TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

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December 20, 1983

WBRD-50-390/83-55
WBRD-50-391/83-52
BLRD-50-438/83-46
BLRD-50-439/83-41

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 (WBN) AND BELLEFONTE NUCLEAR PLANTS (BLN) UNITS 1 AND 2 - CALCULATION OF SUPPORT DESIGN LOADS IN TPIPE - WBRD-50-390/83-55, WBRD-50-391/83-52, BLRD-50-438/83-46, BLRD-50-439/83-41 - FINAL REPORT FOR WBN UNIT 1 AND SECOND INTERIM REPORT FOR WBN UNIT 2 AND BLN UNITS 1 AND 2

The subject deficiency was initially reported to NRC-OIE Inspector P. E. Fredrickson on July 14, 1983 in accordance with 10 CFR 50.55(e) as NCR GEN CEB 8304. Our first interim report was submitted on September 23, 1983. Enclosed is our final report for WBN unit 1 and second interim report for WBN unit 2 and BLN units 1 and 2. We expect to submit our next reports on or about June 21 and December 21, 1984 for WBN unit 2 and BLN units 1 and 2 respectively.

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

WATTS BAR AND BELLEFONTE NUCLEAR PLANTS UNITS 1 AND 2

CALCULATION OF SUPPORT DESIGN LOADS IN TPIPE

NCR GEN CEB 8304

WBRD-50-390/83-55, WBRD-50-391/83-52

BLRD-50-438/83-46, BLRD-50-439/83-41

10 CFR 50.55(e)

FINAL REPORT FOR WBN UNIT 1 AND SECOND INTERIM REPORT FOR WBN UNIT 2 AND BLN UNITS 1 AND 2

Description of Deficiency

Computer program TPIPE does not calculate support design loads correctly in the special post-processor when more than one primary sustained load case (load group 1) is used in the normal condition. More than one primary sustained load is considered when the analysis requires evaluation of preloading of springs, bellows pressure loading and/or cold springing. The TPIPE special post-processor was not designed to process more than one primary stress load case in the normal condition. It will, however, incorrectly process more than one primary load case in the normal condition. Loads incorrectly processed as two or more normal primary stress load cases will correctly compute stresses, but support loads are not combined correctly. Special analyses such as cold spring, bellows loads, and preloaded springs were incorrectly combined with dead loads as normal condition primary stress load cases. Pipe stresses were calculated correctly. However, support loads may have been combined unconservatively.

Safety Implications

Since it is possible to generate unconservative loads which will be placed in support load tables for use in the design of piping supports, piping supports for safety-related equipment could fail under certain transients or events and subsequently, adversely affect the safe operation of the plant.

Correction Action - WBN Unit 1 Only

The TPIPE special post-processor was not intended to compute loads for more than one primary load case in the normal condition. A hand procedure has been developed which will allow the analyst to recompute the design loads for supports near localized phenomena such as cold spring, preload, and bellows load. Loads were extracted from previously analyzed problems and recombined by the analyst using the hand procedure.

TVA's Division of Engineering Design (EN DES) Watts Bar Design Project (WBP) will review approximately 48 support load tables which were affected by the recomputation of design loads for supports near localized phenomena such as cold spring, preload, and bellows load. All affected support drawings will be revised under Engineering Change Notice (ECN) No. 4177 to reflect changes in the appropriate support load tables by January 31, 1984. TVA's Watts Bar Division of Construction (CONST) will install all affected supports by March 2, 1984.

Written instructions were provided to all affected design analysts for handling specialized load cases such as bellows loads, preloading of springs, and for cold springing. To prevent recurrence of this deficiency, the special hand procedure discussed above was incorporated into the Watts Bar Rigorous Analysis Handbook on November 30, 1983.

Interim Progress - Watts Bar Unit 2, Bellefonte Units 1 And 2

TVA is still in the process of evaluating this deficiency as it affects Watts Bar Unit 2. Eight problems have been identified for Bellefonte Units 1 and 2. No problems exist at Browns Ferry or Sequoyah Nuclear Plants.