ROUND 2

REQUEST FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST FOR TECHNICAL SPECIFICATION 3.8.3, "INVERTERS – OPERATING, COMPLETION TIME EXTENSION (LAR-22-002)"

DOCKET NOS. 52-025 AND 52-026

VOGTLE ELECTRIC GENERATING PLANT, UNITS 3 AND 4

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

By letter dated January 3, 2023 (Agencywide Documents Access and Management System Accession No. ML23003A797), the Southern Nuclear Operating Company (SNC or licensee) submitted a license amendment request (LAR) in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.90, for the Vogtle Electric Generating Plant (VEGP), Units 3 and 4, Combined License (COL).

The LAR proposed changes to revise COL Appendix A, Technical Specifications (TSs) 3.8.3, "Inverters – Operating," to extend the Completion Time for Required Action A.1 from 24 hours to 14 days. Additionally, TS 3.3.9, "Engineered Safety Feature Actuation System Manual Initiation," Condition C proposed change would replace misspelled "Requried" with "Required."

A draft request for additional information (RAI) was sent to SNC on April 12, 2023 (ML23102A153). A clarification call was requested by SNC and held on April 26, 2023. As per standard practice, no technical discussion is held during a clarification call. The draft RAI was revised for additional clarity and subsequently accepted by SNC and issued by NRC as a final RAI on May 17, 2023 (ML23137A217).

By letter dated June 13, 2023 (ML23164A270) SNC submitted both a supplement to LAR 22-002 and responses to the RAI. During a public meeting on June 29, 2023, the staff had a technical discussion with SNC regarding the RAI responses. Based on the staff's review of the June 13, 2023 letter and the June 29, 2023 technical discussion with SNC, the staff is issuing a second round of RAIs for LAR 22-002, based on the May 17, 2023, RAI.

On May 17, 2023, the NRC asked as RAI #2:

Section 1.1.2 of Regulatory Guide 1.177, "Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," Revision 0, states in part, "TS may be changed to establish consistently based requirements across the industry or across an industry group." Precedents referenced in the LAR consistently indicate extensions from 24 hours to 7 days.

From a probabilistic perspective, explain, at a high-level, both the relevance of these precedents and the basis for the proposed 14-day extension and the allowed Completion Times that maintain acceptable thresholds for Conditional Core Damage Frequency (CCDF) and Conditional Large Early Release Frequency (CLERF) for VEGP Units 3 & 4.

This information is being requested to support a determination, from a risk perspective, the basis for the extension to 14 days and the potential for additional risk that may not have been evaluated.

SNC responded as follows:

LAR 22-002 (SNC Letter ND-22-0881) Table 1 provided examples of industry operating experience supporting extension of the Completion Time from 24 hours. These examples were intended to show precedents for utilizing the Regulatory Guide (RG) 1.177 approach, as supported by plant-specific probabilistic risk assessment (PRA), to determine the acceptability of the plant-specific requested extension time. They also show the extent to which the 24-hour Completion Time presents an undue burden for plant operations. The examples were not intended to specifically address the VEGP-specific requested Completion Time of 14 days, which was supported by a VEGP Units 3 & 4-specific PRA risk assessment provided in the LAR.

RG 1.177, subsection C.1.1, "Reason for Proposed Change" provides "Generally, acceptable reasons for requesting TS changes fall into one or more of the categories below." The RAI cited subsection C.1.1.2 reason ("... to establish consistently based requirements across the industry or across an industry group") was not the basis for the SNC request. The SNC request cited reason for the request followed the "reason" of RG 1.177, subsection C.1.1.3, "Reduce Unnecessary Burdens," by providing greater operational flexibility for online repair or replacement of an inoperable inverter.

The inverters are explicitly modeled components in the Vogtle 3 and 4 PRA. From LAR 22-002 (SNC Letter ND-22-0881), Technical Evaluation section "Probabilistic Risk Assessment" (commencing on Enclosure page 10 of 27), and Table 4, provide the PRA basis that demonstrates acceptable thresholds for CCDF and CLERF for VEGP Units 3 & 4 are maintained. For each case performed, including cases where multiple inverters within a division are unavailable (i.e., the division is unavailable), the results in Table 5 of LAR 22-002 for Incremental Conditional Core Damage Probability (ICCDP) and Incremental Conditional Large Early Release Probability (ICLERP) are demonstrated to have a small impact (i.e., less than 1 E-6 and 1 E-7, respectively) for the requested 14-day Completion Time. Additional cases show the impact would be small even for a 30-day Completion Time.

Furthermore, the VEGP design being the Westinghouse AP1000 simplified passive advanced light water reactor is a unique "industry group" in the context of RG 1.177 subsection C.1.1.2, with this request reflecting a proposed change that could be considered applicable to this industry group of simplified passive advanced light water reactor plants. The plant is designed with significantly fewer components and significantly fewer safety-related components than a current pressurized water reactor of a comparable size, and the risk associated with the VEGP AP1000 design compares favorably against the Commission's goals for Core Damage Frequency and Large Early Release Frequency. While the VEGP Units 3 & 4 PRA results for an inoperable division of inverters support nearly twice the 14-day Completion Time, SNC conservatively proposed the 14-day Completion Time consistent with the RG 1.177 recommended use of standard practices used in setting Completion Times.

NRC followup RAI #2:

In the response to RAI #2, SNC provided that the 14-day Completion Time is justifiable because the ICCDP and ICLERP are demonstrated to have a small impact (i.e., less than 1 E-6 and 1 E-7, respectively). Since VEGP Units 3 & 4 PRAs are at various stages of completion and do not yet fully reflect as-built, as operated plants, there are uncertainties regarding the assumptions made in the PRA model development in support of the application. As such, the staff requests the licensee to describe applicable uncertainty analyses and/or sensitivity studies that were performed in support of the application to assure acceptability of the PRA results and that the

quantitative results accurately reflect plant conditions. This information is being requested to support a determination that uncertainties in the PRA models have been properly addressed in accordance with RG 1.177, Section 2.3.5.

On May 17, 2023, the NRC asked as RAI #4

10 CFR 50.36(c)(2) requires that operating licenses for nuclear reactors must include TS that specify limited conditions for operation (LCOs) for equipment required for safe operation. TS Section 1.3, “Completion Time,” states that LCOs specify minimum requirements for ensuring safe operation of the unit. “ACTIONS” for an LCO state “Conditions” that usually describe ways in which the LCO requirements can fail to be met and that specify Required Action(s) and Completion Time(s). Required Actions must be completed prior to the expiration of the specified Completion Time (CT).

LAR Section 1 states that “the proposed change would revise COL Appendix A, TS 3.8.3, Inverters – Operating, to extend the CT for Required Action A.1 from 24 hours to 14 days.” The LAR section titled “Industry Experience Related to Inverter Maintenance” indicates that VEGP Units 3 and 4 have no direct operating experience for the specific VEGP inverter. LAR Table 1 provides industry experience examples supporting extension of CTs for inoperable inverters beyond 24 hours, and for some more than 7 days. The longest timeline for inoperable inverter repair and maintenance is 5.5 to 7.5 days for Palo Verde. LAR Section 4.2 lists four precedents with CT extensions going from 24 hours to 7 days. LAR section “Probabilistic Risk Assessment” indicates SNC used Regulatory Guide 1.177 guidance to assess the impact of the CT extension from 24 hours to 14 days. RG 1.177 Section 2 expects licensees to provide strong technical bases, rooted in deterministic engineering and system analysis, for any TS change not just based on PRA results alone. RG 1.177, Section 2.3 indicates that PRA should model specific components and their unavailability models that include test and maintenance downtimes.

SNC does not provide a sufficient deterministic justification to support the proposed 14-day CT extension since it is beyond CT extensions for inoperable inverter both for industry operating experience and precedents that SNC notes in the LAR. The staff requests SNC provide a maintenance timeline (in hours/days) to restore an inoperable inverter to OPERABLE status including high-level activities with margin(s) for each and overall to address reasonable uncertainties in accordance with 10 CFR 50.36, TS 1.3, and guidance in RG 1.177.

The staff have reviewed the LAR in accordance with the Office of Nuclear Reactor Regulation Office Instruction LIC-101, “License Amendment Review Procedures” and has determined that the following additional information is needed to complete the review of the LAR.

SNC responded as follows:

The LAR 22-002 (SNC Letter ND-22-0881) provided the SNC evaluation consistent with RG 1.177, Section C.2, Element 2: Perform Engineering Analysis, with regard to the key principles that ensure (1) current regulations are met, (2) adequate defense-in-depth is maintained, (3) sufficient safety margins are maintained, and (4) proposed increases in risk are small and are consistent with the intent of the Commission's policy statement on safety goals for the operation of nuclear power plants. These key principles are addressed in SNC Letter ND-22-0881 as follows: (1) LAR Section 4.1, Applicable Regulatory Requirements/Criteria, (Enclosure page 21 of 27) evaluation that current regulations are met, (2) LAR Enclosure page

5 of 27 for the defense-in-depth evaluation, (3) LAR Enclosure page 7 of 27 for the safety margin evaluation, and (4) LAR Enclosure beginning page 10 of 27 for the risk evaluation.

RG 1.177, Section C.2, Element 2 also mentions that "TS change requests should give proper attention to the integration of considerations such as conformance to the STS *[Standard Technical Specifications],* generic applicability of the requested change if it is different from the STS,..." and "Standard practices used in setting AOTs *[allowed outage times, i.e., CTs]*...should be followed, e.g., AOTs normally are 8 hours, 12 hours, 24 hours, 72 hours, 7 days, 14 days, etc." Since the current STS for AP1000 (NUREG-2194) (as well as all other STS NUREGs) provides for a 24-hour CT consistent with current VEGP TS, conformance to the NUREG STS is not applicable. While the VEGP PRA results support nearly twice the 14-day CT, SNC conservatively proposed the 14-day CT consistent with the guidance suggesting use of standard times.

The RAI also requests information regarding anticipated maintenance and plant activities for restoration of an inoperable inverter to OPERABLE status. Based on the VEGP inverter design and maintenance practices, SNC anticipates typical maintenance activities and maintenance timeline durations for restoration would be generally consistent with the cited industry experience. However, SNC notes that within the experience of the precedents cited in LAR 22--002 (SNC Letter ND-22-0881) Table 1, durations of up to 7 days are noted as well as two instances where restoration was greater than 7 days. It is also reasonable to anticipate that additional unforeseen difficulties could arise that could extend any such timeline. As such, the SNC proposed 14-day CT (i.e., consistent with the next standard CT suggested by the RG 1.177 guidance) provides appropriate operational flexibility for unforeseen issues, consistent with the AP1000 design-specific defense-in-depth, safety margin, and low change in risk demonstrated in the LAR, which is enabled by the VEGP plant-specific design. A 14-day CT minimizes the potential operational burden of an impending required plant shutdown, or exercising requests for regulatory relief, should extenuating circumstances arise that challenge shorter CTs. It should be noted that when unforeseen issues result in restoration timelines that begin to approach the CT limit, these operational burdens are realized even if final restoration is made within the allowed CT. Imposing these operational burdens with no safety benefit should be minimized. Providing a 14--day CT for a division of inoperable inverters provides this burden reduction.

NRC followup RAI #4:

10 CFR 50.36(c)(2) requires that when TS LCOs are not met, the licensee shall shut down the reactor or follow remedial actions permitted by the TS until the condition can be met. TS Section 1.3, "Completion Time," states that LCOs specify minimum requirements for ensuring safe operation of the unit. "ACTIONS" for an LCO state "Conditions" that usually describe ways in which the LCO requirements can fail to be met and that specify Required Action(s) and CT(s). Required Actions must be completed prior to the expiration of the specified CT.
LAR Section 1 states that "the proposed change would revise COL Appendix A, TS 3.8.3, Inverters – Operating, to extend the CT for Required Action A.1 from 24 hours to 14 days." The LAR indicates that VEGP Units 3 and 4 have no direct operating experience related to maintenance for the specific VEGP inverter. LAR Table 1 provides industry operating experience supporting CT extensions for inoperable inverters beyond 24 hours with the most common extension being 7 days or slightly beyond. To support a TS change request, RG 1.177, Section C.2 provides guidance for licensees that it: (1) provide a strong technical bases rooted in deterministic engineering and system analyses, (2) ensure it is not based on PRA results

alone, and (3) give proper attention to the integration of considerations, such as conformance to the STS**...and practical considerations for test and maintenance** (bold text added for emphasis).

RG 1.177, Section C.2.3.3.1 presumes that a PRA should model specific components at system-train or at component level, and their component unavailability models should include contributions from...test and maintenance downtimes.

For TS 3.8.3.A.1, the Required Action is restoration of one or more inoperable inverters in one division. The staff needs additional information that supports the proposed CT change to 14 days. The staff will be challenged to make its reasonable assurance finding without a sufficient deterministic justification that addresses the “practical considerations for test and maintenance” activities.

Consistent with RG 1.177, a strong technical basis (i.e., deterministic) for a TS change request includes practical considerations for test and maintenance, with test and maintenance downtimes being readily available and necessary for PRA models per RG 1.177, Section C.2.3.3.1. SNC has discussed the current CT time requirement, 24 hours, and provided other industry CT examples ~7 days, and the staff is assessing the justification beyond 7 days using information provided by SNC. This proposal is significant because it requests a new minimum CT for safe operation beyond what has been previously approved and sufficiently justified.

SNC cites the term “unforeseen difficulties” in its previous RAI response as part of their justification. The staff will be challenged to make a safety determination on the LAR given that the phrase “unforeseen difficulties” does not provide a timeframe for inverter maintenance and testing that the staff can evaluate and derive its deterministic safety conclusion that a permanent TS change to a 14-day CT is appropriate. Staff also notes that there are mechanisms in place to address unforeseen difficulties (e.g., notice of enforcement discretion) and that the proposed TS change should take into account typical evolutions with appropriate justification.

Accordingly, the staff requests an estimated time to repair and/or replace an inverter (i.e., repair activities in hours/days with margin) to facilitate its restoration to OPERABLE status in accordance with 10 CFR 50.36, TS 1.3, and guidance in RG 1.177. The inverter time to repair should not include premaintenance activities such as training of SNC staff or lead time for replacement parts. The estimated repair time should include those maintenance tasks and plant activities specific to the repair and restoration of the inverter, which can also be based on past operating experience or vendor recommendations.

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