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

83 OCT 6 A8:30 October 4, 1983

WBRD-50-390/82-99
WBRD-50-391/82-95

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 - QUALIFICATION OF PROCESS PIPING WITH INSTRUMENT LINES ATTACHED - WBRD-50-390/82-99, WBRD-50-391/82-95 - FINAL REPORT FOR UNIT 1 AND THIRD INTERIM REPORT FOR UNIT 2

The subject deficiency was initially reported to NRC-OIE Inspector R. V. Crlenjak on September 9, 1982 in accordance with 10 CFR 50.55(e) as NCR WBN CEB 8228. Interim reports were submitted on October 8, 1982 and April 13, 1983. Enclosed is our final report for unit 1 and third report for unit 2. We expect to submit our next report for unit 2 on or about July 2, 1984.

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

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
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ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
QUALIFICATION OF PROCESS PIPING WITH INSTRUMENT LINES ATTACHED
NCR WBN CEB 8228
WBRD-50-390/82-99, WBRD-50-391/82-95
10 CFR 50.55(e)
FINAL REPORT FOR UNIT 1 AND THIRD INTERIM REPORT FOR UNIT 2

Description of Deficiency

Some thick-walled instrument piping, attached to small bore process piping, was not accounted for in the analysis (i.e., qualification) of the process piping. The instrument lines have approximately the same stiffness as the process piping, therefore the thermal and dynamic qualification of the process piping may be affected. The ASME Boiler and Pressure Vessel Code requirements may no longer be satisfied.

The analyst made an erroneous assumption in assuming that the instrument line would be made of tubing. The assumption was made because the field routed sensing lines are not sent to CEB for review.

Safety Implications

Since the stiffness of the thick-walled instrument piping is substantially different from the stiffness of light-weight flexible tubing, the seismic analyses that erroneously presumed use of the flexible tubing may not be adequately conservative. Consequently, the integrity of the safety-related process piping affected by this nonconformance is questionable under conditions induced by a seismic event. Therefore, the cited nonconformance may be adverse to the safety of operations of the plant.

Corrective Action on Unit 1

TVA has identified all the seismic analysis problems used in the qualification of all piping within the scope of this NCR. TVA is reanalyzing all small bore process piping with attached instrument branch lines that do not meet one of the following criteria: (1) the ratio of the moment of inertia of the run to branch line (I_R/I_b) is greater than or equal to 40, (2) the flexible hose has been installed between the instrument lines and the process piping, (3) tubing has been installed between the instrument line and process piping with at least one five-diameter bend in the first span, (4) an anchor, three-way restraint, or some other rigid support configuration is located within close proximity of the instrument line connection. Reanalysis of the WBN unit 1 piping is delineated on ECN 3069 and is scheduled for completion by November 15, 1983. Any unit 1 pipe support design modification required will be completed by December 1, 1983. All construction rework required will be completed by February 6, 1984.

To prevent recurrence of this deficiency, TVA has issued rigorous analysis policy statement No. 2 (a controlled "quick" revision to the rigorous analysis handbook) establishing a decoupling criteria for instrument lines and revising the analysis checklist to include an item that ensure instrument lines satisfy the rigorous analysis handbook criteria. This policy statement was issued to transmit the requisite information into the analysts' guidelines quickly and will be formally incorporated into the rigorous analysis handbook at a later date.

Interim Progress on Unit 2

TVA has assigned lower priority to unit 2 work in order to support the near-term licensing effort on unit 1. Consequently, further unit 2 design work required as a result of this NCR has been temporarily postponed.

TVA will provide further details on the unit 2 disposition in our next report.