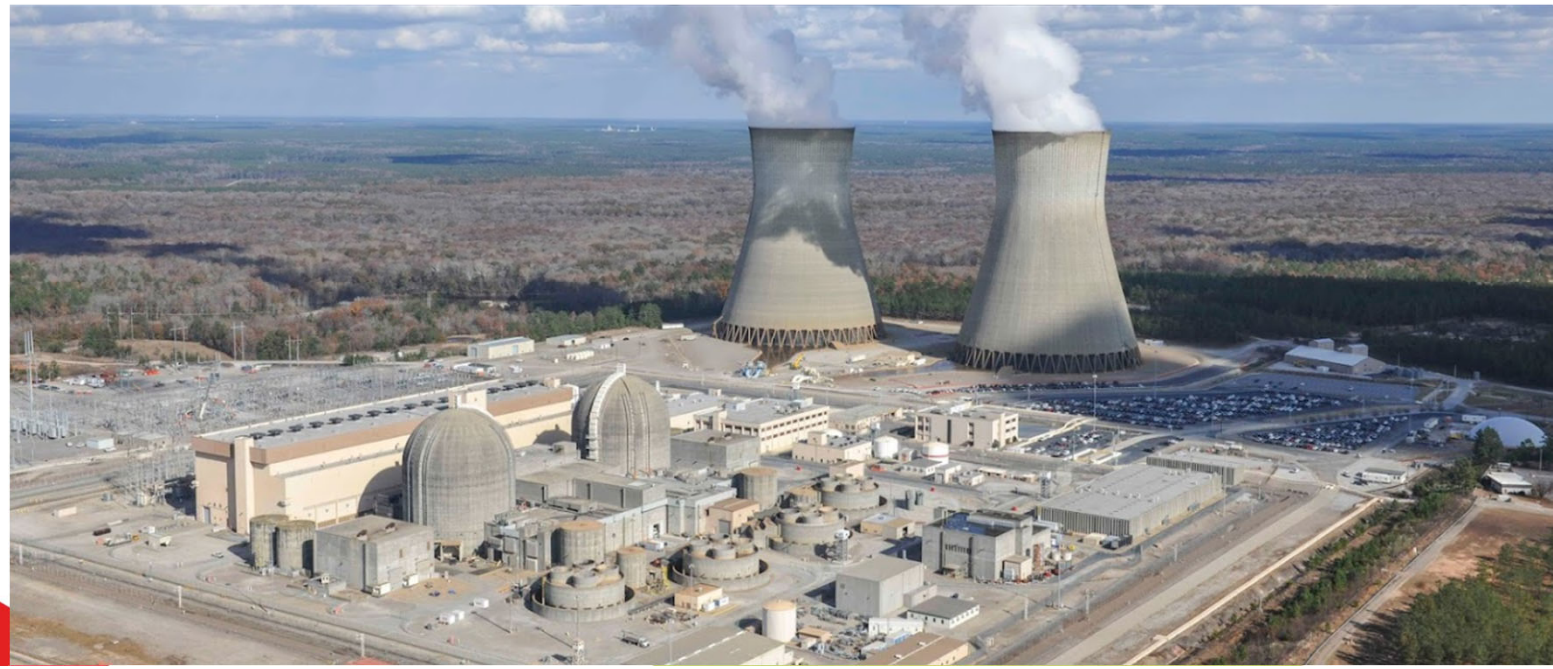
Southern Nuclear

Vogtle Pre-Submittal Meeting to Revise Technical Specification 3.8.1 Diesel Generator Steady State Voltage & Frequency

May 23, 2021



Meeting Purpose and Agenda

- The purpose for this meeting is to discuss the proposed amendment request to revise Technical Specification (TS) 3.8.1 Diesel Generator Steady State Voltage & Frequency
  - TSTF-163 "Minimum vs. Steady State Voltage and Frequency" (ADAMS Accession No. ML040500733)
  - Non-Conservative TS associated with WCAP-17308-NP-A, Treatment of Diesel Generator (DG) Technical Specification Frequency and Voltage Tolerances (ML17215A232)
- This meeting will cover the following topics:
  - Background on TSTF-163
  - Background on non-conservative TS
  - Proposed License Amendment Request
  - Milestones

Background

Background

- Currently DG starts in Surveillance Requirement (SR) 3.8.1.7, SR 3.8.1.11, SR 3.8.1.14, and SR 3.8.1.20 require both a minimum and a maximum range for DG voltage and frequency within 11.4 seconds.

- TSTF-163 (incorporated into NUREG-1431, Standard TS for Westinghouse Plants) provides that these Surveillances require only a minimum voltage and frequency within 11.4 seconds followed by achieving steady state voltage and frequency within the minimum and a maximum range.

Background

- In September of 2016 SNC discovered that some safety related pumps could not be demonstrated to perform as specified in the design basis over the full range of DG steady state voltages and frequencies allowed by the TS Surveillances (i.e., $\geq$ 4025 V and $\leq$ 4330 V, and frequency $\geq$ 58.8 Hz and $\leq$ 61.2 Hz).
- Pressurized Water Reactor Owners Group (PWROG) WCAP-17308-NP-A, Treatment of Diesel Generator (DG) Technical Specification Frequency and Voltage Tolerances, provided a methodology (ML17215A232) for determining the impact of DG steady-state voltage and frequency variation on essential pump motor loads, motor operated valves (MOVs), fans/blowers, and DG loading and fuel oil consumption.

Background

- License Amendment precedents associated with TSTF-163 include:
  - Pacific Gas and Electric Company submittal on March 28, 2011 (ML110880202) for Diablo Canyon, which was NRC approved on March 29, 2012 (ML120790338).

- License Amendment precedents associated with WCAP-17308-NP-A include:
  - Duke Energy submittal on August 19, 2020 (ML20233A258) for Catawba and McGuire, which was NRC approved on June 23, 2021 (ML21131A026).
  - Exelon Generation submittal on June 26, 2020 (ML20178A467) for Braidwood and Byron, which was NRC approved April 2, 2021 (ML21060B281).
  - Exelon Generation submittal on December 11, 2019 (ML19346E536) for Calvert Cliffs, which was NRC approved November 9, 2020 (ML20273A088).

Proposed License Amendment Request

Proposed License Amendment Request

First portion associated with TSTF-163

- SNC proposes to change TS 3.8.1 DG Surveillances to address TSTF-163 related changes to require only a minimum DG voltage and frequency within 11.4 seconds followed by steady-state voltage and frequency ranges.
- The minimum values for voltage and frequency at 11.4 seconds are unchanged.
- These SRs require the DG voltage and frequency at 11.4 seconds to confirm the ability of the DG to reach the conditions to accept load. There are no connected loads during the 11.4 second period.
- Eliminating maximum voltage and frequency limits does not impact subsequently connected loads, which are manually loaded after DG steady state conditions (steady state limits being revised by second portion of the amendment request).

Proposed License Amendment Request

- Current SR 3.8.1.7 (for example)

  Verify each DG starts from standby condition and achieves: in ≤ 11.4 seconds, voltage ≥ 4025 V and ≤ 4330 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.

- Proposed to be changed to:

  Verify each DG starts from standby condition and achieves:

  a. ~~i~~In ≤ 11.4 seconds, voltage ≥ 4025 V and frequency ≥ 58.8 Hz, and

  b. Steady State voltage ≥ ~~4025~~4040 V and ≤ 4330 V, and frequency ≥ ~~58.8~~59.6 Hz and ≤ ~~61.2~~60.4 Hz.

Proposed License Amendment Request

Second portion associated with non-conservative TS DG Surveillance steady state voltage and frequency ranges

- SNC proposes to change TS 3.8.1 DG Surveillances to address non-conservative DG steady state voltage and frequency ranges.
- Current analyses generally assume that the steady-state DG output voltage is 4160 V and the steady-state DG frequency is 60 Hz without accounting for variations in the voltage regulator or speed governor.
- Topical Report WCAP-17308-NP-A provides a methodology to determine the impact of DG steady state voltage and frequency variations on the performance of pumps, valves, fans/blowers, etc.; particularly with regards to the Emergency Core Cooling System (ECCS).
- The allowable steady state variations in voltage and frequency proposed in the TS SRs were analyzed to demonstrate the capability of equipment to meet intended safety performance.

Proposed License Amendment Request

- Current SR 3.8.1.2 (for example)

  Verify each DG starts from standby conditions and achieves steady state voltage ≥ 4025 V and ≤ 4330 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.

- Proposed to be changed to:

  Verify each DG starts from standby conditions and achieves steady state voltage ≥ ~~4025~~4040 V and ≤ 4330 V, and frequency ≥ ~~58.8~~59.6 Hz and ≤ ~~61.2~~60.4 Hz.

Milestones

Milestones

- Submit LAR by end of 2Q-2022
- Request NRC approval within 13 months
- Implement within 120 days of NRC approval

Questions?