

## NRR-DMPSPeM Resource

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**From:** Schaaf, Robert  
**Sent:** Friday, May 3, 2019 2:50 PM  
**To:** Wells, Russell Douglas  
**Cc:** Hulvey, Kimberly Dawn; Edmondson, Carla; Brown, Michael Anthony; Shoop, Undine; Saba, Farideh  
**Subject:** Watts Bar Nuclear Plant - Final Request for Additional Information Related to Application to Revise Technical Specifications Regarding DC Electrical Systems TSTF-500, Revision 2 (EPID L-2018-LLA-0494)  
**Attachments:** Watts Bar - Final RAIs TSTF-500.pdf

Russ,

By letter dated November 29, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18334A389), the Tennessee Valley Authority (TVA) submitted a license amendment request for the Watts Bar Nuclear Plant (WBN), Units 1 and 2. The requested amendments would modify TS requirements related to direct current (DC) electrical systems in accordance with Technical Specification Task Force (TSTF) Traveler TSTF-500, Revision 2, "DC Electrical Rewrite - Update to TSTF-360."

The U.S. Nuclear Regulatory Commission (NRC) staff has determined that additional information, as described in the attached request for additional information (RAI), is required for the staff to complete its review of the subject request.

These RAIs were transmitted to TVA as draft on April 1, 2019. TVA requested a clarification teleconference regarding the draft RAIs, which was held on April 23, 2019. During the call, the staff agreed to minor wording changes to RAI EEOB-1 and RAI EEOB-2.

During the call, TVA requested a date of June 7 (45-days from the date of clarification call) to respond to this request. The staff has determined that the requested response period is acceptable. Therefore, please provide TVA's responses to the attached RAIs by June 7, 2019, in order to enable the staff to complete its review in accordance with TVA's requested schedule for issuance of the amendment. Please call me at 301-415-6020 if you have any additional questions regarding this request for information.

Regards,

*Robert G. Schaaf*

Senior Project Manager

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U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Division of Operating Reactor Licensing  
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REQUEST FOR ADDITIONAL INFORMATION  
REGARDING LICENSE AMENDMENT REQUEST TO REVISE TECHNICAL  
SPECIFICATIONS TO ADOPT TECHNICAL SPECIFICATIONS TASK FORCE (TSTF)  
TRAVELLER TSTF-500, REVISION 2, "DC ELECTRICAL REWRITE – UPDATE TO TSTF-360"  
TENNESSEE VALLEY AUTHORITY  
DOCKET NOS. 50-390 AND 50-391  
WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2

1.0 INTRODUCTION

By letter dated November 29, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession number ML18334A389), Tennessee Valley Authority (TVA, the licensee), requested an amendment to Facility Operating Licenses NPF-90 and NPF-96 for Watts Bar Nuclear Plant (WBN), Units 1 and 2. The proposed license amendment request would revise the WBN Units 1 and 2 TS to adopt the Nuclear Regulatory Commission (NRC)-approved Technical Specifications Task Force (TSTF)-500, Revision 2, "DC [direct current] Electrical Rewrite – Update to TSTF-360." Specifically, the licensee proposed changes to the TS requirements related to DC electrical power systems in TS 3.8.4, "DC sources – Operating," TS 3.8.5, "DC Sources – Shutdown," and TS 3.8.6, "Battery Cell Parameters." Additionally, the licensee proposed to add to the TS Section 5.7, "Procedures, Programs, and Manuals," a new program titled "Battery Monitoring and Maintenance Program."

The Electrical Engineering Operating Branch (EEOB) staff has determined that the following additional information is needed to complete the review of the WBN license amendment request (LAR).

Regulatory Requirements

Title 10 of the *Code of Federal Regulations*, Part 50 (10 CFR 50), Section 36, "Technical Specifications," requires, in part, that the operating license of a nuclear production facility include TS. 10 CFR 50.36 (c)(2) requires that the TS include limiting conditions for operation (LCOs) which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.

10 CFR 50, Appendix A, General Design Criterion (GDC) 17, "Electric power systems," states, in part, that "an onsite electric power system and an offsite electric power system shall be provided to permit functioning of structures, systems, and components important to safety.... The onsite electric power supplies, including the batteries, and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure."

Regulatory Guidance

TSTF-500, Revision 2, "DC Electrical Rewrite – Update to TSTF-360," dated September 22, 2009 (ADAMS Accession No. ML092670242).

EEOB RAI -1

The licensee proposed a new TS 3.8.4 Condition A with associated Required Actions and Completion Time for the required vital battery charger(s).

Condition A would state:

Condition A	One or two required vital battery charger (s) on one subsystem inoperable
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Required Actions A.1, A.2, and A.3 would state:

Required Action A.1	Restore battery terminal voltage to greater than or equal to the minimum established float voltage.
Completion Time	2 hours
<u>AND</u>	
Required Action A.2	Verify battery float current $\leq$ 2 amps.
Completion Time	Once per 12 hours

In Enclosure 4 of the LAR, the licensee provided a commitment to include in the WBN updated safety analysis report (UFSAR) "a requirement to maintain a 2 percent design margin for the vital batteries which corresponds to a 2 amp float current value being used as an indication that the battery is at least 98 percent charged."

In Enclosure 6 of the LAR, the licensee stated that the "normal recharging of the battery from the design discharged condition can be accomplished in approximately 12 hours (with accident loads being supplied) following a 30-minute AC power outage and in approximately 36 hours (with normal loads being supplied) following a 4-hour AC power outage."

The NRC has identified the following discrepancies:

The 2-amp float current value for the vital batteries provides an indication that the batteries are less than 100 percent charged. It does not appear that a discussion about how the 2 percent design margin would ensure that the vital batteries would be 100 percent charged at a 2-amp float current was provided.

It appears that it could take longer than 12 hours to fully recharge a vital battery that would be discharged for a period longer than 30 minutes before connecting the spare charger.

The staff requests the following information to address these discrepancies:

- a) Explain how maintaining a "2 percent design margin ... as an indication that the battery is at least 98 percent charged" will ensure that the WBN vital batteries are fully charged (i.e., capable of performing their design function).

- b) Provide a discussion to demonstrate that the vital battery can be fully recharged in 12 hours from Condition A after a 2-hour discharge (i.e., the time allowed by Required Action A.1 to place the spare charger on the battery).

EEOB RAI-2

The licensee proposed a new TS 3.8.4 Condition D with associated Required Actions and Completion Time for the diesel generator (DG) battery charger(s).

Condition D would state:

Condition D	One DG DC battery charger inoperable
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Required Actions D.1, D.2, and D.3 would state:

Required Action D.1	Restore DG battery terminal voltage to greater than or equal to the minimum established float voltage.
Completion Time	2 hours
<u>AND</u>	
Required Action D.2	Verify battery float current $\leq 1$ amp.
Completion Time	Once per 12 hours
<u>AND</u>	
Required Action D.3	Restore DG battery charger to OPERABLE status
Completion Time	72 hours

In Enclosure 4 of the LAR, the licensee provided a commitment to include in the WBN UFSAR “a requirement to maintain a 2 percent design margin for the DG batteries which corresponds to a 1 amp float current value being used as an indication that the battery is at least 98 percent charged.”

The NRC has identified the following discrepancies:

The 1-amp float current value for the DG batteries provides an indication that the DG batteries are less than 100 percent charged. It does not appear that a discussion about how the 2 percent design margin would ensure that the vial batteries would be 100 percent charged at a 2-amp float current was provided.

The 12-hour and 72-hour completion times for verifying battery float current and for restoring the battery to operable status, respectively, are bracketed in the TSTF-500. It does not appear that the bases for the proposed 12 hours and 72 hours for Required Actions D.2 and D.3, respectively, were provided.

The staff requests the following information to address these discrepancies:

- a) Explain how maintaining a “2 percent design margin ... as an indication that the battery is at least 98 percent charged” will ensure that the WBN DG batteries are fully charged (i.e., capable of performing their design function).

- b) Provide the WBN basis for the 12-hour and the 72-hour completion times for Required Actions D.2 and D.3, respectively.

EEOB RAI-3

The licensee proposed to revise SR 3.8.4.12 and renumber it as SR 3.8.4.6.

Renumbered SR 3.8.4.6 would state:

SR 3.8.4.6

-----NOTE-----  
 Credit may be taken for unplanned events that satisfy this SR.  
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Verify each DG battery charger supplies  $\geq 20$  amps at greater than or equal to the minimum established float voltage for  $\geq 4$  hours.

OR

Verify each DG battery charger can recharge the battery to the fully charged state within 24 hours while supplying the largest combined demands of the various continuous steady state loads, after a battery discharge to the bounding design basis event discharge state.

The NRC staff notes that a discussion about the basis for the proposed 4 hours and 24 hours testing durations in the renumbered SR 3.8.4.6 was not provided.

Explain the basis for the proposed 4 hours and 24 hours testing durations for the WBN DG battery chargers.

EEOB RAI-4

In Enclosure, Section 1.0 of the LAR, the licensee proposed relocating the Technical Specification (TS) Table 3.8.6-1, "Battery Surveillance Requirements," to the proposed Battery Monitoring and Maintenance Program in TS 5.7. The Table 3.8.6-1 includes Category A, B, and C limits for the battery cell parameters (i.e., electrolyte level, float voltage, specific gravity).

Confirm that the battery cell parameters (electrolyte level, float voltage, specific gravity) will continue to be controlled at their current Categories A, B, and C levels in the TS Battery Monitoring and Maintenance Program, and that actions to restore deficient values will be implemented in accordance with the licensee's corrective action program.

EEOB RAI-5

The proposed new TS 3.8.6 Condition A would apply when one DG battery is found with one or more battery cell(s) with a float voltage of less than 2.07 volts (V).

The NRC staff notes that the 2.07-V for the battery cell float voltage is bracketed in TSTF-500. It does not appear that the basis for the proposed 2.07-V limit for the WBN DG battery cell float voltage was provided.

Explain the WBN basis for the 2.07-V limit for the WBN DG battery cell float voltage.

#### EEOB RAI-6

The licensee proposed adding a new TS 3.8.6 Condition F which would apply to one or two required vital battery (ies) on one subsystem or one DG battery found with a pilot cell electrolyte temperature less than the minimum established design limits. The Required Action F.1 would restore the pilot cell electrolyte temperature to greater than or equal to minimum established design limits within 12 hours.

In Enclosure 1 of the LAR, the licensee states: "TVA verifies that battery room temperature is routinely monitored such that a room temperature excursion could reasonably expect to be detected and corrected prior to the average battery electrolyte temperature dropping below the minimum electrolyte temperature."

Regarding the selection of pilot cells, the TSTF-500 states:

Previously, average battery temperature was monitored instead of pilot cell temperature. As a result, temperature was not a criterion with selecting a pilot cell. In order to use pilot cell temperature instead of the average battery temperature, temperature must be used as a criterion when selecting the pilot cell. [...] For batteries where it could be shown that the maximum temperature deviation across the battery did not exceed the IEEE 450 recommended maximum of 5°F [degrees Fahrenheit], the NRC has accepted that the cell temperature was not a critical parameter. Therefore, for these batteries, cell temperature did not have to be taken into account when selecting pilot cells.

The NRC has identified the following discrepancies:

It appears that a discussion about the frequency of monitoring the battery room and how the battery room temperature would be restored if it was outside the temperature design limits was not provided.

It appears that a discussion about the selection of the WBN battery pilot cell based on temperature was not provided.

The staff requests the following information to address these discrepancies:

- a) Provide a discussion about how the vital and DG battery rooms temperatures are monitored at WBN and provide the minimum frequencies at which the temperatures are monitored. Also explain how the licensee would restore the vital and DG battery rooms' temperatures if they were outside the temperature design limits.
- b) Provide a discussion about the selection of the battery pilot cell based on temperature. If the temperature will not be used as a criterion for selecting battery pilot cells, provide an analysis of temperature deviations for the WBN batteries based on operation experience to show that the maximum temperature deviation across the batteries does not exceed the IEEE 450 recommended maximum of 5°F.

EEOB RAI-7

The licensee proposed a new TS 3.8.6 Condition G out-of-limit parameters for batteries in redundant subsystems based on the TSTF-500 TS 3.8.6 Condition E for NUREG-1431, "Standard Technical Specifications Westinghouse Plants," Revision 1.

WBN TS 3.8.6 Condition G and associated Required Action G.1 would state:

Condition G	One or more batteries in redundant subsystems with battery parameters not within limits. <u>OR</u> More than one DG battery with battery parameters not within limits.
Required Action G.1 Completion Time	Restore battery parameters to within limits. 2 hours

The NRC has identified the following discrepancies:

The first option of the proposed Condition G did not specify the type of batteries which the condition pertains to.

The Required Action E.1 in TSTF-500 restores the parameters for the batteries in one subsystem whereas the proposed Required Action G.1 would restore the parameters for all batteries [in the redundant (both) subsystems].

The staff requests the following information to address these discrepancies:

- a) Clarify the type of batteries that would be addressed in the first option condition of the proposed TS 3.8.6 Condition G.
- b) Explain the basis for deviating from the TSTF-500 Required Action for restoring the parameters for the batteries in one subsystem.

EEOB RAI-8

In Enclosure 4 of the LAR, the licensee provided a commitment to verify that plant procedures will require verification of the selection of the pilot cell or cells when performing SR 3.8.6.5. The proposed new SR 3.8.6.5 would verify that each required vital battery and each DG battery pilot cell temperature is greater than or equal to minimum established design limits.

The NRC staff notes that the verification of the selection of the pilot cell or cells should be done when performing the SR that verifies the battery connected cell float voltage, as stated in the TSTF-500.

Provide the justification for deviating from TSTF-500 with respect to the verification of the selection of the pilot cell during the SR for battery cell float voltage.