Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

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

Watts Bar Nuclear Plant, Unit 2
NRC Docket No. 50-391

Subject: **Watts Bar Nuclear Plant (WBN) Unit 2 – Safety Evaluation Report Supplement 22 (SSER22) - Response to NRC Required Action Item**

Appendix HH of NUREG-0847, Supplement 22, "Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Unit 2," contains 51 "required action items associated of all open items, confirmatory issues, and proposed license conditions that the staff has identified."

Enclosure 1 contains the required actions and response to action item 30.

If you have any questions, please contact Bill Crouch at (423) 365-2004.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 12th day of August, 2011.

Respectfully,

E. E. Freeman
Watts Bar Unit 2 Completions Manager

D030
NRR

Enclosure:

1. Response to Action Item From Appendix HH of NUREG-0847, Supplement 22

cc (Enclosure):

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ENCLOSURE 1

Response to Action Item From Appendix HH of NUREG-0847, Supplement 22

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The item numbers used below correspond to item numbers in SSER 22, Appendix HH.

SER Open Item 30

TVA should confirm that all safety-related equipment (in addition to the Class 1E motors) will have adequate starting and running voltage at the most limiting safety-related components (such as motor-operated valves (MOVs), contactors, solenoid valves or relays) at the DVR setpoint dropout setting. TVA should also confirm that (1) the motor-starting transient studies are based on the dropout voltage value of DVR and time delay, (2) the steady-state voltage drop studies are carried out by maximizing running loads on the Class 1E distribution system (bounding combination of safety systems loads), with the voltage at 6.9-kV Class 1E buses (monitored by the DVRs) at or just above the DVR dropout setting, and (3) the DVR settings do not credit any equipment operation (such as LTC transformers) upstream of the 6.9-kV Class 1E buses. TVA should also confirm that the final technical specifications (TSs) are properly derived from these analytical values for the degraded voltage settings. This is Open Item 30

TVA response:

Summary

In response to SER Open Item 30, TVA has performed a motor-starting transient study with the 6.9kV Shutdown Boards maintained at the DVR dropout setting and applying the worst-case accident block-start loading (bounding combination of safety system loads). This analysis did not credit any non-Class 1E equipment upstream of the 6.9-kV Class 1E buses (such as automatic Load Tap Changers (LTCs) or administratively controlled grid capacity). TVA has confirmed that all Class 1E motors required to start and mitigate an accident will have adequate voltage.

Additionally, TVA's existing DVR setpoint analysis evaluated steady-state running accident loading (maximum running load) with the 6.9kV Shutdown Boards at the analytical limit, which is below the DVR dropout setting (including equipment tolerances). This analysis verified all safety-related equipment (motors, static loads) had adequate running voltage. Likewise, the analysis did not credit any non-Class 1E equipment upstream of the 6.9-kV Class 1E buses (such as LTC transformers or administratively controlled grid capacity).

TVA has confirmed that the final Technical Specifications are properly derived from the original analysis values for the DVR settings. The motor starting transient study prepared in response to SER 30, performed without modeling actual offsite power system performance, confirmed that the original setpoint methodology was appropriately conservative.

ENCLOSURE 1

Response to Action Item From Appendix HH of NUREG-0847, Supplement 22

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Background

TVA performed electrical distribution system analysis for motor-starting voltages to reach the conclusions stated above. In performing the additional motor-starting transient study, TVA took into account, in part, feedback provided to TVA by NRC staff at public meetings held June 28-29, 2011 in Rockville, MD and July 25, 2011 in Dana Point, CA. These meetings discussed degraded voltage issues including issues associated with proposed Regulatory Issues Summary 2011-XX, "Adequacy of Station Electric Distribution System Voltages."

Specifically, TVA

1. Performed power system analysis and modeling using ETAP software
2. Assumed the 6.9 kV Shutdown Board voltage was fixed at the same analytical limit as the existing Degraded Voltage Setpoint Analysis. (This is below the DVR dropout setting and included equipment tolerances.) To ensure the analysis did not credit any non-Class 1E equipment upstream of the 6.9-kV Class 1E buses (such as LTC transformers or administratively controlled grid capacity) the Class 1E system was modeled as separated from the upstream system and powered by a fixed voltage source (infinite bus) as discussed by NRC staff at the public meetings associated with Draft RIS 2011-XX discussed above.
3. Performed the block-starting analysis with all Safety Injection-actuated loads starting, with maximum normal operation loading present.
4. Evaluated resulting starting voltages at the terminals of the safety-related motors. Terminal voltage was assessed against vendor data or a conservative value.

TVA's positions is that, while responsive to the RAI and feedback from NRC staff on expected modeling assumptions, the analysis does not model the expected physical performance of the electrical distribution system and is in fact a non-conservative analysis compared to TVA's existing design analysis.