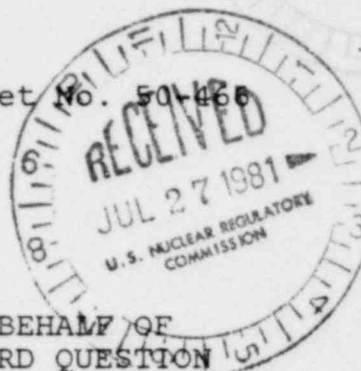


UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the matter of )  
HOUSTON LIGHTING & POWER COMPANY )  
(Allens Creek Nuclear Generating )  
Station, Unit No. 1) )

Docket No. 50-466



TESTIMONY OF WILLIAM F. MERCURIO ON BEHALF OF  
HOUSTON LIGHTING & POWER COMPANY ON BOARD QUESTION  
8 RELATING TO ACNGS REACTOR BUILDING SUBSURFACE  
SOIL MECHANICS

Q. Mr. Mercurio, please state your name and  
business address and describe your educational and  
professional experience.

A. My name is William F. Mercurio, and my business  
address is Ebasco Services, Inc., 2 World Trade Center,  
New York, N.Y. I have previously discussed by position  
and background in connection with my testimony on  
Bishop Contentions 5, 7, 9 and 10.

A. The purpose of this testimony is to address  
Board Question 8 which requests evidence regarding the  
ability of subsurface soil to support the ACNGS reactor  
building. Soil mechanics rather than subsidence is of  
concern here with respect to avoiding unacceptable  
settling of heavy structures.

1  
2 Q. What types of analyses verify the settling  
3 characteristics of soil with respect to soil mechanics?

4 A. Static settlement analyses are used to estimate  
5 the anticipated relative vertical displacements of  
6 structures supported by soil. Soil mechanic theoretical  
7 calculations coupled with actual soil property test  
8 data verify the soil settling characteristics.

9 Q. Would you briefly describe how the underlying  
10 materials at the ACNGS site were observed?

11 A. Geophysical surveys and borings were used to  
12 obtain field data for the development of subsurface  
13 cross-sections. The locations of all borings, geophysical  
14 surveys, observation wells and proposed excavations, as  
15 well as plant structures, are shown on PSAR Figures  
16 2.5.4-5A, 5B and 5C. PSAR Section 2.5.4 provides a  
17 detailed discussion of data collection and observations.

18 Q. Would you describe what information the field  
19 data provided?

20 A. A detailed description of the subsurface  
21 material which was obtained from field exploration was  
22 presented in PSAR Section 2.5.4.3. The basic formations  
23 of the subsurface materials were identified as Beaumont,  
24 Montgomery, Goliad, and Fleming formation. The undisturbed

1 samples extracted from these formations were subjected  
2 to laboratory static and dynamic tests to investigate  
3 their strength characteristics, compressibility under  
4 heavy load and dynamic properties. The results of the  
5 laboratory tests, along with engineering interpretations,  
6 were presented in PSAR Section 2.5.6 and indicate high  
7 shear strengths and low compressibility. This data  
8 confirms that ACNGS is founded on soils which are more  
9 than capable of sustaining the loads to be imposed.

10 Q. Please describe the basic subsurface soil  
11 characteristics and analyses performed for the reactor  
12 building foundation.

13 A. The Reactor building mat foundation will rest  
14 on the Montgomery formation of predominately very dense  
15 and highly compact granular sand material with occasional  
16 overconsolidated clay layers appearing at the lower  
17 portion of the formation.

18 The mat foundation is to be placed on the  
19 very dense and highly compact Montgomery sand formation  
20 around elevation 104, which is about 28 feet below  
21 established plant grade. The maximum allowable bearing  
22 pressure for the reactor mat foundation design is 10  
23 kips per square foot (ksf) under the static loading  
24 conditions. The mat foundation has a safety factor

1  
2 greater than 20. Normally a safety factor of 1.5 is  
3 considered acceptable. A discussion of the method used  
4 and the design parameters for the analysis have been  
5 presented in PSAR Section 2.5.4.10.1.

6 Most of the settlement resulting from the consolida-  
7 tion of the granular material under loads will take  
8 place during the construction of the reactor building.  
9 Based upon consolidation test results and the effective  
10 imposed building load, the total settlement was calculated  
11 to be on the order of one (1) inch or less.

12 Q. What are your conclusions concerning this  
13 Board Question?

14 A. The Applicant has evaluated the subsurface  
15 soil conditions. On the basis of detailed test borings,  
16 geophysical exploration and extensive laboratory testing  
17 programs in conjunction with the structural requirements  
18 imposed by the buildings, the reactor building may be  
19 safely constructed on an earth-supported, reinforced  
20 concrete mat foundation.  
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