Watts Bar Nuclear Plant Units 1 and 2
Adoption of TSTF-425
Initiative 5b - Surveillance Frequency Control Program

September 6, 2018

Agenda

- Meeting Purpose
- License Amendment Request (LAR) Overview
- TVA Surveillance Frequency Control Program (SFCP) Process
- Probabilistic Risk Assessment (PRA) Model Considerations
- Variations from TSTF-425 Template
- LAR Schedule
- Conclusions

Meeting Purpose

- Provide an overview of the proposed Watts Bar Nuclear Plant (WBN) TSTF-425 License Amendment Request (LAR)
- Describe the Internal Events and Seismic PRA models that will be used as a basis for controlling surveillance frequencies
- Discuss any unique variations on the TSTF-425 template that will be included in the LAR as WBN Technical Specification (TS) changes
- Discuss the proposed LAR submittal, review, and implementation schedule

LAR Overview

- Based on the TSTF-425 model application provided in the Federal Register dated July 6, 2009 (*74 FR 31996*)
- Nine attachments:

  1 – Description and Assessment

  2 – PRA Adequacy

  3.1 and 3.2 – WBN Units 1 and 2 TS markup pages

  4.1 and 4.2 – WBN Units 1 and 2 Retyped TS pages

  5 – WBN Unit 1 Bases markup

  6 – No Significant Hazards Consideration

  7 – WBN TS to TSTF-425 Cross Reference

LAR Overview

- Content informed by most recent precedents
- Over 250 Surveillance Requirement (SR) Frequencies are being changed for each WBN unit
- Justifies use of the WBN PRA for use in this risk-informed application
- Variations are identified for changes not specifically addressed in TSTF-425

TVA SFCP Process

- Follows the industry guidance document, NEI 04-10, “Risk-Informed Method for Control of Surveillance Frequencies”
- The TVA SFCP process has been in effect for about three years at the Sequoyah Nuclear Power Plant (SQN)
- SQN-specific implementation procedures will inform the implementation of the SFCP at WBN

PRA Technical Adequacy Review

Internal Events with Internal Flooding PRA Model

- Full Scope Peer Review against the ASME/ANS 2008 PRA Standard Addendum a, Endorsed by RG 1.200 R2
- Underwent Facts and Observation (F&O) Closure Process
- Seven Open F&Os (Finding Level) which were assessed against the SFCP application

PRA Technical Adequacy Review

Seismic PRA Model

- Full Scope Peer Review against Part 5 (seismic) of Addendum b of the 2008 ASME/ANS PRA Standard
- Underwent F&O Closure Process
- One Open F&O (Finding Level), which was assessed against the SFCP application

Model Update & Maintenance

TVA procedures ensure or provide:

- Model configuration, fidelity and realism
- Periodic update requirements
- Living model requirements
- PRA model updates
  - > PRA Maintenance
  - > PRA Upgrade
- Peer Review requirements

Non-Modeled Hazards

Internal Fire Hazards

- Qualitative evaluation
- Progressive screening approach using the Fire Induced Vulnerability Evaluation (FIVE) from the docketed Individual Plant Examination of External Events (IPEEE)

Non-Modeled Hazards

Other External Hazards

- Screening results from the IPEEE for evaluations
- SSCs credited in the IPEEE Other External Hazards Evaluation to allow the hazard to screen is qualitatively evaluated in the SFCP evaluation
- External hazard screening was reviewed against the current as-built, as-operated plant

Shutdown Events

Shutdown risk management in accordance with NUMARC 91-06 which includes a qualitative process

- TVA process assesses the potential impact on shutdown risk
  - focus on planning, conservative decision-making and maintaining defense-in-depth
  - assessment of plant shutdown configurations for impact on Key Safety Functions

Cumulative Risk

- The cumulative risk analysis compares the change in risk for all previously approved Surveillance Test Interval extensions and the extension(s) under consideration that have not been rolled into the model of record
- The delta from the baseline model represents the cumulative risk effect
- Limits for Core Damage Frequency and Large Early Release Frequency are consistent with those limits given in NEI 04-10

Variations from TSTF-425 Template

- TSTF-425 is based on a markup of NUREG-1431 Rev. 3.0 and 3.1
- The WBN Technical Specifications are based on NUREG-1431 Rev. 1
- This difference has resulted in numerous variations, most of which are administrative in nature
- SR that are unique to WBN were screened against the criteria of the model safety evaluation
- None of the variations affect the model safety evaluation provided in the Federal Register Notice for TSTF-425

Variations

SR 3.7.5.2

This SR is currently performed every 31 days on a Staggered Test Basis

- TSTF-425 removes the definition of “Staggered Test Basis”
- TSTF-101 revised the Frequency to “In accordance with the Inservice Testing Program”
- NUREG-1431 Rev. 4 includes this change
- TVA proposes to be consistent with the Improved Standard Technical Specifications and refer to the Inservice Testing Program

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.5.1	Verify each AFW manual, power operated, and automatic valve in each water flow path, and in both steam supply flow paths to the steam turbine driven pump, that is not locked, sealed, or otherwise secured in position, is in the correct position.	~~31 days~~
SR 3.7.5.2	----------NOTE---------- Not required to be performed for the turbine driven AFW pump until 24 hours after ≥ 1092 psig in the steam generator. ---------- Verify the developed head of each AFW pump at the flow test point is greater than or equal to the required developed head.	In accordance with the Inservice Testing Program ~~31 days on a STAGGERED TEST BASIS~~
SR 3.7.5.3	----------NOTE---------- Not applicable in MODE 4 when steam generator is relied upon for heat removal. ---------- Verify each AFW automatic valve that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	~~18 months~~

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Variations

SRs 3.8.1.2 and 3.8.1.3

These SRs surveil the diesel generators with a Frequency “As specified in Table 3.8.1-1.”

- Table 3.8.1-1 establishes frequencies based on failures of valid tests per RG 1.9
- TSTF-37 deleted Table 3.8.1-1 and changed the Frequencies for SRs 3.8.1.2 and 3.8.1.3 to 31 days (based on implementation of the Maintenance Rule and GL 94-01)
- TSTF-425 changed those Frequencies to be included in the SFCP
- TVA proposes to delete Table 3.8.1-1 and state that the SRs 3.8.1.2 and 3.8.1.3 Frequencies will be in accordance with the SFCP

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each required offsite circuit.	~~7 days~~
SR 3.8.1.2	----------NOTES---------- 1. Performance of SR 3.8.1.7 satisfies this SR. 2. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. ---------- Verify each DG starts from standby conditions and achieves steady state voltage ≥ 6800 V and ≤ 7260 V, and frequency 60 Hz nominal.	~~As specified in Table 3.8.1-1~~
SR 3.8.1.3	----------NOTES---------- 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by and immediately follow without shutdown a successful performance of SR 3.8.1.2 or SR 3.8.1.7. ---------- Verify each DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 3960 kW and ≤ 4400 kW.	~~As specified in Table 3.8.1-1~~
SR 3.8.1.4	Verify each skid mounted day tank contains ≥ 218.5 gal of fuel oil.	~~31 days~~

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Table 3.8.1-1 (page 1 of 1)
Diesel Generator Test Schedule

NUMBER OF FAILURES IN LAST 25 VALID TESTS[a]	FREQUENCY
≤ 3	31 days
≥ 4	7 days[b] (but no less than 24 hours)

(a) Criteria for determining number of failures and valid tests shall be in accordance with Regulatory Position C.2.1 of Regulatory Guide 1.9, Revision 3, where the number of tests and failures is determined on a per DG basis.

(b) This test frequency shall be maintained until seven consecutive failure free starts from standby conditions and load and run tests have been performed. If, subsequent to the 7 failure free tests, 1 or more additional failures occur, such that there are again 4 or more failures in the last 25 tests, the testing interval shall again be reduced as noted above and maintained until 7 consecutive failure free tests have been performed.

Variations

SR 3.8.3.7

This SR requires a 10-year inspection of the fuel oil storage tank per RG 1.137.

- TSTF-2 transferred this SR to licensee control
- TSTF-425 does not address SR 3.8.3.7
- TVA is not adopting TSTF-2 as part of the TSTF-425 LAR
- TVA proposes to apply the SFCP to this SR Frequency (meets criteria for inclusion contained in the model safety evaluation)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.3.2	Verify lubricating oil inventory is ≥ 287 gal per engine.	~~31 days~~
SR 3.8.3.3	Verify fuel oil properties of new and stored fuel oil are tested in accordance with, and maintained within the limits of, the Diesel Fuel Oil Testing Program.	In accordance with the Diesel Fuel Oil Testing Program
SR 3.8.3.4	Verify each DG air start receiver pressure is ≥ 190 psig.	~~31 days~~
SR 3.8.3.5	Check for and remove accumulated water from each of the four interconnected tanks which constitute the 7 day fuel oil storage tank.	~~31 days~~
SR 3.8.3.6	Perform a visual inspection for leaks in the exposed fuel oil system piping while the DG is running.	~~18 months~~
SR 3.8.3.7	For each of the four interconnected tanks which constitute the 7 day fuel oil storage tank: a. Drain the fuel oil; b. Remove the sediment; and c. Clean the tank.	~~10 years~~

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Variations

SR 3.8.4.13 Note 1

This Note allows the performance of SR 3.8.4.14 modified discharge test in lieu of the battery service test once per 60 months.

- The phrase “Once per 60 months” is being deleted, which is consistent with the SR 3.8.4.14 Frequency being changed to the SFCP
- This change is technically justified by IEEE 450-1995 and has been accepted by recent precedent (Cooper – ML17061A050)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.4.12	----------NOTE---------- Credit may be taken for unplanned events that satisfy this SR. ---------- Verify each diesel generator battery charger is capable of recharging its associated battery from a service or capacity discharge test while supplying normal loads.	~~18 months~~
SR 3.8.4.13	----------NOTES---------- 1. The modified performance discharge test in SR 3.8.4.14 may be performed in lieu of the service test in SR 3.8.4.13 ~~once per 60 months~~. 2. This Surveillance is not performed in MODE 1, 2, 3, or 4 for required vital batteries. Credit may be taken for unplanned events that satisfy this SR. ---------- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads and any connected nonsafety loads for the design duty cycle when subjected to a battery service test.	~~18 months~~

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LAR Schedule

- Coordination with 10 CFR 50.69 Submittal
  - It is expected that there will be review efficiencies gained because of the common PRA usage
  - Both the TSTF-425 LAR and 10 CFR 50.69 LAR submittals are planned for 9/28/18
- A one-year NRC review is requested
- Upon approval, the TSTF-425 License Amendment will be implemented within 60 days

Conclusions

- TSTF-425 LAR is scheduled to be submitted by September 28, 2018
- LAR is consistent with Model Application and Safety Evaluation, and informed by precedent
- SFCP Process will follow NEI 04-10
- Internal Events PRA meets RG 1.200 Rev. 2 requirements and Seismic PRA Model meets the requirements of Addendum b to the PRA Standard