



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

May 11, 2017

Mr. George A. Lippard, III  
Vice President, Nuclear Operations  
South Carolina Electric & Gas Company  
Virgil C. Summer Nuclear Station  
Post Office Box 88, Mail Code 800  
Jenkinsville, SC 29065

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1 – REQUEST FOR  
ADDITIONAL INFORMATION RE: LICENSE AMENDMENT REQUEST FOR  
IMPLEMENTATION OF TSTF-411 (WCAP-15376-P-A), REVISION 1  
(CAC NO. MF7196)

Dear Mr. Lippard:

By letter dated December 16, 2015, as supplemented by letters dated March 7, 2016, and February 6, 2017, South Carolina Electric & Gas Company (SCE&G, the licensee) requested changes to the Technical Specifications for the Virgil C. Summer Nuclear Station, Unit No. 1. The proposed license amendment changes are based on Technical Specification Task Force (TSTF) Traveler TSTF-411, Revision 1, "Surveillance Test Interval Extensions for Components of the Reactor Protection System (WCAP-15376-P)."

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's submittal and determined that additional information is needed to continue its review. During a clarification call on May 9, 2017, Mr. Thompson of SCE&G requested 45 days of the date of this letter to respond to the NRC request for additional information. The NRC staff agreed to this request but notes that the NRC staff's review is continuing, and further requests for information may be developed.

If you have any questions, please contact me at 301-415-1009 or [Shawn.Williams@nrc.gov](mailto:Shawn.Williams@nrc.gov).

Sincerely,

A handwritten signature in cursive script that reads "Shawn Williams".

Shawn A. Williams, Senior Project Manager  
Plant Licensing Branch II-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-395

Enclosure:  
Request for Additional Information

cc w/enclosure: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION  
LICENSE AMENDMENT REQUEST FOR IMPLEMENTATION OF  
WCAP-15376-P-A, REVISION 1  
SOUTH CAROLINA ELECTRIC & GAS COMPANY  
VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1  
DOCKET NO. 50-395

By letter dated December 16, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15356A048), as supplemented by letter dated March 7, 2016 (ADAMS Accession No. ML16069A021), and February 6, 2017 (ADAMS Accession No. ML17037D369), South Carolina Electric & Gas Company (SCE&G, the licensee), submitted a license amendment request (LAR) for the Virgil C. Summer Nuclear Station, Unit No. 1 (VCSNS). The licensee proposes to revise Technical Specification (TS) 3/4.3.1, "Reactor Trip System Instrumentation," and TS 3/4.3.2, "Engineered Safety Feature Actuation System Instrumentation," to implement the allowed outage time, bypass test time, and surveillance frequency changes approved by the U.S. Nuclear Regulatory Commission (NRC) in Technical Specification Task Force (TSTF) Traveler TSTF-411, Revision 1, "Surveillance Test Interval Extensions for Components of the Reactor Protection System (WCAP-15376-P)" (ADAMS Accession No. ML022470164).

The NRC staff has reviewed the February 6, 2017, response to a request for additional information (RAI), and has determined follow-up RAIs are needed to complete NRC staff review.

**Follow up RAI 1:**

In the cover letter to the February 6, 2017, supplement, the licensee stated that the probabilistic risk assessment (PRA) model was peer reviewed in June 2016 and that the final version of the Peer Review Report has not yet been received by VCSNS. As such, the facts and observations (F&Os) from this peer review were not included in the LAR, as supplemented. In addition, the response to RAI 1 noted some open F&Os from a previous peer review. Therefore, the NRC staff requests the following additional information.

- a. Please confirm what impact, if any, the June 2016 peer review had on the PRA model of record used to support the LAR, and as supplemented, by RAI responses.
- b. In 2011, the licensee performed a Capability Category II gap self-assessment for the PRA model against the Regulatory Guide 1.200, Revision 2, and the ASME/ANS PRA Model Internal Events Standard as a follow-up to a 2007 review against Regulatory Guide 1.200, Revision 1. The response to RAI 1 identified that some open suggestions/findings had not been resolved. Finding 6\_9 involved system-related screenings from the PRA model as specified in system supporting requirements. The licensee's resolution states that re-screening of all of the systems is not yet complete.

Enclosure

Please complete the resolution of finding 6\_9, and provide an updated resolution of this finding and an assessment of its significance to the application. Alternatively, please justify why resolution of this Finding will not affect this application.

**Follow-up RAI 7d, 7f, 7g, 7i, 7j, and 12**

The NRC staff has reviewed the response to RAI 7 for the plant-specific analysis of the Engineered Safety Features Actuation System (ESFAS) signals 8.a and 6.h, and has determined that additional information is necessary regarding the risk evaluation associated with extending their surveillance test intervals (STIs). Therefore, please address the following:

- a. The proposed TS STIs apply to analog channels, logic cabinets, and master relays. Based on the response to RAI 7.j, the risk calculation provided in the March 7, 2016, supplement evaluated the STI extension for analog channels.

For these two signals, logic cabinets and the master relays do not appear to be quantified in the risk evaluation. The WCAP-15376-P-A analysis for the logic cabinet discussed in the response does not appear to be applicable for these two signals since the TSTF-411, Revision 1, stipulates the plant specific functions not evaluated generically for WCAP-15376-P-A or WCAP-10271-P-A must have a plant-specific analysis. In addition, the response to RAI 7.i describes a test in which more than one of the LAR-related instrumentation and control (I&C) components are tested, and indicates that the proposed STI extensions apply to this test. However, the response did not specify if the risk associated with this test is included in the risk assessment.

Please clarify whether logic cabinet and master relays for those two signals and the test described in response to RAI 7.i were included in plant-specific risk evaluation. If the approach taken in the response to the RAIs to evaluate only the analog channels is sufficient, please provide justification. If not, then, consistent with TSTF-411, Revision 1 guidance, complete a plant-specific risk evaluation for these two signals for all proposed STI extensions to I&C components (analog channels, logic cabinet, master relays) and applicable tests involving these components. Please describe how this updated STI extension risk analysis is performed. Please include what was evaluated (e.g., components, tests) for the proposed TS changes; method used to evaluate their STI extension (e.g., increasing failure rates, etc.); as well as other assumptions such as test unavailability. If an updated risk assessment is performed to include the logic cabinet and master relays, provide updated results for the LAR following RG 1.177, RG 1.174, and TSTF-411, Revision 1 guidance, and provide updated results of the response to RAI 12 regarding cumulative risk as appropriate.

- b. The response to RAI 7.d requested a description of the method used to evaluate the common cause failure (CCF) for the STI extension. The response stated that the software generates the appropriate common cause basic events using Multiple Greek Letter common cause factors. However, there was no discussion on how the CCF probabilities are adjusted for extending the STI.

Please explain how the change in the CCF was evaluated for the STI extension for each of the I&C components in the proposed TS changes, and include an example of how the CCF probability was adjusted.

- c. The response to the RAI 7.f stated that doubling the failure rate for the unavailability of the STI extension of analog channels was conservative, but did not provide a basis for this conclusion. Since the STI unavailability depends on the testing scheme (e.g., staggered), please explain what testing scheme was used for calculating the analog channels STI unavailability and why the method described in the RAI response is conservative for this testing scheme. Also, clarify what the fault exposure time was taken to be (e.g., STI/2).

The response to RAI 7.f does not appear to address components not included in the WCAP-10271-P-A STI extensions, as requested. Because neither of the logic cabinet nor the master relays for these two signals were included in the WCAP-10271 STI extensions, according to WCAP-15376-P-A, please explain the testing scheme used for calculating their STI unavailability and the fault exposure time used.

- d. The RAI 7.g.i stated: "Explain why the increase in CDF/LERF [Core Damage Frequency/Large Early Release Frequency] for the new signals given in the supplementary information response is low."

If an updated plant-specific risk assessment for each of these two signals in a, above is performed, and if the updated analysis does not retain the conclusion of "small" risk per RG 1.177, explain why the risk is not "small." Please explain, consistent with RG 1.174 guidance that the change in risk is in an acceptable range. Please provide justification, if applicable. In addition, if the risk assessment was updated and resulted in any new Tier 2 measures, please provide Tier 2 results consistent with RG 1.177 guidance. Include demonstration that there are appropriate restrictions on dominant risk-significant configurations associated with the change, and Tier 2 documentation, as discussed in Section 4.

#### **Follow-up RAI 7.k.ii:**

Limitation and Condition number 4 from the NRC staff's SE on the WCAP-15376 topical report states: "To ensure consistency with the reference plant, the model assumptions for human reliability in WCAP-15376-P, Rev. 0 should be confirmed to be applicable to the plant-specific configuration." The response to RAI 7.k.ii identified that limitation and condition number 4 is confirmed because the operator actions modeled in the WCAP-15376-P-A analysis are not applicable for these two plant-specific signals. A review of WCAP-15376-P-A indicates that these operator actions in the response are back-up actuation signals.

The response does not appear to fully address the limitation and condition because the human reliability modeling should be confirmed to be applicable to the plant-specific configuration for these two signals not evaluated in the topical report. The response to RAI 7.k.iii identified that there are operator actions to back-up both automatic functions. Since these operator actions are not evaluated in WCAP 15376-P-A, and, therefore, model assumptions in WCAP-15376-P-A are not applicable to V.C. Summer plant-specific signals, please confirm that these operator actions for the two signals are in the PRA model and explain what they are.

**Follow-up RAI 9:**

The response to RAI 9 describes how the configuration risk management program (CRMP) tool uses surrogates for signals not modeled in the PRA. (Surrogates are not used for the signals 6.h. or 8.a, according to the response to RAI 7.c.iv.). However, the response to RAI 9 did not provide sufficient information for the surrogates described.

The NRC staff requests the following additional information regarding I&C surrogates for non-modeled signals in the CRMP tool.

- a. The response to RAI 9.ii describes surrogates for analog channels as doubling the “initiating event frequencies (reactor trip or safety injection)”. Reactor trip and safety injection signals are applicable to a wide range of initiating events and accident sequences. Please discuss whether all initiating events are increased, or if only some initiating events are increased, please confirm that the initiating event frequencies which are increased (i.e., doubled) as a surrogate cover the possible initiators for the non-modeled signals.
- b. The unavailability of a logic cabinet may have a different plant and risk impact than the unavailability of an analog channel, therefore, doubling the initiating event frequency may not be applicable. Please confirm that the PRA modeling of the logic cabinet unavailability accounts for the plant response impact of the non-modeled signals (as well as associated relevant modeled signals).
- c. The response to RAI 9 does not include master relays, which are also part of the proposed TS changes. The unavailability of a master relay may also have a different risk significance than an analog channel, and the doubling of the initiating event frequency may not be appropriate. Please describe and justify surrogates, if used, for master relays associated with the functions in the LAR. Please confirm that the PRA modeling of the master relays unavailability accounts for the impact on the plant response.

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1 – REQUEST FOR ADDITIONAL INFORMATION RE: LICENSE AMENDMENT REQUEST FOR IMPLEMENTATION OF TSTF-411 (WCAP-15376-P-A), REVISION 1 (CAC NO. MF7196) DATE: MAY 11, 2017.

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