UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	§	
	§	
HOUSTON LIGHTING & POWER COMPANY	§	Docket No. 50-466
	§	
(Allens Creek Nuclear Generating Station, Unit 1)	§	
	§	

DIRECT TESTIMONY OF MIGUEL A. LUGO
CONCERNING (1) TEXPIRG ADDITIONAL
CONTENTION 6 - MANNINGS COEFFICIENT;
(2) BOARD QUESTION ON SERVICE LEVEL STRESS LIMITS

Q. Would you please state your name and position, and describe your educational and professional qualifications?

A. My name is Miguel A. Lugo and I am employed by Ebasco Services Inc. I am in charge of the design of the ACNGS containment vessel and reactor building foundation mat. A description of my educational and professional background is described in Attachment MAL-1.

Q. Mr. Lugo, would you please answer the first question asked by the Board at page 8 of the September 1 Order, wherein the Board asked a question about the margin of safety in the containment?

A. We have performed preliminary calculations that indicate the Allens Creek containment can withstand approximately 50 psig internal static pressure before reaching its yield strength. Therefore, the "margin of

safety" above the design pressure of 15 psig is approximately 35 psig.

No calculations have been done to determine at what pressure containment failure will occur. In structural design, it is not common practice to design against failure, but rather against specific Code limits. However, it can be said that containment failure will not occur until the internal static pressure is significantly in excess of 50 psig. This is based on the fact that the total ultimate strength of materials such as concrete and steel greatly exceeds the yield strength. Therefore it is concluded that unless the incremental static pressure in the containment exceeds the design pressure by substantially more than the "margin of safety" shown above, containment failure would not be a concern.

With regard to the leakage question in designing the containment structure, the details for weld seams, penetrations, etc. are developed to form a completely leak tight barrier. The actual leakage of the as-built containment due to a design basis LOCA will be determined by the pre-operational leakage test committed to in the PSAR and compared for comformance with the maximum allowed leakage rate also committed to in the PSAR.

Q. Have you read the question by the Board at Tr. 16289 about Service Level C Limits?

A. Yes I have.

Q. Can you answer the Board's question?

A. Yes I can. The ASME Boiler and Pressure Vessel (B&PV) Code identifies various stress limits for different loading conditions by categorizing these conditions under specific "Service Levels" (A thru D). In order to be conservative, the lowest stress limits (Service Level A) are used for the basic design accident loading cases, including the 15 psig design pressure case. For more extraordinary loading cases, the higher Service Level C stress limits must be met. These higher limits are generally in the range of yield stress.

The ACNGS containment design actually is not governed by the 15 psig design pressure, but rather by various pool dynamic loads. Thus, the design has, in effect, inherent extra strength for purely pressure loadings. Under Service Level C Limits, this pressure capability is actually above the 42 psig mentioned in Mr. Fields' testimony.

Attachment MAL-1

MIGUEL A. LUGO

EXPERIENCE SUMMARY:

Registered Professional Engineer with seven years experience in structural analysis and design of various nuclear utility projects.

Responsible for development of design criteria, supervision of design and preparation of specifications for BWR Mark III containment structures (containment vessel, bottom liner, embedded supports, foundation mat, platforms and sump liners.

Responsible for structural analysis for research fusion reactor project, including finite element analysis involving development of and alterations to project-oriented computer programs, as well as use of those general programs commercially available.

Responsible for design of PWR steel structures, including design calculations and detailing for various buildings in the plant.

EMPLOYMENT HISTORY:

Ebasco Services Incorporated, New York, N.Y.; 1974-Present

EDUCATION:

New York University - BECE - 1974
New Jersey Institute of Technology - Courses towards MSCE - In Progress

REGISTRATIONS:

Professional Engineer - New York

PROFESSIONAL AFFILIATIONS:

ASCE - Associate Member