



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

William J. Museler
Site Vice President
Watts Bar Nuclear Plant

APR 26 1993

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

Gentlemen:

In the Matter of the Application of) Docket Nos. 50-390
Tennessee Valley Authority) 50-391

WATTS BAR NUCLEAR PLANT (WBN) - UNITS 1 AND 2 - VITAL BATTERY TESTING -
2-HOUR TEST VERSUS 4-HOUR TEST

The purpose of this letter is to provide NRC with information relating to TVA's basis for performing safety-related battery testing using a 2-hour profile instead of a 4-hour profile.

The future implementation of the Station Blackout (SBO) requirements of 10 CFR 50.63 will involve a 4-hour coping event which will not become a design basis event. The safety evaluation approving TVA's approach to SBO was recently issued and does not require implementation of SBO until 2 years after the SER (i.e., after fuel load). The sizing design of WBN vital batteries is based on loss of all AC power for 2 hours. The current FSAR, design criteria, supporting calculations, preoperational test scoping documents, test instructions, etc., all reflect the 2-hour event. Since the preoperational tests have not yet been performed, and since SBO may be implemented at startup, the Region II staff has questioned using a 2-hour service test versus a 4-hour service test for preoperational testing (Reference NRC Inspection Report 390, 391/93-17).

TVA has determined that either test would be adequate for the purposes of preoperational testing. The use of the 2-hour test would not compromise the conservatism or validity of the testing based on the following:

1. The 2-hour service test duty cycle current values were based on the maximum available capacity for the batteries at their minimum design temperature and aged to 80% manufacturers rating. This was done by adding the calculated spare margin to the duty cycle from the battery sizing calculation. If the same technique is applied to the 4-hour

9305040044 930426
PDR ADOCK 05000390
A PDR

Doyle
1/0

U.S. Nuclear Regulatory Commission
Page 3

APR 26 1993

cc: NRC Resident Inspector
Watts Bar Nuclear Plant
P.O. Box 700
Spring City, Tennessee 37381

Mr. P. S. Tam, Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852

U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

APR 26 1993

duty cycle then both tests are testing the battery to the same performance capability. (It may be noted that more ampere-hours would be drawn from the battery for the 4-hour test but it is not a measure of greater performance capability in that both tests would require the same number of battery positive plates.)

2. Based on informal discussions between TVA, vendor personnel at GNB Industrial Batteries and C&D Charter Power Systems, and a committee member for IEEE Standards 450 and 485, TVA concluded the following concerning which test would pose the worst case:

Although essentially equivalent, the 2-hour test would be worse case since the higher current values would pose more of a challenge to battery connections in terms of increased heating and losses at connection resistances. The current values for either test are considered low enough to not challenge limitations of the battery connections of plate to post, post to intercell connector, etc. Further, the depth of discharge for either test would not challenge the limits of the batteries relative to chemical activity of the electrolyte, plate surfaces, etc.

3. In practical terms, neither a 2-hour nor a 4-hour service test represent a real challenge to battery capability after the first minute when compared to the performance test. The service test load profiles neglecting spare margin would be the same for the first 30 minutes, with the 4-hour profile reflecting the results of load shedding after the first 30 minutes. Only the first minute of the service test duty cycle exceeds the current values used in the performance test. After the first minute, the service test is in effect bounded by the performance test. A battery at approximately 95-96% capacity is needed to pass the performance test but only 80% to pass the service test. This is because the performance test compares tested results against the battery aging curve supplied by the manufacturer whereas the service test presumes that the battery may be aged to the minimum limits of 80%. (A performance test result of less than 95-96% but greater than 80% would indicate that the battery could still be used but would require replacement before the qualified life of 20 years.)

In summary, TVA will perform preoperational testing of the vital batteries, as planned, in accordance with the sizing requirement of 2-hours.

If you have any questions, please telephone Paul L. Pace at (615) 365-1824.

Very truly yours,



William J. Museler

cc: See page 3