TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

January 21, 1983

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Ms. Adensam:

In the Matter of the Application of) Docket No. 50-390
Tennessee Valley Authority) 50-391

The NRC conducted an audit on the plant geotechnical design features on September 22-23, 1982. Initial information on the Watts Bar Nuclear Plant soil amplification studies were provided to the NRC as a result of the audit. During a telephone conference call on December 14, 1982, the NRC reviewer, D. Gupta, requested additional information on the soil amplification studies. Enclosed is the information in response to that request.

If you have any questions concerning this matter, please get in touch with D. P. Ormsby at FTS 858-2682.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Licensing

Sworn to and subscribed before me
this 21st day of Jan. 1983
Paulette H. White
Notary Public
My Commission Expires 9-5-84

Enclosure
cc: U.S. Nuclear Regulatory Commission (Enclosure)
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

B09

ENCLOSURE
WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
GEOTECHNICAL DESIGN INFORMATION REQUESTED BY NRC

Question 1

Soil profiles and soil properties used in the amplification studies for soil-supported structures were requested.

Response

There are three soil-supported category I structures at the Watts Bar Nuclear Plant site for which amplification studies were made.

The three structures are the diesel generator building (DGB), waste packaging area (WPA), and the refueling water storage tank (RWST). As shown on figures 2.5-225 and -226 of the FSAR, these structures are supported on granular fill material. In the case of the DGB (section A2-A2 and B2-B2 on figure 2.5-226) and the RWST (sections E2-E2 and F2-F2 on figure 2.5-226), the fine grained in-situ soils were removed to the top of the basel gravel (about elevation 713). For the WPA (section B1-B1 on figure 2.5-225), the basel gravel as well as the in-situ fine grained soils were removed to the top of rock. Each structure then had granular fill placed to the base of the structure's foundation as described in section 2.5.4.5.2 of the FSAR.

The following table provides the soil parameters used in the amplification studies:

	DGB	WPA	RWST
Shear wave velocity (Vs)	1650 fps	1650 fps	1650 fps
Variation of sheer wave velocity	± 30%	± 30%	± 30%
Unit weight of soil	120 pcf	120 pcf	120 pcf
Depth of soil profile	35 feet	30 feet	30 feet
Damping	10%	10%	10%

Question 2

What input data would we use if we did a SHAKE study for amplification?

Response

A soil-structure interaction analysis was also done on the RWST using the computer program FLUSH. This was done to verify the adequacy of the conservative loads provided to the tank manufacturer. The soils data used in the FLUSH analysis would be similar to the data for a SHAKE analysis. We have provided the basic soils data below.

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The profile used was the same as shown in section E2-E2 on figure 2.5-226 of the FSAR.

The properties used were:

γ = 130 pcf

K_0 = 0.6

$G_{max} = 90{,}000\ \bar{\sigma}_m^{0.5}$ (used for supporting and surrounding material)

G was varied $\pm$ 50% to account for material variation.

The shear modulus and damping used for each element in the finite element model FEM were determined based on the Seed and Idriss curves for sand. (Reference: Seed, H. B., and Idriss, I. M. (1970), 'Soil Moduli and Damping Factors for Dynamic Response Analysis,' Report No. EERC 70-10, University of California, Berkeley, December).

Tank weight - 5,280 kips
Tank radius - 28.5 feet

The loads from the FLUSH analysis were found to be a minimum of 50 percent lower than the loads given to the tank manufacturer.