



DEC 30 1993

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

Gentlemen:

In the Matter of the Application of) Docket Nos. 50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) - UNIT 1 - SUPPLEMENTAL RESPONSE TO NRC REQUEST
FOR ADDITIONAL INFORMATION - SEISMIC LOAD FOR HVAC DUCT SUPPORTS (TAC R00514)

- References:
1. NRC letter to TVA, June 10, 1993, Request for Additional Information - Seismic Load for HVAC Duct Supports (TAC R00514)
 2. TVA letter to NRC, November 1, 1993, Response to NRC Request for Additional Information (RAI) - Seismic Load for HVAC Duct Supports (TAC R00514)

The enclosed information is provided as a supplement to an earlier TVA submittal discussing Seismic Loads for HVAC Duct Supports (Reference 2). It serves to clarify two questions raised by the NRC reviewer during a telecon of November 23, 1993. The two questions relate to the process used by TVA to remove excess high frequency energy beyond 34 Hz from the vertical artificial time history developed for the WBN Site Specific Ground Response Spectrum (SSRS).

If additional information is required, contact P. L. Pace at (615)-365-1824.

Very truly yours,

H. J. Munseler

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Enclosure

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ENCLOSURE

SUPPLEMENTAL RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION SEISMIC LOAD FOR HVAC DUCT SUPPORTS (RELATED TO CIVIL IDI 92-201-19)

NRC Questions

1. Provide additional discussion of the process used by TVA consultant ICEC to remove the excess energy beyond 34 Hz.
2. Clarify which computer programs are utilized to develop the initial unmodified time history in 1989 and the subsequent filter of secondary peaks in 1993.

TVA Response

The process used by International Civil Engineering Consultants (ICEC) to remove the excess energy consists of three parts. First, the vertical time history (i.e., the one containing the excess energy) is filtered using the ICEC computer program FILTER to eliminate high frequencies beyond 34 Hz. It is known that the filtering process can also affect the frequency content between approximately 25-34 Hz. Because of this fact, the second step involved using the ICEC computer program SYNQKE-R to compensate for the perturbations by readjusting the frequency content of the filtered time history below 34 Hz. This adjustment step ensures that the response spectra of the modified (adjusted) time history will closely match the target response spectra. The final step involves reconfirming that the modified time history still complies with the spectrum-matching, Power Spectral Density Function (PSDF), and other requirements of the Standard Review Plan (SRP). The information submitted in TVA's response of November 1, 1993, demonstrates that the modified vertical time history is in full compliance with SRP requirements.

The unmodified time history was developed in 1989 using the BECHTEL computer programs BSIMQKE and DATAN, which were developed by Dr. Wen Tseng and Dr. Kiat Lilhanand while employed by BECHTEL. After filtering using the ICEC program FILTER, the filtered time history was adjusted using the essentially equivalent programs SUNQKE-R and THDAS, respectively, which were developed by Dr. Tseng and Dr. Lilhanand for ICEC. All ICEC programs were verified in accordance with the ICEC QA procedure for computer software verification. The verification packages are available for inspection in the ICEC office in Berkeley, California. Additional validation of the ICEC programs against the BECHTEL programs is shown in Figures 3, 4, and 5 of TVA's submittal of November 1, 1993, which shows excellent agreement between the modified and unmodified time histories in the frequency range below 34 Hz. The slight differences between the two time histories are of no practical engineering significance.

It should be noted that this study was performed to ensure that the excess energy beyond 34 Hz in the unmodified vertical time history could be filtered and eliminated without affecting other lower frequency portions of the time history. The study (1) demonstrates it is not necessary to generate new response spectra and (2) confirms that the current WBN procedure of using the ZPA acceleration of 33 Hz as a cutoff frequency is an appropriate means to compensate for the excess high frequency energy. Therefore, the evaluation basis for the WBN Site Specific Response Spectra, as stated in TVA's November 1, 1993 response, remains the current set previously reviewed by NRC and accepted in SER Supplement 6.