ENCLOSURE

WATTS BAR NUCLEAR PLANT UNIT 2
UNDERVOLTAGE CONDITION ON 125V DC VITAL CONTROL POWER SYSTEM
WBRD-50-391/85-22
NCR WBN EEB 8520
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

A condition was identified at Watts Bar Nuclear Plant (WBN), during a design review, in which some components of the auxiliary feedwater pump turbine (AFPT) control circuit could receive inadequate voltage to ensure their operation. This condition could occur due to a voltage drop in the circuit feeder cable from the 125V dc vital batteries to the affected components. The condition could only occur during a totai loss of all ac power when the AFPT control circuit components are to be supplied with power from the 125V dc vital battery system. (Other components which normally receive power from the 125V dc vital control power system could be affected by this condition. However, their operation/function during a total loss of ac power is not required.)

TVA has determined that this deficiency occurred because the 125V dc vital control power system design was based upon a nominal voltage of 125V dc. However, as described in the WBN FSAR Chapter 8, Section 8.3.2, the system operates through a range of voltages from 105V dc to 140V dc. Apparently, affected WBN electrical system designers and procurement personnel were unfamiliar with that information. The root cause is that WBN Design Criteria WB-DC-30-2, "Design Criteria for 125V Battery System," did not define the battery system voltage range. Thus, affected electrical components were not properly specified nor purchased at the lower dc voltage limit. Also, cable voltage drop calculations were not performed using the lower dc voltage limits as the source voltage.

TVA previously reported this condition to the NRC for WBN unit 1 as nonconformance report (NCR) WBN EEB 8515.

Safety Implications

Upon a loss of offsite power and a single active failure of one motor-driven auxiliary feedwater (AFW) pump, the turbine-driven AFW pump would be required to supply adequate feedwater to the steam generators (SGs) to bring the reactor coolant system temperature down and maintain the reactor in a safe condition. The subject condition could result in a misoperation of the affected AFPT control circuit components and, subsequently, could adversely affect the operation of the AFPT. This could result in an inadequate supply of feedwater to the SGs and could adversely affect the safe operation of the plant.

Corrective Action

TVA will replace the normal feeder cable (2SG220A, 1/2C No. 12) to the AFPT control circuit with a larger cable (2/1C No. 4). This will reduce cable voltage drop to an acceptable level. The corrective action for this item is being done per engineering change notice (ECN) 5797.

To prevent recurrence of this deficiency, TVA has revised WBN Design Criteria WB-DC-30-2 to formally document the voltage range of the vital battery system. All affected design and procurement personnel have been familiarized with this information through the coordinated involvement of the Office of Engineering (OE) electrical, mechanical, and nuclear design branches in the design review analysis of the 125V dc vital power control system.

TVA will complete all necessary corrective actions on this item by initial fuel loading for WBN unit 2.

TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
5N 157B Lookout Place

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January 9, 1986

WBRD-50-391/85-22

U.S. Nuclear Regulatory Commission
Region II
Attn: Dr. J. Nelson Grace, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Dear Dr. Grace:

WATTS BAR NUCLEAR PLANT UNIT 2 - UNDERVOLTAGE CONDITION ON 125V DC VITAL CONTROL POWER SYSTEM - WBRD-50-391/85-22 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector Al Ignatonis on July 16, 1985 in accordance with 10 CFR 50.55(e) as NCR WBN EEB 8520. Enclosed is our final report. Delay in submittal of this report was discussed with Al Ignatonis on January 6, 1986.

If there are any questions, please get in touch with R. H. Shell at FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. A. Domer

J. W. Hufham
Manager of Licensing

Enclosure
cc (Enclosure):
Mr. James Taylor, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

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