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UNITED STATES GOVERNMENT

Memorandum

Appendix B

TO : Edson G. Case, Assistant Director
Division of Reactor Licensing

DATE: November 3, 1965

DOCKET NO. 50-247

FROM : Walter G. Belter, Chief
Environmental & Sanitary Engineering Branch, RDT

SUBJECT: U. S. WEATHER BUREAU HAZARDS SUMMARY REPORT

RDT:NS

Reference is made to your letter of October 11, 1965, to the U. S. Weather Bureau requesting comments on the following:

Description and Safety Analysis
For a Conceptual Unit at Indian Point,
Volumes I and II dated October 1, 1965

The comments of the Weather Bureau's Environmental Meteorological Research Branch are attached.

Attachments:
Comments (orig. & 1 cy.)

Appendix B

DOCKET NO. 50-247

Comments on

Description and Safety Analysis
For a Conceptual Unit at Indian Point,
Volumes I and II dated October 1, 1965

Prepared by

Environmental Meteorological Research Branch
Office of Meteorological Research
October 29, 1965

A primary influence on the meteorological statistics of the Indian Point site seems to be its location in a river valley about a mile wide with terrain rising from 600 to 1000 feet on either side. This influence is shown by the predominant up-river and down-river wind directions and by an annual inversion frequency of 41% in the lower 150 feet and 32% in the lower 300 feet. The latter frequency is in agreement with that found by Hosler [1] using radiosonde data in the lower 500 feet from Albany, New York. At the 100 foot level of the site tower, wind speeds of 4 mph or less during inversions in the lower 150 feet occur 16% of the time. This would indicate that for the short term (less than 2 hours) ground release of effluents the conservative diffusion parameters used in TID-14844 would be appropriate.

The applicant's analysis of the off-site radiological consequences of a major loss of coolant assumes a ground release. For the two-hour dose the inversion parameters assumed in TID-14844 were used and credit was taken for additional dilution due to building turbulence. This latter effect amounted to a factor of 3 at the site boundary (540m) and a factor of 1.25 at a distance of 2000 m, which is consistent with the findings of Islitzer [2]. For the 22-hour dose credit was taken for a higher average wind speed (2 m/s instead of 1 m/s) which doubled the normalized air concentrations. This would seem most reasonable and in fact is conservative because no credit was taken for mean wind direction variability which certainly is a factor over a 22-hour period. For the analysis of the long-term, 30-day hazard consequences, temperature lapse rate and wind speed statistics measured during winds blowing from the 20° sector centered on NNE (predominant direction) were utilized to establish dispersion factor categories. The annual frequency of NNE winds was 15% during which inversions occurred 42% of the time. It is obvious from an inspection of the categories listed on page 5.2-6 of volume II that the inversion category is the major contributor (by a factor of 10) to the long-term dispersion factor. Using Sutton's equation modified for a long-term average (eq. 4.76 in Meteorology and Atomic Energy, AECU-3066) the appropriate dispersion factors were computed. The results were conservative since a wind direction frequency of 35% was used instead of the observed annual value of 15%.

In summary the computed atmospheric dispersion factors for both the short-term and long-term accident are realistic and somewhat conservative in light of the meteorological conditions observed for a year's period at the site meteorological tower.

References

[1] Hosler, C. R., "Low-level Inversion Frequency in the Contiguous United States", Monthly Weather Review, 89, pp. 319-339.

[2] Islitzer, N. F., "Aerodynamic Effect of Large Reactor Complexes ypon Atmospheric Turbulence and Diffusion", IDO-12041.