

The Light company

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December 20, 1983
ST-HL-AE-1040
File No.: C22/G2/G25

Mr. Thomas M. Novak
Assistant Director for Licensing
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7920 Norfolk Avenue
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Dear Mr. Novak:

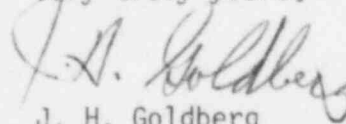
South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
Additional Information Concerning the
Isolation Valve Cubicle Roof Design

By the letter dated September 13, 1983 (Reference ST-HL-AE-1003), Houston Lighting & Power Company (HL&P) submitted a description of the various design/analysis alternatives which were evaluated as part of the Isolation Valve Cubicle (IVC) design and a detailed report regarding the probabilistic evaluations for hurricane and tornado-generated missiles.

Subsequently, your consultant provided the NRC an evaluation of our submittal. Based on this report, the NRC staff generated additional questions. Attachment 1 to this letter documents our responses and should resolve all outstanding questions related to this submittal.

If you should any questions concerning this letter, please contact Mr. Michael E. Powell at (713) 993-1328.

Very truly yours,



J. H. Goldberg
Vice President
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MEP/mpg

Attachment: 1) Response to NRC Questions on Probabilistic Evaluations of Tornado and Hurricane Generated Missile Hazards to the Containment Isolation Valve Compartment Equipment

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RESPONSES TO NRC QUESTIONS ON PROBABILISTIC
EVALUATIONS OF TORNADO AND HURRICANE
GENERATED MISSILE HAZARDS TO THE CONTAINMENT
ISOLATION VALVE COMPARTMENT EQUIPMENT

1. Question

The surface density of the potential missiles is assumed to have a median of 1 missile/65 sq. ft. (or about 6,600 missiles/sq. mile). Although this assumption is consistent with data published in Reference 3, it is in principle possible that the actual surface density of potential missiles will be higher. The applicant should indicate why the assumption concerning surface density of missiles is appropriate. Also, a clarification is needed on whether the second unit is assumed to be under construction in which case the number of potential missiles might be higher than that used in the Bechtel study.

Response

EPRI study indicates that if one unit of a two-unit plant is under construction, the median number of potential missiles is about 5,000. The Bechtel study used a median value of 6,000 and an upper bound value of 15,325. The EPRI survey indicated that more than 80 percent of all potential missiles are stored in the horizontal position, which is not favorable for becoming airborne. The Bechtel study is conservative in this respect in that it assumes all potential missiles are randomly oriented and, therefore, more likely to become airborne.

2. Question

Address the possibility that missiles lighter than those assumed in the Bechtel South Texas Study (e.g., two by fours) might be available, become airborne, and damage the IVC.

Response

Missiles considered in the Bechtel study are represented by averaging the spectra of potential missiles identified in the Standard Review Plan and found in the EPRI survey (see Page D-8, lines 3-6 of Bechtel Tornado Report). Particularly, the EPRI spectra contains 9% light wooden missiles similar to type A missiles in the Standard Review Plan. Although the light missiles in question (e.g., two by fours) were not specifically identified in the EPRI study, the 9% light wooden missiles included objects with characteristics both slightly less favorable and significantly more favorable to becoming airborne. In addition, the Bechtel study conservatively assumed more favorable orientations for potential missiles becoming airborne and conservative cross sectional areas were used. The latter assumption has the effect of making all missiles lighter. If we eliminate the conservatism incorporated in the Bechtel study, we will be able to add 42% (i.e., 2,500 two by fours) of light missiles and still have the same probability of hitting the target. We do not believe that plant site can contain more than 2,500 two by fours because it is almost five times greater than the total number of all wood planks the EPRI survey indicates.

3. Question

According to the Report (Table A.1.b, Page A.6, Hurricane Study), the probability of injection of missiles less than 183 mph is zero. How would the results change if $\eta(W)$ were zero for storms with wind speeds $W < 165$ mph (approximately a 10% change)?

Response

If the threshold hurricane wind speed for missile injection is reduced to 165 mph, the median probability of hitting the target will increase to about 4×10^{-8} per year, if all potential missiles are unrestrained. If only 10% are unrestrained, as in the reference case in the Bechtel study, the result would be 4×10^{-9} per year. Please note that wind speed threshold limits shown in Table A1.a and A1.b are not the lowest ones. In the Bechtel hurricane study, we limited ourselves to point estimate (median) calculation.

The distribution for hitting probability depends on uncertainty distribution for numerous parameters. To find median hitting probability in point estimate, we selected median values for all these parameters. One of these parameters is a restraint coefficient which affects the probability of injection and threshold limit of injection. Therefore, the threshold limits of 181 mph for unrestrained missiles and 197 mph for restrained ones indicate the limits below which 50 percent of all potential missiles could not be injected. The 95th percentile threshold limit for unrestrained standard missiles (below which 5 percent of potential missiles could be injected) is 148 mph. The absolute threshold limit for the standard missile is 114 mph. The 95th percentile for hitting probability is 5×10^{-7} for the reference case in the Bechtel study.