

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street, Tower II

APR 16 1982
April 12, 1982

BLRD-50-438/81-73

BLRD-50-439/81-71

U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303



Dear Mr. O'Reilly:

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2 - DESIGN MISTAKE IN TEST LINE
ISOLATION VALVES - BLRD-50-438/81-73, BLRD-50-439/81-71 - FINAL
REPORT

The subject deficiency was initially reported to NRC-OIE Inspector
R. V. Crlenjak on November 12, 1981 in accordance with 10 CFR 50.55(e) as
NCR BLN BLP 8125. This was followed by our first interim report dated
December 11, 1981. Enclosed is our final report.

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

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Regulation and Safety

Enclosure

cc: Mr. Richard C. DeYoung, Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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ENCLOSURE

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2 DESIGN MISTAKE IN TEST LINE ISOLATION VALVES

NCR BLN BLP 8125

BLRD-50-438/81-73, BLRD-50-439/81-71

10 CFR 50.55(e)

FINAL REPORT

Description of Deficiency

Isolation valves were added to the borated water storage tank (BWST) test line. This test line also serves as the pump recirculation line for the train B makeup pump when operating in the reactor coolant pumps (RCPs) seal injection mode. The closure of these isolation valves defeat the ability of the train B pump to provide backup seal injection flow to the RCPs upon loss of seal injection flow from the train A makeup pumps.

With a loss of train A which provides normal seal injection to the RCPs, a low seal injection flow signal calls for automatic start of the train B makeup pump and opening of the seal injection crosstie valve. However, since the recirculation line isolation valves remain closed, the train B pump will trip off on high recirculation line pressure, resulting in total loss of seal injection flow to the RCPs.

The test line isolation valves were added in the Decay Heat Removal (DHR) System piping. The DHR System designers were not cognizant of the effects the valve placement would have on the operating modes of the train B makeup pump. The deficiency was discovered during a design review of the makeup pump logic.

Safety Implications

With the present system configuration, a single failure in the train A seal injection function could result in total loss of seal injection flow to the reactor coolant pumps. Failure to provide seal injection would result in leakage of reactor coolant water with subsequent degradation of the plant's ability to safely shut down.

Corrective Action

The train B makeup pump recirculation line is being redesigned to move the connection to the BWST test line to a location downstream of the added isolation valves. This change will establish a recirculation flow path that will not be blocked in the event that the train B makeup pump is required to provide seal injection flow to the reactor coolant pumps. Changes to the Makeup and Purification System will be completed before preoperational testing of the system. To prevent recurrence, Bellefonte Design Project has issued a memorandum emphasizing the need for designers to observe the effects of system interaction. The generic problem of deficient design review is being addressed in the 10 CFR 50.55(e) report for Audit M81-13, Deficiency No. 5, which was reported to NRC-OIE Region II on December 15, 1981.