TENNESSEE VALLEY AUTHORITY
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MAR 2 1988

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - RESOLUTION OF OPEN INSPECTION ISSUES

During the NRC inspection in Knoxville, Tennessee, the week of February 15, 1988, a number of miscellaneous issues were reviewed. One of the issues identified was the effect of Square Root of the Sum of the Squares (SRSS) versus Absolute Sums (ABS) on the directional combination of results of basic seismic load cases. This confirmatory letter documents resolution of this issue.

If you have any questions, please call D. L. Williams at (615) 632-7170.

Very truly yours

TENNESSEE VALLEY AUTHORITY

R. Gridley, Director
Nuclear Licensing and
Regulatory Affairs

Enclosure
cc: See page 2

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U.S. Nuclear Regulatory Commission

MAR 2 1988

Enclosure
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ENCLOSURE

SEQUOYAH NUCLEAR PLANT
SRSS VS. ABS COMBINATION

1. Introduction

Square Root of the Sum of the Squares (SRSS) was used for the piping system seismic directional combination method on SQN while the SQN SER issued by the NRC described it as Absolute Sum (ABS). This study investigated the impact of the difference on the SQN piping design.

2. Scope

This evaluation assesses the differences when combining piping seismic results from the two directional responses by the SRSS method versus ABS combination.

3. Approach

Five piping analyses were selected to evaluate the impact of ABS vs. SRSS on the existing SQN design. Three of the five analyses were selected from a previous study addressing the vertical earthquake issue in response to TVA Problem Identification Report PIRSQNCEB8652. The fourth analysis was selected to assess the effect of the auxiliary building spectra and the fifth one assesses the effect of the interior concrete structure spectra.

All critical results, including pipe stress, penetration loads, nozzle loads, valve accelerations, and support loads, were evaluated. Detailed evaluations of all supports designed to interim design criteria CEB-CI-21.89 were made. Other supports were also evaluated to determine that the percent increase would not affect their qualification. The response increases for the faulted loading combination due to ABS vs. SRSS effects are as shown in the attached table.

4. Conclusions

Five piping systems were evaluated to study the impact of SRSS vs ABS as the directional combination method. The difference is around 10 percent when compared to the faulted load case, and the increased loads, stresses, and accelerations are all within allowables. Based on this review, TVA concludes that the use of ABS directional combination for piping systems in lieu of the SRSS approach described in the SQN FSAR does not represent a significant challenge to the design of SQN piping systems. As such, this issue is considered resolved for SQN unit 2 restart.

ATTACHMENT

SRSS VERSUS ABS COMPARISON

Stress Problems / Attributes	N2-14-1R	ICS 0600154-07-03	AB N2-64-2A	AB N2-3-10A, 11A, 12A	N2-64-3R
Pipe Stress	3% to 13% increase max. EQN 9F stress is acceptable	2% increase max.	2% increase max.	3% increase max.	0.5% increase max.
Penetration Loads	None	None	1.3% max. increase	10% max. increase	0.4% max. increase
Nozzle Loads	No nozzles	< 4% Max. increase	4.9% max. increase	<10% max. increase; nozzles are qualified	No nozzles
Valve Accelerations	No valves	All valves meet 2G/3G limit. Increase < 12%	< 3.5% increase	All valves meet 2G/3G limit.	0.2% max increase for 5 valves. 6% increase for 1 valve which is qualified per CEB 87-10C
Supports qualified to CEB-CI-21.89	1% increase - within allowable	None are qualified to CEB-CI-21.89	3% increase - within allowable	10% increase - within allowable	0.1% increase - within allowable