UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	§	
	§	
HOUSTON LIGHTING AND POWER	§	Docket Nos. 50-498 OL
COMPANY, ET AL.	§	50-499 OL
	§	
(South Texas Projects,	§	
Units 1 & 2)	§	

APPLICANTS' ANSWERS AND OBJECTIONS
TO STATE OF TEXAS' FIRST SET OF
INTERROGATORIES TO APPLICANTS ON CONTENTION 4

Pursuant to 10 CFR §§ 2.740 and 2.740b, Applicants hereby provide their answers and objections to the State of Texas' First Set of Interrogatories to Applicants on Contention 4.

I. General

For several of the interrogatories Applicants have provided answers and at the same time objected on the grounds that the interrogatories seek information that is neither relevant to Phase II nor reasonably calculated to lead to the discovery of admissible evidence. While Applicants have provided answers which they believe to be fully responsive to the interrogatories, Applicants nevertheless wish to point out and preserve their objections to such interrogatories.

II. Specific Answers and Objections

Interrogatory 1. Do the Applicants contend that there are no recorded hurricanes

a. in the Gulf of Mexico

b. in the North Atlantic Ocean in which the fastest mile wind speed, 30 ft. above ground has been higher than 125 mph?

Answer:

a. No.

b. No.

Interrogatory 2: Please define "fastest mile wind speed" as used by the Applicants in answering interrogatory 1.

Answer: Fastest-mile wind speed is defined as the highest average speed of one mile of air passing an anemometer for a particular period of time. For example, a fastest-mile speed of 120 mph means that it took 30 seconds for a "mile" of wind to pass the anemometer.

Interrogatory 3: If the answer to interrogatory 1 is "no,"

a. Please identify hurricanes whose fastest mile wind speed, 30 ft. above ground exceeded 125 mph and provide the speed for each hurricane.

b. please explain the selection of 125 mph as the design wind velocity for the fastest mile wind speed at STNP.

c. please identify all studies of documents relied upon in answering 3a and 3b.

Answer: In order to develop its answer to this interrogatory, Applicants reviewed pertinent literature on

hurricanes. The document which provided the information given below is USNRC NUREG/CR-2639: "Historical Extreme Winds for the United States - Atlantic and Gulf of Mexico Coastlines." Applicants also consulted "Meteorological Criteria for Standard Project Hurricane Windfields, Gulf and East Coasts of the United States," NOAA Technical Report NWS 23, September 1979 and "Hurricane Allen 3-10 August 1980", US Army Engineer District, Galveston. The NOAA document provides useful information about, inter alia, the dates and locations of landfall for historic hurricanes. The Corps of Engineers document provides some wind speed information for hurricane Allen, which was too recent to be addressed in the NRC document. The NRC document gives maximum reported sustained wind speeds for land based meteorological stations. A wind speed for hurricane Allen of 138 mph at an oil drilling platform in the Gulf of Mexico is not included in the list below because it is not considered representative of wind speeds that might be measured on land. Hurricane Anita, referenced in interrogatory 4, did not make landfall in the U.S. and is thus not considered representative of wind speeds at the South Texas Project site. Therefore Anita was not investigated. Based on the foregoing, Applicants believe that the information requested is as follows:

a. Gulf of Mexico

i. Hurricane of September 14, 1919, 154 mph at 30 meters at Corpus Christi. Given the wind speed at 30 meters, it is reasonable to assume that the fastest-mile wind speed at 10 meters exceeded 125 mph.

ii. Hurricane Celia (August 3, 1970), 128 mph at 10 meters at Corpus Christi.

North Atlantic Ocean

i. Hurricane of August 18, 1879, at Cape Lookout, North Carolina, 139 mph at 10 meters.

b. USNRC NUREG-0800 defines design wind as the 100 year return period fastest mile of wind. Bases for selection of 125 mph for the South Texas Project are defined in Section 2.3 of the FSAR.

c. The documents relied upon are identified in the answer to each question.

Interrogatory 4: If the answer to interrogatory 1 is "yes," please provide Applicants' position on the fastest mile wind speed for each of the following:

a. The hurricane of September 27 through October 6, 1949 making landfall near Freeport, Texas

b. Hurricane Carla (1961)

c. Hurricane Hilda (1964)

d. Hurricane Betsy (1965)

e. Hurricane Celia (1970)

f. Hurricane Allen (1980)

g. Hurricane Anita

Answer: Not applicable.

Interrogatory 5: Please identify all studies or documents relied upon in answering Interrogatory 4.

Answer: Not applicable.

Interrogatory 6:

a. What is the peak hurricane wind gust value used by Applicants in designing STNP?

b. Where is this value documented in Applicants' filings with the NRC? Please provide a copy of said filing.

c. Please identify all studies or documents relied upon in answering interrogatory 6.

Answer:

a. In designing the STP to withstand hurricane wind gusts, a particular gust wind speed is not determined. Instead, the appropriate gust factor is applied in calculating wind pressure loadings, in order to account for the additional loading effects resulting from wind turbulence in excess of the fastest-mile of wind, and in consideration of the intensity and randomness of gust loading over structural surfaces. The gust factors applied at 30 feet for buildings and structures and parts or portions of buildings and structures (e.g. windows, girts, purlins, spandrels) are in accordance with ANSI A58.1-1972. These factors vary with elevation.

b. The gust factors are taken from ANSI A58.1-1972, "American National Standard Minimum Design Loads for Buildings and other Structures," and documented in the FSAR in Section 3.3.1.1.2.

c. ANSI A58.1-1972 and the STP FSAR Section 3.3.

Interrogatory 7: Do the Applicants contend that there are no recorded hurricanes.

a. in the Gulf of Mexico

b. in the North Atlantic Ocean in which the peak wind gust has been higher than the value given in response to interrogatory 6a?

Answer:

a. & b. Since a specific peak wind gust speed is not identified in response to interrogatory 6a, it is not possible to respond to these interrogatories.

Interrogatory 8: If the answer to interrogatory 7 is "no,"

a. please identify the hurricanes whose gusts exceeded the value given in answer to interrogatory 6.

b. the highest gust for each hurricane identified.

c. please explain Applicants' selection of the value given in answer to interrogatory 6a.

d. please identify all studies or documents relied upon in answering 8a and 8b.

Answer:

a. b. c. d. Summaries of gust values for hurricanes are not available in the literature as is the case for fastest mile wind speeds. Reports on individual hurricanes frequently include information on peak gusts but these values are generally acknowledged to be estimated and not fully reliable. Applicants have not attempted to identify

hurricanes as requested in this interrogatory because, as stated in the answer to interrogatory 6.a., specific gust wind speeds are not a part of the South Texas Project design basis. Instead, an appropriate gust factor is applied in calculating the wind pressure loadings which the plant must be designed to withstand.

Interrogatory 9: Please produce a copy of the non-published private correspondence dated June 1974 referenced in the October 15, 1982 Memorandum and Order of the ASLB in this proceeding (and apparently also referenced in FSAR Section 2.3.1.2.6., at p. 2.3-6a).

Answer: The requested private correspondence was a telephone conversation between Michael Septoff (NUS) and Floyd Garland (National Climatic Center). The telephone call is documented in the FSAR and PSAR. No other records of the telephone call have been located.

Interrogatory 10: What is the Applicants' position on the extent of the "surrounding area" required to be considered by 10 CFR Part 50, Appendix A, Criterion 2? Please explain the basis for Applicants' position.

Answer: The meaning of "surrounding area" for purposes of applying Criterion 2 depends on the particular natural phenomenon under consideration.

Applicants' evaluation of the design wind, through the use of composite meteorological data, takes into consideration an area represented by the wind speed records of Galveston, Corpus Christi, and Victoria. This is described in FSAR Section 2.3.1.2.1.

Interrogatory 11: Would the design of STNP differ if the Applicants had selected a fastest mile speed of 185 mph rather than 125 mph? If so, please describe generally how the design would have differed. If not, please explain why not.

Answer: Applicants have not conducted the detailed analyses which would be necessary to determine whether or not the design of the STP would change if a fastest mile wind speed of 185 mph were selected.

Interrogatory 12: Would the design of STNP differ if the Applicants had selected a peak gust value of 200 mph rather than the value given in response to interrogatory 6a? If so, please describe generally how the design would have differed. If not, please explain why not.

Answer: Applicants have not conducted any detailed analyses to determine whether or not the design of the STP would change under the given circumstances because specific gust wind speeds are not a part of the STP design basis. Instead, as indicated in the answer to interrogatory 6, the appropriate gust factor is applied in calculating the wind pressure loadings which the plant must be designed to withstand.

Interrogatory 13: Please identify each witness Applicants intend to call on Contention 4 and summarize the testimony of each.

Answer: Applicants have not as yet identified the witnesses they intend to call on Contention 4. Upon their

identification, Applicants will supplement this response with the requested information.

Interrogatory 14: Is the Applicants' position that having designed parts of STNP to withstand missiles carried by tornado winds of 360 mph, these same parts of STNP are therefore designed to withstand a fastest mile wind speed of 360 mph? Please explain.

Answer: No. Applicants' position is that in the design of all of the safety related structures at STP the effects of both the design wind (125 mph; non-tornadic, but including hurricanes) and the effects of a postulated design basis tornadic wind (360 mph) have been considered in various combinations with other applicable loads. The safety-related structures must be capable of performing their safety functions under each of these various load combinations. The various load combinations considered in the STP design are shown in FSAR Tables 3.8.1-1 and 3.8.4-1. As shown in those tables, and as required by the various applicable industry codes (ACI 318 or AISC, depending on type of structure), these load combinations include certain load factors which systematically increase certain loads to account for uncertainties in their selection and in the consistency of construction. The load factor applied to the design wind (100 year recurrence interval fastest mile wind) in these combinations is 1.7, i.e., the calculated wind pressure caused by the design wind is increased by 70

percent to account for such uncertainties. Because the occurrence of a tornado at any specific location is recognized to be an extremely rare event, the codes utilize a load factor of one (no increase) for the loads associated with tornadoes (wind pressure, pressure differential and tornado missile loads).

Another factor that differentiates hurricane or design winds from the design basis tornado is that due to friction with the land surface, a straight wind, such as a hurricane, varies in intensity with elevation above ground level. The design basis tornadic winds are assumed not to vary with elevation. The standard height at which design winds (including hurricane winds) are measured is 30 feet. Design analyses take into account the increase in wind velocity with elevation by utilizing a standard engineering formula, which is reproduced in FSAR Section 3.3.1, to convert from the 30 ft. wind to higher wind velocities at higher elevations.

Because the design wind and the tornado wind are considered in different load combinations, different load factors are used in those load combinations, and design basis tornadic winds are assumed not to vary with elevation, one can not directly compare the velocities of the design basis tornado wind and design wind to determine whether a change in the design wind velocity would require a design change. However, in the design of STP the load combinations that consider the design wind loads, including hurricanes,

were not the controlling loads and a substantial increase in the design wind could be accommodated without those load combinations becoming the controlling load combinations. Thus, the design wind velocity could be increased substantially without necessarily requiring a change in plant design.

Interrogatory 15:

a. What is the heaviest rainfall Applicants have considered in the design of STNP?

b. Please identify studies of documents Applicants relied upon for their answer to Interrogatory 15.

Objection: Applicants object to interrogatory 15 on the grounds that the information sought is neither relevant nor reasonably calculated to lead to the discovery of admissible evidence. CCANP Contention 4 addresses the design of STP Category I structures to withstand hurricane wind loadings and hurricane generated missiles and does not address the amount of rainfall considered in the design of the STP.

Answer:

a. The normal drainage system for the drainage of roofs of plant structures has been designed for a maximum intensity of 8"/hr. The probable maximum precipitation considered for local intense precipitation over the 4.5 square mile drainage area into Little Robbins Slough is 38.10 inches in 24 hours. For a more detailed description of these rainfall considerations see STP FSAR Section

2.4.2.3. Effects of Local Intense Precipitation. STP FSAR Section 2.4.3.1 Probable Maximum Precipitation contains a discussion of the estimates of probable depths and durations of rainfall for the various areas considered in the analysis of flood conditions at the STP site.

b. STP FSAR Section 2.4 and references listed therein.

Interrogatory 16:

a. What is the highest flood crest on the Colorado River Applicants have considered in the design of STNP?

b. Please identify all studies or documents Applicants relied upon in answering interrogatory 16.

Objection: Applicants object to interrogatory 16 on the grounds that the information sought is neither relevant nor reasonable calculated to lead to the discovery of admissible evidence. CCANP Contention 4 addresses the design of STP Category I structures to withstand hurricane wind loadings and hurricane generated missiles, and does not address the consideration of flood crests on the Colorado River.

Answer:

a. STP FSAR Figure 2.4.2-2 presents a graph which shows the flood stage of the Colorado River at the Bay City Gage Site vs. the flood stage at the FM 521 bridge. The maximum known stage at the USGS gage site at Bay City since 1869 is 56.1 feet. This translates to a stage at the FM 521

bridge near the STP site of approximately 28.3 feet. This level is well below the STP plant design flood level of 50.8 feet.

b. FSAR Section 2.4 and references therein.

Interrogatory 17:

a. What is the highest hurricane storm surge Applicants have considered in the design of STNP?

b. Please identify all studies and documents Applicants relied upon in answering interrogatory 17.

Objection: Applicants object to interrogatory 17 on the grounds that the information sought is neither relevant nor reasonably calculated to lead to the discovery of admissible evidence. CCANP Contention 4 addresses the design of STP Category I structures to withstand hurricane wind loadings and hurricane generated missiles and does not address hurricane storm surge.

Answer:

a. The highest hurricane storm surge considered in the design of STP is a calculated value of 29.8 feet above mean sea level at the mouth of the Colorado River. This calculated surge, plus the effects of wave action, results in a calculated maximum water level of plant structures of 31.7 feet above mean sea level. FSAR Section 2.4.5 describes the methods used to arrive at these values.

b. FSAR Section 2.4.5 and references therein.

Interrogatory 18: Please identify the witnesses Applicants intend to call on Contention 4 and summarize their testimony.

Answer: Applicants have not yet identified the witnesses they intend to call on Contention 4. Upon their identification, Applicants will supplement this response with the requested information.

Respectfully submitted,

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ATTORNEYS FOR HOUSTON LIGHTING & POWER COMPANY, Project Manager of the South Texas Project acting herein on behalf of itself and the other Applicants, THE CITY OF SAN ANTONIO, TEXAS, acting by and through the City Public Service Board of the City of San Antonio, CENTRAL POWER AND LIGHT COMPANY, and CITY OF AUSTIN, TEXAS

BEFORE ME, the undersigned authority, on this day personally appeared Mark R. Wisenburg, Manager, Nuclear Licensing, Houston Lighting and Power Company, who upon his oath stated that the foregoing "Applicants' Answers and Objections to State of Texas' First Set of Interrogatories to Applicants on Contention 4" were prepared under his supervision and direction, and that all answers contained therein are true and correct to the best of his knowledge and belief.

Mark R. Wisenburg

Mark R. Wisenburg

SUBSCRIBED AND SWORN TO BEFORE ME by the said Mark R. Wisenburg on this 25th day of August, 1983.

Notary Public

My Commission expires:

My Commission Expires January 1, 1988

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CERTIFICATE OF SERVICE

I hereby certify that copies of "Applicants' Answers and Objections to State of Texas' First Set of Interrogatories to Applicants on Contention 4" have been served on the following individuals and entities by deposit in the United States mail, first class, postage prepaid, on this 26th day of August, 1983.

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