

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

5N 157B Lookout Place

March 24, 1986

WBRD-50-390/86-04

WBRD-50-391/86-02

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 - FAILURE TO CONSIDER LATERAL LOADING
IN TYPICAL SUPPORT DESIGN - WBRD-50-390/86-04, WBRD-50-391/86-02 - SECOND
INTERIM REPORT

The subject deficiency was initially reported to NRC-OIE Inspector Al Ignatonis on November 27, 1985 in accordance with 10 CFR 50.55(e) as SCR WBN CEB 8537. Our first interim report was submitted on January 13, 1986. Enclosed is our second interim report. We expect to submit our next report on or about September 18, 1986.

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

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. A. Homer
R. L. Gridley
Manager of Licensing

Enclosure

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

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ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
FAILURE TO CONSIDER LATERAL LOADING
IN TYPICAL SUPPORT DESIGN
WBRD-50-390/86-04, WBRD-50-391/86-02
SCR WBN CEB 8537
10 CFR 50.55(e)

SECOND INTERIM REPORT

Description of Deficiency

Supports on typical drawing series 47A058 and 47A059 are designed in such a way as to allow the development of significant lateral loads which have not been documented in the design of the supports. These additional loads could cause failure of the supports due to increased member stresses/bolt failure at the baseplate. The supports are for category I(L) piping (position retention only). There are approximately 61 support types out of the 165 on the 47A059 series and 24 support types out of 53 on the 47A058 series, which restrain the pipe in the lateral direction. The cause of this deficiency is the misunderstanding of the criteria requirements for supports on category I(L) piping and inadequate training of the design personnel involved. Pipe support designers incorrectly assumed that rigid category I type supports used in piping requiring category I(L) position retention needed to be qualified only for deadweight seismic loads.

Safety Implications

Systems supported with the typical series mentioned perform no primary safety function. Also, supports on the drawing series in question which resist lateral loads are generally interspersed with other types of hangers installed for position retention only in the majority of cases. If a support did pull out of the wall, there is a good possibility that the adjacent supports can carry the additional load and keep the pipe from damaging adjacent safety-related equipment which is the primary function of these types of typical supports. Still, the supports could fail during a safe shutdown earthquake and jeopardize the safe operation of the plant.

Interim Progress

TVA has completed a review of the 47A058 and 47A059 series drawings "worst case" applications of the supports in question and identified 24 typicals of the 47A058 series and 61 typicals of the 47A059 series which are not generically qualified. This information and the approximate numbers and categories of supports involved are tabulated below. The design of a typical support envelops all of the worst case parameters that can contribute to failure of the support. Some of these are support member length, number of pipe attachments, length of pipe supported, tolerance of anchor bolt dimensions, pipe size and piping insulation. Each typical support has different worst case parameters depending on its design options and probable failure mechanisms. TVA presently plans to compare individual support installations against some of the assumed worst case parameters. Those supports remaining unqualified after this effort will then be classed into

similar design groups with common failure mechanisms and the worst case parameters which affect these failure mechanisms will then be reviewed for each class. An assessment of the most likely values for the parameters and their probable effect on the failure mechanisms will then be established and a total reduction factor will be predicted based on the parametric assessment. This reduction factor will reduce the interactive effect of the parameters on the failure mechanisms of each group and reflect the reduction of the load predicted from the worst case design to the actual installation.

Numbers of Drawings Involved and
Approximate Status of Supports

	Drawing Series 47A058	Drawing Series 47A059
No. of Typical Drawings	53	165
No. of Typical Drawings Not Qualified	24	61
Total Supports Installed	10,550	4,565
Supports Not Affected (Acceptable)	3,550	2,065
Varied Supports (Acceptable)	2,800	1,200
Supports Generically Unqualified, Non-Varied (Being Evaluated)	4,200	1,300

Next, a random representative sample from each group of these typicals will be walked down in the field and all applicable parameters measured and recorded. This information will then be reviewed to determine with a sufficient confidence that the predicted reduction factor is valid. If the verified reduction factor is sufficient to show that the group of typicals meets review criteria, then all non-varied installed supports of that group can be considered qualified. If the verified reduction factor is not sufficient to provide the required confidence, each installed support in that group must be walked down and individually reviewed. Supports that still remain unqualified after this individual review will then require modification. In addition, as the hanger program allows field forces to vary from typical support design during installation (with proper Office of Engineering (OE) approval) a comparison of the detailed review of the non-varied pipe supports with the varied pipe supports will be conducted. (There are 2800 varied 47A058 supports and 1200 varied 47A059 supports.)

Designers involved with this work have been verbally instructed in the need to consider lateral loading in typical support design. TVA plans to provide specific documented training in the future. In addition, TVA is in the process of revising those typical support drawings that are not generically qualified for seismic loads.

TVA will provide the next report on this subject on or about September 18, 1986.