



# GEOTECHNICAL ENGINEERS INC.

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March 3, 1982  
Project 81907  
File 2.0  
Ref: 81907-5

Mr. Joseph Kane  
Project Officer  
U. S. Regulatory Commission  
Division of Engineering, M/S P-214  
Washington, D.C. 20555

Subject: Trip Report Nos. 3 and 4 - Bethesda  
Meeting of February 24, 25, 26, 1982  
Midland Plant Underpinning  
Contract No. NRC-03-82-092

Dear Mr. Kane:

On February 24 and 25 a meeting was held to discuss underpinning plans for the service water pump structure. On February 26, 1982 an audit for License Condition 5 of the auxiliary building underpinning was held.

Enclosure (1), Trip Report No. 3, is a list of unresolved issues for the service water pump structure.

Enclosure (2), Trip Report No. 4, is a list of unresolved issues for the auxiliary building.

Sincerely yours,

GEOTECHNICAL ENGINEERS INC.

Steve J. Poulos  
Principal

SJP:ms  
Encl.  
cc w/encl: Mr. Reuben Samuels  
Mr. Hari Singh

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Add:  
J. KANE

Trip Report No. 3

MEETING OF FEBRUARY 24, 25, 1982

SERVICE WATER PUMP STRUCTURE

MIDLAND PLANT UNDERPINNING

CONTRACT NRC-03-82-092

Geotechnical Engineers Inc.

Project 81907  
March 3, 1982

The following items remain unresolved subsequent to our meeting in Bethesda relative to underpinning of the Service Water Pump Structure.

1. Subgrade moduli that were used for the seismic analysis were presented in very general form. The test data and other assumptions and equations used for estimating these moduli should be provided.
2. Provide the remedies that are available to prevent further movement if the maximum allowable movements are reached.
3. Provide the out-of-plane forces for which the wall was designed.
4. Clarify the method used for designing the vertical bolts between the structure and the underpinning wall.
5. Describe the dewatering system to be used to lower the water level to the hard clay.
6. Provide location, depths, and types of piezometers for monitoring groundwater level to ensure that it has been drawn down below excavation level before excavation to that level.

Enclosure (1)

7. Select telltale locations at which differential settlements and strain in the concrete will be measured during underpinning. State precision of measurement and type of instrument. State frequency of readings and evaluation of readings before, during, and shortly after underpinning.
8. Provide limits of movements of strain and differential settlement that will (1) trigger review and (2) trigger a stop of construction and start remedial action.
9. State who is responsible for accepting the bearing stratum by direct inspection.
10. Provide the quantitative method for evaluating the suitability of the dense alluvium.
11. State the limits of thickness of lean concrete under the piers and the maximum difference in elevation between adjacent piers. Review borings and select a bearing elevation low enough to eliminate, for the most part, the need for elevation differences.
12. One pier on hard clay should be carefully load tested (like a pile load test) to about 20% above its expected lock-off load. Which pier will be tested?
13. How often will load on piers be checked during the progress of the work? Who has this responsibility?

Trip Report No. 4

AUDIT OF FEBRUARY 26, 1982

AUXILIARY BUILDING

MIDLAND PLANT UNDERPINNING

CONTRACT NRC-03-82-092

Geotechnical Engineers Inc.

Project 81907

March 2, 1982

The following is a list of issues left unresolved after the audit on February 26, 1982 of the Electrical Penetration Areas and the Control Tower. The audit pertained principally to License Condition 5.

1. A new sequence of construction should be submitted. Some important details on the sequence previously provided have been altered. The support under the EPA at the east and west ends was to be installed prior to advancing drift beyond that point. This sequence is not given in the presently available documents.
2. Strain gages should be mounted in the zones where highest stress changes are expected to occur in the main auxiliary building during underpinning. Tolerable limits of movement and frequency of reading and evaluation before and during critical stages of underpinning should be provided.
3. Remedial measures that are available to the contractor if excessive settlements, deflection, or concrete strain are measured should be provided. The sequence of construction and the location of the drifts and piers should be selected to ensure that acceptable remedial actions are possible in a short time if the movements are excessive.
4. The NRC reviewers were to study the (a) proposed spring constants, (b) the proposed critical monitoring points, and (c) proposed tolerable movements and provide a response to Consumers Power.

Enclosure (2)

5. Jacking load adjustment criteria are to be provided by applicant. Frequency of checks on jacking loads are to be included.
6. Time lapse between observed excessive reading and action for an emergency situation should be given.

NOTE: Items 3, 5, 6, 7, and 8 of Trip Report No. 2 dated February 8, 1982 should be followed up. These items were not covered during the February 26 audit.