

# TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

5N 105B Lookout Place

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WBRD-50-390/81-23  
WBRD-50-391/81-22

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

Dear Dr. Grace:

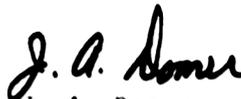
**WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - DISCREPANCY IN AS-BUILT VERSUS  
AS-ANALYZED PIPING SYSTEMS - WBRD-50-390/81-23, WBRD-50-391/81-22 - FINAL  
REPORT FOR UNIT 2**

The subject deficiency was initially reported to NRC-OIE Inspector R. V. Crlenjak on February 26, 1981 in accordance with 10 CFR 50.55(e) as NCR WBN SWP 8108. Our first interim report was submitted on March 30, 1981. Related NCR WBN SWP 8148 was reported to NRC-OIE Inspector Crlenjak on April 29, 1981. Our second interim report was submitted on August 26, 1981. Related NCR 3730R R1 was reported to Inspector Crlenjak on October 30, 1981. Interim reports were submitted on May 20, 1982 and February 1 and June 30, 1983. Our final report for unit 1 and an interim report for unit 2 was submitted on October 4, 1983. Supplemental information was submitted on December 2, 1983, and an interim report for unit 2 was submitted on November 6, 1984. Enclosed is our final report for unit 2.

If you have any questions, please get in touch with R. H. Shell at  
FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY



J. A. Domer  
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)  
Institute of Nuclear Power Operations  
1100 Circle 75 Parkway, Suite 1500  
Atlanta, Georgia 30339

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1983-TVA 50<sup>TH</sup> ANNIVERSARY

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**ENCLOSURE**

**WATTS BAR NUCLEAR PLANT UNIT 2  
DISCREPANCIES IN AS-BUILT VERSUS AS-ANALYZED PIPING SYSTEMS  
WBRD-50-391/81-22  
NCRs WBN SWP 8108, WBN SWP 8148, AND 3730R R1  
10 CFR 50.55(e)  
FINAL REPORT**

Description of Deficiency

NCR WBNSWP8108

During the evolution of the pipe support design effort, inconsistencies have developed between the support locations as specified on the support drawings and the analysis isometrics. The support drawings are used for installation and during the field inspection process. TVA's Office of Construction (OC) refers to the isometric for the support node locations. Construction Specification G-43 allows an acceptable relocation tolerance from the analyzed point; however, some support drawings specify locations outside this tolerance. These discrepancies came about due to the earlier practice of updating the isometrics only if the piping analyses were changed. The original purpose of the isometrics was to depict piping analysis computer models rather than as-designed or installed configurations; therefore, the isometrics were not updated except in cases where the analyses were affected.

NCR WBNSWP8148

Construction Specification G-43 provides support location tolerances from the analysis point. For rigorously analyzed piping, the analysis point is located by the analysis isometric. During the support design phase, the designer may have used part of the relocation tolerance. Watts Bar Engineering Project (WBEP) personnel have told OC they could apply the full Construction Specification G-43 tolerance to the location shown on the support drawing, thus the support could be installed outside of the relocation tolerance. This condition was caused by the informal conveyance and acceptance of technical requirements between TVA's Office of Engineering (OE) and OC personnel.

NCR 3730R R1

Supports were installed out of tolerance with respect to analysis point. Construction Specification G-43 specifies that a support must be installed within tolerance with respect to the analysis point. Contrary to this, OE had previously instructed OC to apply the tolerance to the design location (nonconformance report (NCR) WBN SWP 8148). Consequently, supports were installed out of Construction Specification G-43 tolerance with respect to both the design location and the analysis point. This is a site tracking NCR for OE NCRs WBN SWP 8108 and WBN SWP 8148 and is to be considered representative of a generic condition. Supports 63-1S15-R104 and -R212 have specifically been identified as being representative of this condition.

Besides the site tracking function of this NCR, its primary purpose is to document the condition of the supports being installed outside of the acceptable relocation tolerance with respect to both the design location and the analysis point.

#### Safety Implications

Discrepancies between as-built and as-analyzed piping supports could invalidate the seismic analysis of various safety-related piping systems. Had this condition gone undetected, the safety of the plant may have been jeopardized by failure of safety-related piping during a seismic event.

#### Corrective Action

Instead of utilizing the methods described in Civil Engineering Branch (CEB) Report 81-30 as was done to correct unit 1 support deficiencies (described in TVA's final report to NRC dated October 4, 1983), a pre-issue walkdown is being utilized for all rigorously analyzed pipe support designs as the means to identify any installed supports that are out of tolerance as well as any "to-be" installed supports that cannot be installed within tolerance (with tolerances based on the support node locations on the applicable analysis as stated in the current revision of Construction Specification G-43).

If a support is not yet installed and cannot be installed within Construction Specification G-43 tolerance any interferences preventing the acceptable installation are removed and the support is installed within Construction Specification G-43 tolerance; or the support node location on the isometric is revised to reflect the installable location and the piping is evaluated and/or reanalyzed as necessary by OE's seismic analysis personnel. During installation, additional problems affecting location may occur that could require the support to be located outside of Construction Specification G-43 tolerances. OC documents these problems and OE evaluates and implements reanalysis or revisions as required.

Final support location is verified as within Construction Specification G-43 tolerances by an OC inspection per WBN quality control procedure (QCP) 4.23-3. This inspection utilizes the analysis node point as the basis for the correct support location from which any variances are noted. It is during this inspection that supports which were installed prior to the pre-issue walkdowns and which exceed Construction Specification G-43 tolerances are identified by OC, who documents these variances to OE. OE then performs the same type evaluation as it would for pre-issue walkdown supports which had problems identified during installation.

As a result of these efforts, isometrics are maintained to reflect the installed location of the supports, and the potential that tolerances by a support designer could be added to tolerances used by construction personnel is eliminated as tolerances are directly based on the support location as designated by the support node location on the isometrics. Also, since all unit 2 analysis problems are being reevaluated as part of a programmatic change not related to this deficiency, all supports, whether installed prior to this reevaluation or after, will be inspected to the revised analysis in accordance with the current unit 2 system transfer schedules. This assures that each unit 2 support will be inspected for compliance with the Construction Specification G-43 tolerance, the unit 2 support corrections will be completed by unit 2 fuel load.