TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

83 SEP 26 A8:53

September 22, 1983

BLRD-50-438/83-33
BLRD-50-439/83-29
WBRD-50-390/83-29
WBRD-50-391/83-29

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 AND WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - INCORRECT MAXIMUM PIPE MOVEMENTS - TPIPE PROGRAM - BLRD-50-438/83-33, BLRD-50-439/83-29 WBRD-50-390/83-29, WBRD-50-391/83-29 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector L. Watson on May 4, 1983 in accordance with 10 CFR 50.55(e) as NCR GEN CEB 8303. Our first interim report was submitted on May 26, 1983. Enclosed is our final report. TVA no longer considers 10 CFR 50.55(e) applicable to NCR GEN CEB 8303.

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

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ENCLOSURE

BELLEFONTE AND WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
INCORRECT MAXIMUM PIPE MOVEMENT
BCSs CDR CEB 8301
BLRD-50-438/83-31, BLRD-50-439/83-29
WBRD-50-390/83-29, WBRD-50-391/83-29
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

Certain piping analysis for Bellefonte and Watts Bar considered the safe shutdown earthquake (SSE) seismic anchor movements by conservatively doubling the results of the operating base earthquake (OBE) seismic anchor movements stress analysis. The results which should be scaled by the appropriate scale factor are stresses, support loads and displacements. A post-processing computer program to combine the results of the stress analysis by the TPIPE computer program applies the scale factor only to the stresses and supports loads and does not scale the displacements. These displacements are included in the total maximum displacement at each support point. Therefore, the unscaled seismic anchor movements could result in unconservative displacement data being placed on support load tables. These errors can occur with all versions of TPIPE and the special post-processor under the following conditions: (1) presence of a seismic anchor load case (load Group 3) in the class 2 post-processor, and (2) a scale factor greater than 1.0 for SCF, SCF, or SCF.

This deficiency resulted from an error in TPIPE and the special post-processor. The program error resulted from lack of forethought as to how or if SSE anchor point movements should be added to the deadweight, thermal, and SSE response spectrum load cases to yield the maximum pipe movements and supports.

Safety Implications

Piping analysis supervisors for all of the potentially affected plants were informed of the error in TPIPE, and information was requested on the impact of previous work. The review of previous cases has been completed, with no analyses requiring revision as a result of this condition. Therefore, no conditions adverse to the safety of the plant exist, and we no longer consider 10 CFR 50.55(e) applicable.

Upon review of the ASME section III code, no guidelines are given as to how the displacement from SSE anchor point movements should be combined to yield the maximum pipe movements. Furthermore, the ASME Code does not require that SSE anchor point movements pipe stresses be evaluated.

The response spectrum method of analyzing the effect of an earthquake results in conservative displacements. These earthquake-induced displacements are combined with the deadweight and thermal movements to yield a correct maximum pipe movement, seismic anchor movement (SAM), regardless of SSE anchor point case.

The small localized contribution of the SSE to the entire piping system, anchor movements, and the conservative estimate of the earthquake movement is cause for the TPIPE program not to be changed. Since the TPIPE special post-processor performs the same function in this area as TPIPE, the same conclusion was drawn.