

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

November 1, 1983

WBRD-50-390/83-07
WBRD-50-391/83-06

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 - FAILURE TO PROVIDE BOLT TIGHTENING
REQUIREMENTS - WBRD-50-390/83-07, WBRD-50-391/83-06 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector
P. Fredrickson on January 20, 1983 in accordance with 10 CFR 50.55(e) as
NCR WBN SWP 8230. Interim reports were submitted on February 16, June 17,
and September 22, 1983. Enclosed is our final report.

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
1100 Circle 75 Parkway, Suite 1500
Atlanta, Georgia 30339

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ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
FAILURE TO PROVIDE BOLT TIGHTENING REQUIREMENTS
NCR WBN SWP 8230
WBRD-50-390/83-07, WBRD-50-391/83-06
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

TVA's Division of Engineering Design (EN DES) has not provided the Division of Construction (CONST) with bolt tightening requirements (for other than anchor bolts) for miscellaneous steel structures, pipe supports, conduit supports, HVAC supports, and instrumentation line supports. These requirements are necessary to ensure that the bolt tightening practices by CONST are adequate.

The majority of the bolts involved are unistrut, removable pipe supports, and removable HVAC duct supports.

Tightening requirements for anchor bolts are provided in TVA Construction Specification G-32.

The above discrepancy came about in the early stages of design. The designers assumed that the bolt tightening requirements were addressed in documents such as AISC or ASTM Standards.

Safety Implications

The condition above could increase the risk of failure of the structures or systems under accident conditions. This increase of failure risk is considered to have the potential to adversely affect the safe operation of the plant.

Corrective Action

TVA has completed its evaluation of all bolt tightening requirements. It has been determined that final documentation based on adequate installation requirements exists for all bolted connections except as described below. The bolt tightening requirements for the bolted connections in question are provided to CONST by 47A050 series General Notes drawings, structural drawings and/or manufacturer's recommended installation procedures. The exceptions are Unistrut clamp bolts on instrumentation and conduit supports finalized and inspected before 1980.

To determine the acceptability of these Unistrut connections, a sampling program was performed (WBN 830825 011). The goal of the sampling program was to determine if the proportion of bolts for

Unistrut clamps, which are not adequately tightened, is less than 5 percent with 95-percent confidence level. The sampling program results (WBN 830928 003 and WBN 830914 001) show that some bolts turned under an applied torque equal to the value required to develop the design axial load capacity of the clamp. TVA has tested the Unistrut clamp assemblies (WBP 830915 013) to determine the axial slip load that could be resisted by the clamp when the clamp bolt is not fully tightened. The capacity of the clamp (for the minimum torqued condition found in the sample) as demonstrated by the testing program was compared to the axial design load of the instrumentation lines and conduits. In all cases the clamp capacities were satisfactory for resisting the appropriate axial design load.

Based on the above, we find there is a 95-percent confidence level that less than 5 percent of the Unistrut clamp bolts on instrumentation and conduit supports finalized before 1980 are not tightened to a degree which would cause loss of function, and therefore, no further corrective action is required.

In order to prevent recurrence, EN DES has provided additional clarification for bolting requirements by issuing drawing 47A050-1V under engineering change notice (ECN) 2904. This drawing now clearly points out to the engineer that bolting requirements unless otherwise delineated are to be found in G-53. Also Construction Specification G-53, Specification Revision Notice (SRN) SRN-G-53-5 was issued and provides additional bolt tightening requirements for all bolting materials used at all TVA projects.