TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

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April 2, 1984

BLRD-50-438/83-45
BLRD-50-439/83-38

U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2 - DESIGN OF AUXILIARY FEEDWATER PUMP TRIP AND THROTTLE VALVE ELECTRICAL CIRCUITS - BLRD-50-438/83-45, BLRD-50-439/83-38 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector L. Watson on July 19, 1983 in accordance with 10 CFR 50.55(e) as NCR BLN EEB 8316. This was followed by our interim reports dated August 18 and December 27, 1983. Enclosed is our final report.

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

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Licensing

Enclosure
cc: Mr. Richard C. DeYoung, 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

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2
DESIGN OF AUXILIARY FEEDWATER PUMP TRIP AND
THROTTLE VALVE ELECTRICAL CIRCUITS
10 CFR 50.55(e)
BLRD-50-438/83-45, BLRD-50-439/83-38
NCB BLN EEB 8316
REPORT

Description of Deficiency

The electrical circuitry for the Auxiliary Feedwater Pump Turbine controls receives power through a manual transfer switch (1/2CA-43-003-S) from channel G (normal) and channel F (alternate) of the 125V DC Class 1E power system (EU) and the 120V Class 1E AC Vital Power Distribution System (EJ). The transfer switch is designated and labeled S (special) for separation purposes; however, the cables, conduit, and equipment are designated and labeled G (channel G). The design criteria "Physical Independence of Electrical Systems," NM4-50-D786, stipulates that circuits which can receive power from two divisions shall be identified as S and separated from all other wiring. Therefore, this circuit violates the requirements of the design criteria.

The root cause of this deficiency was determined to be misinterpretation of design criteria ("Physical Independence of Electrical Systems," N4-50-D786). Design criteria N4-CA-D740, "Auxiliary Feedwater Systems," paragraph 6.9, states that the turbine controls shall be powered from channel G with the capability to manually transfer to channel F power. The only guidance provided by N4-50-D786 to meet this requirement is not within the body of the criterion, but in a note associated with Table 5.4.1 of this document.

Safety Implications

The incorrect identification and labeling of the conduits, cables, instruments, and controls associated with the auxiliary feedwater pump turbine provides false information to the operator and the maintenance staff. The identification tags indicate channel G, but the system will at times be powered from channel F. In this situation, the operator could authorize maintenance on the channel F power system or alignment of the auxiliary feedwater (AFW) system such that redundancy is lost. A single failure could then degrade the AFW system so that it could not maintain adequate water level in the steam generators during all design base events.

At some future date, another channel G circuit could be routed with the AFW turbine control circuits. This is possible since there are no special notes, designations, or restrictions on the conduit and cable schedules to indicate the special nature of the AFW turbine control circuits. If the routing of additional channel G circuits in these raceways eventuates, both channels F and G control power sources could be lost due to a common failure.

Corrective Action

The affected AFW pump turbine control cables, conduit, and equipment were revised to S separation category on engineering change notice (ECN) 2372. The main control room instrumentation was revised to S by ECN 2833. These revisions will result in the relabelling of the affected cables, conduit, and equipment and ensure compliance with N4-50-D786. All construction rework associated with these ECNs will be completed by January 15, 1985.

TVA considers this an isolated occurrence not requiring action to prevent recurrence.