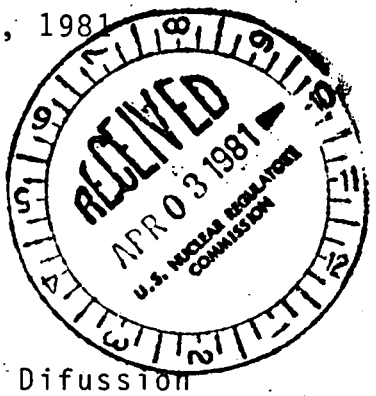
Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

March 20, 1981



Mr. Paul O'Connor, Project Manager
Operating Reactors
U.S. Nuclear Regulatory Commission
Washington D.C. 20555

Subject: Dresden Station, Unit 2
SEP Topic II-2.C Atmospheric Transport and Difussion Characteristics for Accident Analysis

NRC Docket 50-237

Dear Mr. O'Connor:

In our February 4, 1981 letter to D.G. Eisenhut we committed to complete five SEP topic assessments before June 1981. Attached is our first assessment which is for SEP Topic II-2.C, Atmospheric Transport and Diffusion Charactreristics for Accident Analysis. The remaining topic assessments will be submitted to the staff as they are completed.

Please address any questions you may have concerning this matter to this office.

One (1) signed original and thirty-nine (39) copies of this transmittal have been provided for your use.

Very truly yours,

Robert F. Janecek

Robert F. Janecek
Nuclear Licensing Administrator
Boiling Water Reactors

A035
S
1/1

NPS:mnh
1629B
Attachments

P

8104060206

Topic II-2.C Atmospheric Transport and Diffusion Characteristics for Accident Analysis

The objective of this review is to determine transport and diffusion characteristics necessary to establish compliance with 10 CFR 100 guidelines with respect to plant design, control room habitability and doses to the public during and following a postulated design basis accident. In particular, short-term, ground level relative air concentrations (χ/Q) are used to estimate offsite exposures resulting from postulated accidents, while wind speeds are used to estimate doses to control room personnel.

Diffusion characteristics presented here are based on meteorological data obtained at the Dresden site during the period January 1, 1974 through December 31, 1975. This data was also used in evaluations submitted to demonstrate compliance with the requirements of Appendix I to 10 CFR 50 (Reference 1). Data collected at the 300 ft. level is used to determine transport and diffusion characteristics for releases from the 310 ft. tall stack, while data collected at the 35 ft. level is used to establish characteristics for ground level releases.

1. Relative Concentrations at the EAB and LPZ

Postaccident relative concentrations (χ/Q) at the exclusion area boundary (EAB) and at the low population zone (LPZ) distance were calculated using site meteorological data as prescribed in Regulatory Guide 1.145 (Reference 2). Corresponding site independent χ/Q values based on earlier Regulatory Guide 1.3 (Reference 3) assumptions were also determined.

Results for both elevated and ground level release modes for the two calculational methods are presented in Table 1. As the comparison table shows, except for the LPZ ground level release case, the relative concentrations derived using R.G. 1.145 assumptions are consistently lower than the values obtained from R.G. 1.3.

2. Wind Speeds for Determining Control Room Habitability

Guidance for determining the acceptability of control room ventilation designs is given in the Murphy-Campe paper (Reference 4). Atmospheric transport and diffusion effects for this analysis are primarily dependent on the wind speed values assumed for various time intervals following an accident.

For the purposes of this review relevant wind speeds were determined using Dresden site meteorological data for both elevated and ground level release modes. These wind speeds are given in Table 2 along with the site independent values suggested in the Murphy-Campe paper. The comparison table shows that the wind speeds derived from actual site data are consistently higher than those employed in the Murphy-Campe paper and, consequently, will yield lower concentration estimates for postaccident assessments.

3. Concluding Remark

This completes the evaluation of this SEP topic. Dresden Unit 2 conforms to the present review criteria.

Table 1. Offsite Relative Concentrations

	χ/Q (sec/m^3)	
EAB (0.5 miles)	R.G. 1.145	R.G. 1.3
Elevated Release (310 ft.)		
0 - 1/2 hr (fumigation conditions)	6.9-5[a]	1.4-4
0 - 2 hrs (non-fumigation conditions)	2.2-6	1.7-5
Ground Level Release		
0 - 2 hrs	2.6-4	5.3-4
LPZ (5.0 miles)		
Elevated Release (310 ft)		
0 - 1/2 hr (fumigation conditions)	8.7-6	1.8-5
0 - 8 hrs (non-fumigation conditions)	1.3-6	5.2-6
8 - 24 hrs (non-fumigation conditions)	7.6-7	1.5-6
1 - 4 days (non-fumigation conditions)	3.2-7	5.0-7
4 - 30 days (non-fumigation conditions)	9.4-8	1.5-7
Ground Level Release		
0 - 8 hrs	1.1-5	1.7-5
8 - 24 hrs	7.4-6	6.2-6
1 - 4 days	3.0-6	3.0-6
4 - 30 days	8.3-7	4.4-7

[a] 6.9-5 = 6.9×10^{-5}

Table 2. Local Wind Speeds

Time Period	Percentile	Wind Speed (m/sec)		
			Dresden Site	
		Murphy-Campe	Ground	Elevated
0 - 8 hrs	5	1.0	1.20	1.95
8 - 24 hrs	10	1.5	1.75	2.65
1 - 4 days	20	2.0	2.35	3.60
4 - 30 days	40	3.0	3.20	5.20

References:

1. Dresden Station Units 2 and 3, Appendix I Report "Information Relevant to Keeping Levels of Radioactivity in Effluents to Unrestricted Areas As Low As Reasonably Achievable," Docket Numbers 50-237, 50-249 Submitted June 4, 1976.

2. U. S. Nuclear Regulatory Commission, Regulatory Guide 1.145, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants," August 1979.

3. U. S. Nuclear Regulatory Commission, Regulatory Guide 1.3 "Assumptions Used for Evaluating the Potential Radiological Consequences of a Loss of Coolant Accident for Boiling Water Reactors," Revision 2, June 1974.

4. K. G. Murphy and K. M. Campe, "Nuclear Power Plant Control Room Ventilation System Design for Meeting General Criterion 19," 13th AEC Air Cleaning Conference, August 1974.