

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

January 13, 1984

BLRD-50-438/83-12

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:

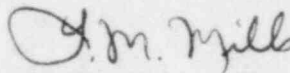
BELLEFONTE NUCLEAR PLANT UNIT 1 - DEFECTIVE SEQUENCER CONTROL CARDS FROM
CONSOLIDATED CONTROL CORPORATION - BLRD-50-438/83-12 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector
P. E. Fredrickson on January 12, 1983 in accordance with 10 CFR 50.55(e) as
NCR 2162. This was followed by our interim report dated February 8, 1983.
Enclosed is our final report. We consider 10 CFR Part 21 applicable to
this deficiency.

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 UNIT 1
DEFECTIVE SEQUENCER CONTROL CARDS FROM
CONSOLIDATED CONTROLS CORPORATION
BLRD-50-438/83-12
NCR 2162
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

Sequencer Control Card 6N194-1, SN009, in the Solid State Control System Logic Cabinet 1IX-IR-006-A, slot 38, failed during an undervoltage test. Replacement card SN012 was installed and experienced a similar failure. Replacement card SN033 was then installed and a slightly different failure was noted. Finally, another replacement card was installed and system operation returned to normal. The Solid State Control System has been supplied to TVA by Consolidated Controls Corporation (CCC) of Bethel, Connecticut.

TVA has verified the adequacy of the supplier quality controls program in the resolution of NCR 1950 (BLRD-50-438/82-68, BLRD-50-439/82-61). Analysis of the failures of boards SN009, SN012, SN033 does not indicate any common mode failure. The failure of board SN009 during operation is due to a random failure of one or more board components. A more definitive cause of failure was not possible due to physical damage by mishandling or improper shipping after discovery of the failures. The failures of boards SN012 and SN033 may be due to mishandling and improper installation by plant personnel. In addition, TVA and CCC concluded that some damage to components could be caused by static electricity discharges during handling.

Safety Implications

The type of failure which was identified in the cards would have resulted in automatic switching of safety-related systems to the "loss of power" mode. This results in the automatic starting or stopping of certain plant features. Had this defect remained uncorrected, the operator would be unable to regain control of some features erroneously placed in the "loss of power" mode. The features would, in turn, become necessary to maintain safe operation of the plant.

Corrective Action

The failed cards were returned to the supplier (CCC) for inspection and repair. CCC found that some components on boards SN009 and SN033 had been physically damaged by mishandling or improper shipping. Replacement of these components was accomplished; the boards then passed all functional and burn-in testing. CCC identified several shorted components on board SN012, which were replaced; the board then passed all functional and burn-in testing. All boards have been returned to Bellefonte Nuclear Plant for use as spares.

In order to prevent the physical damages from recurring, site management issued a memorandum to applicable personnel which provided instructions on board removal, handling, and packaging. Vendor information was also distributed to provide guidance to prevent damage due to static electricity discharge. TVA is monitoring all component failures in all CCC-supplied board and module types to ensure detection of common mode failures. (There have been no additional failures of 6N194 boards since these three boards failed on or about January 7, 1983.)

TVA has concluded that these failures are random events that have been fully corrected; therefore, no further actions are required.