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August 12, 2016
NND-16-0308
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 and 3
Combined License Nos. NPF-93 and NPF-94
Docket Nos. 52-027 & 52-028

Subject: VCSNS Units 2 & 3 LAR 14-11: Request for License Amendment and Exemption: Debris Screen Related Dimensions

Reference: 1. ND-16-1171, Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, Request for License Amendment and Exemption (LAR-16-013): Debris Screen Related Dimensions, dated August 11, 2016

In accordance with the provisions of 10 CFR 50.90, South Carolina Electric & Gas Company (SCE&G) , acting on behalf of itself and the South Carolina Public Service Authority (Santee Cooper), requests an amendment to the Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 combined license (COL) numbers NPF-93 and NPF-94, respectively. The requested amendment proposes to depart from Tier 2 information in the Updated Final Safety Analysis Report (UFSAR) (which includes the plant-specific DCD Tier 2 information) and involves changes to COL Appendix C information and to the corresponding plant-specific Tier 1 information. 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 plant-specific Tier 1 material departures.

The proposed changes are to information identifying the frontal face area and screen surface area for the In-Containment Refueling Water Storage Tank (IRWST) screens, the location and dimensions of the protective plate located above the containment recirculation (CR) screens, and increasing the maximum Normal Residual Heat Removal System (RNS) flowrate through the screens. This License Amendment Request (LAR) is identical in content to Reference 1.

A Pre-Submittal Meeting was held with the NRC Staff on June 23, 2016 to discuss the draft license amendment and exemption request provided by Southern Nuclear Operating Company (SNC). This submittal addresses comments that were received during that meeting.

The description, technical evaluation, regulatory evaluation (including the significant hazards consideration determination), and environmental considerations for the proposed changes in the License Amendment Request (LAR) are contained in Enclosure 1 to this letter. Enclosure 2 includes an exemption request to support the proposed departures from Tier 1 material, which includes the background and supporting basis for this requested exemption. Enclosure 3 provides markups depicting the requested changes to the plant-specific licensing basis documents.

In order to support the VCSNS Unit 2 construction schedule, SCE&G requests NRC staff review and approval of the license amendment and exemption no later than May 9, 2017. Approval by this date will allow sufficient time to implement licensing basis changes prior to affected construction and associated ITAAC activities. SCE&G expects to implement the proposed amendment within thirty days of approval. SNC has stated in Reference 1 that the current requested approval date for Vogtle Electric Generating Plant (VEGP) Unit 3 is December 1, 2016.

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 publicly-available enclosures to the designated State Official.

Should you have any questions, please contact Mr. Nick R. Kellenberger by telephone at (803) 941-9834, or by email at nicholas.r.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 12th day of August, 2016.

Sincerely,

April R. Rice
Manager
New Nuclear Licensing

MHK/ARR/mhk

Enclosure 1: Request for License Amendment: Debris Screen Related Dimensions (LAR 14-11)

Enclosure 2: Exemption Request: Debris Screen Related Dimensions (LAR 14-11)

Enclosure 3: Proposed Changes to Licensing Basis Documents (LAR 14-11)

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South Carolina Electric and Gas Company

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

NND-16-0308

Enclosure 1

Request for License Amendment:
Debris Screen Related Dimensions
(LAR 14-11)

(This Enclosure consists of 18 pages, including this cover page.)

Table of Contents

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

1. SUMMARY DESCRIPTION

The proposed changes would depart from the licensing basis documents to (1) increase the credited frontal face area and screen surface area for the In-Containment Refueling Water Storage Tank (IRWST) screens, (2) modify the required elevation and front extension of the protective plate located above the containment recirculation (CR) screens to increase the maximum spacing above the CR screens and to decrease the minimum length that the protective plate must extend to the front of the CR screens, and (3) increase the maximum Normal Residual Heat Removal System (RNS) flowrate through the IRWST and CR screens.

The requested amendment proposes changes to plant-specific design control document (PS-DCD) Tier 2 information as incorporated into the Updated Final Safety Analysis Report (UFSAR), and involves changes to COL Appendix C and the corresponding plant-specific Tier 1 information. This enclosure requests approval of the license amendment necessary to implement the proposed changes. Enclosure 2 provides the Exemption request that seeks approval for the departure from plant-specific Tier 1 material.

2. DETAILED DESCRIPTION AND TECHNICAL EVALUTATION

As discussed in UFSAR Section 6.3, the primary function of the AP1000 Passive Core Cooling System (PXS) is to provide emergency core cooling following postulated design basis events. To accomplish this function, the PXS is designed to perform the following functions:

- Emergency core decay heat removal
- Reactor coolant system emergency makeup and boration
- Safety Injection
- Containment pH control

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, and requires an alignment of valves upon actuation of the specific components.

The PXS, as described in UFSAR subsection 6.3.2.2.7, contains two different sets of screens used following a Loss of Coolant Accident (LOCA): IRWST screens (PXS-MY-Y01A/B/C) and CR screens (PXS-MY-Y02A/B). These screens are provided to prevent debris from entering the reactor and impeding core cooling passages during a LOCA. The screens, as identified in UFSAR Table 3.2-3, are AP1000 Equipment Class C. The structural frames, attachment to the building structure, and attachment of the screen modules use the criteria of the ASME Code, Section III Subsection NF. The screen modules are fabricated of sheet metal and are designed and fabricated to a manufacturer's standard.

The RNS does not perform an active safety-related function and is not required to mitigate a design basis accident. However, it provides safety-related design functions of (1) preserving containment integrity by isolation of the RNS lines penetrating containment, (2) providing a flow

path for long-term, post-accident RCS makeup, and (3) preserving the reactor coolant pressure boundary. Additionally, as described in UFSAR subsection 5.4.7.1.2, the RNS also provides shutdown heat removal, shutdown purification, IRWST cooling, low pressure RCS makeup and cooling, low temperature overpressure protection, and spent fuel pool cooling. Minimum IRWST frontal face and screen surface areas are a function of the maximum RNS flowrate during post-LOC RNS operation when RNS takes suction through the IRWST screens.

A significant consideration in the design and location of the screens is the potential effect of debris accumulation. Suction from the RNS while aligned with the IRWST or CR screens influences the amount of debris transported. If excessive debris collects at the screen, flow could be impeded, potentially impacting the PXS emergency core cooling function.

2.1 IRWST Screens Size and RNS Flow Increase

Detailed Description

Three IRWST screens are located at the bottom of the IRWST. As discussed in UFSAR subsection 6.3.2.2.7.2, two screens are located at either end of the tank (Screens A and B) and one is located in the center (Screen C). A cross-connect pipe connects the three IRWST screens to distribute flow. The IRWST is closed off from the containment; its vents and overflows are normally closed by louvers. Because of this, the potential for introducing debris into the IRWST is limited. Additionally, as identified in UFSAR subsection 6.3.8.1, a containment cleanliness program is required to prevent significant debris accumulation, and the inspection required by the plant-specific Technical Specifications (TS) Surveillance Requirement (SR) 3.5.6.10 periodically confirms the IRWST screens are not restricted by debris.

Plant-specific Tier 1 Table 2.2.3-4 Item 8.c.viii, along with the supporting UFSAR information, identifies that IRWST Screens A and B are required to have a frontal face area of ≥20 ft^2 with a screen surface area of ≥500 ft^2, and IRWST Screen C is required to have a frontal face area of ≥40 ft^2 with a screen surface area of ≥1000 ft^2, for a total minimum IRWST frontal face area of ≥80 ft^2, and a screen surface area of ≥2000 ft^2. The minimum IRWST frontal face and screen surface areas are a function of the maximum RNS flowrate during post-LOCA RNS operation when RNS takes suction through the IRWST screens.

As identified in UFSAR subsection 6.3.2.2.7.1 prior to the design change described below, the RNS maximum flowrate during post-LOCA injection and recirculation was limited to 2320 gpm. The maximum RNS flowrate range defines the post-accident flow limit imposed on the IRWST and containment recirculation screens. The minimum RNS flowrate, which was not identified in the UFSAR, is 2162 gpm. The minimum flowrate is defined by the required flow needed to create sufficient backpressure on the Core Makeup Tank (CMT) injection lines to maintain the CMT water level above the Automatic Depressurization System (ADS) Stage 4 actuation setpoint during RNS operation.

With a maximum RNS flowrate of 2320 gpm and a minimum flowrate of 2162 gpm, the flow control range of 158 gpm is not large enough to fully account for flow instrument uncertainty and control valve response variations. The flowrate uncertainty when using both RNS trains is ±127.3 gpm, which would require a flow range of 254.6 gpm in order to appropriately control the flow between the maximum and minimum allowed flowrates. In addition to instrument uncertainty, the flow range must also be large enough to accommodate the flow changes resulting from control valve modulation to maintain the

required flowrate. The RNS flowrate continually varies because it is dependent on RCS pressure which decreases during an accident. Therefore, the flow range must be larger than 254.6 gpm.

Thus, to accommodate the increased flow range, a design change increased the maximum RNS flowrate to 2600 gpm, which was subsequently incorporated into the UFSAR via a non-LAR departure. The increased maximum flowrate provides a flow range of 438 gpm (2162 gpm to 2600 gpm), which is large enough to account for RNS flow instrument uncertainty and support control valve response to variations in flow. The minimum RNS flowrate was not changed, so the RNS flow function to maintain the CMT level above the setpoint that would actuate ADS Stage 4 is not impacted. During subsequent review of the incorporation of the RNS flow increase into design documents, it was determined that the increase to the maximum RNS flowrate requires a corresponding change to the minimum required IRWST screen frontal face and surface areas specified in COL Appendix C (and plant-specific Tier 1) and Tier 2 information. The missed impact to the IRWST screen area ITAAC was identified in the vendor's corrective action program, and is included within the scope of this LAR.

The increase in the RNS maximum flowrate requires a corresponding increase in the IRWST minimum screen areas required to be credited to maintain the design basis for the IRWST screens consistent with the results of the screen head loss testing that demonstrates acceptability of the screens.

Accordingly, this amendment request proposes revising the required IRWST minimum screen areas to accommodate the increase in RNS maximum flow as identified in Table 1 below. The necessary licensing basis document changes are described in Table 2 below.

Table 1
Proposed Changes to IRWST Minimum Required Screen Areas

IRWST Screen	Current Minimum Required Areas		Proposed Minimum Required Areas	
	Frontal Face Area (ft^2)	**Screen Surface Area** (ft^2)	**Frontal Face Area** (ft^2)	**Screen Surface Area** ft^2)
A	20	500	25	575
B	20	500	25	575
C	40	1000	50	1150
Total	80	2000	100	2300

The proposed minimum required IRWST screen areas remain below the actual IRWST screen areas provided in the design; thus no physical changes are required to be made to the IRWST screens to support the proposed changes. These proposed changes do result in a reduction in the margin between the screen areas credited in the IRWST screen analysis, and the screen areas provided in the design; however, as discussed in further detail below in the Technical Evaluation, substantial margin remains in the design.

Licensing Basis Change Descriptions

Table 2	
Plant-Specific Changes	**Description of the proposed change**
Plant-specific Tier 1 and COL Appendix C Table 2.2.3-4 Item 8.c.viii (ITAAC no. 193)	1) Increase each minimum IRWST Screens A and B frontal face area from 20 ft^2 to 25 ft^2 and minimum total screen surface area from 500 ft^2 to 575 ft^2 and 2) Increase the minimum IRWST Screen C frontal face area from 40 ft^2 to 50 ft^2 and minimum total screen surface area from 1000 ft^2 to 1150 ft^2.
UFSAR subsection 6.3.2.2.7.1	Item 12 is revised to increase the maximum RNS flowrate during post-LOCA injection and recirculation, and thus the maximum flowrate for the IRWST and CR screens, to 2600 gpm. (Note that this change is not reflected in the Proposed Changes to the Licensing Basis Documents in Enclosure 3, since this change has already been incorporated into the UFSAR.)
UFSAR Table 6.3-2	Increase IRWST Screens A and B minimum total screen surface area from 500 ft^2 to 575 ft^2 and IRWST Screen C minimum total screen surface area from 1000 ft^2 to 1150 ft^2; remove the unit "ft^2" from the IRWST Screen C surface area for consistency with the table format.

Technical Evaluation

As discussed above, the RNS maximum flowrate range defines the post-accident flow limit imposed on the IRWST and CR screens. By specifying minimum total screen areas that are consistent with the screen head loss testing data and the increased flow, the screen head loss performance remains consistent with the screen testing results. This proposed activity makes no changes to RNS functions, equipment, or to the associated codes and standards involved. As discussed further below, revision of the debris settling analysis confirmed that the protective plate above the containment recirculation screens continues to fulfill its design function of preventing coating debris from reaching the CR screens at the increased RNS flowrate.

As discussed in UFSAR subsection 6.3.2.2.7.1, "General Screen Design Criteria," operation within the RNS maximum flow limit provides for operation of the plant consistent with screen head loss testing. Acceptability of the IRWST screen design and required minimum screen areas is supported by debris testing performed on a model representative of the screen design, scaled to demonstrate acceptability of the IRWST and CR screen design and sizes. The IRWST and CR screen design consists of arrays of "pockets," described in detail in the information transmitted to the NRC in Reference 1. The design allows the front of the screens to act as trash racks, while use of the pockets result in a much greater screen total surface area than just the area of the screen face. Accordingly, the ITAAC associated with the IRWST and CR screens contain requirements on the frontal face area of the screens, as well as the surface area (total filter surface area) of the screens.

Acceptability of the IRWST and CR screen sizing is based on the results of screen head loss testing performed on a representative model of the IRWST and CR screen design scaled to the maximum design flows expected during post-accident operation, based on the screen frontal face areas, which are proportionate to the screen total surface areas. The applicability and scaling of the debris loading test results to the IRWST and CR screen designs was reviewed and accepted by the NRC during the AP1000 design certification. The basis for NRC acceptance of the IRWST and CR screen designs is documented in NUREG-1793, Supplement 2, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Plant Design."

The IRWST screens had a minimum required combined total frontal face area of 80 ft^2. At the previous maximum RNS flowrate of 2320 gpm, the flowrate per IRWST screen total frontal face area was approximately 29 gpm/ft^2. At the increased RNS flowrate of 2600 gpm, and the proposed increase of the minimum IRWST screen total frontal face area to 100 ft^2, the flowrate per the minimum required IRWST screen total frontal face area is reduced to approximately 26 gpm/ft^2. Because the new IRWST minimum screen total frontal face area requirement results in a lower flowrate/ft^2 of screen frontal face area, the changes to the minimum required IRWST screen frontal face areas will result in a more conservative minimum requirement, providing margin within the screen flowrates, while still leaving substantial margin within the physical design, as discussed further below. The minimum required IRWST total screen surface area for the IRWST screens is proposed to be increased from 2000 ft^2 to 2300 ft^2. This is accomplished by increasing each IRWST Screens A and B required surface area from 500 ft^2 to 575 ft^2 and increasing the IRWST Screen C required surface area from 1000 ft^2 to 1150 ft^2. Since the design and size of the screens are not being changed by this activity, the relationship between IRWST screen frontal face area to IRWST screen surface area is not changed, and is thus consistent with the current design and licensing basis. The proposed change results in credit of 90% of the total IRWST screen frontal face area, versus the previous credit of 73% of the total IRWST screen frontal face area, and thus still provides 10% margin between the total IRWST screen frontal face area credited, and the total IRWST screen frontal face area provided in the physical screen design. Therefore, for the approximately 12% increase in RNS flowrate, the total IRWST screen frontal face area is being increased 25%, while the total IRWST screen surface area is being increased by 15%.

The CR screens, which use the same screen pocket design and dimensions as the IRWST screens, are subject to the same maximum RNS flow of 2600 gpm. However, the CR screens are much larger, with a current minimum required total frontal face area of 210 ft^2 (versus 100 ft^2 for the IRWST screens), and a minimum required total screen surface area of 5000 ft^2 (versus 2300 ft^2 for the IRWST screens). Accordingly, no changes to plant-specific Tier 1 and corresponding COL Appendix C Table 2.2.3-4 Item 8.c.viii (ITAAC no. 193) are required for the CR screens.

It should be noted that the debris testing performed on the IRWST and CR screen design demonstrated a measured head loss of 0.0 psi when subjected to the very conservative debris loading equivalent to 50% of the total fiber and debris assumed available inside containment. As discussed in UFSAR subsection 6.3.2.2.7.1, sensitivity studies determined that a head loss of 0.25 psi at the maximum screen flows was acceptable based on long-term core cooling sensitivity analyses. These conservatisms, in conjunction with the credit of less than the total screen area provided in the design (90%), result in substantial margin remaining in the IRWST screen design.

The proposed increase to the minimum size of the IRWST screens is based upon the same design and analysis methods used in the original design; thus, there is no change to the method in which the IRWST screen size was determined. As the proposed ITAAC minimum screen areas are less than the screen areas provided in the design, sufficient margin remains in the design of the screen.

No change is made to the standards to which the screens are designed or built as identified in UFSAR Table 3.2-3. There is also no change to the design of debris mitigation features described in UFSAR subsection 6.3.2.2.7.2 such as the screen orientation or the inspection requirements. Accordingly, the increased IRWST screen size does not increase the risk of debris clogging the screen.

The proposed changes do not affect the radiological source terms (i.e., amounts and types of radioactive materials released, their release rates and release durations) used in the accident analyses. No system or design function or equipment qualification is adversely affected by the proposed changes. The changes do not result in a new failure mode, malfunction or sequence of events that could adversely affect a radioactive material barrier or safety-related equipment. The proposed changes do 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.

2.2 CR Screens Protective Plate Location and Dimensions

Detailed Description

UFSAR subsection 6.3.2.2.7.3 describes debris that may exist in containment following a Loss of Coolant Accident. Debris is limited following an accident due to the use of metal reflective insulation. Debris transport is limited by the use of high density coatings and the design requirement described in UFSAR subsection 6.3.2.2.7.1, criterion 11. The use of coatings is described in UFSAR subsection 6.1.2.1. A containment cleanliness program is required to control foreign debris and quantities of different materials inside containment. This program is discussed in UFSAR subsection 6.3.8.1.

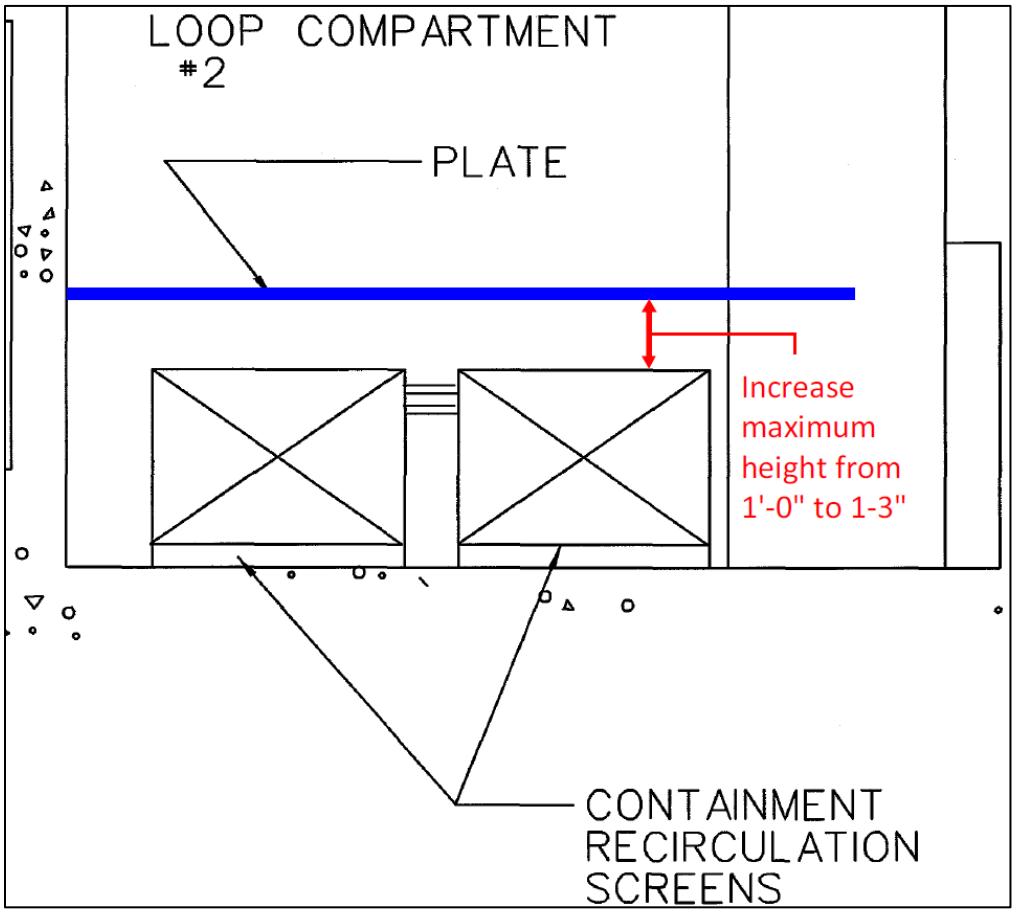
As discussed above, the AP1000 design includes two containment recirculation screens, whose function is described in UFSAR subsection 6.3.2.2.7.3. These screens are oriented vertically along walls above the loop compartment floor in Room 11202 (also identified in the UFSAR as SG Compartment 2), significantly above the lowest level in containment, the reactor vessel cavity. As the accumulators, core makeup tanks, and IRWST inject, the containment is flooded up to a level above the top of the screens sufficient to provide recirculation flow through the gravity injection lines back into the reactor coolant system. A protective plate is located directly above the screens, as shown in UFSAR Figures 6.3-8 and 6.3-9, to prevent debris from above from entering and becoming entrained in the coolant flowpath directly in front of the screens. In addition, a two-foot high curb is provided in front of the screens to prevent settled debris from reaching the screen. Without the protective plate, recirculation flow may cause debris falling into the flowpath directly in front of the screens to be swept to the screens before it settles to the floor. Coatings are not used in the area located under the plate in order to prevent paint debris from bypassing the plate entirely.

This proposed change alters the location and dimensions of this plate. Plant-specific Tier 1 Table 2.2.3-4, along with the supporting UFSAR information, identifies several

dimensional requirements for the protective plate to enable settlement of debris falling into the CR flow path to prevent it from reaching the screens. The associated plant-specific Tier 1 requirements include the requirements that the plate (1) be located no more than 1 ft above the top of the containment recirculation screens, (2) extend out at least 10 ft perpendicular to the screen surface, and (3) extend at least 7 ft to the side of the screen surface. During a review of the plant design, it was identified that the proposed construction alternatives for the plate did not meet Tier 1 ITAAC requirements (1) and (2) identified above.

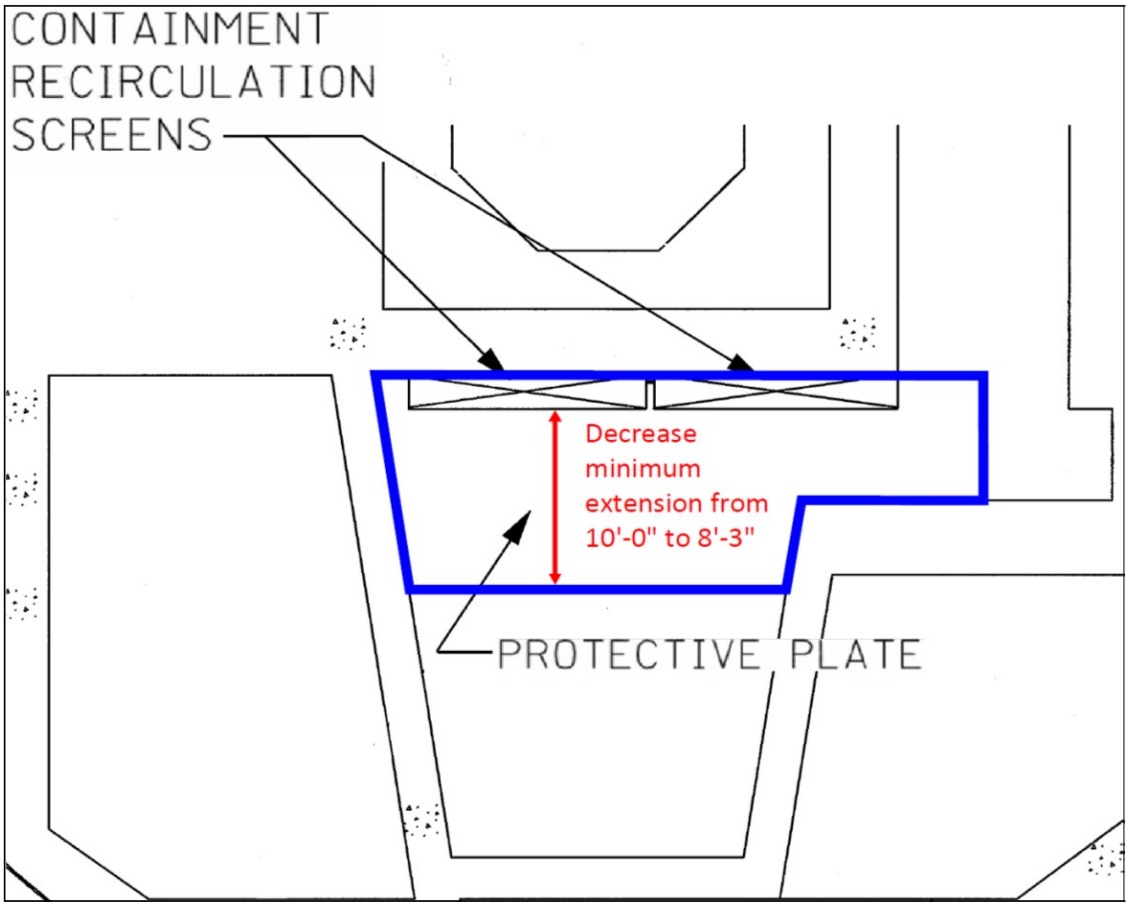
To address this inconsistency, it is proposed that the maximum distance of the plate above the top of the screen be increased to a height of 1 ft 3 in as shown in Figure 1 below. Note that this height requirement applies only at the required distances perpendicular to and to the side of the screens, as the corresponding debris transport evaluation, discussed further below, credits the height of the plate at these locations only. Changes are proposed to UFSAR subsection 6.3.2.2.7.1 to clarify this requirement. As discussed below in the technical evaluation that assesses the effect of this change on debris transport, this increased spacing does not adversely affect the design function of the protective plate, and thus continues to support acceptable screen performance.

Figure 1, Above Screen Location (Front View)



Additionally, it is proposed that the perpendicular extension of the plate beyond the recirculation screens be reduced from 10 feet to 8 feet, 3 inches as shown in Figure 2 below. This reduction increases clearance to support reactor coolant pump (RCP) removal and increases the accessibility for future maintenance. The proposed dimension changes affect COL Appendix C, plant-specific Tier 1, and the UFSAR identified minimum plate extension length from the front of the CR screens. The necessary licensing basis document changes are described in Table 3 below. As discussed below in the technical evaluation that assesses the effect of the change on debris transport, this reduction in plate length does not adversely affect the design function of the protective plate, and thus continues to support acceptable screen performance.

Figure 2, Plate Extension Length (Top View)



Finally, descriptions of the plate above the CR screens are revised to reflect a single plate.

Licensing Basis Change Description

Table 3	
Plant-Specific Changes	**Description of the proposed change**
Plant-specific Tier 1 and COL Appendix C Table 2.2.3-4 Item 8.c.vii (ITAAC no. 192)	1) Increase the maximum height of the CR screen protective plate above the screens from “1 ft” to “1 ft, 3 in”, 2) decrease the minimum protective plate extension perpendicular from the screens from “10 ft” to “8 ft, 3 in”, 3) revise to reflect that there is a single protective plate, and 4) clarify that the dimensions are measured from the face of the CR screens.
Plant-specific Tier 1 and COL Appendix C Table 2.2.3-4 Item 8.c.xiii (ITAAC no. 198)	1) Decrease the CR screen protective plate minimum extension perpendicular from the screens from “10 feet” to “8 ft, 3 in”, and clarify that this dimension applies perpendicular to the “front” of the screens, and 2) clarify that the required plate extensions to the front and the side are measured from the face of the CR screens.
UFSAR subsection 1.9.4.2.2, Task Action Plan Item A-43	Clarify in the AP1000 Response to Task Action Plan Item A-43 that a single horizontal plate is located above the CR screens.
UFSAR subsection 6.1.2.1.5	In the fourth and fifth paragraphs, clarify that there is a single protective plate located above the CR screens.
UFSAR subsection 6.3.2.2.7.1	1) Change measurements for the CR screen protective plate location and required extension to the front to “1 foot, 3 inches” and “8 feet, 3 inches,” respectively, 2) clarify that the CR protective plate extension to the front of the screen is perpendicular to the “front” of the face of the CR screens, 3) clarify that the dimensions are measured from the CR screen faces, 4) clarify that the required extension of the CR protective plate is “at least” 7 feet to the side of the screens, and 5) provide clarifying information concerning the required CR screen height dimension.

Table 3	
Plant-Specific Changes	**Description of the proposed change**
UFSAR subsection 6.3.2.2.7.3	1) Clarify that the protective plate prevents debris from falling into the water closer than 8 feet, 3 inches from the front of the CR screens and 7 feet from the side of the face of the CR screens, 2) identify that the north edge of the north CR screen face is located at least 3 feet, 6 inches from the north corner of the west wall of steam generator compartment 2 (Room 11202), to which the CR screens are attached, 3) identify that placement of the north CR screen prevents debris falling into the vertical access corridor (Room 11204) from entering the water closer than 3 feet 6 inches from the face of the north CR screen, 4) reduce the minimum CR screen protective plate length extension under which requires the use of stainless steel to “8 feet, 3 inches,” and 5) make minor clarifying changes.
UFSAR Table 14.3-2	In the first entry for subsection 6.3.2.2.7.1: 1) Change the location of the CR screens’ protective plate height to “1 foot, 3 inches” above the top of the face of the screens, 2) change the required extension of the CR screens’ protective plate to “8 feet, 3 inches” perpendicular to the front of the face of the screens, and 3) clarify that the required (7 feet) extension of the CR screens’ protective plate to the side is from the face of the screens. In the first entry for subsection 6.3.2.2.7.3: 1) Reduce the minimum CR protective plate extension to the front to “8 feet, 3 inches”, and 2) clarify that the extension is perpendicular to the face of the CR screens.
UFSAR Table 19.59-18, Item 72	Revise Item 72 to clarify that there is a single protective plate located above the CR screens.
UFSAR subsection 19E.2.3.2.7	1) Change the location of the CR screens’ protective plate height to “1 foot, 3 inches” above the top of the face of the screens, 2) change the required extension of the CR screens’ protective plate to “8 feet, 3 inches” perpendicular to the front of the face of the screens, and 3) clarify that the required (7 feet) extension of the CR screens’ protective plate to the side is from the face of the screens.

Technical Evaluation

As identified in UFSAR subsection 6.3.2.2.7.3, the CR protective plate is provided to prevent nonsafety-related (Service Level II) coating debris that could detach in the post-accident environment from falling into the CR coolant flow too close to the CR screens, where it could be transported to the screens. Accordingly, the coating debris settling and transport analysis performed to support the AP1000 certification was revised to demonstrate that the proposed revisions to the protective plate configuration would continue to prevent coating debris from reaching the screens, while considering the proposed higher RNS maximum design flowrate of 2600 gpm. The revised coating debris settling analysis, which is not affected by the changes to the IRWST screen area ITAAC changes, confirmed the acceptability of these changes.

Debris settling rates used for the analysis were developed by using the most conservative settling rate reported in NUREG/CR-6916, "Hydraulic Transport of Coating Debris," for coating materials representative of the AP1000 design, and applying an additional margin factor of 1.4 to the selected rate for additional conservatism. For example, if the settling rate from NUREG/CR-6916 found that debris settled 2 feet vertically for every 1 foot of horizontal movement, a margin factor of 1.4 would assume the debris would settle only approximately 1.4 feet vertically for every 1 foot of horizontal movement. Acceptability of the use of the settling rate data in NUREG/CR-6916 is documented in Supplement 2 of the AP1000 FSER (NUREG-1793, Vol. 2). Additionally, while the AP1000 conforms with the guidance provided in NRC Regulatory Guide 1.82, Revision 3, "Water Sources for Long-Term Recirculation Cooling Following a Loss-Of-Coolant Accident," as identified in UFSAR Appendix 1A, which preceded issuance of NUREG/CR-6916, NRC Regulatory Guide 1.82, Revision 4, identifies that licensees may use the debris settling results in NUREG/CR-6916 to the extent they apply to a licensee's plant-specific coating types.

The proposed changes do not adversely affect the structural qualification of the CR protective plate module; the structure remains qualified for its required load combinations. The proposed changes do not affect the radiological source terms (i.e., amounts and types of radioactive materials released, their release rates and release durations) used in the accident analyses. No system or design function or equipment qualification is adversely affected by the proposed changes. The changes do not result in a new failure mode, malfunction or sequence of events that could adversely affect a radioactive material barrier or safety-related equipment. The proposed changes do 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.

2.3 Environmental Review

The proposed changes associated with this license amendment request do not affect the containment, control, channeling, monitoring, processing or releasing of radioactive and non-radioactive materials. The types and quantities of expected effluents are not changed, and no effluent release path is adversely affected by the proposed changes. Therefore, radioactive or non-radioactive material effluents are not affected by the proposed changes.

Plant radiation zones (as described in UFSAR Section 12.3), controls under 10 CFR 20, and expected amounts and types of radioactive materials are not affected by the

proposed changes. Therefore, individual and cumulative radiation exposures are not increased by this activity.

2.4 Summary

The requested activity updates the location and dimensions of the protective plate above the containment recirculation screens and increases the minimum screen size for the IRWST screens. The proposed design changes do not significantly affect any safety-related equipment or function, a radioactive material barrier or a safety analysis. In addition, no nonsafety-related design function described in licensing basis would be adversely affected.

3. TECHNICAL EVALUATION (Contained within Section 2)

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 change to COL Appendix C and a corresponding departure from 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. This change involves a revision to COL Appendix C (and corresponding plant-specific Tier 1) information, and thus requires NRC approval for the Tier 1 and associated Tier 2 departures.

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 35, Emergency core cooling, requires that a system to provide abundant emergency core cooling shall be provided and that suitable redundancy in components and features be provided. The containment recirculation screens and the IRWST screens remain compliant with this GDC as the proposed change does not alter the overall function or redundancy of the equipment, and the impacts on the design do not prevent the functions from working as designed.

4.2 Precedent

No precedent is identified.

4.3 Significant Hazards Consideration Determination

The proposed changes would revise the Combined Licenses (COLs) in regard to the location and dimensions of the protective plate above the containment recirculation screens,

the minimum size of the In-Containment Refueling Water Storage Tank (IRWST) screens, and the RNS maximum flowrate.

The requested amendment proposes changes to Updated Final Safety Analysis Report (UFSAR) information, which involve changes to the COL Appendix C and corresponding plant-specific Tier 1 information.

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 change to the location and dimensions of the protective plate continues to provide sufficient space surrounding the containment recirculation screens for debris to settle before reaching the screens as confirmed by an evaluation demonstrating that the protective plate continues to fulfill its design function of preventing debris from reaching the screens. In addition, the increase to the minimum IRWST screen size reinforces the ability of the screens to perform their design function with the increased RNS maximum flowrate proposed. The proposed changes do not adversely affect any accident initiating component, and thus the probabilities of the accidents previously evaluated are not affected. The affected equipment does not adversely affect the ability of equipment to contain radioactive material. Because the proposed change does not affect a release path or increase the expected dose rates, the potential radiological releases in the UFSAR accident analyses are unaffected.

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 activity to change the location and dimensions of the protective plate above the containment recirculation screens, to change the minimum IRWST screen size, and to increase the maximum RNS flowrate through the IRWST and CR screens does not alter the method in which safety functions are accomplished. The analyses demonstrate that the screens are able to perform their functions in a similar manner and perform adequately in response to an accident, and no new failure modes are introduced by the proposed change.

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 change to the design does not change any of the codes or standards to which the IRWST screens, containment recirculation screens, and containment recirculation screen protective plate are designed as documented in the UFSAR. The containment recirculation screen protective plate continues to prevent debris from reaching the CR screens, and the IRWST and CR screens maintain their ability to block debris while at the proposed increase in RNS maximum flowrate.

No safety analysis or design basis acceptance limit/criterion is challenged or exceeded by the proposed changes.

Therefore, the proposed amendment does not involve a significant reduction in a margin of safety.

Based on the above, 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.

4.4 Conclusions

In conclusion, 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. Pursuant to 10 CFR 50.92, the requested change does not involve a Significant Hazards Consideration.

5. ENVIRONMENTAL CONSIDERATIONS

The proposed changes would revise the Combined Licenses (COLs) with regard to the location and dimensions of the protective plate above the containment recirculation screens, the size of the IRWST screens, and the maximum RNS flowrate through the IRWST and CR screens.

The proposed changes require changes to Updated Final Safety Analysis Report (UFSAR) information that involve changes to COL Appendix C and corresponding plant-specific Tier 1 information.

This review has determined the proposed change requires an amendment to the COL. However, a review of the anticipated construction and operational effects of the requested amendment has determined 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 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 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 in the requested amendment are to the protective plate above the recirculation screens, to the size of the IRWST screens, and to the maximum RNS flowrate through the IRWST and CR screens. 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 functionality of any design or operational features credited with controlling the release of effluents during plant operation. Therefore, it is concluded that 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 modify the location and dimensions of the containment recirculation screen protective plate, the size of the IRWST screens, and the maximum RNS flowrate through the IRWST and CR screens. Plant radiation zones (addressed in UFSAR Section 12.3) are not affected, and controls under 10 CFR 20 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 effects 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), an environmental impact statement or environmental assessment of the proposed exemption is not required.

6.0 REFERENCES

1. APP-GW-GLN-147, "AP1000 Containment Recirculation and IRWST Screen Design," Revision 3. Submitted via Westinghouse letter DCP_NRC_002700 dated 11/25/2009, ML093380096.

South Carolina Electric and Gas Company

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

NND-16-0308

Enclosure 2

Exemption Request:

Debris Screen Related Dimensions

(LAR 14-11)

(This Enclosure consists of 7 pages, including this cover page)

1.0 PURPOSE

South Carolina Electric and Gas Company (the Licensee) requests a permanent exemption from the provisions of 10 CFR 52, Appendix D, Section III.B, *Design Certification Rule for the AP1000 Design, Scope and Contents*, to allow a plant-specific departure from elements of the certification information in Tier 1 of the plant-specific AP1000 Design Control Document (DCD). The regulation, 10 CFR 52, Appendix D, Section III.B, requires an applicant or licensee referencing Appendix D to 10 CFR Part 52 to incorporate by reference and comply with the requirements of Appendix D, including certified information in DCD Tier 1. The Tier 1 information for which a plant-specific departure and exemption is being requested is related to the location of the protective plate above both containment recirculation (CR) screens and the length of the extension of the plate beyond the screen. Additionally, the plant-specific departure and exemption being requested is related to the size of the frontal face areas and total screen surface areas of the in-containment refueling water storage tank (IRWST) screens.

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:

- Plant-specific Tier 1 Table 2.2.3-4, item 8.c.vii
  - Increase the maximum height of the CR screen protective plate above the screens from “1 ft” to “1 ft, 3 in”.
  - Decrease the minimum protective plate extension perpendicular from the screens from “10 ft” to “8 ft, 3 in”.
  - Revise to reflect that there is a single protective plate.
  - Clarify that the dimensions are measured from the face of the CR screens.
- Plant-specific Tier 1 Table 2.2.3-4, item 8.c.viii
  - Increase each minimum IRWST Screens A and B frontal face area from 20 ft^2 to 25 ft^2 and minimum total screen surface area from 500 ft^2 to 575 ft^2.
  - Increase the minimum IRWST Screen C frontal face area from 40 ft^2 to 50 ft^2 and minimum total screen surface area from 1000 ft^2 to 1150 ft^2.
- Plant-specific Tier 1 Table 2.2.3-4, item 8.c.xiii
  - Decrease the minimum protective plate extension perpendicular from the screens from “10 ft” to “8 ft, 3 in”, and clarify that this dimension applies perpendicular to the “front” of the screens.
  - Clarify that the required plate extension to the front and the side are measured from the face of the CR screens.

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 Licensee 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 protective plate above the CR screens, it was determined that the location of the plate above the CR screens and the length of the extension of the plate beyond the screen impacted equipment accessibility for maintenance. Additionally, design finalization also determined that the minimum IRWST screen size needed to be increased to ensure the screens would meet their design requirements.

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 OF ACCEPTABILITY

An exemption is requested to depart from AP1000 plant-specific DCD Tier 1 material with regard to the location and dimensions of the protective plate above the containment recirculation screens and the surface area of the In-Containment Refueling Water Storage Tank (IRWST) screens.

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 plant-specific 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 design and programmatic information currently provided in Tier 2 of the plant-specific DCD related to maintenance and dose reduction.

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 as discussed in Enclosure 1 of the accompanying License Amendment Request, an exemption from 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)]; 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 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 changes to elements of the Tier 1 DCD to depart from the AP1000 certified (Tier 1) design information. The plant-specific Tier 1 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 Tier 1 ITAAC will continue to serve its required purpose.

The proposed change to the location and dimensions of the protective plate continues to provide sufficient space surrounding the containment recirculation screens for debris to settle before reaching the screens at the proposed increase in RNS maximum flowrate (as confirmed by an evaluation demonstrating that the protective plate continues to fulfill its design function of preventing debris from reaching the screens). In addition, the increase to the minimum IRWST screen size reinforces the ability of the screens to perform their design function at the proposed increase in RNS maximum flowrate.

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 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 revise location and dimensions of the protective plate above the containment recirculation screens and would increase the minimum size of the In-Containment Refueling Water Storage Tank (IRWST) screens, as presented in plant-specific Tier 1 information, 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 revised 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 “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 change to the location and dimensions of the protective plate continues to provide sufficient space surrounding the containment recirculation screens for debris to settle before reaching the screens (as confirmed by an evaluation demonstrating that the protective plate continues to fulfill its design function of preventing debris from reaching the screens). In addition, the increase to the minimum IRWST screen size reinforces the ability of the screens to perform their design function while providing the proposed maximum RNS flowrate through the IRWST screens.

The proposed change to Tier 1 information is to revise the location and dimensions of the protective plate above the containment recirculation screens and to increase the minimum IRWST screen size. 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 plant-specific 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 are necessary to 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 proposed change to revise the location and dimensions of the protective plate above the containment recirculation screens and to increase the minimum IRWST screen size for the proposed increase in RNS maximum flowrate, are departures from tables and text in the plant-specific AP1000 DCD. This exemption request and the associated marked-up table and text demonstrate that there is a minimal change from the plant-specific AP1000 DCD, minimizing the reduction in standardization and consequently the safety impact from the reduction.

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 revision of the location and dimensions of the protective plate above the containment recirculation screens and increase the minimum IRWST screen size for the proposed increase in RNS maximum flowrate, as described in the plant-specific Tier 1 information. The changes in location and dimensions of the plate and size of the screens will not impact the functional capabilities of these components.

The proposed change to the location and dimensions of the protective plate above the CR screens continues to provide sufficient space surrounding the containment recirculation screens for debris to settle before reaching the screens at the proposed increase in RNS maximum flowrate (as confirmed by an evaluation demonstrating that the protective plate continues to fulfill its design function of preventing debris from reaching the screens). In addition, the increase to the minimum IRWST screen size reinforces the ability of the screens to perform their design function at the proposed increase in RNS maximum flowrate.

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 DCD 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 and Gas Company

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

NND-16-0308

Enclosure 3

Proposed Changes to Licensing Basis Documents

(LAR 14-11)

Note: Added text is **Blue Underline**

Deleted text is ~~**Red Strikethrough**~~

(This Enclosure consists of 8 pages, including this cover page)

Tier 1 (and COL Appendix C) Subsection 2.2.3, Passive Core Cooling System

Table 2.2.3-4 items 8.c)vii) and 8.c)viii) - Revise the Acceptance Criteria column information in the locations shown below.

Table 2.2.3-4
Inspection, Tests, Analyses and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
8.c) The PXS provides RCS makeup, boration, and safety injection during design basis events.	i) ….	i) …
	vii) Inspection of the as-built components will be conducted for the plate~~s~~ located above the containment recirculation screens.	vii) The ~~P~~plate~~s~~ located above ~~each~~ the containment recirculation screens is ~~are~~ no more than 1 ft, 3 in above the top of the face of the screens and extends ~~out~~ at least ~~10~~ 8 ft, 3 in perpendicular to the front and at least 7 ft to the side of the face of the screens ~~screen surface~~.
	viii) Inspection of the IRWST and containment recirculation screens will be conducted. The inspections will include…	viii) The screens utilize pockets with a frontal face area of ≥ 6.2 in^2 and a screen surface area ≥ 140 in^2 per pocket. IRWST Screens A and B each have a sufficient number of pockets to provide a frontal face area ≥ ~~20~~ 25 ft^2, a screen surface area ≥ ~~500~~ 575 ft^2, and a screen mesh size of ≤ 0.0625 inch. IRWST Screen C has a sufficient number of pockets to provide a frontal face area ≥ ~~40~~ 50 ft^2, a screen surface area ≥ ~~1000~~ 1150 ft^2, and a screen mesh size ≤ 0.0625 inch. Each containment recirculation screen has a sufficient number of pockets to provide a frontal face area ≥ 105 ft^2, a screen surface area ≥ 2500 ft^2, and a screen mesh size ≤ 0.0625 inch. A debris curb exists in front of the containment recirculation screens which is > 2 ft above the loop compartment floor. The bottoms of the IRWST screens are located ≥ 6 in above the bottom of the IRWST.
	ix) …	ix) …

Table 2.2.3-4 item 8.c)xiii) - Revise the Inspections, Tests, Analyses column information in the locations shown below.

Table 2.2.3-4 Inspection, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
8.c) The PXS provides RCS makeup, boration, and safety injection during design basis events.	i) ….	i) …
	xiii) Inspections will be conducted of the surfaces in the vicinity of the containment recirculation screens. The surfaces in the vicinity of the containment recirculation screens are the surfaces located above the bottom of the recirculation screens up to and including the bottom surface of the plate discussed in Table 2.2.3-4, item 8.c.vii, out at least ~~10 feet~~ 8 ft, 3 in perpendicular to the front and at least 7 feet ~~perpendicular~~ to the side of the face of the screens ~~screen face~~.	xiii) These surfaces are stainless steel.
	xiv) …	xiv) …

Updated Final Safety Analysis Report

UFSAR subsection 1.9.4.2.2, Task Action Plan Item A-43, AP1000 Response – Revise first paragraph as shown below.

Air ingestion, vortexing, and debris blockage are not significant concerns for the AP1000. Containment recirculation includes sump screens that conform to the criteria specified in Regulatory Guide 1.82. The recirculation screens have a large cross-sectional area to reduce the fluid flow velocity through the screen and to provide a large screening area to accommodate accumulated debris. A ~~H~~horizontal plate~~s~~ located above the recirculation screens precludes debris being deposited in the water directly adjacent to the screens. Pipe subject of loss of coolant pipe breaks and in the vicinity of these breaks use reflective metallic insulation to preclude the generation of fibrous insulation debris. See Subsection 6.3.2.2.7 for additional information on the design of the screens and limits on use of fibrous insulation.

UFSAR subsection 6.1.2.1.5, Safety Evaluation – Revise fourth and fifth paragraphs as shown below.

The AP1000 has a number of design features that facilitate the use of Service Level II coatings inside containment. These features include a passive safety injection system that provides a long delay time between a LOCA and the time recirculation starts. This time delay provides time for settling of debris. These passive systems also flood the containment to a high level which allows the use of containment recirculation screens that are located well above the floor and are relatively tall. Significant volume is provided for the accumulation of coating debris without affecting screen plugging. These screens are protected by a plate~~s~~ located above the screens that extends out in front and to the side of the screens. Coatings are not used under th~~ese~~is plate~~s~~ in the vicinity of the screens. The protective plate~~s~~, together with low recirculation flow, approach velocity and the screen size preclude postulated coating debris above the plate~~s~~ from reaching the screens. Refer to Subsection 6.3.2.2.7.3 for additional discussion of these screens, the~~ir~~ protective plate~~s~~ and the areas where coatings are prohibited from being used.

The recirculation inlets are screened enclosures located near the northwest and southwest corners of the east steam generator compartment (refer to the figures in Subsection 6.3.2.2.7.3). The enclosure bottoms are located above the surrounding floor, which prevent ingress of heavy debris (density ≥100 lbm/ft^3). Additionally, the screens are oriented vertically and are protected by a large plate~~s~~ located above the screens, further enhancing the capability of the screens to function with debris in the water. The screen mesh size and the surface area of the containment recirculation screens in the AP1000, in conjunction with the large floor area for debris to settle on, can accommodate failure of coatings inside containment during a design basis accident even though the residue of such a failure is unlikely to be transported to the vicinity of the enclosures.

UFSAR subsection 6.3.2.2.7.1, General Screen Design Criteria - Revise first paragraph, item 1, eighth bullet, in the locations shown below.

- Screens have solid top cover. Containment recirculation screens have a protective plate~~s~~ that is ~~are~~ located no more than 1 foot, 3 inches above the top of the face of the screens, which ~~and~~ extends at least ~~10~~ 8 feet, 3 inches perpendicular to the ~~in~~ front and at least 7 feet to the side of the face of the screens. The plate dimensions are relative to the portion of the screens where water flow enters the screen openings. The protective plate maximum height dimension is the distance between the top of the screens and the underside of the protective plate module top plate at the exposed edges of the protective plate, which extend into the containment recirculation water flow (east toward steam generator 2, and north toward the corridor). Coating debris, from coatings located outside of the ZOI, is not transported to the containment recirculation screens, to the IRWST screens, or into a direct vessel injection or a cold leg LOCA break that becomes submerged during recirculation considering the use of high density coatings discussed in Subsection 6.1.2.1.5.

UFSAR subsection 6.3.2.2.7.3, Containment Recirculation Screens - Revise fourth and sixth paragraphs in the locations shown below.

The amount of debris that may exist following an accident is limited. Reflective insulation is used to preclude fibrous debris that can be generated by a loss of coolant accident and be postulated to reach the screens during recirculation. The nonsafety-related coatings used in the containment are designed to withstand the post accident environment. The containment recirculation screens are protected by a plate~~s~~ located above them. The~~se~~ protective plate~~s~~ prevents debris from the failure of nonsafety-related coatings from getting into the water close to the screens ~~such that~~ (closer than 8 feet, 3 inches from the front of the face of the screens and 7 feet from the side of the face of the screens) where the recirculation flow ~~can~~ could cause the debris to be swept to the screens before it settles to the floor. The north edge of the north containment recirculation screen face is located at least 3 feet, 6 inches from the north corner of the west wall of steam generator compartment 2 (Room 11202), to which the containment recirculation screens are attached. Placement of the north containment recirculation screen prevents debris falling into the vertical access corridor (Room 11204) from entering the water closer than 3 feet, 6 inches from the face of the north containment recirculation screen. Stainless steel is used on the underside of the~~se~~ plate~~s~~ and on surfaces located below the plate~~s~~, above the bottom of the screen~~s~~ face, ~~10~~ extending at least 8 feet, 3 inches perpendicular to the~~in~~ front and at least 7 feet to the side of the face of the screens to prevent coating debris from reaching the screens.

…

The design of the containment recirculation screens reduces the chance of debris reaching the screens. The screens are orientated vertically such that debris settling out of the water will not fall on the screens. The protective plate~~s~~ described above provide~~s~~ additional protection to the screens from debris. A 2-foot-high debris curb is provided to prevent high density debris from being swept along the floor by water flow to the containment recirculation screens. The screen design provides the trash rack function. This is accomplished by the screens having a large surface area to prevent a single object from blocking a large portion of the screen and by the screens having a robust design to preclude an object from damaging the screen and causing bypass. The screen prevents debris larger than 0.0625 inch from being injected into the reactor coolant system and blocking fuel cooling passages. The screen is a type that has more surface area to accommodate debris that could be trapped on the screen. The design of the containment recirculation screens is further described in APP-GW-GLN-147 (Reference 4).

UFSAR Table 6.3-2, Component Data – Passive Core Cooling System - Revise the screens information in the locations shown below.

Screens	IRWST	Containment Recirculation
Number	3	2
Surface area, screen (square feet)	IRWST Screens A and B: ≥ ~~500~~ 575 per screen IRWST Screen C: ≥ ~~1000~~ 1150 ~~ft~~ ^{2}	≥ 2,500 per screen
Material	Stainless steel	Stainless steel
AP1000 equipment class	C	C

UFSAR Table 14.3-2 (Sheets 5 and 6 of 17), Design Basis Accident Analysis - Revise the plate information in the locations shown below.

Section 6.3.2.2.7.1	The containment recirculation screens have a protective plate~~s~~ that is ~~are~~ located no more than 1 foot, 3 inches above the top of the face of the screens, which ~~and~~ extends ~~out~~ at least ~~10~~ 8 feet, 3 inches perpendicular to the ~~in~~ front and at least 7 feet to the side of the face of the screens, to prevent coating debris from reaching the screens.	

And

Section 6.3.2.2.7.3	The surface materials used in the vicinity of the containment recirculation screens are stainless steel. In the vicinity of the containment recirculation screens includes surfaces located above the bottom of the recirculation screens up to and including the bottom surface of the plate discussed in subsection 6.3.2.2.7.1, and the surfaces ~~10~~ extending at least 8 feet, 3 inches perpendicular to the ~~in~~ front and at least 7 feet to the side~~s~~ of the face of the screens ~~face~~.	

UFSAR Table 19.59-18, AP1000 PRA-Based Insights – Revise Item 72, fourth bullet as shown below.

- Screens have a protective plate~~s~~ that is~~are~~ located close to the top of the screens and extends out in front and to the side of the screens

UFSAR subsection 19E.2.3.2.7, Containment Recirculation Screens - Revise the bullet in the first paragraph in the locations shown below.

- Screens have a protective plate~~s~~ located no more than 1 foot, 3 inches above the top of the face of the screens, which ~~and~~ extends at least ~~10~~ 8 feet, 3 inches perpendicular to the ~~in~~ front and at least 7 feet to the side of the face of the screens.