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Docket Nos. 50-390
and 50-391

Mr. H. G. Parris
Manager of Power
Tennessee Valley Authority
500 A Chestnut Street, Tower II
Chattanooga, Tennessee 37401

Dear Mr. Parris:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION ON WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2

The Geotechnical Engineering Branch requires additional information to complete their review of the Final Safety Analysis Report for Watts Bar Nuclear Plant, Units 1 and 2. The information required to complete our review (Enclosure (1)) concerns the susceptibility of alluvial silty sands and sandy silts within the foundation of the Class IE electrical conduit and the ERCW pipeline to liquefaction (Q362.36). Enclosure (1) also contains a revision to Q362.32, sent to you previously in a March 30, 1981 letter.

As discussed with your staff, we request that the information be prepared to support a site visit to be scheduled in the first week of July 1981.

Please contact us if you desire any discussion or clarification of the enclosed requests.

Sincerely,

Original signed by
Robert L. Tedesco

Robert L. Tedesco, Assistant
Director for Licensing
Division of Licensing

cc: See next page

APP 3

8105100359

OFFICE	DL:LB#4	DL:LB#4	AD/L				
SURNAME	TKenyon:eb	EAdensam	RTedesco				
DATE	4/29/81	4/2/81	5/6/81				

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAY

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Sincerely,

Robert L. Tedesco, Assistant
Director for Licensing
Division of Licensing

Enclosure: As stated

cc: See next page

Mr. H. G. Parris
Manager of Power
Tennessee Valley Authority
500A Chestnut Street Tower II
Chattanooga, Tennessee 37401

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Chattanooga, Tennessee 37401

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Tennessee Valley Authority
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Knoxville, Tennessee 37902

Resident Inspector/Watts Barr NPS
c/o U. S. Nuclear Regulatory Commission
P. O. Box 629
Spring City, Tennessee 37831

Mr. David Ormsby
Tennessee Valley Authority
400 Chestnut Street, Tower II
Chattanooga, Tennessee 37401

ENCLOSURE (1)
REQUEST FOR ADDITIONAL INFORMATION

362.32
(revised)
(2.5.4)

The information provided for the foundation soil conditions underneath several Category I structures, e.g., ERCW Discharge Overflow Structure, Refueling Water Storage Tanks and Waste Packaging Area is not sufficient to complete the review. Where applicable, provide the depth to bedrock, properties of in-situ gravel, properties and thickness of granular fill under the structure and excavation and backfill details for these category I structures. Provide details of pile foundation design and installation for category I structures founded on piles (e.g., Condensate Demineralizer Waste Evaporator Building and ERCW Pipe Slabs).

362.36 Your response to Q362.27, in Amendment 42 has not provided sufficient information to establish that the zone of alluvial silty sands and sandy silts within the foundation of the Class IE Electrical Conduit and the Essential Raw Cooling Water pipeline are not loose and potentially susceptible to liquefaction. The information required by the staff for an adequate review was requested earlier in Q362.14, Q362.24 and 362.27, but has not been provided to the staff. We request that you provide the following information in sufficient detail for an independent staff review.

1. Provide following plots drawn to scale on oversize drawings (approximately 22 in x 34 in) for category I Essential Raw Cooling Water pipeline and class IE Electrical Conduit. Preferably, provide one drawing for Essential Raw Cooling Water pipeline and the other for Class IE Electrical Conduit.

   Include the following information:

   (a) locations and routing from one end of the utility to the other, clearly identifying the lines.

   (b) locations of the borings along the route of the pipeline and the conduit. Indicate by legend the type of sampling in these borings (split spoon or undisturbed sampling) and show the spacing between

individual borings. Show the locations of the pertinent borings that provide information about the liquefaction potential of soils under question.

(c) Show the contours of the as built ground surface along these utilities after placement of fill.

2. Explain your basis for using borings spaced as much as 200 to 400 ft apart along the routes of these lines to provide reasonable assurance that the soil profile underneath the utilities does not contain materials susceptible to liquefaction. Note that boring log SS-50 shows about 10 ft. of loose alluvial material below water table and because of the wide spacing of the borings, the lateral extent of the loose zone cannot be established in this area. Explain how the extent of loose alluvial material was determined from the widely spaced borings in different sections along the routes.

3. On oversize drawings (approximately 22 in x 34 in), provide the following details to scale for Category I Essential Raw Cooling Water pipeline and class IE Electrical Conduit. Preferably, provide one drawing for pipeline and the other for Class IE conduit.

Include the following information:

a) The pertinent boring logs along the routes of the conduit and pipeline showing the fill above the pipeline and conduit. The spacing between

the logs be to scale as well. Provide the classification and blow count information on this plot. If some of the borings along the routes not used in the liquefaction potential evaluation (e.g., bori 2, 66, 89, 91, 98, 100 and 102), identify and provide logs for the borings. Provide justification for not using these borings in analysis.

b) Show soil stratification and top of shale boundary on the profile.

c) Draw the 25-year high water level or the design water level (if this level equals the probable maximum flood level) on profile and discuss how it corresponds to water table information presented in Section 2.4.13.2.

d) Draw the invert and top of class IE Electrical Conduit and ERCW pipeline on the logs.

e) Show the as built fill above the pipeline and the conduit and indicate the ground surface elevation on the logs.

4. Based on the information provided in items 1, 2 and 3, discuss in detail the probable vertical and lateral extent of the alluvial soil with $N \leq 30$ that is below the 25-year high water table or the design water level (if this level equals the probable maximum flood level). Discuss the gradation, relative density, and cyclic strength characteristics of material in this strata.

5. Provide det of the dynamic response computations and the factors of safety fiquefaction potential of alluvial soils in the profile along the rG of the utilities. Include the following information:

(a) The cro:ection of the one dimensional soil profile analyzed. Indicatee water table elevation used in the analysis. Discuss any conse[illegible]sm in selecting the profile.

(b) The dynamic s] moduli and damping values of the various soils in the profile. rovide the value of the coefficient of earth pressure at rest used f- the analysis.

(c) The characterisics of the seismic input used for liquefaction analysis, viz, esponse spectrum of the input motion, and its point of application in the soil profile.

(d) The method of dynamic response analysis, various assumptions used for converting the irregular shear stress time history to 5 cycles of equivalent uniform cyclic stress. Show typical results.

(e) Provide the results of analysis for the entire profile.

(f) Justify the use of the cyclic strength properties curve given in response to Q362.27. Explain the scatter in the laboratory test data and justify your interpretation of the data.

(g) Provide a Table of factors of safety for the alluvial material at various depths against liquefaction potential.