



Watts Bar Nuclear Plant (WBN)
Pre-Submittal Meeting for Proposed License Amendment Request
Regarding a One-Time Change for the WBN Unit 2 Technical
Specification (TS) 3.7.8
“Essential Raw Cooling Water (ERCW) System”

January 16, 2019

Agenda

- Opening Remarks
- System Overview
- Overview of the 6.9 kilovolt (kV) Shutdown Board (SDBD) 1A-A Maintenance
- Proposed One-Time Change for WBN Unit 2 TS 3.7.8
- Basis for Proposed One - Time Change
- Technical Evaluation
- Regulatory Precedent
- Schedule for Submittal
- Closing Remarks

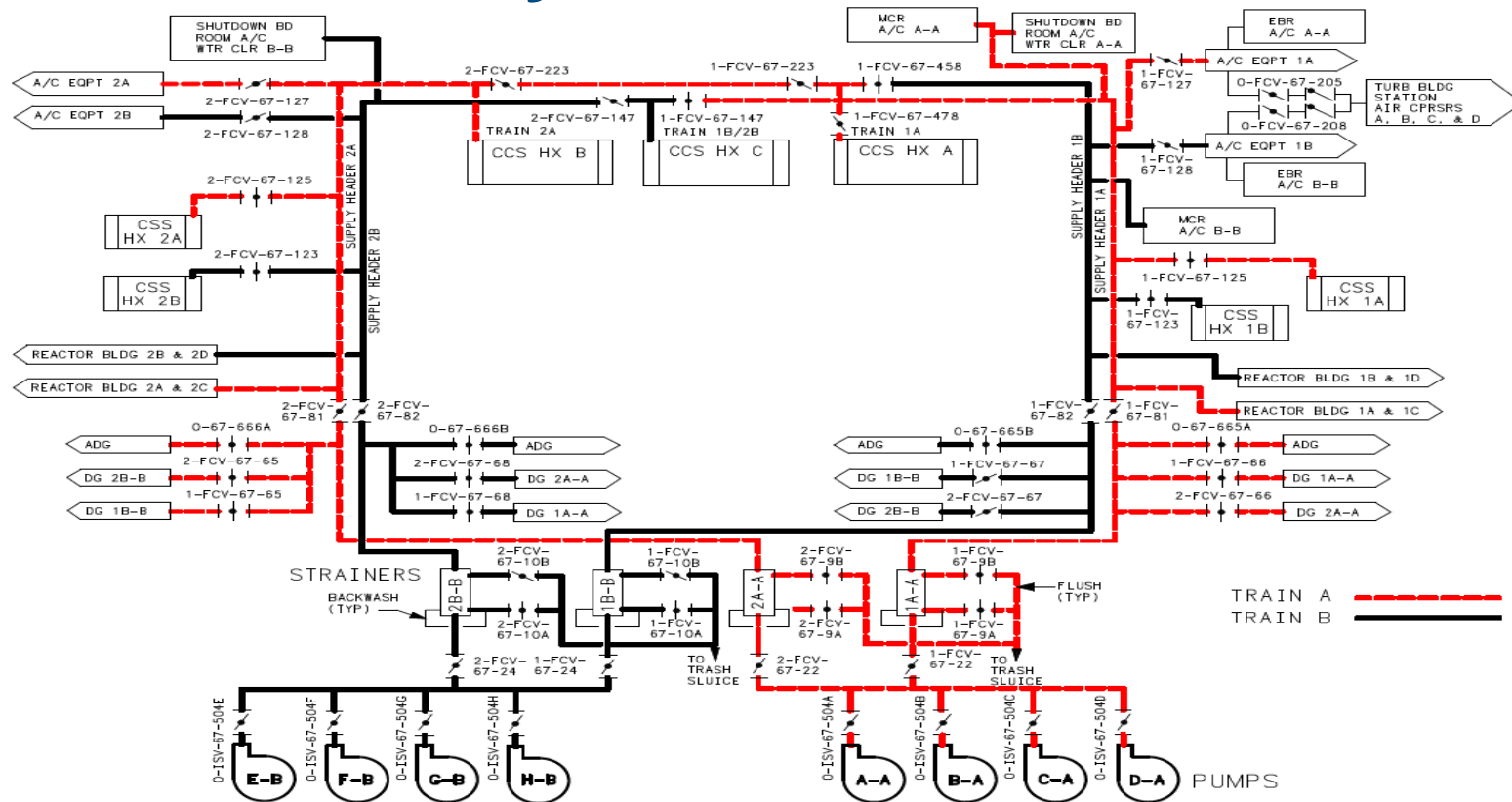
Opening Remarks

- WBN Unit 1 is currently scheduled to perform SDBD maintenance during the Spring 2020 outage
- This license amendment request (LAR) proposes a one-time extension of the WBN Unit 2 TS 3.7.8 “ Essential Raw Cooling Water (ERCW) System” completion time from 72 hours to seven days to perform scheduled maintenance activities on 6.9kV SDBD 1A-A when WBN Unit 1 is defueled.
- To support this LAR, a one-time limiting ultimate heat sink (UHS) temperature of $\leq 71^{\circ}\text{F}$ is proposed.
- Due to the commonality of the WBN 6.9kV SDBD loads, performing maintenance on a 6.9kV SDBD during a WBN Unit 1 refueling outage affects the ERCW system on the operating unit.
- With regard to the ERCW system currently, WBN TS require two ERCW pumps aligned to separate 6.9kV SDBDs to be operable per train, with two trains required for each unit. Consequently, this requires all four 6.9 kV SDBDs to be operable to support the ERCW pump TS requirement.

System Overview

- The ERCW System is a common two-train system with each train having the capability to provide the required cooling water for both units under any credible plant condition.
- These ERCW System trains are independent and redundant.
- Each train of the ERCW system has four pumps total. As noted in the bases of WBN TS 3.7.8, for operating modes 1-4, two ERCW pumps aligned to separate 6.9kV SDBDs are required to be operable per train, with two trains required for each unit.
- The ERCW system has been analyzed for "worst case" heat loads under combinations of maximum river water temperature, design basis accident conditions, normal cooldown requirements, power train failures, for both units.
- The ERCW system has sufficient pump capacity for cooling water flows under all conditions and the system is arranged in such a way that even a complete header loss can be isolated in a manner that does not jeopardize plant safety.

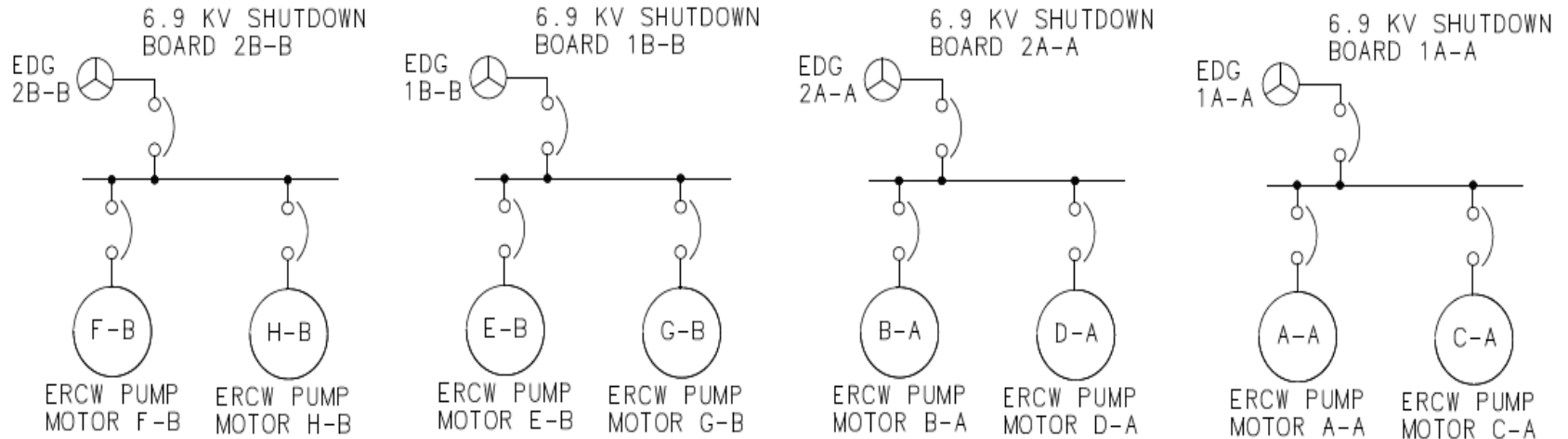
System Overview



SIMPLIFIED SKETCH OF THE ESSENTIAL RAW COOLING WATER (ERCW) SYSTEM

System Overview

ERCW Pump Motor Electrical Board Alignment



Overview of 6.9kV SDBD 1A-A Maintenance

- Maintenance activities performed during a 6.9kV SDBD board outage include:
 - Breaker compartment inspections
 - Indicating light resistor replacements
 - Fuse blocks
 - Relays and instruments
 - Circuit breaker interface inspections and adjustments
 - Primary/Secondary disconnects
 - Shutter inspection
 - Breaker position and interface measurements and adjustments
 - Bus inspections and tests
 - As-found and as-left insulation resistance (megger) testing
 - Torque checks

Overview of 6.9 kV SDBD 1A-A Maintenance

Shutdown Board Maintenance Timeline		
	Activity	Duration
1	Install Clearance	6 Hours
2	Ground Installation	4.5 Hours
3	Breaker Compartment Inspections	42 Hours
4	Circuit Breaker Interface Inspections and Adjustments	34 Hours
5	Bus Inspections and Tests	8 Hours
6	Ground Removal	4.5 Hours
7	Release Clearance	6 Hours
	Total	105 Hours

- 105 Hours is 4 Days 9 hours.
- Remaining duration of the one-time TS change allows for a contingency should the maintenance activities identify the need for an unexpected repair.

Overview of 6.9 kV SDBD 1A-A Maintenance

- In addition to this proposed LAR, other changes will be required to facilitate SDBD maintenance.
 - On November 26, 2018, Tennessee Valley Authority (TVA) submitted an LAR to the completion times with alternating current (AC) power sources and AC electrical distribution subsystems.
 - > NRC acceptance of this LAR 1/3/2019
 - On November 29, 2018, TVA submitted an LAR to adopt the Technical Specification Task Force (TSTF) Traveler TSTF-500.
- The proposed TS changes contained in these LARs are not dependent on each other and may be approved individually. However, the approval of all proposed TS changes is necessary to provide the time required to perform 6.9kV SDBD 1A-A maintenance with WBN Unit 2 in operation.

Proposed One – Time Change for WBN Unit 2 TS 3.7.8

The proposed one–time change to the WBN Unit 2 TS 3.7.8 will:

- Add a new condition for modes 1-4 to increase the completion time for an inoperable ERCW Train from 72 hours to 7 days based on the following :
 - > When WBN Unit 1 is defueled.
 - > UHS temperature is $\leq 71^{\circ}\text{F}$.
 - > One ERCW System train is inoperable for planned maintenance of 6.9kV SD BD 1A-A.

Proposed
One -Time
Change for
WBN Unit 2
TS 3.7.8

3.7 PLANT SYSTEMS

3.7.8 Essential Raw Cooling Water (ERCW) System

LCO 3.7.8 Two ERCW trains shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>-----NOTES-----</p> <p><u>1. Only applicable when Unit 1 is defueled.</u></p> <p><u>2. Only applicable when Ultimate Heat Sink (UHS) temperature is ≤ 71 °F.</u></p> <p><u>3. Only applicable during planned maintenance on 6.9 kV shutdown board 1A-A.</u></p> <p>-----</p> <p><u>A. One ERCW train inoperable.*</u></p>	<p><u>A.1</u></p> <p>-----NOTES-----</p> <p><u>1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources - Operating," for diesel generator made inoperable by ERCW.</u></p> <p><u>2. Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops - MODE 4," for residual heat removal loops made inoperable by ERCW.</u></p> <p>-----</p> <p><u>Restore ERCW train to OPERABLE status.</u></p> <p><u>AND</u></p> <p><u>A.2</u></p> <p><u>Verify UHS temperature is ≤ 71 °F.</u></p>	<p><u>7 days</u></p> <p><u>1 hour</u></p> <p><u>AND</u></p> <p><u>Once every 12 hours thereafter</u></p>

(continued)

* This Condition will apply during the Unit 1 spring 2020 refueling outage (U1R16) or until May 1, 2020, whichever occurs first.

Proposed
One -Time
Change for
WBN Unit 2
TS 3.7.8

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<u>BA.</u> One ERCW train inoperable <u>for reasons other than Condition A.</u>	<u>BA.1</u> -----NOTES----- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources- Operating," for diesel generator made inoperable by ERCW. 2. Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops-MODE 4," for residual heat removal loops made inoperable by ERCW. ----- Restore ERCW train to OPERABLE status.	72 hours
<u>CB.</u> <u>Required Action A.1 and associated Completion Time not met.</u> <u>OR</u> Required Action and associated Completion Time of Condition <u>AB</u> not met.	<u>CB.1</u> Be in MODE 3. <u>AND</u> <u>CB.2</u> Be in MODE 5.	6 hours 36 hours

Basis for Proposed One-Time Change

- TVA employs a graded approach to defense in depth (DID) and protected equipment strategies when equipment is removed from service
 - > NPG-SPP-07.0 “Work Management”
 - » This program incorporates risk assessment methodologies and contingency processes to maximize personnel safety, plant safety, plant reliability, and worker productivity during plant modifications, maintenance, and testing.
 - > Includes both Online Work Management and Outage Management
 - » NPG-SPP-07.1 “On Line Work Management” provides the guidance for the development and risk assessment for the daily schedule and supports the 13 week rolling schedule
 - » NPG-SPP-07.2 “Outage Management” provides guidance for the development and risk assessment of the outage schedule
 - > NPG-SPP-07.3.4 “Protected Equipment”
 - » “Provides guidance for protecting plant equipment in order to minimize the potential for adverse operational events.

Basis for Proposed One-Time Change

- DID (cont.)
 - Engineering analyses have been performed with a single ERCW pump powered from the 6.9kV SDBD 2A-A (train A) in operation under the following bases
 - » Design basis accident in WBN Unit 2
 - » Loss of offsite power
 - » WBN Unit 1 100 hour limit prior to irradiated fuel movement (WBN TS 3.9.10)
 - » WBN Unit 1 defueled
 - » Unnecessary WBN Unit 1 ERCW cooling loads isolated.
 - » 6.9kV SDBD 1A-A Out of Service
 - » “B” ERCW train assumed failed
 - » UHS temperature of $\leq 71^{\circ}\text{F}$
 - This analyses conclude that a single ERCW pump powered from 6.9kV SDBD 2A-A can supply sufficient heat removal, while maintaining the outlet piping thermal stress temperature limits

Technical Evaluation

- Hydraulic Proto-Flo model is used for the ERCW analyses
 - Proto-Flo model was modified to reflect ERCW one pump configuration powered from 6.9kV SDBD 2A-A
 - Reconfigured flow rates were compared to the analyzed flow rates for required equipment
 - > For components where flow rates are less than analyzed;
 - » ERCW temperature versus ERCW flow curves were developed to determine the maximum allowable temperature for the one pump ERCW operation.
 - PROTO-HX was used to determine the ERCW temperature required for available flow rate for heat exchangers and discharge piping temperature limits
 - Heat transfer analyses were used for the shutdown board room and electric board room chiller performance
 - Outlet piping temperatures were evaluated to confirm piping thermal stress limits were not exceeded
 - The UHS temperature of 71°F ensures the required ERCW loads have sufficient cooling, while maintaining the outlet piping thermal stress temperature limits.

Technical Evaluation

- Conservatism in the analyses include
 - ERCW pump performance curve used represents the in-service surveillance testing (IST) minimum performance criterion.
 - Predicted flow rates for a single ERCW pump performance are reduced by 10% in the ERCW hydraulic analyses to account for measurement and analysis uncertainties
 - 100 gallon per minute (gpm) system leakage loss is assumed in the analyses. This accounts for any unidentified system leakage which is in excess of typical system leakage under normal operating conditions.
- Commitments included in the LAR
 - Hardware Changes
 - > To improve ERCW flow margin, emergency diesel generator 2A-A jacket water heat exchangers 2A1 and 2A2 will be replaced prior to implementation of the one-time TS change. The new heat exchangers are higher capacity units which require less ERCW cooling water flow.
 - Administrative Controls
 - > Site operational procedure(s) will be developed / revised to align the ERCW system in accordance with the analyses prior to entry into the one-time WBN Unit 2 TS change.

Regulatory Precedent

- The proposed LAR to WBN Unit 2 TS 3.7.8 is consistent with the license amendment approved by Nuclear Regulatory Commission (NRC) for the Sequoyah Nuclear Plant (SQN), that also made a change to TS 3.7.8 for SQN Units 1 and 2.
 - SQN LAR submitted on March 11, 2016 (ML16225A276)
 - Request for Additional Information (RAI) responses dated May 31, 2016 (ML16153A071) and July 22, 2016 (ML16207A205),
 - NRC Approval September 29, 2016 (ML16225A276)
- SQN LAR also added a new Condition A to TS 3.7.8 with a completion time of seven days and a limiting UHS temperature.
- Key differences are:
 - WBN LAR TS 3.7.8 Condition A is only applicable when WBN unit 1 is defueled
 - WBN LAR TS 3.7.8 Condition A is only applicable when one ERCW System train is inoperable for planned maintenance of 6.9kV SDBD 1A-A

Schedule for Submittal

- 1/16/19 - Pre-submittal meeting with NRC
- 2/28/19 - Submit LAR to NRC
- Request NRC approval by 2/15/20 with a 30-day implementation date to support the WBN Unit 1 outage scheduled for Spring 2020 (U1R16).
- March 2019 - Telecon or meeting to discuss any NRC questions

Closing Remarks

- Proposed one-time WBN Unit 2 TS change is needed to support scheduled maintenance activities of the 6.9kV SDBD 1A-A during the Unit1 R16 outage at WBN.
- Due to the commonality of the 6.9kV SDBDs, performing maintenance on 6.9kV SDBD 1A-A during a WBN Unit 1 refueling outage affects operability of the ERCW system for WBN Unit 2.
- The one-time change will extend the WBN Unit 2 TS 3.7.8 completion time from 72 hours to 7 days to support maintenance activities on 6.9kV SDBD 1A-A when WBN Unit 2 is in operation.
- This change is needed to support the WBN Unit 1R16 outage scheduled for Spring 2020.

