Proposed Vogtle Electric Generating Plant Units 3 & 4 License Amendment Request

**Revise Technical Specification 3.3.8
Engineered Safety Feature Actuation System Instrumentation
Function 17, Source Range Neutron Flux Doubling
Remove MODE 2 APPLICABILITY**

June 17, 2024

Agenda

- Description

- Technical Evaluation

- Regulatory Evaluation

- Schedule

- Discussion / Feedback

DESCRIPTION

- Technical Specification 3.3.8
  - Engineered Safety Feature Actuation System (ESFAS) Instrumentation
  - Table 3.3.8-1, Function 17, required OPERABLE in MODES 2, 3, 4, 5
- Source Range Neutron Flux Doubling Function:
  - Purpose is to block boron dilution event
  - Terminates supply from dilution sources
  - TS 3.3.8 allows Function to be blocked during startup
    - Applicability Note provides exceptions - "when the reactor is critical or when an intentional approach to criticality is in progress"
    - i.e., when in MODE 2 or when proceeding from MODE 3 into MODE 2

Proposed Changes to TS 3.3.8, Table 3.3.8-1, Function 17

17. Source Range Neutron Flux Doubling   ~~2$^{(i)}$,~~3$^{(i)}$,4$^{(j)}$

                                                                    5$^{(j)}$

…

(i) With unborated water source flow paths not isolated ~~except when critical or~~ except during intentional approach to criticality

(j) With unborated water source flow paths not isolated

DESCRIPTION (continued)

- Final Safety Analysis Report (FSAR) Subsection 7.3.1.2.14 termination of a boron dilution event via actuations from the source range neutron flux doubling function
  - Includes discussion of blocking the function when above the P-6 setpoint (~1E5 cps) and when above the P-8 setpoint (~551 F [TS 3.4.2, Minimum Temperature for Criticality])

- Startup Procedures block the source range neutron flux doubling function above the P-6 and P-8 setpoints while in MODE 3 (as allowed by TS 3.3.8 Applicability footnote) and in MODE 2
  - Blocked while in MODE 3 "when an intentional approach to criticality is in progress"
  - Continues to be blocked while in MODE 2 "when an intentional approach to criticality is in progress"
  - Continues to be blocked while in MODE 2 "when the reactor is critical"

TECHNICAL EVALUATION

- FSAR Subsection 15.4.6.2.5 describes the boron dilution event analysis during startup

  - Credits only the source range reactor trip function (TS 3.3.2)
  - Does not credit the source range neutron flux doubling function (TS 3.3.8)

- Pertinent ISTS NUREG-1431, Rev. 5, for Westinghouse TS 3.3.9

  - Boron Dilution Protection System MODE 2 Applicability is [bracketed]
  - Applicability Note allows blocking boron dilution flux doubling signal while in MODE 2 and 3 "during reactor startup"
  - Per Bases, "The accident analyses rely on automatic BDPS actuation to mitigate the consequences of inadvertent boron dilution events."

TECHNICAL EVALUATION (continued)

- Consistent with Vogtle Units 1 and 2 TS 3.3.8
  - High Flux at Shutdown Alarm Applicability does not include MODE 2
  - Applicability Note allows blocking the alarm in MODE 3 "during reactor startup"

REGULATORY EVALUATION

- General Design Criterion 13 – *Instrumentation and control*
  - Instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions…
  - Source range neutron flux doubling function not required for anticipated operational occurrences or for accident conditions

- General Design Criterion 20 – *Protection system functions*
  - The protection system shall be designed (1) to initiate automatically the operation of appropriate systems including the reactivity control systems, to assure that specified acceptable fuel design limits are not exceeded as a result of anticipated operational occurrences and (2) to sense accident conditions and to initiate the operation of systems and components important to safety.
  - Source range neutron flux doubling function not required for anticipated operational occurrences or for accident conditions

REGULATORY EVALUATION

- 10 CFR 50.36, Criterion 3 – *mitigation*
  - …an LCO is required for a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.
  - Source range neutron flux doubling function is not part of the primary success path for a design basis accident or transient

- Significant Hazards Consideration
  - No significant hazards identified

- Environmental Consideration
  - Meets the eligibility criteria for categorical exclusion

Proposed Changes to TS 3.3.8, Table 3.3.8-1, Function 17

17. Source Range Neutron Flux Doubling ~~2⁽ⁱ⁾,~~3⁽ⁱ⁾,4^(j)

5^(j)

…

(i) With unborated water source flow paths not isolated ~~except when critical or~~ except during intentional approach to criticality

(j) With unborated water source flow paths not isolated

Related Bases Changes to TS 3.3.8, Function 17 (for information)

17. Source Range Neutron Flux Doubling

…

The signal to block boron dilution on source range neutron flux increasing at an excessive rate (source range neutron flux doubling) must be OPERABLE in ~~MODE 2 and~~ MODE 3 if unborated water source flow paths are not isolated except ~~. However, the signal to block boron dilution on source range flux doubling is not required in MODE 2 or MODE 3 when the reactor is critical or~~ when an intentional approach to criticality is in progress. It must also be OPERABLE in MODES 4 and 5 if unborated water flow paths are not isolated. In MODE 6, a dilution event is precluded by the requirement in LCO 3.9.2 to close, lock and secure at least one valve in each unborated water source flow path.

Schedule

- **Target submittal   3rd Qtr 2024**

- **Outage related   No**

- **Target approval   3rd Qtr 2025**

Discussion / Feedback