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

December 13, 1983

BLRD-50-438/81-76
BLRD-50-439/81-75

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 - VIKING FLOW CONTROL VALVES IN FIRE PROTECTION SYSTEM - BLRD-50-438/81-76, BLRD-50-439/81-75 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector R. V. Crlenjak on November 24, 1981 in accordance with 10 CFR 50.55(e) as NCR BLN MEB 8103. This was followed by our interim reports dated December 22, 1981, and March 1, June 7, and October 4, 1982, and January 14, June 7, and August 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 (Enclosure):
Mr. Richard C. DeYoung, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Records Center
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
VIKING FLOW CONTROL VALVES IN HIGH PRESSURE FIRE PROTECTION SYSTEM
BLRD-50-438/81-76, BLRD-50-439/81-75
NCR BLN MEB 8103
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

The Viking model G-1 and G-2 flow control valves which are used in preaction sprinkler systems will not regulate outlet pressure to 25 lb/in^2 as required by the acceptance criteria in Preoperational Test PT-RF-01. Severe system vibrations occur when attempts are made to regulate the valves under the high inlet pressure and low flow conditions established by the Preoperational Test. These conditions are equivalent to those that would result if water was flowing from a single sprinkler head.

The model G-1 and G-2 flow control valves are manufactured by Viking Corporation of Hastings, Michigan. The manufacturer's catalog literature indicates that the valves will regulate outlet pressure as low as 25 lb/in^2. However, the literature did not indicate that the valves would not regulate properly under the conditions TVA is establishing during preoperational testing (i.e., high inlet pressure and low flow).

The manufacturer's catalog literature states that the valves can be used to control water pressure on sprinkler systems. This statement led TVA to believe that the valves would function properly for flows equivalent to a single sprinkler head when the valves are sized in accordance with the manufacturer's Technical Bulletin No. 4041 for the maximum design flows dictated by National Fire Protection Association Standard No. 13. In verbal discussions with a representative of the manufacturer, we were assured that the valves would regulate properly under such low flow conditions for pressures up to the maximum working pressure for which they are rated.

Safety Implications

The severe vibrations induced by the flow control valves can cause damage to the sprinkler system piping and impair the system's function. Failure of the sprinkler system could, in the event of a fire, allow spreading of the fire which could compromise safety-related systems and thereby adversely affect the safe operation of the plant. A system failure could also result in water or mechanical damage to safety-related equipment located near the damaged piping.