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M. Service
ELD
IE (3)

JAN 27 1978

Docket Nos: 50-390 & 50-391

Tennessee Valley Authority
ATTN: Mr. Godwin Williams, Jr.
Manager of Power
830 Power Building
Chattanooga, Tennessee 37201

bcc: J. R. Buchanan, NSIC
Thomas B. Abernathy
ACRS (16)

Gentlemen:

SUBJECT: CORPS OF ENGINEERS CONCERNS ON WATTS BAR

Enclosed is a copy of a letter from the Corps of Engineers who are consultants to the staff on the Watts Bar application.

We would appreciate your response to their concerns by March 3, 1978 in order to keep in schedule.

Please contact us if there are any questions.

Original signed by:

Steven A. Varga, Chief
Light Water Reactors Branch No. 4
Division of Project Management

Enclosure:
As Stated

cc:
See Next Page

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GD

OFFICE➤	DPM:LWR #4	DPM:LWR #4				
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DATE➤	01/ /78	01/ /78				

ccs:
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Mr. Wesley Byrd, Project Manager
Tennessee Valley Authority
303 Power Building
Chattanooga, Tennessee 37401

DEPARTMENT OF THE ARMY
WATERWAYS EXPERIMENT STATION, CORPS OF ENGINEERS
P. O. BOX 631
VICKSBURG, MISSISSIPPI 39180

IN REPLY REFER TO: WESSH

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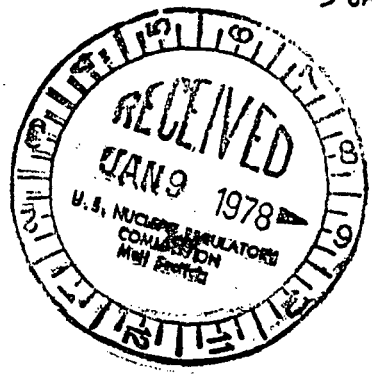

Mr. William P. Gammill
Chief, Site Analysis Branch
Directorate of Licensing Regulation
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Gammill:

At the request of Mr. Joe Kane, of the Nuclear Regulatory Commission (NRC), we have reviewed Amendments 28 and 30 to the FSAR on Watts Bar Nuclear Plant.

Amendments 28 and 30 contain responses to draft questions formulated during our initial review of the FSAR. After reviewing this information, we find the following areas of concern still remaining:

a. It is our opinion that the investigations of the soil along the alignments of the Class IE conduits and the ERCW pipelines, as described in the FSAR, are not adequate to demonstrate that these soils would be stable under seismic loading. Logs of borings on the ERCW pipeline alignment have not yet been received by WES; however, we infer that the information that has been developed is similar to that obtained for the Class IE conduits. Specific reasons for our concern are as follows:

(1) Soil borings are at excessive intervals (about 200 ft), and no attempt has been made to correlate soil units or to develop a coherent geological cross section of the soils.

(2) Nearly total reliance is placed on blow counts and on split-spoon samples to determine soil properties. The few borings in which undisturbed samples were taken penetrated only the upper part of the overburden. Consequently, no direct information is available on the densities of granular soils and their susceptibility to liquefaction. Also, many of the granular soils encountered are described as gravelly; blow counts in such materials are difficult to interpret.

(3) Reliance is placed on 24-hour water level readings in the split-spoon boreholes to indicate the long-term water table conditions.

(4) Reliance is placed on gradation of granular soils to prove their nonsusceptibility to liquefaction. It is our opinion that gradation alone is not a sufficient basis to conclude that any cohesionless soils are safe against liquefaction.

The applicant should supplement these investigations to adequately define the soil and groundwater conditions along the Class IE conduit and ERCW pipeline alignments, or, alternatively, demonstrate that liquefaction of the foundation soils would not endanger these Category I facilities.

b. The method used for measurement of shear-wave velocities is questionable. Because of refraction through high-velocity zones or through the water column in the borehole, the indicated velocities are higher than true average velocities even with a homogeneous soil layer. Also, the influence of possible low-velocity zones in the lower part of the depth interval represented by the boring cannot be detected. The applicant should consider variations of $\pm$ 50 percent in the shear-wave velocity values, and determine the effects of such variation on safety related structures.

c. Several Category I structures (e.g. the Diesel Generator Building) overlie in situ granular soils described as silty gravel, for which only data from split-spoon borings are presented. We would like to review any test data on this material (especially density data) that were obtained at the time the foundation excavations were open.

d. We would like to review the procedures used to determine earth pressures due to seismic loading on sheet pile and concrete retaining walls (Q362.9). For this purpose, the applicant should be requested to furnish copies of Reference 1 and the relevant portions of Reference 2, cited in Section 3.7.2.1.1. (Reference 1 is a 1939 TVA report, and Reference 2 is material presented at a short course at UCLA.)

e. With regard to the stability analyses for the intake channel, the information provided is not sufficient for us to judge the adequacy of the analyses. The applicant should provide descriptions or drawings indicating the forces considered in the analyses, and where appropriate, how they were computed.

WESSH
Mr. William P. Gammill

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If there are any questions concerning this review, or if we can be of further assistance, please call Dr. A. G. Franklin at FTS 542-2658.

Sincerely yours,

F. R. Brown

F. R. BROWN
Engineer
Technical Director