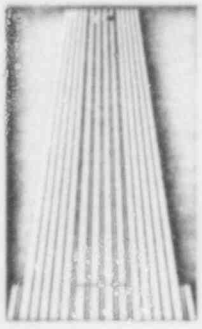

Houston
Lighting
& Power
Company

Electric Tower
P.O. Box 1700
Houston, Texas 77001

August 8, 1979
ST-HL-AE-366
SFN: V-0100

Mr. Dominic B. Vassallo
Assistant Director
Division of Project Management
U. S. Nuclear Regulatory Commission
1717 H. Street
Washington, D. C. 20555

Dear Mr. Vassallo:

South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
Soil Structure Interaction Analysis Procedures
For Category I Structures of the
South Texas Project

Attached is an outline of the proposed procedures to be employed by Houston Lighting & Power Company in performing soil structure interaction analysis for Category I structures at the South Texas Project. These procedures, developed in response to NRC question SEB 130.12, were discussed with Messrs. E. Licitra and R. Gupta of your office on August 4, 1979, and were telecopied to Dr. Gupta on August 7, 1979.

Should you desire additional information please contact Mr. L. R. Jacobi at (713) 676-7953.

Very truly yours,

E. A. Turner
Vice President
Power Plant Construction
& Technical Services

LRJ:bf
Attachment
cc: Without Attachment
Director, NRC Office of Inspection & Enforcement
M. D. Schwarz (Baker & Botts)
R. Gordon Gooch (Baker & Botts)
J. R. Newman (Lowenstein, Newman, Reis, Axelrad & Toll)
D. G. Barker
A. J. Granger
R. A. Frazar

447 197

Soil-Structure Interaction Analysis procedures for Category I structures of South Texas Project

1. Calculations of equivalent soil-spring constants and damping coefficients

   Formulas in the following papers will be followed:

   a. Horizontal and Rocking Motions

      "Coupled Horizontal and Rocking Vibration of Embedded Footings"

      by Beredugo and Novak, Canadian Geotechnical Journal, 9,447 (1972).

   b. Vertical Motion

      "Vertical Vibration of Embedded Footings"

      by Novak and Beredugo

      Journal of the Soil-Mechanics and Foundations Division

      SM-12, December 1972.

   c. Torsional Motion

      "Torsional and Coupled Vibrations of Embedded Footings"

      by Novak and Sachs

      Earthquake Engineering and Structural Dynamics

      Vol. 2, 11-33 (1973).

2. No effective soil mass will be added.

3. Shear Modulus

   Maximum shear modulus (at 10^{-4}% strain level)

   and 75% of maximum shear modulus will be evaluated and results compared for some cases.

4. Time history modal superposition and strain energy weighted modal damping will be used.

5. Time History Input Motion

   - For surface structures - Time histories whose response spectra envelope those in Regulatory Guide 1:60 will be used as input to the base of the soil springs.
   - For deeply embedded structures - Time histories simulating Regulatory Guide 1.60 Design Response Spectra will be modified to take into account the effect of deep embedment.

     As an example, the procedures suggested by Kausel, Whitman, Morray, and Elsabee in the following papers may be followed:

     - "The Spring Method for Embedded Foundations" in Nuclear Engineering and Design, Vol. 48, 1978 and
     - "Dynamic Analysis of Embedded Structures" SMIRT conference, 1977 paper k2/6.

6. One set of soil properties will be used (no variation of soil properties over a range) and the peaks of the calculated Floor Response Spectra will be shifted by $\pm$ 15%.

7. Only 2% damping ratio will be used to generate Floor Response Spectra for comparison, unless the new results exceed the existing results. For this case, other damping ratios will also be used.