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MEMORANDUM FOR: William Regan, Jr., Chief
Environmental Projects Branch No. 2, DSE

FROM: L. G. Hulman, Chief
Hydrology-Meteorology Branch, DSE

SUBJECT: DRAFT ENVIRONMENTAL STATEMENT INPUT - METEOROLOGY

PLANT NAME: WPPSS Nuclear Project No. 2
LICENSING STAGE: OL
DOCKET NUMBER: ~~50-~~397
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RESPONSIBLE BRANCH: EPB-2

Enclosed is the meteorology input for the Operating License Review Draft Environmental Statement for the WPPSS Nuclear Project No. 2. John Goll prepared this summary.

Original Signed by
L. G. Hulman
L. G. Hulman, Chief
Hydrology-Meteorology Branch
Division of Site Safety and
Environmental Analysis

Enclosure:
As stated

cc: w/o enclosure
R. Boyd

cc: w/enclosure
R. DeYoung
R. Denise
V. Moore
W. Kreger
J. Collins
J. Norris
J. Goll

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SURNAME ▶		JGoll:sb	CHMarkee	LGHulman		
DATE ▶		1/12/79	1/16/79	1/16/79		

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Draft Environmental Statement Input
WPPSS Nuclear Project No. 2
Docket No. 50-396
Hydrology-Meteorology Branch - Meteorology

2.4 METEOROLOGY

2.4.1 Regional Climatology

The Columbia Basin of western Washington has a mild, dry climate as a result of frequent incursions of maritime polar air from the Pacific Ocean into a basically continental, near-desert-type climatic area. Although maritime polar air masses are predominant over the basin, the air usually loses most of its moisture in ascending the western slopes of the Cascades and is warmed in descending the eastern slopes. Occasionally, continental air penetrates into the basin from the interior of the continent. These continental air masses are responsible for the large annual range of temperatures in the region and also can cause large diurnal temperature ranges. Temperatures of 32^{o} Celsius (90^{o} Fahrenheit) or higher may be reached on about 50 days annually over the southeastern Columbia Basin, while temperatures below -18^{o}Celsius (0^{o} Fahrenheit) may be expected on four days annually. Temperatures will be below 0^{o} (32^{o} Fahrenheit) on about 120 days each year, and on about 20 of these days the temperature will not rise above the freezing mark. (USDC, 1974; USDC, 1976; Stone, et al., 1972). Since the basin is in the "rain shadow" of the Cascades, rainfall is sparse in the region, averaging only 150 to 200 millimeters (6 to 8 inches) annually. Annual snowfall averages from about 250 to 500 millimeters (10 to 20 inches) over the basin. Hail may occur one day each

year, while freezing rain may occur seven days annually. (Baldwin, 1973; WPPSS, 1977; USDC, 1974; USDC, 1976; Stone, et al., 1972).

2.3.2 Local Meteorology

To assess the local meteorological characteristics of the WNP-2 site, we evaluated climatological data that have been recorded in the Hanford reservation area since 1912 (Stone, et al., 1972). Data similar to those recorded at National Weather Service stations have been observed since 1945, with the primary observation station located about 25 kilometers (16 miles) northwest of the site. Data are also available from the onsite meteorological measurements program (WPPSS, 1977). Data from these locations are reasonably representative of conditions expected at the site.

In the site area, average daily maximum and minimum temperatures range between 33° and 16° Celsius (92° and 61° Fahrenheit) in July, the warmest month, and between 3° and -6° Celsius (37° and 22° Fahrenheit) in January, the coolest month. The extreme maximum temperature recorded was 46° Celsius (115° Fahrenheit) (July 27, 1939); the extreme minimum temperature has been -33° Celsius (-27° Fahrenheit) (December 12, 1919).

Hanford receives about 160 millimeters (6.3 inches) of rain annually. November, December, and January are the "wettest" months, totalling an average of 65 millimeters (2.6 inches). For July, August, and September, the combined average is less than 17 millimeters (0.7 inches). The maximum 24-hour rainfall recorded has been 48 millimeters (1.9 inches) (October 1957). Snowfall averages

330 millimeters (13 inches) per year, with 180 millimeters (7.1 inches) being the greatest snowfall over a 24-hour period (January 1954). Heavy fogs (visibility of 0.4 kilometer (1/4 mile) or less) occur 24 days annually, with 80 percent of the daily occurrences recorded between November and January.

For the two year period of April 1974 through March 1976, the wind-flow over the site, as measured at the 10-meter (33-foot) level of the WPPSS meteorological tower, occurred about 60 percent of the time from the south- and northwest-ward directions. Figure 2.4-1 shows the directional frequency of the site vicinity winds. Winds were calm (windspeeds less than 0.2 meters per second (0.5 miles per hour)) less than 0.1 percent of the time at the 10-meter (33-foot) level.

2.4.3 Severe Weather

Although infrequent, thunderstorms, dust storms, and tornadoes can affect the site area. Thunderstorms occur about 10 days annually, predominantly between May and August (Baldwin, 1973; Stone, et al., 1972). Between 1940 and 1970, dust or blowing dust and sand reduced visibility to under 11 kilometers (seven miles) about 20 hours annually (Orgill and Sehmel, 1976). Tornado data reported by Fujita (1976) show that, between 1950 and 1975, 22 tornadoes occurred on the flatter terrain east of the Cascades within 230 kilometers (143 miles) of the site (115,000 square kilometers (45,000 square miles)). Our analysis of these data

indicate that the expected path area of a tornado in this region is about 1.2 square kilometers (0.5 square miles). Using the methods of Thom (1963), we calculated a recurrence interval for a tornado at the plant site of about once in 120,000 years. The highest wind speed recorded at elevations representative of the plant site on the Hanford reservation meteorology tower has been a gust to 80 miles/hour (January 11, 1972). (WPPSS, 1977)

2.4.4 Atmospheric Dispersion

To calculate atmospheric diffusion estimates, we used the joint frequency distributions of wind speed and direction by atmospheric stability class, based on the vertical temperature gradient, collected at the WPPSS site during the period April 1974 to March 1976. The distributions were for wind speeds and direction measured at the 10-meter (33-foot) level with the vertical temperature difference between the 75- and 10-meter (245- and 33-foot) levels. The joint data recovery data for stability and wind was 94 percent. Section 6.2.3 describes the onsite meterological program. (WPPSS, 1977)

Using these data we made our own independent estimates of average atmospheric dispersion conditions for the WNP-2 site using our atmospheric dispersion model for long-term releases (Sagendorf and Goll, 1976). This model is based on the "Straight-Line Trajectory Model" described in Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors." The calculations

also include considerations of intermittent releases during more adverse atmospheric dispersion conditions than indicated by an annual-average calculation and as a function of total duration of release. As suggested in Regulatory Guide 1.111, we used vertical dispersion parameters developed from atmospheric diffusion data from desert field tests (Yanskey, et al., 1966). We assumed a ground-level release only, and included an estimate of maximum increase in calculated relative concentration (X/Q) and relative depositon (D/Q) due to the spatial and temporal variation of the airflow not considered in the straight-line trajectory model (as discussed in Regulatory Guide 1.111). Radioactive decay of effluents and depletion of the effluent plume were also considered as described in Regulatory Guide 1.111.

Table 5.X lists the X/Q and D/Q values we estimated for specific points of interest.

6.2.3 Onsite Meteorological Measurements Program

The onsite meteorological measurements program consists of a 75-meter (245-foot) tower and an auxiliary 2.1-meter (seven-foot) instrument mast, both 760 meters (2500 feet) west of the WNP-2 facility.

Table 6.2-1 lists the parameters measured and the measurement levels on the tower. Section 6.1.3 of the Environmental Report provides information regarding maintenance, calibrations, quality

assurance, data handling and processing procedures, and the specific instrumentation used for the onsite program (WPPSS, 1977). This program meets the regulatory position contained in Regulatory Guide 1.23, "Onsite Meteorological Programs." Additional meteorological measurements are available from the Hanford main meteorological tower (located about 25 kilometers (16 miles) northwest of the site) and from a network of remote stations around the Hanford reservation (Stone, et al. 1972).

6.3 OPERATIONAL MONITORING

6.3.1 Meteorological Monitoring

During plant operation meteorological measurements will be made on the 75-meter (245-foot) tower. Table 6.2-1 lists the parameters to be measured and the measurement levels on the tower. Data from these measurements will be available in the control room. (WPPSS, 1977)

WPPSS Nuclear Project No. 2 DES

References - Meteorology Section - Sections 2.4 and 6.2.3

Baldwin, J. L., 1973: Climates of the United States, U. S. Department of Commerce, Environmental Data Service, Washington, D. C.

Fujita, T. T., 1976: Re-Evaluation of the Design Basis Tornado at the HPFL Facility, Richland, Washington. The University of Chicago, Chicago, Illinois.

Orgill, M. M., and G. A. Sehmel, 1976: Frequency and Diurnal Variation of Dust Storms in the Contiguous U. S. A. Atmospheric Environment, Vol. 10, pp. 813-825.

Sagendorf, J. F., and J. T. Goll, 1976: NUREG-0324, XOQDOQ, Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations, (DRAFT). U. S. Nuclear Regulatory Commission, Office of Nuclear Reactor Reactor Regulation, Washington, D. C.

Stone, W. A., D. E. Jenne, and J. M. Thorp, 1972: Climatography of the Hanford Area. BNWL-1605, Battelle Pacific Northwest Laboratories, Richland, Washington.

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U. S. Atomic Energy Commission, 1972: Regulatory Guide 1.23, Onsite Meteorological Programs. USNRC Office of Standard Development, Washington, D. C.

U. S. Department of Commerce, Environmental Data Service, 1976: Local Climatological Data, Annual Summary with Comparative Data - Yakima, Washington. National Climatic Center, Asheville, N. C.

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Washington Public Power Supply System, 1977: Environmental Report - Operating License Stage, Nuclear Project No. 2. NRC Docket No. 50-396.

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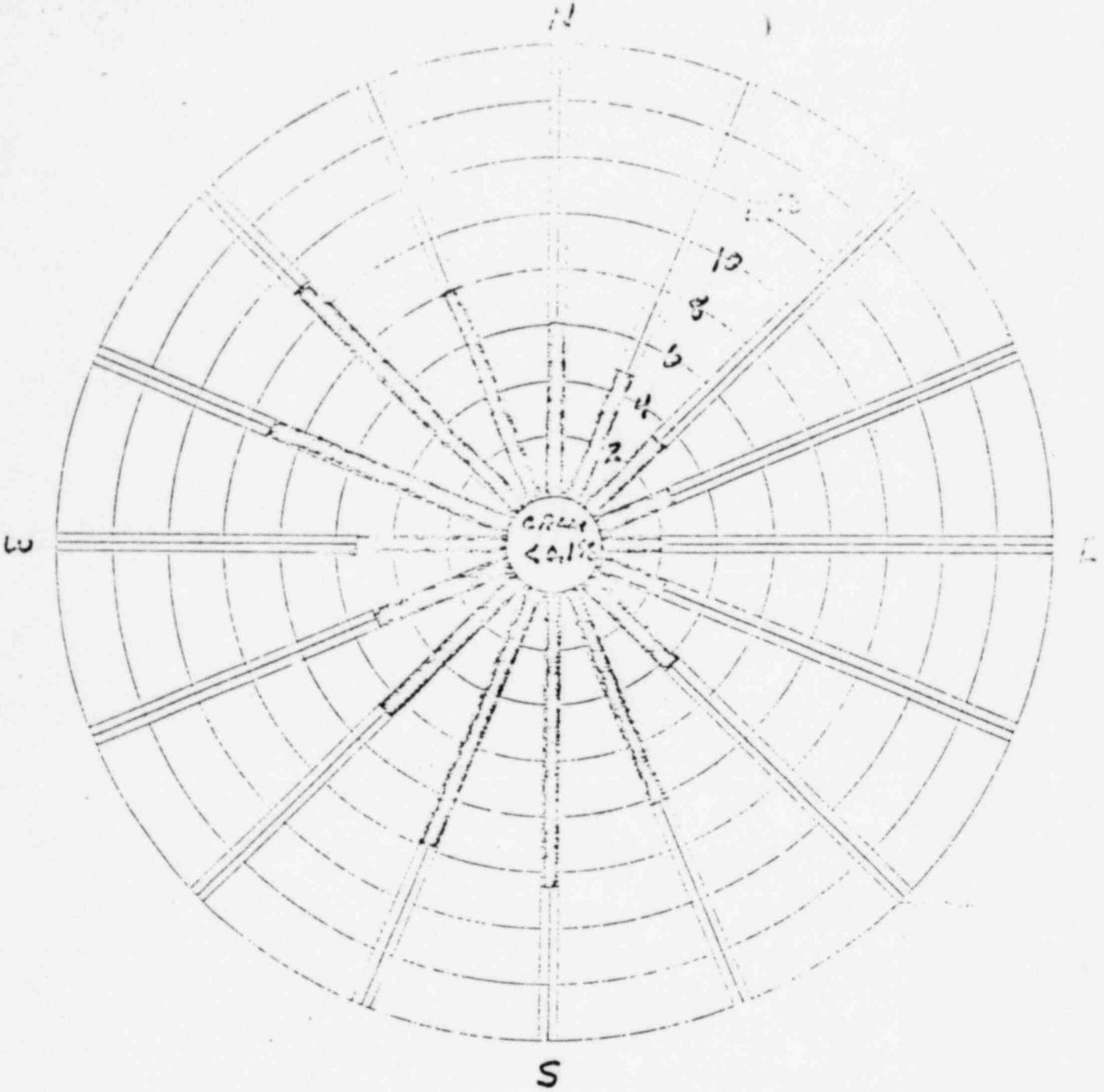

Figure 2.4-1. DIRECTIONAL FREQUENCY OF WIND - WPPSS Site. Data at 10 meters (33 feet) above ground level, April 1974 through March 1976. Bars show the direction from which the wind blows. Calms are those winds with hourly average speeds less than 0.2 meters per second (0.5 miles per hour).

TABLE 6.2-1

WNP-2 75 METER (245-FOOT)
METEOROLOGICAL TOWER INSTRUMENTATION

(Data from this tower were used to evaluate atmospheric dispersion for the WNP-2 site and will be available during plant operation)

Measured Parameter	Elevation Above Ground	
	Meters	Feet
Wind Direction and Speed	10, 75	33, 245
Dry-bulb temperature	10, 75	33, 245
Dry-bulb temperature gradient	75, 10	245-33
Precipitation	0.9	3

DEC 2 2 1978

Docket No. 50-397

MEMORANDUM FOR: Wm. H. Regan, Jr., Chief
Environmental Projects Branch 2

FROM: Jan A. Norris, Project Manager
Environmental Projects Branch 2

SUBJECT: FORTHCOMING MEETING WITH THE POTENTIAL INTERVENORS ON THE WNP-2 OL APPLICATION

Date and Time: Friday, January 5, 1979 at 10:00 AM

Location: Lobby of the Benton Hotel in Portland, Oregon

Purpose: To meet informally with the potential intervenors on the WNP-2 OL application in accordance with POMP 204, Rev. 1.

Participants:

NRC

J. Norris, W. Paton

Potential Intervenors

Susan Garrett, Creg Darby, Doreen Nepom

[illegible] Signed by
[illegible]

Jan A. Norris, Project Manager
Environmental Projects Branch 2
Division of Site Safety and
Environmental Analysis

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Docket No. 50-397

MEMORANDUM FOR: Steve Varga, Chief
Light Water Reactors Branch No. 4

FROM: Wm. H. Regan, Jr., Chief
Environmental Projects Branch 2

SUBJECT: MEETING WITH POTENTIAL INTERVENORS IN WNP-2 CASE

This is to confirm our telephone conversation in which I informed you that Jan A. Norris, Environmental Project Manager for WNP-2, will not attend the upcoming meeting with the potential intervenors in Portland, Oregon, on December 19, 1978. When the date for that meeting was made firm, we were informed by the Travel Branch that no reservation could be made on airlines because of the holiday traffic rush. Mr. Norris will make separate arrangements to meet with the potential intervenors as soon as practicable.

Original signed by
W. H. Regan

Wm. H. Regan, Jr., Chief
Environmental Projects Branch 2
Division of Site Safety and
Environmental Analysis

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