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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

In the Matter of	(
)	
HOUSTON LIGHTING AND	(Docket Nos. 50-498 DL
POWER COMPANY, ET AL.)	50-499 DL
(South Texas Project,	(
Units 1 and 2))	

CCANP RESPONSE TO APPLICANTS' MOTION FOR
SUMMARY DISPOSITION OF CCANP CONTENTION FOUR

I. Introduction

CCANP Contention 4, currently pending in this proceeding, states:

"The South Texas Project (STP) Category I structures and equipment are inadequately designed and constructed with respect to wind loadings as demonstrated by the fact that actual wind velocities associated with hurricanes which occurred along the Texas Gulf Coast have exceeded wind loadings for which STP structures have been designed and evaluated. Further, there are non-Category I structures containing equipment which if destroyed or damaged would jeopardize the safe operation of STP. These non-Category I buildings are not designed to withstand winds generated by hurricanes and if damaged would provide missile type projectiles which could penetrate Category I structures which are inadequately protected." Memorandum and Order (August 3, 1979), Attachment at 3.

On March 12, 1985, Applicants filed their Motion for Summary Disposition on CCANP Contention Four [Hereinafter "Motion"]. In this motion, Applicants contend that the CCANP contention raises no genuine issues of fact but is "based upon [CCANP's] mininterpretation and misuse of historical wind speed data" and [CCANP's] failure to understand the methods approved by the NRC and utilized in the industry to ensure that nuclear power plants are properly designed to withstand loads resulting from high winds." Motion at 13.

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CCANP herein responds to Applicants' Motion and sets forth facts CCANP believes to be contested and the reasons for CCANP's position. This response is accompanied by a statement of material facts as to which there is a genuine issue to be heard. (Exhibit 1).

II. The Adequacy of STNF Category I Structures and Equipment to Withstand the Conditions Potentially Created by a Hurricane is Questionable.

A. Calculation of the Operating Basis Wind for STNF

The design of Category I structures at STNF is based in part on an operating basis wind (OBW) of 125 mph. Applicants admit that there have been estimated or recorded wind speeds far in excess of the 125 OBW on at least 19 different occasions. Motion at 4; Wolfe at ## 16, 17, 18. But Applicants claim that these estimates and recordings can be excluded from the data base used to calculate the OBW. Motion at 8; Wolfe at ## 14-22.

The Applicants support their exclusion of this data with the following reasons:

- the data records gusts or instantaneous wind speeds, not fastest-mile wind speed values;
- the data records estimated wind speeds; or
- the data is otherwise not reliable.

Addressing gusts and instantaneous wind speeds first, there are three problems with Applicants' approach.

First, Applicants dismiss a Board concern over whether hurricane and tornado winds are directly comparable given their different durations. Motion at 11, n.*; Linderman at 7, n.*. The basis for dismissing this Board concern is that the critical

factor to be measured is the "elastic" range of STNF Category I structures. Linderman at 7, n.*. The elastic range is calculated based on a given wind load measured in pounds per square foot with the length of time that load is applied irrelevant to the ability of the structure to withstand the load. Id.

Applying this same reasoning to gusts and instantaneous wind speeds, these two measures should be incorporated directly into the calculations of the operating basis wind load rather than treated as a coefficient multiplier, Linderman at 9, n.*, #12.

Second, a "gust" speed at which point the wind monitor blew away cannot be ruled out as a possible fastest-mile wind speed. At least one reading provided by CEU took place at the point the monitor blew away.

Third, and more generally, Applicants reject some readings as not being the fastest-mile wind speed. Wolfe, #16, item 1 (155 mph), item 3 (153 mph), item 6 (150-175 mph), item 7 (161 mph and 160-180 mph), item 9; #18, item 1. At the same time, Applicants reject the readings themselves as not necessarily reliable for other reasons. If Applicants cannot be sure of the accuracy of the readings, they cannot be sure the readings were not fastest-mile wind speeds incorrectly treated as gusts or instantaneous wind speeds.

A similar reliability question is raised by other reasons Applicants give for excluding readings. These reasons include:

- observation height unknown,
- quality of observer training indeterminate,
- quality of equipment indeterminate, and
- estimated value. Wolfe, ## 16-18.

These reasons both individually and as a group are not an adequate basis for excluding readings.

A statement that the observation height for a reading is unknown does not affirmatively establish that the height was not 30 feet (or ten meters).

A statement that the quality of the observer training is indeterminate does not affirmatively establish that the observer was inadequately trained.

A statement that the quality of the equipment is indeterminate does not affirmatively establish that the equipment was inadequate in any way.

A statement that the reading was estimated does not affirmatively establish that the reading was inaccurate or unreasonable.

Overall, the Applicants appear to be attempting to shift the burden of proof to the intervenors or the NRC Staff; if the Applicants cannot affirmatively prove the unreliability of a particular reading, then they fail to meet their burden of proof that their calculations need not include the data.

The root of the Applicants' approach seems to be a confusion about what would constitute a conservative approach in this context. The National Weather Service may choose not to rely on data such as that excluded by Applicants when writing their official reports on a hurricane because they seek to maintain a high level of scientific credibility.

But that form of conservatism is not what is sought in the nuclear context. For example, as Applicants note, "uncertainties in data" lead to providing "an additional margin of safety."

Linderman #6 (emphasis added): See also Motion at 6. A conservative approach in the nuclear context means including any data which might be reliable rather than excluding data not clearly reliable.

The Applicants seek to justify their approach by citing the guidance provided by the NRC Standard Review Plan, Wolfe, #14; Linderman, #7, which states that "[d]ata on severe weather phenomena should be based on standard meteorological records from nearby representative National Weather Service (NWS), military or other stations recognized as standard installations which have long periods on record." SRP Section 2.3.1 as quoted in Wolfe, #14.

CCANF contends that the SRP guidance is not meant to be the exclusive basis for selecting data on severe weather phenomena but only to direct Applicants to one reliable source. Alternatively, the numerous available recordings above the current DBW and excluded by the Applicants (20 readings), call for a more comprehensive approach in this case than the approach contained in the SRP.

Furthermore, the Applicants' approach repeatedly narrowed the data base, both in terms of the number of sources and the duration of measurement history. Wolfe, #11 and at 5, n.* (Sources reduced to four, only one with a history longer than 41 years; then reduced again to those four only during the last 29 years). With such limited sources as a basis for calculation, events outside the boundaries calculated from such sources cannot be ruled out with any reasonable degree of certainty.

Applicants agree that at least one reliable measurement of

fastest-mile wind speed did exceed 125 mph but somehow manipulated the data to avoid having to use this higher speed as the OBW. Wolfe, #19.

Finally, when numerous recorded wind speeds in excess of the OBW in fact exist, the possibility of a higher OBW than calculated is made much less remote. Such readings should be considered as parameters for the highest possible OBW. In this case, a conservative approach would be to select the highest recording as the OBW. That reading would be 190 mph. Wolfe, #16, item 6.

F. Incorporation of the Design Basis Tornado Winds into The Design of the STNP

In their calculations, the Applicants treat the wind load generated by the design basis tornado (DBT) as a separate event whose inclusion in the design calculations obviates the need to be concerned if the OBW is calculated too low. Linderman, ## 17, 18. Applicants consider the design for the DBT or the DBT in combination with other design basis conditions (but not the OBW, Linderman, #16), to "envelope loads generated by the OBW and other severe conditions." Linderman, ## 17, 26.

But hurricanes on the Texas coast are frequently accompanied by tornadoes. The design calculations for STNP should, therefore, assume the maximum wind load would be the OBW (whether calculated as the Applicants do or as CCANP contends it should be) plus the DBT. These wind loads would then be augmented by the load combinations referred to by Applicants.

The results of such a combined OBW/DBT event are in part illustrated by Applicants' affidavit. See Linderman, #17. The DBT

alone would generate a wind load of 332 pounds per square foot. Id. A 200 mph OBW (close to the 190 mph urged by CCANP), with a gust factor applied using the Applicants' methodology, would generate a wind load of 133 pounds per square foot at 30 feet. While a design compensating for a load of 332 pounds per square foot would be able to handle a load of 133 pounds per square foot - the Applicants' basic argument - such a design might well fail at a load of 465 pounds per square foot (332 + 133), i.e. should a tornado occur during a peak wind hurricane. The Applicants' calculations fail to include this possible combination of events and are, therefore, inadequate to provide a reasonable assurance that Category I structures can withstand the highest probable wind loads.

C. Incorporation of Other Loads into the Design of the SINP

As noted by Applicants, after the highest probable wind load is calculated, additional loads are assumed to provide a margin of safety. Motion at 7; Linderman, ## 12, 13, 16. These same extra loads would be applied to both the higher OBW argued for by CCANP and the OBW/DBT combination which CCANP contends must be incorporated into the design.

D. Impact of Failure of Non-Category I Structures on Category I Structures

1. Turbine Generator Building

Applicants' position that the DBT loads on the Turbine Generator Building will not cause any failure of that building damaging to the attached Category I structures relies on the current calculation of DBT loads, Linderman, #20, a calculation

shown above to be an inadequate basis for design. The Turbine Generator Building analysis is, therefore, also inadequate.

2. Missiles

a. Applicants' position that all Category I structures at STNP, except for the Isolation Valve Cubicle (IVC) roof, are designed to withstand a spectrum of missiles which might be generated by the DBT, Linderman, ## 22, 23, is deficient in depending on an inadequate calculation of maximum wind speeds which could occur, i.e. is not based on the probable DBT + OBW value.

b. The Isolation Valve Cubicle (IVC) roof is not protected against hurricane generated missiles because the Applicants convinced the NRC to accept a probability risk assessment analysis regarding the likelihood of a missile striking an IVC roof. But the accident at the Salem reactor in New Jersey demonstrated the severe inadequacy of the PRA method and the danger of relying on such a calculation. The PRA analysis at Salem calculated the probability that both the primary and backup scram systems for the reactor would fail once in 20,000 years of reactor operation. In fact, such an event occurred at the Salem reactor after less than 500 years of reactor operation. Given the large margin of error in the PRA method, the NRC cannot rely on Applicants' application of that method to the questions of a missile striking an IVC roof. See Linderman, # 24.

E. Impact of Storm Surge on Category I Buildings

The Applicants appear to take the position that the existence of roads surrounding the power block at a height 3.26

feet above the level of the probable maximum hurricane storm surge and the placement of the power block itself 1.26 feet above the same storm surge level assures such a storm surge will not jeopardize Category I structures. The power of a storm surge is so immense, however, that the roads could well be overtopped as the water piles up against them, could fail or be breached under the pressure of the storm surge, or could otherwise be severely damaged by the combination of the storm surge, backwash, and Colorado River overflow. The base of the power block is similarly at risk should the road barrier fail or be breached.

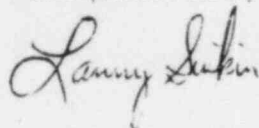
III. Conclusion

Contrary to Applicants position, STNF is not adequately designed to withstand the most severe conditions which could be created by a hurricane at the STNF site.

The Applicants took a non-conservative approach to calculating the OBW. The Applicants erroneously treated the OBW and DBT as independently occurring phenomena and, therefore, erroneously assumed calculations based on the DBT would envelope conditions created by the OBW. In general, the Applicants underestimated the potential power of a hurricane.

Given the unpredictability of hurricanes, both as to their direction of travel and their potential severity, and given the limited data available for predictive purposes, the ASLB should enter an order requiring that the STNF be placed in a safe shut down condition whenever a hurricane enters the Gulf of Mexico and until such time as the hurricane is dissipated.

Respectfully submitted,



Lanny Sinkin

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Dated: April 4, 1985
Washington, D.C.

UNITED STATES OF AMERICA

CALCULATED
EXHIBIT I

NUCLEAR REGULATORY COMMISSION

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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DOCKETING & SERVICE
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In the Matter of

HOUSTON LIGHTING AND
POWER COMPANY, ET AL.
(South Texas Project,
Units 1 and 2)

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Docket Nos. 50-498 OL
50-499 OL

MATERIAL FACTS AS TO WHICH THERE IS A
GENUINE ISSUE TO BE HEARD

Pursuant to 10 C.F.R. Section 2.749(a), CCANP hereby submits, in conjunction with its Response to Applicants' Motion for Summary Disposition of CCANP Contention Four, a statement of material facts as to which there is a genuine issue to be heard.

(1) The design of Category I structures at the South Texas Nuclear Project (STNP) uses an operating basis wind (OBW) of 125 mph at a standard reference height of 30 feet, despite the Applicants' admission that data exists indicating the OBW should in fact be much higher than 125 mph.

(2) There is a question whether the readings treated and excluded as gusts or instantaneous wind speeds are in fact fastest-mile wind speeds since the reliability of the measurements is not affirmatively established.

(3) There is a question whether the OBW should in fact include gusts and instantaneous wind speeds for purposes of designing Category I structures to withstand the possible wind loads since the length of time a load is applied to STNP Category I structures is irrelevant.

(4) A conservative approach to calculating the OBW would include rather than exclude readings of wind speeds whose reliability might be questionable but whose inaccuracy is not affirmatively demonstrated. The calculated OBW for STNP is, therefore, not conservative in that it does not include numerous readings whose inaccuracy was not affirmatively proven and which are in excess of the OBW. This non-conservative characteristic is especially apparent given that many of the higher readings excluded came from the immediate vicinity of the plant, the site of the plant (Matagorda County) is the most common point in Texas for hurricanes to make landfall, and the readings used by the Applicants are from more remote areas.

(5) Applicants treatment of NRC guidance on how the OBW should be calculated as requiring the exclusion of data from all but a few sources is an overly narrow interpretation of the intent of the NRC Standard Review Plan. Alternatively, the NRC guidance is too confining in a case where so many other readings exist which are in excess of those from NRC identified sources. In either case, the calculation of the OBW should take into account the numerous readings excluded by the Applicants.

(6) Applicants excluded measured wind speeds which exceed their own 1000-year recurrence interval values. See Applicants' Motion at 7, n.*. If the excluded values are included, the true 1000-year recurrence value would also be much higher. This would produce a higher OBW should the 1000-year value be used in place of the 100-year value as suggested by the Board.

(7) The limited number of data sources and the short time period over which Applicants' OBW values were measured do not provide an adequate basis for accepting the Applicants' calculations on hurricane generated pressures on Category I structures.

(8) The design of Category I structures at the STNP does not take in consideration the possible simultaneous occurrence of an OBW (whether at the 125 mph used by Applicants or the 190 mph value urged by CCANP) and a design basis tornado (DBT) with a maximum wind speed of 360 mph. The frequent occurrence of hurricane generated tornadoes require the design of Category I structures at STNP to be adequate to withstand the pressures generated by a DBT and OBW occurring simultaneously.

(9) The additional margin of safety provided by Applicants' application of load factors does not compensate for excluding the higher wind speed data from the OBW calculation because these additional factors would also be applied to a higher OBW resulting from inclusion of the data excluded.

(10) While Category I structures, except for the Isolation Valve Cubicle (IVC) roof, may be adequately designed to withstand a missile generated by the DBT, these structures are not designed to withstand a missile propelled by a simultaneously occurring DBT and OBW. Since hurricanes on the Texas coast frequently generate tornadoes, the missile protection design should encompass a response to such a simultaneous occurrence.

(11) Given the large error in NRC accepted probability risk assessment values for the simultaneous failure of both the primary and back up scram mechanisms at the Salem reactor, a PRA analysis cannot be relied upon as a basis for failing to protect the IVC roof from tornado or hurricane-generated missiles.

(12) While stating that there are barriers (roads) surrounding the power block which are higher than the probable maximum hurricane storm surge and that the power block itself is above the level of such a surge, Linderman, #25, there is no evidence to support that these barriers can withstand the power of a storm surge or that the power block can withstand the expected impact if the roads fail or are breached by the hurricane-generated forces.

(13) STNP Category I structures and equipment have not been designed to withstand hurricane-generated wind loads (including concurrent tornado loads).

(14) STNP Category I structures and equipment have not been designed to withstand missiles generated by hurricane and/or tornado activity and propelled by a combination of hurricane and tornadic winds.

(15) STNP is not designed adequately to prevent damage by the probable maximum storm surge, combined with the 100-year flood in the Colorado River.

(16) Since tornadoes frequently occur with Gulf Coast hurricanes and since a DBT is considered an "extreme" condition

requiring the STNP to cease operations, the Applicants should be required to put STNP in a safe shut down condition anytime a hurricane is within the Gulf of Mexico and to remain in that condition until the hurricane dissipates.

(17) Given the limited data available for STNP, the unpredictability of hurricanes, both as to their direction and severity (including possible concurrent tornado activity), the most prudent policy for protection of public health and safety is to require the STNP to be placed in a safe shut down condition whenever a hurricane enters the Gulf of Mexico and to remain in that condition until the hurricane dissipates.

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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In the Matter of ()
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(South Texas Project, ()
Units 1 and 2) ()

Docket Nos. 50-498 OL ⁸⁵ APR 10 AIO:32
50-499 OL

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CERTIFICATE OF SERVICE

I hereby certify that copies of CCANP RESPONSE TO APPLICANTS' MOTION FOR SUMMARY DISPOSITION OF CCANP CONTENTION FOUR were served by hand delivery (*) or deposit in the U.S. Mail, first class postage paid to the following individuals and entities on the 8th day of April 1985.

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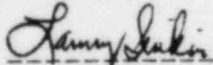
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