Comments on

Midland Plant Units 1 and 2
Consumers Power Company
Preliminary Safety Analysis Report
Volumes I and II dated October 30, 1968

Prepared by

Air Resources Environmental Laboratory
Environmental Science Services Administration
February 3, 1969

The location of the site in the east central part of Michigan in flat terrain where elevations range between 600 and 625 feet above mean sea level, would indicate that atmospheric flow is largely governed by the large-scale, continental pressure patterns. Thus, in winter and spring when frequent storm tracks pass through the area, the ventilation rate would be high and atmospheric diffusion relatively good. From the Climatic Atlas of the United States [1] this region of Michigan shows an average annual wind speed of about 11 mph, with a maximum of 13 mph in March and a minimum of 8 mph in August.

The immediate approach to the plant from the south, west, and east is over rural, often marsh-like terrain uninterrupted by large buildings. The approach from the north includes the surface roughness and heat source effects of the city of Midland and the Dow Chemical complex. However, this effect would be largely dissipated by the time the flow reached the southern site boundary. An on-site measurement of pertinent meteorological parameters such as the standard deviation of the horizontal wind (σ_θ) and the wind speed ($\bar{u}$) would inherently include the distant upwind turbulent effects provided the effect of the reactor building complex wake could be avoided.

The only near on-site wind data available is a 5-year record from two Dow Chemical wind stations about 1-1/2 miles to the northwest and the Saginaw Tri-City Airport climatological record about 8 miles to the southeast. The Dow station shows an average annual wind speed of 6.8 mph while the Saginaw station shows a value of 10.3 mph. The frequency of winds of 3 mph or less (including calms) is 14% for Dow and 8% for Saginaw. It is difficult to explain the rather low wind speeds at Dow, especially since the data were taken atop a 60-ft telephone pole whereas the Saginaw data were taken at a height of 20 feet. The Saginaw data more nearly agree with the climatological wind data for the region.

The average monthly gustiness data for Dow (Table 2A-11) indicates that in September 1966 the atmospheric diffusion rate was less than Pasquill Type E at a speed of 2 m/s for about 50% of the time during the sunrise hours. Since no joint frequency distribution data between gustiness and wind speed are given, it is not possible to quantitatively asses the probability of specific diffusion rates.

Beside the reservations the applicant has with regard to the use of the Dow data (see p. 2A-32), we have the following reasons for questioning the validity of the Dow data in assessing the atmospheric diffusion from a ground source at the Midland nuclear site: 1) wind speeds which seem unusually low when compared to the climatological averages of the region, 2) the difficulty in being able to classify "gustiness" by the range of azimuth wind direction under low wind speeds (10% calm or 1 mph during September 1966 and 1967), and 3) since a ground source is postulated, the Dow wind data at a 60-ft height above the ground may not be appropriate.

The basis for the applicant's 2-hour diffusion model is the method by which routine hourly weather data (Saginaw) is used to obtain Pasquill diffusion categories. Nine months of data were chosen on the basis of being the "worst" diffusion months as judged by the Dow "gustiness" data. Each hour of the 270 days of Saginaw data were then categorized as to Pasquill Type and wind speed. It should be pointed out that this method is an approximate one which is used when more precise categorization, as with σ_θ, is not possible. The method, by definition, limits Pasquill Types E and F to nighttime hours and conversely limits Types A, B and C to daytime hours. The applicant selected from each of the 270 days the "worst" consecutive two-hour period and then averaged the data over the whole sample to produce the statistics for the model. Thus, the first hour of the period contained 219, 32, and 19 hours respectively for categories F, E, and D and the second hour contained 192, 46, and 32 hours, respectively. The average wind speed for all the F cases was about 2 m/s.

In summary, since the Saginaw data shows that over a period of nine non-consecutive, "worst", months the frequency of moderate to strong inversions (Type F) existed about 20% of the time at a speed of 2 m/s, it would seem reasonably conservative to assume for the 2-hour postulated release of radioactivity, a diffusion rate equivalent to Type F and 1 m/sec. The resulting relative concontration at a distance of 1170 m would be 5×10^{-4} sec m^{-3} as compared to the applicant's value of 1.75×10^{-4}.

Reference

[1] U. S. Dept. of Commerce (ESSA), "Climatic Atlas of the United States", June 1968, 80 pp.

18-1

FROM:
RDT

(Milton Shaw)

DATE OF DOCUMENT: Feb 7, 1969

DATE RECEIVED: Feb 10, 1969

NO.: 4

LTR. | MEMO: X | REPORT: | OTHER:

ORIG.: 1 | CC: | OTHER:

TO:
Dr. Peter A. Morris

ACTION NECESSARY ☐ | NO ACTION NECESSARY ☐

CONCURRENCE ☐ | COMMENT ☐

DATE ANSWERED:

BY:

CLASSIF.: U

POST OFFICE

REG. NO:

FILE CODE: 50-329 50-330 50-255

DESCRIPTION: (Must Be Unclassified)
Memo transmitting:

REFERRED TO	DATE	RECEIVED BY	DATE
P. Howe 2-10			
w/2 cys for ACTION			

ENCLOSURES: dtd 2-3-69, COMMENTS/PREPARED BY ESSA ON MIDLAND PLANT, Units 1 and 2, Consumers Power Co., PSAR Vols 1 and 2 (2 cys rec'd)

Comments, dtd 2-3-69, prepared by ESSA on Palisades Plant FSAR, Vols I, II & III (2 cys rec'd)

Info Copies to:
H. Price & Staff
Morris/Schroeder
Mason/Ireland (Palisades only Orig & 3 cys)
Blunt/Muller (Midland only; Orig & 3 cys)
Boyd
Levine
Skovholt

REMARKS:

DISTRIBUTION: 9 reg file
1-OGC T. Conner

U.S. ATOMIC ENERGY COMMISSION MAIL CONTROL FORM FORM AEC-3265 (6-60)

☆ U.S. GOVERNMENT PRINTING OFFICE: 1968-296-615