TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

84 MAY 16 A9:08

May 14, 1984

WBRD-50-390/84-11
WBRD-50-391/84-11

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 - NEW DEFICIENCIES IN BARTON PRESSURE TRANSMITTERS-WBRD-50-390/84-11, WBRD-50-391/84-11 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector Dave Verrelli on February 23, 1984 in accordance with 10 CFR 50.55(e) as NCR WBN NEB 8401. Our first interim report was submitted on March 22, 1984. 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

OFFICIAL COPY
IE 27

ENCLOSURE

WATTS BAR NUCLEAR PLANTS UNITS 1 AND 2
NEW DEFICIENCIES IN BARTON PRESSURE TRANSMITTERS
NCR WBN NEB 8401
WBRD-50-390/84-11 AND WBRD-50-391/84-11
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

Westinghouse Electric Corporation, Pittsburgh, Pennsylvania, supplies pressure and differential pressure transmitters manufactured by ITT Barton, City of Industry, California, for safety-related applications at Watts Bar Nuclear Plant. Westinghouse recently notified TVA that all Barton Model 763 and Model 764 transmitters which are located in a harsh environment are potentially subject to additional errors at elevated temperatures due to calibration techniques and electrical leakage through the span and zero potentiometers. These temperature-related errors introduce a positive bias in the transmitter output. Westinghouse's letter of notification also made reference to a separate problem of output shift in model 763, suppressed zero transmitters. The output shift occurs upon exposure to operating pressure and is always negative.

Safety Implications

Had these deficiencies gone uncorrected, the positive bias introduced by the thermal effects could have prevented or delayed safety injection upon receipt of a low pressurizer pressure signal thus resulting in an accident not currently analyzed. Further, the postaccident error in the wide range reactor coolant system (RCS) pressure indication could have caused the operator to terminate safety injection at low RCS pressure without adequate core subcooling. The negative shift in suppressed zero pressure transmitter output which is caused by exposure to operating pressure only affects the pressurizer pressure transmitters. Westinghouse's evaluation concludes that no adverse safety consequences result from the negative output shift.

Corrective Action

ITT Barton has corrected the thermal nonrepeatability problem (caused by improper calibration techniques and current leakage) in all transmitters manufactured or repaired at their facility since January 1, 1983. Transmitters built to the corrected design are traceable by baseline design configuration number. TVA has compared the baseline certification for each Barton 763 and 764 transmitter installed in unit 1 to the baseline configuration number for the corrected design. The only unit 1 transmitters subject to the thermally induced positive bias are the pressurizer pressure transmitters (1-PT-68-322, -323, -334, and -340) and the wide range reactor coolant system (RCS) pressure transmitters (1-PT-68-68 and -69). Replacements for the wide range RCS pressure transmitters of the corrected design are onsite since those transmitters had already been scheduled for replacement under TVA's NUREG-0588 program.

In addition to the thermal positive bias, the pressurizer pressure transmitters are suppressed zero transmitters and are therefore subject to negative drifts upon exposure to operating pressure. Westinghouse has evaluated the impact of the negative drift (which could reach 4.2 percent of span between calibrations) and determined that it is only nonconservative for the high pressurizer pressure reactor trip. The negative drift has been considered in the setpoint analysis of the high pressurizer pressure protection channel and adequate margin exists between the setpoint and the safety analysis limit.

The thermal positive bias introduced in the pressurizer pressure channel has been considered in the setpoint analysis of the low pressurizer pressure reactor trip and safety injection protective channels. Adequate margin exists for the reactor trip function. Margin was restored for the safety injection function by lowering the safety analysis limit to 1700 psig.

Westinghouse has agreed to repair pre-1983 vintage transmitters to eliminate both the pressure drift and thermal nonrepeatability deficiencies. The unit 1 pressurizer pressure transmitters will be repaired as schedule permits; however, based on the above discussion, no hardware corrective action is required from a safety standpoint. As unit 2 transmitters are installed, any necessary corrective action will be performed in accordance with TVA's program plan for meeting the requirements of NUREG-0588.