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January 7, 2021

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

Serial No.: 20-431
NRA/YG: R0
Docket No.: 50-395
License No.: NPF-12

DOMINION ENERGY SOUTH CAROLINA, INC. (DESC)
VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
LICENSE AMENDMENT REQUEST LAR-20-176
“UPDATE OF ANALYTICAL METHOD TO THE CORE OPERATING LIMITS REPORT
WITH THE FULL SPECTRUM LOSS OF COOLANT ACCIDENT APPROACH”
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION (RAI)

By letter dated June 4, 2020 (Agencywide Documents Access and Management System Package Accession No. ML20156A303), Dominion Energy South Carolina, Inc. (DESC), submitted a license amendment request to revise Technical Specifications (TS) Section 6.9.1.11, “Core Operating Limits Report,” for Virgil C. Summer Nuclear Station (VCSNS), Unit 1. VCSNS is proposing to replace currently approved methods with the full spectrum loss of coolant accident analysis (FSLOCA) approach.

In an email dated December 7, 2020 from Mr. Vaughn Thomas, the VCSNS NRC Project Manager, to Mr. Yan Gao of Dominion Energy, the Nuclear Regulatory Commission (NRC) staff requested additional information to facilitate their review of the subject LAR. The NRC’s request for additional information (RAI) and DESC’s responses are provided in the Enclosures to this letter.

Enclosure 1 contains information proprietary to Westinghouse Electric Company, LLC (“Westinghouse”), and is supported by an Affidavit (Enclosure 3) signed by Westinghouse, the owner of the information. The Affidavit sets forth the basis on which the information may be withheld from public disclosure by the NRC and addresses with specificity the considerations listed in paragraph (b)(4) of Section 2.390 of the NRC’s regulations.

Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the NRC’s regulations.

Correspondence with respect to the copyright or proprietary aspects of the information provided in the enclosures to this letter or the supporting Westinghouse Affidavit should reference CAW-20-5122 (Enclosure 3) and should be addressed to Zachary S. Harper, Manager, Licensing Engineering, Westinghouse Electric Company, 1000 Westinghouse Drive, Suite 165, Cranberry Township, Pennsylvania 16066. The non-proprietary version of the RAI responses is provided in Enclosure 2.

Enclosure 1 contains information that is being withheld from public disclosure under 10 CFR 2.390. Upon separation from Enclosure 1, this page is decontrolled.

cc: U.S. Nuclear Regulatory Commission - Region II
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Mr. G. J. Lindamood
Santee Cooper – Nuclear Coordinator
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Enclosure 2

**Response to NRC Request for Additional Information
(Non-Proprietary)**

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION
UPDATE OF ANALYTICAL METHOD TO THE CORE OPERATING LIMITS REPORT
WITH THE FULL SPECTRUM LOSS OF COOLANT ACCIDENT APPROACH

DOMINION ENERGY SOUTH CAROLINA, INC. (DESC)
VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1

1.0 NRC REQUEST FOR ADDITIONAL INFORMATION (RAI) [2.4]

Regulatory Basis

The regulatory bases for the following LOCA related requests for additional information (RAIs) are the requirements contained in 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors," insofar as they establish the requirements and acceptance criteria for emergency core cooling system (ECCS) design, and for the evaluation models (EMs) used to evaluate ECCS performance during a hypothetical LOCA. Specific considerations include 10 CFR 50.46(a)(1)(i) requires the use of an acceptable EM to evaluate ECCS performance under the conditions of a hypothetical LOCA, and 10 CFR 50.46(a)(1)(ii) allows for the development of an EM that conforms to the required and acceptable features specified in Appendix K to 10 CFR 50. 10 CFR 50.46(a)(1)(i) also requires ECCS cooling performance to be calculated for a number of postulated LOCAs of different sizes, locations, and other properties sufficient to provide assurance that the most severe hypothetical LOCAs are calculated.

Acceptance criteria set forth in paragraph (b) of 10 CFR 50.46, and the results of the ECCS evaluation must show that the acceptance criteria are met. Among others, these include requirements related to peak cladding temperature (PCT), maximum cladding oxidation, and maximum hydrogen generation.

Background

The licensee planned to transition from the current statistically based Best Estimate Large Break LOCA and deterministically based Small Break LOCA methods to a state-of-the-art, unified, and approved Full Spectrum LOCA approach (Reference 2). The proposed change will involve a change of VCSNS current Technical Specification 6.9.1.11, "Core Operating Limits Report," analytical methods Item (c). The proposed change in analysis methods also will fulfill the South Carolina Electric and Gas (now Dominion Energy South Carolina) commitment to address fuel pellet thermal conductivity degradation (TCD) as described in Nuclear Regulatory Commission Information Notice 2011-21, by replacing the previous PAD3.4 and PAD4.0 fuel thermal performance codes with the updated and approved PADS code in the LOCA analyses.

The aforementioned Full Spectrum LOCA approach was adopted by Westinghouse to complete an analysis with the FULL SPECTRUM™ loss-of-coolant accident (FSLOCA™) evaluation model (EM) for VCSNS. This LAR requests approval to apply the Westinghouse FSLOCA EM.

RAI-1; Axial Power Difference

VCSNS TS LCO 3.2.1 requires the axial power difference (APD) be maintained within the allowed operational space specified in COLR as based on the Relaxed Axial Offset Control (RAOC) or within the target band specified in the COLR about the target flux difference during base load operation. Based on WCAP-16996, Figure 25.2-13, the staff has a concern that the axial power distributions created in FSLOCA EM library for VCSNS analysis may not sufficiently reflect the VCSNS reactor design. The licensee is requested to provide assurance that the axial power distributions created in FSLOCA EM library for VCSNS analysis are consistent with, or bound, those allowed by VCSNS TS LCO 3.2.1.

RAI-2; Operator Action

No operator actions are described in the transient descriptions or sequences of events. The licensee is requested to confirm that all assumed accident mitigation features occur automatically or discuss any operator actions that may be taken during the time spans as considered in the analyses.

1.1 DESC/VCSNS Response

RAI-1 Response

The library of axial power distributions used in the VCSNS analysis with the **FULL SPECTRUM™** loss-of-coolant accident (**FSLOCA™**) evaluation model (EM) was generated using the methodology described in Section 25.2.1.4 of WCAP-16996-P-A, Revision 1 [2.1]. [

] ^{a,c} Per Item 1.0e in Table 1 of the License Amendment Request Technical Evaluation (Attachment 4 to Agencywide Documents Access and Management System (ADAMS) Accession No. ML20156A303 [2.2]), the VCSNS FSLOCA EM analysis supports an AFD band of -12% to +10% at 100% power. (Note that the FSLOCA EM analysis supports a wider AFD band than the most recent COLR, which allows an AFD band of -8% to 8% at 100% power per Figure 3 of ADAMS Accession No. ML20147A596 [2.3].) [

] ^{a,c}

Therefore, the power distributions created in FSLOCA EM library for VCSNS analysis are consistent with, or bound, those allowed by VCSNS TS LCO 3.2.1.

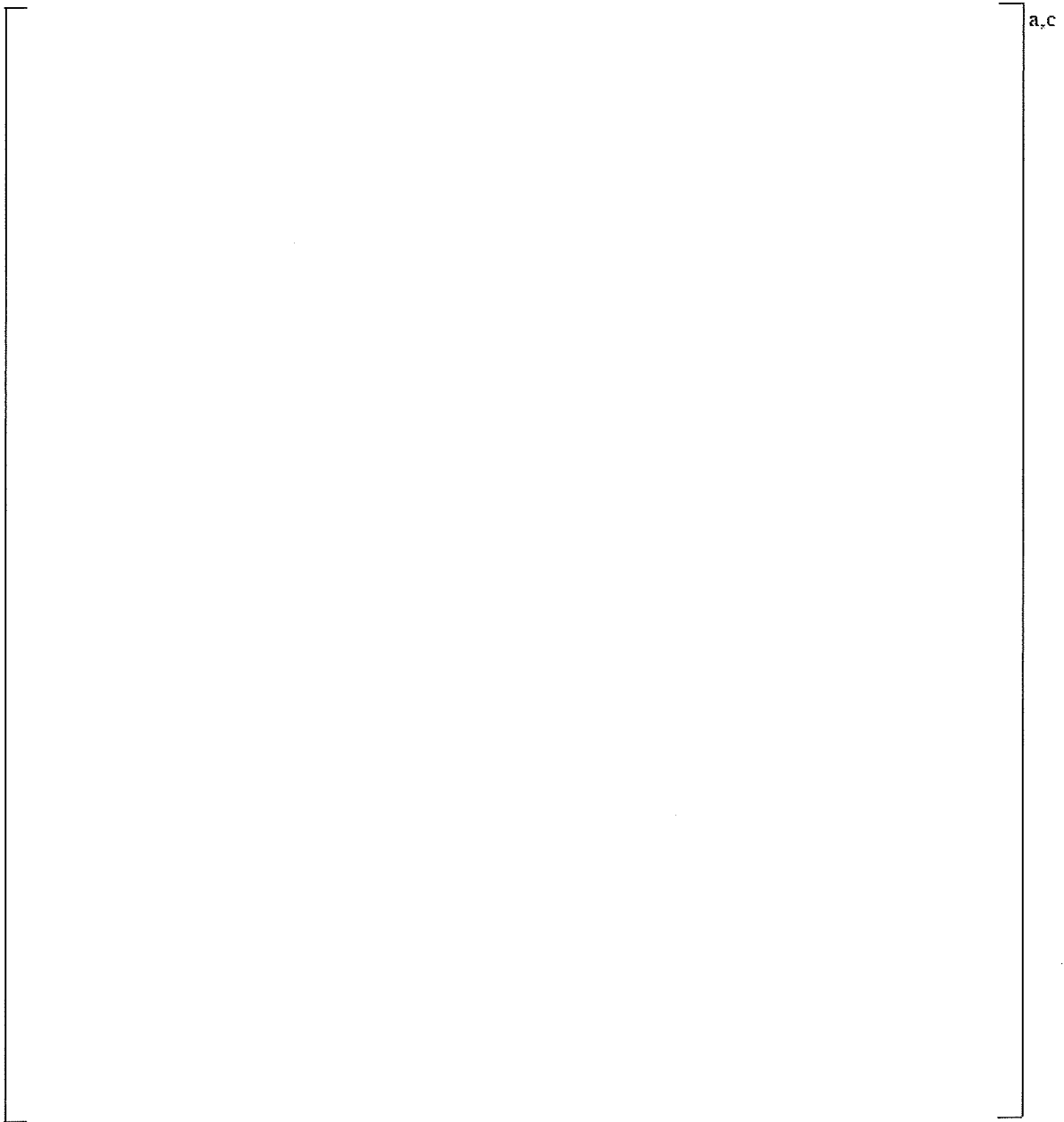


Figure 1: [

] a,c

RAI-2 Response

The VCSNS FSLOCA analysis does not directly credit any operator actions. Safety system actuation occurs automatically due to the reactor trip and engineered safety feature actuation systems. In addition, the analysis does not require any new operator

actions or the modification of existing operator actions in order to satisfy the applicable acceptance criteria of 10 CFR 50.46.

A continuous action step that directs operators to trip the Reactor Coolant Pumps (RCP) following a Small Break LOCA within 5 minutes of meeting a trip criterion is included in VCSNS Emergency Operating Procedures (EOPs). Additional information regarding the modeling of RCP operation within the methodological requirements of FSLOCA is contained on page B-983 of the Appendices of WCAP 16996-P-A, Revision 1 [2.1].

2.0 REFERENCES

- 2.1 WCAP-16996-P-A, Revision 1, "Realistic LOCA Evaluation Methodology Applied to the Full Spectrum of Break Sizes (FULL SPECTRUM LOCA Methodology)," November 2016
- 2.2 ADAMS Accession No. ML20156A303, "Dominion Energy South Carolina (DESC), Virgil C. Summer Nuclear Station (VCSNS) Unit 1 License Amendment Request, Update of Analytical Method to The Core Operating Limits Report with The FULL SPECTRUM Loss of Coolant Accident Approach," June 2020
- 2.3 ADAMS Accession No. ML20147A596, "Dominion Energy South Carolina, Inc., Virgil C. Summer Nuclear Station Unit 1, Core Operating Limits Report (COLR) for Cycle 26," May 2020
- 2.4 ADAMS Accession # ML20342A382, Request for Additional Information
- 2.5 Email from Mr. Vaughn Thomas (NRC) to Mr. Yan Gao (DESC) dated December 7, 2020, "Final RAI for Summer FS LOCA LAR"

Enclosure 3

Westinghouse Affidavit for Withholding Proprietary Information

AFFIDAVIT (CAW-20-5122)

COMMONWEALTH OF PENNSYLVANIA:

COUNTY OF BUTLER:

- (1) I, Zachary S. Harper, have been specifically delegated and authorized to apply for withholding and execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse).
- (2) I am requesting the proprietary portions of CGE-20-27-P be withheld from public disclosure under 10 CFR 2.390.
- (3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged, or as confidential commercial or financial information.
- (4) Pursuant to 10 CFR 2.390, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.
 - (i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse and is not customarily disclosed to the public.
 - (ii) The information sought to be withheld is being transmitted to the Commission in confidence and, to Westinghouse's knowledge, is not available in public sources.
 - (iii) Westinghouse notes that a showing of substantial harm is no longer an applicable criterion for analyzing whether a document should be withheld from public disclosure. Nevertheless, public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar technical evaluation justifications and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable

others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

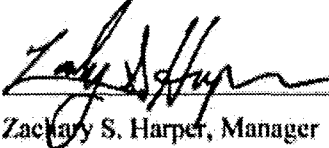
- (5) Westinghouse has policies in place to identify proprietary information. Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:
- (a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.
 - (b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage (e.g., by optimization or improved marketability).
 - (c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.
 - (d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.
 - (e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.
 - (f) It contains patentable ideas, for which patent protection may be desirable.

- (6) The attached documents are bracketed and marked to indicate the bases for withholding. The justification for withholding is indicated in both versions by means of lower-case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower-case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (5)(a) through (f) of this Affidavit.

I declare that the averments of fact set forth in this Affidavit are true and correct to the best of my knowledge, information, and belief.

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

Executed on: 12/14/2020


Zachary S. Harper, Manager
Licensing Engineering