UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NOV 2 1 1984

Docket No. 50-354

MEMORANDUM FOR: A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing

FROM: David H. Wagner, Project Manager
Licensing Branch No. 2
Division of Licensing

SUBJECT: FORTHCOMING MEETING WITH PUBLIC SERVICE ELECTRIC & GAS COMPANY (PSE&G) - HOPE CREEK

DATE & TIME: ~~Wednesday, December 5, 1984~~ TUESDAY, DECEMBER 18, 1984
1:00 p.m.

LOCATION: ~~Phillips Building~~ MARYLAND NATIONAL BANK BUILDING
~~Room 114~~ ROOM 6110
~~7920 Norfolk Ave.~~ 7735 OLD GEORGETOWN ROAD
Bethesda, Maryland

PURPOSE: Discussion of Riverborne Missiles (The comments contained in the Enclosure to this meeting notice will be discussed.)

PARTICIPANTS*:

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David H. Wagner

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cc: See next page

*Meetings between NRC technical staff and applicants for licenses are open for interested members of the public, petitioners, intervenors, or other parties to attend as observers pursuant to "Open Meeting Statement of NRC Staff Policy", 43 Federal Register 28058, 6/28/78.

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Questions and Comments Pertaining to:
Arthur D. Little, Inc. (ADL) Report C-50918 (September 1984); and
Meteorological Evaluation Services, Inc. (MES) Reports on
Hope Creek Generating Station Extreme Event Site Flooding Meteorology
(July 1984 and August 1984)

1. On p. 5 of the ADL Report it is stated that grade level is approximately 14 ft above Mean Low Water Level. In Table 2, footnote 4, p. 7, it is stated that an increased water depth of 12 ft over Mean Low Water results in a water level which is about 3 ft below plant grade (rather than 2 ft, as would result from the statement on p. 5 of the ADL Report). Is there a reason for the difference between the statements in p. 5 and in Table 2?

2. It appears implicit in the estimate of the kinetic energy per unit area for a large recreational boat hitting a structure (p. 16) that the impact area is 100 ft^2. Explain why the impact areas could not be significantly smaller than 100 ft^2.

3. Explain why the chances of an unmanned vessel approaching within 10 miles of Hope Creek without a prior grounding are estimated on p. 44, Appendix C of the ADL Report, to be less than ten percent.

4. It is assumed in the ADL Report (p.45) that the probability per mile of simultaneous loss of power and steering is $\lambda=10^{-5}$/mile. This estimate is based on historical data contained in References 1 and 7. Do these historical data pertain to severe storm conditions? If not, are the estimates independent of whether storm conditions are present?

5. Explain why, once power and steering are lost, the vessel is more likely to head towards the target (rather than equally likely to move in any direction), by a factor of about 10 for the water intake structure and by a factor of about 100 for entering the Hope Creek site (see p. 47 of the ADL Report).

6. The probabilities of strike by a non-self-propelled vessel already within ten miles of Hope Creek striking the water intake structure are stated on p. 48 of the ADL Report to be 1.2×10^{-5}/vessel for the intake structure and 3.1×10^{-3}/vessel for the Hope Creek site. Were the same multiplication factors of 10 and 100 used in these estimates as in the estimates discussed in item 5 above?

7. In any given storm, wind speeds over water are higher than wind speeds over ground. It appears that this was not taken into account in the estimation of annual probabilities of extreme six-hour wind speeds at 33 ft elevation. Is this the case? If so, why?

8. In the July 1984 MES Report it is stated that the probability of occurrence in any one year of a "probable maximum hurricane," H_{max}, having a direction of motion, D, capable of causing a very large tidal surge can be obtained as follows:

$$P(H_{max}, D) = P(H_{max})\ P(D) \quad (1)$$

where $P(H_{max})$ = probability of occurrence in any one year of a probable maximum hurricane regardless of trajectory, and P(D) = probability of occurence in any one year of a storm having the direction of motion D. It is estimated in the above-mentioned Report that $P(H_{max}) \simeq 10^{-3}$/yr. It is is further estimated in the Report that $P(D) \simeq 10^{-2}$/yr, the justification for that estimate being that only about one storm in 100 years was sufficiently strong and had the direction of motion needed to cause a significant tidal surge.

Actually, P(D) should represent the ratio of the number of storms having a direction of motion D to the total number of storms, regardless of their direction. For the area and time frame considered, it would follow from the Report that this ratio is about 5/39 (p.9). If the ratio 5/39 were used in Eq. 1 above, rather than the ratio 1/100, the estimated probability $P(H_{max}, D)$ would increase by an order of magnitude, i.e., it would be about 10^{-4}/yr, rather than 10^{-5}/yr as estimated in the MES Report.

To summarize, it appears that the MES Report uses, in lieu of P(D), a joint probability P(V,D), where V is a relatively large wind speed such that $P(V,D) \simeq 10^{-2}$/yr, An explanation is requested concerning this matter.

9. It is stated in the August 1984 MES Report (p. 4) that the NBS BSS-124 document "is based on actual hurricane climatology and statistics only insofar as the frequency of occurrence of hurricanes in various locations is concerned." Actually, NBS BSS-124 also uses statistics based on climatological data concerning the pressure difference between center and periphery of storms, radius of maximum wind speeds, speed of translation of storm, and direction of storm translation (see pp. 3 and 4 of NBS BSS 124).

10. In Table 1 of the August 1984 MES Report, were any of the storms of the thunderstorm type? This question is asked because, if indeed some of those storms were of that type, then the ratios FM/1H and FM/6H would be too high to be possibly respresentative of hurricane winds.

11. Page 7 of the August 1984 MES Report reproduces estimates of directional fastest-mile wind speeds from the NBS BSS-124 Report. However, the estimates of NBS BSS-124 pertain to winds blowing from a $360^{\circ}/16 = 22.5^{\circ}$ sector, rather than from the 79°-170° sector. Using data on which the NBS BSS-124 report is based (which are available on tape at NBS), the fastest-mile wind speeds at 10m over ground are estimated as

36 mph, 73 mph, and 85 mph for the 10-yr, 50-yr, and 100-yr mean recurrence intervals, respectively, rather than 25 mph, 57 mph, and 70 mph, as indicated on p. 7 of the August 1984 MES Report.

Date: 11/20/84

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