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

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June 30, 1983

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:

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - STEAM GENERATOR WATER LEVEL REFERENCE COLUMN ERROR - NCR MEB 79-33 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector M. Thomas on July 6, 1979 in accordance with 10 CFR 50.55(e). Interim reports were submitted on July 30 and September 27, 1979; June 20, August 22, and November 3, 1980; January 15 and May 20, 1981; May 19 and July 8, 1982 and January 13, 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, DC 20555

Records Center (Enclosure)
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
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ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
STEAM GENERATOR WATER LEVEL REFERENCE COLUMN ERROR
NCR MEB 79-33
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

The steam generator (SG) secondary side water level instrumentation utilizes a reference water column external to the SG but inside the SG enclosure. The column has a condensate reservoir at the top with the top portion of the reservoir connected to the SG steam space. A differential pressure transmitter is connected between the bottom of the column and the SG water space. The column thus provides a reference water column of constant height to which the water depth in the SG is compared through the transmitter. In the event of a high energy line break in the containment, the reference column could become heated and the reduced water density could cause the SG water level to be indicated erroneously high. In the event of a main feedwater line break, this would delay actuation of the SG low-low level signal which initiates a reactor trip. A timely reactor trip is assumed in the plant safety analysis of a main feedwater line break.

The deficiency results from a Westinghouse Electric Corporation, Pittsburgh, Pennsylvania, design oversight. Westinghouse reported the deficiency to TVA and other Westinghouse plant owners and has also reported it to NRC under 10 CFR 21.

Safety Implications

Although there are several redundant reactor trip signal sources, the steam generator low-low water level signal is the primary one assumed by Westinghouse in the plant safety analysis for a feedwater line break. Had this deficiency gone uncorrected, the delay in initiation of the low-low steam generator water level reactor trip would have introduced a condition not analyzed in the safety analysis.

Corrective Action

Westinghouse has determined that this situation can be corrected by thermally insulating the sensing lines and adjusting the low-low water level setpoint. After completing an analysis of the main feedwater line break, considering the effect on the insulated steam generator water level reference column, Westinghouse has determined that a low-low water level set point of 12-percent of span from 0- to 30-pecent nominal load increasing linearly to 54.9-percent of span at 100-percent nominal load will ensure reactor trip within the time assumed in the safety analysis. This set point is based on the sensing lines being thermally insulated from eight vertical inches below the centerline of the condensate pots to 10 feet outside the steam

generator enclosure for the upper tap sensing lines and from eight vertical inches below the lower level taps to 10 feet outside the steam generator enclosure for the lower tap sensing lines. The insulation is metallic and is protected by flow shields to prevent damage from the flow released by a pipe break within the enclosure. The set point change has been implemented. This insulation will be installed in unit 1 by October 31, 1983, and in unit 2 by April 1, 1984.

TVA addressed the generic issue of temperature effects upon level measurements in response to NRC-OIE Bulletin No. 79-21. As a result of the Bulletin 79-21 investigation, TVA identified another fill fluid related condition and is resolving that condition under NCR WBN SWP 8236, Postaccident Readings from Containment Sump Level Transmitters.