FROM: U.S. Department of Commerce National Oceanic & Atmospheric Admin. Silver Spring, Maryland 20 Isaac Van der Hoven	DATE OF DOCUMENT: 6-16-71	DATE RECEIVED 6-18-71	NO.:	
	LTR. x	MEMO:	REPORT:	OTHER:
TO: Dr. Peter A. Morris	ORIG.: 1	CC:	OTHER:	
	ACTION NECESSARY ☐ NO ACTION NECESSARY ☐	CONCURRENCE ☐ COMMENT ☐	DATE ANSWERED: BY:	
CLASSIF: U · POST OFFICE · REG. NO:	FILE CODE: 50-289 (Consultant)			

DESCRIPTION: (Must Be Unclassified)
Ltr re our 3-6 & 6-5-71 ltrs..trans the following:

ENCLOSURES:
Comments on Three Mile Island Nuclear Sta. Unit # 1..FSAR & Amdts 15 & 20. dtd 6-16-71.

REMARKS:

REFERRED TO	DATE	RECEIVED BY	DATE
H. Denton W/2 Cys for ACTION	6-18-71		
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U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Silver Spring, Maryland 20910

June 16, 1971

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Regulatory File Cy.

Dr. Peter A. Morris, Director
Division of Reactor Licensing
U. S. Atomic Energy Commission
Washington, D. C. 20545

Dear Dr. Morris:

This refers to the letters of March 6, 1971 and June 5, 1971 from Richard C. DeYoung, Assistant Director for Pressurized Water Reactors of the Division of Reactor Licensing, requesting comments on the following:

Three Mile Island Nuclear Station Unit 1
Metropolitan Edison Company
Final Safety Analysis Report
Amendment 15 dated 12/16/70
Amendment 20 dated 5/26/71.

These comments are attached.

Sincerely,

Isaac Van der Hoven

Isaac Van der Hoven, Chief
Air Resources Environmental Laboratory
Air Resources Laboratories

Attachment

cc:
E. H. Markee, DRL, USAEC

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LB

U.S. DEPART T OF COMMERCE
National Oce nd Atmospheric Administration
Silver Spring, Maryland 20910

Comments on

Three Mile Island Nuclear Station Unit 1
Metropolitan Edison Company
Final Safety Analysis Report
Amendment 15 dated 12/16/70
Amendment 20 dated 5/26/71

Prepared by

Air Resources Environmental Laboratories
National Oceanic and Atmospheric Administration
June 16, 1971

The applicant's evaluation of the accident dose probabilities is based on wind measurements taken 100 feet above grade at the site. Assuming a ground source, this would have the effect of underestimating the downwind concentrations because of lower wind speeds at 30 feet as compared to the measured speeds at 100 feet. Using the ASME Dispersion Guide [1] we would estimate this effect to cause the winds at the lower level to be 1/2 that at 100 feet under stable conditions. Conversely, the effect on the standard deviation of the horizontal wind direction (σ_θ) would be a doubling of the value at the lower level with a subsequent overestimation of the dispersion if the 100-ft measurements were used. Consequently, because of these compensating effects we have assumed that, with some modifications, the joint frequency distribution of wind speed, direction, and σ_θ as measured at 100 feet can be used to approximate dispersion characteristics of a ground source.

We have made two modifications to the applicant's diffusion categorization. First, we have considered the nighttime (2000 h through 0700 h) calms to be equivalent to Pasquill Type F and a wind speed of less than 1 mph. Second, we have assumed that nighttime direction range values (θ) between 45 and 75 degrees with wind speeds of less than 2.5 mph (classified as Type D in Table 2-25) are equivalent to Type F diffusion to account for the likelihood that vertical diffusion rates would be underestimated by the applicant's categorization. We also assumed, as did the applicant, that nighttime direction range values greater than 75 degrees with wind speeds less than 2.5 mph are equivalent to Type E diffusion. Thus, with these assumptions and with the data presented in Tables 2-22 and 2-25 we have concluded that conditions equivalent to Type F and speeds less than 0.5, 0.7, and 1.1 m/s, respectively, occur with a frequency of 3.3, 4.9, and 7.0 percent.

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From these frequency statistics we have extrapolated that for the 0-2 hour release a relative concentration of 8×10^{-4} sec m^{-3} would be exceeded 5 percent of the time at the exclusion distance of 610 m and assuming a building wake effect of cA = 1000 m^2. This concentration is equivalent to Pasquill Type F and a speed of 0.75 m/s. Since only hourly wind statistics on an annual basis are given, we have not attempted to estimate the effect of accidental releases between 8 hours and 30 days.

On an annual basis, we have taken the observed winds from the WNW sector at a frequency of 13 percent and assumed that 5 percent was inversion (Type F) at 4 m/s, 4 percent neutral (Type D) at 5 m/s and 4 percent lapse (Type B) at 4 m/s. The resulting site boundary average annual concentration for a ground source was 6×10^{-6} sec m^{-3}.

In summary, although we have reservations about using wind fluctuation data (σ_{θ}) to categorize diffusion during non-steady conditions, we feel our separate consideration of the calm and low wind speed categories, in part, resolves this problem. For the short-term (0-2 hours) concentration our value is a factor of 4 higher than that of the applicant as listed in Table 2-24. Our computation of the annual concentration is higher by a factor of 1.3.

Reference

[1] Smith, M. E. (Editor) "Recommended Guide for the Prediction of the Dispersion of Airborne Effluents." American Society of Mechanical Engineers, 1968, 85 pp.

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