# Watts Bar Nuclear Plant (WBN) Unit 2 Pre-Submittal Teleconference for Proposed License Amendment Requests (LARs) for the WBN Unit 2 Replacement Steam Generator (RSG) Project

January 21, 2021

# Agenda

- Opening Remarks
- Background
- LAR Schedule Milestones
- Closing Remarks

# Opening Remarks

- The purpose of this meeting is to discuss the planned LARs for the WBN Unit 2 RSG Project.
- The following LARs are needed to support the RSG project:
  - WBN-TS-20-04 – SG Tube Rupture (SGTR) Accident Dose Design Basis Change
  - WBN-TS-20-05 – SG Water Level Changes for RSGs
  - WBN-TS-20-06 – SG Program Changes
  - WBN-TS-20-23 – Change to Unit 1 TS 3.7.12 for Continuous Opening of the Auxiliary Building Secondary Containment Enclosure (ABSCE) as a One-Time Exception
- Individual presentation for each LAR.

# Background

- TVA initially planned to replace the WBN Unit 2 Alloy-600 steam generators with Alloy-690 RSGs during the WBN Unit 2 Fall 2023 refueling outage (U2R5).
- TVA recently decided to move this activity to the Spring 2022 refueling outage (U2R4) scheduled to commence in March 2022.
- The RSGs have been manufactured and delivered to the WBN, where the RSGs have been placed in protected storage until they are prepared for installation just prior to the RSG outage.
- For the RSG components, the LARs are similar in nature to those done for the WBN Unit 1 SG replacement project.

# Schedule for Submittal

- January 21, 2021 – Pre-submittal teleconference with NRC
- March 1, 2021 – Submit  LARs to NRC
- Expedited NRC approval of the LARs by February 1, 2022 (Requested) with implementation by March 1, 2022 (scheduled start of WBN U2R4 outage to replace the Unit 2 steam generators)

# CLOSING REMARKS

TVA

# Watts Bar Nuclear Plant (WBN)
# Proposed Modification to UFSAR Section 15.5 to Reflect Revised Steam Generator Tube Rupture (SGTR) Accident Dose Values Associated with Operation of the Unit 2 Replacement Steam Generators (RSGs)

January 21, 2021

# Agenda

- Opening Remarks
- Background
- Need for Change
- Proposed Design Basis Changes for WBN dual-unit Updated Final Safety Analysis (UFSAR)
- Precedent
- Closing Remarks

# Opening Remarks

- Purpose of the meeting is to discuss proposed changes to reflect the revised analysis of the radiological consequences of a Steam Generator Tube Rupture (SGTR) Accident associated with operation of Unit 2 Replacement Steam Generators (RSGs).
- Per guidance in NEI 96-07 R1, the increase in the main control room (MCR) thyroid dose for the pre-accident case was a more than minimal increase in the radiological consequences of an accident previously evaluated in the UFSAR.
- All SGTR Accident doses remain less than the 10 CFR 100, *Reactor Site Criteria,* and 10 CFR 50, Appendix A, GDC 19, *Control Room,* dose limits as specified in NUREG-0800, *Standard Review Plan*.

# Background

- Installation of RSGs for WBN Unit 2 results in revised primary and secondary side mass releases reflected in UFSAR Table 15.5-18.
- Primary side releases decrease
  - Increase in primary coolant that flashes before control room isolation
- Secondary side releases increase
- Reactor Coolant System (RCS) and SG volumes increase
  - Identical to WBN Unit 1 values
- All other input remains the same

# Need for Change

- To enable installed operation of the Unit 2 RSGs, the affected WBN Design and Licensing Bases must be updated and demonstrated to meet Regulatory Requirements.
- The increase in the MCR thyroid dose for the pre-accident case exceeded the NEI 96-07, Revision 1, threshold for requiring Nuclear Regulatory Commission (NRC) approval.
  - The increase was greater than 10% of the difference between the current calculated dose value and the regulatory guideline value (10 CFR 50 Appendix A GDC 19).
  - Increase is attributed to the increase in the amount of primary coolant that flashes during the time period before the MCR is isolated.
- The tables on the next two slides show current SGTR Accident doses compared to those resulting from WBN Unit 2 operation with the RSGs installed.
- The SGTR Accident doses remain less than the 10 CFR 100 and 10 CFR 50, Appendix A, GDC 19 dose limits as specified in NUREG-0800.

# SGTR Accident Dose Comparison Table 1

**Pre-Accident Initiated Iodine Spike (14 µCi/gm maximum peak)**

| (rem) | Current SGs | Replacement SGs | Difference | Regulatory Limit (rem) | Allowable Increase (10 percent) |
|---|---|---|---|---|---|
| 2 Hour Exclusion Area Boundary Doses | | | | | |
| Gamma | 4.11E-01 | 3.58E-01 | Decreases with RSGs | 25 | N/A |
| Beta | 2.37E-01 | 1.92E-01 | Decreases with RSGs | 300 | N/A |
| Thyroid – ICRP-30 | 1.44E+01 | 1.36E+01 | Decreases with RSGs | 300 | N/A |
| 30 Day Low Population Zone Doses | | | | | |
| Gamma | 1.21E-01 | 1.04E-01 | Decreases with RSGs | 25 | N/A |
| Beta | 7.26E-02 | 5.78E-02 | Decreases with RSGs | 300 | N/A |
| Thyroid – ICRP-30 | 4.13E+00 | 3.88E+00 | Decreases with RSGs | 300 | N/A |
| Main Control Room Doses | | | | | |
| Gamma | 6.47E-02 | 5.19E-02 | Decreases with RSGs | 5 | N/A |
| Beta | 7.23E-01 | 5.65E-01 | Decreases with RSGs | 30 | N/A |
| Thyroid – ICRP-30 | 1.31E+01 | 1.51E+01 | Increases 2 rem with RSGs (> 10%) | 30 | 30 – 13.1 = 16.9<br>16.9 x 0.1 = 1.69 rem |



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# SGTR Accident Dose Comparison Table 2

**Accident Initiated Iodine Spike (0.265 μCi/gm steady state)**

| (rem) | Current SGs | Replacement SGs | Difference | Regulatory Limit (rem) | Allowable Increase (10 percent) |
|---|---|---|---|---|---|
| 2 Hour Exclusion Area Boundary Doses | | | | | |
| Gamma | 6.39E-01 | 5.36E-01 | Decreases with RSGs | 2.5 | N/A |
| Beta | 2.85E-01 | 2.28E-01 | Decreases with RSGs | 30 | N/A |
| Thyroid – ICRP-30 | 8.51E+00 | 7.00E+00 | Decreases with RSGs | 30 | N/A |
| 30 Day Low Population Zone Doses | | | | | |
| Gamma | 1.88E-01 | 1.55E-01 | Decreases with RSGs | 2.5 | N/A |
| Beta | 8.75E-02 | 6.84E-02 | Decreases with RSGs | 30 | N/A |
| Thyroid – ICRP-30 | 2.52E+00 | 2.03E+00 | Decreases with RSGs | 30 | N/A |
| Main Control Room Doses | | | | | |
| Gamma | 6.27E-02 | 4.85E-02 | Decreases with RSGs | 5 | N/A |
| Beta | 7.28E-01 | 5.49E-01 | Decreases with RSGs | 30 | N/A |
| Thyroid – ICRP-30 | 2.45E+00 | 2.58E+00 | Increases 0.13 rem with RSGs (< 10%) | 30 | 30 – 2.45 = 27.55<br>27.55 x 0.1 = 2.755 rem |

# Proposed Design Basis Changes for WBN UFSAR (Table 15.5-18 markup)

WBN

TABLE 15.5-18

PARAMETERS USED IN STEAM GENERATOR TUBE RUPTURE ANALYSIS

| | | |
|---|---|---|
| Primary Side Activity | Technical Specification Limit | |
| Secondary Side Activity | Technical Specification Limit ~~ANSI/ANS-18.1-1984~~ (Expected levels, 150 gpd/SG) | |
| Iodine Spiking Factor | Case 1: Accident initiated spike of 500 times equilibrium iodine concentration.<br>Case 2: Pre-accident spike of 14 µCi/gm I-131 equivalent. | |
| Iodine Partition Factor | 100 | |
| | Unit 1 | Unit 2 |
| Secondary Side Mass Release (Ruptured Steam Generator) | | |
| 0-2 hours | 108,200 lbm | 109,000~~103,300~~ lbm |
| 2-8 hours | 35,500 lbm | 33,200~~32,800~~ lbm |
| Secondary Side Mass Release (Intact Steam Generator) | | |
| 0-2 hours | 539,500 lbm | 571,300~~492,100~~ lbm |
| 2-8 hours | 925,000 lbm | ~~900,200~~969,400 lbm |
| Primary Coolant Mass Release (Total) | | |
| 0-2 hours | 166,200 lbm | ~~191,400~~131,400 lbm |
| Primary Coolant Mass Release (Flashed) | | |
| 0-2 hours | 9189 lbm | ~~10,077.2~~9585 lbm |
| Meteorology | See Table 15.5-14 and 15A-2 | |

# Proposed Design Basis Changes for WBN UFSAR (Table 15.5-19 markup)

WBN-4

TABLE 15.5-19

DOSES FROM STEAM GENERATOR TUBE RUPTURE

**UNIT 1**

Pre-Accident Initiated Iodine Spike (14µCi/gm maximum peak)

| (rem) | 2 HR EAB | 30 DAY LPZ | CONTROL ROOM |
|---|---|---|---|
| Gamma | 3.71E-01 | 1.09E-01 | 8.86E-02 |
| Beta | 2.11E-01 | 6.45E-02 | 9.76E-01 |
| Thyroid (ICRP-30) | 1.32E+01 | 3.79E+00 | 2.27E+01 |

Accident Initiated Iodine Spike (0.265 µCi/gm steady state)

| (rem) | 2 HR EAB | 30 DAY LPZ | CONTROL ROOM |
|---|---|---|---|
| Gamma | 5.55E-01 | 1.62E-01 | 8.42E-02 |
| Beta | 2.48E-01 | 7.59E-02 | 9.64E-01 |
| Thyroid (ICRP-30) | 6.99E+00 | 2.06E+00 | 3.92E+00 |

**UNIT 2**

Pre-Accident Initiated Iodine Spike (14µCi/gm maximum peak)

| (rem) | 2 HR EAB | 30 DAY LPZ | CONTROL ROOM |
|---|---|---|---|
| Gamma | 3.58~~4.11~~E-01 | 1.04~~21~~E-01 | 5.19~~6.47~~E-02 |
| Beta | 1.92~~2.37~~E-01 | 5.78~~7.26~~E-02 | 5.65~~7.23~~E-01 |
| Thyroid (ICRP-30) | 1.36~~44~~E+01 | 3.88~~4.13~~E+00 | 1.~~3~~51E+01 |

Accident Initiated Iodine Spike (0.265 µCi/gm steady state)

| (rem) | 2 HR EAB | 30 DAY LPZ | CONTROL ROOM |
|---|---|---|---|
| Gamma | 5.36~~6.39~~E-01 | 1.55~~88~~E-01 | 4.85~~6.27~~E-02 |
| Beta | 2.28~~85~~E-01 | 6.84~~8.75~~E-02 | 5.49~~7.28~~E-01 |
| Thyroid (ICRP-30) | 7.00~~8.51~~E+00 | 2.03~~52~~E+00 | 2.458E+00 |

# Proposed Design Basis Changes for WBN UFSAR (Table 15.5-18 final)

WBN

TABLE 15.5-18

PARAMETERS USED IN STEAM GENERATOR TUBE RUPTURE ANALYSIS

| | | |
|---|---|---|
| Primary Side Activity | Technical Specification Limit | |
| Secondary Side Activity | Technical Specification Limit (Expected levels, 150 gpd/SG) | |
| Iodine Spiking Factor | Case 1: Accident initiated spike of 500 times equilibrium iodine concentration.<br>Case 2: Pre-accident spike of 14 µCi/gm I-131 equivalent. | |
| Iodine Partition Factor | 100 | |
| | Unit 1 | Unit 2 |
| Secondary Side Mass Release (Ruptured Steam Generator) | | |
| 0-2 hours | 108,200 lbm | 109,000 lbm |
| 2-8 hours | 35,500 lbm | 33,200 lbm |
| Secondary Side Mass Release (Intact Steam Generator) | | |
| 0-2 hours | 539,500 lbm | 571,300 lbm |
| 2-8 hours | 925,000 lbm | 969,400 lbm |
| Primary Coolant Mass Release (Total) | | |
| 0-2 hours | 166,200 lbm | 131,400 lbm |
| Primary Coolant Mass Release (Flashed) | | |
| 0-2 hours | 9189 lbm | 9585 lbm |
| Meteorology | See Table 15.5-14 and 15A-2 | |

# Proposed Design Basis Changes for WBN UFSAR (Table 15.5-19 final)

WBN-4

TABLE 15.5-19

DOSES FROM STEAM GENERATOR TUBE RUPTURE

**UNIT 1**

Pre-Accident Initiated Iodine Spike (14µCi/gm maximum peak)

| (rem) | 2 HR EAB | 30 DAY LPZ | CONTROL ROOM |
|---|---|---|---|
| Gamma | 3.71E-01 | 1.09E-01 | 8.86E-02 |
| Beta | 2.11E-01 | 6.45E-02 | 9.76E-01 |
| Thyroid (ICRP-30) | 1.32E+01 | 3.79E+00 | 2.27E+01 |

Accident Initiated Iodine Spike (0.265 µCi/gm steady state)

| (rem) | 2 HR EAB | 30 DAY LPZ | CONTROL ROOM |
|---|---|---|---|
| Gamma | 5.55E-01 | 1.62E-01 | 8.42E-02 |
| Beta | 2.48E-01 | 7.59E-02 | 9.64E-01 |
| Thyroid (ICRP-30) | 6.99E+00 | 2.06E+00 | 3.92E+00 |

**UNIT 2**

Pre-Accident Initiated Iodine Spike (14µCi/gm maximum peak)

| (rem) | 2 HR EAB | 30 DAY LPZ | CONTROL ROOM |
|---|---|---|---|
| Gamma | 3.58E-01 | 1.04E-01 | 5.19E-02 |
| Beta | 1.92E-01 | 5.78E-02 | 5.65E-01 |
| Thyroid (ICRP-30) | 1.36E+01 | 3.88E+00 | 1.51E+01 |

Accident Initiated Iodine Spike (0.265 µCi/gm steady state)

| (rem) | 2 HR EAB | 30 DAY LPZ | CONTROL ROOM |
|---|---|---|---|
| Gamma | 5.36E-01 | 1.55E-01 | 4.85E-02 |
| Beta | 2.28E-01 | 6.84E-02 | 5.49E-01 |
| Thyroid (ICRP-30) | 7.00E+00 | 2.03E+00 | 2.58E+00 |

# Precedent

- In support of the replacement of the WBN Unit 1 SGs, changes to UFSAR Section 15.5 were proposed to reflect the increased doses for the SGTR accident resulting from installation of the WBN Unit 1 RSGs, as approved in Amendment 64 (ML062290485).
- In May 2019, License Amendment 27 added a limit to the Tritium Producing Burnable Absorber Rods for WBN Unit 2. Among other impacts, this entailed approval of the resulting changes to the SGTR dose consequences (ML18347B330).

# CLOSING REMARKS

TVA

# Watts Bar Nuclear Plant (WBN)
# Proposed Modifications to the Unit 2 Technical Specifications to Change the Required Narrow Range Steam Generator Water Level Value for Operation of the Unit 2 Replacement Steam Generators

January 21, 2021

# Agenda

- Opening Remarks
- Background
- Need for Change
- Proposed TS changes
- Precedent
- Closing Remarks

# Opening Remarks

- Purpose of the meeting is to discuss proposed changes to the narrow range steam generator water level (SGWL) required value contained in WBN Unit 2 Technical Specifications (TS) Limiting Condition for Operation (LCO) 3.4.7.b and Surveillance Requirements (SRs) 3.4.5.2, 3.4.6.3, and 3.4.7.2.
- For these TS, the required narrow range SGWL value changes from ≥ 6% with the Old (Existing) Steam Generators (OSGs) to ≥ 32% with the Replacement Steam Generators (RSGs).
- Similar required narrow range SGWL value changes (≥ 6% to ≥ 32%) were made to the WBN Unit 1 TS resulting from replacement of the Unit 1 OSGs with same design RSGs.

# Background

- Within each RSG, the secondary side water coverage of the tube bundle is achieved at a narrow range SGWL of ≥ 32% (WBN Unit 2 TS LCO 3.4.7.b and TS SRs 3.4.5.2, 3.4.6.3, and 3.4.7.2), as opposed to the ≥ 6% narrow range SGWL value that defines secondary side water coverage of the tube bundle in each OSG.
- For Unit 2 TS LCO 3.4.7.b and SRs 3.4.5.2, 3.4.6.3, and 3.4.7.2, the condition achieved by tube bundle water coverage establishes the function of the steam generator to be used as a heat removal mechanism.
- The Unit 2 and Unit 1 RSGs are the same design steam generators (Westinghouse Model 68AXP). Same analyses were used for Unit 1 and Unit 2 RSGs to derive the SGTR Accident doses. A detailed demonstrated accuracy calculation (DAC) establishes the ≥ 32% setpoint value, which considered instrument uncertainty, margin, narrow range tap location, RSG tube bundle height, and environmental conditions of the instrumentation.

# Need for Change

In order to establish a SG capable to function as a heat removal mechanism, the SG tube bundle must be covered on the SG secondary (shell) side. The percentage of narrow range SGWL instrument span with the RSGs that demonstrates the point at which water coverage of the SG tube bundle has been achieved is ≥ 32%, as opposed to the ≥ 6% value utilized for the OSGs. Unit 2 TS LCO 3.4.7.b, and SRs 3.4.5.2, 3.4.6.3, and 3.4.7.2 state the required narrow range SGWL value at which point secondary side water coverage of the SG tube bundle is achieved. As a result, with installation of the Unit 2 RSGs, the Unit 2 TS LCO 3.4.7.b, and SRs 3.4.5.2, 3.4.6.3, and 3.4.7.2 must be changed to incorporate the revised required narrow range SGWL value of greater than or equal to 32%.

# Proposed TS Changes

- Revise WBN Unit 2 TS LCO 3.4.7.b and SRs 3.4.5.2, 3.4.6.3, and 3.4.7.2 to change the required narrow range SG water level value from ≥ 6% to ≥ 32% following replacement of the Unit 2 SGs.
- For consistency with LCO 3.4.7.b and SRs 3.4.6.3 and 3.4.7.2, "≥" is spelled out (i.e., "greater than or equal to") in SR 3.4.5.2 as an administrative change.
- Associated changes are made to the Unit 2 TS Bases.

# Proposed TS Changes for WBN 2 (markup)

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.4.5.1 | Verify required RCS loops are in operation | In accordance with the Surveillance Frequency Control Program |
| SR 3.4.5.2 | Verify steam generator secondary side water levels are ≥ 6% narrow range for required RCS loops. | In accordance with the Surveillance Frequency Control Program |

(continued)

Change to read: "greater than or equal to 32%"

# Proposed TS Changes for WBN 2 (markup)

| | | |
|---|---|---|
| | | Program |
| SR 3.4.6.3 | Verify SG secondary side water levels are greater than or equal to 6% narrow range for required RCS loops.<br>Change "6%" to "32%" | In accordance with the Surveillance Frequency Control Program |



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# Proposed TS Changes for WBN 2 (markup)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Loops - MODE 5, Loops Filled

LCO 3.4.7 One residual heat removal (RHR) loop shall be OPERABLE and in operation, and either:

a. One additional RHR loop shall be OPERABLE; or

b. The secondary side water level of at least two steam generators (SGs) shall be greater than or equal to 6% narrow range.

Change "6%" to "32%"

-----NOTES-----

1. One required RHR loop may be inoperable for up to 2 hours for surveillance testing provided that the other RHR loop is OPERABLE and in operation.

2. No reactor coolant pump shall be started with one or more RCS cold leg temperatures less than or equal to the COMS arming temperature specified in the PTLR unless the secondary side water temperature of each SG is ≤ 50°F above each of the RCS cold leg temperatures.

3. All RHR loops may be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation.

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# Proposed TS Changes for WBN 2 (markup)

| | | |
|---|---|---|
| SR 3.4.7.2 | Verify SG secondary side water level is greater than or equal to 6% narrow range in required SGs.<br>Change "6%" to "32%" | In accordance with the Surveillance Frequency Control Program |
| SR 3.4.7.3 | Verify correct breaker alignment and indicated power | In accordance with |

# Proposed TS Changes for WBN 2 (final typed)

| | | |
|---|---|---|
| SR 3.4.5.2 | Verify steam generator secondary side water levels are greater than or equal to 32% narrow range for required RCS loops. | In accordance with the Surveillance Frequency Control Program |

(continued)

| | | |
|---|---|---|
| SR 3.4.6.3 | Verify SG secondary side water levels are greater than or equal to 32% narrow range for required RCS loops. | In accordance with the Surveillance Frequency Control Program |

# Proposed TS Changes for WBN 2 (final typed)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Loops - MODE 5, Loops Filled

LCO 3.4.7 One residual heat removal (RHR) loop shall be OPERABLE and in operation, and either:

a. One additional RHR loop shall be OPERABLE; or

b. The secondary side water level of at least two steam generators (SGs) shall be greater than or equal to 32% narrow range.

| | | |
|---|---|---|
| SR 3.4.7.2 | Verify SG secondary side water level is greater than or equal to 32% narrow range in required SGs. | In accordance with the Surveillance Frequency Control Program |

# Precedent

- In support of the replacement of the Watts Bar Unit 1 SGs, similar changes to WBN Unit 1 TS LCO 3.4.7.b and SRs 3.4.5.2, 3.4.6.3, and 3.4.7.2 were approved in Amendment 61 (ML060960075)

# CLOSING REMARKS

TVA

TVA

# Watts Bar Nuclear Plant (WBN)
# Proposed Modifications to the Unit 2 Technical Specifications Steam Generator Program Descriptions to Reflect Replacement of the Unit 2 Old (Existing) Steam Generators (OSGs) with Replacement Steam Generators (RSGs)

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January 21, 2021

# Agenda

- Opening Remarks
- Background
- Need for Change
- Proposed Technical Specification (TS)/Facility Operating License (FOL) Changes
- Precedent
- Closing Remarks

# Opening Remarks

- Purpose of the meeting is to discuss proposed administrative changes to the Steam Generator (SG) Program descriptions contained in WBN Unit 2 TS 3.4.17, 5.7.2.12, and 5.9.9 to remove SG inspection and repair provisions that become invalid with the installation of the Unit 2 RSGs.
- The SG material change from Alloy 600 Old (Existing) Steam Generators (OSGs) to Alloy 690 RSGs requires removal from the Unit 2 TS of inspection/repair provisions that are only applicable to the Alloy 600 OSGs.
- In addition, the allowance to use PAD4TCD to establish core operating limits is proposed to be deleted from License Condition 2.C.(4) in the Unit 2 FOL, because PAD4TCD usage applies only to the OSGs.

# Background

- Current WBN Unit 2 TS 3.4.17, 5.7.2.12, and 5.9.9 describe the following SG inspection/repair provisions that are only applicable to the Alloy 600 OSGs:
  - F* SG Tube Inspection Method (NRC SE ML16203A365)
  - Voltage-Based Alternate Repair Criteria (ARC) SG Tube Inspection Method (NRC SE ML19063B721)
  - SG Tube Sleeving Repairs
- License Condition 2.C.(4) of the current WBN Unit 2 FOL allows usage of PAD4TCD to establish core operating limits until the Unit 2 OSGs have been replaced (NRC SE ML19046A286)

# Need for Change

- Administrative changes to the Unit 2 TS and the Unit 2 FOL are necessary to remove descriptions of the following SG inspection/repair provisions that with the installation of the RSGs will no longer be NRC-approved for use:
  - F* SG Tube Inspection Method
  - Voltage-Based Alternate Repair Criteria (ARC) SG Tube Inspection Method
  - SG Tube Sleeving Repair

- The allowance to use PAD4TCD to establish core operating limits, as described in the Unit 2 FOL, License Condition 2.C.(4), applies only until the Unit 2 SGs have been replaced. With the installation of the Unit 2 RSGs, it is necessary to administratively remove the License Condition 2.C.(4) statement allowing the use of PAD4TCD.

# Proposed TS/FOL Changes

- Revise Unit 2 TS 3.4.17, 5.7.2.12, and 5.9.9 to remove the term "repair," which applies to SG tube sleeving with the OSGs. With the RSGs, only SG tube plugging is permissible.
- Remove descriptions associated with F*, Voltage-Based ARC, and SG Tube Sleeving from TS 5.7.2.12 and 5.9.9. Minor editing is also proposed to make these Unit 2 TS sections consistent with their counterparts in Unit 1 TS 5.7.2.12 and 5.9.9.
- Revision to Unit 1 TS 5.7.2.12 also reflects TSTF-510, Revision 2, "Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection," for Alloy 690 thermally treated tubing.
- Revise Unit 2 FOL License Condition 2.C.(4) to remove reference to PAD4TCD.



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# Proposed TS Changes for WBN 2 (markup)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.17 Steam Generator (SG) Tube Integrity

LCO 3.4.17 SG tube integrity shall be maintained

AND

All SG tubes satisfying the tube plugging ~~or repair~~ criteria shall be plugged ~~or repaired~~ in accordance with the Steam Generator Program.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

-----------------------------------------------------------NOTE-----------------------------------------------------------

Separate Condition entry is allowed for each SG tube.

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| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. One or more SG tubes satisfying the tube plugging ~~or repair~~ criteria and not plugged ~~or repaired~~ in accordance with the Steam Generator Program. | A.1 Verify tube integrity of the affected tube(s) is maintained until the next refueling outage or SG tube inspection. | 7 days |
| | AND | |
| | A.2 Plug ~~or repair~~ the affected tube(s) in accordance with the Steam Generator Program. | Prior to entering MODE 4 following the next refueling outage or SG tube inspection. |

| | | |
|---|---|---|
| SR 3.4.17.2 | Verify that each inspected SG tube that satisfies the tube plugging ~~or repair~~ criteria is plugged ~~or repaired~~ in accordance with the Steam Generator Program. | Prior to entering MODE 4 following a SG tube inspection. |

# Proposed TS Changes for WBN 2 (markup)

Procedures, Programs, and Manuals
5.7

5.7 Procedures, Programs, and Manuals (continued)

5.7.2.12 Steam Generator (SG) Program

A Steam Generator Program shall be established and implemented to ensure that SG tube integrity is maintained. In addition, the Steam Generator Program shall include the following:

a. Provisions for condition monitoring assessments. Condition monitoring assessment means an evaluation of the "as found" condition of the tubing with respect to the performance criteria for structural integrity and accident induced leakage. The "as found" condition refers to the condition of the tubing during a SG inspection outage, as determined from the inservice inspection results or by other means, prior to the plugging ~~or repair~~ of tubes. Condition monitoring assessments shall be conducted during each outage during which the SG tubes are inspected~~,~~ or plugged, ~~or repaired~~ to confirm that the performance criteria are being met.

# Proposed TS Changes for WBN 2 (markup)



5.7.2.12 Steam Generator (SG) Program (continued)

2. Accident induced leakage performance criterion: The primary-to-secondary accident induced leakage rate for any design basis accident, other than an SG tube rupture, shall not exceed the leakage rate assumed in the accident analysis in terms of total leakage rate for all SGs and leakage rate for an individual SG. Leakage for all degradation mechanisms is not to exceed 150 gpd for each unfaulted SG. Leakage for all degradation mechanisms~~,~~ ~~excluding that described in Specification 5.7.2.12.c.2,~~ is not to exceed 1 gpm in the faulted SG. ~~Leakage for degradation mechanisms described in Specification 5.7.2.12.c.2 is not to exceed 4 gpm for the faulted SG.~~

ARC

3. The operational leakage performance criterion is specified in LCO 3.4.13, "RCS Operational LEAKAGE."

~~c.~~ Provisions for SG tube plugging ~~or repair~~ criteria. Tubes found by inservice inspection to contain ~~a~~ flaws ~~in a non-sleeved region~~ with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged~~ or repaired~~.

Tube Repair

c. ~~The following alternate tube plugging shall be applied as an alternative to the 40% depth based criteria:~~

F*

~~1. Tubes with service-induced flaws located in the portion of the tube from the top of the tubesheet to 1.64 inches below the top of the tubesheet, or from the bottom of the roll transition to 1.64 inches below the bottom of the roll transition, whichever is lower, shall be plugged. Tubes with service-induced flaws located below this elevation do not require plugging.~~

ARC

~~2. The voltage based methodology, in accordance with Generic Letter (GL) 95-05, shall be applied at the tube to straight leg tube support plate interface as an alternative to the 40% depth based criteria of Specification 5.7.2.12.c: Tubes shall be plugged in accordance with GL 95-05 or repaired.~~

~~Tube Support Plate Plugging Limit is used for the disposition of an Alloy 600 steam generator tube for continued service that is experiencing predominantly axially oriented outside diameter stress corrosion cracking confined within the thickness of the tube support plates and flow distribution baffles (FDB). At tube support plate intersections and FDB,~~

(continued)

# Proposed TS Changes for WBN 2 (markup)



5.7 Procedures, Programs, and Manuals

ARC

~~the plugging or repair limit is described below:~~

~~a) Steam generator tubes, with degradation attributed to outside diameter stress corrosion cracking within the bounds of the tube support plates and FDB with bobbin voltages less than or equal to 1.0 volt will be allowed to remain in service.~~

~~b) Steam generator tubes, with degradation attributed to outside diameter stress corrosion cracking within the bounds of the tube support plates and FDB with a bobbin voltage greater than 1.0 volt will be plugged or repaired, except as noted in Specification 5.7.2.12.c.2.c below.~~

~~c) Steam generator tubes, with indications of potential degradation attributed to outside diameter stress corrosion cracking within the bounds of the tube support plates and FDB with a bobbin voltage greater than 1.0 volts but less than or equal to the upper voltage repair limit (calculated according to the methodology in GL 95-05 as supplemented) may remain in service if a rotating pancake coil or acceptable alternative inspection does not detect degradation.~~

~~d) Certain intersections as identified in Attachment 2 of WAT-D-10708 ("Tennessee Valley Authority, Watts Bar Nuclear Power Plant Unit 1, Application for Implementation of Voltage Based Repair Criteria, Westinghouse Steam Generator Tubes Affected by ODSCC at TSPs," Revision 0, January 12, 2000) will be excluded from application of the voltage based repair criteria as it is determined that these intersection may collapse or deform following a postulated LOCA + SSE event. As noted in Section 4 of SG-SGMP-13-16-NP, "Watts Bar Nuclear Plant Unit 2 Applicability of GL 95-05 Voltage Based Alternate Repair Criteria," the list of tubes identified for exclusion for the Unit 1 original steam generators are the same as for Unit 2.~~

~~e) Steam generator tubes, with indications of potential degradation attributed to outside diameter stress corrosion cracking within the bounds of the tube support plates and FDB with a bobbin voltage greater than the upper voltage repair limit (calculated according to the methodology in GL 95-05 as supplemented) will be plugged or repaired.~~

(continued)





TVA

# Proposed TS Changes for WBN 2 (markup)



5.7 Procedures, Programs, and Manuals

ARC

~~If an unscheduled mid-cycle inspection is performed, the following mid-cycle repair limits apply instead of the limits specified in Specifications 5.7.2.12.c.2.a through 5.7.2.12.c.2.d.~~

~~The mid-cycle repair limits are determined from the following equations:~~

$$\cancel{V_{MURL} = \frac{V_{SL}}{1.0+NDE + Gr[(CL-\Delta t)/CL]}}$$

$$\cancel{V_{MLRL} = V_{MURL} - (V_{URL} - V_{LRL})\ [(CL-\Delta t)/CL]}$$

~~where:~~
~~$V_{MURL}$ - mid-cycle upper voltage repair limit based on time into cycle~~

~~$V_{SL}$ = structural limit voltage~~

~~NDE = 95-percent cumulative probability allowance for nondestructive examination uncertainty (i.e., a value of 20 percent has been approved by NRC). The NDE is the valve provided by the GL 95-05 as supplemented.~~

~~Gr = average growth rate per cycle length~~

~~CL = cycle length (the time between two scheduled steam generator inspections)~~

~~$V_{URL}$ = upper voltage repair limit (Note 1)~~

~~$V_{LRL}$ = lower voltage repair limit~~

~~$V_{MLRL}$ = mid-cycle lower voltage repair limit based on $V_{MURL}$ and time into cycle~~

~~$\Delta t$ = length of time since last scheduled inspection during which $V_{URL}$ and $V_{LRL}$ were implemented~~

~~Implementation of these mid-cycle repair limits should follow the same approach as in Specifications 5.7.2.12.c.2.a through 5.7.2.12.c.2.d.~~

~~Note 1: The upper voltage repair limit is calculated according to the methodology in GL 95-05 as supplemented. $V_{URL}$ will differ at the tube support plates and flow distribution baffle.~~

(continued)

# Proposed TS Changes for WBN 2 (markup)



5.7 Procedures, Programs, and Manuals (continued)

5.7.2.12 Steam Generator (SG) Program (continued)

F*

d. Provisions for SG tube inspections. Periodic SG tube inspections shall be performed. The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from ~~t1.64 inches below the bottom of the roll transition or 1.64 inches below the top of the tubesheet, whichever is lower at the tube inlet, to 1.64 inches below the bottom of the roll transition or 1.64 inches below the top of the tubesheet, whichever is lower at the tube outlet~~the tube-to-tubesheet weld at the tube inlet to the tube-to-tubesheet weld at the tube outlet, and that may satisfy the applicable tube plugging ~~or repair~~ criteria. The tube-to-tubesheet weld is not part of the tube. In addition to meeting the requirements of d.1, d.2, and d.3 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection. A degradation assessment shall be performed to determine the type and location of flaws to which the tubes may be susceptible and, based on this assessment, to determine which inspection methods need to be employed and at what locations.

1. Inspect 100% of the tubes in each SG during the first refueling outage following SG installation.

TSTF-510

2. After the first refueling outage following SG installation, inspect each SG at least every ~~24~~72 effective full power months or at least every refueling outage (whichever results in more frequent inspections). In addition, the minimum number of tubes inspected at each scheduled inspection shall be the number of tubes in all SGs divided by the number of SG inspection outages scheduled in each inspection period as defined in a, b, c and d below. If a degradation assessment indicates the potential for a type of degradation to occur at a location not previously inspected with a technique capable of detecting this type~~In addition, inspect 100% of the tubes at sequential periods of 60 effective full power months beginning after the first refueling outage inspection following SG installation. Each 60 effective full power month inspection period may be extended up to 3 effective full power months to include a SG inspection outage in an inspection period and the subsequent inspection period begins at the conclusion of the included SG inspection outage. If a degradation assessment indicates the~~

(continued)

# Proposed TS Changes for WBN 2 (markup)



5.7 Procedures, Programs, and Manuals (continued)

TSTF-510

~~potential for a type of degradation to occur at a location not previously inspected with a technique capable of detecting this type of degradation at this location and that may satisfy the applicable tube plugging or repair criteria, the minimum number of locations inspected with such a capable inspection technique during the remainder of the inspection period may be prorated.~~ of degradation at this location and that may satisfy the applicable tube repair criteria, the minimum number of locations inspected with such a capable inspection technique during the remainder of the inspection period may be prorated. The fraction of locations to be inspected for this potential type of degradation at this location at the end of the inspection period shall be no less than the ratio of the number of times the SG is scheduled to be inspected in the inspection period after the determination that a new form of degradation could potentially be occurring at this location divided by the total number of times the SG is scheduled to be inspected in the inspection period. Each inspection period defined below may be extended up to 3 effective full

# Proposed TS Changes for WBN 2 (markup)



5.7 Procedures, Programs, and Manuals (continued)

5.7.2.12 Steam Generator (SG) Program (continued)

TSTF-510

power months to include a SG inspection outage in an inspection period and the subsequent inspection period begins at the conclusion of the included SG inspection outage.

a) After the first refueling outage following SG installation, inspect 100% of the tubes during the next 144 effective full power months. This constitutes the first inspection period;

b) During the next 120 effective full power months, inspect 100% of the tubes. This constitutes the second inspection period;

c) During the next 96 effective full power months, inspect 100% of the tubes. This constitutes the third inspection period; and

d) During the remaining life of the SGs, inspect 100% of the tubes every 72 effective full power months. This constitutes the fourth and subsequent inspection periods.~~The fraction of locations to be inspected for this potential type of degradation at this location at the end of the inspection period shall be no less than the ratio of the number of times the SG is scheduled to be inspected in the inspection period after the determination that a new form of degradation could potentially be occurring at this location divided by the total number of times the SG is scheduled to be inspected in the inspection period.~~

3. If crack indications are found in any SG tube, then the next inspection for each affected and potentially affected SG for the degradation mechanism that caused the crack indication shall not exceed 24 effective full power months or one refueling outage (whichever results in more frequent inspections). If definitive information, such as from examination of a pulled tube, diagnostic non-destructive testing, or engineering evaluation indicates that a crack-like indication is not associated with a crack(s), then the indication need not be treated as a crack.

ARC

~~4. Indications left in service as a result of application of the tube support plate voltage-based repair criteria (Specification 5.7.2.12.c.2) shall be inspected by bobbin coil probe during all future refueling outages.~~

(continued)

# Proposed TS Changes for WBN 2 (markup)



5.7 Procedures, Programs, and Manuals (continued)

ARC

~~Implementation of the steam generator tube-to-tube support plate repair criteria requires a 100 percent bobbin coil inspection for hot-leg and cold-leg tube support plate intersections down to the lowest cold-leg tube support plate (including the FDB) with known outside diameter stress corrosion cracking (ODSCC) indications. The determination of the lowest cold-leg tube support plate intersections having ODSCC indications shall be based on the performance of at least a 20-percent random sampling of tubes inspected over their full length.~~

e. Provisions for monitoring operational primary-to-secondary LEAKAGE.

# Proposed TS Changes for WBN 2 (markup)



5.7 Procedures, Programs, and Manuals (continued)

Tube Repair

~~5.7.2.12 Steam Generator (SG) Program (continued)~~

~~f. Provisions for SG Tube Repair Methods:~~

~~Steam generator tube repair methods shall provide the means to reestablish the RCS pressure boundary integrity of SG tubes without removing the tube from service. For the purposes of these Specifications, tube plugging is not a repair. All acceptable tube repair methods are listed below.~~

~~1. Westinghouse leak-limiting Non-Nickel Banded Alloy 800 sleeves, WCAP-15918-P, Revision 4, "Steam Generator Tube Repair for Combustion Engineering and Westinghouse Designed Plants with ¾ Inch Inconel 600 Tubes Using Leak Limiting Alloy 800 Sleeves." A Non-Nickel Banded Alloy 800 sleeve shall remain in service for no more than five fuel cycles of operation starting from the outage when the sleeve was installed.~~

# Proposed TS Changes for WBN 2 (markup)

5.9.9 Steam Generator Tube Inspection Report

A report shall be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.7.2.12, Steam Generator (SG) Program. The report shall include:

a. The scope of inspections performed on each SG,

b. Degradation mechanisms found,

c. Nondestructive examination techniques utilized for each degradation mechanism,

d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,

Tube Repair

e. Number of tubes plugged ~~or repaired~~ during the inspection outage for each degradation mechanism,

f. The number and percentage of tubes plugged ~~or repaired~~ to date, and ~~the~~ effective plugging percentage in each SG,

~~g.~~ The results of condition monitoring, including the results of tube pulls and in-situ testing.

~~h.~~g. ~~Repair method utilized and the number of tubes repaired by each repair method.~~

# Proposed TS Changes for WBN 2 (markup)

Tube Repair



5.9 Reporting Requirements (continued)

~~5.9.9 Steam Generator Tube Inspection Report (continued)~~

~~For implementation of the voltage based repair criteria, in accordance with GL 95-05, to tube support plate (and flow distribution baffle) intersections, notify the NRC prior to returning the steam generators to service should any of the following conditions arise:~~

1. ~~If estimated leakage based on the projected end-of-cycle (or if not practical, using the actual measured end-of-cycle) voltage distribution exceeds the leakage limit (determined from the licensing basis dose calculation for the postulated main steam line break) for the next operating cycle.~~
2. ~~If circumferential crack-like indications are detected at the tube support plate intersection and flow distribution baffles.~~
3. ~~If indications are identified that extend beyond the confines of the tube support plate and flow distribution baffles.~~
4. ~~If indications are identified at the tube support plate elevations and flow distribution baffles that are attributable to primary water stress corrosion cracking.~~
5. ~~If the calculated conditional burst probability based on the projected end-of-cycle (or if not practical, using the actual measured end-of-cycle) voltage distribution exceeds 1 x $10^{-2}$, notify the NRC and provide an assessment of the safety significance for the occurrence.~~

~~A report shall be submitted within 90 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with Specification 5.7.2.12, "Steam Generator (SG) Program," when voltage-based alternate repair criteria have been applied. The report shall include information described in Section 6.b of Attachment 1 to Generic Letter 95-05, "Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking."~~

5.10 Record Retention

(removed from Technical Specifications)

# Proposed TS Changes for Unit 2 FOL License Condition 2.C.(4) (markup)

C. The license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act, and to the rules regulations, and orders of the Commission now or hereafter in effect, and is subject to the additional conditions specified or incorporated below.

(1) Maximum Power Level

TVA is authorized to operate the facility at reactor core power levels not in excess of 3459 megawatts thermal.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A as revised through Amendment No. 45, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. TVA shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) TVA shall implement permanent modifications to prevent overtopping of the embankments of the Fort Loudon Dam due to the Probable Maximum Flood by June 30, 2018.

(4) ~~PAD4TCD may be used to establish core operating limits until the WBN Unit 2 steam generators are replaced with steam generators equivalent to the existing steam generators at WBN Unit 1.~~ Deleted

# Proposed TS Changes for WBN 2 (final)

SG Tube Integrity
3.4.17

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.17 Steam Generator (SG) Tube Integrity

LCO 3.4.17 SG tube integrity shall be maintained

AND

All SG tubes satisfying the tube plugging criteria shall be plugged in accordance with the Steam Generator Program.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

-----------------------------------------------------------NOTE-----------------------------------------------------------

Separate Condition entry is allowed for each SG tube.

------------------------------------------------------------------------------------------------------------------------------

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| A. One or more SG tubes satisfying the tube plugging criteria and not plugged in accordance with the Steam Generator Program. | A.1 | Verify tube integrity of the affected tube(s) is maintained until the next refueling outage or SG tube inspection. | 7 days |
| | AND | | |
| | A.2 | Plug the affected tube(s) in accordance with the Steam Generator Program. | Prior to entering MODE 4 following the next refueling outage or SG tube inspection. |

| | | |
|---|---|---|
| SR 3.4.17.2 | Verify that each inspected SG tube that satisfies the tube plugging criteria is plugged in accordance with the Steam Generator Program. | Prior to entering MODE 4 following a SG tube inspection. |



TVA

# Proposed TS Changes for WBN 2 (final)



5.7 Procedures, Programs, and Manuals (continued)

5.7.2.12 Steam Generator (SG) Program

A Steam Generator Program shall be established and implemented to ensure that SG tube integrity is maintained. In addition, the Steam Generator Program shall include the following:

a. Provisions for condition monitoring assessments. Condition monitoring assessment means an evaluation of the "as found" condition of the tubing with respect to the performance criteria for structural integrity and accident induced leakage. The "as found" condition refers to the condition of the tubing during a SG inspection outage, as determined from the inservice inspection results or by other means, prior to the plugging of tubes. Condition monitoring assessments shall be conducted during each outage during which the SG tubes are inspected or plugged, to confirm that the performance criteria are being met.

# Proposed TS Changes for WBN 2 (final)



5.7 Procedures, Programs, and Manuals

5.7.2.12 Steam Generator (SG) Program (continued)

2. Accident induced leakage performance criterion: The primary-to-secondary accident induced leakage rate for any design basis accident, other than an SG tube rupture, shall not exceed the leakage rate assumed in the accident analysis in terms of total leakage rate for all SGs and leakage rate for an individual SG. Leakage for all degradation mechanisms is not to exceed 150 gpd for each unfaulted SG. Leakage for all degradation mechanisms is not to exceed 1 gpm in the faulted SG.

3. The operational leakage performance criterion is specified in LCO 3.4.13, "RCS Operational LEAKAGE."

c. Provisions for SG tube plugging criteria. Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged.

# Proposed TS Changes for WBN 2 (final)



5.7 Procedures, Programs, and Manuals (continued)

5.7.2.12 Steam Generator (SG) Program (continued)

d. Provisions for SG tube inspections. Periodic SG tube inspections shall be performed. The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet to the tube-to-tubesheet weld at the tube outlet, and that may satisfy the applicable tube plugging criteria. The tube-to-tubesheet weld is not part of the tube. In addition to meeting the requirements of d.1, d.2, and d.3 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection. A degradation assessment shall be performed to determine the type and location of flaws to which the tubes may be susceptible and, based on this assessment, to determine which inspection methods need to be employed and at what locations.

1. Inspect 100% of the tubes in each SG during the first refueling outage following SG installation.

2. After the first refueling outage following SG installation, inspect each SG at least every 72 effective full power months or at least every refueling outage (whichever results in more frequent inspections). In addition, the minimum number of tubes inspected at each scheduled inspection shall be the number of tubes in all SGs divided by the number of SG inspection outages scheduled in each inspection period as defined in a, b, c and d below. If a degradation assessment indicates the potential for a type of degradation to occur at a location not previously inspected with a technique capable of detecting this type of degradation at this location and that may satisfy the applicable tube repair criteria, the minimum number of locations inspected with such a capable inspection technique during the remainder of the inspection period may be prorated. The fraction of locations to be inspected for this potential type of degradation at this location at the end of the inspection period shall be no less than the ratio of the number of times the SG is scheduled to be inspected in the inspection period after the determination that a new form of degradation could potentially be occurring at this location divided by the total number of times the SG is scheduled to be inspected in the inspection period. Each inspection period defined below may be extended up to 3 effective full

(continued)

# Proposed TS Changes for WBN 2 (final)



5.7 Procedures, Programs, and Manuals (continued)

5.7.2.12 Steam Generator (SG) Program (continued)

power months to include a SG inspection outage in an inspection period and the subsequent inspection period begins at the conclusion of the included SG inspection outage.

a) After the first refueling outage following SG installation, inspect 100% of the tubes during the next 144 effective full power months. This constitutes the first inspection period;

b) During the next 120 effective full power months, inspect 100% of the tubes. This constitutes the second inspection period;

c) During the next 96 effective full power months, inspect 100% of the tubes. This constitutes the third inspection period; and

d) During the remaining life of the SGs, inspect 100% of the tubes every 72 effective full power months. This constitutes the fourth and subsequent inspection periods.

3. If crack indications are found in any SG tube, then the next inspection for each affected and potentially affected SG for the degradation mechanism that caused the crack indication shall not exceed 24 effective full power months or one refueling outage (whichever results in more frequent inspections). If definitive information, such as from examination of a pulled tube, diagnostic non-destructive testing, or engineering evaluation indicates that a crack-like indication is not associated with a crack(s), then the indication need not be treated as a crack.

e. Provisions for monitoring operational primary-to-secondary LEAKAGE.

(continued)

# Proposed TS Changes for WBN 2 (final)

5.9.9 Steam Generator Tube Inspection Report

A report shall be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.7.2.12, Steam Generator (SG) Program. The report shall include:

a. The scope of inspections performed on each SG,

b. Degradation mechanisms found,

c. Nondestructive examination techniques utilized for each degradation mechanism,

d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,

e. Number of tubes plugged during the inspection outage for each degradation mechanism,

f. The number and percentage of tubes plugged to date, and effective plugging percentage in each SG,

g. The results of condition monitoring, including the results of tube pulls and in-situ testing.



TVA

# Proposed TS Changes for Unit 2 FOL License Condition 2.C.(4) (final)

C. The license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act, and to the rules regulations, and orders of the Commission now or hereafter in effect, and is subject to the additional conditions specified or incorporated below.

(1) Maximum Power Level

TVA is authorized to operate the facility at reactor core power levels not in excess of 3459 megawatts thermal.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A as revised through Amendment No. 45, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. TVA shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) TVA shall implement permanent modifications to prevent overtopping of the embankments of the Fort Loudon Dam due to the Probable Maximum Flood by June 30, 2018.

(4) Deleted

# CLOSING REMARKS

TVA

# Watts Bar Nuclear Plant (WBN)

## Proposed Modifications to Unit 1 Technical Specification 3.7.12 for One-Time Exception to Permit Continuous Opening of the Auxiliary Building Secondary Containment Enclosure (ABSCE) as Needed to Support the Unit 2 Replacement Steam Generator (RSG) Outage

January 21, 2021

# Agenda

- Opening Remarks
- Background
- Need for Change
- Basis for Change
- Proposed TS Changes
- Precedent
- Closing Remarks

# Opening Remarks

- The purpose of this briefing is to discuss a proposed one-time exception for WBN Unit 1 Technical Specification (TS) 3.7.12 “Auxiliary Building Gas Treatment System (ABGTS)” to allow administratively controlled openings of the ABSCE boundary on a continuous basis during the Unit 2 RSG Outage.

- The activities of the RSG project are larger in scale than those of a typical refueling outage, leading to more movement of personnel and equipment.

- The administrative controls to be employed are the same as those used currently for control of the intermittent openings of the ABSCE boundary presently allowed by Unit 1 TS 3.7.12. These controls achieve closure of all ABSCE boundary openings within two minutes following notification from the main control room (MCR) of an Auxiliary Building Isolation (ABI) alarm, thus ensuring closure of the ABSCE consistent with the safety analysis.

# Background

- The ABGTS, and the ABSCE that provides the ventilation envelope supporting ABGTS operability, are shared between WBN Unit 1 and Unit 2.

- WBN 1 and 2 TS 3.7.12 requires ABGTS to be operable during Modes 1-4 for each unit.

- When Unit 2 shuts down for the RSG Outage, it will exit the Unit 2 TS 3.7.12 operability requirements for ABGTS.

- However, due to the shared ABGTS and ABSCE boundary, the operability requirements of WBN Unit 1 will still apply during the RSG Outage.

# Background

- During the Unit 2 RSG Outage, temporary openings will be made in the Unit 2 shield building concrete dome and steel containment vessel to allow removal of the old (existing) SGs and installation of the RSGs.
- Also during the RSG Outage (as with any Unit 2 outage), when the Unit 2 equipment hatch is opened, the Unit 2 containment becomes an extension of the ABSCE boundary.
- The Note added to WBN Units 1 and 2 TS 3.7.12 in October 2017 (ML17236A057) allows intermittent opening of the ABSCE boundary under administrative controls that ensure the ABSCE can be closed consistent with the safety analysis.
- In the TVA response to an RAI in 2017 (ML17205A322) TVA acknowledged that a separate LAR would be needed for the openings of the ABSCE to support the Unit 2 RSG project.

# Need for Change

- During the Unit 2 RSG Outage, a large flow of personnel and equipment in and out of the Unit 2 Containment is planned. This flow will be in excess of what is experienced during a typical refueling outage.

- Given that the ABSCE boundary will be required to be operable, the current wording of the Note in Unit 1 TS 3.7.12 would limit passage through this boundary to intermittent openings.
  Coupled with the large flow of personnel and equipment, this would lead to excessive cycling of the ABSCE doors, which in turn could challenge the integrity of the doors over the course of the Unit 2 RSG Outage.

- Thus, there is a need for continuous, versus intermittent, opening of the ABSCE boundary at controlled access points during the Unit 2 RSG Outage.

# Need for Change

- The ABSCE access points proposed to be kept continuously open have been identified.
- The following are summaries of each access point.
  - Plant Door A157, Upper Containment Personnel Air Lock Access Door – to be used by workers accessing upper containment areas through the Upper Personnel Air Lock, as well as providing minor equipment access.
  - Plant Door A77, Lower Containment Personnel Air Lock Access Door – to be used by workers accessing lower containment areas through the Lower Containment Personnel Air Lock, as well as providing minor equipment access.
  - Plant Door A132/A133, Auxiliary Building General Supply Fan Room Access Door – to be used by workers for general access to the Auxiliary Building.
  - Unit 2 Equipment Hatch – to be used to transfer materials and equipment into and out of containment; secured by temporary ABSCE door (0-DOOR-410-R003).
- Note that when these doors are secured, they provide part of the ABSCE boundary and thus the temporary openings in the shield building have no continued impact on the ABSCE.

# Need for Change

- The ABSCE boundary controlled access points described on the previous slide are shown on these figures:
  - WBN dual-unit Updated Final Safety Analysis Report UFSAR Figure 6.2.3-5
  - WBN UFSAR Figure 6.2.3-6
  - WBN UFSAR Figure 6.2.3-7

# Basis for Change

- In terms of ABSCE closure time capability, there is no difference between the control of intermittent ABSCE openings currently managed under Unit 1 TS 3.7.12 versus the control of continuous ABSCE openings proposed to be managed during the Unit 2 RSG Outage.

- As required by existing TVA procedures, ABSCE openings will be continuously manned and in contact with the MCR, ready for closure within the time requirements of the safety analysis.

- Based on similar experience with other TVA nuclear projects, there is confidence that the WBN RSG Project team can achieve closure of the continuously-open permanent plant doors A157, A132/A133, A77, and the temporary ABSCE door (0-DOOR-410-R003), as required during the WBN-2 RSG Outage consistent with the safety analysis.

# Proposed TS Changes

- One-time new footnote 1 to the existing TS 3.7.12 Note that describes the intermittent opening of the ABSCE.

- Associated changes are made to the Unit 1 TS Bases.



TVA

# Proposed TS Changes for WBN 1 (markup)

3.7 PLANT SYSTEMS

3.7.12 Auxiliary Building Gas Treatment System (ABGTS)

LCO 3.7.12 Two ABGTS trains shall be OPERABLE.

-------------------------------------------NOTE-------------------------------------------
The Auxiliary Building Secondary Containment Enclosure (ABSCE) boundary may be opened intermittently under administrative controls that ensure the ABSCE can be closed consistent with the safety analysis.[1]
------------------------------------------------------------------------------------------------

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. One ABGTS train inoperable. | A.1 Restore ABGTS train to OPERABLE status. | 7 days |
| B. Two ABGTS trains Inoperable due to inoperable ABSCE boundary. | B.1 Initiate actions to implement mitigating actions. | Immediately |
| | AND | |
| | B.2 Verify mitigating actions ensure main control room occupants do not exceed 10 CFR 50 Appendix A GDC 19 limits. | 24 hours |
| | AND | |
| | B.3 Restore ABSCE boundary to OPERABLE status. | 7 days |

(continued)

1. As a one-time exception for the Watts Bar Unit 2 Spring 2022 outage, during which the Unit 2 Replacement Steam Generators (RSGs) will be installed, the breaches of the ABSCE boundary needed to support the Unit 2 RSG project activities (temporary ABSCE door 0-DOOR-410-R003 and permanent plant doors A157, A132/A133, and A77) may be opened on a continuous basis, provided that the ABSCE can be closed consistent with the safety analysis.

# Proposed TS Changes for WBN 1 (final)

3.7 PLANT SYSTEMS

3.7.12 Auxiliary Building Gas Treatment System (ABGTS)

LCO 3.7.12 Two ABGTS trains shall be OPERABLE.

------------------------------------------NOTE------------------------------------------
The Auxiliary Building Secondary Containment Enclosure (ABSCE) boundary may be opened intermittently under administrative controls that ensure the ABSCE can be closed consistent with the safety analysis.[1]
------------------------------------------------------------------------------------------

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. One ABGTS train inoperable. | A.1 Restore ABGTS train to OPERABLE status. | 7 days |
| B. Two ABGTS trains Inoperable due to inoperable ABSCE boundary. | B.1 Initiate actions to implement mitigating actions. | Immediately |
| | AND | |
| | B.2 Verify mitigating actions ensure main control room occupants do not exceed 10 CFR 50 Appendix A GDC 19 limits. | 24 hours |
| | AND | |
| | B.3 Restore ABSCE boundary to OPERABLE status. | 7 days |

(continued)

1. As a one-time exception for the Watts Bar Unit 2 Spring 2022 outage, during which the Unit 2 Replacement Steam Generators (RSGs) will be installed, the breaches of the ABSCE boundary needed to support the Unit 2 RSG project activities (temporary ABSCE door 0-DOOR-410-R003 and permanent plant doors A157, A132/A133, and A77) may be opened on a continuous basis, provided that the ABSCE can be closed consistent with the safety analysis.

# Precedent

- NRC License Amendment for Watts Bar Nuclear Plant, Units 1 and 2, dated October 17, 2017 (ML17236A057)
  - NRC approved a change to TS 3.7.12 to add a Note allowing intermittent opening of the ABSCE boundary under administrative controls that ensure the ABSCE can be closed consistent with the safety analysis.

- There is no direct precedent for a change from intermittent opening to a one-time exception for continuous opening of the ABSCE.

# CLOSING REMARKS

TVA