



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

CNL-19-106

October 24, 2019

10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 2
Facility Operating License No. NPF-96
NRC Docket No. 50-391

Subject: **Supplement to Application to Modify Watts Bar Nuclear Plant Unit 2 Technical Specifications 3.7.8 to Extend the Completion Time for an Inoperable Essential Raw Cooling Water Train on a One-Time Basis (WBN-TS-18-07) (EPID L-2019-LLA-0020)**

Reference: TVA Letter to NRC, CNL-19-014, "Application to Modify Watts Bar Nuclear Plant Unit 2 Technical Specifications 3.7.8 to Extend the Completion Time for an Inoperable Essential Raw Cooling Water Train on a One-Time Basis (WBN-TS-18-07)," dated February 7, 2019 (ML19038A483)

In the referenced letter, Tennessee Valley Authority (TVA) submitted a request for an amendment to the Technical Specifications (TS) for Watts Bar Nuclear Plant (WBN) Unit 2. The proposed amendment revises the WBN Unit 2 TS 3.7.8, "Essential Raw Cooling Water (ERCW)," on a one-time basis to support performance of maintenance on 6.9 kiloVolt (kV) Shutdown Board (SDBD) 1A-A and associated 480 Volt (V) boards and motor control centers (MCC).

As noted in Section 2.2 of Enclosure 1 to the license amendment request (LAR), the proposed new WBN Unit 2 TS 3.7.8, Condition A, extends the completion time for restoring an inoperable ERCW System train to operable status for up to seven days when performing planned maintenance on the 6.9 kV SDBD 1A-A and associated 480 V boards and MCC. Note 1 to the proposed new Condition A states:

"1. Only applicable during the Unit 1 spring 2020 outage (U1R16), but no later than May 1, 2020."

Due to the recent extended outage of WBN Unit 1, TVA has decided to delay the start date of the U1R16 outage from March 10, 2020 to an anticipated start date of April 24, 2020. The U1R16 outage is expected to be completed by May 25, 2020. Therefore, TVA is supplementing the LAR to change the date in Note 1 to the proposed TS 3.7.8 Condition A from May 1, 2020, to May 31, 2020, to allow for sufficient time for any unexpected delays during the U1R16 schedule.

The enclosure to this submittal provides a revised Section 2.2 of Enclosure 1 to the referenced letter reflecting the above date change. The enclosure also provides a revised Figure 1 from Section 3.2.4 of Enclosure 1 to the referenced letter to reflect the WBN ERCW intake temperature history from April and May between 2015 and 2018 along with the corresponding text for this figure. Revision bars are provided in Enclosure 1 to reflect the changes. The revised Sections 2.2 and 3.2.4 of Enclosure 1 to the referenced letter supersedes the one provided in the referenced letter.


Attachment 1 to the enclosure provides a revised markup of the proposed WBN Unit 2 TS 3.7.8 (page 3.7-18). Attachment 2 to the enclosure provides a revised (re-typed) WBN Unit 2 TS 3.7.8 (page 3.7-18). Attachment 3 to the enclosure provides a revised markup of TS Bases 3.7.8 (page B3.7-44). The changes to the TS Bases are provided for information only. The revised TS 3.7.8 and Bases in Attachments 1, 2, and 3 to the enclosure of this submittal supersede those provided in the referenced letter.

The change in the outage dates for WBN Unit 1 will not adversely impact any expected change in the ERCW intake temperature. Furthermore, the results of the thermal-hydraulic analysis in the referenced letter are unchanged for determining that ERCW will supply adequate cooling to WBN Unit 2 during a postulated loss of coolant accident (LOCA), as well as WBN Unit 1 after entering a defueled condition, when the ultimate heat sink temperature is less than or equal to 71°F. Therefore, the enclosure to this letter does not change the no significant hazard considerations nor the environmental considerations contained in the referenced letter. Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and the enclosure to the Tennessee Department of Environment and Conservation.

There are no new regulatory commitments associated with this submittal. Please address any questions regarding this request to Kimberly D. Hulvey at (423) 751-3275.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 24th day of October 2019.

Respectfully,



James T. Polickoski
Director, Nuclear Regulatory Affairs

Enclosure: Revised Sections 2.2 and 3.2.4 to Enclosure 1 of the License Amendment Request and Associated Revised Technical Specification and Bases

cc (see Page 3)

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cc (Enclosure):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Watts Bar Nuclear Plant
NRC Project Manager – Watts Bar Nuclear Plant
Director, Division of Radiological Health - Tennessee State Department of Environment
and Conservation

Revised Section 2.2 and 3.2.4 to Enclosure 1 of the License Amendment Request and Associated Revised Technical Specification and Bases

2.2 PROPOSED CHANGE

A one-time change to WBN Unit 2 TS 3.7.8 is proposed that extends the completion time for restoring an inoperable ERCW System train to operable status for planned maintenance on 6.9 kV SDBD 1A-A and associated 480 V boards and MCCs, when WBN Unit 1 is defueled and ultimate heat sink (UHS) temperature is less than or equal to (\leq) 71°F. The proposed changes are reflected in Enclosures 3 and 4 to this submittal and are summarized below:

- New TS 3.7.8 Condition A applies when one ERCW train is inoperable. The new Condition is modified by the four notes below. All four notes are required to be met in order to use new Condition A.
 1. Only applicable during the Unit 1 spring 2020 outage (U1R16), but no later than May 31, 2020.
 2. Only applicable when Unit 1 is defueled.
 3. Only applicable when UHS temperature is \leq 71 °F.
 4. Only applicable during planned maintenance on 6.9 kV SDBD 1A-A and associated 480 V boards and MCCs.
- Required Action A.1 for the proposed Condition A of WBN Unit 1 TS 3.7.8 specifies restoration of the affected ERCW train to operable status with a completion time of seven days. This required action is modified by two notes that require entry into applicable Conditions and Required Actions of Limiting Condition for Operation (LCO) 3.8.1, "AC Sources - Operating," for the inoperable emergency diesel generator (EDG) and LCO 3.4.6, "RCS Loops - MODE 4," for Residual Heat Removal (RHR) loops made inoperable by the ERCW system condition during shutdown board maintenance. These notes are an exception to LCO 3.0.6 and ensure the proper actions are taken for the affected components in these systems.
- Required action A.2 specifies that the UHS temperature be verified to be \leq 71°F within one hour and once every 12 hours thereafter. If the UHS temperature is found to be greater than 71°F, then the analytical assumptions for justifying the extended completion time for Condition A are no longer met and Condition B is entered for an inoperable ERCW train for reasons other than Condition A. The frequency of 12 hours is consistent with the frequency for other site shiftly surveillances and is appropriate because the temperature of the Tennessee River does not fluctuate significantly over a 12-hour period.
- Condition A (re-sequenced as Condition B) is changed to apply for reasons other than new Condition A.
- Condition B (re-sequenced as Condition C) is changed to also apply when Required Action A.1 and associated Completion Time are not met. Therefore, when an ERCW train is inoperable for maintenance on 6.9 kV SDBD 1A-A (and associated 480 V boards and MCCs) and is not restored to an operable status in seven days, the unit is required to be placed in Mode 3 in 6 hours and Mode 5 in 36 hours.

In addition to this proposed license amendment, other TS changes will be required to facilitate electrical board maintenance through separate license amendment requests (LAR). Specifically, in Reference 1, TVA submitted an LAR to extend the completion

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Revised Section 2.2 and 3.2.4 to Enclosure 1 of the License Amendment Request and Associated Revised Technical Specification and Bases

times associated with alternating current (AC) power sources and AC electrical distribution subsystems. In Reference 2, TVA submitted an LAR to adopt Technical Specification Task Force (TSTF) Traveler TSTF-500, Revision 2, "DC Electrical Rewrite - Update to TSTF-360." The requested changes within this LAR do not rely on the approval of the proposed changes contained in References 1 and 2.

3.2.4 Evaluation Method and Approach

A comprehensive and scenario-specific thermal hydraulic analysis was developed to determine the ERCW and CCS alignments required to support the proposed completion time for restoring an inoperable ERCW train. The prerequisite ERCW train valve alignments were analyzed to ensure safe plant operation during the extended completion time for electrical board maintenance. The analysis was conducted in accordance with the following approach and methodology.

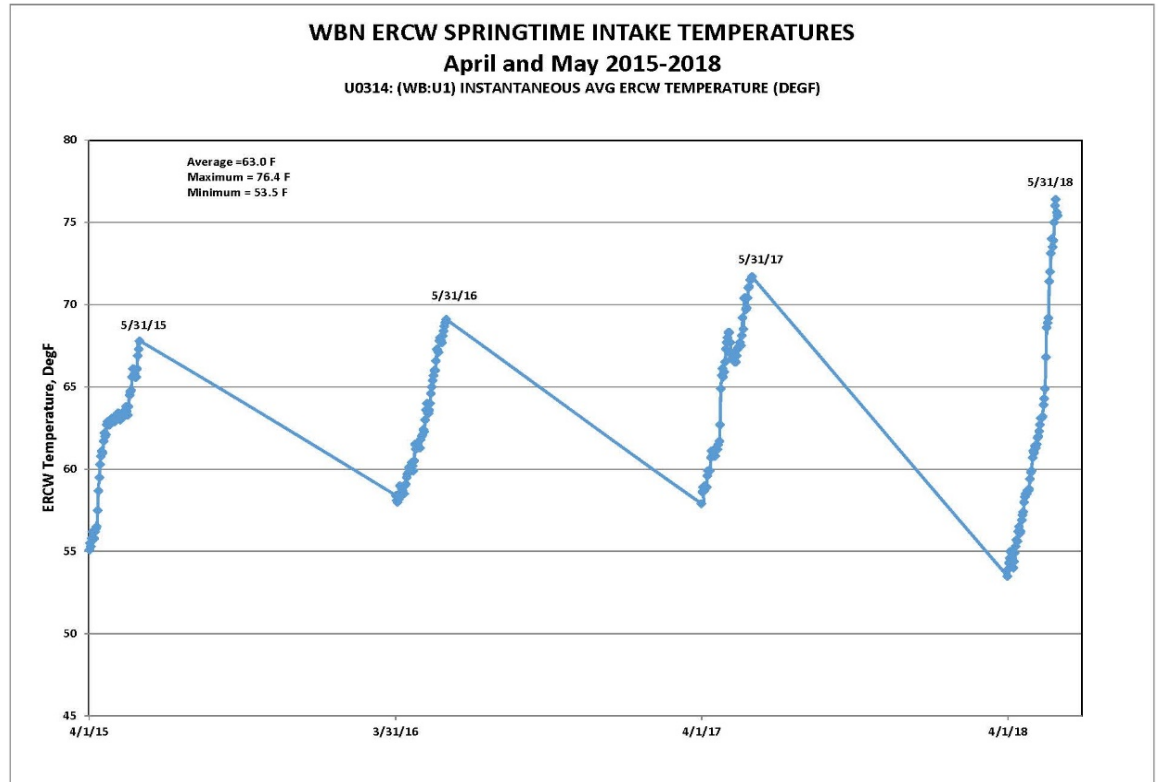
The ERCW System and CCS are shared systems supporting dual-unit operation. Four 6.9 kV SDBDs power the safety-related equipment on both units. The 6.9 kV SDBDs are required to support the shared ERCW and CCS safety functions. At the current design basis UHS temperature of 85°F supplying the ERCW System, a dual-unit outage is required to perform periodic maintenance on the boards. However, the required ERCW cooling water flow to the essential components is lower at reduced ERCW temperatures and the UHS temperature is historically lower than 85°F during springtime refueling outages.

As indicated in Figure 1, a review was performed of the past four years of plant data for the ERCW temperature throughout the months of April and May. As shown in this figure, the overall average temperature is 63°F. While Figure 1 does show ERCW temperatures exceeding 71°F towards the middle to later periods of May, it should be noted that the planned maintenance of the 6.9 kV SDBD 1A-A and associated 480 V boards and MCCs is planned to be completed within the first two weeks of the U1R16 outage following WBN Unit 1 being defueled (i.e., the planned maintenance is planned to be completed by May 7, 2019). Therefore, the ERCW temperature is expected to be below 71°F when the planned maintenance is performed. Additionally, during the outage, TVA monitors the river temperature to ensure the ERCW temperature is not expected to exceed 71°F during the period of the scheduled maintenance. Furthermore, the results of the thermal-hydraulic analysis provided in Section 3.2 remain valid for determining that ERCW will supply adequate cooling to WBN Unit 2 during a postulated loss of coolant accident (LOCA), as well as WBN Unit 1 after entering a defueled condition, when the UHS temperature is less than or equal to 71°F. The date of May 31, 2020, in Note 1 to the proposed TS 3.7.8 Condition A is approximately one week from the scheduled end date of the U1R16 outage to allow for sufficient time for any unexpected delays during the U1R16 schedule. In the unlikely event the UHS temperature exceeds 71°F during the performance of the planned maintenance, TVA would take the appropriate actions in accordance with TS 3.7.8.

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Figure 1 - WBN ERCW Intake Temperature History



The analysis determined the available ERCW flow to each ESF component when 6.9 kV SDBD 1A-A is out of service, and then determined the maximum allowable ERCW temperature at the respective available flow rate for each essential component to transfer its design basis heat load. The limiting ERCW component temperature was then compared to the historical springtime Tennessee River temperature data to demonstrate the available UHS margin, allowing one 6.9 kV SDBD to be removed from service for up to seven days during a spring refueling outage.

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Initial Conditions

- WBN Unit 2 operating at 100 percent of rated thermal power,
- WBN Unit 1 in a defueled condition more than 100 hours after shutdown,
- Unnecessary WBN Unit 1 ERCW loads are isolated from the ERCW System, leaving the spent fuel pool as the remaining WBN Unit 1 ERCW load, and
- UHS temperature is $\leq 71^{\circ}\text{F}$.

Scenario

A design basis LOCA is postulated to occur on WBN Unit 2 during the WBN Unit 1 spring refueling outage after 6.9 kV SDBD 1A-A is removed from service for planned maintenance. Concurrent with the LOCA, a LOOP and a worst case single active failure of Train B (SDBDs and EDGs 1B-B and 2B-B) is assumed, leaving 6.9kV SDBD 2A-A and associated EDG 2A-A to supply power to the ESFs and components.

There are three major steps in the analysis. First, the flow-balanced and benchmarked hydraulic model of the ERCW System is configured for the LOCA unit (WBN Unit 2) with non-essential WBN Unit 1 ERCW loads isolated. This step determines the ERCW flow rate available to each ESF component. The flow rates are compared to the design basis flow rates required at the design basis UHS temperature and components predicted to receive less than design basis flow are identified.

Next, component-specific thermal analyses are performed to determine the reduced ERCW temperature required to transfer the component-specific design basis heat load, with margin at the reduced available ERCW flow. Three different types of thermal analysis are applied, consistent with the component type. The shell and tube heat exchangers are modeled with PROTO-HX software, the board room chillers are modeled with energy balance spreadsheet models, and the finned-tube air coils are modeled with PROTO-HX Air Coil software.

Finally, a composite PROTO-FLO/PROTO-HX thermal model of the ERCW and CCS is utilized to evaluate the overall performance of both systems, showing that the design basis heat loads are transferred with margin and that outlet temperature limits are not exceeded. This step determines the overall limiting condition for the maximum ERCW temperature allowed throughout the proposed TS completion time extension.

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Revised Section 2.2 and 3.2.4 to Enclosure 1 of the License Amendment Request and
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Attachment 1

Revised WBN Unit 2 TS 3.7.8 (page 3.7-18) (marked-up)

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>1. <u>Only applicable during the Unit 1 spring 2020 outage (U1R16) but no later than May 31, 2020.</u></p> <p>2. <u>Only applicable when Unit 1 is defueled.</u></p> <p>3. <u>Only applicable when Ultimate Heat Sink (UHS) temperature is ≤ 71 °F.</u></p> <p>4. <u>Only applicable during planned maintenance on 6.9 kV shutdown board 1A-A and associated 480 V boards and motor control centers.</u></p> <p>-----</p> <p>A. <u>One ERCW train inoperable.</u></p>	<p><u>A.1</u></p> <p>-----NOTES-----</p> <p>1. <u>Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources - Operating," for diesel generator made inoperable by ERCW.</u></p> <p>2. <u>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>

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Revised Section 2.2 and 3.2.4 to Enclosure 1 of the License Amendment Request and
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Attachment 2

Revised WBN Unit 2 TS 3.7.8 (page 3.7-18) (re-typed)

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> <ol style="list-style-type: none"> Only applicable during the Unit 1 spring 2020 outage (U1R16) but no later than May 31, 2020. Only applicable when Unit 1 is defueled. Only applicable when Ultimate Heat Sink (UHS) temperature is ≤ 71 °F. Only applicable during planned maintenance on 6.9 kV shutdown board 1A-A and associated 480 V boards and motor control centers. <p>-----</p> <p>A. One ERCW train inoperable.</p>	<p>A.1</p> <p>-----NOTES-----</p> <ol style="list-style-type: none"> Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources - Operating," for diesel generator made inoperable by ERCW. Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops - MODE 4," for residual heat removal loops made inoperable by ERCW. <p>-----</p> <p>Restore ERCW train to OPERABLE status.</p> <p><u>AND</u></p> <p>A.2</p> <p>Verify UHS temperature is ≤ 71 °F.</p>	<p>7 days</p> <p>1 hour</p> <p><u>AND</u></p> <p>Once every 12 hours thereafter</p>

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Revised Section 2.2 and 3.2.4 to Enclosure 1 of the License Amendment Request and
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Attachment 3

Revised TS Bases 3.7.8 (page B3.7-44) (marked-up)

BASES (continued)

APPLICABILITY In MODES 1, 2, 3, and 4, the ERCW System is a normally operating system that is required to support the OPERABILITY of the equipment serviced by the ERCW System and required to be OPERABLE in these MODES.

In MODES 5 and 6, the OPERABILITY requirements of the ERCW System are determined by the systems it supports.

ACTIONS

A.1 and A.2

Condition A is modified by four notes that limit the conditions and parameters that allow entry into Condition A. The first note limits the applicability of Condition A to the time period when Unit 1 is in a refueling outage in spring 2020, but no later than May 31, 2020. The second note limits the applicability of Condition A to the time period when Unit 1 is defueled. The third note requires a temperature limitation on UHS Temperature. The fourth note states that Condition A is only applicable during planned maintenance on 6.9 kV shutdown board 1A-A (1-BD-211-A) and associated 480 V boards and motor control centers (i.e., 1-BD-212-A1-A, 1-BD-212-A2-A, 1-MCC-213-A1-A, 1-MCC-213-A2-A, 1-MCC-214-A1-A, 1-MCC-214-A2-A, 1-MCC-215-A1-A, 1-MCC-215-A2-A, and 1-MCC-232-A-A). This will allow the plant configuration to be aligned (i.e., cross-ties exist and isolation of loads to facilitate maintenance and modification activities) to minimize the heat load on the ERCW system to ensure ERCW continues to meet its design function.

The 7 day completion time is acceptable based on the following:

- Low probability of a DBA occurring during that time.
- Heat load on the ERCW System is substantially lower than assumed for the DBA with the opposite unit defueled.
- Redundant capabilities afforded by the OPERABLE train.

If one ERCW system train is inoperable for planned maintenance, action must be taken to restore to an OPERABLE status within 7 days. In this Condition, the remaining OPERABLE ERCW system train is adequate to perform the heat removal function. However, the overall reliability is reduced because a single failure in the OPERABLE ERCW system train could result in loss of ERCW system function.

Required Action A.1 is modified by two Notes. The first Note indicates that the applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources - Operating," should be entered if an inoperable ERCW system train results in an inoperable diesel generator. The second Note indicates

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