

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
5N 1578 Lookout Place

January 15, 1986

WBRO-50-390/85-45
WBRO-50-391/85-44

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 UNITS 1 AND 2 - UNANALYZED DIESEL GENERATOR TRANSIENTS
FOR A BLACKOUT FOLLOWED BY A SAFETY INJECTION SIGNAL - WBRO-50-390/85-45,
WBRO-50-391/85-44 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector
Al Ignatonis on September 27, 1985 in accordance with 10 CFR 50.55(e) as SCR
WBN EEB 8538. Our interim report was submitted on October 29, 1985. Enclosed
is our final report.

Delay in submittal of this report was discussed with Mr. Ignatonis on
January 6, 1986.

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

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. A. Domer

J. A. Domer
Manager of Licensing

Enclosure

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

Records Center (Enclosure)
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, Georgia 30339

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ENCLOSURE
WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
UNANALYZED DIESEL GENERATOR TRANSIENTS FOR A
BLACKOUT FOLLOWED BY A SAFETY INJECTION SIGNAL
WBRD-50-390/85-45, 50-391/85-44
SCR WBN EEB 8538
FINAL REPORT

Description of Deficiency

As a result of the Diesel Generator C-S Load Study issued May 14, 1984, the control circuits of the 480V shutdown board room chiller packages that can be powered by diesel generators (DG) 1B-B and 2A-A were modified to prevent the chillers from being connected until 45 seconds into the loading sequence (engineering change notice (ECN) 4480). In the issued study, they were then considered connected at exactly 45 seconds into the loading sequence. Also, the control room and electric board room air-conditioner compressors were considered connected at exactly 60 seconds into the loading sequence because they have internal timers that prevent them from being energized until 60 seconds after power returns following any interruption. The DGs were shown by vendor analysis to be within the transient voltage and frequency limits allowed in NRC Regulatory Guide 1.9 with the loading sequence considered.

Recent review of system schematics 45W760-31-18 and -19, for a preoperational test activity, revealed a problem with these loads for the scenario of a blackout with a subsequent safety injection signal (SIS). Per design criteria WB-DC-30-1 "Emergency Auxiliary AC Power System," and section 8.3.1.1 of the Watts Bar Nuclear Plant (WBN) FSAR (page 8.3-10), if the blackout-only sequence is being loaded on the DG and a SIS occurs, those loads not yet connected have their sequential timers reset and will then be sequentially loaded. This required design feature was not incorporated into ECN 4480 and is not in the control circuitry for either the chillers or air-conditioner compressors. Lack of this feature creates a potential loading condition not analyzed or tested for compliance with Regulatory Guide 1.9 and does not satisfy design criteria requirements or agree with the FSAR description.

In addition, these chillers and air-conditioners are process controlled and completion of the DG sequence timing interval only enables their operation. Their actual loading on the DG can occur any time after the 45- and 60-second time delays. This also creates undefined conditions not analyzed for compliance with Regulatory Guide 1.9. Similarly, this situation applies to all process-only controlled loads powered by the DGs. For example, process-controlled loads on the 480V motor control centers, which are not tripped due to a blackout or SIS, are assumed to operate at the start of the loading sequence; however, they will operate whenever required by their process signals. Since in the DG load study these loads were considered operating at zero seconds (i.e., instantaneously), but they may operate at any time, this also creates a loading sequence not previously analyzed.

The root cause of the deficiency was failure to consider and evaluate the possibility of significant process-controlled loads starting at the same time that sequenced loads are allowed to start.

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