

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
5th 157B Lookout Place

January 28, 1986

WBRD-50-390/85-55
WBRD-50-391/85-52

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 UNITS 1 AND 2 - EXCESSIVE CONDUIT BENDS -
WBRD-50-390/85-55, WBRD-50-391/85-52 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector
Al Ignatonis on October 22, 1985 in accordance with 10 CFR 50.55(e) as NCR WBN
6347. Our interim report was submitted on December 20, 1985. Enclosed is our
final report. We no longer consider this deficiency to be reportable under 10
CFR 50.55(e).


This report provides information requested by Tom Conlon and Tom Gibbons in a
December 20, 1985 telephone conversation.

Delay in submittal of this report was discussed with Bob Carroll on
January 21, 1986.

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

Very truly yours,

TENNESSEE VALLEY AUTHORITY


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)
Institute of Nuclear Power Operations
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Atlanta, Georgia 30339

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ENCLOSURE

**WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
EXCESSIVE CONDUIT BENDS**

WBRD-50-390/85-51, WBRD-50-391/85-52

FOR WBN 147

10 CFR 50.55(e)

FINAL REPORT

Description of Deficiency

A condition was identified at Watts Bar Nuclear Plant (WBN) in which several electrical conduits (37 total) were installed with more than 360 degrees of accumulated bends between cable pull points. This condition does not meet the requirements of TVA Electrical Design Guide DG-E13.1.1 nor the requirements of TVA General Construction Specification G-40 (GCS G-40). The 37 deficiencies were from a worst case sample of 82 conduits selected for cable sidewall pressure (SWP) calculations. A generic review is still in progress.

TVA has determined the cause of this deficiency to be that the original version of GCS G-40 did not clearly prohibit the use of more than 360 degrees of accumulated bends between pull points as required by the National Electrical Code (1984 Edition).

Safety Implications

TVA has completed calculations of cable pulling tension and SWP for all cables pulled in the affected conduits. SWP limits were exceeded in 12 of the conduits. Those cables whose allowable SWP has not been exceeded are considered acceptable for use as-is. Cables for which the allowable SWP has been exceeded are also considered acceptable based on an evaluation of representative electrical megger and high potential test results at five TVA plants, which provided no evidence of a trend of degradation of cable insulation properties. The small number of identified cable failures also demonstrates that electrical cables are reliable components. Thus, TVA considers that any class 1E cable failure resulting from excessive SWP during installation, would occur in a random manner and would produce no significant adverse impact on plant safety.

As such, TVA no longer considers 10 CFR 50.55(e) applicable to this item.

To prevent recurrence, conduits installed at WBN in the future shall have no more than 360 degrees of bends between pull points. This requirement has been added to GCS G-38, section 3.2.1.1.b on revision 6, and has been added to GCS G-40, section 3.1.2.3 on revision 9.