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50-439 Bellefonte Nuclear Plant, Unit 2, Tennessee Valley Au 05000439
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SUBJECT: Final deficiency rept re check valves interfacing between
RCS & makeup & purification sys failed design conditions.
Initially reported on 930513. Valves upgraded to higher
using NB-3540 of ASME Code Section 3 for Units 1 & 2.

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TITLE: 50.55(e) Construction Deficiency Report

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H. Fred McCluskey
Site Vice President, Bellefonte Nuclear Plant

JUN 08 1993

BLRD-50-438/93-04
BLRD-50-439/93-04

10 CFR 50.55(e)

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Gentlemen:

In the Matter of the Application of)
Tennessee Valley Authority)

Docket Nos. 50-438
50-439

BELLEFONTE NUCLEAR PLANT (BLN) - FAILURE OF THE MAKEUP AND PURIFICATION SYSTEM HIGH PRESSURE INJECTION CHECK VALVES TO MEET INTERFACE DESIGN CONDITIONS FOR THE REACTOR COOLANT SYSTEM - BLRD-50-438/93-04 AND BLRD-50-439/93-04 - FINAL REPORT

The subject deficiency was reported to the NRC Operations Center on May 13, 1993 in accordance with 10 CFR 50.55(e)(3) as Significant Corrective Action Report (SCAR) BLSCA930002. Enclosed is TVA's final report on this subject.

Should there be any questions regarding this information, please telephone Greg Pierce, BLN Site Licensing Manager, at (205) 574-8058.

H. Fred McCluskey
H. Fred McCluskey

Enclosure

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U.S. Nuclear Regulatory Commission
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cc (Enclosure):

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ENCLOSURE
BELLEFONTE NUCLEAR PLANT (BLN) UNITS 1 AND 2
FAILURE OF THE MAKEUP AND PURIFICATION SYSTEM
HIGH PRESSURE INJECTION CHECK VALVES TO MEET INTERFACE
DESIGN CONDITIONS FOR THE REACTOR COOLANT SYSTEM
SIGNIFICANT CORRECTIVE ACTION REPORT (SCAR) BLSCA930002
BLRD-50-438/93-04 AND BLRD-50-439/93-04

FINAL REPORT

DESCRIPTION OF DEFICIENCY

During the design review of the Makeup and Purification system (NV) (approximately March 19, 1993), the high pressure injection check valves that interface between the NV and the Reactor Coolant System (NC) were found to not meet the NC design conditions. The design conditions for the NC system are 2500 psig @ 670°F and the design conditions for the NV system are 3200 psig @ 200°F. However, the check valve is a 1500 psi valve and is rated at 2447 psig @ 670°F and 3405 psig @ 200°F.

The valves in question are listed below with their locations:

1NV-IHCV-427-A	622' Azimuth 341	22103	Warehouse location SB-26-6C
1NV-IHCV-434-A	622' Azimuth 052	22060	Warehouse location SB-26-6C
1NV-IHCV-474-B	622' Azimuth 199	22043	Warehouse location SB-26-6C
1NV-IHCV-480-B	622' Azimuth 127	22073	Warehouse location SB-24-7A

SAFETY IMPLICATIONS

The valves have a specified design condition of 2500 psig at 670°F. The valves supplied have a maximum pressure rating of 2447 psig at 670°F per the 1974 ASME Boiler and Pressure Vessel Code. The design condition that these valves could be subjected to exceeds the allowable pressure ratings for the supplied valves.

The primary safety function of the NV system is to supply high pressure injection to the reactor vessel following a loss-of-coolant accident (LOCA). If a valve fails due to overpressurization and such a failure occurs during emergency core cooling system actuation with an associated assumed single failure, then inadequate high pressure injection flow would occur. This could result in inadequate core cooling.

CAUSE

The cause of this design inadequacy is related to the change in the valve pressure/temperature ratings that occurred between the 1971 ASME Code and the 1974

ASME Code. When the NV system was designed, a 1500 psi valve met the dual design conditions for the NC/NV interface. In the 1971 ASME Code, a 1500 psi valve was rated for 3500 psig at 200°F and 2627 psig at 670°F. The 1974 ASME Code rates a 1500 psi valve at 3405 psig at 200°F and 2447 psig at 670°F. Therefore, the valves as procured do not meet the design conditions that they may encounter.

CORRECTIVE ACTIONS

A minimum valve wall thickness calculation will be performed to qualify the valves to a higher rating using NB-3540 of the 1974 ASME Code Section III for both the Unit 1 and the Unit 2 valves. The Unit 1 valves that can not be upgraded will be repaired or replaced. Procurement of replacement valves will be initiated for the Unit 2 valves that can not be upgraded.

Current procedures require a review of the limiting interface design requirements to determine the procurement requirements. Therefore, procedural controls are in place to preclude recurrence.

These corrective actions will be completed prior to Unit 1 system completion and turnover for testing.