appendix A, page 3.5.6-3 and VCSNS Unit 3 COL, Appendix A, page 3.5.6-3 information by changing the IRWST volume as shown below:

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.6.1	Verify the IRWST water temperature is < 120°F.	24 hours
SR 3.5.6.2	Verify the IRWST borated water volume is ~~>~~ ≥ 73,100 cu. ft.	24 hours
SR 3.5.6.3	Verify the volume of noncondensible gases in each of the four IRWST injection squib valve outlet line pipe stubs has not caused the high-point water level to drop below the sensor.	24 hours
SR 3.5.6.4	Verify the IRWST boron concentration is ≥ 2600 ppm and ≤ 2900 ppm.	31 days AND Once within 6 hours after each solution volume increase of ≥ 15,000 gal
SR 3.5.6.5	Verify each motor operated IRWST isolation valve is fully open.	12 hours
SR 3.5.6.6	Verify power is removed from each motor operated IRWST isolation valve.	31 days
SR 3.5.6.7	Verify each motor operated containment recirculation isolation valve is fully open.	31 days
SR 3.5.6.8	Verify each IRWST injection and containment recirculation squib valve is OPERABLE in accordance with the Inservice Testing Program.	In accordance with the Inservice Testing Program
SR 3.5.6.9	---------- - NOTE - Squib actuation may be excluded. ---------- Verify continuity of the circuit from the Protection Logic Cabinets to each IRWST injection and containment recirculation squib valve on an actual or simulated actuation signal.	24 months

Technical Specifications 3.5.7 In-containment Refueling Water Storage Tank (IRWST) – Shutdown, MODE 5

Revise VCSNS Unit 2 COL, Appendix A, page 3.5.7-2 and VCSNS Unit 3 COL, Appendix A, page 3.5.7-2 information by changing the IRWST volume as shown below:

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. IRWST boron concentration not within limits. OR IRWST borated water temperature not within limits. OR IRWST borated water volume ~~≤~~ < 73,100 cu. ft. and ~~>~~ ≥ 70,907 cu. ft.	D.1	Restore IRWST to OPERABLE status.	8 hours
E. Required motor operated IRWST isolation valve not fully open. OR Power is not removed from required motor operated IRWST isolation valve.	E.1	Restore required motor operated IRWST isolation valve to fully open condition with power removed.	1 hour
F. Required Action and associated Completion Time of Condition A, B, C, D, or E not met. OR LCO not met for reasons other than Condition A, B, C, D, or E.	F.1 AND F.2	Initiate action to establish 20% pressurizer level with the Reactor Coolant System (RCS) pressure boundary intact. Suspend positive reactivity additions.	Immediately Immediately

Technical Specifications 3.5.8 In-containment Refueling Water Storage Tank (IRWST) – Shutdown, MODE 6

Revise VCSNS Unit 2 COL, Appendix A, page 3.5.8-1 and VCSNS Unit 3 COL, Appendix A, page 3.5.8-1 information by changing the IRWST volume as shown below:

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required motor operated containment recirculation isolation valve not fully open.	A.1 Open required motor operated containment recirculation isolation valve.	72 hours
B. Required IRWST injection flow path with noncondensible gas volume in one squib valve outlet line pipe stub not within limit.	B.1 Restore noncondensible gas volume in squib valve outlet line pipe stub to within limit.	72 hours
C. Required IRWST injection flow path with noncondensible gas volume in both squib valve outlet line pipe stubs not within limit.	C.1 Restore noncondensible gas volume in one squib valve outlet line pipe stub to within limit.	8 hours
D. IRWST and refueling cavity boron concentration not within limits. OR IRWST and refueling cavity borated water temperature not within limits. OR IRWST and refueling cavity borated water volume ~~≤~~ < 73,100 cu. ft. and ~~>~~ ≥ 70,907 cu. ft.	D.1 Restore IRWST to OPERABLE status.	8 hours

Technical Specifications 3.5.8 In-containment Refueling Water Storage Tank (IRWST) – Shutdown, MODE 6

Revise VCSNS Unit 2 COL, Appendix A, page 3.5.8-2 and VCSNS Unit 3 COL, Appendix A, page 3.5.8-2 information by changing the IRWST volume as shown below:

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required motor operated IRWST isolation valve not fully open. OR Power is not removed from required motor operated IRWST isolation valve.	E.1 Restore required motor operated IRWST isolation valve to fully open condition with power removed.	1 hour
F. Required Action and associated Completion Time of Condition A, B, C, D, or E not met. OR LCO not met for reasons other than Condition A, B, C, D, or E.	F.1 Initiate action to establish water level ≥ 23 feet above the top of the reactor vessel flange. AND F.2 Suspend positive reactivity additions.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.8.1	Verify the IRWST and refueling cavity water temperature is < 120°F.	24 hours
SR 3.5.8.2	Verify the IRWST and refueling cavity water total borated water volume is ~~>~~ ≥ 73,100 cu. ft.	24 hours

Tier 1 (and COL Appendix C) Table 2.2.3-4

Revise VCSNS Tier 1, page 2.2.3-21; VCSNS Unit 2 COL, Appendix C, page C-134; and VCSNS Unit 3 COL, Appendix C, page C-134 information by changing the IRWST volume as shown below:

Table 2.2.3-4 (cont.)
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
	iv) Inspections of the elevation of the following pipe lines will be conducted: – IRWST injection lines; IRWST connection to DVI nozzles – Containment recirculation lines; containment to IRWST lines – CMT discharge lines to DVI connection – PRHR HX outlet line to SG connection	iv) The maximum elevation of the top inside surface of these lines is less than the elevation of: – IRWST bottom inside surface – IRWST bottom inside surface – CMT bottom inside surface – PRHR HX lower channel head top inside surface
	v) Inspections of the elevation of the following tanks will be conducted: – CMTs – IRWST	v) The elevation of the bottom inside tank surface is higher than the direct vessel injection nozzle centerline by the following: – CMTs $\geq$ 7.5 ft – IRWST $\geq$ 3.4 ft
	vi) Inspections of each of the following tanks will be conducted: – CMTs – Accumulators – IRWST	vi) The calculated volume of each of the following tanks is as follows: – CMTs $\geq$ 2487 ft^3 – Accumulators $\geq$ 2000 ft^3 – IRWST $\geq$ 73,**100**~~**900**~~ ft^3 between the tank outlet connection and the tank overflow
	vii) Inspection of the as-built components will be conducted for plates located above the containment recirculation screens.	vii) Plates located above each containment recirculation screen are no more than 1 ft above the top of the screen and extend out at least 10 ft perpendicular to and at least 7 ft to the side of the screen surface.