

TENNESSEE VALLEY AUTHORITY

5N 157B Lookout Place

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March 20, 1986

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

U.S. Nuclear Regulatory Commission
Region II
Attention: Dr. J. Nelson Grace, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Dear Dr. Grace:

WATTS BAR NUCLEAR PLANT UNIT 2 AND BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2 -
CALCULATION OF SUPPORT DESIGN LOADS IN TPIPE - WBRD-50-391/83-52,
BLRD-50-438/83-46, BLRD-50-439/83-41 - FINAL REPORT

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. Interim reports were submitted on September 23, and
December 20, 1983, June 25, 1984, April 18, and May 24, 1985. Enclosed is our
final report. This deficiency was closed for Watts Bar unit 1
(WBRD-50-390/83-55) in Inspection Report 50-390/84-76.

If there are any questions, please get in touch with R. H. Sheil at
FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. L. Gridley
R. L. Gridley
Manager of Licensing

Enclosure

cc: Mr. James Taylor, Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Records Center (Enclosure)
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ENCLOSURE

WATTS BAR NUCLEAR PLANT UNIT 2
BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2
CALCULATIONS OF SUPPORT DESIGN LOADS IN TPIPE
WBRD-50-391/83-52, BLRD-50-438/83-46, BLRD-50-439/83-41
NCR GEN CEB 8304
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

When a piping analysis problem requires evaluation of preloading of springs, bellows pressure loading, and/or cold springing, more than one primary sustained load must be considered. The special postprocessor in the computer program "TPIPE" was not designed to process more than one primary stress load case in the normal condition. Therefore, TPIPE does not calculate support design loads correctly in the special postprocessor when more than one primary sustained load case (load group 1) is used in the normal condition. Support loads, bellows loads, and preloaded springs were incorrectly combined with dead loads as normal condition primary stress loadcases. Consequently, support loads may have been combined unconservatively, although the pipe stresses were calculated correctly.

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 thereby adversely affect the safety of operations of the plant.

Corrective Action

A manual 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 manual procedure.

For Watts Bar unit 2, all analysis problems affected by this deficiency have been revised and the associated support load tables have been issued. The affected support designs have been revised and issued under Engineering Change Notice (ECN) 4178 to reflect the changes required by the revised support load tables. Modifications will be completed before fuel load.

For Bellefonte units 1 and 2, the six analysis problems affected by this deficiency have been revised and the associated support load tables have been issued. The affected supports were redesigned and drawings were issued under ECN 3129. Modifications will be completed 6 months before fuel load.

To prevent recurrence of this deficiency, 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. The special manual procedure discussed above was incorporated into the Watts Bar Rigorous Analysis Handbook in November 1983 and into the Bellefonte Rigorous Analysis Handbook in March 1984. The instructions were also added to the TPIPE manual in February 1983.