



May 25, 2017  
NND-17-0319  
10 CFR 50.90

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

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

Subject: LAR 16-20S1: Voluntary Supplement to VCSNS Units 2&3 Request for License Amendment and Exemption: IRWST Volume Changes

References: 1. NND-16-0512, LAR 16-20: VCSNS Units 2&3 Request for License Amendment and Exemption: IRWST Volume Changes, Dated December 6, 2016 [ADAMS Accession Number ML16342B712]

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, requested an amendment to Combined License (COL) Numbers NPF-93 and NPF-94, for VCSNS Units 2 and 3, respectively, in Reference 1. This license amendment request (LAR), LAR 16-20, proposed changes to Updated Final Safety Analysis Report (UFSAR) Tier 2, COL Appendix A, and COL Appendix C (and associated Tier 1) information to address in-containment refueling water storage tank (IRWST) minimum volume changes. 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 was also requested for the involved Tier 1 information.

Subsequent to the submittal of Reference 1, questions were asked of SCE&G by the NRC regarding statements addressing the required IRWST minimum water volume of 73,100 ft<sup>3</sup> that appeared in LAR 16-20. As a result, SCE&G is submitting this voluntary supplement to the LAR to provide additional information. Enclosure 4 of this supplement provides responses to NRC clarifying questions on Reference 1.

The supplemental information provided in this LAR supplement does not impact the scope or conclusions of the Technical Evaluation, Regulatory Evaluation (including the Significant Hazards Consideration Determination), or Environmental Considerations of the original LAR 16-20 provided in Reference 1. However, SCE&G is proposing a

change in the requested NRC approval date as presented in LAR 16-20 from June 12, 2017 to June 30, 2017.

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

This letter contains no regulatory commitments. This letter has been reviewed and confirmed to not contain security-related information.

Should you have any questions, please contact Mr. Nick Kellenberger by telephone at (803) 941-9834 or by email at [nicholas.kellenberger@scana.com](mailto:nicholas.kellenberger@scana.com).

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

Executed on this 25<sup>th</sup> day of May, 2017.

Sincerely,



April R. Rice  
Manager, Nuclear Licensing  
New Nuclear Deployment

ARR/gt

Enclosures 1 - 3: (previously submitted with the original LAR, Reference 1)

Enclosure 4: Virgil C. Summer Nuclear Station (VCSNS) Units 2&3 – Changes to LAR 16-20 Regarding IRWST Minimum Water Volume (LAR 16-20S1)

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**South Carolina Electric & Gas Company**

**NND-17-0319**

**Enclosure 4**

**Virgil C. Summer Nuclear Station Units 2&3**

**Changes to LAR 16-20 Regarding IRWST Minimum Water Volume**

**(LAR 16-20S1)**

**(Enclosure 4 consists of four pages, including this cover page.)**

NND-17-0319

Enclosure 4

Changes to LAR 16-20 Regarding IRWST Minimum Water Volume (LAR 16-20S1)

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, requested an amendment to Combined License (COL) Numbers NPF-93 and NPF-94, for VCSNS Units 2 and 3, respectively, by SCE&G letter NND-16-0512, dated December 6, 2016 [ADAMS Accession Number ML16342B712]. This license amendment request (LAR), LAR 16-20, proposed changes to Updated Final Safety Analysis Report (UFSAR) Tier 2, COL Appendix A, and COL Appendix C (and associated Tier 1) information to address in-containment refueling water storage tank (IRWST) minimum volume changes. 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 was also requested for the involved Tier 1 information.

Subsequent to the submittal of LAR 16-20, questions were asked of SCE&G by the NRC regarding statements addressing the required IRWST minimum water volume of 73,100 ft<sup>3</sup> that appeared in LAR 16-20. As a result, SCE&G is submitting this voluntary supplement to the LAR to provide additional information. The NRC questions and SCE&G's responses are provided below:

**NRC Question 1.**

In reading Summer Units 2 and 3 UFSAR Rev 4, Section 15.6.5.4B.1 on page 15.6-26 contains the following sentence:

The IRWST at a minimum provides an additional 73,900 ft<sup>3</sup> of water for long-term core cooling.

However, Summer LAR 16-20 states in Enclosure 1 on pages 3 and 7 of 16 the following:

The results of the UFSAR Chapter 15 accident analyses are acceptable assuming a required IRWST minimum water volume of 73,100 ft<sup>3</sup>.

Enclosure 3 of the LAR does not contain a proposed markup where this value of 73,900 ft<sup>3</sup> is being changed to 73,100 ft<sup>3</sup> in Section 15.6.5.4B.1. Please justify why there is no change proposed for UFSAR Section 15.6.5.4B.1.

**SCE&G Response to NRC Question 1.**

The first sentence of the fifth paragraph of UFSAR Subsection 15.6.5.4B.1 states: "The IRWST at a minimum provides an additional 73,900 ft<sup>3</sup> of water for long-term core cooling." However, as a result of NRC issuance of VCSNS License Amendment 52 [Package No. ML16144A591], this sentence in UFSAR Subsection 15.6.5.4B.1 is being changed to state: "The IRWST nominally provides an additional source of water for long-term cooling." This change has been implemented in the VCSNS UFSAR via the revision notice process and will appear in the next 10 CFR 50.71(e) UFSAR submittal (Rev 5). Therefore, no additional change to this sentence is necessary to be included in LAR 16-20.

**NRC Question 2.**

In LAR 16-20 in Enclosure 1 on pages 7-8 bullets numbers 1-5, there is reference of calculations. Is this information coming from the FSAR and have the chapters been updated?

Also, can the calculation models be placed in the electronic reading room?

**SCE&G Response to NRC Question 2.**

The analyses described in bullets numbers 1 through 5 on pages 7-8 of Enclosure 1 to LAR 16-20 have been made available in the Westinghouse reading room for NRC review.\*\* These documents and the conclusions provided in LAR 16-20 concerning the various analyses are consistent with the current licensing basis in the VCSNS UFSAR that existed when LAR 16-20 was submitted to the NRC. There are no licensing basis changes approved and implemented since the LAR submittal that require additional changes to the UFSAR with respect to the analyses that have IRWST volume as an input parameter. As described in the above SCE&G Response to NRC Question 1, UFSAR Subsection 15.6.5.4B.1, Description of Small-break LOCA Transient, has been revised to delete the reference to IRWST water volume of 73,900 ft<sup>3</sup>. However, the IRWST water volume in the underlying analysis was not revised and is still consistent with the description in bullet 1 on page 7 of Enclosure 1 to LAR 16-20.

**\*\* Bullet 1 from page 7 of Enclosure 1 to LAR 16-20**

“Small-break LOCA analyses, using the NOTRUMP AP1000 model, are conservative in relation to a required IRWST minimum water volume of 73,100 ft<sup>3</sup>. 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<sup>3</sup> (~73,077 ft<sup>3</sup>).”

The following document supports the conclusions that the results of the accident analyses are acceptable assuming a required IRWST minimum water volume of 73,100 ft<sup>3</sup>:

- APP-SSAR-GSC-130, Rev. 2, AP1000 Plant Small-Break LOCA Steady State Model

The following document supports the conclusions that a required IRWST minimum water volume of 73,100 ft<sup>3</sup> is acceptable for the small break LOCA analyses. (NOTRUMP uses the nominal full-power operation level of 28.8 feet. Therefore, the minimum head for IRWST injection is assumed.)

- APP-GW-GLR-153, Rev. 1, AP1000 Core Reference Report Reference 7

**Bullet 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.”

The following document supports the conclusions that a required IRWST minimum water volume of 73,100 ft<sup>3</sup> is acceptable for the large break LOCA analyses. (ASTRUM does not model beyond start of ADS Stage 4 actuation and IRWST injection.)

- APP-GW-GLE-026, Rev. 1, Application of ASTRUM Methodology for Best-Estimate Large-Break Loss-of-Coolant Accident Analysis for AP1000

**Bullet 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<sup>3</sup>.”

The following document supports the conclusions that the results of the accident analyses are acceptable assuming a required IRWST minimum water volume of 73,100 ft<sup>3</sup>:

- APP-PXS-M3C-034, Rev. 4, Containment Flood-Up Level

Bullet 4

“Containment analyses, using the WGOTHIC AP1000 model, use an IRWST water volume of 73,100 ft<sup>3</sup>. Therefore, there is no impact on these analyses.”

The following document supports the conclusions that the results of the accident analyses are acceptable assuming a required IRWST minimum water volume of 73,100 ft<sup>3</sup>:

- APP-SSAR-GSC-768, Rev. 0, AP1000 WGOTHIC Evaluation Model for Peak Containment Pressure Analyses

Bullet 5

“Transient analyses, using the LOFTRAN AP1000 model, have been updated to use an IRWST water volume of 73,100 ft<sup>3</sup>. 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<sup>3</sup>.”

The following document supports the conclusions that the results of the accident analyses are acceptable assuming a required IRWST minimum water volume of 73,100 ft<sup>3</sup>:

- APP-SSAR-GSC-135, Rev. 1, Advanced First Core LOFTRAN Base Deck

Additional Information

The following document supports the conclusions that the results of the seismic and structural analyses are acceptable assuming a required IRWST minimum water volume of 73,100 ft<sup>3</sup>, and that the actual water volume used in the seismic design analyses is 76,800 ft<sup>3</sup>.

- APP-1100-S2C-034, Rev. 3, Finite Element Solid-Shell Model of Containment Internal Structures